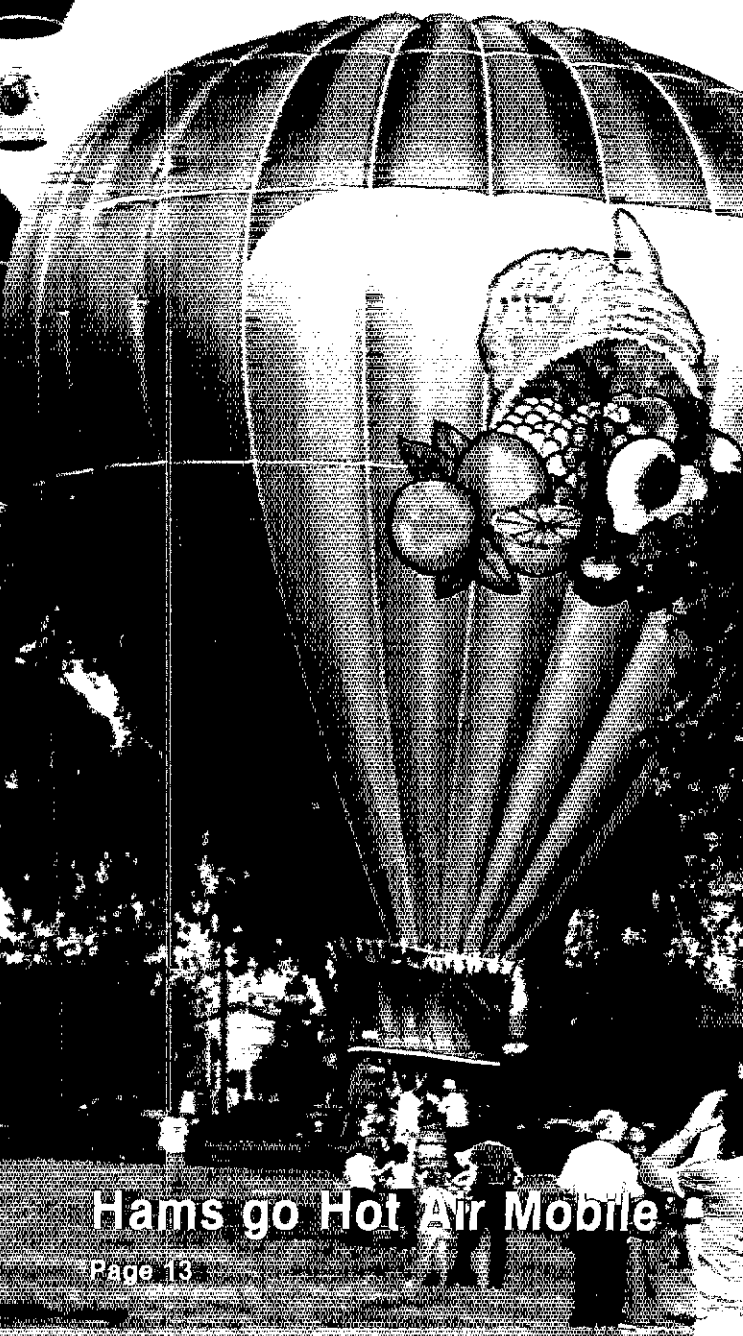


QST

September 1982 \$2.50



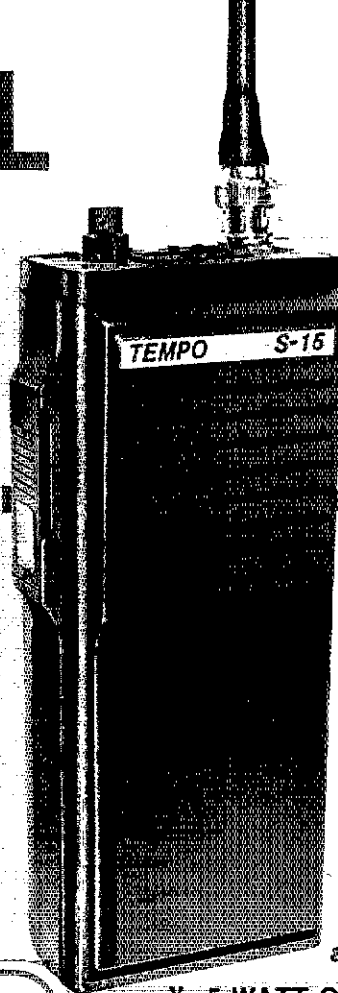
devoted entirely to Amateur Radio



Hams go Hot Air Mobile

Page 13

the ALL NEW tempo S-15



more radio ...less money

**TEMPO'S ALL NEW S-15 SYNTHESIZED
HAND HELD OFFERS IMPORTANT
FEATURES AT A PRICE THAT DEFIES
COMPARISON.**

Compare these features with any other hand held
available... the S-15 is the obvious choice

Tempo S-2

Enables you to use 220 MHz repeaters throughout the U.S.. The S-2 is thoroughly field tested and offers a long life of dependable service. A good way to get into 220 MHz operation if you're not on yet and with the addition of a Tempo power amplifier you can build a small base station or a powerful mobile rig. \$289 S-2T...\$319

NEW REDUCED PRICES!

Tempo S-4

The first 440 MHz hand held and still a winner...offers the perfect way to get into an uncrowded band. Check one out at your local Tempo dealer or write Henry Radio. \$289 S-4T...\$319

Boost the power of your hand held or mobile unit with a Tempo solid state power amplifier. A broad range of power outputs available at very affordable prices. Please write for literature.

Tempo M1

Tempo does it again! This time with the world's first and only ALL CHANNEL synthesized hand held marine transceiver. The Tempo M1 operates on all marine channels...both U.S. and international, plus four weather channels. This is a real working tool and a hobby rig with hundreds of uses. It is skillfully engineered and built to provide endless hours of hard use. 1 watt low power—2 1/2 watts high power positions. And the price...LESS THAN \$500.

- * 5 WATT OUTPUT (1 watt low power switchable)
- * "EASY REMOVE" BATTERY PACK
- * 1 HOUR QUICK CHARGE BATTERY SUPPLIED (450 ma/HR)
- * BNC ANTENNA CONNECTOR & FLEX ANTENNA
- * EXTREMELY EASY TO OPERATE
- * PLUG FOR DIRECT 13.8 VOLT OPERATION
- * 3 CHANNEL MEMORY. (1 channel permits non-standard repeater offsets. 200 micro amp memory maintenance (standby)).
- * VERY SMALL AND LIGHT WEIGHT (only 17 ounces)
- * 10 MHz FREQUENCY COVERAGE: 140-150 MHz (150-160 for export customers)
- * AMPLE SPACE FOR PROGRAMMABLE ENCODER
- * SPEAKER/MICROPHONE CONNECTOR
- * ELECTRICALLY TUNED STAGES (receiving sensitivity and output power are constant over entire operating range)
- * LOW PRICE...\$289

S-15 with touch tone pad... \$319

SUPPLIED ACCESSORIES:

Rubber antenna • Standard charger • Ear phone • Instruction manual • 450 ma/HR battery (quick charge type)

OPTIONAL ACCESSORIES:

1 hour quick charger (ACH 15) • 16 button touch tone pad (S15T) • DC cord • Solid state power amplifiers (S-30 & S-80) • Holster (CC15) • Speaker/mike (HM 15)

Available from Tempo dealers and



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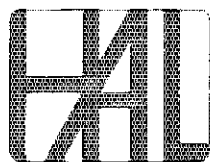
SELECT YOUR FAVORITE FEATURE



Yes, the CT2100 has the features you want – and built-in, too! The CT2100 has been designed by the RTTY people at HAL for optimum operator convenience. No “hidden” keyboard controls to remember – it’s all on the front panel, arranged for serious operators. Why settle for a compromise or imitation when you can have the CT2100? Compare feature for feature; you’ll find that the CT2100 offers the most performance and flexibility for your dollar.

- Send or receive ASCII, Baudot, or Morse code
- RTTY and Morse demodulators are built-in
- RTTY speeds of 45, 50, 74, 100, 110, 300, 600, and 1200 baud – ASCII or Baudot
- Four RTTY modems: “high tones”, “low tones”, “103 Modem tones”, and “202 Modem tones”
- Three shifts for high and low tones (170, 425, and 850 Hz)
- Crystal-synthesized transmit tones
- Send and receive Morse code at 1 to 100 wpm
- Characters displayed on 24 line screen
- Choose either 36 or 72 characters per line
- 2 pages of 72 character lines or 4 pages of 36 character lines
- Split-screen for pretyping transmit text
- Audio, current loop, or RS232 data I/O
- Printers available for hard-copy of all 3 codes
- On-screen RTTY tuning bar plus LED indicators
- ALL ASCII control characters; half or full duplex
- Brag-tape storage of 8-256 character messages in MSG2100 EPROM option
- Two programmable HERE IS messages

Write or call for more details. See the CT2100, KB2100, Printer, and Video Monitor at your favorite HAL dealer.



HAL COMMUNICATIONS CORP.

BOX 365

URBANA, ILLINOIS 61801

217-367-7373

ICOM Handhelds

2 Meter, 220 or 440 MHz

ICOM's reliable, field proven, handhelds have been the most popular handheld on the market. Here's a few reasons why:

THE TRANSCIVERS. The IC-2AT features full coverage of the 2 meter ham band. The IC-3AT covers 220 to 224.99 MHz, and the IC-4AT has 440 to 449.995 MHz. Each radio is only 2.6in x 1.4in x 6.5in in size. Excellent audio quality is provided by a quality speaker and an electret condenser microphone. All have battery saving 0.15 watt low power. Touchtone® pad is included.*

STANDARD EQUIPMENT. Each transceiver comes complete — ready to use — with BP3 rechargeable battery, AC wall charger, flexible antenna, earphone, wrist strap, and belt clip...all standard.

THE SYSTEM. Accessories for the handheld series are interchangeable among transceivers. Slide on removable battery packs allow quick changing of batteries. Batteries may be charged while removed from the transceiver.

Service manuals for
IC-2AT now
available-3AT and
4AT-available-soon.

IC-2AT
2 meter

IC-3AT
220 MHz

IC-4AT
440 MHz

Leather Case
Available with
without cut-out
for Touchtone
pad.

IC-HM9
Speaker Mic

IC-BC30
Battery Charger
117 VAC (Battery
Determines
Charge Rate)

IC-BP5**
Battery Pack
10.8 VDC, 425 mA/H
1.5 hr charge

IC-ML1 12 VDC
144 MHz Booster
10W out/12 VDC
(comes with 5ft coax,
BNC to PL-259)

IC-BP4** ††
Battery Case

IC-CPL
Cigarette Lighter
Cord w/ Fuse
(charges BP3/ powers DC1)

IC-BP3†
Battery Pack
8.4VDC 250 mA/H
15 hr. charge

IC-BP2**
Battery Pack
7.2 VDC 425 mA/H
1.5 hr charge

IC-BC25U
AC Wall Charger
117 VAC in
(for charging
BP3 only)

IC-DC1
DC Regulator
12 VDC in/
9.6 VDC out
(comes with DC
cord — will not get
power from BC30)

* Also available without Touchtone® Pad

** Requires BC30 Charger

† Will charge from BC30, BC25U, CPL, or 12
VDC Direct (pack is internally regulated)

†† Accept 6 AA size batteries - Alkaline or NiCd
(Do not attempt to charge Alkaline batteries)



ICOM

The World System

QST

September 1982 Volume LXVI Number 9

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THE COVER

There'll be hot air galore at the California Balloon Festival Sept. 23-26. Contact a HAM operator and earn a certificate! See p. 13.



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It's Time To SANTEC uP

It's time for you to get the best of the excitement of full-feature synthesized handheld operations, and SANTEC technology hands you the uP-to-the-minute radio whose time has come. Here are just four great reasons why you should SANTEC uP:

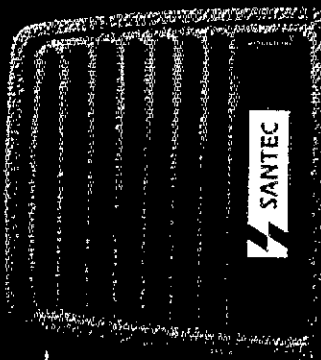
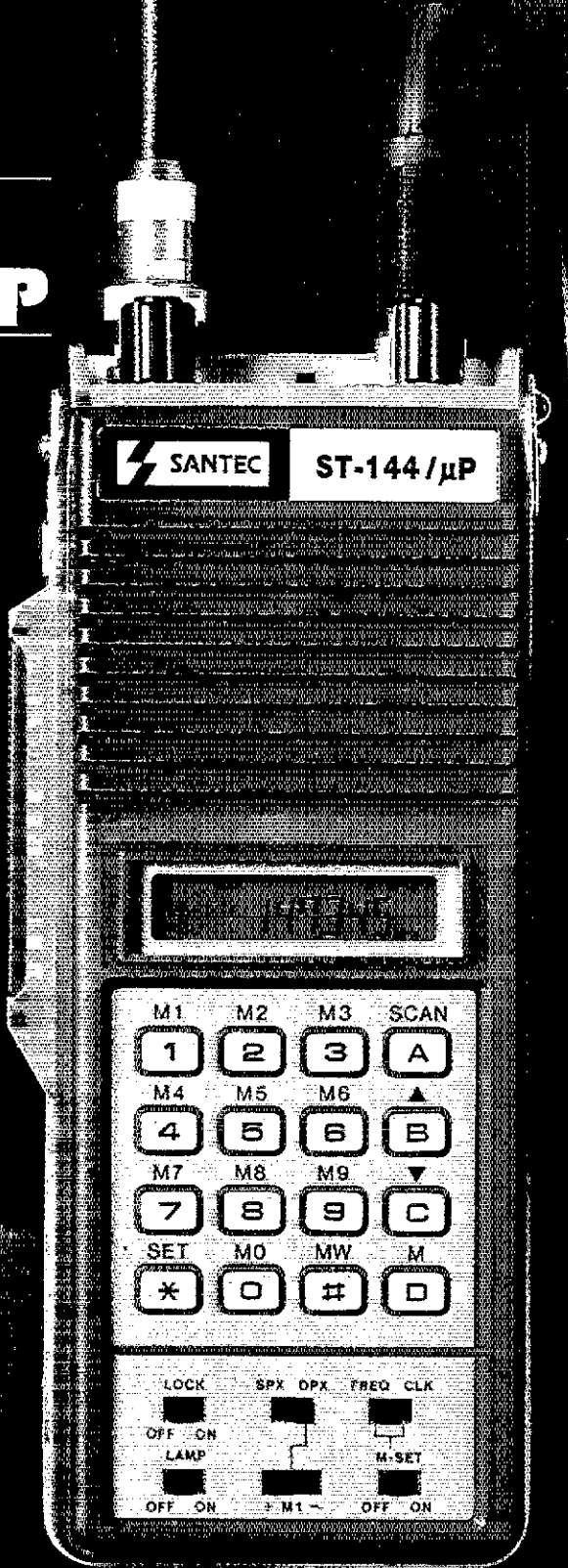
■ **Memory channels store standard repeater offsets or simplex.** Easily programmed and instantly recalled, each memory frequency comes uP with its own offset (plus or minus 600 kHz) or in the simplex mode as originally entered.

■ **Less than 10 ma drain in receive** means more standby time for SANTEC owners. The ST-144/μP saves its power.

■ **High power output when you need it.** You can choose to transmit at 0.1W, 1.0W, or even 3.5W (all nominal), and your SANTEC can reach out through all types of operating conditions.

■ **Outstandingly good warranty and service.** Your SANTEC comes with the back uP that doesn't back down in 90 days: a full two year extended service period, which no one else can match, in addition to the regular 90 day limited warranty for parts and labor.

When it's time to compare features and value, nothing else stands uP with SANTEC. Now that it's time for you to get the best, it's time to SANTEC uP.



Shown with optional SM-1 speaker microphone



Accessories for SANTEC Handheld Radios
 clockwise from upper left
 Leather Case (ST-LC)
 Base Charger & Power Supply (ST-58C)
 Remote Speaker (MS-505)
 Mobile Charger (ST-MC)
 Speaker Microphone (SM-1)

The ST-144 uP is approved under FCC Part 15



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CONTEST WINNING ANTENNAS

AV-3

3 BAND VERTICAL
10-15-20 METERS
Only 14 ft., 4.26 m. height
Low priced
Easy to use

AV-5

5 BAND VERTICAL
10-15-20-40-80 METERS
Self-supporting
25 ft., 7.4 m. height
Capacitive X-hat



WITH ADD-ON KIT
4 BAND YAGI
10-15-20-30/40 METERS

NEW 30 METER
WARC BAND WITH
A3 OR A4



3 BAND YAGI
10-15-20 METERS



3 BAND VERTICAL
10-15-20 METERS
No radials
Remote tuning
Better than average
performance
22 ft., 6.7 m. height

THE CHOICE,
A FAVORITE
FOR DX-PEDITIONS

The world renowned Cushcraft HF Multiband antennas are chosen time after time for DX-peditions to far corners of the globe. Their excellent gain, outstanding radiation pattern, 2kw power rating, easy assembly, and high strength-clean profile aluminum construction enable the adventurous DX-er to travel further and make more contacts.

For your home QTH, DX-pedition, field day, or contest select a high performance Cushcraft antenna available through dealers worldwide.

A3
Broadband, excellent gain and f/b ratio, 2 kw power rating direct 50 Ω feed, Boom 14 ft., 4.26 m., longest element 28 ft., 8.5 m., weight 27 lbs., 12.9 kg., turn radius 15.5 ft., 4.7 m., mast dia. 1 1/4 in. to 2 in., 3.18 cm. to 5.08 cm., material 6063-T832 seamless aluminum.

A4
Broadband, excellent gain and f/b ratio, 2 kw power rating, direct 50 Ω feed, boom 18 ft., 5.48 m., longest element 32 ft., 9.7 m., weight 37 lbs., 16.8 kg., turn radius 18 ft., 5.48 m., mast dia. 1 1/4" to 2 in., 3.18 to 5.08 cm., material 6063-T832 seamless aluminum.



cushcraft
CORPORATION

THE ANTENNA COMPANY
P.O. Box 4680
Manchester, NH 03108 USA
TELEX 953050





R-600

"Now hear this"...digital display, easy tuning

The R-600 is an affordably priced, high performance general coverage communications receiver covering 150 kHz to 30 MHz in 30 bands. Use of PLL synthesized circuitry provides maximum ease of operation.

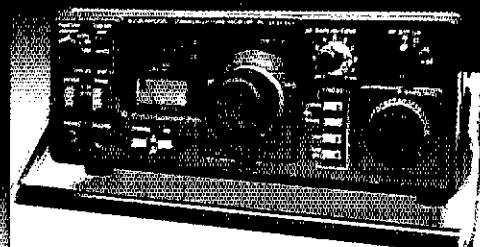
R-600 FEATURES:

- 150 kHz to 30 MHz continuous coverage, AM, SSB, or CW.
- 30 bands, each 1 MHz wide, for easier tuning.
- Five digit frequency display, with 1 kHz resolution.
- 6 kHz IF filter for AM (wide), and 2.7 kHz filter for SSB, CW and AM (narrow).
- Up-conversion PLL circuit, for improved sensitivity, selectivity, and stability.

- Communications type noise blanker eliminates "pulse-type" noise.
- RF Attenuator allows 20 dB attenuation of strong signals.
- Tone control. • Front mounted speaker.
- "S" meter, with 1 to 5 SINPO "S" scale, plus standard scale.
- Coaxial and wire antenna terminals.
- 100, 120, 220, and 240 VAC, 50/60 Hz. Selector switch on rear panel.
- Optional 13.8 VDC operation, using DCK-1 cable kit.
- Other features include carrying handle, headphone jack, and record jack.

Optional accessories for R-600 and R-1000:

- DCK-1 DC Cable kit. • SP-100 External Speaker.
- HS-6, HS-5, HS-4 Headphones.
- HC-10 Digital World Clock.



R-1000

High performance, easy tuning, digital display

The R-1000 high performance communications receiver covers 200 kHz to 30 MHz in 30 bands. An up-conversion PLL synthesized circuit provides improved sensitivity, selectivity, and stability.

R-1000 FEATURES:

- Covers 200 kHz to 30 MHz.
- 30 bands, each 1 MHz wide.
- Five-digit frequency display with 1-kHz resolution and analog dial with precise gear dial mechanism.
- Built-in 12-hour quartz digital clock/timer.
- RF step attenuator.
- Three IF filters for optimum AM, SSB, CW.
- Effective noise blanker. • Tone control.
- Built-in 4-inch speaker. • Dimmer switch.
- Wire and coax antenna terminals.
- Voltage selector for 100, 120, 220, and 240 VAC. Operates on 13.8 VDC with optional DCK-1 kit.



TS-530S

"Cents-ational"...IF shift, digital display, narrow-wide filter switch

The TS-530S SSB/CW transceiver covers 160-10 meters using the latest, most advanced circuit technology, yet at an affordable price.

TS-530S FEATURES:

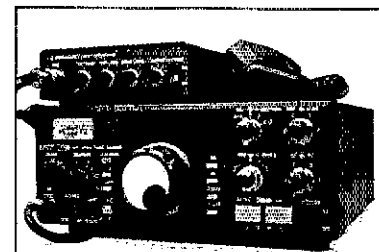
- 160-10 meters, LSB, USB, CW, all amateur frequencies, including new 10, 18, and 24 MHz bands. Receives WWV on 10 MHz.
- Built-in digital display (six digits, fluorescent tubes), with analog dial.

- IF shift tunes out interfering signals.
- Narrow/wide filter selector switch for CW and/or SSB.
- Built-in speech processor, for increased talk power.
- Wide receiver dynamic range, with greater immunity to overload.
- Two 6L46B's in final, allows 220W PEP/180 W DC input on all bands.
- Advanced single-conversion PLL, for better stability, improved spurious characteristics.
- Adjustable noise-blanker, with front panel threshold control.

- RIT/XIT front panel control allows independent fine-tuning of receive or transmit frequencies.

Optional accessories:

- SP-230 external speaker with selectable audio filters.
- VFO-240 remote analog VFO.
- VFO-230 remote digital VFO.
- AT-230 antenna tuner/SWR/power meter.
- MC-50 desk microphone
- KB-1 deluxe VFO knob.
- YK-88C (500 Hz) or YK-88CN (270 Hz) CW filter.
- YK-88SN (1.8 kHz) narrow SSB filter.



TS-660

The TS-660 "QUAD BANDER" covers 6, 10, 12, 15 meters.

- FM, SSB (USB), CW, and AM
- Dual digital VFO's
- Digital display
- IF shift built-in
- 5 memories with memory scan
- UP/DOWN microphone
- All-mode squelch
- Noise blanker
- CW semi break-in/sidetone
- 10 W on SSB, CW, FM; 4 W on AM.

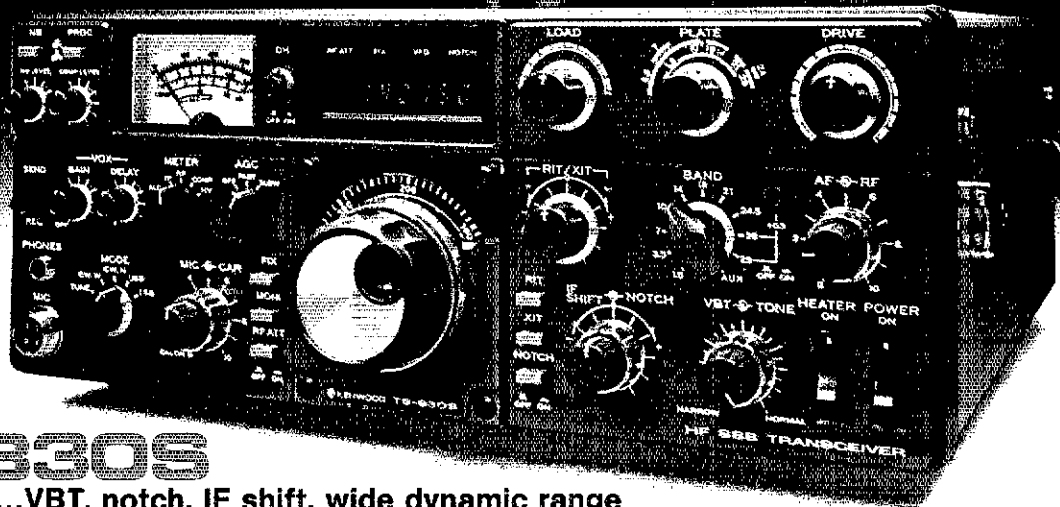
Optional accessories:

- PS-20 power supply
- VOX-4 speech processor/VOX
- SP-120 External speaker
- MB-100 Mobile mount
- YK-88C, YK-88CN CW filters
- YK-88A AM filter.



KENWOOD

TRIO-KENWOOD COMMUNICATIONS
1111 West Walnut, Compton, California 90220



TS-830S

"Top-notch"...VBT, notch, IF shift, wide dynamic range

The TS-830S has every conceivable operating feature built-in for 160-10 meters (including the three new bands). It combines a high dynamic range with variable bandwidth tuning (VBT), IF shift, and an IF notch filter, as well as very sharp filters in the 455-kHz second IF.

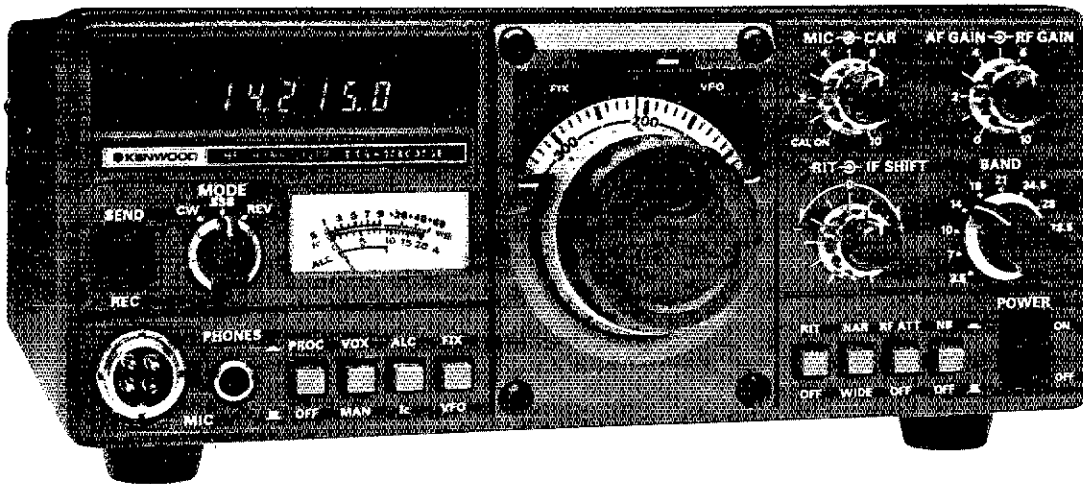
TS-830S FEATURES:

- LSB, USB, and CW on 160-10 meters, including the new 10, 18, and 24-MHz bands. Receives WWV on 10 MHz.

- Wide receiver dynamic range. Junction FETs in the balanced mixer, MOSFET RF amplifier at low level, and dual resonator for each band.
- Variable bandwidth tuning (VBT). Varies IF filter passband width.
- Notch filter high-Q active circuit in 455-kHz second IF.
- IF shift (passband tuning).
- Noise-blanker threshold level control.
- Built-in digital display, (fluorescent tube), with analog dial.
- 6146B final with RF negative feedback. Runs 220 W PEP (SSB)/180 W DC (CW) input on all bands.
- Built-in RF speech processor.
- Narrow/wide filter selection on CW.
- SSB monitor circuit.
- RIT and XIT (transmitter incremental tuning).

Optional accessories:

- SP-230 external speaker.
- VFO-230 external digital VFO with five memories, digital display.
- VFO-240 external analog VFO.
- AT-230 antenna tuner.
- YG-455C (500 Hz) or YG-455CN (250 Hz) CW filter for 455 kHz IF.
- YK-88C (500 Hz) or YK-88CN (270 Hz) CW filter for 8.83 MHz IF.
- KB-1 deluxe heavyweight knob.



TS-130SE

"Small talk"...IF shift, Processor, N/W switch, affordable.

A compact, all solid-state HF SSB/CW transceiver for mobile or fixed base station, covering 3.5 to 29.7 MHz.

TS-130SE FEATURES:

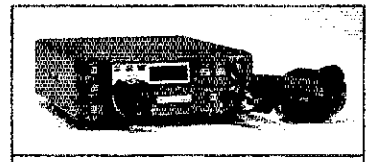
- 80-10 meters including the new 10, 18, and 24 MHz bands. Receives WWV on 10 MHz.
- TS-130SE runs 200 W PEP/160 W DC input on 80-15 meters, 160 W PEP/140 W DC on 12 and 10 meters. TS-130V version at 25 W PEP/20 W DC, all bands, also available.

- Digital display, built-in.
- IF shift circuit.
- Speech Processor, built in.
- Narrow/wide filter selection on CW and SSB with optional filters.
- Automatic SSB mode selection (LSB on 40 meters and below, USB on 30 meters and up). SSB reverse switch provided.
- RF attenuator, built-in.
- Effective noise blanker.
- Final amplifier protection circuit assures maximum reliability. Output power is reduced if abnormal operating conditions occur. For very severe operations, optional cooling fan, FA-4, is available.
- Dimensions: 3-3/4 H x 9-1/2 W x 11-9/16 D (inches). Weight: 12.3 lbs.
- Other features: VOX, CW semi break-in with sidetone, one fixed channel, and 25 kHz marker.

Optional accessories:

- PS-30 matching power supply (TS-130SE).
- KPS-21 power supply (TS-130SE).
- PS-20 power supply (TS-130V).
- SP-120 external speaker.
- VFO-120 remote VFO.
- FA-4 fan unit (TS-130SE).
- YK-88C (500 Hz) and YK-88CN (270 Hz) CW filters.
- YK-88SN (1.8 kHz) narrow SSB filter.
- AT-130 antenna tuner.
- MB-100 mobile mounting bracket.

NEW



Optional DFC-230 Digital Frequency Controller

Frequency control in 20-Hz steps with UP/DOWN microphone (supplied with DFC-230). Four memories and digital display. (Also operates with TS-120S, TS530S, and TS-830S.)



KENWOOD

TRIO-KENWOOD COMMUNICATIONS

1111 West Walnut, Compton, California 90220

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Reports Invited: The ARRL Board of Directors (see list at left) determines the policies of ARRL. The 16 divisions of the League are further arranged into 73 administrative "sections," each headed by an elected Section Communications Manager. Your SCM welcomes reports of club and individual activity. ARRL Field Organization appointments are available covering a wide range of amateur radio operating interests. Whatever your license class, your SCM has an appointment available. Check with your SCM (below) for further information. Section boundaries are defined in the booklet *Operating an Amateur Radio Station*, free to members.

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Phone Expansion II

The American Radio Relay League, Inc., is a noncommercial association of radio amateurs, bonded for the promotion of interest in Amateur Radio communication and experimentation, for the relaying of messages by radio, for the advancement of the radio art and of the public welfare, for the representation of the radio amateur in legislative matters, and for the maintenance of fraternalism and a high standard of conduct.

It is an incorporated association without capital stock, chartered under the laws of Connecticut. Its affairs are governed by a Board of Directors, elected every two years by the general membership. The officers are elected or appointed by the Directors. The League is noncommercial and no one commercially engaged in the manufacture, sale or rental of radio apparatus is eligible to membership on its board.

"Of, by and for the amateur," it numbers within its ranks the vast majority of active amateurs in the nation and has a proud history of achievement as the standard-bearer in amateur affairs.

Inquiries regarding membership are solicited. A bona fide interest in Amateur Radio is the only essential qualification; ownership of a transmitting station and knowledge of the code are not prerequisites, although full voting membership is granted only to licensed amateurs.

All general correspondence should be addressed to the administrative headquarters at Newington, Connecticut 06111.

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On this page in May, you were invited to share your thoughts on expansion of the U.S. high-frequency phone bands. Many of you did, as the "Correspondence" columns for July and August (and the bulging mailboxes of your division directors!) will attest. It fell to the League's Plans and Programs Committee, chaired by Vice President Gar Anderson, K0GA, to develop a recommendation based upon this membership input for Board consideration at its July meeting in Cedar Rapids. This was no easy task; members' views reflected a considerable divergence of opinion. The climax of the process was a lengthy informal discussion on Tuesday evening, July 20, as described beginning on page 47 of this issue. From this emerged a plan for high-frequency phone expansion which was acceptable to nearly every member of the Board. The plan adopted by the Board at Minute 17 represents an excellent balance of complex and competing concerns, and deserves the support of the membership and the rest of the amateur community, overseas as well as at home. Above all, it deserves to be adopted without change by the FCC.

Quite a number of members took advantage of this final opportunity to comment on the position on 20-meter phone expansion previously adopted by the Board, designated by FCC as RM-3860. Supporters of RM-3860 outnumbered opponents by about three to one, a reassuring sign that the Board is seen as heading in the right direction. We hope the Commission will resist the temptation to substitute its own judgment for that of the amateur community on how this popular and crowded band should be apportioned.

In its Notice of Inquiry in Docket 82-83, the Commission asked seven general questions about hf phone expansion (see May QST, p. 51, for the complete text). Many members addressed those questions in their comments. In general, members saw no reason to fear that a modest expansion of the U.S. phone subbands would trigger anything that would hurt domestic telegraphy (cw and RTTY) operations, with one exception: 40 meters. Only a minority believed that non-U.S. stations still had a legitimate requirement to be protected from U.S. phone operations, but a slight majority felt that reserving some frequencies for "split operation" was desirable; thus, a rationale exists for "foreign phone bands," but somewhat narrower than the present ones. There was strong support for extending existing subbands as opposed to creating new, non-contiguous ones, and support for relocating Novice subbands, if necessary to accomplish this (which will *not* be necessary under the proposals adopted by the Board). A majority of members commenting felt that simply making the new phone frequencies available to General licensees would hurt the Commission's system of incentives, although comment on this point came primarily from Advanced and Extra Class licensees. Finally, there was very little feeling that the recent 7-MHz phone expansion by Canada, into the

7050-7100 kHz segment, should influence U.S. decisions regarding that band.

In translating members' opinions into specific numbers that would be accepted by the amateur community and the FCC, the Board had a challenging assignment. The most controversial band was 75 meters, where the Board was already on record as favoring an expansion of General Class phone privileges. Under the plan adopted by the Board, Extra Class licensees gain 25 kHz with no change in the amount of exclusivity they enjoy; Advanced gain 25 kHz below 3800 kHz, prime territory for DX work, while retaining greater exclusivity than under the earlier Board position; and Generals gain 40 kHz, more than previously proposed, to ease the congestion which afflicts nets in the evening. If adopted by the Commission, these changes would have some impact on Canadian operations at 3750-3800 kHz; U.S. amateurs should not be surprised if the Canadian reaction is to extend the phone band in that country to below the U.S. Novice segment.

The Board's position of "no change" on 40 meters was based not only upon current comment, but on member reaction to an earlier proposal to authorize limited U.S. phone operation below 7100 kHz. That idea had drawn a strong negative response.

At 15 meters, while the pressure for phone expansion is somewhat less than in the more-crowded 20-meter band, U.S. amateurs could make much better use of the 21.2-21.25 MHz segment if phone were permitted there. Back in 1972, the FCC inexplicably narrowed the Extra Class segment from 25 to 20 kHz; other than to correct this, the ARRL proposal simply moves the subband edges down by 50 kHz.

At 10 meters, an expansion of 200 kHz for General, Advanced and Extra Class licensees is envisioned, primarily to encourage phone stations to avoid the frequencies higher in the band that are used by amateur satellites. The expansion is designed to not disrupt the worldwide network of beacon stations operating between 28.2 and 28.3 MHz.

While there are bound to be differences of opinion over the specific numbers adopted by the ARRL Board, we believe most amateurs will find they are very sensible within the context of the present FCC license structure. Except for the Canadian 75-meter problem mentioned earlier, the impact of this modest expansion program on amateurs overseas will be insignificant — certainly, much less than if the U.S. simply expanded its phone subbands to the limits prescribed in the IARU regional band plans. Here at home, we hope most will agree with the member who, on hearing of the Board's position at the National Convention in Cedar Rapids, said: "This represents a true consensus of the amateur community." If the FCC can be convinced of the accuracy of that remark, early action on phone expansion is a strong possibility; if not, the Commission will be understandably reluctant to act, thus preserving a *status quo* which is clearly unfair to its licensees. — David Sumner, K1ZZ

League Lines...

ARRL efforts have led to FCC moderating its proposal to permit inland operation of non-government radiolocation stations in the 420-450 MHz band. A Report and Order in Docket 80-135 limits such operation to spread-spectrum emission only, with a frequency limitation of 420-435 MHz, a power limitation of 50 watts, and a requirement for a "manufacturer's identifier" to be built into the emission to aid in tracking down interference. Conventional pulse-ranging systems in the 420-450 MHz band will continue to be permitted only in coastal areas. Non-government radiolocation must not cause interference to amateur stations. For more background, see September and December 1981 "Happenings."

AMSAT, the Radio Amateur Satellite Corporation, is looking for a full time, professional executive director/general manager. The position is located in suburban Washington, DC and will require some travel and weekend work. Salary is in the \$30,000 range, plus substantial performance-based incentives. The successful candidate must be able to develop and implement innovative educational programs, manage and coordinate the work of hundreds of volunteers, lead a comprehensive fund-raising activity, and oversee the day-to-day operations of AMSAT. An engineering/technical background is desirable, and an active Amateur Radio interest is mandatory. If interested, send your resume to the Search Committee/AMSAT, P.O. Box 27, Washington, DC 20044. Deadline is November 1.

At the request of the National Cable Television Association, the FCC has granted an extension of time until September 1 for filing comments in ARRL's petition to require cable television to abandon its use of amateur frequencies. The petition, RM-4040, was filed by ARRL on January 12 of this year to stem the growing problem of leaky CATV systems causing harmful interference to Amateur Radio operation.

Final action on the ARRL-backed bills to amend the Communications Act is expected early in September. The Senate Bill, S. 929, and the House Bill, H.R. 5008, will be reported out of a Senate/House Conference Committee, where the few remaining differences between the bills are to be resolved. It now looks like "smooth sailing" for this Congressional legislation, which will authorize the FCC to (1) regulate the susceptibility of electronic equipment to radio frequency interference, (2) exempt Amateur Radio from the "secrecy of communications" provisions (thus clearing the way for stepped-up voluntary monitoring of rules compliance in the amateur bands), (3) use volunteers in preparing and administering amateur license exams and in monitoring for rules violators, and (4) extend the term of amateur station licenses from 5 to 10 years.

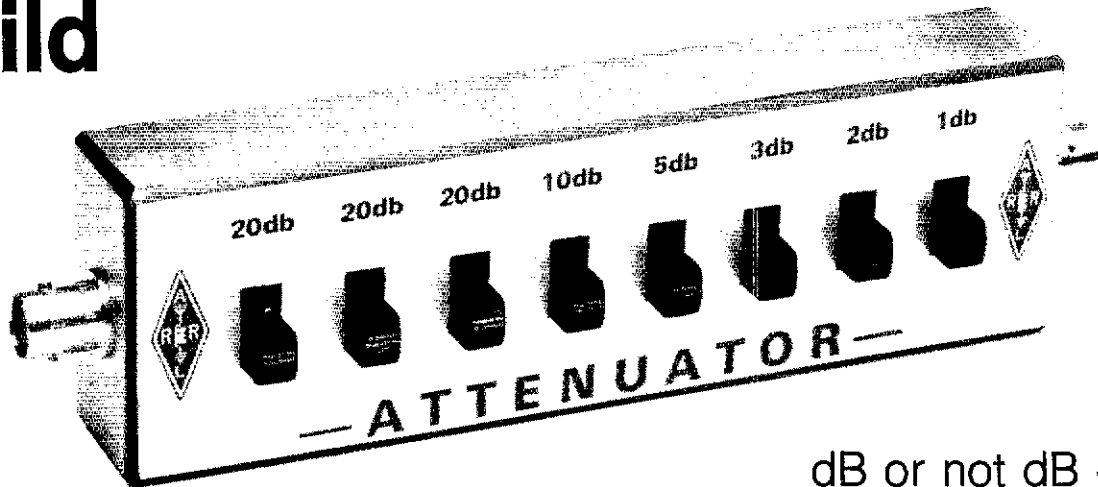
Attention repeater enthusiasts! Production of the 1983-1984 edition of the ARRL Repeater Directory is underway. If you want information about your repeater to appear in this edition, you must register by November 1. CD-240 (repeater registration card) is a handy form to use; it is available from Hq. for the asking (plus an s.a.s.e., please).

ARRL Hq. is looking for an Assistant Public Information Officer (entry-level salary) to share responsibility for Amateurradio and a new, general-interest amateur newsletter, which will begin publication later. If you have the requisite skills and are interested, contact Peter O'Dell, KB1N, at Hq. for more information.

ARRL Public Information Office still has copies of Public Service Announcements -- both TV and radio. If you can place them with a local station write today. There's no charge, and it is a great way to let the public know about Amateur Radio.

ARRL needs material for our monthly newsletter, Amateurradio, which goes to important government officials. We need positive, upbeat stories with photos of Amateur Radio in action. Clippings from local newspapers are a good source. Because it is frequently impossible to return photos, please do not send them if you must have them back.

A Step Attenuator You Can Build



dB or not dB — you decide! This low-cost, high performance addition to your shack or workshop is a worthy project.

By Bob Shriner,* WA0UZO and Paul K. Pagel,** N1FB

There probably are a number of *Handbook* and *QST* readers who need a low-cost, 1-dB step attenuator for the workbench or shack. Purchasing a commercially made unit may be out of the question because of the expense involved. Certainly the concept of the attenuator is simple, the formulas and resistor values are at hand,¹ and the components are inexpensive and readily available. But layout of the unit and concern for the careful assembly involved (if good, reliable results are to be obtained) are, for many, enough to put the idea far out of mind.

Well, take heart! At last you can have that attenuator without agonizing over the parts layout! The mechanics have been worked out for you. If you have an aversion to cutting rectangular switch holes, a complete kit — with prepunched switch holes — may be purchased.² Doesn't that sound attractive?

Description

Fig. 1 is the schematic diagram of the attenuator. Eight pi-network resistive sections are employed; the attenuation is variable in 1-dB steps. A total attenuation

value of 81 dB may be had with all the sections switched in. The maximum attenuation of any single section is limited to 20 dB because leak-through would probably spoil the effect of higher attenuation sections and result in inaccuracy.

This is a low-power attenuator; it is not designed for use at power levels exceeding 1/4 watt. If for some reason the attenuator will be connected to a transceiver, a means of bypassing the unit during transmit periods must be devised.

Parts

All the switches are dpdt standard-size slide types. Stackpole S-5022CD03-0 units are used here. Other switch types may work as well, but have not been tested. The use of subminiature switches should be avoided. An earlier prototype using such switches was constructed, but the results obtained were inadequate, owing to poor isolation and mechanical switch construction.

Carbon-composition or film, 1/4-watt, 5%-tolerance resistors are used. The calculated resistance values and the actual values used are shown in Table 1. Ideally, the resistors should be selected using a reliable ohmmeter; this will ensure accuracy.

Double-sided pc board is used for the enclosure. Dimensions for the model described here are given in Fig. 2. The kit version of the attenuator has identifica-

tion lettering etched into the top surface (or front panel) of the unit. This adds a nice touch, and is a permanent means of labeling. Of course, rub-on transfers or Dymo tape labels could be used as well.

Female BNC single-hole, chassis-mount connectors are used at each end of the enclosure. These connectors are small and easy to mount, have excellent rf qualities, and provide a means of easily connecting and disconnecting the attenuator by a simple twist of the wrist. They are available from many suppliers, including Radio Shack.³ For the economy-minded builder, perhaps the best place to scrounge this type of connector is at flea markets. They are usually offered as "pull outs" and at attractive prices.

Construction

After all the box parts are cut to size and the necessary holes are made, scribe light lines to locate the inner partitions. Carefully tack-solder all partitions in position. A 40-watt pencil type of iron should provide sufficient heat. Dress any pc-board parts that do not fit squarely. Once everything is in proper position, run a solder bead all the way around the joints. Caution: Do not use excessive amounts of solder, as the switches must later be fit flat inside the sections. The top, sides, ends and partitions can be completed. Dress the outside of the box to suit your taste. For instance, you might wish to bevel the

*Notes appear on page 13.

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**Assistant Technical Editor, ARRL

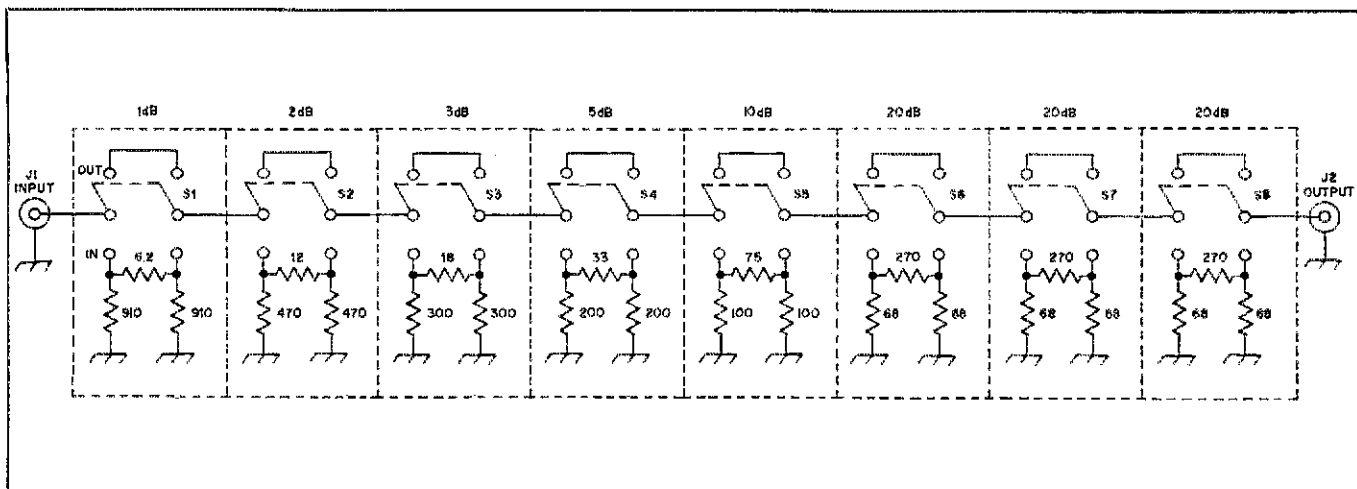


Fig. 1 — Schematic diagram of the attenuator. Resistors are 1/4-W, 5%-tolerance, carbon-composition or film types. Resistances are given in ohms.

Table 1

PI Network Attenuator Resistance Values for 52 Ohm Impedance

dB	Calculated Value		Standard Value Used	
	R1, R3	R2	R1, R3	R2
1	904	6	910	6.2
2	453	12	470	12
3	304	18	300	18
5	185	31	200	33
10	100	74	100	75
20	63	257	68	270

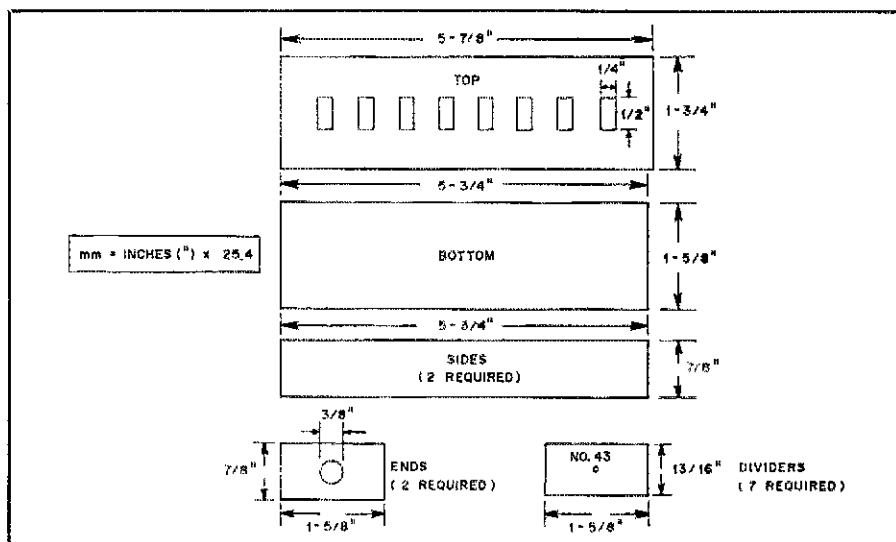
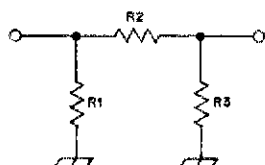


Fig. 2 — Mechanical dimensions of the attenuator enclosure.

box edges. Buff the copper with steel wool, add lettering, and finish off the work with a coat of clear lacquer or polyurethane varnish.

Using a little lacquer thinner or acetone (and a lot of caution), soak the switches to remove the grease that was put in during their manufacture. When dry, spray the inside of the switches lightly with a TV-tuner cleaner/lubricant. Using a sharp drill bit (about 3/16 inch will do),⁴ countersink the mounting holes on the attenuator side of the switch mounting plate. This ensures that the switches will fit flush against the top plate. At one end of each switch, bend the two lugs over and solder them together. Cut off the upper halves of the remaining switch lugs. (A look at Fig. 3 will help clarify these steps.)

Solder the horizontal members of the pi

sections between the appropriate switch lugs. Try to keep the lead lengths as short as possible, and do not overheat the resistors. Now solder the switches in place to the top section of the enclosure by flowing solder through the mounting holes and onto the circuit-board material. Be certain that you place the switches in their proper positions; correlate the resistor values with the degree of attenuation. Otherwise, you may wind up with the 1-dB step at the wrong end of the box — how embarrassing!

Once the switches are installed, thread a piece of no. 18 bare copper wire through the center lugs of all the switches, passing it through the holes in the partitions. Solder the wire at each switch terminal. Cut the wire between the poles of each individual switch, leaving the wire con-



Fig. 3 — Close-up of the switch detail.

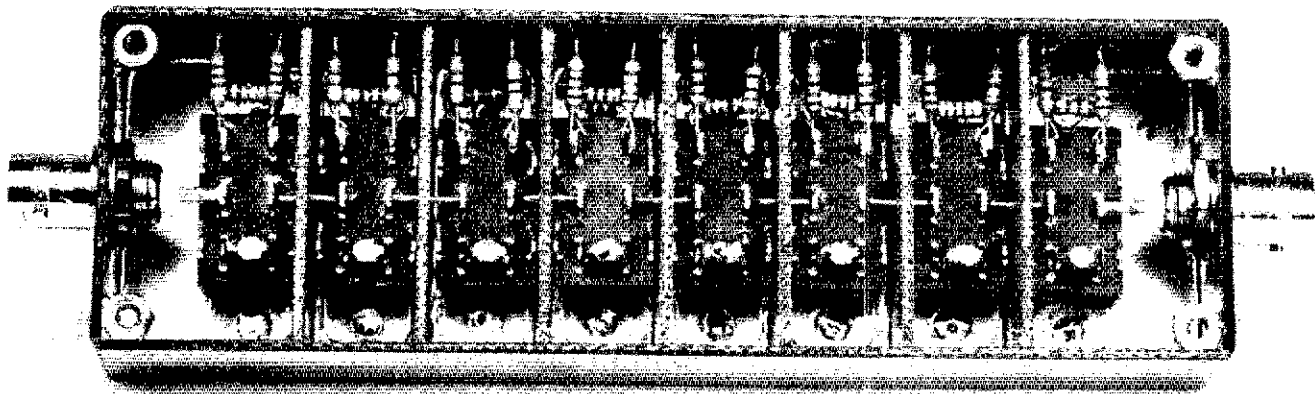


Fig. 4 — An inside view of the completed attenuator. Use of short, direct leads enhances the performance of the unit. Brass nuts soldered at each of the four corners allow machine screws to be used to secure the bottom cover. File one corner of each nut to permit a flat, two-sided fit within the enclosure.

necting one switch pole to that of the neighboring one on the other side of the partition, as shown in Fig. 4.

At each of the two end switch terminals, leave a wire length of approximately 1/8 inch. Install the BNC connectors, and solder the wire pieces to the connector center conductors.

Now install the resistors that comprise the vertical (grounded) legs of each pi section. Use short lead lengths. Remember that physical symmetry is conducive to good performance. Do not use excessive amounts of heat when soldering.

Solder a no. 4-40 brass nut at each inside corner of the enclosure. Recess the nuts approximately 1/16 inch from the bottom edge of the box to allow sufficient room for the bottom panel to fit flush. Secure the bottom panel with four no.

4-40, 1/4-inch machine screws and you're done!

The End Result

ARRL lab tests proved the attenuator to be a good performer. A Hewlett-Packard 8640B signal generator and a 8554B spectrum analyzer were used with a Tektronix 2701 step attenuator in the test setup. Results of the insertion-loss measurements, with no attenuation switched in, are shown in Table 2. The

homemade attenuator exhibited a maximum error of less than ± 1 dB through 450 MHz, the maximum error occurring in the 20-dB attenuator sections. Such a degree of accuracy should be more than adequate for most applications.


We hope you enjoy building this weekend project. You're sure to find a number of uses for it in the shack and in the workshop. It's a simple — and accurate — piece of test equipment you can build yourself! 

Table 2

Attenuator Insertion Loss

Frequency (MHz)	29.7	50	144	220	450
Insertion loss (dB)	<0.1	<0.2	0.5	0.5	1.2

Notes

- *D. DeMaw, *ARRL Electronics Data Book* (Newington: ARRL, 1976), p. 32.
- *A complete kit of parts is available from Circuit Board Specialists, P.O. Box 969, Pueblo, CO 81002. Price: \$15.
- *Part no. 278-105.
- *mm = in. \times 25.4.

Strays

RIDING HIGH WITH AMATEUR RADIO

□ Things really will be looking up on September 23-26, when members of the Tulare County Amateur Radio Emergency Service provide communications for the 1982 California Balloon Festival in Visalia. As in the past two years, the Tulare ARES hams will be kept busy with a host of on- and off-the-air activities, which include handling emergency medical traffic and manning a public display booth for the 50,000 people expected to attend the four-day event. A special attraction during the weekend will be a helium balloon race, which the amateurs will monitor for race officials.

In addition, Tulare County hams expect to make contacts with amateurs around the world while operating a special-event station at the launch site, where nearly 75 colorful hot-air balloons are also

scheduled to fly. A certificate will be awarded to those contacting KB6AR or KB6CC on 7.235, 14.285, 21.360 or 28.510 MHz from 0100Z September 25 to 0100Z September 27. QSL with a business size s.a.s.e. to KB6CC at the address

below for your certificate. Who knows; maybe you'll be able to complete a QSO with a H.A.M. (Hot Air Mobile) operator! — *Scott Thompson, KB6CC, 4024 W. Monte Vista Ave., Visalia, CA 93277*



Radio amateurs who contact the 1982 California Balloon Festival special-event stations will receive an attractive certificate similar to this one, which was awarded last year.

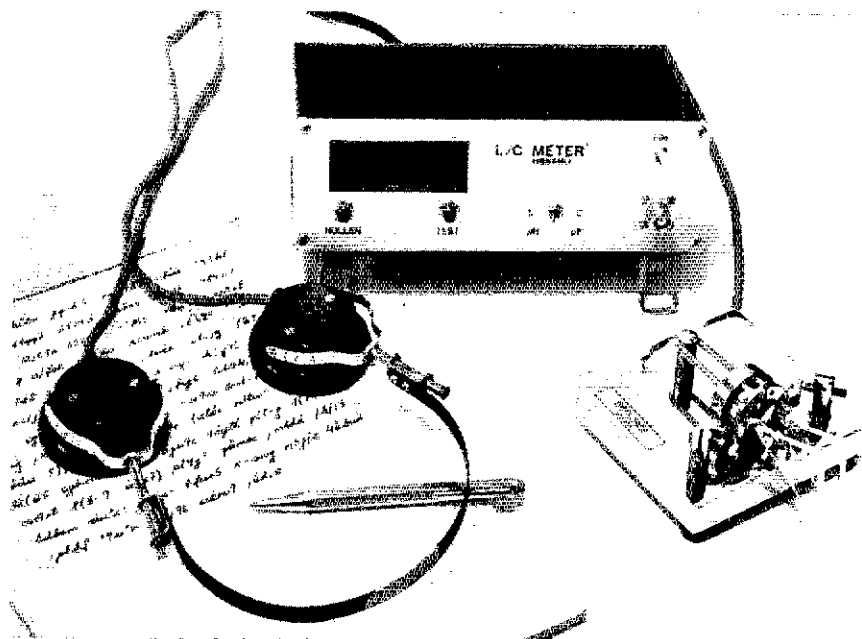
Next Month in QST

- It's nonpolluting, renewable and, best of all, free. What is it? Solar power. If you've ever thought about using the sun to run your amateur station, you'll want to read the article in October QST.
- Need a paddle for use with an iambic keyer? You can build the "CHIP" quickly and cheaply.
- If you're a contester who has access to a computer, check out the On Line column. It will provide insights on automating your contest efforts.

Build a Microprocessor-Controlled L-C Meter That Sends Morse Code

Part 1: This classic-looking unit has much to offer the active amateur. Its good looks are exceeded only by its accuracy.

By Urs Hadorn,* HB9ABO



This L-C meter complements those low-cost R-C or R-L-C measuring instruments that do not cover the ranges suitable for hf and vhf work; inductances of 0 to 2000 μH and capacitances of 0 to 2000 pF can be measured. It can also be used as an electronic keyer or as an automatic Morse code generator, with the sending speed being displayed in both cases. Two software versions are available for this microprocessor-based unit. The operating parameters and differences between the two software versions are presented in Table 1.¹

One might wonder why an L-C meter has been mated with such an unrelated function as that of an electronic keyer. The evolution occurred because my keyer and an old L-C meter were constantly "struggling" for the limited space available on my operating table. Furthermore, it provided an opportunity to replace hardware with software, as there was still some free space in the program memory, once the L-C meter functions had been accounted for. The cost of the

additional keyer parts (one IC and three jacks) is a fraction of the cost of a separate electronic keyer!

Fundamentals

Measuring principle: Ideas for the measuring method were taken from the Tektronix type 130 L-C meter (refer to Fig. 1). An oscillator operates at an idling frequency, f_0 . The inductance to be measured is connected in *series* with the oscillator inductance; the capacitance to be measured is connected in *parallel* with the oscillator L-C circuit. With an "unknown" connected, the oscillator frequency is shifted to a lower frequency, f_2 . With f_2 and both resonant-circuit constants (L and C) known, the unknown component value can be calculated by

$$L_x = \frac{1}{(2\pi f_2)^2 C} - L \quad (\text{Eq. 1})$$

$$C_x = \frac{1}{(2\pi f_2)^2 L} - C \quad (\text{Eq. 2})$$

where

L_x = unknown inductance in henrys

C_x = unknown capacitance in farads
 L = inductance of the oscillator resonant circuit in henrys
 C = capacitance of the oscillator resonant circuit in farads
 f_2 = oscillator frequency in hertz (with the unknown connected)

The relationships of Eq. 1 and 2 assume stable and constant values for L and C. This condition normally cannot be met in practice because a free-running oscillator often has a tendency to drift, especially when a flexible piece of cable and two movable clips form part of the frequency-determining circuit, as is the case in this setup.

The following premises determined the assignment of values for f_0 , L and C in the design phase:

1) Inductance resolution should be more refined than that of capacitance, because 1 μH is more significant than 1 pF in practical shortwave work (a fact that seems to be often ignored by manufacturers of test equipment). Hence, the ratio of picofarads to microhenrys in the L-C circuit should be greater than 1:1.

2) The maximum counting frequency of the microprocessor (μP) used is 133

¹Notes appear on page 17.

*Im Riedtli 1, CH-8154 Oberglatt, Switzerland

Table 1
Differences Between Software Versions

Parameter	Standard Software	USA Software
Display for overflow	UEb	OFLO
Display for underflow	-UL-	-UF-
Cw speed display	Characters per minute	Words per minute
Cw speed range	30 to 250 cpm	6 to 50 wpm
Cw speed increment	1 cpm	0.2 wpm
Number of characters in set	51	44
Character set	ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890..?/!-äöüèà(,":	ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890..?/!-,:;

kHz; f_0 must not exceed this value.

With these conditions in mind, I chose $f_0 = 120,000$ kHz and $L = 700 \mu\text{H}$. This dictates a C value of 2513 pF.

Assume the oscillator idles at 120,050 Hz instead of the theoretical f_0 of 120,000 Hz. Further assume a small value C_x is connected to the measuring terminals. This detunes the oscillator to frequency f_2 of, say, 120,005 Hz. Because f_2 is higher than f_0 , Eq. 1 yields a negative result! Although this can happen only with small values of C_x and L_x , this fundamental type of error is not acceptable, even for amateur equipment.

If the inevitable oscillator instability and the movableness of the measuring terminals are taken into account, the actual idling frequency (f_1) must be recorded just before connecting the unknown. This frequency must be included in the calculation together with one of the resonant-circuit constants (L or C) as shown by

$$L_x = L \left(\frac{f_1^2}{f_2^2} - 1 \right) \quad (\text{Eq. 3})$$

$$C_x = C \left(\frac{f_1^2}{f_2^2} - 1 \right) \quad (\text{Eq. 4})$$

where

f_1 = actual idling frequency — the oscillator frequency when there is no unknown connected. When measuring L_x , test terminals are shorted; when measuring C_x , test terminals are open circuited.

Any error caused by the drift or the measuring setup is included in f_1 . In Eq. 3 and 4, the error (if any) is assigned to that resonant-circuit constant that does not appear in the equation. This means that when measuring capacitances any deviation of the actual idling frequency (f_1) from its theoretical value (f_0) is credited to the circuit L; whereas when measuring inductances the circuit C is blamed for any deviation. With these assumptions the overall accuracy is barely influenced, as will be shown later.

Oscillator: The active portion of the oscillator of this instrument is an NIC (Negative Immittance Converter) circuit.² See Fig. 2. The NIC yields a negative resistance ($-R$) at the output terminal, A, provided that $R_1 = R_2$. This negative resistance compensates for the loss

resistance in the oscillator tank circuit. The now "lossless" tank starts to oscillate, hence the circuit becomes an oscillator.

Accuracy

A number of factors determine the practical accuracy of this L-C meter: oscillator instability, resolution, losses in the unknown.

Oscillator instability: The oscillator frequency is allowed to deviate $\pm 0.17\%$ from the nominal value. If this limit is exceeded on either side, measurement is inhibited by the controlling software. In the worst case, the circuit L or C is therefore allowed to miss the nominal value by not more than $\pm 0.33\%$, which is equal to the effective error for the measurement. In practice, this oscillator drifts only about 0.05% in the temperature range of 15 to 25° C.³ The error to be expected because of drift is therefore 0.1% — negligible for an instrument of this category.

Resolution: Two factors determine the resolution:

1) Because the oscillator frequency is being measured during 0.25 second, the smallest frequency change that can still be detected is 4 Hz. If $f_1 = 120,000$ Hz, $f_2 = 119,996$ Hz, $L = 700 \mu\text{H}$ and $C = 2513$ pF are used in Eq. 3 and 4, the smallest measurable inductance amounts to 47 nH (0.047 μH), and the smallest measurable capacitance amounts to 0.167 pF.

2) The program computes with an accuracy of 16 bits, the binary point being to the left of the fifth least significant bit. This can produce a maximum computing error of 0.03125 μH or pF.

To determine the overall worst-case instrument resolution, the counter and computer resolution values have to be added: 0.047 μH + 0.03125 μH = 0.08 μH , and 0.167 pF + 0.03125 pF = 0.2 pF. The effects of resolution are most restrictive when small values are being measured. They can, however, be minimized by interpolation between two adjacent values.

Losses in the unknown: Although they are restricted almost exclusively to inductors, losses in the unknown are the most important source of error for this L-C meter. During the alignment procedure the oscillator is adjusted so that an equivalent series loss resistance of 0 to 10 ohms does not affect the oscillator fre-

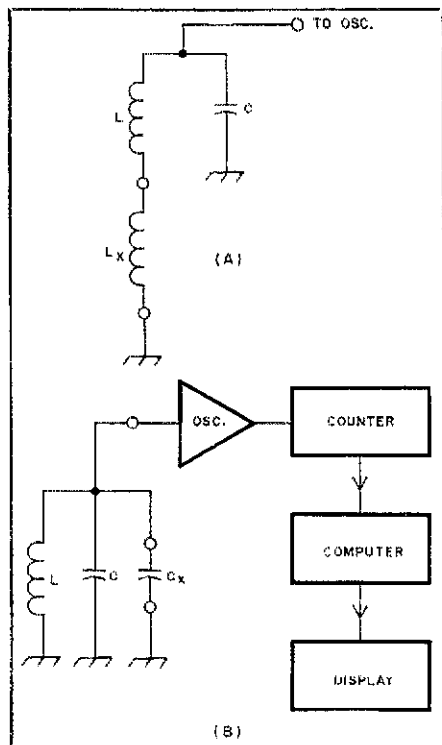


Fig. 1 — Basic circuit of the L-C meter for measuring inductance (A) and capacitance (B).

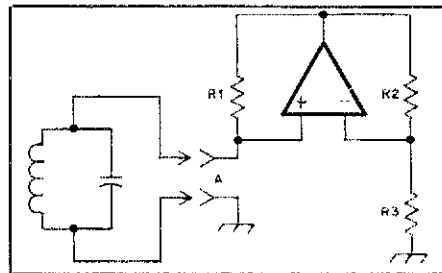


Fig. 2 — Basic circuit of an oscillator using an NIC circuit as the active element.

quency. The compensation circuit involved (C_{11} , C_{13} and R_2 of Fig. 3), however, introduces reactances of unknown magnitude. Oscillator adepts are kindly invited to contemplate about this mechanism so as to find a rule of thumb for predicting the amount of error due to losses in the unknown.

Practical accuracy: To check the instrument accuracy, a number of various types of inductors and capacitors were measured, using 11 L-C meters constructed according to the information given here. The results were compared to those obtained using a Hewlett-Packard 4274A L-C-R meter — a lab type of instrument. From the results the following conclusions were made:

1) Readings of less than 1 pF and of less than approximately 0.4 μH are just rough estimates because of resolution limitations.

2) The lower range readings differ in accuracy and deviation between units. In the medium and higher ranges, where the

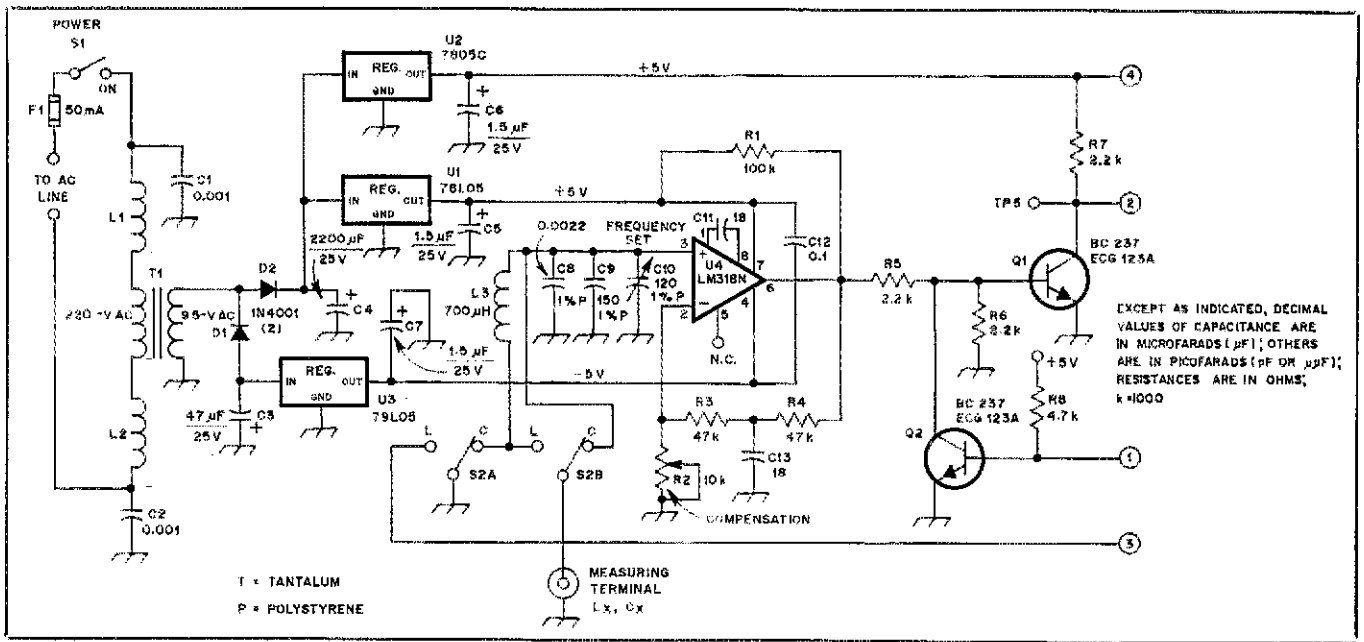


Fig. 3 — The L-C meter analog-section schematic diagram. T1 is of European manufacture. It bears the identification TUP.7W9, and has secondary ratings of 9.5 V and 7.5 W, and a 220-V primary. (Purchased from Grieder AG, Nauenstrasse 63, CH-4002 Basel, Switzerland).

resolution is of less importance, the deviation in results becomes more uniform and the variation decreases.

3) Some inductors yielded rather small errors; others produced greater deviations, but with a remarkable unanimity among the L-C meters.

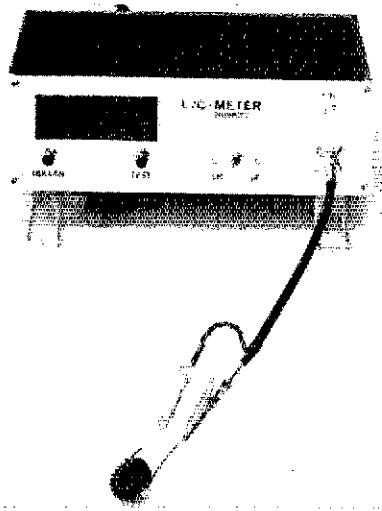
4) Obviously, the error in inductance reading depends on the coil design. High-Q inductors produce more accurate readings. Capacitance-measurement errors are less dependent on the different capacitor types. However, the deviations are so remarkably uniform that a correction factor of +1% is justified. This factor has been incorporated into the latest software version.

Rather than predict a definite figure of accuracy for this instrument, as is customary for industrial equipment, all aspects affecting accuracy have been discussed or at least mentioned. This should enable the reader to judge the degree of accuracy that can be expected from this L-C meter. Compared with other instruments in the lowest price class, this unit has a high degree of accuracy that is sufficient for the purposes of the hf constructor.

Circuit Description

Analog Section: This section (shown in Fig. 3) consists of the power supplies and the oscillator. U1 and U3 form the split supply for the oscillator. U2 is the main regulator, feeding +5 V to the digital circuit and the display. S2, the L-C selection switch, establishes the configuration according to Fig. 1A or 1B, and signals the position to the microprocessor.

The 2513-pF capacitance value required is formed by the sum of the capacitances of C8, C9, C10, the capacitance of the



The L-C meter in action, measuring inductance.

measuring setup and a capacitance introduced by the op-amp circuit. C10 is used to tune the oscillator frequency to exactly 120,000 Hz.

Circuit inductance (L) is concentrated in L3, which has to be prealigned to 700 μ H. R2 is used to compensate for losses in the unknown.

Q1 is driven into saturation by the output signal of U4. It translates the symmetrical signal into a 5-V pk-pk square wave (TP5) to suit the needs of the microprocessor. Q2 is used by the μ P to lock out the oscillator signal in the ELECTRONIC KEYS and CW TUTOR modes.

If desired, only the analog part of the instrument and a simplified power supply can be built. Such a "barefoot" L-C meter requires the use of a frequency counter and a calculator. The counter is

connected to test point TP5. With no unknown connected, f_1 is read from the counter and entered into the calculator. Then the unknown is connected, and the new frequency (f_2) is entered into the calculator. The unknown then can be calculated using Eq. 3 or 4. Circuit constants remain the same: $L = 700 \mu$ H, and $C = 2513$ pF.

Digital Section: This section, shown in Fig. 4, is dominated by the μ P, U6. To reduce costs, a circuit with more than one chip is used, with the 8035 being chosen for the μ P. U6 measures the incoming frequency at input pin T1 by means of an internal frequency counter, and then computes the value of the unknown inductor or capacitor. Signals from S3 (NULL) and S2 (L-C) affect the process of calculations.

U6 is connected to the "outside world" via the DOT and DASH lever inputs and the TONE and TX outputs. These connections are routed through buffer stages (U5) to protect U6 from unpredictable conditions that sometimes prevail in a ham shack. The TX output is able to handle +30-V amplitudes and sink keying currents of up to 40 mA. The TONE output emits a 5-V pk-pk, 781-Hz signal so that keying may be monitored. A small speaker can be connected in series with a 1.5- μ F capacitor (acting as an impedance transformer) to the TONE output.

The data bus links U6 with the address latch (U7), the program memory (U8) and the display driver (U9). On this bus, the latch and the display driver are data receivers. The program memory is a data transmitter, and the processor is a receiver and transmitter of data. The processor releases the data bus to one of the connected components for exchanging data at a specific time. It also ensures that only

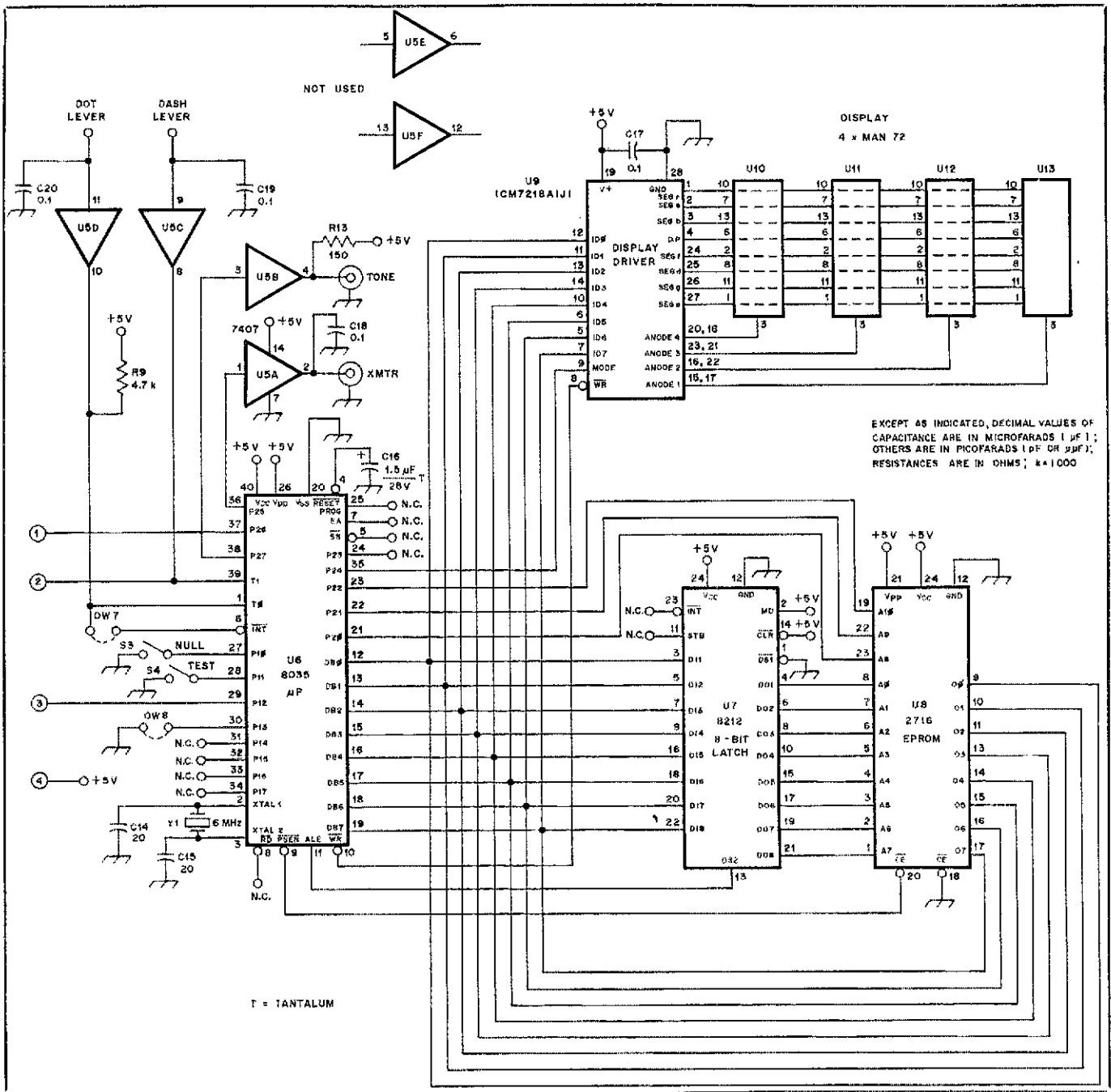


Fig. 4 — The L-C meter digital-section schematic diagram. Most, if not all, of the parts shown here may be obtained from Jameco® Electronics, 1355 Shoreway Rd., Belmont, CA 94002. See note 1 regarding U8.

the entitled addressee reads the data on the bus. This task is accomplished by means of three control signals: \overline{PSEN} , \overline{ALE} and \overline{WR} . U6 generates its own clock signal using a built-in oscillator for which the frequency (6 MHz) is controlled by the external crystal, Y1.

Every 2.5 μs , the processor fetches a new instruction from U8 and executes it. U8 is an EPROM (erasable programmable read-only memory) containing the whole instrument program. In designing this instrument, about half the work consisted of developing and adapting the controlling software.

Display driver U9 receives the data to be displayed from the μP . Data are stored

and displayed until there are new data coming in. Segment information distribution to the individual digits, as well as the multiplexing of the different on and off signals, is performed by U9, independently from the μP . U9 also delivers the necessary voltages and currents, limiting the latter without any external components. Part 2 of this article (to appear in a forthcoming issue) describes the microprocessor software and the construction of the L-C meter. Complete alignment and operating instructions are included.

Notes

¹ EPROMs (2716) containing the program can be

obtained from the author for \$15 U.S. or 25 Swiss Fr., prepaid air-mail delivery included. Please specify the desired software version, standard or U.S. This offer is valid for radio amateurs only, and does not include any rights to the software. Two etched, tinned and drilled pc boards (the display and main circuit boards) are also available from the author for \$25 U.S. or 45 Swiss Fr., air-mail delivery included. The ARRL and QST in no way warrant these offers.

PC-board patterns, parts overlays, information pertinent to the original boards and an object code listing are available from the ARRL for \$2. Readers should recognize that the main board is designed specifically for use with the particular power transformer, fuse holder and inductor (L3) used in the original version. However, a suitable power transformer and fuse holder may be mounted off the main circuit board, on a chassis wall, at the builder's discretion.

²H. Dauch, *Operationsverstaerkertechnik*, Lehrinstitut Onken, CH-8280 Kreuzlingen, Switzerland, Letzbrief 6, S6-21.

³ $\overline{V}^* = 9/5 C^* + 32$

A Programmable Serial-Communication Interface

Frustrated by a computer that can't "speak" with your radio gear? Build this interface system and overcome the communication barrier!

By Edward B. Kalin,* K1RT

Almost any personal computer can be used as an RTTY terminal if a suitable interface to a demodulator is available. I designed such an interface for use with my Radio Shack TRS-80® (Model I, Level II) microcomputer.† The interface may be used to provide transmission and reception of the 5-bit Baudot code or the ASCII code using most of the popular bit rates. As the interface is general purpose in nature, it may be used to provide communication between the microcomputer and a variety of input/output (I/O) devices, such as printers, tape recorders and telephone modems. It can also be used to provide relay control of many types of electronic equipment. While this interface is designed specifically for use with the TRS-80, the same techniques can be applied to most microprocessor-based computers with little modification.

I built the interface in three parts: A port decoder, a serial-communication interface and a relay controller (Fig. 1). The port decoder is used to select up to 16 input and 16 output functions under program control. Translation between the serial-by-bit RTTY transmission format and the parallel byte-oriented structure of the microcomputer data bus is performed by the serial-communication interface. The relay controller is used for station-control functions, such as transmit-receive (T-R) switching and automated cw i-d transmission. Code format and bit rate are set by a computer program. This program must also handle the translation of the received code into a format suitable for display, and the conversion of the characters entered on the keyboard into the desired transmission code. Relay

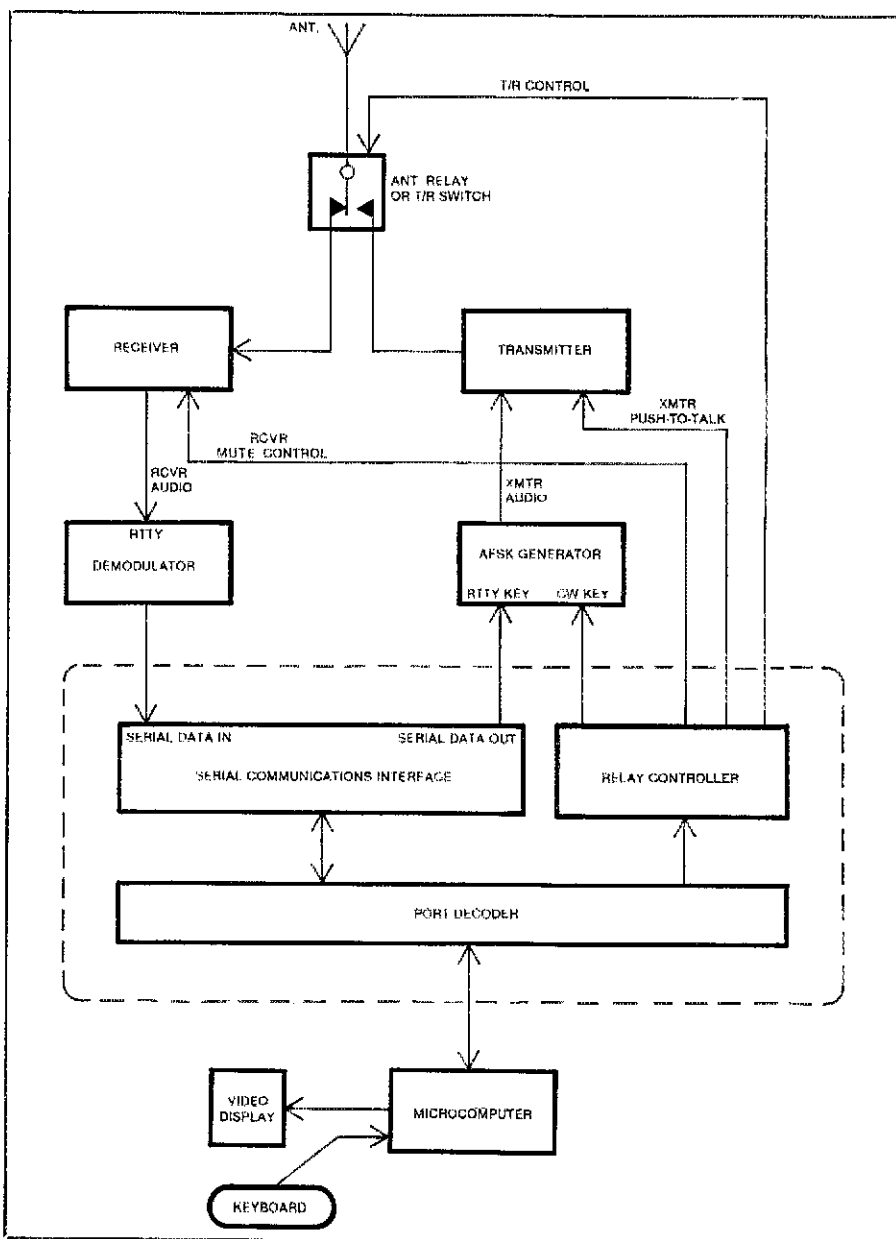


Fig. 1 — System block diagram of a typical "all-electronic" RTTY station. The microcomputer interface consists of the sections within the dashed lines.

†TRS-80® is a registered trademark of Tandy Corporation.

*83 Kenmore Rd., Bloomfield, CT 06002

operation is also determined by the program.

Port Decoder

At the "heart" of the TRS-80 is a Zilog Z-80 microprocessor. The Z-80 can communicate with the outside world by means of programming instructions that use I/O ports. Implemented in the Z-80 are 256 input and 256 output ports. When an instruction that references one of these ports is executed, the Z-80 places the binary address of the specified port on the eight low-order address bus pins (A0 through A7) and sets the active-low I/O request pin ($\overline{\text{IOREQ}}$) to 0 (Fig. 2). If the instruction calls for output to a port, the contents of a Z-80 register are placed on the data bus and the $\overline{\text{WR}}$ (write) pin is activated. It is the responsibility of the external device to detect the occurrence of these events and latch the eight data bits during the brief interval that they are present on the bus. If the external device latches the bus data at any other time, it will receive invalid data.

Similarly, if the instruction calls for input from a port, the Z-80 activates the $\overline{\text{RD}}$ (read) pin, and the external device must place eight bits of data on the bus during the appropriate time interval. This allows the Z-80 to read the data into a register. If the external device places data on the bus at any time other than when the appropriate port is selected, it will interfere with the normal operation of the Z-80.

The port-decoder circuit (Fig. 3) is designed to monitor the state of the address, $\overline{\text{IOREQ}}$, $\overline{\text{RD}}$, and $\overline{\text{WR}}$ signals. It can be set to recognize 16 input and 16 output ports. When the decoder senses that one of these ports has been activated, the decoder will signal the appropriate external device. In this case, the external devices are the serial-communication interface and the relay controller. Additional devices, such as digital-clock circuits, digital-to-analog and analog-to-digital converters, and LED drivers may be selected by the port decoder as well.

By ORing the $\overline{\text{RD}}$ and $\overline{\text{WR}}$ signals with the $\overline{\text{IOREQ}}$ signal internally, the TRS-80 generates active-low $\overline{\text{IN}}$ and $\overline{\text{OUT}}$ signals. These I/O signals are buffered and made available to the outside world on the 40-pin TRS-80 bus connector. A 40-conductor ribbon cable is used to connect the $\overline{\text{IN}}$ and $\overline{\text{OUT}}$ signals and the buffered address lines (A0 through A7) to the port-decoder board. The bidirectional buffered data bus is also routed to the decoder board for distribution to the serial-communication interface and the relay controller. The ribbon cable should be kept as short as possible, as it carries high-frequency square-wave signals that can interfere easily with broadcast and amateur reception.

In the port decoder, U3 buffers the $\overline{\text{IN}}$ and $\overline{\text{OUT}}$ signals and address lines A0 through A3. This results in only one LS

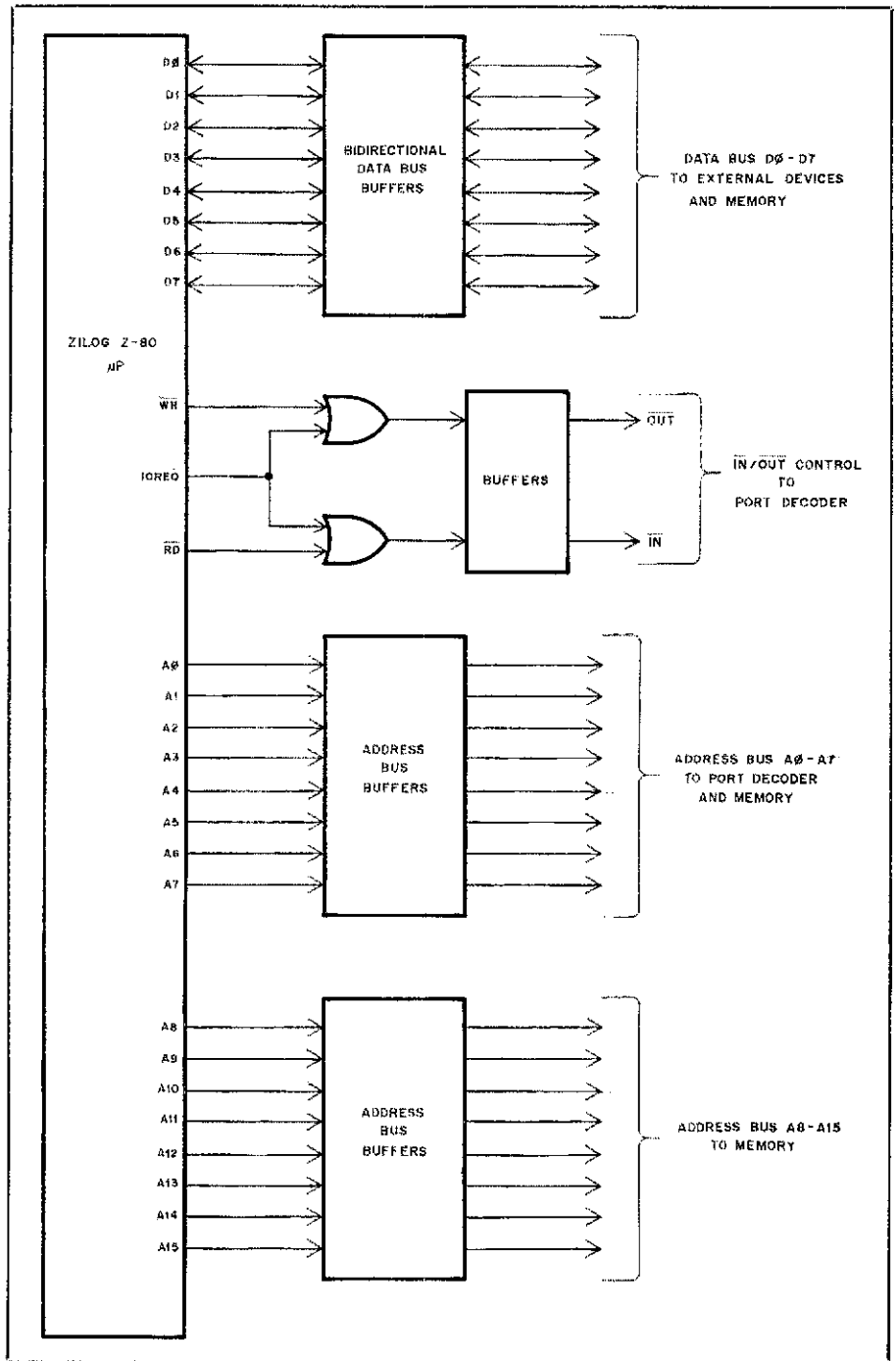


Fig. 2 — Simplified diagram showing the Z-80 microprocessor pins referred to in the text.

TTL load on each TRS-80 bus line, instead of the two TTL loads represented by U4 and U5. 74154 data demultiplexers (U4 and U5) are used to decode input and output ports 0 through 15, respectively. When an input instruction for any port in that range is executed, the $\overline{\text{IN}}$ signal and the ORed address lines A4, A5, A6, and A7 at the output of U2A are simultaneously low. This enables U4. The U4 output pin selected by the binary combination of address lines A0, A1, A2 and A3 goes to a low logic level, while the other U4 outputs remain high. When an output instruction for any port in the

proper range is executed, U5 is enabled and the appropriate output pin goes low to indicate the selected output port. The serial-communication interface and the relay controller monitor the U4 and U5 outputs and respond to the appropriate port-select pulse.

The I/O ports may be located at positions other than 0 through 15 by selecting other combinations of A4 through A7 to activate U4 and U5. As the TRS-80 uses several of the high-numbered ports for internal functions (such as activating the built-in cassette interface), it is advisable to assign user-defined ports to the lower

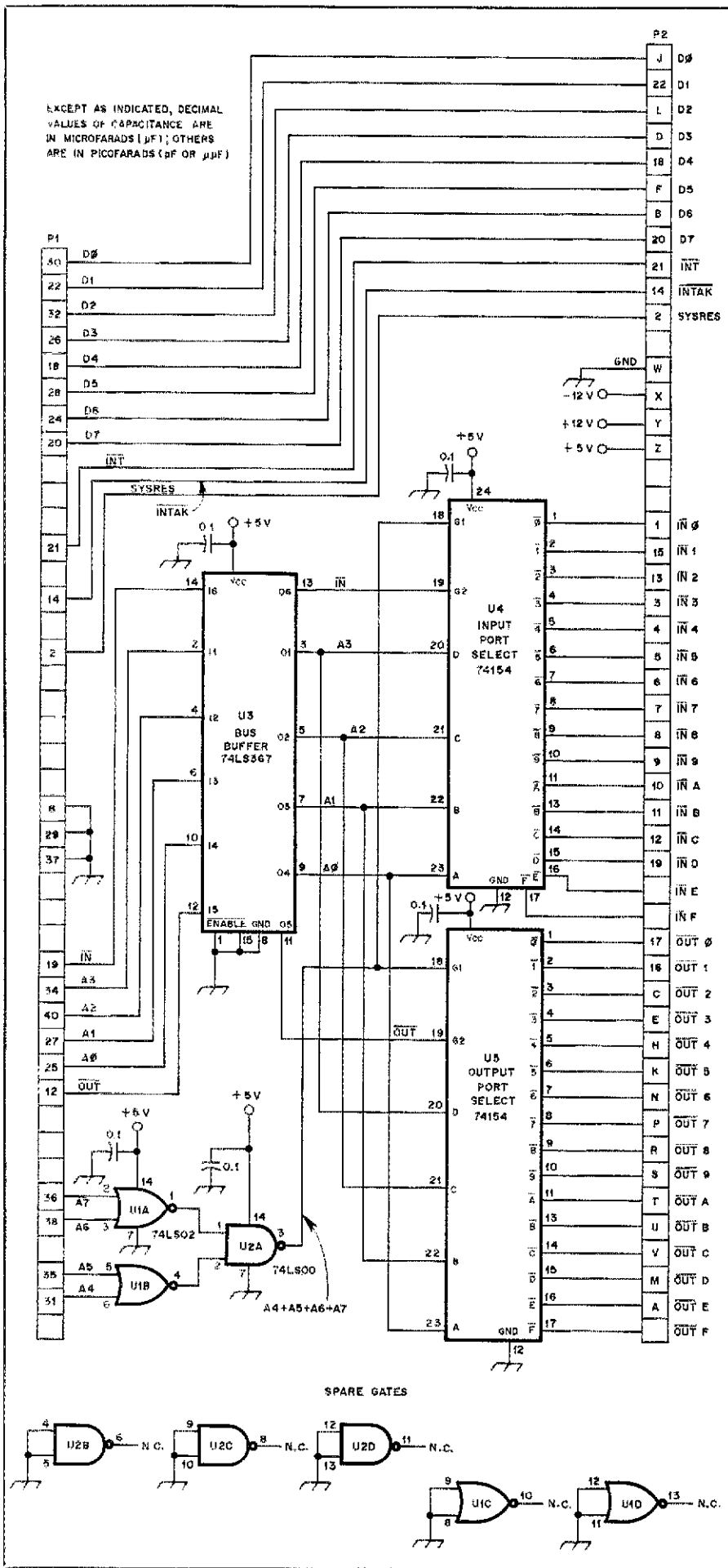


Fig. 3 — Port decoder schematic diagram. Connections to the TRS-80 bus are made through P1 (see text). P2 is a 44-contact card-edge connector used to make the connections to the other interface boards. All capacitors are 16-V, disc-ceramic. Numbered components are for text reference only.

port ranges in order to prevent conflicts from arising.

Relay Controller

The relay-controller circuit permits two relays to be actuated independently under program control. With the addition of three ICs, the controller can be expanded to accommodate a total of four relays. A relay-control word output to port 0 governs the function performed by K1 and K2 (Table 1). Using this scheme, it is possible to turn either relay on or off, or to simultaneously actuate or de-energize both relays.

Controller operation is understood best by examining the sequence of events required to turn K1 on and off (refer to Fig. 4). In order to actuate K1, a program can output a relay-control word of 03 to port 0. As a result, the port decoder will generate a short, negative-going port 0 output-select pulse, which is applied to pin 11 of NOR gate U1D. Simultaneously, data bit D0 (which is at a logic 1) is inverted by U1C and applied to the other U1D input. These inputs result in a positive-going pulse at the U1D output (pin 13). This pulse clocks U2A, causing the data present at the D input to be transferred to the Q output. Since D1, which is at a logic 1, is connected to the D input of U2A, the Q output will go to a high level. When the clock pulse goes away, the Q output will remain latched high. The Q output drives three paralleled sections of an open-collector inverting buffer (U3), which energizes the K1 coil. Each section of U3 can sink up to 30 mA, for a total capability of 90 mA. Radio Shack type 275-214 4pdt 12-V relays, with coil-current requirements of 75 mA each, are used for K1 and K2. LEDs connected across the coils indicate the relay status.

To de-energize K1, the program can output a relay-control word of 01 to port 0. The operation of the circuit will be identical to the description above, except that D1 will be at a logic 0 level, with the

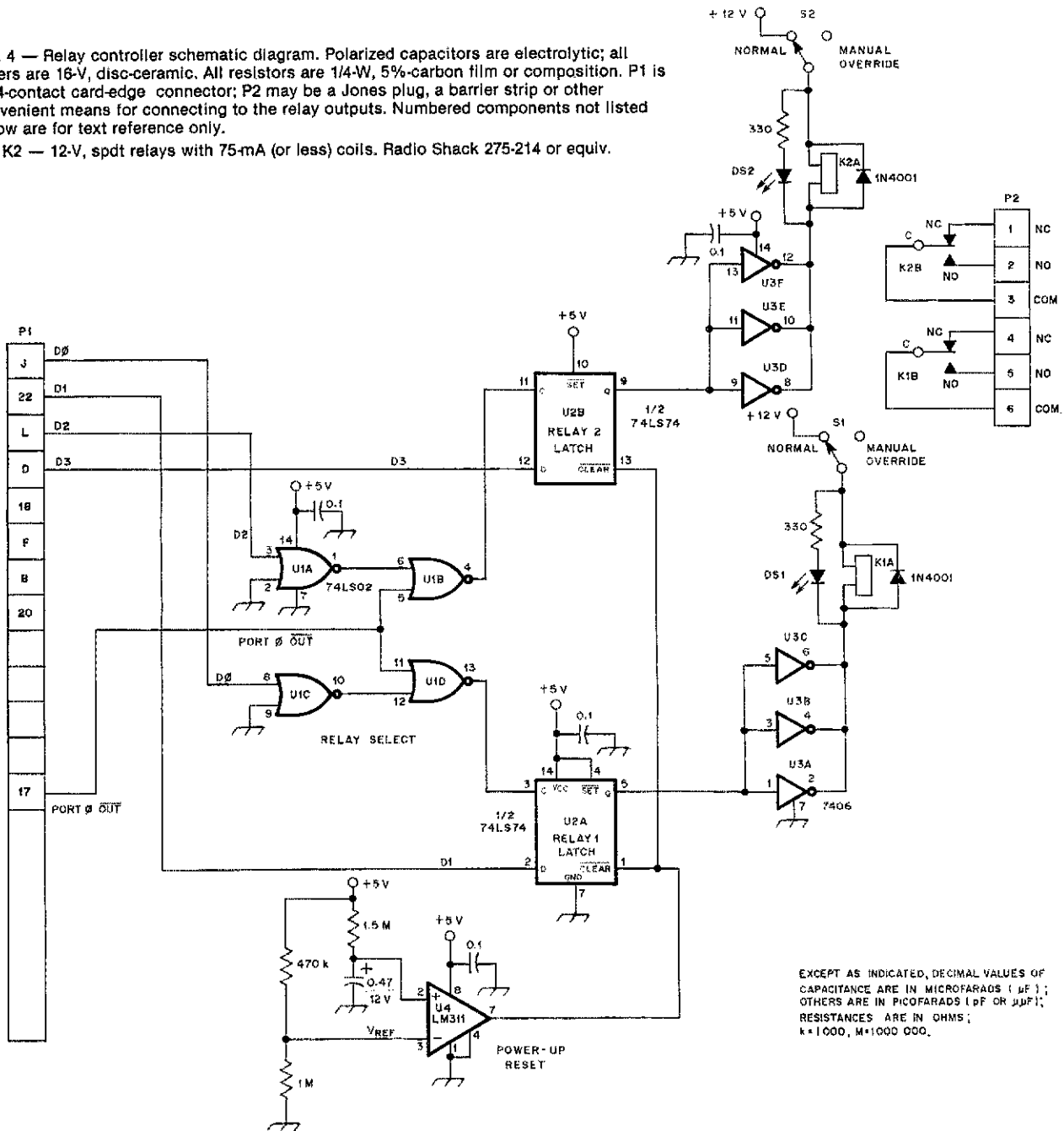
Table 1
Relay Control Word

Bit Position	Function							
D7	D6	D5	D4	D3	D2	D1	D0	
X	X	X	X	X	X	1	1	Actuate K1.
X	X	X	X	X	X	0	1	De-energize K1.
X	X	X	X	1	1	X	X	Actuate K2.
X	X	X	X	0	1	X	X	De-energize K2.

X = Don't care

Fig. 4 — Relay controller schematic diagram. Polarized capacitors are electrolytic; all others are 16-V, disc-ceramic. All resistors are 1/4-W, 5%-carbon film or composition. P1 is a 44-contact card-edge connector; P2 may be a Jones plug, a barrier strip or other convenient means for connecting to the relay outputs. Numbered components not listed below are for text reference only.

K1, K2 — 12-V, spdt relays with 75-mA (or less) coils. Radio Shack 275-214 or equiv.



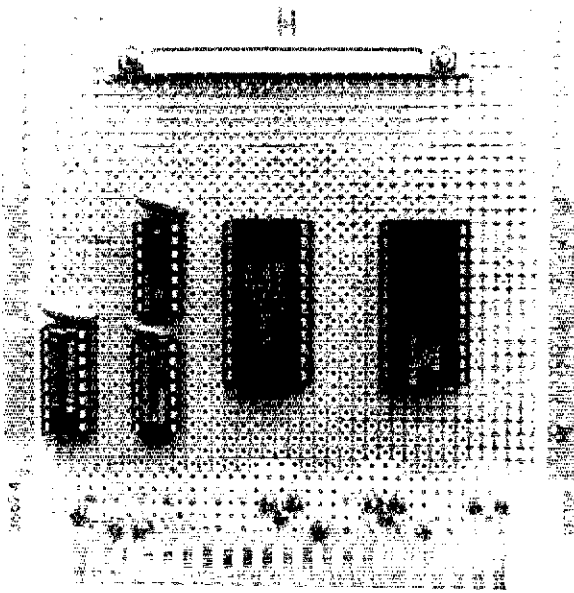
result that a logic 0 is clocked through to the U2A Q output. This output is inverted by U3, thereby turning off K1. K2 operation is similar.

Whenever a computer is used to switch potentially hazardous voltages, it is important to pay close attention to safety measures. It is entirely possible for a malfunctioning program to actuate either of the relays unexpectedly. If the relays are used to apply line voltage to a high-voltage power supply or to control an antenna rotator, the unintentional activation could lead to disaster. Because of this, manual-override switches have been included in series with the relay coils. Whenever the computer is in use for pur-

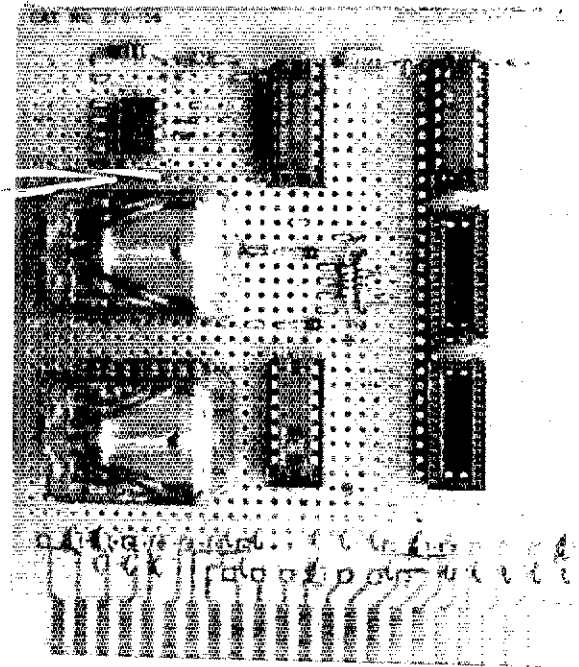
poses other than relay control, or the equipment controlled by the relays is being serviced, it is a good idea to defeat relay operation by opening the override switches.

It is also necessary to ensure that every time the computer and the relay controller are turned on the relays remain de-energized. A power-up initialization circuit, consisting of comparator U4 and associated resistors and capacitors, sets flip flops U2A and U2B to known states by briefly holding their CLEAR inputs low when power is first applied. After a short delay, the CLEAR is released and the operation of the relays may be controlled by the computer. The delay length is

governed by the time constant of the 1.5-M Ω resistor and the 0.47- μF capacitor. The reference point is set by the voltage divider connected to the inverting input of U4. If it is necessary for the computer to actuate a relay as part of its power-up initialization program, it should be possible to add a three-state buffer (a 74LS367, for example) that is enabled by a port 0 input operation. This buffer can direct the CLEAR signal onto the data bus, so the computer can monitor the status of the relay initialization. Similarly, it may be desirable to direct the flip flop outputs onto the data bus through three-state buffers, so that the computer can determine the state of each relay.



A Vector 3662-4 plugboard serves as the foundation for the port decoder. The 44-pin card-edge connector is used to make connections to the other interface boards. Connections to the TRS-80 bus are made through the 40-pin double-row connector at the top of the board.



The relay controller was constructed on a Radio Shack no. 276-156 plugboard. Wires connected to the relay contacts are soldered directly to the plugboard.

With the addition of another 74LS02, a 74LS74 and a 7406, the circuit can be expanded to allow the control of four relays. The new circuitry should be wired identically to the schematic shown in Fig. 4, except that the connections to D0 through D3 should be replaced by connections to D4 through D7, respectively. Table 1 can be expanded to reflect the additional relays.

Serial-Communication Interface

An RTTY character is transmitted by sending a bit pattern corresponding to the character across a communication link, one bit at a time. The serial-communication interface reassembles a received data stream into bit patterns corresponding to the original transmitted characters, and provides those patterns in parallel format to the microcomputer. The interface also works in the other direction, accepting parallel bit patterns from the microcomputer and sending them bit-by-bit to an AFSK generator, a modem or another computer interface.

The serial-communication interface characteristics are flexible — they may be changed under program control. A program may set the transmission bit rate to any of ten common speeds. An asynchronous data format is used. The number of data bits per character may be set to 5, 6, 7 or 8, and the number of stop bits may be set to 1 or 2, to accommodate the transmission of Baudot, ASCII and other common codes. Parity checking is not selectable by the interface software. If parity checking is desired, it may be "hard

wired" onto the board, or it may be implemented in software for character lengths of up to 7 bits. Three output ports and two input ports are used to control the interface operation. Inputs from and outputs to the communication equipment (RTTY demodulator, AFSK generator, etc.) correspond to a subset of the EIA RS-232C standard.

The serial-communication interface circuit (Fig. 5) may be broken into three major functional blocks: programmable bit-rate selection, serial-to-parallel and parallel-to-serial conversion, and communication equipment interface.

The software-selectable bit rate may be set to any of the four common Baudot transmission speeds corresponding to 60, 66, 75 and 100 words per minute, or to any of six common ASCII bit rates (110, 300, 1200, 2400, 4800 or 9600 bps). A single clock controls the transmit and the receive data rates, but, if the interface is operated in the half-duplex mode (alternating transmission and reception), it is possible for the controlling software to select different transmit and receive rates. The basis of the bit-rate-selection circuit is a Motorola MC14411 bit-rate generator. This large-scale integrated circuit functions as a combination oscillator and multistage frequency divider. A 1.8432-MHz quartz crystal controls the oscillator frequency, and the divider provides a selection of standard clock frequencies at the output pins. The serial-to-parallel conversion circuit requires a clock frequency of 16 times the desired data bit rate. The common ASCII bit-rate clock

frequencies are available directly from the bit-rate generator. External dividers (U7, U9 and U10) are used to derive the standard Baudot speeds (60, 75 and 100 wpm) from the MC14411 output frequencies. The resultant Baudot clock frequencies are not exact, but they are quite close, typically differing from the desired frequencies by about one percent. Errors this small are insignificant. The available frequencies are listed in Table 2.

Software selection of the bit rate is accomplished by directing a Communications Control Word (CCW) to output port B (B is the hexadecimal representation of decimal 11). The four low-order bits of the CCW are latched from the microprocessor data bus when the port B output-select pulse, generated by the port decoder, clocks U2. The four high-order bits of the CCW are simultaneously latched by U1. These bits are used to select the characteristics of the serial conversion circuit, which will be described shortly. Three of the low-order CCW bits are used as inputs to a 1-of-8 data selector, U4, which routes the chosen bit-rate

Fig. 5 — Serial-communication interface schematic diagram. P1 is a 44-contact card-edge connector. All resistors are 1/4-W, 5%-carbon film or composition. Unless otherwise noted, all capacitors are 16-V, disc-ceramic. Numbered components not listed below are for text reference only.
P2 — 25-pin male D-type connector.
U3 — General Instruments AY5-1013, AY5-1013A, AY5-1014 or equiv. UART.
U8 — Motorola MC14411 bit-rate generator.

EXCEPT AS INDICATED, DECIMAL VALUES OF CAPACITANCE ARE IN MICROFARADS (μ F); OTHERS ARE IN PICOFARADS (pF OR μ pF); RESISTANCES ARE IN OHMS; K=1000, M=1000000

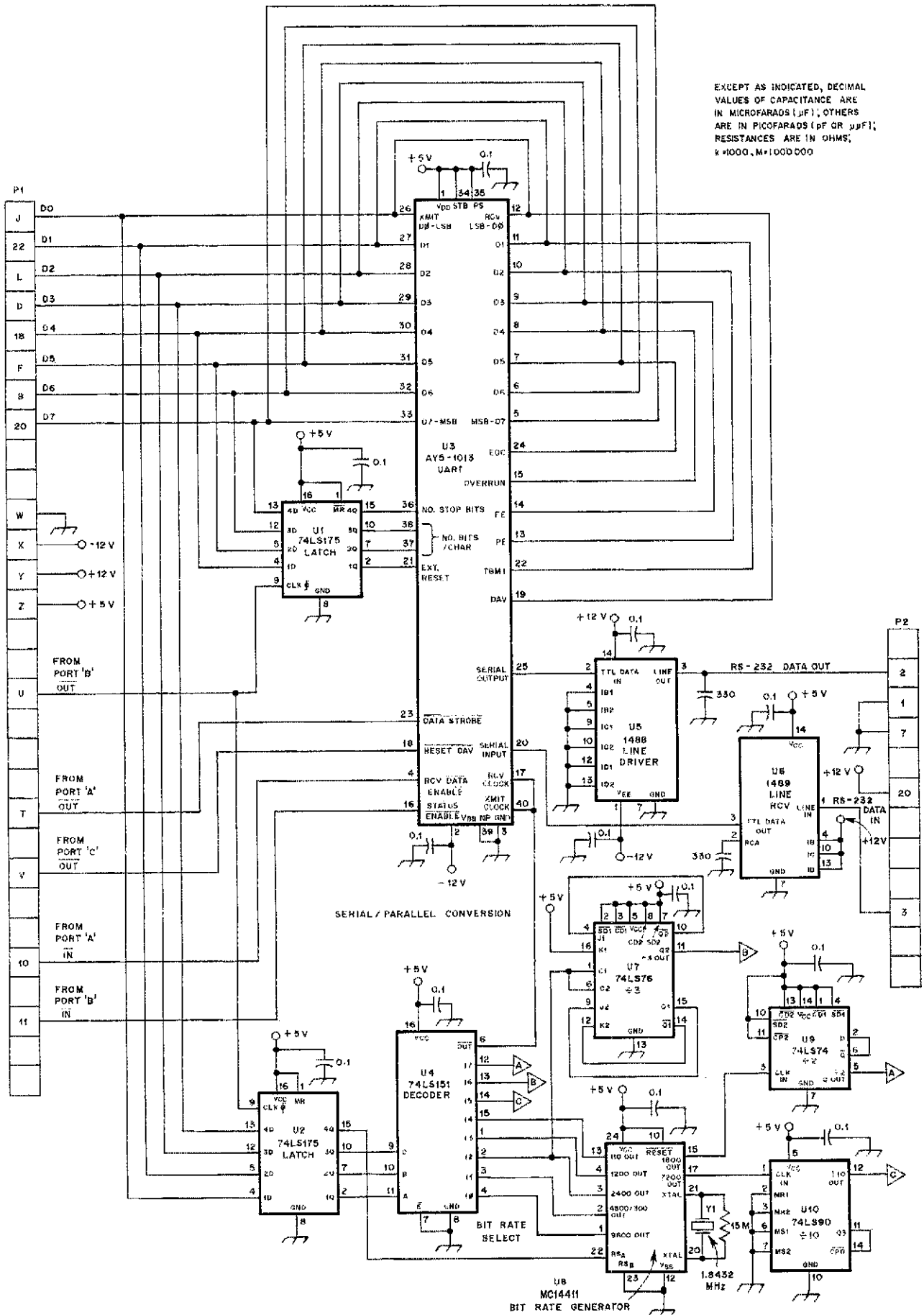


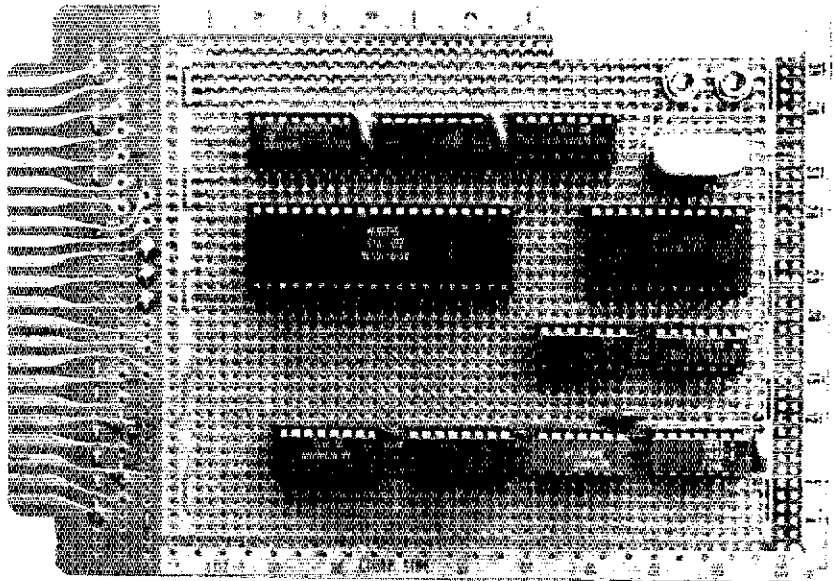
Table 2
Available Bit-Rate Frequencies

Bit Rate (bps)	Desired Freq. (Hz)	Actual Freq. (Hz)	Error (%)	Format
45.45	727.2	720	- 1.0	60-wpm Baudot
50	800	800	0.0	66-wpm Baudot
56.92	910.7	900	- 1.2	75-wpm Baudot
74.2	1187.2	1200	+ 1.1	100-wpm Baudot
110	1760	1758.8	- 0.07	ASCII
300	4800	4800	0.0	ASCII
1200	19,200	19,200	0.0	ASCII
2400	38,400	38,400	0.0	ASCII
4800	76,800	76,800	0.0	ASCII
9600	153,600	153,600	0.0	ASCII

clock signal to the serial conversion circuit. The fourth CCW bit is used as an input to a rate-select pin of the MC14411; it chooses an appropriate internal division ratio for the desired output frequency. The proper settings for the CCW bits are given in Fig. 6.

Serial-to-parallel and parallel-to-serial conversions are performed by a single large-scale integrated circuit called a Universal Asynchronous Receiver Transmitter, or UART. The UART can be divided logically into two independent sections: A receiver section, which converts a received serial bit stream into a parallel bit pattern, and a transmitter section, which converts a parallel bit pattern into a serial-by-bit data stream. Characteristics common to both sections include the number of data bits and stop bits per character, parity generation and detection and (in this circuit) the data rate. Three of the high-order CCW bits are used to select the number of data and stop bits per character. The remaining CCW bit may be used by a program to reset the UART to a known state prior to starting data transmission or reception. Fig. 6 defines CCW bits used to select these functions, and some typical CCWs are shown in Table 3.

A Status Control Word, or SCW, is provided in the UART. This allows the microcomputer software to determine when the UART receive buffer contains a complete character, as well as to ascertain when the UART transmit buffer is prepared to accept a character from the microprocessor. There are two bits in the SCW that provide these important functions (Fig. 7). Execution of an input from port B causes the SCW to be applied to the data bus, where it is captured by the microprocessor. The SCW Data-Available bit (labeled DAV on the schematic) is set to 1 by the UART after a character has been received properly. After checking the SCW for the presence of the DAV bit, the microcomputer may retrieve the received character by per-



A Vector 3682-8 plugboard was used for the serial-communication interface board. The bit-rate generator and crystal are located at the upper-right-hand corner of the board. The 40-pin IC near the board center is the UART.

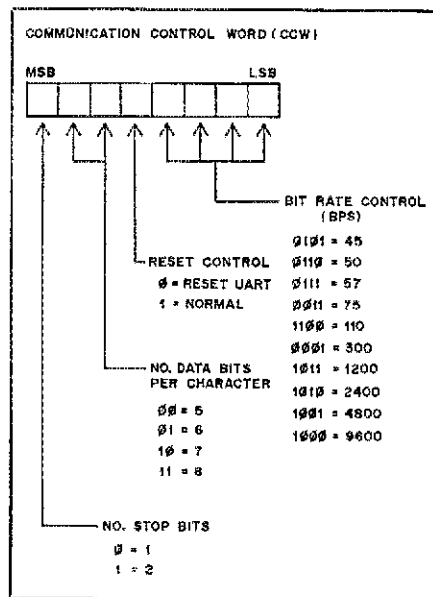


Fig. 6 — A Communication Control Word (CCW), output by the program to port B, controls the selection of the bit rate and the number of data and stop bits per character.

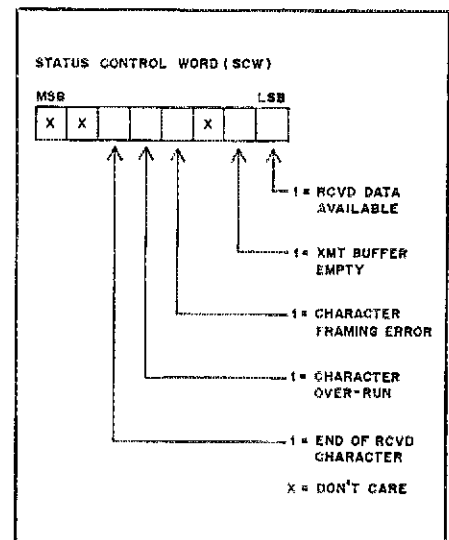


Fig. 7 — The UART Status Control Word (SCW) allows the program to determine the state of the UART and the action to be performed next. The program reads the SCW by executing an input from port B instruction.

Table 3
Typical Communication Control Words (CCW)

Mode	CCW (MSB)	Hex Equiv. (LSB)
60-wpm Baudot Transmit	1 0 0 0 0 1 0 1	85
60-wpm Baudot Receive	0 0 0 0 0 1 0 1	05
110-bps ASCII	0 1 1 0 1 1 0 0	6C
300-bps ASCII	0 1 1 0 0 0 0 1	61

forming an input operation from port A. The port A input select pulse causes the UART to place the received character on the microprocessor data bus, and the input operation places the character in a CPU register. It may then be examined and manipulated by the program. Following the character input operation, it is necessary for the program to reset the DAV bit by performing an output to port C. This prepares the UART to receive the next RTTY character. It is not necessary to output any specific data byte to port C to reset DAV, as the output select pulse

performs that function. This type of operation is often referred to as "handshaking." The UART informs the microprocessor that data is available, the microprocessor reads the data, then alerts the UART that the data has been read and allows the UART to process the next received character.

A form of handshaking is required on the transmit side as well. Before sending a character to the UART transmit buffer, the program must verify that the transmit buffer is empty (and hence prepared to accept a new character) by checking the SCW bit labeled TBMT. If TBMT is set to 1, the transmit buffer is empty and the microprocessor may output a character to the UART. If TBMT is set to zero, the UART is not ready to accept another character, and the program will have to check the TBMT status in a loop until the UART is ready to proceed. A summary of the usage of input and output ports used by the serial-communication interface is given in Table 4.


The serial-data in and serial-data out pins of the UART are TTL compatible. To connect the serial communications interface to "real-world" devices, it is necessary to convert the TTL output level to RS-232C levels, and to convert RS-232C input levels to TTL. In its simplest terms, the RS-232C standard defines a logic 1 as a negative voltage within a certain voltage range, and a logic 0 as a positive voltage within a specified range. U5 performs the TTL to RS-232C conversion for the output data. A TTL logic 1 applied to pin 2 of U5 results in a negative 12-V signal at the output, pin 3, and a TTL logic 0 at pin 2 is converted to a positive 12-V output at pin 3. U6 performs the level conversion for received RS-232C data. Both U5 and U6 have spare sections, which may be used to implement some of the other functions defined by the RS-232C standard.

The functions provided by the port decoder, the relay controller and the serial communication interface may be accessed by programming statements in machine or assembler language, or in a higher-level language such as BASIC. Although a program can be written in BASIC to send and receive RTTY at 60 wpm, it is doubtful that a BASIC program will execute fast enough to permit copy at full machine speed for any of the higher data rates. Programs should be written in machine or

assembly language to take advantage of the higher execution speed available. It should be possible to write relay-control programs in BASIC, including keyboard-to-Morse programs for moderately fast code speeds.

Construction

The interface is constructed on three plug-in perforated boards using wire-wrap techniques. A 40-conductor ribbon cable terminating in a Radio Shack type 276-1558 or equivalent card edge connector is used to bring the address, data and control buses from the TRS-80 to the port decoder board. The cable may be wired directly to terminals on the board, or a special 40-pin connector, such as the one shown in the photograph, may be mounted on the port decoder board. The schematic diagrams show the Radio Shack bus pin numbers for the TRS-80 signals that are used with the interface. Be certain to double-check that the card-edge connector is inserted properly in back of the TRS-80, and that the pin numbers on the connector match the TRS-80 board pin-numbering scheme. While a common ground is necessary between the TRS-80 and the interface boards, separate +5 V, +12 V, and -12 V power supplies must be used to power the interface. It is not possible to use the TRS-80 supplies for this purpose. The port decoder is constructed on a Vector 3662-4 plugboard, which mates with a 44-pin pc card connector. The serial-communication interface is built on a 3662-6 plugboard, and the relay controller uses a 3662-4 board. With this scheme, three 44-pin edge connectors could be mounted in a card cage, with like pins on each connector wired in parallel to form a bus or "motherboard." The signals available on this bus include input and output select lines for each port, the eight bits of the data bus and the power and ground connections. The schematics of the three boards designate the Vector socket/plugboard pin-numbering scheme. The port-decoder schematic shows three TRS-80 signals, labeled SYSRES, INT, and INTAK, replacing three of the port-select lines to allow for future expansion. It may be possible to construct the relay controller on the same board as the port decoder to maximize the utilization of the available ports within the constraints of a 44-pin bus. If additional functional modules are added to this bus, it may be necessary to include a bidirectional data bus buffer on the port-decoder board to satisfy the drive requirements of the additional devices.

With the addition of this interface system, your TRS-80 microcomputer will become a versatile part of your amateur station. In addition to the obvious RTTY applications, the interface will allow you to implement many other station functions. Your imagination may be your only limit. 

Strays



Bob Heil, K9EID (right), of Marissa, Illinois, receives the Radio Amateur of the Year Award from Judge Stanley S. Phillips at the 1892 Dayton (Ohio) Hamvention. Bob, who has written many articles for *QST* (most recently, July 1982), was cited for his many personal and technical contributions to Amateur Radio, particularly his work in vhf and audio. (photo by Harrison Church)

QST congratulates . . .

□ Commander John Scott Redd, K0DQ, of the *USS King*, on earning the Navy Battle Efficiency Competition award.

AMATEUR RADIO COURSES IN BRAILLE

□ The Hadley School for the Blind in Illinois has available two courses of study in Braille for radio amateurs: Amateur Radio Course I, which prepares the student for the Novice exam, and Amateur Radio Course II, based on the ARRL *Radio Amateur's License Manual*, which prepares the student for the Technician/General exam.

For more information, write to the attention of Byron Eguiguren, WD9IAN, Hadley School for the Blind, 700 Elm St., Winnetka, IL 60093. — Jon Hollingshead, K9BIO, Zion, Illinois



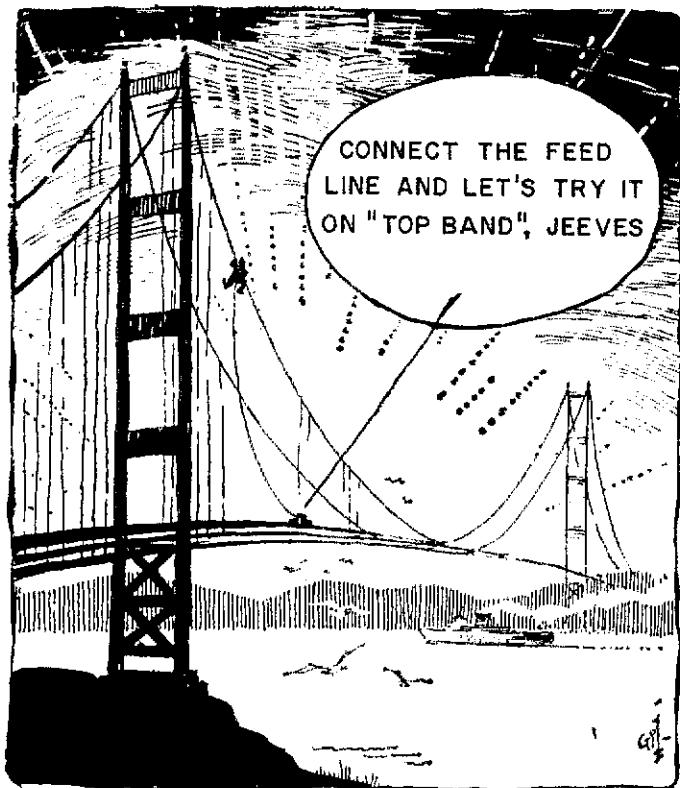
Bruce Humphrys, K0HR, gives his acceptance speech at the Dayton (Ohio) Hamvention last April after receiving the Special Achievement Award for his many years of service to handicapped persons through Amateur Radio. Humphrys is director of the Handi-Ham System in Golden Valley, Minnesota, a local project he has helped build into an international operation. (photo courtesy N8ADA)

Table 4

Serial-Communication Interface Port Assignments

Port	Output	Input
A	Transmit Data Out	Receive Data In
B	Communication Control Word	Status Control Word
C	Reset Data Available Indicator	Unused

The "K4YF Special" Antenna



Need a compact, broadband antenna for 80 and 160 meters? If size is an overriding consideration, this antenna will provide good performance in a minimum of space.

By John L. Wilson,* K4YF

My 70-ft \times 20-ft backyard¹ is far too small to accommodate an 80-meter dipole or ground-plane antenna. Operation on 160 meters appeared entirely beyond consideration. I wanted a good match over the entire 80-meter band, with a low radiation angle to work DX. Early experiments with an inverted L for 80 meters evolved into the present configuration. Only an accident revealed the possibility of using it on the newly expanded 160-meter band.

Construction Details

On 80 meters, the radiator of the K4YF Special is a closed wire rectangle, 60 \times 4 feet, fed at a corner by the center conductor of a 52-ohm coaxial cable. The cable shield is connected to two radials. The radiator is supported near its center by a PVC-pipe spreader, mounted at right angles to a 40-foot mast that is bracketed to the side of the house. The radiator forms a narrow inverted V.

Fig. 1 shows the details of my installa-

tion. The two end spreaders and the center support are pieces of 3/4-inch PVC pipe. This material is available from most hardware and building supply stores. Holes are drilled 4 feet apart in each end of the spreaders, and the antenna wire is threaded through the holes. The center spreader is 5 feet long, to hold the antenna about a foot away from the house. The 4-foot spacing is not critical, and even a 2-foot spacing gives good bandwidth on 80 meters.

I keep the V tightly closed so that most radiation will be vertically polarized. The use of 1-foot lengths of PVC pipe at the apex to slightly spread the top of the V might be useful. Tie the antenna off at a corner rather than at the center of each end spreader. Otherwise, it will twist "slowly, slowly in the wind."

The Ground System

It would have been desirable to have an extensive system of 1/4-wavelength radials, but that was not feasible. I was surprised to find that something far less involved will work well on 80 meters, and acceptably on 160 meters.

I "made do" with two 70-foot radials.

They are not extended in a straight line, as would be preferred; rather, they follow a convenient path around the side of the house and along the fence of my yard. Prior experience taught me that earth grounds using metal stakes are not generally satisfactory for grounding antenna systems. These radials provide a reasonable ground system for the antenna.

The angle between the ground radials and the feed line affects the antenna input impedance. A gentle 30° droop below horizontal produced a matched condition between the feed line and the antenna.

160-Meter Operation

One evening, a temporary splice in the antenna wire broke. Since the antenna would no longer work on 80 meters, I commenced tuning the newly expanded 160-meter band. To my surprise, the antenna was nearly resonant. The radiator was now a 130-foot wire, albeit bent in a peculiar fashion.

Currently, to operate on 160 meters, an spdt relay breaks the rectangle at the corner next to the feed point and adds 20 feet of wire to that end. This resonates the

¹Notes appear on page 27.

*3824 North Woodrow St., Arlington, VA 22207

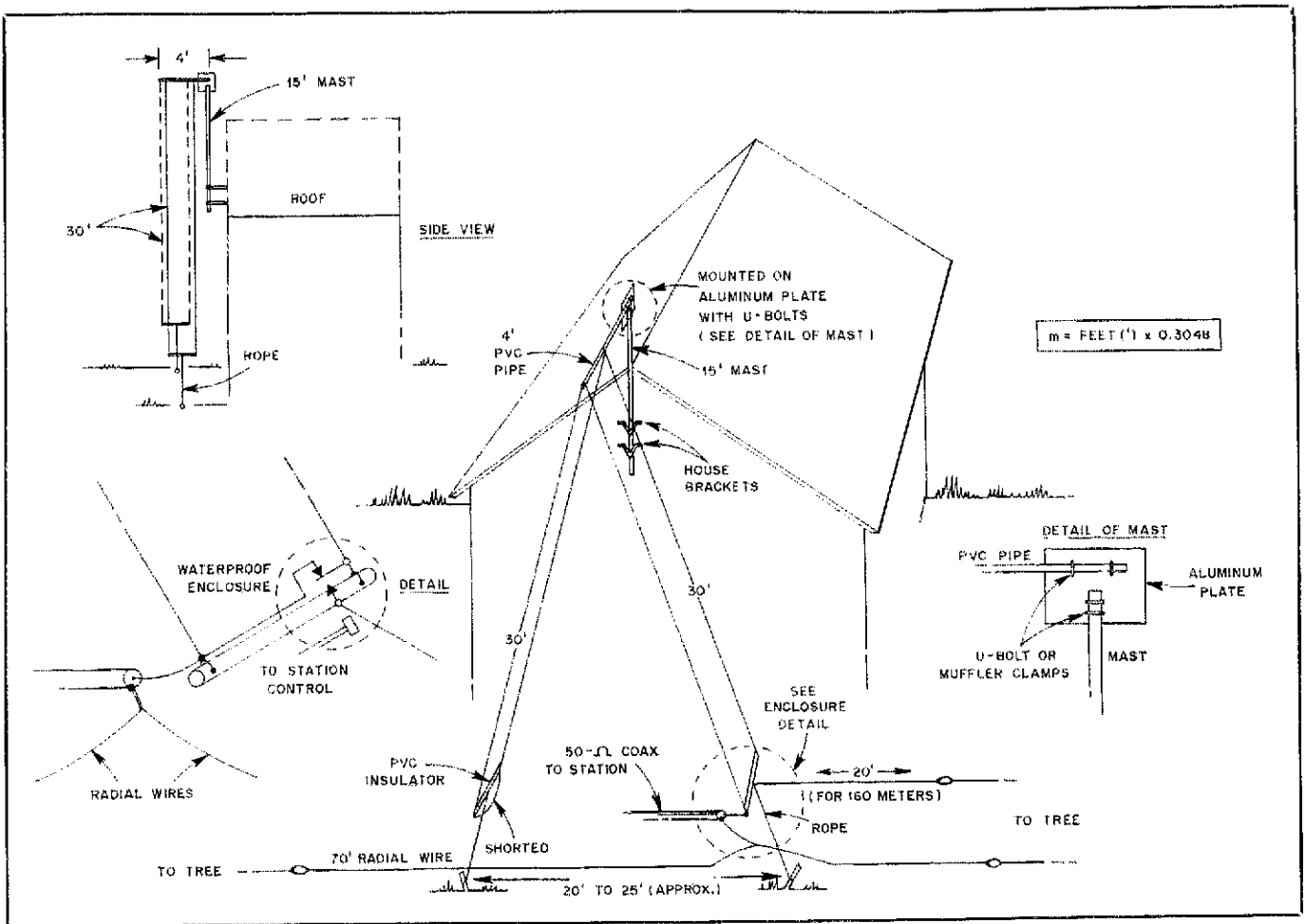


Fig. 1 — Construction and mounting details for the K4YF Special.

system at 1805 kHz. I mounted the relay in a waterproof box fastened to the end spreader.

Tuning the Antenna

I recommend the use of an antenna noise bridge to adjust the length for resonance at your favorite operating frequency on 160 meters. For best results, this also requires the use of an electrical $1/2$ wavelength of coaxial cable, inclusive of the velocity factor (approximately 180 feet). A noise bridge permits accurate measurement of the resonant frequency and the impedance of the antenna. When antennas are high and in the clear, textbook formulas and an SWR indicator may suffice; but when the antenna is crowded and the ground system is makeshift, the noise bridge is quite helpful.

On 80 meters, the antenna has a feed-point impedance of approximately 60 ohms at the resonant frequency of 3575 kHz. It has an SWR of less than 2:1 over the entire 3.5- to 4-MHz range. The antenna also has a feed-point impedance near 60 ohms at the resonant frequency on 160

meters (1805 kHz), but the SWR rises rapidly beyond ± 40 kHz from that frequency.

Performance

As expected, the antenna exhibits a low radiation angle because of the mostly vertical configuration. The antenna works quite well on 80 meters for paths over 2000 miles.² It is not as good as a full-size ground-plane antenna, but seems better than a dipole at 50 feet. Like most verticals, the K4YF Special is noticeably poor for daytime operation. The first time I used the antenna on the 160-meter band, I managed to work stations in Idaho and French Saint Martin. This antenna does not appear to work as well as a 160-meter dipole at 50 feet, or a top-loaded vertical — but then it fits into my yard.

If space and height are not severely limited, the performance of the K4YF Special may be appreciably improved by treating it as a $1/4$ - λ sloper. This would be easy to construct, puts the current point high above ground, and radiates a maximum signal in the direction of slope.

With a 60-foot tower, the radiator rec-

tangle would slope down from near the top of the tower at a 30° angle with the vertical. No center spreader is needed in this case. The shield of the coaxial cable should be grounded to the tower. The antenna will exhibit broadband characteristics on 80 meters, which distinguishes it from a simple $1/4$ - λ , ground-plane antenna.

If you break the rectangle at the feed point, this antenna can be used on 40 meters as a full-wave loop. It will have a feed-point impedance of about 200 ohms, and so will require a matching system for use with 52-ohm coaxial cable. This would involve a more complex switching arrangement. Since I have no need for another 40-meter antenna, I did not undertake this work.

If your antenna space is limited, try a K4YF Special. Experiment with different configurations. Perhaps you can improve the performance, but one thing is for certain: It works better than no antenna at all.

Notes

¹m = ft \times 0.3048.

²km = mi \times 1.6093.



The Half-Delta Loop: A Critical Analysis and Practical Deployment

A delta-shaped, grounded half-wavelength loop offers superior performance over the half- and full-sloper antennas. Low-band DXers should find this antenna effective for multiband operation.

By John S. Belrose,* VE2CV and Doug DeMaw,** W1FB

Is DXing one of your pursuits? Are you having inferior results with wire antennas for the 160-, 80- and 40-meter bands? Or, would a particularly good multiband antenna satisfy your needs for general communications in the mf and hf spectrum? If the answer to any of these questions is "yes," this paper will provide the information you may be looking for.

The Half-Delta Loop contains a sloping wire, approximately $\lambda/3$ in length, which is attached to the top of a grounded tower about $\lambda/6$ high. Feed to the antenna is applied between the lower end of the sloping wire and ground. Radial wires should be connected to the feed-point ground and the grounded end of the tower. This antenna is the grounded equivalent of a full-wavelength Delta Loop, apex down, apex-fed, that has been rotated through 90 degrees. The lower half is replaced by its image in the ground plane (see Fig. 1).

In a previous paper by author Belrose,¹ data obtained on an outdoor antenna-pattern range were presented to show the polar diagrams for the modeled antenna, measured at f_0 , $2f_0$, $3f_0$ and $4f_0$, where f_0 is the antenna fundamental frequency, or the frequency at which the half loop and its image equal one wavelength. Radiation

is to some extent like that of a monopole-antenna array: The radiated field is dominantly vertically polarized, and the maximum in the vertical-plane pattern is directed at the horizon. However, the azimuthal pattern is complicated. At f_0 it is elliptical, with maximum gain (5 dBi) in the directions that are broadside to the half loop. At $2f_0$, $3f_0$ and $4f_0$ the antenna is bidirectional, with maximum gain in opposite directions in the plane of the half loop. Nulls in the pattern are found in the broadside directions.

It was noticed that while the input impedance was low at f_0 and at all harmonics, resonance did not occur at exact multiples of f_0 . This paper (1) examines in detail the impedance-frequency variation; (2) describes experience in practical deployment of the antenna at full scale; and (3) discusses the practical situation where the supporting tower, which is part of the radiator, bears a triband Yagi, which is typical of most amateur situations.

Half-Delta Loop Modeled

A Half-Delta Loop was modeled at 200 MHz; i.e., the half loop and its image in the ground plane was a 1-wavelength loop with 200-MHz resonance. The mast was a copper rod that was 0.3175 cm in diameter and 28.25 cm high.² The sloping wire was twice this dimension — 56.5 cm long. Antenna mounting was done on a 1-1/2

meter square ground plane. A Hewlett-Packard 4191A rf impedance analyzer was used to measure the impedance. This microprocessor-controlled instrument provides, among other facilities, electrical-length compensation. This permits extension (up to 100 cm) of the test-port-to-measurement point, as needed to measure antennas. The machine-plotted impedance-value measurements are, therefore, the impedance of the Half-Delta Loop at its input. Measurements were made via a type-N chassis-feedthrough connector, fed through the ground plane to the measurement instrument located beneath.

The impedance $|Z|$ and θ for the frequency range of 180 to 980 MHz are shown in Figs. 2 and 3. Notice the loop resonance (low Z and θ equal to zero) occurred at 203, 350, 545, 737 and 873 MHz. The Half-Delta Loop and its ground image was 1, 2, 3, 4 and 5 wavelength loop-resonant at these frequencies (Table 1).

If λ_n is the wavelength at a resonant frequency, f_n , where n is the integral number of electrical wavelengths around the loop and its image of length l , then

$$l = k_n n \lambda_n \quad \text{and} \quad (\text{Eq. 1})$$

$$k_n = \frac{l}{n \lambda_n} \quad (\text{Eq. 2})$$

¹Notes appear on page 32.

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**ARRL Senior Technical Editor

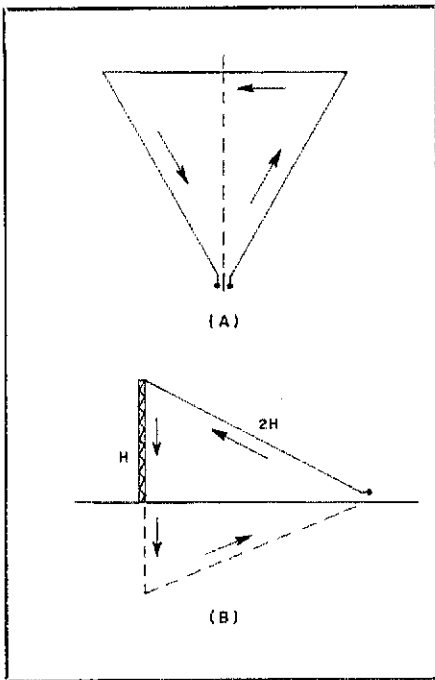


Fig. 1 — Illustration of (A) a conventional full-wave Delta Loop and (B) the grounded version with its image half in the ground plane.

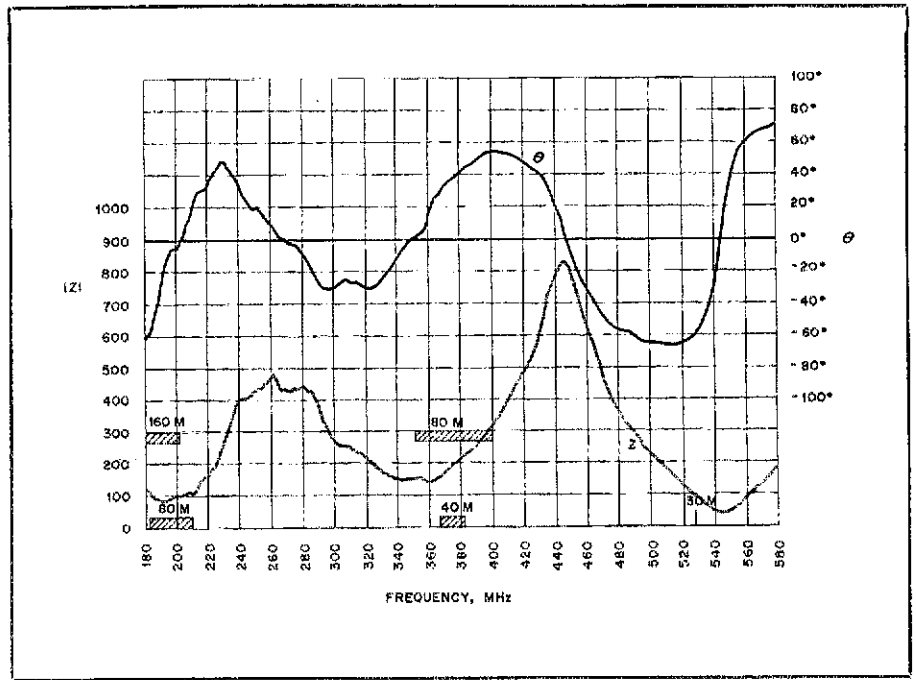


Fig. 2 — Curves that show the feed impedance of the Half-Delta Loop versus operating frequency for the scaled model. The upper curve relates to θ . Corresponding full-scale model frequencies are noted.

where k_n is a factor that relates the physical and electrical lengths. Values for k_n , deduced from the measured values for f_n , are also given in Table 1.

Notice that except for the 1-wavelength loop resonance, the electrical and physical lengths are approximately equal; i.e., $k_n \approx 1$, within an uncertainty that is probably experimental error (± 3 percent). While this is an interesting fact, since the electrical and physical lengths at f_0 are significantly different (15 percent), the higher-order resonant frequencies are not integral multiples of f_0 . If the Half-Delta Loop is employed for amateur communications, therefore, the physical size and resonant conditions must be a compromise. Table 2 contains dimensions (estimated) for a Half-Delta Loop for use on 80, 40, 30 and 20 meters. The average scale factor is, therefore, 52.26, and for this scale factor the band edges can be marked on Figs. 2 and 3. The mast height at full scale would be 14.76 m (48.4 feet), the length of the sloping wire 29.53 m (96.8 feet) and the diameter of the mast would be 166 mm (6.5 inches).

A similar analysis for a Half-Delta Loop designed for use on 160, 80 and 40 meters yields a scale factor of 100.44. This corresponds to a tower height of 28.37 m (93 feet). The length of the slope wire would be 56.76 m (186.2 feet).

Half-Delta Loop, Tower and 20-M Yagi

The curves in Fig. 4 show impedance-frequency plots for a Half-Delta Loop alone, and connected to a tower that supports a 3-element, 20-M, wide-spaced Yagi. For these measurements, since a

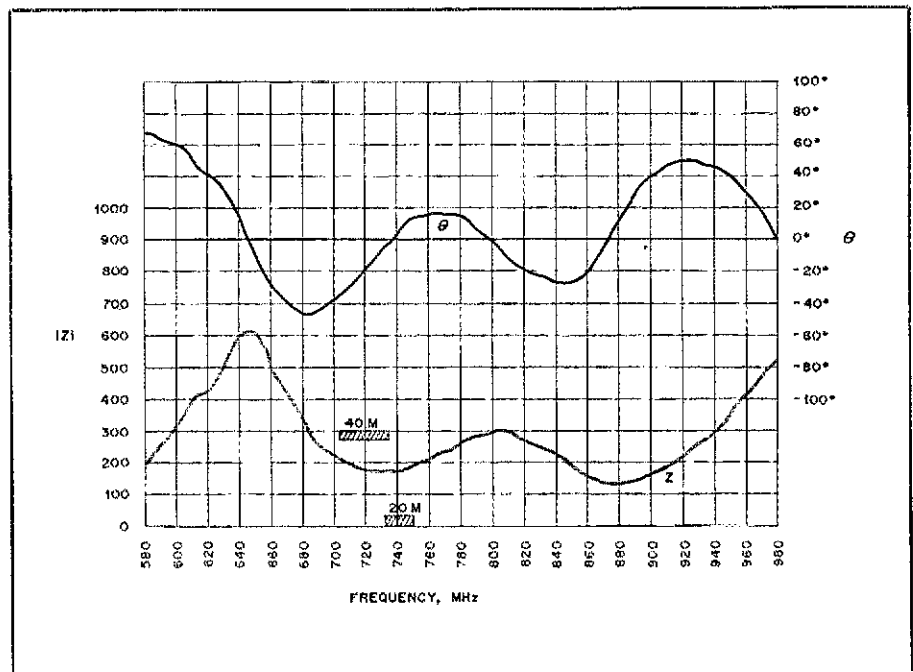


Fig. 3 — Impedance and θ curves that show the corresponding full-scale performance at 40 and 20 meters.

Table 1
Scale-Model Characteristics

N	F (MHz)	R_a (ohms)	k_n
1	203	100	1.15
2	350	150	0.99
3	545	40	1.03
4	737	170	1.04
5	873	133	0.98

Table 2
Harmonic Resonances

Band (m)	Midband f (MHz)	Model Resonant f (MHz)	Scale Factor
80	3.75	203	54.13
40	7.15	350	48.95
30	10.10	545	53.96
20	14.17	737	52.00

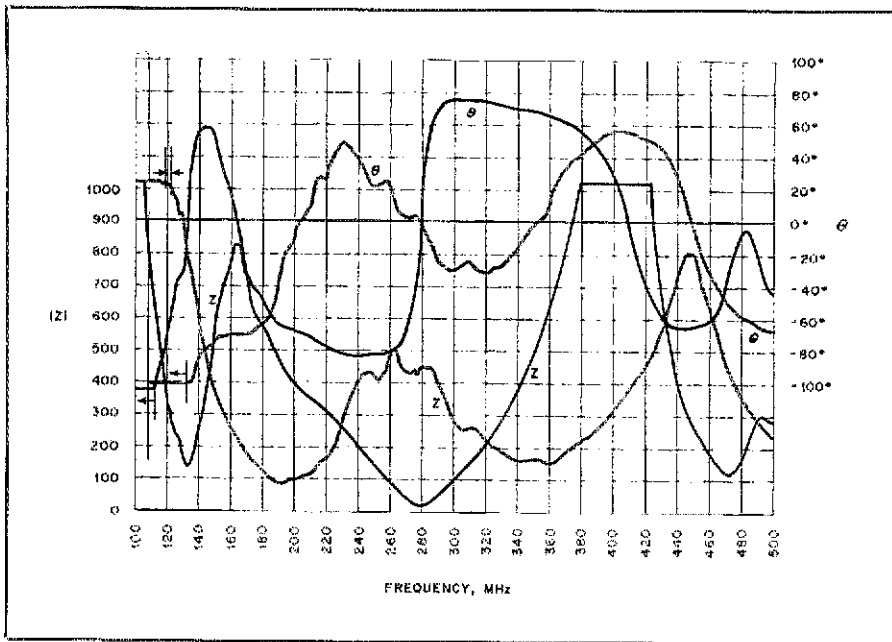


Fig. 4 — Impedance-frequency plots for a Half-Delta Loop alone, and plots for the same system with a 20-meter Yagi atop the tower. (See text.)

Yagi was modeled, the measurements refer to a particular scale factor — 53.33. It was assumed that the tower height was 15.06 m (49.4 feet), and that the beam antenna was attached to a mast that extended 1.6 m (5.25 feet) above the top of the tower. Notice that, as expected, the beam antenna had a marked effect on the resonant frequency of the loop antenna. The loop alone was resonant at 202 MHz (3.787 MHz at full scale), whereas the loop-mast-Yagi system was resonant at 132 MHz (2.475 MHz at full scale) and at 280 MHz (5.25 MHz). Clearly, the radiation pattern (not measured) would also be different from that of the Half-Delta Loop alone. Therefore, a Half-Delta Loop can't be deployed on a tower that supports a beam antenna. Although an antenna-matching circuit could be employed (needed even for the Half-Delta Loop alone), the resultant antenna configuration is more like a shunt-fed tower with top loading (the Yagi) than a Half-Delta Loop.

Minimizing the Beam-Antenna Effect

It is possible to stub-tune the tower to minimize reradiation from it. More than one stub can be used to "detune" a tower at more than one frequency. A possible arrangement is seen in Fig. 5. The Half-Delta Loop would be made completely from wire and insulated from the tower, and the tower would be stub-tuned to minimize reradiation from it. The optimum stub length is critical. While it should be "field tuned," a nominal length (total length plus the length of the shorting element) is about 5 percent less than a quarter wavelength. This should provide satisfactory results.

Ideally, *each* leg of the tower should be stub-tuned, since this arrangement reduces the reradiation best and provides the greatest bandwidth. If the tower is less than a quarter wavelength, it will be necessary to tune the stub by connecting a capacitor across the open end of it. But, this will reduce the bandwidth of the system. It will also complicate the mechanical/electrical construction. Optimum tuning will be tricky without instrumentation. The simplest adjustment method is to tune for minimum current in the portion of the tower below the stub. A current probe will be required if this is done. A suggested technique is shown in Fig. 6. It has been used successfully by author DeMaw for probing shunt-fed towers. A T200-2 Amidon or a Micrometals powdered-iron toroid core ($\mu_i = 120$) is sawed in half, then taped together with the tower leg inside the center hole.

Practical Deployment at Full Scale

The VE2CV professional test-range results were confirmed generally during practical analysis of the Half-Delta Loop at full scale (Fig. 7). The differences in test conditions were the two ground systems (an ideal ground plane at VE2CV and a mediocre buried-radial system at W1FB) and a disparity in the cross-sectional area of the slant wire at W1FB with respect to that of the scaled version at VE2CV. The latter would have required no. 40 wire to represent approximate scaling of the no. 16 wire used in the full-scale example, which would have been impractical. No. 22 wire was used for the 200-MHz scaled model. Therefore, at full scale the impedances at the anti-resonant frequen-

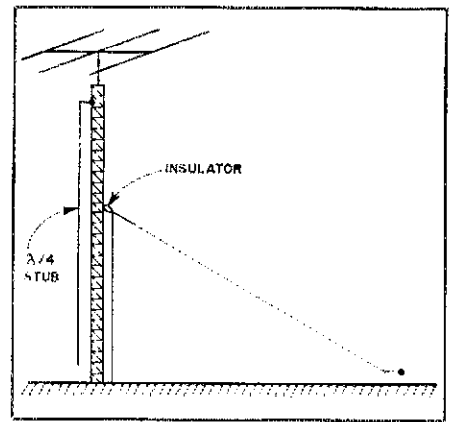


Fig. 5 — Suggested arrangement for stub-tuning the tower when the loop is insulated from the tower and a 20-meter or other beam antenna is affixed to the tower. (See text.)

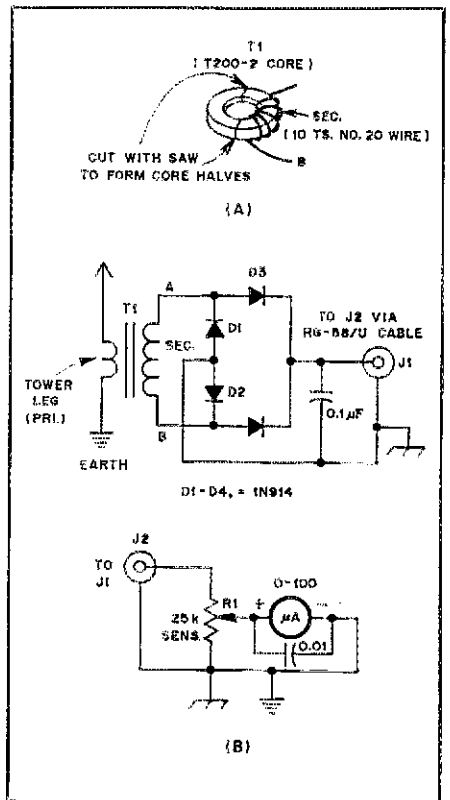


Fig. 6 — Current-probe arrangement that can be applied when adjusting the tuning stub of Fig. 5. Illustration A shows the sampling transformer, which is cut in half and installed on a tower leg (see text). The bridge rectifier and metering circuit is shown at B.

cies should be greater than those of the modeled version, but the impedances at resonance should not be much different. A cage-type or parallel-pair slope wire could be used to lower the Q of the loop, and the impedances would be reduced. Several months of testing took place at W1FB in Newington, Connecticut, during 1981 and 1982. Evaluation was carried out at 3.5, 7.0 and 14.0 MHz, with short-term

tests at 21.0 and 28.0 MHz.

Initial tests involved the use of a 50-foot³ Rohn-25 tower (unguyed). No antennas other than the Half-Delta Loop slant wire were attached to the tower. A system of 16 buried radials extended out from the tower. These wires varied in length from 60 to 110 feet. They were complemented by a 6-foot ground rod driven into the earth at the base of the tower. Four more ground rods (4 feet each) were used at the loop feed point, plus four on-ground 40-meter radials and two on-ground 80-meter radials. The composite ground system was obviously less effective than that at the VE2CV professional test range, but the results were good. It is important to recognize the need for an effective ground system when using this and other ground-dependent antennas, such as grounded quarter-wavelength verticals. The integrity of the tower-section continuity is vital also: A quality electrical joint must prevail at the junction of each tower section. A copper bonding strap across the tower-leg joints will help ensure proper electrical integrity. Crank-up towers will require special attention in this regard. This rule is applicable also in the case of Half-Sloper antennas, since the tower is an integral part of the antenna.

Early Results

The first practical model of the Half-Delta Loop was based on the VE2CV k-factor for overall length. It did not follow exactly the H-2H rule of Fig. 1, but it was close. Indeed, the harmonic relationship was not precise as performance was checked from 80 through 10 meters. In fact, the feed impedances, as measured with a General Radio 1606-A rf bridge, were substantially higher than those obtained by VE2CV on the 200-MHz model. Fortunately, the impedances were greater than 50 ohms, but not greatly so (see Table 3). The notable exception was at 7 MHz, where the value was about 1000 ohms. The advantage of having a terminal impedance greater than 50 ohms on all of the bands is that an L network can be used to provide a step-up transformation. Therefore, there is no need to reverse the network for one or more bands to shift to a step-down condition. Fig. 8 shows the network used at W1FB during practical analysis of the system.⁴

It is probable that a more effective ground system would have had some effect on the impedances measured for the full-scale model. A Kenwood TS-820S transceiver was used during the tests to provide a signal source. The resistive-resonance condition was noted for the bands of interest, as were band-edge impedances.

Some peculiar results were obtained during the first set of tests. The impedance values made little sense on certain frequencies, and suddenly the cause was

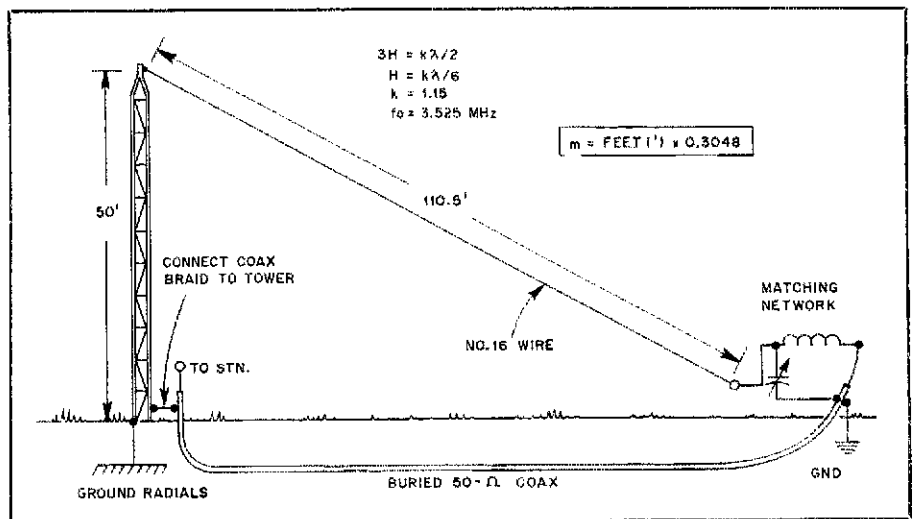


Fig. 7 — Diagram of the Half-Delta Loop deployed at full-scale for practical analysis. The matching network was controlled remotely, and was switchable for 80, 40 and 20 meters. It was housed in a weatherproof box on a short pole at the antenna feed point. The network control cable and the RG-8/U feed line were buried 3 inches in the ground and routed back to the tower (note shield braid connections to ground at each end of the antenna). See text for details of the earth- and radial-ground system.

found: The tower still contained a 30-foot shunt arm (feed line disconnected from the lower end of it) that was used to feed the tower as an 80-meter vertical. Removal of the feed arm resolved the problem. This illustrates clearly the effect of a tuned stub, as discussed earlier, on the loop system. In this example the "stub" was not desirable, since there was no beam antenna atop the tower.

Performance Characteristics

Owing to the small city lot (5/8 acre) at W1FB, it was not practical to deploy a reference dipole for performance com-

Table 3
Full-scale Characteristics

F (MHz)	R _a (ohms)	Reactance
3.5	228	+j43
3.7	620	+j14
4.0	140	-j306
7.0	1000	-j571
14.0	251	+j18
14.3	345	+j70
21.0	100	-j238
1.8	290	-j1775

Measurement results obtained at the feed point of a full-scale Half-Delta Loop. The rf impedance bridge was connected directly to the loop feed terminals. The loop was dimensioned as indicated in Fig. 7.

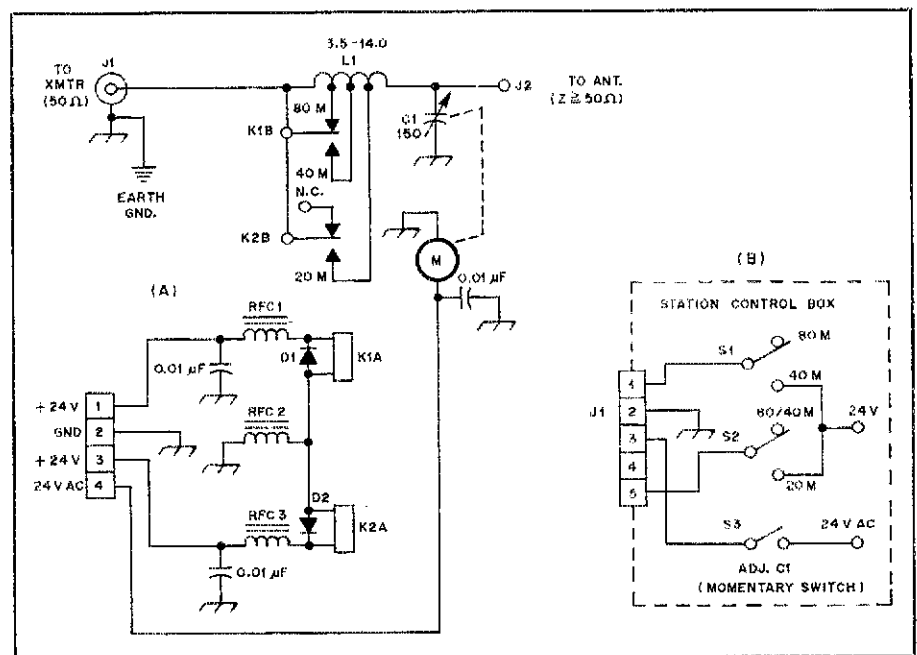


Fig. 8 — Schematic diagram of the three-band L network used to provide a match to 50-ohm cable. Specific circuit data are available from QST (see ref. 4). K1 and K2 are rf-isolated from ground to prevent arcing at high rf-power levels. L1 is a large piece of Miniductor[®] stock.

TA PROFILES

With our thanks for the expert advice we've received on rf power amplifiers and radio transmitters, we are pleased to introduce ARRL Technical Advisor Nathan O. Sokal, WA1HQC. He joined our TA family in 1979.

Nat has been a licensed radio amateur since 1967. He holds an Advanced class license. As a technical speaker, he has given several outstanding papers at radio clubs and at ARRL-organized IEEE seminars. He is the holder of a Bachelor's and a Master's degree in electronics from the Massachusetts Institute of Technology. While attending MIT, he was elected to the Eta Kappa Nu electrical engineering honor society and the Sigma Xi research honorary society. After graduating from MIT, Nat held engineering and supervisory positions with several companies. He was involved primarily with design, manufacture, field installation and operation of a wide variety of analog and digital equipment for instrumentation, control, communication, computation, and signal and data processing.

In 1965, Nat founded Design Automation, Inc., an electronics consulting company. Here he has been involved with the design (and design review) of a wide variety of electronic equipment. He is engaged also with computer simulation of electronic systems and circuits, and development of high-efficiency switching-mode power amplifiers (including rf power amplifiers) and power converters. He is a co-inventor of the Class E switching-mode rf power amplifier and of a high-efficiency, high-linearity rf power amplifier. Nat resides in Lexington, Massachusetts. He is a busy fellow, but when he has any time to spare he can be found in his ham shack and, we hope, reading *QST!* — *Marian Anderson, WB1F5B*



Meet TA Nat Sokal, WA1HQC.

parisons. Furthermore, the dipole would necessarily have been in the immediate field of the Half-Delta Loop. This would have affected the accuracy of the performance comparisons. However, the loop proved to be very effective for DX work, and is perhaps the best wire antenna that W1FB has used for that purpose at 3.5 and 7.0 MHz. Previous 80- and 40-meter antennas included full slopers, half slopers, inverted Vs and shunt-fed towers.

Many reports of RST 599 were received from European, South American and Australian stations. Some DX stations reported, "OM, you have the loudest signal from the U.S." Such reports were consistent over several months. Calls were received via "long path" from JA stations on 40 meters as early in the day as 2100 UTC. This did not happen with previous 40-meter antennas at W1FB. It was a nice experience!

Reception with the loop was somewhat superior to that while using the shunt-fed tower and half-sloper antennas. There was less man-made noise heard in the receiver, owing to the closed-loop characteristics of the new antenna. Initial receiving tests implied that something was amiss — a short or open circuit somewhere in the system: The S meter registered no noise, as opposed to the more normal noise reading of S1 to S3 on 80 and 40 meters. But, upon tuning the bands, it was learned that all was well: Signals popped up to S9 and higher, despite the otherwise quiet reception! In some locations, depending on non-ionospheric noise levels, this feature could be an asset for weak-signal reception.

Performance out to approximately 1000 miles on 40 meters seemed to be on par with that of the sloper and half-sloper antennas. This was based on a three-year weekly schedule with W8PLC and W8EEF (ARRL TA) in Michigan. At greater distances, the Half-Delta Loop appeared to outperform the slopers greatly, based on historical observations.

Indications are that the loop is rather omnidirectional at f_0 , but that it becomes increasingly directive (with gain) at the harmonic frequencies. Directivity appears bidirectional in the plane of the slant wire (north-south at W1FB), confirming the test-range findings of VE2CV. Excellent coverage was had over relatively short north-south distances on 20 meters, with S9-plus reports from as far away as Nova Scotia and southern New Jersey (in-plane); this was never the case when using the triband Yagi at 50 feet. This demonstrated the gain and directivity of the loop at the higher harmonics.

The loaded Q of the matching network of Fig. 8, plus the loop bandwidth, has been entirely suitable for covering 50 kHz on 80 meters, 100 kHz on 40 meters and 200 kHz on 20 meters without readjusting the network. This provided operation well within the 1.5:1 VSWR points for each

band. The network is remote-controlled from the shack, thereby negating a need to go to the rear of the property to change bands or tune the network.

Recent Tests


A Cushcraft A4 triband Yagi was placed atop the tower in early 1982. The results were devastating with respect to the loop performance. In order to reestablish resonance and obtain a matched condition, the slant wire had to be shortened by some 25 feet. Although performance remained good, it no longer equalled that of the correctly dimensioned loop. Resonance was checked with a calibrated dip meter before the slant wire was shortened. The readings changed from 3.5 and 7 MHz to 2.5 and 5 MHz, indicating the effect from the Yagi. This supports the findings of VE2CV, reported earlier in this paper. It appeared that the revised system performed as a shunt-fed tower with delta feed (or slant-wire feed).

Summary Comments

One need not have a tower to use the Half-Delta Loop antenna. A telescoping mast (joints bonded electrically) can be used as the vertical member of the loop. Similarly, a tree can serve as a vertical support. In this instance, it will be necessary to employ a drop wire from the top of the tree to ground, thereby providing the necessary conductor that would otherwise be formed by the tower. The drop wire should not touch the trunk, limbs or leaves of the tree.

A Half-Delta Loop should serve admirably for multiband use during Field Day operations. It offers an excellent alternative to complicated directive arrays on the lower bands. It should appeal also to those with small city lots.

Acknowledgments

Author DeMaw wishes to express his gratitude to Jack Belrose for providing early-on information concerning the scale-model tests. Thanks is given to Jerry Hall (K1TD) and George Collins (KC1V) of the ARRL staff for their help in making performance measurements on the first model of the full-scale Half-Delta Loop. 

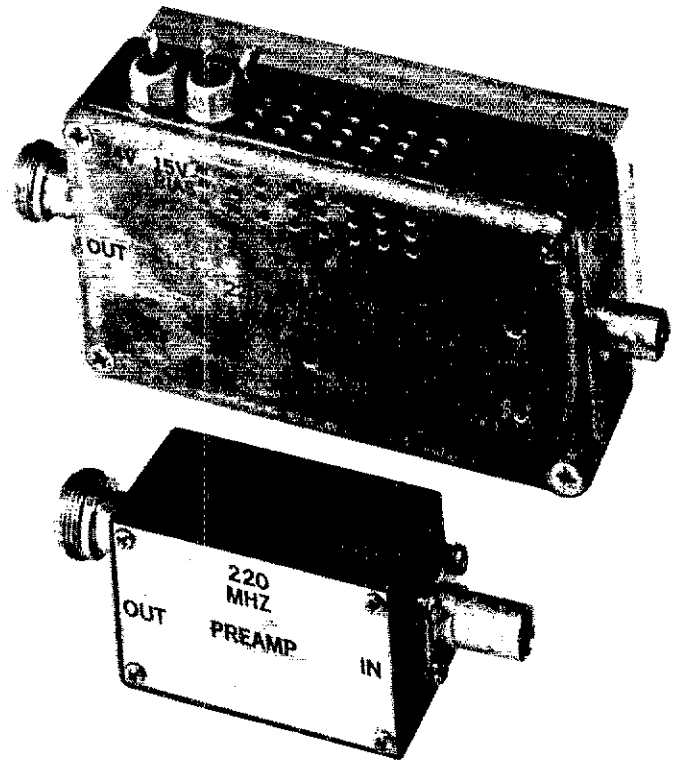
Notes

- ¹J. Belrose, "The Half-Delta Loop: A Grounded, Vertically Polarized Antenna," *Ham Radio*, May 1982.
- ² $Ft = m \times 3.281; in. = mm \times 0.03937; in = cm \times 0.3937$. The diameter of a triangular lattice mast 3 in. on a side equals $0.84 b = 0.84 (8) = 6.7$ in. See Belrose, "The Half-Wave Vertical," *Ham Radio*, Sept. 1981, pp. 36-39.
- ³ $m = ft \times 0.3048$.
- ⁴D. DeMaw, "Antenna Matching, Remotely — Some Thoughts," *QST*, July 1982.
- ⁵The disparity between the impedances measured by VE2CV and by W1FB may be due in part to a difference in the conductor-size ratios of the scaled and full-scale models. Also, the slope angle of the full-size model at W1FB was different from that of the 200-MHz professional model, owing to the feed point being elevated some 3 feet above the ground plane (snow problems).

Explore "220" with this State-of-the-Art Transverter!

Part 2: Ready to improve the performance of your 220-MHz station? Building a remote preamplifier and a 40-W linear amplifier is a great way to do it.

By Richard Stroud,* W9SR/W9BRN



If you have completed construction of the transverter described in Part 1, you probably have begun exploring the 220-MHz band.¹ You can make your explorations more enjoyable by increasing the effectiveness of your station. In addition to improving the all important antenna, there are two approaches to enhanced station performance. First, the receive capability can be improved by using a low-noise preamplifier (Fig. 8) mounted near the antenna. Remote preamplifier mounting reduces the effect of feed-line loss on the system noise figure and allows full utilization of the low preamplifier noise figure.

The second approach is to increase the transmit power level. An output power of 40 to 50 W is suitable for general operating. The amplifier in Fig. 9 provides a minimum output of 40 W with good IMD characteristics. This power level is compatible with many of the high-power amplifiers used in this band. Using this equipment and an 11-element Yagi at 50 feet,² I have been able to work similar stations regularly at a distance of 150 miles.

Signal-quality reports on ssb and cw have been good. A spectrum analyzer was used to evaluate the transverter/amplifier combination for spectral purity. All harmonics and spurious emissions are 70 dB or more below the carrier (Fig. 10). Shown in Fig. 11 is a power supply capable of providing the necessary voltages for the transverter, the preamplifier and the linear amplifier.

Construction

The preamplifier and the linear amplifier follow the construction techniques used for the transverter. A piece of 1/16-inch-thick, double-sided copper-clad board is the circuit foundation and ground plane. Grounded component leads are soldered directly to the board. Teflon press-fit terminals are used where insulated supports are required. The power supply has conventional point-to-point wiring.

Preamplifier: A 1-1/2 × 1-1/4 × 2-1/4-inch aluminum box (Pomona no. 2417) houses the remote preamplifier. Two no. 4-40 screws are used to mount the circuit board to the bottom of the box. No. 8 nuts, placed over the screws, serve as spacers between the box and the circuit board. Both sides of the board are tinned, and short lengths of bus wire connect the

clad surfaces. The bus wires are passed through drilled holes, then are soldered on each side.

A BNC connector was chosen as the antenna input for its compatibility with the transfer relay I used. Others may wish to use a type-N connector, which generally yields a lower VSWR. Copper straps (3/16-inch wide) are placed under the upper connector mounting screws and soldered to the circuit board below. This continues the ground path from the connector to the board without a significant impedance variation.

The transistor used in the preamplifier is an NEC 645-35 uhf device. It is operated at a collector voltage of 8 V and a current of 7 mA. A 5/8-inch-high shield across the transistor isolates the input and output circuits. Power is routed to the preamplifier through the output coaxial cable. An internal regulator prevents voltage variations resulting from long cable runs. If you wish to power the preamplifier directly, disconnect RFC6 from the output jack and apply 12 to 15 V to the choke. If this is done, C49 can be omitted and R13 can be connected directly to the output jack.

Two 470-pF chip capacitors are used to bypass the Q7 emitter leads. One capacitor is placed under each emitter

*Notes appear on page 36.

*P.O. Box 73, Liberty Center, IN 46766

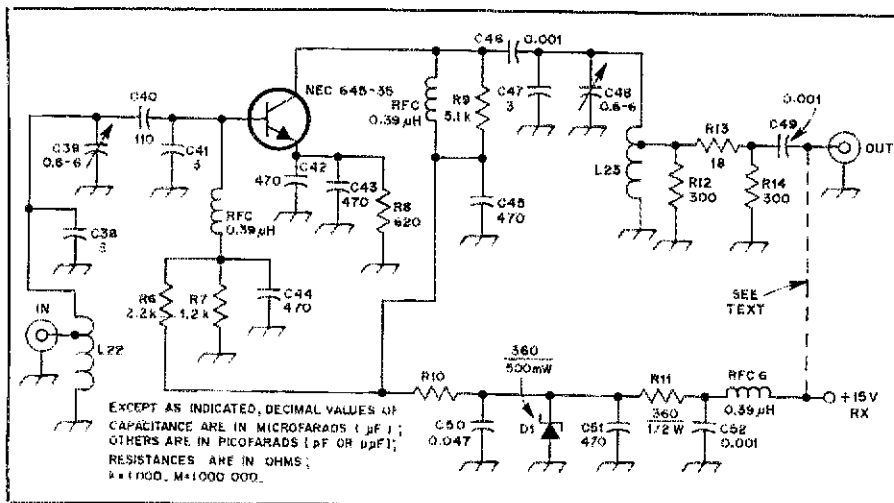


Fig. 8 — 220-MHz remote preamplifier schematic diagram. The power supply may be connected to RFC6 rather than through the coaxial line, if desired (see text). Unless specified otherwise, all resistors are 1/4-W, 5% carbon types.

C38, C40, C41, C47 — NP0 disc ceramic.

C39, C48 — 0.6- to 6-pF piston trimmer,

Johanson 4640.

C42-C45, incl. — Ceramic chip capacitor (ATC, JFD or equiv.).

L22 — 4-1/2 t no. 20 bus wire, 1/8-in. ID × 7/16 in. long, tapped at 4 t from gnd.

L23 — 5 t no. 20 bus wire, 1/8-in. ID × 1/2 in. long, tapped 1-1/2 t from gnd.

Q7 — NEC 645-35. Available from California Eastern Laboratories, 3 New England Executive Park, Burlington, MA 01803 (unit cost is approximately \$7).

RFC4-5, incl. — 0.39-μH miniature rf choke.



Interior view of the remote preamplifier. A BNC type of connector is used at the preamplifier input. A shield isolates the input and the output circuits.

lead. Access to the trimmer capacitors is provided by drilling two 1/8-inch-diameter holes in the box bottom. Be sure to have the cover in place during final alignment. Adjust the trimmers for the lowest noise figure attainable.

Measured noise figure of the preamplifier is 0.8 dB, and the gain is 24 dB. Because of the high gain, the overall system dynamic range is degraded slightly — a tradeoff to obtain minimum noise figure. A remote transfer relay is used to bypass the preamplifier. This avoids overload when strong interfering signals are present. I used a surplus Amphenol 360-11890-20 relay. It is located with the T-R relay and the preamplifier on the tower. It should be housed in a watertight enclosure as close to the antenna as possible. The transfer relay cannot be used with an antenna having a dc path across the feed line, as the preamplifier supply

voltage appears at the antenna when the relay is in the bypass position.

Linear amplifier: A Bud CU-124 diecast box (approximately 2-1/4 × 4-1/4 × 1 inch) houses the power amplifier. A 1/2-inch-thick aluminum plate, cut to the outline of the box bottom, serves as the heat sink. I cut two 1/8-inch-wide grooves in the plate to increase the surface area and to improve the heat radiation. Each groove is 1/4-inch deep and runs the full length of the plate. The plate was drilled and tapped for the no. 4-40 screws that are used to attach it to the box. The box bottom is cut away to clear the transistor mounting flange. Oversized holes drilled in the box provide clearance for the feedthrough capacitors and the Teflon terminals that protrude from the bottom of the circuit board. The transistor mounting flange is bolted directly to the heat sink. Heat-sink compound (Dow Corning 340

or equiv.) is applied to the transistor flange and the heat sink. This heat sink is satisfactory for normal ssb and cw operation; if long key-down periods are expected, a larger heat sink may be required.

For ease of assembly, the solder-in standoff capacitors and most other components should be mounted before the circuit board is secured in the box. All six transistor leads are cut to a length of 1/4 inch. The copper foil under the base and collector tabs is removed to avoid shorting to the ground plane. Input and output connections are made directly to the transistor tabs. The threaded stud of the reference diode (D8) is used as one of the transistor mounting screws. This places the diode in good thermal contact with the transistor, thus providing bias temperature compensation. The diode body is soft copper, so don't over tighten it. After the circuit board, the box and the transistor are bolted to the heat sink, the four emitter leads are laid flat against the circuit board and soldered in place.

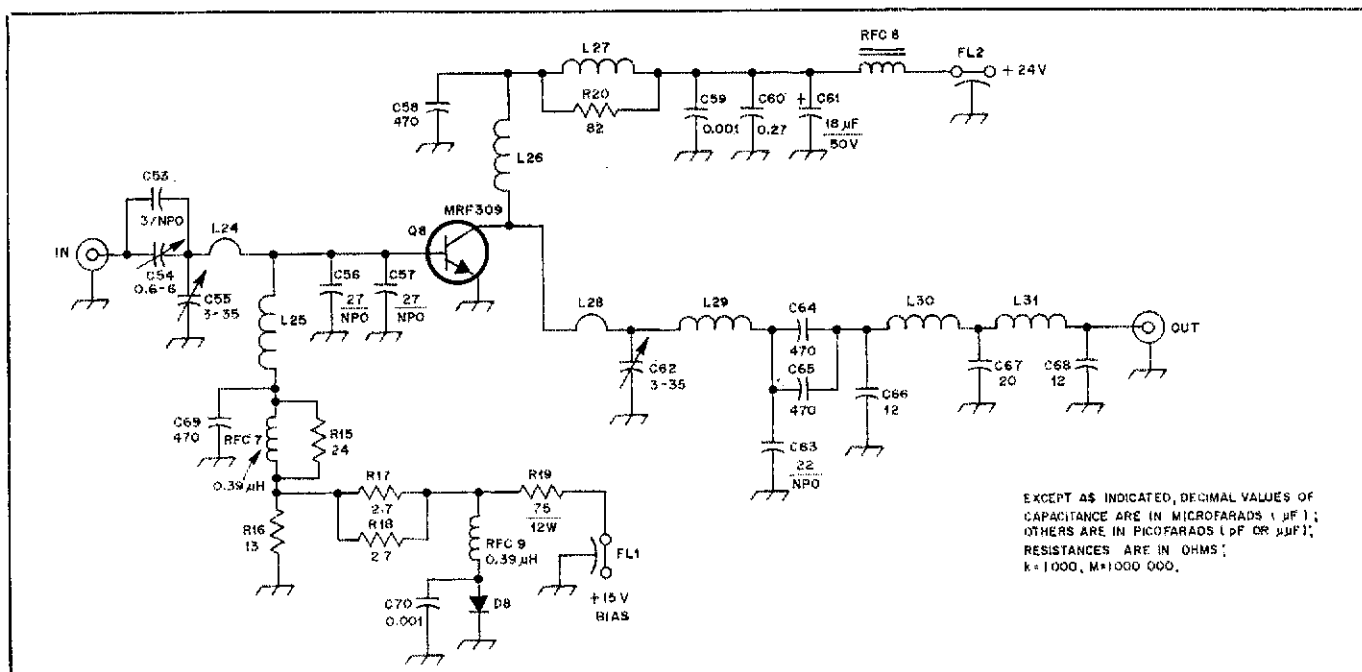
Capacitors C56 and C57 should be low-inductance chip types. One capacitor is mounted on each side of the transistor base lead and soldered directly to the ground plane (see photo). C63 should also be a low-inductance capacitor. The harmonic-filter capacitors (C66, C67 and C68) are small dipped-mica units with the leads cut to a length of approximately 1/8 inch. It is important to position the filter inductors (L29, L30 and L31) as shown in the photograph. This will prevent inductive coupling across the filter. If a spectrum analyzer is available during alignment, the lead length of the mica capacitors and the inductance of L30 and L31 can be adjusted to minimize or "notch" the second harmonic.

A pattern of holes is drilled in the cover and the side of the box near R19 to allow air flow around that resistor. Adjustment holes (1/8-inch diameter) are also drilled in the cover above C54, C55 and C62.

The resting (no drive) Q8 collector current should be adjusted to 45 mA by selecting the value of R16; the resistance needed depends on the individual transistor. Raising the resistance of R16 will increase the collector current. To protect Q8, start with a low resistance and work up to the desired current. Do not apply collector voltage with R16 open, even momentarily, as the transistor can be damaged by the resulting high collector current.

Feedthrough power-line filters (FL1 and FL2) were used for the 24-V and the bias-voltage connectors. Feedthrough capacitors of 470- to 1000-pF capacitance could be used as substitutes for the filters. The 24-V supply is connected permanently to the amplifier. Applying the 15-V potential turns the unit on. Bias switching is controlled by the T-R circuitry in the transverter.

This amplifier has a gain of nearly 10



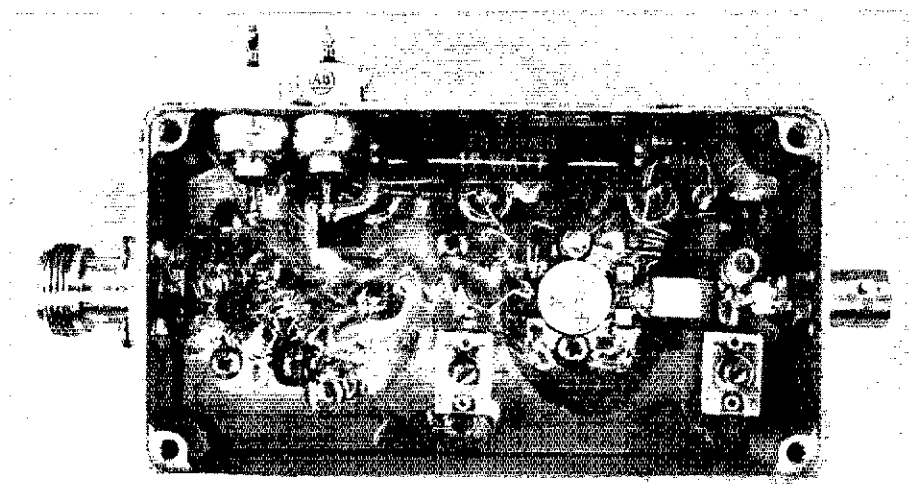
EXCEPT AS INDICATED, DECIMAL VALUES OF CAPACITANCE ARE IN MICROFARADS (μF); OTHERS ARE IN PICOFARADS (pF OR μF); RESISTANCES ARE IN OHMS; k=1000, M=1000 000.

Fig. 9 — 40-W linear power amplifier schematic diagram. Unless otherwise specified, all resistors are 1/4-W, 5% carbon types. Capacitors are rated at 100 V.

- C54 — 0.6- to 6-pF piston trimmer, Johanson 4640.
- C55, C62 — 3- to 35-pF mica compression trimmer, Arco 403 or equiv.
- C56, C57, C63 — Ceramic chip capacitor (ATC, JFD or equiv.).
- C58, C59, C69 — Standoff capacitor, Allen Bradley SSSD. Spectrum Control 54 803 003 or equiv.
- C64, C65 — Disc-ceramic capacitor.
- C66-68, incl. — Dipped-mica capacitor.

- D8 — Silicon diode, Unitrode UT5105 or equiv.
- FL1, FL2 — Feedthrough line filter, Alien Bradley F1B or equiv. 470- to 1000-pF feedthrough capacitors may be used as substitutes.
- L24 — 1-in. length of 1/2-inch-wide copper strap formed in a 1/2 turn.
- L25 — 3 t no. 20 bus wire, 1/8-in. ID x 1/4 in. long.
- L26 — 2 t no. 18 bus wire, 5/32-in. ID x 3/8 in. long.
- L27 — 9 t no. 28 enameled wire wound on R20.

- L28 — 9/16-in. length of no. 18 bus wire.
- L29 — 2 t no. 18 bus wire, 1/8-in. ID x 7/16 in. long.
- L30, L31 — 5 t no. 20 bus wire, 1/8-in. ID x 7/16 in. long.
- Q8 — Motorola MRF309 rf power transistor. A 2N6439 or a TRW J02015A may be used as a substitute.
- RFC7 — 0.39-μH miniature rf choke.
- RFC8 — 1-1/2 t ferrite choke, Ferroxcube VK200 19/4B or equiv.



Interior view of the linear amplifier. It is important that the harmonic-filter inductors (near the type-N output connector) be positioned as shown to prevent unwanted coupling across the filter.

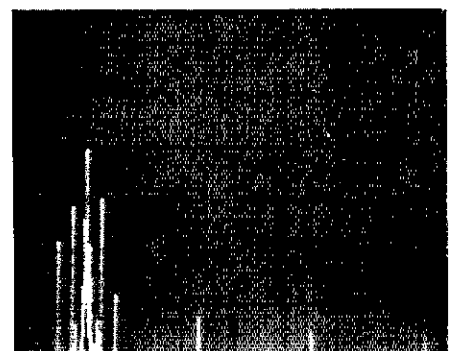


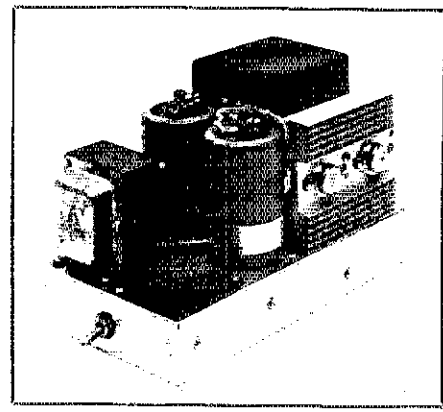
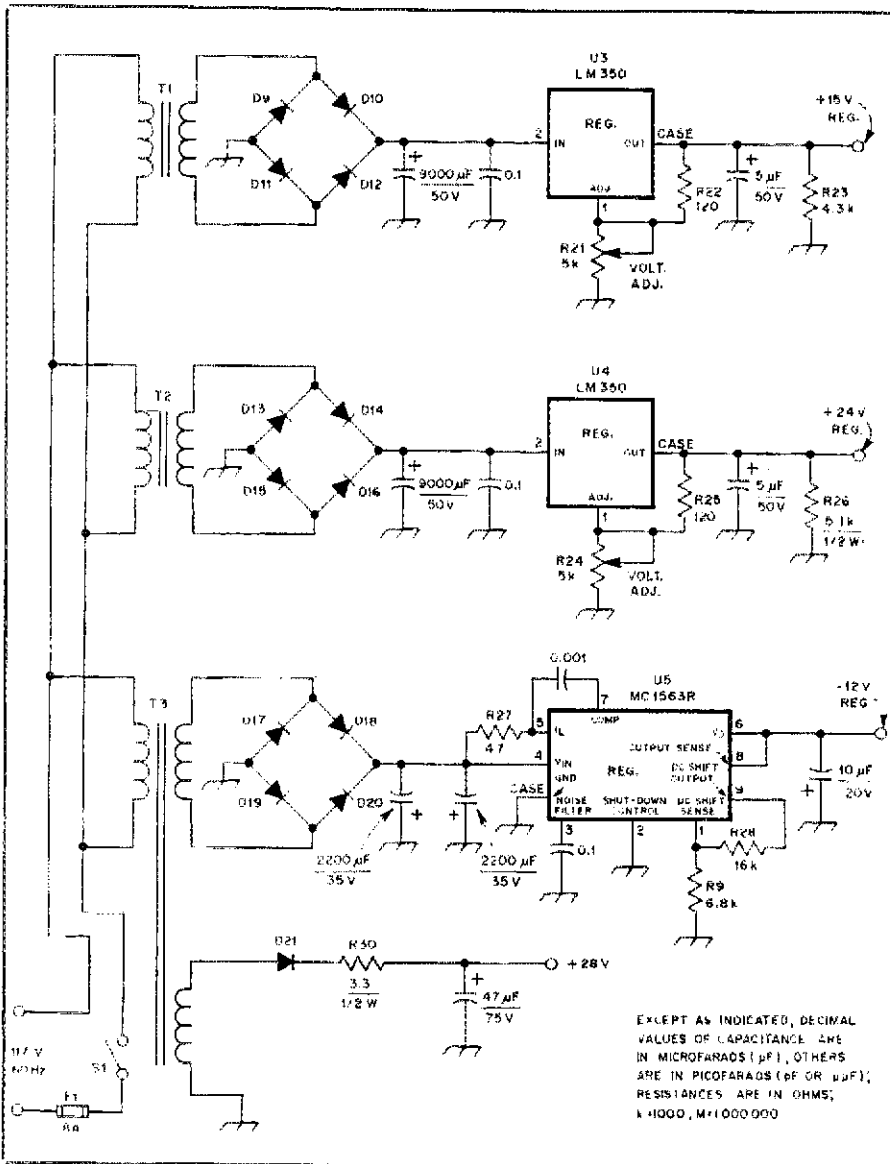
Fig. 10 — Spectral display of the transverter/amplifier signal at the 50-W output level. The largest signal is the 220.1-MHz carrier. It has been notched 60 dB to permit viewing on the spectrum analyzer. The carrier reference level is actually 30 dB above the top of the display. Each vertical division is 10 dB, and each horizontal division is 100 MHz. Display center frequency is 500 MHz. All spurious signals resulting from oscillator harmonics and undesired mixer products are more than 70 dB below the carrier, and all harmonics are at least 90 dB down. This meets FCC requirements for commercial equipment.

dB, and, when operated from a 24-V, 3-A supply, is capable of over 50 W of output. Linearity is very good up to an output level of approximately 42 W. During two-tone IMD testing at an output power of 40 W, the third-order products were found to be 35 dB below the desired output signals. An input VSWR of 1:1 can be obtained by adjusting C54 and C55. The output

network is aligned by adjusting C62 for maximum output power. Final adjustment of C62 should be performed at full output power.

Power supply: A conventional design using IC voltage regulators was used for the power supply shown in Fig. 11. None of the supply components are critical, and builders are encouraged to use any

suitable materials they have on hand. It is necessary only to ensure that the output voltages are near the specified values and that the current capacity is ample. I obtained my transformers from a scrapped



This version of the transverter power supply was constructed around surplus transformers. The devices mounted on the finned heat sink are the regulators for the positive supplies.

stereo amplifier and from a local "junk" dealer.

A 5 × 9 × 1-1/2 inch chassis serves as the power-supply base. You may wish to use a larger chassis, especially if larger transformers are used.

The LM350 regulators are mounted on a standard heat sink which is bolted to the chassis top. Aluminum brackets under the chassis support the -12 V regulator and the power diodes. Mica insulating washers are used under the LM350s and the diodes. Be sure to apply heat-sink compound to the mounting surfaces of these devices and to the heat sinks.

The value of R28 can be selected to set the negative supply output to -12 V. R21 and R24 are adjusted to set the voltage of the +15- and +24-V supplies. An octal socket is used as the supply output connector.

With the addition of these units, the performance of your 220-MHz station will rival that of many stations currently active on the band. It is my hope that with the construction of this transverter system many new "explorers" will be heard on 220 MHz.

Notes
 *R. Stroud, "Explore '220' with this State-of-the-Art Transverter!" *QST*, Aug. 1982, pp. 14-18.
 *mm = in. × 25.4; m = ft × 0.305; km = mi × 1.6.

Fig. 11 — Power supply schematic diagram. This supply provides all the necessary voltages for operation of the transverter system. Unless otherwise specified, all resistors are 1/4-W, 5% carbon types, and capacitors are rated at 100 V. Polarized capacitors are electrolytic. Others are disc ceramic.

- D9-12, incl. — 3-A, 100-V silicon rectifier diodes.
- D13-16, incl. — 5-A, 100-V silicon rectifier diodes.
- D17-21, incl. — 1/2-A, 100-V silicon rectifier diodes.
- S1 — 10-A spst toggle switch.
- T1 — 18-V, 2-A power transformer.
- T2 — 26-V, 3-A power transformer.
- T3 — 12.6-V, 0.5-A power transformer.
- U3, U4 — Adjustable 3-A voltage regulator, National LM350 or equiv.
- U5 — Adjustable 0.5-A negative voltage regulator, Motorola MC1563R, MC1463R or equiv.

Strays

HIS DISABILITY ISN'T A HANDICAP

Success stories like this one are heartening, for, despite being blind, Dr. Walter Horn (I4MK) of Persiceto (Bologna), Italy, is a chief electronics engineer at Akron, Bologna, and has designed many sophisticated circuits over the years. He believes that he is the only unsighted person in the electronics profession in Italy.

Dr. Horn has designed amateur equipment that has been described in *QST* and other amateur literature. He is currently developing a general-coverage receiver, a low-noise synthesizer, a 150- to 170-MHz synthesized transceiver and a solid-state a-m broadcast transmitter. (I wonder what he does to keep busy during his spare time!)

Walter equates his career to that of Marconi by saying, "G. Marconi proceeded from long waves to short waves, perhaps because he was tired of winding coils!" Walter has also gone from long waves (relative) to short ones (vhf). He

summarizes by saying that, for the blind, "the most difficult task is certainly that of coil winding, especially if they are taped."

Other blind amateurs may get inspiration from talking to I4MK on the air. I'm sure he has some interesting tales to relate.

— Doug DeMaw, W1FB

I would like to get in touch with . . .

anyone who has an operating manual and/or a schematic for a Sigma AF-250L a-m/fm analyzer. Bob Witte, KB0CY, 2253 Evelyn Ct., Loveland, CO 80537.

Technical Correspondence

Conducted By
Dennis J. Lulis,* W1LL

The publishers of QST assume no responsibility for statements made herein by correspondents.

NOTES ON CATVI

□ With many cable TV systems now operating inside the amateur vhf bands, concern is mounting over potential interference to either service. Because there is a great deal of misinformation concerning this subject, we would like to address the technical aspects of CATV/Amateur Radio band sharing.

The typical amateur 2-meter transceiver requires an input of $0.25 \mu\text{V}$ for 20 dB of quieting, or $0.2 \mu\text{V}$ for 12 dB SINAD. If we assume a legal limit point-source radiation of $20 \mu\text{V}/\text{m}$ at 10 feet¹ on 145.25 MHz (CATV Ch. E), and the amateur station is 100 feet away, this gives us a field strength of $2 \mu\text{V}/\text{m}$. This $2 \mu\text{V}/\text{m}$ equals $0.66 \mu\text{V}$, more than enough to break the squelch and, because of the capture effect on fm, probably enough to prevent weaker signals from getting through. Most likely, the amateur's antenna will be closer than 100 feet to the cable, and it will have gain, thereby worsening the situation.

A typical signal-level meter for the CATV industry goes down to -40 dBmV .² Preamps can extend this range an additional 16 dB. This -56 dBmV equals $1.59 \mu\text{V}$ and, at 145.25 MHz, relates to a field strength of $4.85 \mu\text{V}/\text{m}$ at 10 feet. Routine cable monitoring will discover radiation that is as low as $12 \mu\text{V}/\text{m}$ and that averages $16 \mu\text{V}/\text{m}$ at a distance of 10 feet. If we assume the average 2-meter antenna to be 50 feet from a potential radiation source (about average for northern New Jersey), this distance equates to a signal strength of 0.787 to $1.05 \mu\text{V}$. Even a $1\text{-}\mu\text{V}$ leak would equal $0.2 \mu\text{V}$ at 50 feet. One microvolt is -60 dBmV , and could *not* be measured on the signal-level meter plus preamp just discussed.

With the above in mind, let us examine a properly installed cable drop, in which many people believe most radiation problems originate. We will assume a level of $+15 \text{ dBmV}$ for the 145.25-MHz signal at the output port of the tap. This is a worst-case situation, as the level at this frequency is normally several decibels lower. Modern triple- and double-shielded drop cable connected to an "F" fitting with integral O-ring and secured by a hex-crimper has an isolation figure of -90 dB . Therefore, right up against the port (say, 1 inch away), *maximum* leakage would be $0.178 \mu\text{V}$ (-75 dBmV) — insufficient to meet even the 12-dB SINAD figure given previously. With a 50-ft distance between the amateur antenna and the cable, there would be only $0.000297 \mu\text{V}$ of signal appearing at the antenna. Sixty decibels of gain would be needed to have this low-level signal create problems; the most elaborate antenna installations have a maximum gain of 25 dB, so there should never be any trouble from a properly installed drop.

There is the potential radiation problem caused by people illegally hooking up their TVs at the tap or adding another TV using components available from many vendors. Improperly hooked-up video games or computer terminals may also cause problems.

The most serious threat, of course, would be an illegal hookup at the tap. Generally, the radiation occurring would be in the order of millivolts rather than microvolts, and would cause interference (ghosting) to televisions *not* hooked up to the cable system at all, as well as to Amateur Radio stations. A problem of this sort would most likely be taken care of promptly, as *everybody* would be complaining. The two cases cited above are more insidious, as radiation may be fairly low and possibly frequency selective; they will usually affect only adjacent neighbors, whose complaints will be the first indication that something is amiss. Often, the uniqueness of the problem (e.g., only on channel 13 at 2 to 3 P.M., and then it goes to channel 10) will be the giveaway clue.

Although cable egress and ingress always coexist, it is more difficult to protect against the latter. Amateur signal levels, even at QRP, are far higher than cable levels. One-hundred and fifty milliwatts (21.76 dBm) is much more than 15 dBmV (-33.75 dBm). The only thing that can be done is to make sure all connections are rf tight and properly terminated, which help protect against egress, too. At our system on Long Island, we were troubled by 2-meter ingress at our main head-end in Farmingville. This caused reception problems on Channel E throughout the entire cable system. While the amateurs running the repeater were very cooperative, it was obvious that the head-end had to be made impervious to the amateur signal — no simple feat when only 300 feet separated the two sites. However, by ensuring that all connections were tight, all unused ports were terminated and other rf-integrity improvements were made, the ingress directly into the head-end was eliminated. The only problem remaining was with the CATV customers immediately adjacent to the head-end site. Although this is an ongoing problem, it is in the process of being rectified through the use of double-shielded drop cable and the other cures cited previously.

How should we resolve the problem of CATVI without going to extremes? We believe the possibility of peaceful coexistence does exist. We recommend that your amateur frequency coordinators: (1) make themselves known to cable operators in their areas of responsibility and, (2) not assign the 144.65/145.25-MHz repeater pair unless no other pair is available. On the other side of the coin, the cable operator can offset his channel. Offsetting will "buy" a good 20 dB of margin.

A numerical example will explain. Assume there is a problem at 145.24 MHz (say, $1 \mu\text{V}$, -60 dBmV). If we shift the video carrier up about 38 kHz, the second sideband (downward in frequency) will be 6.5 kHz above the repeater frequency and the third sideband will be over 9 kHz below. This second sideband, in addition to being pretty much out of the

repeater passband, is 20 dB down from the level of the carrier frequency. As proven already, -75 dBmV will not cause interference to amateurs; — here we are talking about -80 dBmV or better. Even if there is more signal than $1 \mu\text{V}$, this greater than 20-dB margin may be the difference between making the repeater totally unusable and just being a source of minor interference.

It is very important that there be a liaison between the frequency coordinators and the cable operators for the purposes of choosing an offset that will eliminate the problem at one repeater without causing problems at another. Tolerances have to be taken into account, but a minimum of 20 dB can be gained by merely offsetting. An offset of 55 kHz or less is feasible, and can be done by any cable operator without having to modify the converters or worry about adjacent cable channels. The offset solution has been accepted by the FCC and the FAA to resolve interference problems in the aeronautical band, 108-136 MHz. — *Stephen Raimondi, W2QUU, Director of Engineering, and Robert Wanderer, KT2D, Special Projects Engineer, Rogers UA Cablesystems, Inc., Oakland, New Jersey*

Feedback

□ An incorrect address for Radiokit was given in the July 1982 QST article, "A New, More Versatile Transmatch." The correct address is: Radiokit, P.O. Box 411, Greenville, NH 03048.

□ There was a connection missing in the schematic of the equalizer in "Equalize Your Microphone and Be Heard!" in July QST. There should be a connection from the junction of the 10-k Ω and 100-k Ω resistors connected to the LOW GAIN control and pin 1 of U1B. The parts-placement diagram for the equalizer is available by sending an s.a.s.c. to: Audio Equalizer, TIS, 225 Main St., Newington, CT 06111.

□ In "Go for the Gain, NBS Style," (August 1982 QST), there are errors in Table 5. The length of the 1st director on the 0.8-, 1.20- and 3.2- λ long Yagis should be 0.428, rather than 0.482.

□ Author Morrow, WB6GTM ("WARC and LF on the TR-7," July 1982 QST), wishes to add a clarification note to his text: The BCD band-select code should be reversed before placing it on pins 9-12 of the AUX-7 plug; that is, the most significant bit of the code should be on pin 12, and the least significant bit on pin 9. In addition, the author is providing etched and drilled printed-circuit boards for \$7.50, postpaid. A complete parts kit including board, resistors, diodes and connectors is available for \$15. The ARRL in no way warrants this offer.

¹m = ft \times 0.3048

²dBmV = decibels referenced to 1 millivolt

*Assistant Technical Editor

Heathkit® ETS-3401 Microcomputer Training System

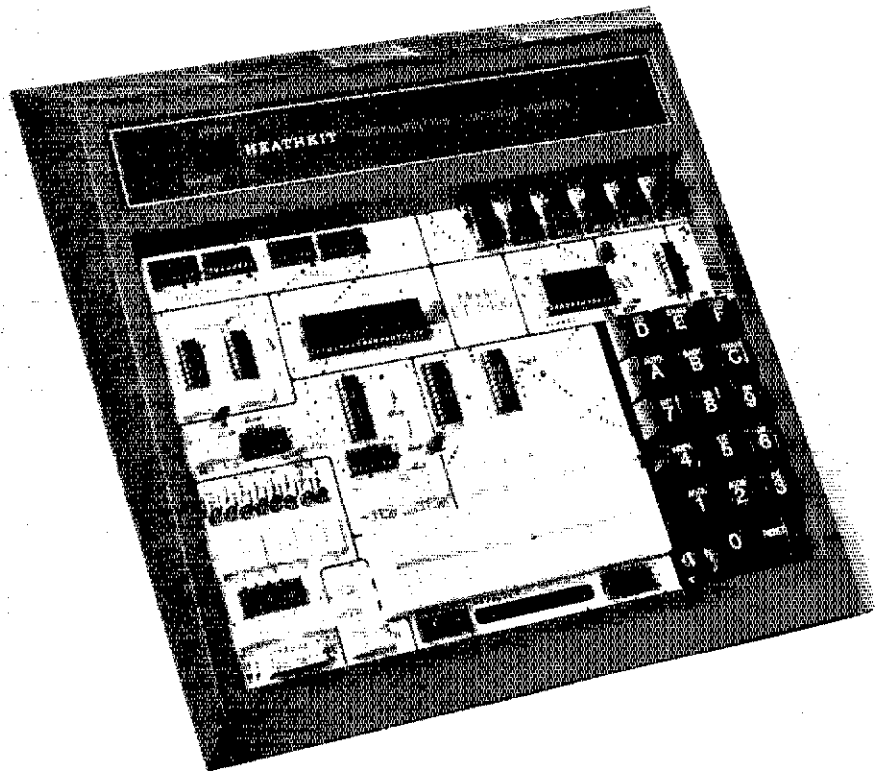
The Heathkit® ETS-3401 system is a package designed to train someone with little or no knowledge of computers. It is an ambitious goal on the part of Heath — and they succeed! ETS-3401 consists of the ET-3400 Microprocessor Trainer, an EE-3401 Microprocessor Self-Instruction Course, the ETA-3400 Accessory and the ETA-3400-1 Memory Expansion IC set. My first reaction was that I needed a computer just to keep track of all these numbers, but, as with any Heathkit®, everything proceeds logically, one step at a time.

ET-3400A Microprocessor Trainer

The trainer is the "heart" of the course. With it, the student gets plenty of hands-on experience. Without it, the program would be little more than just another good book on computer basics. A Motorola MC6800 microprocessor IC is the "brains" of the trainer. A small ROM monitor controls the operation of the MC6800. The ET-3400A has 256 bytes of memory (RAM), with provisions for an additional 256 bytes (512 bytes total).

A hexadecimal 17-key pad (16 value keys plus a RESET button) provides the user with a means of entering data and instructions. The data readout system consists of six 7-segment LEDs, which display hexadecimal data. The student has tremendous flexibility while using the two together. The memory address or the contents of the memory associated with that address may be changed at will. After depressing the AUTO key, the user has but to enter the first address of the program. The student then enters the instruction (or data) for that first address. As soon as the two keys have been pushed, the trainer advances automatically to the next memory location and awaits the next two key strokes. Meanwhile, the LEDs have displayed the first address and, momentarily, the first two keystrokes, before changing to the next memory location and two blanks. After a little practice, I found it easy (a lot easier than I originally anticipated) to enter moderately long (for me) programs.

Once the programming is complete, Heath advises the user to examine the contents of each memory cell to make sure no mistakes have been introduced. This can be accomplished semiautomatically once the first address has been entered. The user can call the contents of each memory cell (1 byte, 2 hexadecimal numbers) to the display for checking by hitting the FORWARD or BACKWARD key. The user then can tell the microprocessor to execute the program one step at a time (SINGLE STEP). After each step, the memory location of the next step and the contents of that step appear in the LEDs. Additionally, after each step, the student can call for the display to show the contents of either accumulator or the status flags. This is a powerful learning tool, when trying to teach yourself to think like a computer!



All the microprocessor address, control and data buses are available on the front panel. This simplifies experimenting with external control circuits. Eight switches (DIP) are built-in to provide binary means for manipulating data during the experiments. A solderless, breadboard-type connector block is built-in for experimenting and designing. Built-in +5- and ± 12 -V supplies will meet the power requirements of most circuits.

I spent about 8 hours building the trainer. The instructions were complete, accurate and easy to follow. The trainer worked the first time and ever since. It is an easy kit to build.

Heath now has a new version of the trainer, the ET-3400A. According to Heath, the only difference is that the "A" meets the new FCC standards on rf emissions. Operation is the same in both units.

EE-3401 Microprocessor Self-Instruction Course

Two large loose-leaf notebooks containing several hundred pages of material, two tape cassettes, a flip chart and a bag of electronic components make up the course. Heath has done a skillful job of preparing the text to lead the neophyte through the inner workings of the computer. The first chapter deals with binary arithmetic and number systems used with computerized devices. It also covers octal and hexadecimal number systems and binary codes (BCD, ASCII, etc.). Most of the material in

this chapter was "old hat" to me; I found it the most boring chapter of the course. But it is good review material for those familiar with binary fundamentals, and would be mandatory for someone not already conversant with binary techniques.

Heath provides several review questions at the end of each major section. The answers are printed on following pages. If the student does not feel he has a clear understanding of the material, Heath instructs him to go back over it until he does. Each chapter has a unit exam at the end. This is similar to the review questions, and it carries the same advice for the student dissatisfied with his performance.

Each of the eight text chapters has a list of experiments to perform from Chapters 9 and 10 using the trainer. The experiments in Chapter 9 deal with programming techniques. Those in Chapter 10 involve interfacing the trainer with external circuitry. More than one experiment may be associated with each chapter. Chapter 1 calls for experiments 1 and 2. Experiment 1 has 7C₁₆ (124₁₀) entries — 1 told you the AUTO feature of the trainer is a good one! A second program requires more entries! The good news with the experiments is that they become more demanding mentally, but require fewer entries.

Chapter 2 introduces the basic concepts and jargon of computers. A hypothetical microprocessor is discussed. Heath describes the function of each of the major sections of the

μ P IC. Diagrams show the routing of information between these sections and the other components outside the microprocessor. The student sees how various instructions are implemented.

Chapter 3 covers computer arithmetic. In addition to binary adding, subtracting, multiplying and dividing, the chapter contains information about two's complement arithmetic and the four basic Boolean logic operations.

Heath presents an introduction to programming in Chapter 4. The unit covers the difference between machine, assembly, interpretive and compiler languages. Other topics included are flow charts, branching, addressing for branching and flags.

Chapters 5 and 6 present the MC6800 microprocessor IC. Not surprisingly, most of the statements about the hypothetical microprocessor turn out to be applicable to the MC6800. For the most part, the points of divergence are those where the MC6800 has features more advantageous than those of the hypothetical μ P. In fact, this is one of the things that I found most helpful in the course. Heath has deliberately provided some programs that will not work properly. The student has the task of finding out why they do not work and correcting them.

Heath compares and contrasts the block diagram and the programming model of the MC6800. This helps make clear the functioning of the instruction set, which is covered in detail. Extended and indexed addressing can be used with the MC6800; Heath demonstrates why these methods make a more versatile computer. The text points out that the memory stack of the MC6800 is superior to the cascade stack found on many other microprocessors; it also covers the instructions associated with the stack. Subroutines and instructions associated with them constitute another portion of the discussion. The text covers other pertinent operations, including input/output and interrupts. At points, I felt overwhelmed by the amount of new information in each paragraph. Repeated reading and doing the experiments did much to alleviate these feelings.

The final two chapters of the text portion, 7 and 8, discuss interfacing. As Heath points out, there are basically two things that you can do with a computer: program it and interface it. The text defines 3-state logic, and explains the need for it. Heath covers the MC6800 control lines and timing relationships. Memory devices (RAM), address decoders and readout devices are analyzed. The Peripheral Interface Adapter (PIA), one of the most important devices that can be interfaced with a computer, is covered in detail.

Interfacing experiments (Chapter 10) associated with Chapters 7 and 8 use the bag of electronic components, and are among the best that I have seen. One of the first involves loading data into a RAM with the DIP switches on the trainer. George Collins, KC1V, has told me some "war stories" about loading massive programs into computers with switches. This short experiment has given me a much deeper appreciation for what he is talking about.

Heath has given me a deeper understanding of and an appreciation for the "easy way" by first making me do it the "hard way." Some of the experiments involve numerous connections. The resulting "rat's nest" of wires is enough to send me running for a bottle of aspirin. All the experiments worked — after I found my wiring mistakes. That was an education, too!

Once the course is completed, the student

has the option of taking a final examination. If the student scores a passing grade of 70% or better, he earns 8.0 Continuing Education Units (CEUs) and a Certificate of Achievement. A classroom version of the course is also available.

ETA-3400 Memory Accessory

The ETA-3400 turns the trainer into a full-fledged personal computer, lacking only more sophisticated input/output devices. It contains a 32- \times 8-bit ROM programmed to provide seven outputs selecting various expansion functions. The RAM memory expansion is made up of eight 1K \times 4-bit memory ICs. Two of the ICs come with the ETA-3400 itself, while the other six ICs make up the optional ETA-3400-1 kit. Alone, the ETA-3400 has 1 kilobyte of user memory; with the expansion ICs, the total comes to 4 kilobytes. The trainer by itself has 512 bytes of memory.

A Peripheral Interface Adapter (PIA) handles the input/output functions. It has two 8-bit bidirectional data ports and four control lines. Each line can be programmed to act as an input or an output. One port connects to a terminal device, while the other connects to a cassette tape recorder.

The terminal input can be configured for an RS232 standard connection or for a 20-mA current loop. A builder has the option of connecting to an ASCII keyboard and a video display or to a Teletype-style ASCII keyboard and printer. Alternatively, he can write a program that would allow connection with a Baudot Teletype machine. Heath does not supply any information on this.

Another ROM installed in the ETA-3400 carries the instructions for Tiny BASIC, an abbreviated version of standard BASIC. With this provision, the user has the option of running programs found in the popular literature without extensive modifications. I have not been able to use this feature, because I do not have a terminal attached to the computer yet. I did perform the diagnostic tests listed in the assembly manual, and all seems well.

Construction is simple and straightforward. It took me about 8 hours to assemble the ETA-3400 and another 2 hours to modify the trainer to function with it. The modifications to the trainer consist of removing the four RAM ICs from the trainer, adding a 40-pin connector, and changing a few components affecting the clock (oscillator) frequency and stability. Although this improves the functioning of the computer, it affects the outcome of some of the experiments in Chapter 10. Heath advises the student to finish the experiments (and the remainder of the course) before modifying the trainer and attaching the ETA-3400. The Trainer can be used independent of the ETA-3400 by removing the 40-conductor connecting cable and reinstalling the four RAM ICs on the Trainer.

I would recommend the ETS-3401 Microcomputer Training System to anyone wanting a fundamental understanding of computers. (With today's trends, that may be anyone wishing to remove the top cover from an amateur transceiver.) The course is well written, logical and thorough. It compares quite favorably with the "three-day seminars" costing two to three times as much. On the other hand, if your primary interest is simply running game programs, the ETS-3401 may not be your best bet. It's not a toy — it's an education (and fun)!

The ET-3400 Trainer and the ETA-3400 Ac-

cessory can be wired for 117- or 234-V ac operation. The Trainer is 3-1/2 \times 12-1/8 \times 11-3/4 inches (HWD), and weighs 4 pounds. The Accessory is 3-1/2 \times 11-1/4 \times 13 inches (HWD), and weighs 6 pounds. Price classes for the units are: EE-3401, \$100; ET-3400A, \$225; ETA-3400, \$175; ETA-3400-1, \$50. Package price: \$480. Additional information may be obtained from the Heath Company, Benton Harbor, MI 49022. — Peter O'Dell, KB1N

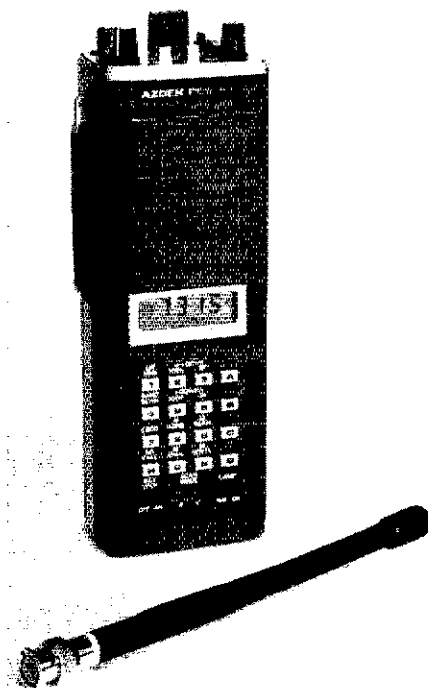
AZDEN PCS-300 2-METER HAND-HELD TRANSCEIVER

□ Move over, Atari: The Azden PCS-300 is here! This small 2-meter fm hand-held transceiver has a multitude of attractions, including CMOS microprocessor (μ P) control, eight memory channels, a pleasing keyboard actuation tone, full 2-meter coverage, an LCD readout with S/R/F meter, a DTMF key pad and programmable scanning.

"Taking the controls" of this rig perhaps can be accomplished best by examining the symmetrically placed operating controls and functions. The rotary POWER switch/VOLUME control is easily maneuverable by even the largest and clumsiest fingers. A PL PHONE switch (push button) controls the optional tone encoder.

The 16-button keyboard functions as a full DTMF encoder. The HI/LO power switch selects transmitter output of either one or three watts. A rotary SQUELCH control switch, identical to the VOLUME control switch, has a TONE position from which the squelch will open only for signals accompanied by a certain designated subaudible tone frequency (using the optional board). An external microphone with a PTT jack and an accompanying earphone jack share a dust-cover cap for protection when they are not in use. The TX-OFFSET switch has four positions (MW [memory write], +M [plus offset], -M [minus offset], and S [simplex]), and allows for the use of nonstandard offset frequencies, which is handy for MARS operation. This

1mm = in. \times 25.4, m = ft \times 0.3048, kg = lb \times 0.454.



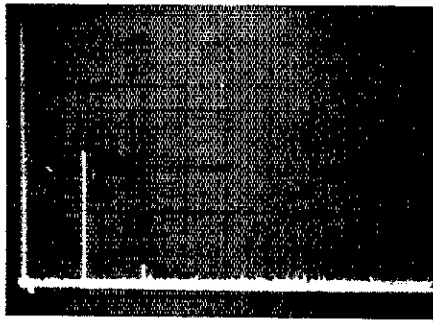


Fig. 1 — Spectral display of the Azden PCS 300. Vertical divisions are each 10 dB; horizontal divisions are each 100 MHz. Output power is approximately 3 watts at a frequency of 146 MHz. All spurious emissions are at least 62 dB below peak fundamental output. The fundamental has been reduced in amplitude approximately 35 dB by means of notch cavities; this prevents analyzer overload. The Azden PCS-300 complies with current FCC specifications for spectral purity.

switch selects a memory channel independent of the eight regular ones, and it can store an offset value that may be as small as zero or as large as 7.995 MHz. A BNC antenna connector completes the layout of the top of the PCS-300. Azden warns not to transmit with the antenna twisted or held in your hand — the antenna impedance will be affected!

Attractive Appearance

The '300 is attractive, compact and light. It is as wide as, and just a little longer than, a dollar bill. The built-in electret microphone and the internal speaker are located above the readout. Both are disconnected when an external microphone is used. (Though certainly typical for audio in most hand-held transceivers, the sound quality of the PCS-300 wasn't as natural as I would like — some voices were too "tinny" for my taste.)

The display is the focal point of this radio, and obviously was designed with users in mind. It is large and can be read easily, even in bright sunlight. The frequency display indicates the lower four operating frequency digits; for example, 5.450 means 145.450 MHz. When an offset is used, the display shows the transmit frequency during transmit, and the receive frequency at other times. An incandescent lamp (its switch is located on the bottom front panel) lights up the display. The lamp remains on for about 20 seconds, then turns off to preserve the batteries (the display flashes on and off when the charge is getting low). The lamp is useful at

night, though I still haven't figured out how to change frequencies safely while driving.

Other Functions

Indicators (+ 600 and - 600) show when a standard offset is in use. If an offset would cause an out-of-band transmission, the radio goes to the simplex mode even if the offsets are activated. "+ " and "- " indicators are used when nonstandard offsets are employed. MM indicates memory mode, and the S/R/F S-bar LCD indicator shows relative signal strength when receiving and relative output when transmitting. M ADRS is provided by the same eight-bar indicator; the memory channel being used is indicated by flashing of the corresponding memory address bar (which also occurs when receiving a strong signal). For example, if 6.79 is in memory 3, then the memory address bar directly above 3 will flash on and off, independent of the S/R/F indications.

The bottom front of the PCS-300 includes a KEY LOCK switch, which prevents accidental change of frequency, and a SCAN MODE switch, which directs the scanner to look for either busy (B) or vacant (V) channels. Located on the bottom of the radio, the charging terminal connects to the NiCd battery charger. The belt hanger, logically, is on the back of the radio.

Fun to Use

Operating the PCS-300 is where the fun begins. The 16-key pad, which directs all the μ P control functions, produces an electronic "beep" every time a key is pressed to let you know that the μ P has received the command. In the transmit mode, this function is disabled, and the key pad operates as a DTMF encoder pad. Put the KEY LOCK switch on to prevent changing frequencies, instead of accessing a number, while using autopatch. Frequency is changed by the SK UP and SK DOWN keys. When one holds either of these keys for longer than 1/2 second, the frequency will move continuously up or down at the rate of eight channels per second. As with all the UP or DOWN keys, it is easier to depress the key for the required time for continuous frequency change, and release the key as the desired frequency is approached. Then, merely actuate the key a few times to reach the goal frequency. The 100K UP and 100K DOWN keys move the frequency up or down by 100 kHz; they do not affect the MHz digit. The MHz UP key changes megahertz upward only from two to nine, and does not affect the 100-kHz and 5-kHz digits. "Upward only" must be emphasized, because I became accustomed to pressing a DOWN button to change the 100- and 5-kHz digits, and automatically pressed the key below the MHz UP

key to try to decrement the frequency in MHz steps. That didn't work because that key is the BAND SCAN key — not the desired function. The BAND SCAN key initiates scanning in 5-kHz steps between the two preprogrammed limit frequencies. The lower-limit frequency is in memory seven, and the upper limit is in memory eight. A M ADRS key changes the memory address from channel one through channel eight.

No matter what frequency or memory is in use, the M CALL key calls the contents of memory channel one. M WRITE places the displayed frequency into the memory channel indicated by the memory address bar. Don't forget to include \pm 600 when you store the desired frequency using this function. M SCAN actuates scanning of the eight memory channels, and any busy channel stays on for six seconds before scanning proceeds.

Sound complicated? It isn't really. I chose to put the WIAW repeater frequency, 145.450 (- 600), in memory one and several other local repeater and most-used simplex frequencies in the other memories. All I had to do to find out what was going on locally was to use the M SCAN function. I could always stop at an interesting channel by pressing M CALL and then M ADRS. To continue scanning, I simply pressed M SCAN again. The programmable scan limits are a real convenience: One doesn't have to scan the entire nearly 8-MHz-wide band. For example, 5.000 to 7.399 could be programmed in memories seven and eight to hear the most-used 2-meter fm segments. If scanning for busy channels, the scanner stops for six seconds, then goes on. If you want to stay on that busy channel, press either the 100K UP, 100K DOWN, SK UP or SK DOWN buttons. To begin scanning again, press the BAND SCAN key, and on it goes. I would have liked the function to begin scanning once more at the point where I had stopped it, but the scan proceeds each time from the limit set in memory seven. To prevent accidental transmissions or "sitting on the microphone button," a transmit lock switch is provided on the transmit bar.

Comments

What didn't I like about the Azden PCS-300? Of major significance was the poor-quality transmit audio. On-the-air reports confirmed that my transmissions sounded terrible. A few internal audio output adjustments fixed that, and my voice quality (and ego) was back to normal. The schematics included in the manual gave little information. Another annoyance was the low (0.023- μ V) squelch sensitivity. Some signals broke squelch, even with the control set at its highest level. After three weeks of use, two loose screws were found rattling around inside. Luckily, any disasters were avoided; replacement of the screws was quick and easy. I have also developed a penny-pinching preference for a rechargeable, individual NiCd battery system instead of the sealed NiCd packs the Azden uses.

Good Overall

What did I like about this radio? — everything else! The Azden PCS-300 shows good adjacent-channel rejection of signals, and the radio is quite stable. The receiver, in general, is as good as or better than other similar radios I have used. Having had some experience with other μ P-controlled, hand-held transceivers, I was surprised and pleased that this μ P didn't go wild in normal use and even in extremes of temperature. Admittedly, I am far from immune to the flashy features of the rig;

Azden PCS-300, Serial No. 81001

Manufacturer's Claimed Specifications

Frequency Range: 142.000 to 149.995.
 Mode of operation: Fm.
 Current drain: 40 mA in receive mode — no input signal;
 800 mA in Hi transmit mode; 400 mA in Lo transmit mode;
 0.01 mA in memory backup (with power switch off).
 Size (HWD): 7.24 x 2.55 x 1.75 in.
 Weight: 1.4 lb.
 Transmitter power output: Hi — 3.0 W; Lo — 1.0 W.
 Spurious radiation: Better than -60 dB.
 Receiver 1st i-f: 10.7 MHz; 2nd i-f: 455 kHz.
 Receiver sensitivity: Better than 0.2 μ V for 12 dB SINAD.
 Squelch sensitivity: Less than 0.15 μ V.
 Audio output: More than 200 mW (8-ohm load and 10% distortion).

Measured in ARRL Lab

As specified.
 As specified.
 Not measured.
 As specified.
 As specified.
 Hi — 3.1 W; Lo — 1.0 W.
 See Fig. 1.
 As specified.
 0.2 μ V (20 dB quieting).
 0.023 μ V.
 500 mW.

in fact, using the PCS-300 is almost comparable to a good game of Space Invaders or Pac-Man. These flamboyant features, combined with the solid basics this 2-meter radio has, make the '300 a joy to use. Even better, I don't have the feeling that next year the radio will be passé. The PCS-300 is manufactured by Japan Piezo Co., Ltd., and distributed by Amateur-Wholesale Electronics, Inc., 8817 S.W. 129 Terrace, Miami, FL 33176. Price class: \$290. — Carol L. Colvin, AJ2I

CUSHCRAFT 617-6B "BOOMER" 6-METER YAGI

Over the past several years, I have seen a revolution in commercially manufactured amateur vhf antennas. The new generation of computer-designed, long-boom Yagis offers forward gain and front-to-back ratios that were unheard of a few years ago. Evidence of this fact is the great number of operators making successful contacts on the more difficult propagation modes (EME, tropo scatter) using small antenna arrays.

On 6 meters, the primary interest of serious operators is the antenna performance over terrestrial paths. The use of ionospheric and/or meteor scatter will increase in the coming years as we head for the bottom of the solar cycle. Antenna gain is an important factor when determining scatter system range.

Cushcraft's latest Yagi for 6 meters is the 617-6B, a six-element, computer-designed, long-boom Yagi that appears to have good forward gain and front-to-back ratio. Called a "Boomer," this Yagi is by no means portable! Its boom is 34 feet long, 2 feet longer than the full-size Cushcraft "Skywalker" 20-M Yagi.

Construction

The Boomer arrived in a single shipping box. (Luckily, Murphy did not strike — all the hardware was accounted for!) Construction took approximately 2-1/2 hours. Each boom and element section is premarked at the factory to speed assembly. Hose clamps hold the boom sections together, and U bolts clamp the elements to the boom. Two sections of tubing are used as boom struts to keep the 0.058-inch-wall boom from sagging. A T-match is used to feed the driven element, and a coaxial balun transforms the balanced feed to the unbalanced coaxial line.

The antenna material is 6063-T832 aluminum, and stainless steel clamps are supplied.

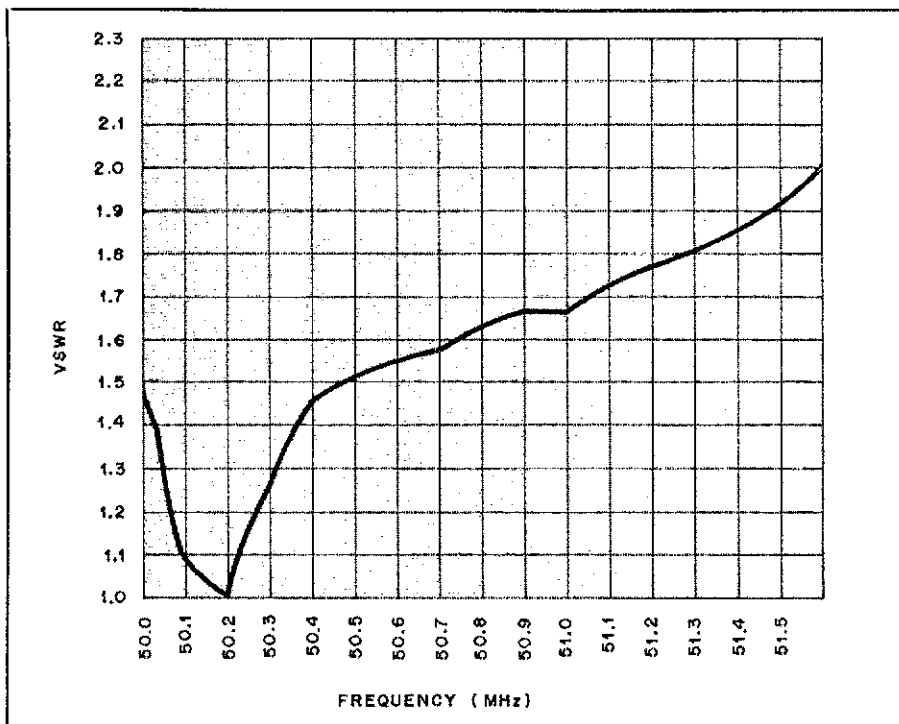


Fig. 2 — VSWR curve of the 617-6B.

Plastic end caps are provided for each of the elements and the boom. The SO-239 connectors have protective plastic boots, and a silicone compound used to keep out moisture and prevent corrosion is supplied.

Installation and Operation

After construction, the Yagi was placed on top of a 40-foot tower on the roof of the ARRL Hq. building. The thin-wall boom lowers the weight of the Boomer to just 26 pounds; I brought it up on the tower and clamped it down myself. Only one mechanical weakness was noticed during the installation: Hose clamps are used to secure sections of the boom together; if these hose clamps are not extremely tight, the boom can twist easily, causing the elements to become misaligned.

How does the Boomer perform? To say it in a single word — "fantastic." I was very im-

pressed with the forward-gain and front-to-back ratio characteristics. During the 1982 January ARRL VHF SS, I used the Boomer in conjunction with a 250-watt amplifier and exciter. During the contest I had no trouble working stations in Illinois and Ohio on scatter — not bad for low transmitter power. The antenna has been on the Hq. tower for several winter months, and none of the hardware has corroded. Performance remains the same as it was the day it was put up.

The Boomer is not for everyone. The limited bandwidth would discourage fm operators, and the large size could be prohibitive to hams living on some city lots. But for those wanting a potent signal on 50 MHz, the Boomer certainly justifies the bill. Price class of the 617-6B Boomer is \$260. It is manufactured by Cushcraft Corp., P.O. Box 4680, Manchester, NH 03108 — Gerry Hull, AK4L

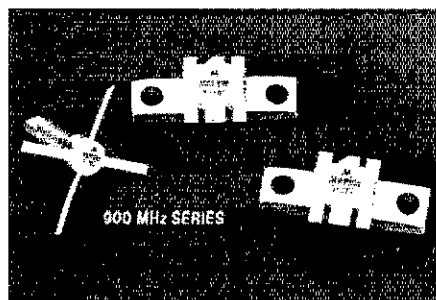
New Products

MOTOROLA HIGH-POWER 900-MHz TRANSISTORS

Motorola has introduced a new 24-V dc, 900-MHz power transistor series. This new line includes the MRF890, a 2-W, 9-dB minimum gain predriver; the MRF892, a 14-W, 8.5-dB driver; and the MRF894, a 30-W, 7-dB final amplifier. These new rf transistors are fully characterized across the 804- to 960-MHz frequency range, and are intended for large-signal, common-base amplifier applications in industrial and commercial cellular fm radio-

telephone equipment.

The three devices are designed for ease of interstage matching, and feature all-gold metallization and emitter ballasting for increased reliability and ruggedness. All devices have guaranteed gain performance at 900 MHz and collector efficiencies of 55% minimum, and will withstand 30:1 VSWR load-mismatch conditions at rated output power and supply voltage. For more information, contact Tom Bishop at Motorola Semiconductor Products, Inc., P.O. Box 20912, Phoenix, AZ 85036, tel. 602-244-6394. — Paul K. Pagel, N1FB



DIVERSITY COMBINER FOR RTTY RECEPTION

□ The circuit of Fig. 1 is useful for combining two (ideally) identical but independently demodulated data streams for display or further processing. Typical data inputs would be from envelope detectors, tone decoders or phase-locked loops, each responding only to one tone (mark or space). The data streams must be in phase. If they aren't, U2D can be used to invert one channel by wiring one input HIGH. As shown, the circuit accepts logic levels of +12 volts and ground. Other levels can be accommodated by scaling the input resistors.

Here's how it works: When both inputs are toggling with full logic swing, the summing amplifier is saturated and the output is a full-swing inverted replica of the input. This signal is then fed to the comparators, U1B and C. Since these comparators have complementary outputs, the output of U2A will be a constant HIGH. Meanwhile, the signal from U1A has been applied to Schmitt trigger U1D and inverter U2C. The signal is finally gated through U2B, which acts as an inverter because one input has been programmed HIGH by the comparators and U2A. Because the signal path has an even number of inverters, the output data is in phase with the input.

Now suppose one of the data channel inputs remains constantly LOW while the other toggles normally. A loss of one tone, either to deep selective fading or transmitter malfunction, could cause this condition. With one channel input held LOW, the summing amplifier toggles not at full logic swing, but from +6 to +12 volts. This swing triggers the noninverting comparator (U1B), but the inverting comparator (U1C) output stays LOW because the summing amplifier output does not cross the +3-volt threshold. Thus one input of U2A is held low while the other toggles, making U2A a noninverting buffer. While the summing amplifier toggles only between +6 and +12 volts, the Schmitt trigger output remains LOW. This stage has a 10-percent hysteresis band, preventing unwanted toggling at the +6-volt level. The LOW output of U1D is inverted to a HIGH by U2C, which places U2B in the inverting mode. Two data inversions have taken place, so the output data sense is erect.

The other abnormal condition is a constant HIGH at one input with valid data at the other. This situation could arise when an interfering carrier falls on one of the RTTY tones. A frozen HIGH input biases the summing amplifier output swing to the 0 to +6-volt region, which triggers the inverting comparator (U1C). The noninverting comparator output stays LOW, because no part of the U1A signal crosses the +9-volt threshold. U2A becomes a noninverting buffer by virtue of the comparator outputs. The Low-region swing of the summing amplifier forces the Schmitt trigger HIGH and U2C LOW, causing U2B to act as a

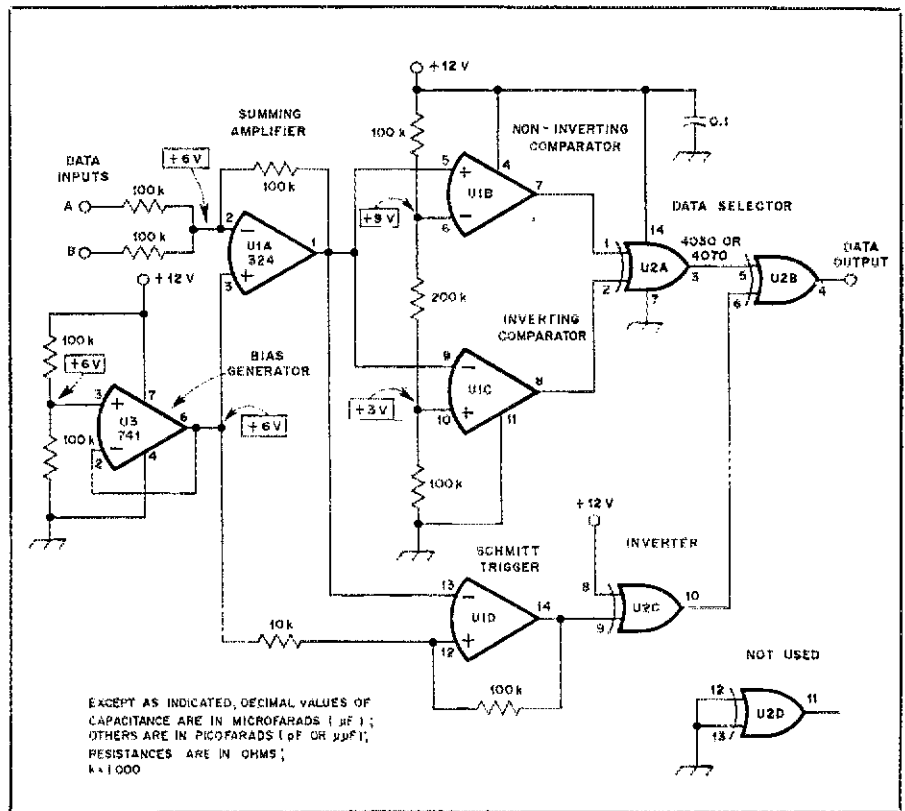


Fig. 1 — Schematic diagram of the diversity combiner for RTTY reception.

noninverting buffer. Here again, the number of logic inversions is even.

This diversity combiner is a worthwhile addition to any RTTY receiving system. Automatic single-tone copy when one tone is lost or jammed is a feature not obtainable with combinational logic alone. However, the circuit is not entirely jam-proof. If one tone is lost or interfered with during an RTTY character, that character will be erroneous. Intermittent or pulsed jamming of one tone can be combated by forcing the affected input HIGH or LOW. —George Woodward, W1RN, ARRL Hq.

TVI FROM THE HEATH REMOTE COAXIAL-CABLE SWITCH

□ I was plagued by an intriguing TVI problem. I tried the normal methods to correct the problem, then traced it to my Heath SA-1480 coaxial-cable switch. The eight-conductor cable that connects the remote switch to the control unit was picking up rf energy. This energy was being fed into the control unit, and the LEDs on the front panel were generating harmonics. The subject of harmonics being generated by diodes that are excited by rf has been covered in many publications, but many people may overlook LEDs as a source of harmonics.

To determine how much harmonic radiation your station is producing, first connect the exciter directly to a shielded dummy load. With the transmitter tuned to full power in the cw mode, you should not see any pattern on a nearby TV receiver tuned to any of the vhf channels. Be especially sure to check unused channels. If there is any signal on the screen, your exciter must be TVI-proofed using the methods described in *The Radio Amateur's Handbook*. After your transmitter passes this test, connect the coaxial-cable switch and the station antenna. Check again for interference on the TV. If your switch is generating harmonics you will see evidence of it on the screen. Now, by disconnecting the eight-conductor cable from the rear of the control unit, you can determine if the harmonic energy is being produced by the LEDs in the control box.

To correct this problem, you must prevent the transmitted signal from getting into the control circuit. This can be accomplished by bypassing each control lead and filtering the ac power lead. The terminal strip on the back of the box is a convenient place to add 0.01-µF bypass capacitors. I ran a ground bus made of no. 14 copper wire between ground lugs under the two no. 6-32 bolts that hold the terminal strip. One end of each capacitor is connected to the inside solder lug of each terminal, and the other end is soldered to this ground bus.

*Assistant Technical Editor

I also added 100- μ H rf chokes (Radio Shack 273-102) in series with each ac power lead. Be sure these are insulated to prevent short circuits. These steps completely cured my TVI problems. — *Jim Abercrombie, Jr., N4JA, Augusta, Georgia*

RG-8/U AND THE PL-259

One of the most common feed line/connector combinations in Amateur Radio is the PL-259 connector on RG-8/U coaxial cable. Many amateurs have difficulty installing these fittings properly. A connector that is mechanically or electrically insecure invites trouble. Fig. 2 illustrates a method I have used both at home and on the job without failure.

Prepare the body of the connector by using a small file to roughen the metal around the solder holes. Tin the area around each hole, but do not get solder inside the body or on the threads. Remove 1-1/4 inches of the outer jacket using a sharp knife. Be careful not to nick the braid. Next, lightly tin the exposed braid, but try not to melt the inner dielectric. Cut through the tinned braid, 5/8 inch from the end, with a small tubing cutter. Now cut through the dielectric, 1/16 inch from the edge of the braid. The tubing cutter works fine for this, also. The easiest way I have found to remove this piece of dielectric is to grasp it with a pair of pliers and twist it in one direction while slowly pulling it off. After you tin the center conductor, you are ready to put on the barrel, and then thread the connector all the way onto the cable. Solder the center pin and braid, using only enough heat to achieve good solder flow. Remove any excess flux, and use an ohmmeter to check for continuity and shorts. Weatherproof all outside connections, and you will have a reliable assembly. — *Kirk Carter, VY1CC, Whitehorse, Yukon Territories, Canada*

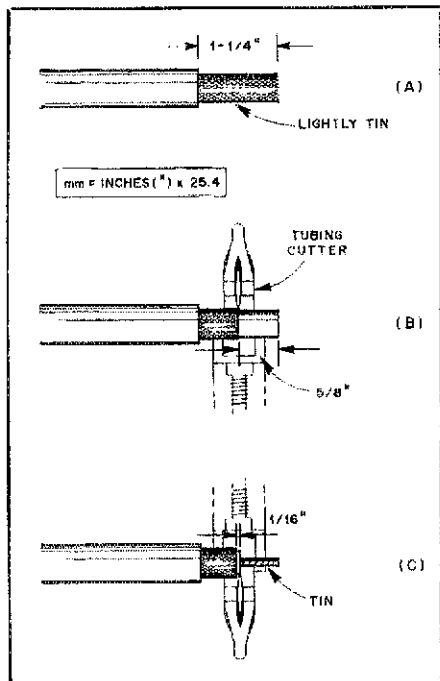


Fig. 2 — The steps used by VY1CC to prepare a piece of RG-8/U coaxial cable for the installation of a PL-259 connector are shown in parts A, B and C.

DRAKE L7 AMPLIFIER FAILURE

The power supply in my Drake L7 amplifier failed after several months of use. This problem is apparently a common one, because my dealer told me that four of the 15 amplifiers he sold recently have had the same problem. Apparently, arcs occur from the 50-k Ω , 50-W bleeder resistors to the mounting screws that hold them in place. I found one of these screws blackened and with two rows of threads missing apparently because of this arcing. Of all the failures reported to my dealer, each occurred when the amplifier was in the ssb mode, and was not keyed. This places a maximum voltage on the bleeder resistors, up to 2.8 kV.

Each resistor is mounted between two metal tabs that are grounded through the mounting screws, which tighten the tab against mica insulators at each end of the resistors. If the resistor is not aligned properly, the insulators do not separate the resistors and screws sufficiently to prevent arcing.

I bought some nylon bolts, nuts and spacers to lift the tabs above ground. I also bought some protective acrylic spray (Radio Shack no. 64-2317) and applied it liberally to the tabs, mounting screws and power-supply frame. An engineer for the resistor manufacturer told me that the specifications call for the use of a centering washer to ensure that the mounting screws are centered if the resistor is more than 500 V above ground potential. — *Denny Warrick, WB0MWJ, Watertown, South Dakota*

RELAY DRIVER FOR THE IC-551 AND IC-251A TRANSCEIVERS

No provision is provided on the IC-551 or IC-251A vhf transceivers for switching an external linear amplifier. However, 9-V dc is present at pin 6 of the accessory socket during transmit. This supply can not drive a relay directly because it can only provide up to 5 mA.

Fig. 3 shows how this 9-V supply can be used to switch Q1 into conduction and to activate K1 during transmit. Pin 2 on the accessory socket provides 13-V dc at 300 mA, and pin 8 is ground. The current-limiting resistor, R1, provides the proper base current to turn on Q1. — *Hamp Richardson, KSEFW, Albuquerque, New Mexico*

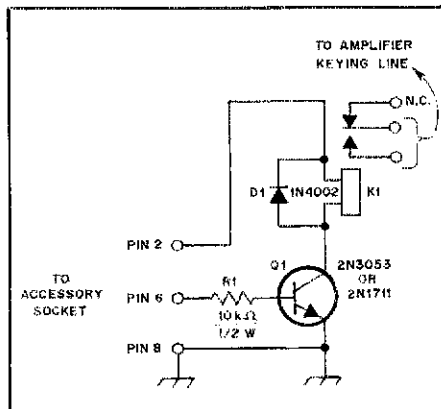


Fig. 3 — Schematic diagram of a relay driver that can be used with an IC-551 or an IC-251A to key a linear amplifier. K1 is any 12-V relay with a coil resistance of approximately 185 ohms.

WORN MARKINGS ON INDICATOR KNOBS

Pointer lines and numbers on dial knobs can become worn off after hard use. In most cases, the markings are etched into the plastic, and then filled with paint. Here is an easy way to renew these marks. Liquid Paper[®] or Wite-Out[®] is perfect for the job. Simply fill the number or pointer groove with the paint. The small brush-applicator cap is just right. Scrape off the excess with a fingernail once the paint is dry; the markings will look as good as new. — *Sandy Gerli, AC1Y, ARRL Hq.*

TTL LEVELS FROM THE RADIO SHACK TRS-80[®] MICROCOMPUTER CASSETTE-OUTPUT PORT

Software for Morse code generation with the Radio Shack TRS-80[®] microcomputer typically uses the cassette-output port to develop the keying signal. The keyed output is achieved by opening and closing the motor-control relay contacts. This relay was not designed for keying service, and it is simply not fast enough to respond properly at high keying speeds.

Fig. 4 shows how standard TTL output-level changes can be obtained for a keying circuit. A transistor switch capable of handling the current and voltage requirements of your transmitter is the only additional requirement.

The larger of the two gray plugs is removed from the AUX jack on the cassette player and inserted into J1. Before keying can start, the motor-control relay must be on, so your program must initially include a statement line with the command "OUT 255, 4." Thereafter, if the program executes "OUT 255, 5," a TTL high will be developed at the comparator output. If the program executes "OUT 255, 6," the comparator will develop a TTL low at the output. — *C. T. Isley, W7KIM, Greenville, Texas*

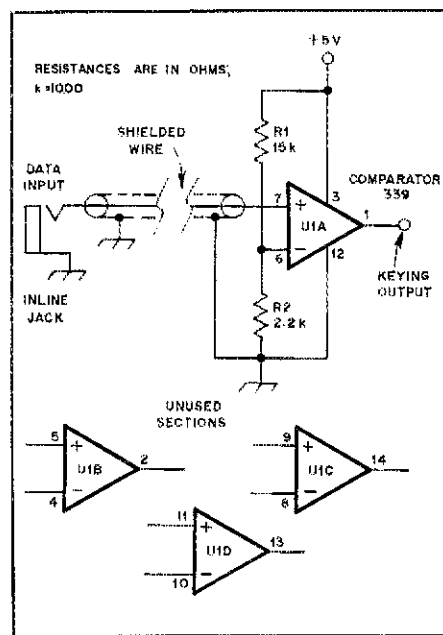


Fig. 4 — Schematic diagram of a circuit to develop TTL output levels from a microcomputer cassette-output port. U1 is a 339 quad comparator. Any one of the four sections may be used.

DX Lists — Pros and Cons

By John F. Lindholm,* W1XX

Pro: "Nets are among the finer traditions of Amateur Radio. They foster, among other things, fellowship and friendships. Branding these operators as outlaws may very well have the same effect as the passage of prohibition." — WD0DMN

Con: "Working DX from a list or net is as if I stood in line at the Redondo Beach pier awaiting my turn to have a diver attach a large fish to my hook." — N6HI

With these two comments you have the makings of a donnybrook that has polarized the community of DX enthusiasts. The issue that has DXers at the opposite ends of the spectrum is whether the controlled working of DX through lists or nets is ethical.

A Little History

The genealogy of such lists can be traced to the earliest days of Amateur Radio when one might have asked the DX station to "listen for my friend." The current list technique involves working DX stations in a controlled situation with the "listmaster," or emcee, being an important third party. In the same manner that discipline is maintained in a traffic net by the control station, the listmaster sees to it that stations call the DX station in an orderly manner, as prescribed by the list taker. The list is often taken off frequency by an assisting station. Such lists can range all the way from impromptu sessions to highly organized nets that meet daily on announced frequencies to dispense the DX manna. The traditional freestyle method of working DX simply involves station A calling station B. When station B is rare DX, station A usually has to compete with station C, station D . . . through station Z to the nth power. This is defined as a pileup.

The driving force behind all this interest is the DX Century Club, as amateurs pursue the DX game of increasing their country totals. Since DXCC is an ARRL-sponsored award, the rules of the game are subject to the voice of the participants. The DX Advisory Committee (DXAC) receives such input from the members, studies it, and recommends any changes in the rules to the ARRL Awards Committee.

The subject of DX lists has been scrutinized by the DXAC before. The question was studied in depth in 1978-79 to ascertain if contacts made by list operations should count for DXCC credit. At that time, the DXAC concluded that such contacts should count, but that operations through lists were not the preferred method of operation. A detailed operating guideline for such operations was prepared by the DXAC and compiled by DXAC Board Liaison N4MM. It was

published in September 1979 *QST*.¹

The subject was resurrected more recently by an active DXer, Carl Henson, WB4ZNH, who has seen extensive action from both sides of the list and the pileup. It was Carl's contention that abuses of list operations had reached such proportions as to outweigh any good they may perform. He sought to broaden DXCC Rule 12 on sportsmanship to define such operations as unethical. His suggested rule change would place the onus on the listmaster, not the participants, as follows:

PROPOSED that the Awards Committee of ARRL modify Rule 12 by adding a new Paragraph (d): For (a) and (b) above, the taking of "lists" and the solicitation of DX stations to operate from a "list" or "DX net" is poor operating ethics.

His direct correspondence to hundreds of active DX aficionados prompted an avalanche of several hundred letters to Hq., expressing either support for, or disagreement with, a list crackdown. Every one of the letters received was duplicated and circulated to each member of the DXAC for study. Never has an

[With lists] "little skill is required . . . no experience with propagation is needed, no effort."

operating issue generated such avid interest amongst the membership. So let the members speak!

Don't Shoot the Piano Player

Some of the correspondents thought that ARRL Hq. was behind a move to ban lists. As a KA1 said: "It's not often I take pen in hand, but I have recently learned of a potential issue that angers me greatly. I speak of the pending disqualification of list or net DX for DXCC credit. I would candidly ask you when will ARRL get in step with the times. In my four short years as a ham, I keep looking for the League to represent my position. When will you find some accord?" A WB3 observed: "I

would hate to see ARRL become a dictatorship, because someone does not like the way another amateur enjoys his or her hobby, so long as they are doing it legally." And this from a W4, who quipped: "I am probably wasting my time writing this letter because you gentlemen at ARRL are so conservative you hate to see the days of the week change."

The question of regulation was addressed by N6VO: "The last thing Amateur Radio needs is another division among our ranks. My position is neither for nor against lists, rather it is directed toward the ominous spectre of more regulation in a time that amateurs have strived for less regulation. Are we saying to the world that now that we have fewer regulations, we cannot control our activities?" And K6BG: "Does the ARRL [Hq.] have the right to say that contacts from a list or net don't count? Such an edict would not promote international goodwill." And K9MX: "Let's not get into the business of dictating 'how' each of us must pursue his hobby." While WA2VUY offered: "Who are we to dictate how the DX station wishes to operate? Why should we be penalized for a valid contact under conditions in which a DX station wishes to operate?"

List Abuses

Those in favor of the rules change see many abuses of lists, as follows: "Once a long, long time ago, you needed skill, a good antenna system and some equipment to work DX. Today, all that is needed is a telephone." — W2BHK. "Joe Dipole guesses at a 3 by 1 report until someone tells him his report, so that they can have a shot before the band changes." — WB4ZNH. "A list operation recently overheard: 'XX1XXX, make your call. . . no, George, the call is XX1XXX. . .' To identify the would-be caller should be unthinkable." — W5CWQ/6. "The biggest service by lists is to boost the ego of the listmaster and providing contacts to those who want to kiss posteriors. Unless the guy with a dipole cultivates the listmaster over a period of time, his chances of being heard at the taking of the list are very slim." — K5FUV. "There are several DX Net emcees who should be granted Official Relay Station appointments." — K8ND. "The present proliferation of lists/nets is, in my view, a result of certain stations,

*Communications Manager, ARRL

¹J. Kanode, "DX Operating Procedures and Guidelines," *QST*, Sept. 1979, p. 89.

mainly Ws, who latch onto rare and semi-rare stations. Instead of instructing them on correct procedure, the listmasters become parasites to the DX station. I find it hard to believe that operators whose native tongue is English must work through lists." — *W2FG*. "Was the DXCC program designed for third-party traffic?" — *K3ZR*

N4SA perceives that "once it was desirable to optimize station design for the best long-haul signal possible. Now it appears that the station should be optimized for the best possible signal at the listmaster's QTH." While N4FJ offers this solution: "Don't give a man a fish. Teach him how to catch one." And W5DV summarizes: "It seems clear that this is a rather divisive issue. My fundamental objection to lists is that they deny the feeling of achievement. Little skill is required, no particular station effectiveness is called for, no experience with propagation is needed, no effort. Most arguments in favor of lists are based on the assumption that everyone should have an equal chance to work every country. The point of all this is that we cannot make things equal in DXing, even if we try. There will always be those who spend more money, or those with greater operating skill and experience, or those favored with excellent DX locations. It is crucial that ARRL continue to set the standards for DX achievement. ARRL gives direction to DXing all over the world. No other organization has near the prestige which you command. If you declare a piece of real estate to be a country, everyone will try to work it. On the other hand, if you decree that it fails to meet the criteria, it will be ignored in droves. Thus, it follows that you alone have the necessary influence to end a practice which has clearly gotten out of hand. Some will believe that there is a problem of enforcement. Although I am skeptical of any plan which would create a band of vigilantes, I believe that the majority of DXers would support the revised DXCC rules and abide by them as they have in the past. I think DXers would applaud your efforts to keep DXCC a worthwhile awards program."

Rationale for Lists

The majority of letters received were from those who advocate list/net operation, a sampling of which follows. "Popular event tickets are available by standing in line somewhere, not knocking people out of the way to be first." — *W6SN*. "Without DX lists or DX nets the majority of DX amateurs would never have a chance to work a new country." — *W1DQH*. "Come on guys. List operations and nets have been around many years, and they were born of expediency. I hope ARRL has enough sense not to hang itself as far as the DX world is

concerned." — *W5DRS*. "I think we should be considerate of the DX station that has to try to contend with the pileups that often get out of hand." — *KQ4L*. "It's the DX station's choice. Many low-power or non-English-speaking hams would never be worked without list operations." — *WA6AJP*. "These operations are something that have evolved and grown with the swelling of the amateur and DX ranks. It was a natural step in DX evolution, and I feel that as long as they are conducted fairly and honestly, then by all means let it be so. If I do not want to operate in that manner, I won't. But I will not begrudge those who do, the opportunity to do so. I think this is one issue that should never have been raised." — *AF5H*. "We must remember that many

"Without DX lists or DX nets the majority of DX amateurs would never have a chance to work a new country."

DX stations have modest equipment and antennas, have a poor understanding of English, or are too inexperienced to handle pileups. Nets and lists offer a way for these hams to furnish us with a new country." — *WA0ADX*. "Many stations run low power and have simple antennas, not by choice and not necessarily because of financial considerations. There is a nice fellowship 'hunting' together, and we all get excited when good contacts are made. Listening to pileups with all the sickies, policemen, foul language, etc. is rather sickening. It does seem much more gentlemanly (and ladylike) to do DXing in some form of polite order." — *VK6YL*

Big Guns vs. Little Pistols

Some of the strongest comments came from those who reduced the matter to the "haves vs. the have-nots," such as: "I am for any fair means of working DX, including lists for DXCC credit. Otherwise the 'fat cats' would have all the advantage. Put me down for the little guy." — *N3ADI*. "We couldn't help noticing the similarity between banning lists/nets and slashing social programs. It amounts to 'supply-side' DXing, and the little pistols get it in the neck again. Supply-side DXing appeals to the huge linear/stacked-array types who are usually on the sunny side of 300 countries anyway. Convenient to break the pileup on the first or second call, but how frustrating to have to wait

on a list like thousands of peasants. Outlawing lists and DX nets would be like throwing out the baby with the bath water." — *KB7SB*. "This proposal is supported mainly by the 'haves' who do not want the 'have-nots' to get what the 'haves' have!" — *KB9UB*. "Lists and nets are important to all the 'little pistols' to work DX. Leave the lists alone and worry about the lids who cause intentional QRM, ask DX stations to work their friends, or call rare DX to say hello since their previous QSO yesterday! And what about the tailenders and those who continue to call during QSOs? Nets circumvent several of these poor operating procedures. And what about 2-meter alerting for DX. Isn't this almost the same as a list? Let DX stations work any way they see fit." — *VE3CYX*

Advocating the opposite view, however, is WB4GNT: "I feel very sorry for those people who are starting DXing now and get into the 'list trap.' They feel that they are *incapable* of working DX if it is not spoon-fed to them, and thus they never learn by trying to work it unassisted. As an analogy, consider a group of duck hunters going out on a hunt. Some of the hunters have worked to become good-marksman, but some have never practiced and couldn't hit the broad side of a barn. The poor hunters demand that all the ducks be trapped, knocked unconscious and laid out on the trail in front of them. Since this is the only way to shoot the ducks, both the good shots and bad shots are reduced to blasting away at the unconscious game. The good hunters have no fun, and their skills atrophy."

Spectrum Usage

Speaking to the conservation of spectrum usage by list operations, we hear: "I would favor DXCC credit being disallowed for stations worked via split-frequency operation. Such operations take up too much of the band, sometimes 10 to 30 kHz. This causes much unnecessary QRM, and is an infringement to those who do not participate in DXing." — *W1BPM*. "Net operations do not create QRM, they help eliminate it. There is more jamming of split operations than you hear on nets." — *K7GLL*. "Pileups create a lot of unnecessary QRM. A big one can wipe out 10-20 kHz. A well-run DX net is rarely more than a few kHz wide." — *N4EKE*. "After listening to a rare DX station working a pileup on 10 meters make one contact every six minutes and also hearing him make better than one contact every minute on a list operation, I conclude that many more amateurs can work him in a given time span on a list than by digging him out of a pile." — *K0JFN*. "Witness the present DXpedition as I write this. Bedlam over 20 kHz wide on prime DX frequencies. This is better?" — *W7CNL*

"Hey, Clyde, How are Things in Borneo?"

One of the biggest gripes from the mailbag (from both pro and con listers alike) is the station who must flex his DX muscles daily, to wit: "What really bothers me is the Big Gun DXer saying to the rare DX station, 'Nice to work you again. I can always make it through the pileup. It was only yesterday that we had our last QSO.' Oh yes, it happens. And it happens often." — *KIRB*. "These guys use their multi-kilobuck stations and legal (?) power to climb over the low-power, sub-super antenna stations to work whomever they want, a la: 'Haven't worked you all week, pal. How are things in Borneo?' This is competition? In a list operation, the high-powered boys have to wait their turn, depriving them of their ego trip." — *WADYY*

Lists are Unsportsmanlike

Further expounding the anti-list view, we first hear from *KS2F*: "Hopefully, you have come to realize that this form of working DX has done absolutely nothing to preserve the integrity and sense of accomplishment with an awards program sponsored by ARRL." Followed by a chorus: "It is my personal belief that this practice rapes the intent of an amateur radio station DX operator. This results in a form of 'repeater.' This repeater can also be at times selective as to input." — *WB0TET*. "I oppose list/net operations because they dull the operating skills, lead to claimed contacts that simply did not take place. And lastly, but most importantly, it is just not DXing." — *N8AAT*. "If we can agree that hunting DX is a sport with the spoils going to the skillful operator (sharpshooter), then in the great tradition of sportsmanship it cannot be regarded as a sport or sportsmanlike if the quarry is hog-tied and immobilized." — *VE3HGN*. "How can you just sit on a net and wait for the QSO? That would bore me to death." — *KA6GKU*. "List is a four-letter word." — *NAAD*. "Competition is in the finest of American traditions. Once challenged, we walked on the moon as a result. We admired the dynasty of Vince Lombardi because he was a real competitor. We admire those who made it to the top from humble beginnings. History is replete with accomplishments resulting from competition of one kind or another." — *W9BW*. "Lists for the most part are sleazy at best." — *K6EMN*

Banning Lists is Unenforceable

More comments focused in on the perceived unenforceability of the proposed rules change than perhaps any single issue. "Trying to decide which QSL comes from a list contact would be a real bag of snakes." — *KB2MY*. "Don't make rules you can't enforce." — *W2HXF*. "Consider the alternatives.

Consider the policing. Consider the additional work for the DXCC desk. Consider the reasons for nets and lists. Consider the condition of the ham bands without the congregation of nets and lists. Consider the preferences of the foreign operators. Consider the opinion of the DXCC membership. Don't let a minority tail wag the dog." — *KC9AT*. "All the bands would have to be policed by official 'snitches' who would report their 'finds' to Hq. Do we want to recognize and sanction such activity? The League has only so many resources, and these should be used in a way which most effectively aids the entire amateur community. I do not want my League's energies spent enforcing this issue." — *KB2T*. "Either we have ethical behavior by DXers, or we don't. You just can't legislate it!" — *K0SE*. "Is ARRL prepared to monitor all QSOs with all list operations?" — *W3LDD*. "The League would open itself to one of the worst hassles you've ever seen." — *K5LIL*. "The adoption of a rule so difficult to enforce as that proposed could undermine the integrity of the DXCC award by

"The answer . . . is education, the development of skills for working DX without the need for lists/nets."

rendering the enforcement of such a rule to border on the incredible." — *KC5KL*. "Let's not get the DXAC into an area with more thorns than a rosebush. Besides, Don Search & Co. have enough police work now." — *KC4CT*. "DX lists? They are best left alone. On a purely mechanical basis, any attempt to police nonlist from list contacts would make for horrendous red tape and adjudications." — *KB0FZ*. "Although I concur with those statements circulated concerning alarm about intentional QRM and poor operating ethics seen on the DX bands today, I do not agree with the proposed solution. Not only obviously unenforceable, one would have to be very naive to think that intentional QRM would 'go away' by abolishing lists and DX nets. If a DX station doesn't want to have a list taken for him, or to get on a net, all he has to do is refuse. If one doesn't want to participate in lists/nets, that's your prerogative. Meanwhile, I remain content in the knowledge that I am enjoying my hobby and won't get ulcers over trivial matters." — *W4PTT*

Education Offers the Best Solution

The response from the membership on

this operational issue was overwhelming, with comments generally running three to one in favor of list operations. The DXAC appreciates the hundreds of amateurs who took the time to express their opinion.

In May, the DXAC voted unanimously to reject any change to the DXCC rules that would take action against list takers or that would effectively discredit any confirmations from list/net operations. Although the members of the DXAC recognize the abuses of some list operations, they do not feel that lists, per se, are unethical. Thus, the DXAC by its vote has reaffirmed its stance of 1979 that lists are generally not the preferred way to work DX; however, at times they are justified. The DXAC agrees with the following comments that the League's role is to promote good operating technique through education, and that better ways to accomplish this should continue to be explored.

"Action needed is definitely educational in nature. I feel strongly that many new hams operate out of ignorance and not from malice. Movies, slide shows and other audio visual presentations could be developed for showing at hamfests and conventions." — *KC4UQ*. "The main problem does not lie in a list vs. freestyle operating method, but rather that some list takers cannot handle the list-taking job as well as others. A program of education within DX associations and radio clubs worldwide could be instituted to also spread the gospel of split frequency operation." — *K4SE*. "It seems that we shouldn't be using lists/nets as a crutch to DX operating. The answer I think is education, the development of skills for working DX without the need for lists/nets." — *W3NF*. "It would be wise to suggest how to conduct list operations. No telephone calls or by mail. No previous days before. Whoever makes the list, do it while the DX station is there, and do it by districts according to propagation." — *W8DOG*

Summing it all up is Ross, *WB6GFJ/FO0FB*: "Banning DXCC credit because the contact was made via a list is not the answer. Rather, we could embark on a major educational campaign within the DX clubs to get their members to sharpen their DX operating skills. Maybe it is just a dream to think that an effort of education would clear up the problem. However, I think the growth of Amateur Radio outpaced what we old-timers wanted to accept. We sat back and let the newcomers flounder, rather than accept the responsibility of teaching them the finer points of operating."

Perhaps this article, written at the direction of the DXAC, will air the subject appropriately and bring about a cleansing effect on all types of DX operating habits that we all hear on the airwaves. Good DX!

Smooth Sailing at Cedar Rapids

With its eye toward promoting the healthy trends, and heading off the undesirable ones, the July Board meeting tackled such diverse matters as cable TV interference, phone-band expansion and special-interest newsletters.

By Harold M. Steinman, K1FHN

Each ARRL Board meeting has a mood, a tone, a feeling, an overall impression that lingers in the memories of the participants. The July meeting, held at Cedar Rapids, Iowa, July 21-22, was, as the shaving cream commercial goes, "smooth, clean and easy." Sure, there was disagreement on certain points; there always is when amateurs get together, especially when those amateurs are determining policy for the six-million-dollar organization called the American Radio Relay League. But there was no antagonism; compromises were struck in a businesslike manner, questions were referred for study when insufficient information was available, and all who participated went away with the feeling that the League is in good hands.

It was the first Board meeting chaired by newly elected ARRL President Vic Clark, W4KFC, and the first meeting with General Manager Dave Sumner, K1ZZ, representing the staff and being grilled by his 16 bosses. To what degree the ease of the meeting can be attributed to the "honeymoon" period is uncertain. That will be determined in a later installment in this continuing series of articles.

Pre-meeting Session

On the evening prior to the official start of a Board meeting, the directors usually get together for an informal session during which they communicate to one another the issues they consider worthy of discussion. The objective is to generate a free flow and exchange of ideas, and to uncover problem areas so that changes, recommendations and compromises can



A view of part of the front table. Left to right are General Manager Dave Sumner, K1ZZ; President Vic Clark, W4KFC; and Vice Presidents Carl Smith, W0BWJ, Larry Price, W4RA, and Gar Anderson, K0GA.

be sought prior to the opening of the formal session. At Cedar Rapids, this informal session was devoted to two subjects: phone-band expansion and cable-television interference (CATV). The former received the bulk of the attention, with all facets of the issue being fully explored. A compromise plan was reached after several hours of discussion, a plan that is believed to take into account the wishes of a majority of League members. Details follow.

Phone-Band Expansion

FCC Docket 82-83, concerning hf phone-band expansion, actually consists of two parts. The first is a Notice of Pro-

posed Rulemaking, wherein the Commission proposes to add the frequencies 14,150-14,200 kHz to those currently authorized for telephony use, and to make this entire range available for use by General, Advanced and Extra Class licensees. The second part of the docket is a Notice of Inquiry, wherein the Commission merely explores the question of phone-band expansion on other hf bands with the intent of possibly using the comments received as the basis of a rules proposal at some later date.

Docket 82-83 was brought to the attention of League members in May 1982 *QST*, in the editorial on page 9 and in the article on page 51. Comments were

*Manager, Membership Services, ARRL

Technical Excellence Award

The ARRL Pewter Cup Technical Excellence Award was awarded to R. Cracknell, ZE2JV, F. Anderson, ZS6PW, and C. Fimerellis, SV1DH, for their November and December 1981 article, "The Euro-Asia to Africa VHF Transequatorial Circuit During Solar Cycle 21." Honorable mentions went to A. Helfrick, K2BLA, for his December 1981 article, "A Modern Up-converting General-Coverage Receiver," and to R. Wilson, KL7ISA, and H. Silverman, W3HWC, for their July 1981 article, "Wire Line — A New and Easy Method of Microwave Circuit Construction." Congratulations!

solicited from members, and studied by the Plans and Programs Committee. The final plan recommended by the Board, and which the League will file with the FCC, is:

3.5-4.0 MHz, 80 Meters
3.750-3.775 Extra
3.775-3.850 Advanced, Extra
3.850-4.000 General, Advanced, Extra

7.0-7.3 MHz, 40 Meters
No change

14.0-14.35 MHz, 20 Meters (as previously petitioned)
14.150-14.175 Extra
14.175-14.225 Advanced, Extra
14.225-14.350 General, Advanced, Extra

21.0-21.45 MHz, 15 Meters
21.200-21.225 Extra
21.225-21.300 Advanced, Extra
21.300-21.450 General, Advanced, Extra

28.0-29.7 MHz, 10 Meters
28.3-29.7 General, Advanced, Extra

Cable Television Interference

While it is certainly an important issue, CATVI did not occupy a great deal of the Board's time. Why? For the simple reason that the Board was unanimous in its feeling that the enormity and persistence of the problem mandates the continuing and untiring efforts of the RFI Task Group, the ARRL counsel and the staff in seeking solutions. The Board called for vigorous action to protect legitimate users of the radio spectrum from the insidious and detrimental effects of CATVI (see minute 73).

Biological Effects of RF Energy

There were two motions on this subject. The Board directed that the League request that the FCC retain control of power levels that may be generated by all forms of communications equipment when such equipment (including Amateur Radio transmitters) is in the transmit mode. In addition, ARRL will ask FCC to adopt the American National Standards Institute 1982 allowable exposure levels for rf energy and retain this exclusive control (Minute 47). It was also voted that the ARRL Committee on the Biological Effects of RF Energy respond to proposals made by federal, state and local government agencies seeking to regulate human exposure to rf energy, and that the committee take advantage of every opportunity to urge federal preemption in this

area (Minute 48). (Federal preemption of exposure levels for rf energy will discourage the establishment of arbitrary rf exposure standards by state and local governments.)

Volunteer Counsel Position Established

Are you a lawyer admitted to the bar in any U.S. or Canadian jurisdiction? Do you want to help the League fight the burgeoning number of restrictive and anti-amateur zoning and RFI ordinances? If so, you should consider becoming a Volunteer ARRL Counsel (see Minute 41).

New ARRL Newsletter

In order to make intelligent decisions it is necessary to be informed. One important product of the League is information. The League's primary vehicle for the

dissemination of information is *QST*, which is limited by the reality of copy deadlines and space restrictions. There will soon be an ARRL newsletter — the title of which has not yet been determined — that will carry news of the FCC, summaries of FCC dockets, League news and general news of interest to the Amateur Radio community. This newsletter will be published no less often than every two weeks and mailed by First Class mail. It will be more timely than *QST*, and will be able to treat many subjects in greater depth. Distributed free of charge to division-level volunteers, it will be made available to other members on a subscription basis (Minute 78).

Availability of Mailing Lists

In addition to the present policies concerning the availability of membership

Studies Initiated by the Board

When insufficient information to make a decision is at hand, or a subject is worthy of further exploration before specific action is warranted, the Board will often refer the matter to an appropriate committee or individual. Recommendations are to be made to the Board at a later date. The Board originated 26 studies at its July meeting. In many cases, more than one committee or individual was assigned responsibility for the study. In the table below, only the party with primary responsibility for the study is listed.

Ad hoc committees were created to study:

- a revitalization plan for the Intruder Watch (Minute 18)
- a more continuous Washington presence for ARRL (Minute 42)
- methods of strengthening the Canadian Radio Relay League (Minute 50)
- steps to be taken by ARRL to cope with the transfer of monitoring and licensing activities by the FCC to the Amateur Radio Service (Minute 57)
- changes in Board procedures (Minute 86)

The Membership Affairs Committee will study:

- feasibility of producing and distributing a loose-leaf type of operating manual and standardized operating aids to be included therein (Minute 55)
- opening Board meetings to League members (Minute 58)
- offering to League members other types of insurance plans (Minute 70)
- extending automatic permission to affiliated-club newsletter editors to reprint items from *QST* (Minute 71)

The Management and Finance Committee will study:

- content of Product Review column of *QST* (Minute 84)
- improving accuracy and timeliness of the *Repeater Directory* (Minute 85)

The Operational and Finance Committee will study:

- operational cost reduction and improving organizational cash flow (Minute 51)
- retirement plan for staff personnel (Minute 52)
- increasing travel allowance for use of private automobiles (Minute 103)

The Plans and Programs Committee will study:

- recommendations for the distribution of handout material at Amateur Radio talks and demonstrations (Minute 94)

The DX Advisory Committee will study:

- including on the DXCC Country list information that indicates the countries served by the ARRL outgoing QSL Bureau (Minute 100)
- creating a QRP non-endorseable DXCC award (Minute 101)

The Emergency Communications Advisory Committee will study:

- feasibility of selecting a common connector for use with radio equipment (Minute 90)

The VHF Repeater Advisory Committee will study:

- transmitting a geographical identifier along with a repeater's i-d (Minute 61)
- a recommended 15-kHz split-channel band plan for 2 meters (Minute 72)
- suggested tone-access codes for specialized uses, such as time, weather, etc. (Minute 83)

The VHF/UHF Advisory Committee will study:

- the 6-meter band plan proposed at Minute 82 of the March 1982 meeting. See May 1982 *QST*, p. 49. (Minute 63)

The General Manager will study:

- the possibility of a publication, on the order of *QEX*, directed at digital applications of Amateur Radio (Minute 53)
- producing an audio-visual presentation on the International Amateur Radio Union (Minute 75)
- developing a kit of materials for distribution to affiliated-club journal editors (Minute 79)
- installing a "bulletin board" type access to the League's computer for use by directors (Minute 89)

How You Can Help

If you would like to contribute to one of these studies, simply send a letter to ARRL Hq., addressed to the proper committee or individual. It will be acknowledged, and copies will be made and distributed to all parties concerned. You should also send a copy to your own division director, whose address can be found on page 8. You can influence League policy.

lists in the form of mailing labels, membership lists will be furnished at commercial mailing-list rates for any legitimate business purpose under a cost schedule prepared by the general manager. (The present policy makes such lists available at no charge for certain administrative purposes and in conjunction with ARRL-approved hamfests and conventions. The lists are now available at cost for League election campaigns and for certain noncommercial, pro-amateur purposes but they have not been available previously for commercial use.) *It is important to note that the privacy of League members will be respected, and any*

member who does not wish to be on any commercially available mailing list may so request (Minute 26).

Amateur Radio Postage Stamps Sought

Now is the time to begin efforts to secure the issuance of Amateur Radio postage stamps on the occasions of the 75th anniversary of the ARRL (1989) and the 25th anniversary of the first Amateur Radio satellite (1986). The General Manager was directed to do so at Minute 92.

The Fine Print

Author: It is recommended highly that

you read the fine print on the pages that follow.

Reader: Why?

Author: It contains the detailed minutes of the Board meeting.

Reader: But wasn't *this* article supposed to tell me what happened at the Board meeting?

Author: Yes, but I was able to give you only the highlights, to whet your appetite. Also, I might have left something out that you would find interesting (not that I would deliberately deceive you, of course).

Reader: Okay. Now, where did I put my magnifying glass . . . □

Moved and Seconded...

MINUTES OF EXECUTIVE COMMITTEE MEETING NO. 400 JULY 9, 1982

Pursuant to due notice, the Executive Committee of the American Radio Relay League, Inc., met by telephone conference call at 3:07 P.M. EDT on Friday, July 9, 1982. Present on the line were President Victor C. Clark, W4KFC, in the Chair; Vice President Carl L. Smith, W0BWJ; Directors Paul Grauer, W0FIR, Mitch Powell, VE3OT, and William J. Stevens, W6ZM; and General Manager David Sumner, K1ZZ. Also present on the line were Vice Presidents Larry E. Price, W4RA, and Gar Anderson, K0GA, Director Edmond A. Metzger, W9PRN, and Counsel Christopher D. Imlay, N3AKD. Director Jay Holladay, W6EJJ, was traveling in England and was unable to be present.

At the request of the Chair, Messrs. Sumner and Imlay reviewed the anti-amateur ordinance enacted earlier this year in Burbank, Illinois, and discussed at Minute 4.2 of the Executive Committee Meeting of May 1, 1982. The members of the Committee were in receipt of a detailed document dated June 24, 1982, prepared by Roger Borowski, WA9EKA, as Chairman of the Burbank Tower Fund. After discussion, on motion of Mr. Stevens, seconded by Mr. Grauer, it was unanimously VOTED that the Executive Committee expresses its wholehearted support for the action being undertaken by the radio amateurs of Burbank, Illinois, to seek a preliminary injunction in Federal court against the enforcement of the extremely objectionable ordinance recently enacted in their city and, further, to seek a declaratory judgment overturning the ordinance. ARRL support is authorized up to the amount of \$7500 to supplement funds being raised from other sources, subject to monthly review of expenses incurred.

There being no further business, the Committee adjourned at 3:50 P.M. Respectfully submitted, David Sumner, K1ZZ Secretary Victor C. Clark, W4KFC President

NO. 401 JULY 20, 1982

AGENDA

1. Recognition of Life Members
2. Affiliation of Clubs
3. Approval of Conventions
4. Report on requests for direct Antenna Case funding: Mr. Imlay
5. Report on FCC actions: Mr. Imlay
6. Review of actions taken by the General Manager in response to previous Board Meeting actions
7. Report on Wallace Nolen suit

8. Pension matters
9. Request for deficiency appropriation for the Management and Finance Committee
10. Request from Vice Director Ellis for copies of Northwestern Division financial records
11. Progress report on 1983 National Convention, Houston

Pursuant to due notice, the Executive Committee of the American Radio Relay League, Inc., met at 1:30 P.M. CDT, Tuesday, July 20, 1982, at Stouffer's Five Seasons Hotel, Cedar Rapids, Iowa. Present were President Victor C. Clark, W4KFC, in the Chair; Directors Paul Grauer, W0FIR, and William Stevens, W6ZM; First Vice President Carl L. Smith, W0BWJ; and General Manager David Sumner, K1ZZ. Also present, at the invitation of the Committee, were Vice President Gar Anderson, K0GA, and Counsel Christopher D. Imlay, N3AKD. Present at various times during the course of the meeting as observers were Vice President Richard L. Baldwin, W1RU; Directors Frank Butler, W4RH, Clyde Hurlbert, W5CH, Mary Lewis, W7QGP, Edmond A. Metzger, W9PRN, Gay Milius, W4UG, Leonard M. Nathanson, W8RC, John Sullivan, W1HHR, Hugh Turnbull, W3ABC, and Raymond B. Wangler, W5EDZ; Vice Directors Thomas W. Comstock, N5TC, Claire Richard Dyas, W0JCP, Kenneth A. Ebner, K9EN, George W. Hippisley, K2KIR, John C. Kanode, N4MM, and Peter F. Matthews, WB6UIA; Honorary Vice President Robert York Chapman, W1QV; and Washington Area Coordinator Perry F. Williams, W1UED.

Mr. Clark conveyed to the group the regrets of Directors Jay Holladay, W6EJJ, and Mitch Powell, VE3OT, who were unable to attend because of business commitments.

1) On motion of Mr. Stevens, the Committee recognized the names of 123 newly elected Life Members, and directed the General Manager to list their names in QST.

2) On motion of Mr. Stevens, the affiliation of the following clubs was approved (Category I affiliates unless otherwise indicated):

Arsenal Technical High School Radio Club, Indianapolis, IN (Category III); AT&T Amateur Radio Club, (ATG ARC), Chatham, NJ; Bemidji Amateur Radio Club, Bemidji, MN; Blackstrap Repeater Association, Inc., Cumberland Ctr., ME; Boombenders Youth Group, Downers Grove, IL (Category III); Central Indiana Contesters, Greenwood, IN; Coachella Valley ARC, Indio, CA; Eastern Nevada Amateur Radio Society, Ely, NV; 4-H Radio Operators, Bridgeton, NJ (Category III); Glynn Radio Association, Brunswick, GA; Hen House Gang, Bethlehem, CT; Intermedics Inc, ARC, Freeport, TX; James Williams Jr. High ARC, Rhinelander, WI (Category III); Key Beepers of Sedro Woolley High School, Sedro Woolley, WA (Category III); Lake Elsinor Valley ARC, Wildoman, CA; McKinney

Amateur Radio Club, Allen, TX; Pee Dee FM Repeater Association, Florence, SC; South Canadian Amateur Radio Society, Norman, OK; South Peninsula ARC, Homer, AK; Toronto High School ARC, Toronto, OH (Category III); Niagara Peninsula DX Group, St. Catharines, Ont., CN.

With this action, the League now has the following number of active affiliated clubs: Category I, 1770; Category II, 10; Category III, 229.

3) On motion of Mr. Grauer, approval was granted for the holding of the following ARRL conventions: Louisiana State, August 7-8, 1982, Shreveport, LA; Dakota Division, September 17-19, 1982, Moorhead, MN; Georgia State, March 26-27, 1983, Columbus, GA; Atlantic Division/NY State, May 20-21, 1983, Rochester, NY; Kansas State, June 4-5, 1983, Salina, KS; Delta Division, August 13-14, 1983, Shreveport, LA.

It was noted that the date of the Midwest Division Convention in So. Sioux City, Nebraska, approved by the Committee at its February 6 meeting, should be April 16-17, 1983, and not April 15-16.

4) Mr. Imlay reviewed the status of local litigation and state legislation concerning Amateur Radio, as follows:

4.1) *Guschke v. City of Oklahoma City, Oklahoma.* U.S. District Judge David L. Russell has denied Oklahoma City's Motion to Dismiss, which was based on the claim that there was no substantial federal question at issue, an encouraging development for Mr. Guschke, who is NSSW. His attorney, Micheal Salem, NSMS, has renewed the request for ARRL financial assistance in the case. After discussion, on motion of Mr. Stevens, it was voted that the League offer support by providing out-of-pocket expenses for the appearance of an expert witness, and by preparing demonstrative evidence in support of the plaintiff's contentions.

4.2) Mr. Imlay reviewed briefly the status of efforts in Multnomah County, Oregon, to enact an ordinance that would restrict the levels of rf radiation from transmitters located in the county. The concern apparently is for the biological effects of rf energy. Efforts to exempt Amateur Radio from the provisions of the ordinance appear to have been successful for the moment, although the question of local jurisdiction over rf emissions remains unresolved and the situation requires continued monitoring.

4.3) Mr. Imlay also reported on a bill that has passed the Illinois legislature, S.B. 1387, to make it a misdemeanor to "knowingly" interfere with "public utility communications." While the thrust of the legislation is to combat "theft of service," it may have some unintended effects upon Amateur Radio. Study is continuing.

5) Mr. Imlay reported briefly on the status of several matters now before the FCC, reserving most comment for the Board Meeting scheduled for the next day. FCC has taken no action on the League's

application for review of the dismissal of ARRL petition RM-3855, concerning the new 10-MHz band. Comments have been prepared, but not yet filed, setting forth the League's views on the 14-MHz telephony expansion proposed by FCC in Docket 82-83; separate comments will be prepared in response to the Inquiry portion of the docket, dealing with telephony expansion in the other high-frequency bands, after the Board adopts its position on this issue. The deadline for comments in the "biological effects" proceeding, Docket 79-144, has been extended to August 16; an extensive ARRL filing has been prepared and will be submitted before the deadline.

6) Mr. Sumner distributed a written report on what has been done by staff in response to previous Board Meeting actions.

7) Mr. Sumner briefly reviewed the status of the suit filed against the League by member Wallace Nolen, WA2BLM. A motion to dismiss the suit has been filed on behalf of the League on the grounds that no complaint has been filed with the Court, and that there is therefore no basis on which a suit could proceed.

8) A request for a review and increase of the benefits being paid an annuitant under the League's pension plan was discussed by the Committee. No action was taken on the request pending further review and study of the pension plan.

9) A request from Director Wangler as chairman of the Management and Finance Committee for an additional appropriation for the Committee's work was presented. The annual budget for standing committees of the Board is \$6000; owing to a high level of activity early in the year in connection with the search for a General Manager, an additional appropriation is needed. On motion of Mr. Stevens, it was voted to authorize an additional \$6000 for the Management & Finance Committee for 1982.

10) A request from Vice Director Mel Ellis, K7AOZ, for copies of Northwestern Division financial reports was discussed. In the course of the discussion, it was pointed out that the Management & Finance Committee serves as the Board Audit Committee, and that any member who questions expenditures being made by a member of the Board on behalf of the League may request a review by the Board member's peers on the Audit Committee. On motion of Mr. Stevens, Mr. Ellis's request was denied.

11) At the invitation of the Committee, Mr. Wangler delivered a brief oral report on preparations for next year's National Convention, scheduled for October 7-9, 1983, in Houston.

There being no further business, the Committee adjourned at 2:58 P.M.

Respectfully submitted,
David Sumner, K1ZZ Secretary
Victor C. Clark, W4KFC President

MINUTES OF THE 1982 SECOND MEETING OF THE BOARD OF DIRECTORS OF THE AMERICAN RADIO RELAY LEAGUE, INC. JULY 21-22, 1982

AGENDA

1. Roll Call
2. Moment of Silence
3. Consideration of the Agenda for the Meeting
4. Approval of Minutes for the 1982 Annual Meeting
5. Supplementary reports by the officers
6. Receive reports and consider recommendations of the committees
7. Acceptance of reports of the officers
8. Director's motions

1) Pursuant to due notice, the Board of Directors of the American Radio Relay League, Inc., met in second session at the Stouffer's Five Seasons Hotel and Conference Center, in Cedar Rapids, Iowa, on July 21, 1982. The meeting was called to order at 9:07 A.M., Central Daylight Time, with President Victor C. Clark, W4KFC, in the Chair, and the following directors present: Thomas B. J. Atkins, VE3CDM,¹ Canadian Division; Frank M. Butler, Jr., W4RH, Southeastern Division; Lys J. Carey, K0PGM, Rocky Mountain Division; Paul Grauer, W0FIR, Midwest Division; Clyde O. Hurlbert, W5CH, Delta Division; Mary E. Lewis, W7QGP, Northwestern Division; Peter F. Matthews, WB6UIA,² Southwestern Division; Edmond A. Metzger, W9PRN, Central Division; Gay E. Milius, Jr., W4UG, Roanoke Division; Leonard M. Nathanson, W8RC, Great Lakes Division; Tod Olson, K0TO, Dakota Division; William J. Stevens, W6ZM, Pacific Division; John C. Sullivan, W1HHR, New England Division; Hugh A. Turnbull,

W3ABC, Atlantic Division; Raymond B. Wangler, W5EDZ, West Gulf Division; Stan Zak, K2SJO, Hudson Division. Also in attendance, as members of the Board without vote, were Carl L. Smith, W0BWJ, First Vice President; Larry E. Price, W4RA, Vice President; Garfield A. Anderson, K0GA, Vice President; Richard L. Baldwin, W1RU, International Affairs Vice President; and David Sumner, K1ZZ, General Manager. Also in attendance, at the invitation of the Board as non-participating observers were the following vice directors: Thomas W. Comstock, N5TC, West Gulf Division; Edward W. Dunn, W4NZW, Delta Division; Claire Richard Dyas, W0JCP, Midwest Division; Kenneth A. Ebner, K9EN, Central Division; Linda S. Ferdinand, N2YL, Hudson Division; George W. Hipsley, K2KIR, Atlantic Division; John C. Kanode, N4MM, Roanoke Division; and Marshall Quait, AG0X, Rocky Mountain Division. There were also present Honorary Vice President Robert York Chapman, W1QV; Canadian Counsel B. Robert Benson, QC, VE2VW; Christopher D. Imlay, N3AKD; Technical Department Manager Doug DeMaw, W1FB; Communications Department Manager John Lindholm, W1XX; Membership Services Manager Harold M. Steinman, K1FHN; and Washington Area Coordinator Perry F. Williams, W1UED.

2) The assembly observed a moment of silence in recollection of Director Jesse Bieberman, W3KT, past directors Jack Brabb, W8DY, Phil Haller, W9HPG, and Mort Kahn, W2KR/K4KR; and General Kamchai Chotikul, HS1WR, President, Radio Amateur Society of Thailand.

The Chair welcomed new directors Tod Olson, K0TO, and Hugh Turnbull, W3ABC, and new vice directors Thomas B. J. Atkins, VE3CDM, Edward W. Dunn, W4NZW, and George W. Hipsley, K2KIR, to the meeting. Regrets for non-attendance were expressed by the president on behalf of Treasurer James E. McCobb, Jr., K1LLU, and Canadian Division Director Mitch Powell, VE3OT, and for late attendance on behalf of Southwestern Division Director Jay A. Holladay, W6EJJ.

3) On motion of Mr. Nathanson, seconded by Mr. Milius, it was unanimously VOTED that the agenda as printed is adopted.

4) On motion of Mr. Sullivan, seconded by Mr. Stevens, unanimously VOTED that the Minutes of the 1982 Annual Meeting of the Board of Directors are approved in the form in which they were issued by the Secretary.

5) Supplementary reports of the officers were presented here. President Clark reported on the IARU Region III Conference in Manila; events on the calendar for the remainder of 1982; correspondence, heavy but current; frequent contacts with General Manager Sumner, Washington Area Coordinator Williams, and Counsel Imlay and with Vice Presidents Smith, Price, Anderson, and Baldwin. He also touched on the Communications Technical Amendments Act of 1982, H.R. 5008; the new 10.1-10.15 MHz amateur band; cable television interference and RM 4040; the Burbank, Illinois, anti-amateur ordinance; legal counsel; the study of By-Law 20 on recall; phone band expansion as proposed in Docket 82-83 and the ARRL Ad Hoc Committee on Digital Communications. Particular attention was focused on the Long-Range Planning Committee Report, now being implemented; the League's financial status; the Canadian Radio Relay League; reinforcement of the Headquarters staff; and delegation of licensing and monitoring matters by FCC to the amateur community in the near future.

6) Continuing Agenda item #5, First Vice President Smith gave background on ARRL's involvement in the International Amateur Radio Union and reported on his trip to the Region III Conference in Manila followed by visits to Thailand, Bangladesh, India, Bahrain and the IARU Region I Executive Committee Meeting in Bremen, Federal Republic of Germany. His written report also commented on attendance at meetings of the Management & Finance Committee

and the Executive Committee along with a visit to Southern Missouri. Vice President Smith also was an observer at the IARU Region II Executive Committee Meeting in Brasilia in June.

7) Vice President Price presented his written report, covering his activities with the Ad Hoc Committee to Study By-Law 20, Ad Hoc Committee to Study Legal Counsel, Membership Affairs Committee and his appearances at ARRL conventions.

8) Vice President Anderson presented a brief oral report concerning his work on the Ad Hoc Committee on By-Law 20 and on the Plans and Programs Committee.

9) International Affairs Vice President Baldwin presented an extensive written report with details on travel including the Manila Conference of IARU Region III and subsequent visits to China and Japan. His oral remarks highlighted plans for creating an Administrative Council for the International Amateur Radio Union, which then would work on rewriting the IARU Constitution. Proposed travel by IARU officers for 1983 includes one or two to a portion of the Mobile World Administrative Radio Conference in February-March, 1983; the Region II Triennial Conference in Colombia, 3 regional IARU Executive Committee meetings and two one-week sessions of the Administrative Council of IARU should it be formed.

10) General Manager Sumner presented two papers: a review of actions in response to previous Board directives and a report of the general manager for the period since the annual meeting in March. The written report covered personnel, with little turnover in the past four months, but some vacancies and some new challenges/opportunities being posed by H.R. 5008; finances, considerably better than budget for the first six months of 1982, but with some uncertainties in the future; improvements in QST content at no additional cost during the past several months owing to savings realized from production improvements, and some imaginative solutions to perennial post office problems; books, in which the new edition of the *Antenna Book* is a bright spot, and with other new or revised works underway; membership recruitment in which a principal tool is the resurrected "New Ham News" mailed to each new licensee; and travel by the General Manager since March. General Manager's oral remarks highlighted special-interest newsletters and a request for Board endorsement of a general interest newsletter. He also touched on audio-visual materials in preparation. General Manager Sumner then called on Washington Area Coordinator Williams for a Washington update. Further action by the Senate Foreign Relations Committee on ratification of the Final Acts of the World Administrative Radio Conference, 1979, is not expected until August; ratification could be delayed until the end of the year. Efforts will continue to persuade FCC to release 10.1-10.15 MHz to the Amateur Service prior to ratification. Final acceptance of H.R. 5008, the Communications Technical Amendments Act of 1982, and its Senate equivalent, Goldwater's S. 929, appear imminent. Dr. William Schneider, K2TT, has been nominated to be Under Secretary of State for Security Affairs, Science and Technology. During the course of the above discussion, Southwestern Division Director Jay A. Holladay, W6EJJ, joined the meeting at 9:58 A.M.

11) In the absence of Treasurer James E. McCobb, Jr., K1LLU, his report was presented by the General Manager. The report covered sale of securities and reinvestment of the proceeds; reports of yields, and investment philosophy.

12) Counsel Imlay presented an extensive report covering the AMTOR (error-correcting RTTY) proposal to FCC, 14-MHz telephony expansion, criteria for financial assistance in local RFI or antenna litigation, the 10-MHz band, expansion of other phone bands, antenna/RFI cases, cordless-telephone matters, spread spectrum amateur operation, beacon operation, and cable-television interference. His oral remarks highlighted H.R. 5008, recent activities relative to 10 MHz, the Burbank, Illinois, case, and the doctrine of Federal preemption, which holds that local governments are not free to legislate in the field of radio operation. The Board was in recess from 10:30 to 10:53 A.M.

13) Canadian Vice Director Atkins presented a brief oral report on behalf of Canadian Radio Relay League President Powell. Subjects included internal organization, proposed constitutional changes and the work being handled from CRRL Headquarters on behalf of Canadian members.

14) Canadian Counsel Benson gave an oral report with further details on organizational changes and local legal matters.

15) Mr. Chapman, as President, presented a report for the ARRL Foundation, Inc., covering administration; OSCAR funding; scholarships; fundraising; and a brief financial statement showing disbursements of \$71,115 during the fiscal year July 1, 1981-June 30, 1982.

16) Turning now to Agenda item 6, Mr. Anderson,



Vice President for International Affairs Dick Baldwin, W1RU, explains a point about IARU.

¹Vice director acting on behalf of Director Mitch Powell, VE3OT, throughout the meeting.

²Vice director acting on behalf of Director Jay A. Holladay, W6EJJ, until 9:59 A.M.

as Chairman, presented the report of the Plans and Programs Committee. On motion of Mrs. Lewis, seconded by Mr. Milius, it was unanimously VOTED that the President of ARRL appoint an Ad Hoc Committee to formulate a revitalization plan for the Intruder Watch program, such a committee to include staff, IARU representatives, and the Intruder Watch Director for Region 2.

17) On motion of Mr. Anderson, seconded by Mr. Stevens, after discussion, it was VOTED that the ARRL, after considering the questions raised by the Federal Communications Commission in Docket 82-83, favors the expansion of telephone allocations in the 3- to 30-MHz bands as follows:

3.5-4.0 MHz, 80 Meters
3.750-3.775 Extra
3.775-3.850 Advanced, Extra
3.850-4.000 General, Advanced Extra

7.0-7.3 MHz, 40 Meters
No change

14.0-14.35 MHz, 20 Meters (as previously petitioned)
14.150-14.175 Extra
14.175-14.225 Advanced, Extra
14.225-14.350 General, Advanced, Extra

21.0-21.45 MHz, 15 Meters
21.200-21.225 Extra
21.225-21.300 Advanced, Extra
21.300-21.450 General, Advanced, Extra

28.0-29.7 MHz, 10 Meters
28.3-29.7 General, Advanced, Extra

Messrs. Atkins and Zak requested to be recorded as voted opposed.

18) Mr. Sullivan, as Chairman, presented the report of the Membership Affairs Committee. There followed a thorough discussion of further plans for implementation of the new section level ARRL structure, supplementing actions accepted at Minute 76 of the 1982 Annual Meeting. During the course of the above discussions, the Board was in recess for lunch from 12:35 to 1:32 P.M., reconvening with all persons hereinbefore mentioned present except Mr. Stevens.

19) On motion of Mr. Sullivan, seconded by Mr. Nathanson, after discussion, it was VOTED that the General Manager, in cooperation with the Membership Affairs Committee, is instructed to proceed with full implementation of the restructuring program recommended by the Long-Range Planning Committee and as set forth in Appendix B of the Membership Affairs Committee Report of July 1982, including development of staffing and budgetary requirements and promulgation of information to the field organization, to enable an orderly transition to the new plan; further, that the Board of Directors be kept informed by means of interim reports regarding progress toward these objectives. During the course of the above discussion, Mr. Stevens entered the meeting at 1:42 P.M.

20) On motion of Mr. Sullivan, seconded by Mr. Stevens, it was unanimously VOTED that the following "Rules and Regulations of the ARRL Field Organization" are adopted to supersede the "Rules and Regulations of the Communications Department," to be effective in each ARRL section as the transition from Section Communications Manager to Section Manager occurs.

Rules and Regulations of the ARRL Field Organization

1. The League maintains a Field Organization for the following purposes and objectives: emergency communications, message traffic, volunteer monitoring, RFI problem-solving, support of affiliated clubs, state government liaison, encouragement of technical activities and dissemination of on-the-air bulletins.

2. For the activities of the ARRL Field Organization, the territory of the League is defined as consisting of the territorial Divisions described in By-Law 26. The ARRL Divisions are further subdivided into ARRL Sections for the administrative purposes of the Field Organization.

3. In each Section there will be an elected Section Manager (SM) who will have authority over the Field Organization in his or her section, and, in cooperation with his Director, will foster and encourage ARRL activities and programs within that section.

4. Any candidate for the office of Section Manager must have been both a member of the League for a continuous term of at least two years and a licensed amateur of General class (or Canadian Advanced Amateur Certificate) or higher preceding receipt of a petition of nomination.

5. Each Section Manager shall be elected for a two-year term of office in accordance with the following procedure:

a) On any date not later than 5:30 P.M. of the Friday prior to or corresponding to the tenth day of March, June, September and December of each year, nominating petitions signed by five or more Full members of specified sections and naming a Full



Vice President Gar Anderson, KØGA, leads the discussion on phone-band expansion.

member of each such section as candidate for Section Manager may be filed with the General Manager. The General Manager shall solicit such petitions in two appropriate issues of QST to insure completion of the election on or before June 30, September 30, December 31 or March 31, respectively. The solicitation shall show the name, call and term ending date of the incumbent in each section solicited, and give full instructions for filing.

b) If there is only one eligible nominee on the appropriate listed closing date for receipt of petitions, the General Manager shall declare him elected without balloting. If there is more than one eligible nominee, then on or before April 1, July 1, October 1 or January 2, respectively, the General Manager shall send by mail a ballot to each person who on the date coinciding with the respective closing date from paragraph 5a above of that year was a Full Member of the League in the section in which the election is being held. If that mailing date falls on a Saturday or a Sunday, then ballots shall be sent out no later than the following Monday. The ballot listing the candidates shall solicit a vote for one name. The ballot shall be accompanied by information on the Amateur Radio background of each candidate.

c) Ballots to be counted shall reach the General Manager not later than 5:30 P.M. of the Friday prior to or corresponding to the 20th of May, August, November or February, respectively, and shall be counted the following Tuesday, under the supervision of the General Manager. The candidate receiving the greatest number of votes in each case shall be declared elected. The candidates shall be notified by mail and the results of election for Section Manager terms beginning July 1, October 1, January 1 or April 1, respectively, shall appear in the first available issue of QST.

d) If there is no eligible nominee, the procedure in 5a, b and c will be repeated in six months, and the term of office of any Section Manager elected under this resolicitation procedure will be shortened to 18 months. If there again is no eligible nominee, the person holding office shall continue in office until the next regular election established by these rules for said section.

e) Vacancies in the office of Section Manager occurring between elections shall be filled by appointment by the General Manager.

6. The office of any Section Manager may be declared vacant by the Executive Committee whenever it appears to be in the best interests of the membership to do so. On such declaration, the General Manager will appoint a new Section Manager as provided in Rule 5e.

7. The Section Manager is the senior elected ARRL official in his section. In discharging his responsibilities, he:

a) Recruits and appoints eight section-level assistants to serve under his general supervision and to administer the following ARRL programs in the section: emergency communications, message traffic, official observers, affiliated clubs, public information, state government liaison, technical activities and on-the-air bulletins.

b) Supervises the activities of these assistants to ensure continuing progress in accordance with overall ARRL policies and objectives.

c) Appoints qualified ARRL members in the section to volunteer positions of responsibility in support of section programs, or authorizes the respective section-level assistants to make such appointments.

d) Maintains liaison with the Division Director and makes periodic reports to him regarding the status of Section activities; receives from him information and guidance pertaining to matters of mutual concern and interest; serves on the Division Cabinet and renders advice as requested by the Division Director; keeps informed on matters of policy which affect section-level programs.

e) Conducts correspondence or other communications, including personal visits to clubs, hamfests and conventions, with ARRL members and

affiliated clubs in the section; either responds to their questions or concerns, or refers them to the appropriate person or office in the League organization; maintains liaison with, and provides support to, representative repeater-frequency coordinating bodies having jurisdiction in the section.

f) Writes, or supervises preparation of, a monthly "Section News" column in QST to encourage member participation in the ARRL programs in the section.

8. Forming a major part of the ARRL Field Organization are the Amateur Radio Emergency Service (ARES) and the National Traffic System (NTS) for emergency and traffic operations. Details concerning ARES and NTS (as well as the Radio Amateur Civil Emergency Service [RACES], which is administered by the U.S. Government's Federal Emergency Management Agency) are contained in the ARRL *Public Service Communications Manual*.

9. Field Organization leadership appointments from the Section Manager shall be available to qualified ARRL Full members in each section. These appointments are as follows: Section Emergency Coordinator, Section Traffic Manager, Official Observer and RFI Coordinator; State Government Liaison, Technical Coordinator, Affiliated Club Coordinator, Public Information Officer, Bulletin Manager, District Emergency Coordinator, Emergency Coordinator and Net Manager. These appointees shall assist the Section Manager in specialized functions. Other leadership appointments may be established by the General Manager with the approval of the Executive Committee. Complete details of the qualifications, duties and functions of these appointees shall be contained in ARRL publications such as *Operating An Amateur Radio Station*.

10. Field Organization station and individual appointments from the Section Manager shall be available to qualified ARRL Full Members in each section. These appointments are as follows: Official Relay Station, Official Bulletin Station, Official Emergency Station, Official Observer and Public Information Assistant. Complete details of the qualifications for these appointments shall be contained in ARRL publications such as *Operating An Amateur Radio Station*.

11. These rules and regulations shall have the force and effect of the By-Laws of the League, including details contained in referenced publications. They may be amended as necessary from time to time by the General Manager upon approval of the Executive Committee. The General Manager shall cause more detailed provisions to be published as needed in current editions of League publications.

21) On motion of Mr. Sullivan, seconded by Mr. Zak, it was unanimously VOTED that the Membership Affairs Committee recommendation for the establishment of a cap on reimbursable expenses for volunteer officials in each ARRL section is adopted in principle; and further, that the General Manager is to develop a recommended formula for Executive Committee approval, which will provide an equitable basis for the spending of no more than \$75,000 in section-level program expenses during 1983.

22) On motion of Mr. Carey, seconded by Mrs. Lewis, the following resolution was unanimously ADOPTED:

WHEREAS the ARRL sought to encourage experimental activity at the higher radio frequencies through the creation of the Official Experimental Station as a Communications Department appointment; and

WHEREAS the name of the appointment later was changed to Official VHF Station, and its function expanded to include other forms of vhf activity; and

WHEREAS reports of significant vhf activity generally are made directly to the conductor of The World Above 50 MHz column in QST, and not via the Section Communications Manager; and

WHEREAS this has proved to be an effective means of promoting vhf activity and experimentation; and

WHEREAS the restructured field organization will continue to recognize VHF/UHF technical advances under the direction of a Section Technical Coordinator; and

WHEREAS the OVS appointment appears no longer to serve a useful purpose; and

WHEREAS the League's commitment to promoting VHF/UHF activity would not be compromised by the discontinuance of the Official VHF Station appointment.

BE IT RESOLVED that the Board of Directors of the American Radio Relay League expresses its thanks to those who have served faithfully as OVS appointees, and invites them to continue their participation in the ARRL operating program; and

BE IT FURTHER RESOLVED that the Official VHF Station appointment is hereby discontinued.

23) On motion of Mr. Sullivan, seconded by Mr. Holladay, it was unanimously VOTED that the General Manager is directed to proceed with the implementation of a new class of affiliated club in ac-

cordance with Appendix A of the Membership Affairs Committee report. The Membership Affairs Committee is directed to monitor the progress of this program and to report to the Board its findings.

24) On motion of Mr. Nathanson, seconded by Mr. Zak, it was unanimously VOTED that the General Manager encourage the manufacturers of Amateur Radio equipment to standardize on connectors such as microphone and power-supply inputs.

25) Moved, by Mr. Nathanson, seconded by Mrs. Lewis, that the General Manager instruct the Technical Information Service to obtain service manuals on current radio equipment used in the Amateur Service. After discussion, a roll call being requested, the question was decided in the affirmative. Messrs. Carey, Holladay, Hurlbert, Mrs. Lewis, Messrs. Milius, Nathanson, Atkins, Stevens and Sullivan voted aye; Messrs. Butler, Grauer, Metzger, Olson, Turnbull, Wangler and Zak voted no. So the motion was ADOPTED, 9 in favor to 7 opposed.

26) Moved, by Mr. Price, seconded by Mr. Carey, that lists of members of the League are available from Headquarters in the form of mailing lists under the terms and conditions described in the following policy:

Category 1 labels — Lists furnished without charge to further the organizational purposes of the League. "Admin" labels are furnished to incumbent division directors and section managers for use in routine and administrative mailings to members in their respective geographical territories.

"Convention" and "Hamfest" labels are furnished, upon request, to sponsors of ARRL sponsored and approved events for use in making mailings promoting the event. They may not be used for any other purpose, specifically for campaign mailings during an ARRL election.

Category 2 labels — Lists furnished at cost of production.

"Campaign" labels are furnished, upon request, to any election candidate whose eligibility has been properly certified for the purpose of campaigning for office in the League.

"Non-commercial" labels are furnished to any Full member of the League for any non-commercial purpose which is designed to further amateur radio and the purposes of the League. Such lists may be furnished up to a division in size.

Category 3 labels — Lists furnished at commercial mailing list rates.

"Commercial" labels are furnished for any legitimate business purpose. Such lists are made available under a cost schedule prepared from time to time by the General Manager of the League.

Any member of the League may, upon request, have his name deleted from any category 3 commercial lists which are furnished by League Headquarters. Such a request may be made upon renewal by an annual member or any time by a Life Member of the League.

A roll call vote being requested, the question was decided in the affirmative. All of the directors voted aye except Mr. Grauer and Mr. Metzger, who voted no. Accordingly, the motion was ADOPTED, 14 to 2.

27) On motion of Mr. Carey, seconded by Mr. Nathanson, it was unanimously VOTED that the General Manager be directed to continue discussions with national youth groups for the purpose of making the youths and their leaders aware of Amateur Radio. The General Manager shall coordinate his activities with the Membership Affairs Committee and the Management and Finance Committee. The Board was in recess from 3:00 to 3:15 P.M., reconvening with First Vice President Smith in the Chair.

28) On motion of Mrs. Lewis, seconded by Mr. Stevens, it was VOTED that the General Manager develop a program that will inform the membership that gifts to the ARRL will be accepted as memorials or honors in the name of a third party. Mr. Grauer requested to be recorded as voting opposed.

29) On motion of Mrs. Lewis, seconded by Mr. Stevens, it was unanimously VOTED that the reporting date on Minute 20 of the September 1981 Board Meeting, concerning differential pricing for ARRL publications, be extended from January 1, 1983 to January 1, 1984.

30) On motion of Mr. Sullivan, seconded by Mr. Nathanson, it was unanimously VOTED that the ARRL Pewter Cup Technical Excellence Award for the best QST article of 1981 be awarded to R. Cracknell, ZEZJV, F. Anderson, ZS6PW, and C. Fimerelis, SV1DH, for their November and December 1981 article, "The Euro-Asia to Africa VHF Transequatorial Circuit During Solar Cycle 21." And further that Honorable Mention be given to the remaining candidates for their QST article. They are A. Helfrick, K2BLA, for his December 1981 article, "A Modern Upconverting General-Coverage Receiver" and authors R. Wilson, KL7ISA, and H. Silverman, W3HWC, for their July 1981 article, "A New and Easy Method of Microwave Circuit Construction."

31) Continuing Agenda item 6, Mr. Wangler, as Chairman, presented the report of the Management & Finance Committee, which covered rewriting position descriptions for the president, general manager and treasurer; ways of encouraging Amateur Radio and ARRL activities among elderly or disabled persons in group facilities; and potential problems in finishing the year within budget.

32) Mr. Butler, as Liaison, spoke briefly for the VHF Repeater Advisory Committee, which continues its study of 2-meter "splinter frequency" pairs.

33) Mr. Olson, as Liaison, presented the report of the Contest Advisory Committee, including preliminary views on the status of the District of Columbia in certain contests.

34) Mr. Kanode, as Liaison, presented the report of the DX Advisory Committee, covering Kamanan Island deletion effective March 11, 1982; and deletion of Serrana Bank/Roncador Cay, Bajo Nuevo and Saudi Arabia/Iraq Zone, all recommended to the Awards Committee for action. Mr. Kanode highlighted lists and DX nets as the biggest problem presented to the DX Advisory Committee; an educational solution holds the best hope for improvement, as for instance with a QST article to be presented soon.

35) Mr. Sullivan, as Liaison, spoke briefly for the Emergency Communications Advisory Committee, which continues its work on an alert frequency.

36) Mr. Zak, as Liaison, presented a brief report on the Public Relations Advisory Committee, showing that the Committee has been enlarged and reorganized under the "Restructuring" system and work will be resumed.

37) Mr. Holladay, as Liaison, reported briefly for the VHF/UHF Advisory Committee, where a topic of intense interest is the proposed 900-MHz amateur band.

38) Mr. Price, as Chairman, presented the report of the Ad Hoc Committee on Legal Counsel. On his motion, seconded by Mr. Carey, it was unanimously VOTED that the report of the Ad Hoc Committee on Legal Counsel is adopted and the General Manager is directed to incorporate the recommendations into the Directors' Workbook as standing policy of the Board.

39) Moved, by Mr. Nathanson, seconded by Mr. Holladay, that the Board appoints Christopher Imlay as Counsel of the American Radio Relay League to serve at the pleasure of the Board of Directors. Moved, by Mr. Stevens, seconded by Mr. Milius, that the motion be amended to insert the word "General" before the word "Counsel." A roll call vote being requested, a tie was initially found to exist. Messrs. Holladay, Metzger, Milius, Atkins, Stevens, Sullivan, Wangler and Zak voted aye; Messrs. Butler, Carey, Grauer, Hurlbert, Mrs. Lewis, Messrs. Nathanson, Olson, and Turnbull voted no. The Chair cast the deciding vote in the negative, so the motion to amend was LOST. The question then being on the original motion, the same was unanimously ADOPTED.

40) Moved, by Mr. Hurlbert, seconded by Mr. Atkins, that the Board appoints B. Robert Benson as Associate Counsel for Canada of the American Radio Relay League to serve at the pleasure of the Board of Directors. On motion of Mr. Atkins, seconded by Mr. Milius, it was VOTED to amend the motion by adding the initials QC (signifying Queen's Counsel) after Mr. Benson's name and striking the words "Associate Counsel for Canada," replacing them with the words "Canadian Counsel." Mrs. Lewis requested to be recorded as voting no. The question then being on the motion as amended, the same was unanimously ADOPTED.

41) On motion of Mr. Sumner, seconded by Mr. Milius, it was unanimously VOTED that the position

of Volunteer ARRL Counsel is created. The assistance of members who are admitted to the Bar in any U.S. or Canadian jurisdiction is solicited in rendering advice on legal matters in their specialty concerning the League or its members in their respective jurisdictions.

42) On motion of Mr. Holladay, seconded by Mr. Zak, it was unanimously VOTED that the President is directed to appoint a special Ad Hoc Committee on Washington Representation, with membership to include, but not be limited to, such members of the Board as may have first-hand experience in the workings of the Federal government. The committee's assignment is to develop a plan for implementing the recommendations of the Long-Range Planning Committee with respect to developing a more continuous Washington presence for ARRL, with a preliminary report at the 1983 Annual Meeting.

43) Mr. Anderson, as Chairman, presented the report of the Ad Hoc Committee on By-Law 20. On his motion, seconded by Mr. Nathanson, it was VOTED that the report of the Ad Hoc Committee to Study By-Law 20 is accepted.

44) Mr. Holladay, as Chairman, reported for the Amateur Satellite Service Council, commenting that the Phase III B satellite is being shipped to Germany as part of the preparation for launch next year. Discussion of a store-and-forward digipeater packet satellite is underway. During the course of the above, Mr. Dunn took the seat for Mr. Hurlbert.

45) Mr. Turnbull, as Chairman, spoke for the RFI Task Group, reporting that the Norfolk Office of FCC had asked a club to investigate a non-amateur RFI case. The case was solved, but guidelines are needed for future requests of this type. In reference to the ARRL proposal, RM 4040, which would bar cable television from using amateur frequencies, the League must maintain a position of strength.

46) On motion of Mr. Nathanson, seconded by Mr. Dunn, it was unanimously VOTED that the Board stand in recess, at 5:00 P.M., for dinner. The Board reconvened at 8:21 P.M., with all persons hereinbefore mentioned present, and with President Clark in the Chair.

47) Mr. Wangler, as Chairman, presented the report of the Ad Hoc Committee on Biological Effects of RF Energy. On his motion, seconded by Mrs. Lewis, it was unanimously VOTED that the Counsel of the American Radio Relay League prepare a petition for presentation to the Federal Communications Commission requesting that the Commission retain control of power levels which may be generated by all forms of communication equipment when in the transmit mode, including amateur radio transmitters. It is further requested that they adopt the American National Standards Institute's 1982 allowable exposure levels for radio frequency energy, and retain this exclusive control under the Federal Communications Commission. Mr. Atkins abstained.

48) On motion of Mr. Wangler, seconded by Mr. Holladay, it was unanimously VOTED that the ARRL Committee on the Biological Effects of RF Energy proceed in responding to proposals made by federal, state and local government agencies seeking to regulate human exposure to radio frequency energy. The Committee is further directed to take advantage of every opportunity to urge federal preemption in this area, and to discourage the establishment of arbitrary RF exposure standards by state and local governments.

49) Moving now to Agenda item 7, on motion of Mr. Sullivan, seconded by Mr. Butler, it was unanimously VOTED that the reports of the officers are accepted and placed on file.

50) As the first action on Agenda item 8, motions of directors, on motion of Mr. Atkins, seconded by Mr. Sullivan, it was unanimously VOTED that the President is instructed to appoint an Ad Hoc Committee to study possibilities for strengthening of the Canadian Radio Relay League and to examine and make recommendations as to such rearrangement of resource allocation and responsibility sharing between ARRL and CRRL as would result in optimum benefit to each corporation and its respective members.

51) On motion of Mr. Metzger, seconded by Mr. Grauer, after discussion, it was unanimously VOTED that the Management and Finance Committee is instructed to work closely with the General Manager and Treasurer to explore operational cost reduction for strengthening the organization cash flow.

52) On motion of Mr. Metzger, seconded by Mr. Grauer, it was unanimously VOTED that the Management and Finance Committee is instructed to review in detail the retirement plan for staff personnel and identify any changes considered desirable; further, that the results of these studies, together with appropriate recommendations, be reported to the Board of Directors no later than the Annual 1983 meeting.

53) On motion of Mr. Nathanson, seconded by Mr. Hurlbert, after discussion, unanimously VOTED that the General Manager investigate the possibility of a digital publication on the order of QEX to direct its attention to digital applications to Amateur Radio, in-



Canadian Vice Director Tom Atkins, VE3CDM left, representing the CRRL, irons out problems with Communications Department Manager John Lindholm, W1XX.

cluding AMTOR, RTTY, Packet Radio and all allied areas of interest.

54) On motion of Mr. Nathanson, seconded by Mr. Stevens, it was unanimously VOTED that the General Manager by instructed to implement as soon as possible those new special interest publications that he has found feasible as a result of the prior investigation pursuant to the Board direction of March 1982.

55) On motion of Mr. Zak, seconded by Mr. Grauer, unanimously VOTED that the Membership Affairs Committee study the feasibility of providing to the membership, at a nominal charge, a loose-leaf type of sectionalized operating manual, and to standardize the size of the operating aids for incorporation into this manual.

56) It was moved by Mr. Grauer, seconded by Mr. Sullivan, that By-Law 6 be amended to strike the last sentence and to substitute therefor the following: "This special rate shall apply to Life Memberships only for members who have reached the age of sixty-five." A roll call vote being required, the question was decided in the affirmative; all of the directors voted aye, so the By-Law was AMENDED.

57) On motion of Mr. Sullivan, seconded by Mr. Holladay, it was unanimously VOTED that the President is instructed to appoint an Ad Hoc Committee to study and develop recommendations concerning steps that should be taken by ARRL to cope with the prospect of transfer of monitoring and licensing activities by the Federal Communications Commission to the Amateur Radio Service. This committee shall report to the Board no later than November 1, 1982.

58) Moved by Mrs. Lewis, seconded by Mr. Stevens, that the following resolution be adopted by ARRL:

WHEREAS, the ARRL is promulgating a policy of openness with the membership, and

WHEREAS, the operation of the Board of Directors is not clearly understood by the members,

IT IS RESOLVED that the Board of Directors meetings be open for attendance for all members on a space-available basis, reserving the right to close that portion of the meeting reserved for the Committee of the Whole or matters reserved for Board members only. After discussion, on motion of Mr. Price, seconded by Mr. Holladay, the matter was referred to the Membership Affairs Committee. Mrs. Lewis, Messrs. Nathanson and Stevens asked to be recorded as voting against referral to the Committee; Mr. Hurlbert abstained.

59) On motion of Mr. Stevens, seconded by Mr. Sullivan, it was unanimously VOTED that, in view of recent FCC rulemaking, which greatly expands the areas in which amateur power levels are restricted to 50-W dc input in the 420-450 MHz band without special permission, the General Manager is directed to take steps to ensure that amateurs in the affected areas are able to obtain the required permission as easily and as quickly as possible.

60) It was moved by Mr. Milius, seconded by Mr. Butler, that the Board of Directors endorse in principle the changing of FCC rules to permit transmitter power in the Amateur Service to be regulated in terms of output rather than dc input, provided that amateurs operating transmitters incapable of exceeding the legal limit shall not be required to own instruments to measure output power. Moved, by Mr. Nathanson, seconded by Mrs. Lewis, that the matter be laid on the Table, but the motion to Table was LOST. Whereupon, the vote being on the original motion, the same was ADOPTED.

61) On motion of Mr. Butler, seconded by Mr. Carey, it was VOTED that the VRAC is directed to study the desirability of recommending to repeater owners the inclusion, in the repeater automatic on-the-air identification, of a geographical identifier, which will assist transient stations in locating the repeater.

62) On motion of Mr. Holladay, seconded by Mr. Butler, it was unanimously VOTED that the Board of Directors requests the ARRL Committee on Amateur Radio Digital Communication to conduct the following activities as its initial task assignment:

A. Monitor pending League petitions in Docket 81-699 and RM 4122 and be prepared to provide technical assistance.

B. Review frequencies designated for RTTY in League band plans.

C. Work with packet radio and RTTY groups (Baudot, ASCII, etc.) to develop standards for amateur digital communications.

D. Develop an ARRL data communications directory.

E. Review existing ARRL publications dealing with RTTY and digital communications and make recommendations for updates.

F. With the impending release of FCC Docket 81-699 and RM 4122, the Committee shall study the amended FCC rules and advise the Board whether these rules are adequate for digital communications experimentation and growth.

The initial report of this Committee shall be made at



Atlantic Division Vice Director George "Bud" Hippiusley, K2KIR, converses with Washington Area Coordinator Perry Williams, W1UED, during a break.

the 1983 Annual Meeting.

63) On motion of Mr. Wangler, seconded by Mr. Zak, after discussion, it was unanimously VOTED that the 6-meter band plan proposed under Minute 82 of the March 1982 Board Meeting be reviewed by the current VHF/UHF Advisory Committee in consultation with the VHF Repeater Advisory Committee, the Six Meter International Radio Klub (SMIRK) and other interested groups. This review, with recommendations, should be presented at the first Board Meeting in 1983.

64) On motion of Mr. Metzger, seconded by Mr. Grauer, after discussion, it was unanimously VOTED that the General Manager is instructed to prepare a revised organization chart for the Headquarters, showing function and areas of responsibility, with copies to be provided to each member of the Board 60 days prior to the Annual 1983 Meeting. During the course of the above, the Board was in recess from 9:52 to 10:02 P.M. After adoption of the motion, the Board recessed at 10:03 P.M., reconvening at 8:41 A.M. on July 22, 1982, with all persons hereinbefore mentioned present.

65) On motion of Mr. Olson, seconded by Mr. Stevens, after discussion, it was unanimously VOTED that the revised criteria for direct antenna-case funding, as prepared by Counsel Imlay and staff, be approved and be authorized for use by the Executive Committee in determining future antenna-case funding.

66) On motion of Mr. Nathanson, seconded by Mr. Carey, the following resolution was unanimously ADOPTED:

WHEREAS, the Louisville Amateur Radio Club has successfully hosted the Kentucky State Convention and the Great Lakes Division Convention with attendance in excess of six thousand people; and

WHEREAS, the Louisville Amateur Radio Club has the Louisville, Kentucky, fairgrounds facilities available with parking facility for 27,000 cars and an arena housing 17,000 seats; and

WHEREAS the people of Kentucky have treated graciously the representatives of the ARRL; and

WHEREAS the Louisville group has petitioned to hold an ARRL National Convention,

IT IS THEREFORE RESOLVED that the Board of Directors approve the holding, in September, of the 1983 National Convention in Louisville, Kentucky, "the home of fast horses, good whiskey, and beautiful women."

67) On motion of Mr. Zak, seconded by Mr. Baldwin, after extended discussion, it was unanimously VOTED that the Secretary is directed to cast an affirmative vote on behalf of ARRL with respect to IARU Proposal 170, the Constitutional Amendment to create the IARU Administrative Council.

68) On motion of Mr. Grauer, seconded by Mr. Zak, it was unanimously VOTED that the Headquarters inform the Director of members in his or her Division that are eligible for 50- or 60-year pins or plaques, in order to provide the director an opportunity of making a presentation in person.

69) On motion of Mr. Sullivan, seconded by Mrs. Lewis, the following resolution was unanimously ADOPTED:

WHEREAS, the amateurs of the United States have a long tradition of service in emergencies in both war and peace, to the people and their government; and

WHEREAS, agreements in advance to broad principles concerning emergency communications facilitate action in time of need; now, therefore,

BE IT RESOLVED that ARRL seek Memoranda of Understanding with such agencies as the Federal Emergency Management Agency (FEMA) and the National Communications System (NCS).

70) On motion of Mr. Stevens, seconded by Mr.

Nathanson, it was unanimously VOTED that the Membership Affairs Committee, in conjunction with the General Manager, study the feasibility of offering to the ARRL members another service — a six-plan group insurance program in the areas of Life, hospital, disability income, excess major & major medical expense and high-limit accident.

71) Moved by Mr. Milius, seconded by Mr. Butler, that the General Manager is instructed to include an appropriate statement in QST and in ARRL Radio Club News, which extends to the editors of newsletters of affiliated clubs permission to reprint in their newsletters certain advisory information from QST, such as League Lines, WIAW schedules and information on forthcoming conventions and operating events. After extended discussion, on motion of Mr. Price, seconded by Mr. Sullivan, it was unanimously VOTED to refer the matter to the Membership Affairs Committee.

72) Moved by Mr. Butler, seconded by Mr. Sullivan, that the Board adopts the following recommendations regarding the utilization of the 15-kHz splinter channels in the 146-148 MHz amateur band, and commends these to repeater operators and frequency coordinators:

1. For repeaters located east of the Continental Divide, the ARRL suggests standardizing on upright 15-kHz splinter channels; that is, all repeater outputs are in the 146.61-147.39 MHz segment of the subband. Recognizing the existence of a significant minority of inverted split repeaters east of the Continental divide and wishing to minimize expense and inconvenience of these repeater groups, the ARRL recommends a phase-in period of five years from this date for converting to the suggested system.

2. Each frequency coordinator is urged to assign a standard subaudible tone for optional use by each splinter repeater coordinated now or in the future.

3. It should be noted that these suggestions do not affect the areas of California and the Pacific Northwest utilizing a different plan, which are shielded by mountainous terrain from areas using other systems. After discussion, on motion of Mr. Holladay, seconded by Mr. Wangler, unanimously VOTED that the matter be referred to the VHF Repeater Advisory Committee.

73) On motion of Mr. Holladay, seconded by Mr. Wangler, unanimously VOTED that the ARRL Board of Directors views with deep concern the serious and growing incidence of unresolved cases of radio frequency interference arising to and from cable television systems operating in non-compliance with Federal regulations; further, the Board instructs the RFI Task Group, with the full assistance and cooperation of the staff and legal counsel, to press for development of appropriate corrective measures by CATV interests at both the national and local levels; in addition, vigorous action shall be continued to assure the existence of adequate safeguards in the form of Federal regulation and enforcement so that the legitimate users of the radio spectrum are protected from the insidious and detrimental effects of radio frequency interference both from and to these ostensibly closed systems.

74) Moved by Mr. Wangler, seconded by Mr. Turnbull, that Rule 1 of the Rules and Regulations Concerning Affiliated Societies is amended by striking the definition of "Category 3" affiliated societies and substituting therefor the following: "Category 3 — Local school or youth-group Amateur Radio clubs, in homes for the elderly or disabled." A roll call being requested, the question was decided in the affirmative: all 16 directors voted in favor, so the motion was ADOPTED. The Board was in recess from 10:32 to 10:51 A.M.

75) On motion of Mr. Atkins, seconded by Mr. Zak, unanimously VOTED that the General Manager, working with the officers of IARU, investigate the possibility of producing a comprehensive audio-visual presentation explaining the workings of the International Amateur Radio Union, and report progress at the 1983 Annual Meeting of the Board.

76) On motion of Mr. Hurlbert, seconded by Mr. Nathanson, after discussion, it was unanimously VOTED that a strong and appropriate disclaimer be noted upon all materials and responses made to requests for assistance or inquiries involving legal matters; it is the intent and sense of the Board, and accordingly, it is League policy, that the League is not furnishing legal aid or advice to anyone and that any response made by the League should be understood to be general guidance pointing only to an appropriate source of help.

77) On motion of Mr. Nathanson, seconded by Mr. Sullivan, the following resolution was unanimously ADOPTED:

WHEREAS, the General Manager has begun an accounting; and

WHEREAS funds are still being held by the League for Project Goodwill;

BE IT RESOLVED, in recognition of the contribution of many individuals, groups, and radio clubs,

that the General Manager is directed to continue an ongoing accounting and semiannual reporting to the Board of Directors at each Board meeting until all kits have been shipped or all funds have been spent.

78) On motion of Mr. Grauer, seconded by Mr. Turnbull, it was unanimously VOTED that the Board approves the General Manager's proposal for an ARRL Newsletter, to be distributed free of charge to active volunteers at the division level in place of the present "List A" Directors' Letters, and to be available to other members on a subscription basis.

79) On motion of Mr. Sullivan, seconded by Mr. Nathanson, it was unanimously VOTED that the General Manager, in cooperation with the Membership Affairs Committee, is instructed to investigate the feasibility of developing a kit of materials for distribution to the editors of affiliated-club journals, to include reproducible logos, a library of diagrams and cartoons, and a collection of tips and guidelines on bulletin preparation.

80) On motion of Mrs. Lewis, seconded by Mr. Milius, after discussion, it was unanimously VOTED that the General Manager is instructed to prepare for distribution, without delay, a publication, in hand-out form, to be aimed at and to be used solely for the education of the general public about Amateur Radio.

81) Moved by Mr. Stevens, seconded by Mr. Smith, that the General Manager is instructed to increase the annual contribution of dues by ARRL to the IARU Region III organization to \$500. After discussion, a roll call vote being requested, the question was decided in the affirmative, with all directors voting in favor except Mr. Carey who voted opposed.

82) Moved by Mr. Milius, seconded by Mr. Holladay, that the Membership Affairs Committee, with the assistance and advice of the General Manager, study the feasibility of offering affiliated clubs that sell ARRL publications and merchandise at approved hamfests and conventions a percentage commission from the gross receipts derived from the sale of those publications and merchandise. After extended discussion, on motion of Mr. Price, seconded by Mrs. Lewis, it was unanimously VOTED that the matter is laid on the Table.

83) On motion of Mr. Carey, seconded by Mr. Butler, it was unanimously VOTED that the VHF Repeater Advisory Committee, in consultation with the Emergency Communications Advisory Committee, is requested to arrive at suggested tone-access codes for specialized uses, such as time, weather, temperature, signal strength, etc.

84) On motion of Mr. Butler, seconded by Mr. Carey, it was unanimously VOTED that the Membership Affairs Committee, in conjunction with the General Manager, is directed to study the content of the Product Review column in *QST* with a view toward making the information presented therein more useful to members. The study should include, but not be limited to, the parameters reported for VHF equipment.

85) On motion of Mr. Holladay, seconded by Mr. Milius, it was unanimously VOTED that the Membership Affairs Committee, in conjunction with the VHF Repeater Advisory Committee and the staff, investigate methods for improving the accuracy and timeliness of information published in the *ARRL Repeater Directory*; this study is to include the feasibility of review of galley proofs by the appropriate frequency-coordination groups, and a report and recommendations shall be presented at the 1983 Annual Meeting.

86) On motion of Mr. Wangler, seconded by Mr. Holladay, VOTED that it is the policy of the Board that, prior to the approval of ARRL conventions, possible conflicts in dates with other events shall be called to the attention of all parties, and that Headquarters is instructed to communicate this policy to applicants for ARRL convention approval. The Board was in recess from 12:28 P.M., reconvening at 1:30 P.M., with all those hereinbefore mentioned in attendance with the exception of Mr. Hippiusley.

87) On motion of Mr. Metzger, seconded by Mr. Wangler, after extended discussion, it was unanimously VOTED that the Board accepts the job descriptions of President, Treasurer, and General Manager, as prepared and presented by the Management & Finance Committee.

88) On motion of Mr. Olson, seconded by Mr. Sullivan, after discussion, VOTED that the President is directed to reconstitute the Ad Hoc Committee to study changes in Board procedures; in particular, to review and revise the report presented at Minute 48 of the 1982 Annual Meeting. The Committee shall report not later than 30 days prior to the 1983 Annual Meeting its findings concerning methods by which operations of the Board may be made more effective and efficient. During the course of this motion, Mr. Hippiusley returned to the meeting at 1:46 P.M.

89) On motion of Mr. Nathanson, seconded by Mrs. Lewis, the following resolution was unanimously ADOPTED:

WHEREAS, the League has a computer, and

WHEREAS, the directors can be served by a rapid dissemination of information.

BE IT RESOLVED that the General Manager investigate the possibility of installing a "bulletin board" type access to the League computer to promulgate information to directors through a terminal telephone link and modem.

90) On motion of Mr. Sullivan, seconded by Mr. Carey, it was unanimously VOTED that the Emergency Communications Advisory Committee is directed to study the feasibility of selecting a common connector for use with radio equipment (microphones and power supplies). The advisory committee shall report to the Board at the Annual Meeting in 1983.

91) On motion of Mrs. Lewis, seconded by Mr. Carey, it was VOTED that the General Manager and the Management & Finance Committee expedite production of a more portable ARRL booth for distant area usage for conventions and hamfests.

92) On motion of Mr. Stevens, seconded by Mr. Sullivan, it was unanimously VOTED that the General Manager is instructed to commence efforts to secure issuance of Amateur Radio postage stamps on the occasions of the 75th Anniversary of the American Radio Relay League and the 25th Anniversary of the first amateur satellite.

93) Moved by Mr. Milius, seconded by Mr. Nathanson, that the Plans and Programs Committee study the feasibility of combining the VHF Repeater and VHF/UHF Advisory Committees, and use subcommittees for specialized areas. After discussion, on motion of Mr. Nathanson, seconded by Mr. Sullivan, it was VOTED that the matter is laid on the Table.

94) On motion of Mr. Holladay, seconded by Mrs. Lewis, it was unanimously VOTED that the Plans and Programs Committee, in conjunction with the Public Relations Advisory Committee, develop recommendations on the preparation and distribution of handout materials for use at talks and demonstrations about Amateur Radio.

95) On motion of Mr. Metzger, seconded by Mr. Grauer, it was unanimously VOTED that the Secretary, in the name of the American Radio Relay League, thank the Management and Staff of Stouffer's Five Seasons Hotel for their superb and courteous service given to the Board members at their July 1982 Board Meeting.

96) On motion of Mr. Hurlbert, seconded by Mr. Nathanson, it was unanimously VOTED that the General Manager clearly categorize and identify all expenses reasonably capable of budgetary identification in the preparation of his annual proposed budget, particularly, but not limited to, all expenses relating to the IARU, and that each member of the Board be furnished a detailed quarterly statement of all expenses reasonably related to or identifiable with the IARU, including the purpose, reason or justification for the expenditure.

97) On motion of Mr. Sullivan, seconded by Mr. Nathanson, unanimously VOTED that, in recognition of the impending retirement of the senior member of this Board, the Board of Directors wishes to use this occasion to express its thanks and appreciation to Director Stan Zak, K2SJO, for his many years of service to the League both as a Vice Director and a Director (Applause).

98) On motion of Mrs. Lewis, seconded by Mr. Stevens, it was unanimously VOTED that the RFI Task Group, the staff, the counsel and the Washington Area Coordinator be commended for their efforts to develop solutions to the growing problem of cable-television interference; further, that action to assure proper and responsible means for resolving this problem by cable television organizations be continued.

99) On motion of Mr. Stevens, seconded by Mr. Holladay, it was unanimously VOTED that the Board of Directors extends its heartfelt thanks and deep appreciation to Hart Postlethwaite, WB6CQW, International Commander of Happy Flyers, for his invaluable assistance to the League's program against malicious interference on the amateur bands, and for his continuing efforts in the development of direction-finding techniques for search-and-rescue operations.

100) On motion of Mr. Stevens, seconded by Mr. Milius, it was unanimously VOTED that the DX Advisory Committee study the advisability and desirability of including information on the ARRL DXCC country list, which indicates the countries served by the ARRL Outgoing QSL Bureau.

101) On motion of Mr. Milius, seconded by Mr. Wangler, it was unanimously VOTED that the ARRL Board directs the DX Advisory Committee to study the desirability and level of interest in creating a QRP non-endorseable DXCC award, and report back to the Board on this matter at its Annual Meeting in 1983.

102) On motion of Mr. Milius, seconded by Mr. Sullivan, it was unanimously VOTED that the Contest Advisory Committee complete, before the end of 1982, its study of the proposal for the District of Columbia to become a separate multiplier in contests where states are multipliers.

103) Moved by Mr. Milius, seconded by Mr. Nathanson, that the travel allowance for the use of private automobiles be set at 25 cents per mile, in lieu of 20 cents as presently in effect. After discussion, on motion of Mr. Holladay, seconded by Mr. Butler, unanimously VOTED to refer the matter to the Management and Finance Committee. Mr. Dyas took the seat for Mr. Grauer; Mr. Hippiusley, for Mr. Turnbull; Mr. Kanode, for Mr. Milius; Mr. Quiait, for Mr. Carey; Mr. Ebner, for Mr. Metzger; Mr. Matthews, for Mr. Holladay; and Mr. Comstock, for Mr. Wangler. There was an opportunity for all present to make informal remarks, during the course of which the Board was in recess from 2:59 P.M. until 3:17 P.M.

104) On motion of Mr. Zak, seconded by Mr. Sullivan, unanimously VOTED that the meeting is adjourned, *sine die*, at 5 P.M. Total time in session as a Board: 14 hours, 30 minutes; total direct authorizations: \$500. Respectfully submitted, David Sumner, K1ZZ, Secretary

Life Member Applicants July 20, 1982

List No. 1: Patrick J. Anderson, WB4TLH; Bill F. Antal, W8JEJ; Ernest L. Bechtol, W4HBZ; Bill D. Burns, KB5BG; Stanley L. Darmofal, WD8OWM; William A. Fabricius, WB2AUH; Thomas W. Fort, KA4KGR; Larry R. Ganz, KB2GV; Jayne Ann Hale, WB9WHT; Don Hammond, W4BCV; Stephen Heyer, KC2L; Verner W. Huntus, WB6RTE; William H. Johnson, VE3LRT; Michael A. Kelly, N9BWF; Patrick R. Lambert, WD0FEX; Winston L. Lancaster, N4WL; Russell V. Lenth, AE9R; Ruth Anne Mason, WB4QWW; John P. Qualmann, WB9WGL; Ronald L. Seaman, WD8OJD; Thomas R. Sessions, Jr., K4RV; Norman P. Smith, WA6ABD; Ralph E. Smith, N6ZJ; Bruce Streger, WB2ADF; Thomas B. Supples, K10C; Daniel S. Thomas, W4PLI; Doug Thomas, NSBST; W. Wayne Williams, KB5FP; Brett Kendall Winchester, WA7RZH.

List No. 2: Newton P. Aucoin, N5BOD; Ronald L. Birgen, WD4EOX; Clotis R. Boan, AK6J; Donald E. Brown, WB7FGO; Barry Carlson, WB7WTD; Jerrold L. Carlson, WB4SIA; Robert A. Chambers, NC6J; Richard E. Combs, N5DRM; Edward R. Corey, K17Z; Donald E. Courter, KA0FDY; Wally Cox; Donald E. Daze, KC5AK; Joe Diaz, W2LPZ; Richard G. Dittmer, WH6AMX; Charles A. Douglas, K4YSF; Michael R. Eiden, WD9JID; Wayne L. Ezell, KA4NNE; Kirk W. Fetzer, KA8HSJ; Russell P. Frettenborough, K8JLB; Charles G. Fuller, Jr., KE6AK; Robert E. Garland, WB3AIG; Ralph E. Gillette, WL7F; Thomas A. Gutekunst, N9TG; W. F. Hartman, N4DNW; Robert W. Hastings, K6PHE; Gerald Hawkins, WD6CKN; Lawrence G. Hays, WB6OTS; Bruce D. Herrick, K1TMM/0; Raymond L. Highland, K1G0X; Carl F. Hilker, Jr., AE8V; Hugh L. Hollandsworth, WA4ION; Merle Holmes, WB9SEJ; John W. Hulka; James R. Johns, Jr., KA0IQT; Gerald S. Johnson, NA4Z; Richard M. Kline, WB3BLM; John P. Korb, WB4PBI; Angela Korn, KC7EQ; Arthur C. Labarea, WA1PRJ; Theodore R. Lerner, WA2JMW; Althea M. McBride, WB3FUR; Paul D. McBride, W3JLG; D. W. Maclean, N4CUS; Nicholas B. Marsala, AB5M; Edward F. Mascali, WA2KIC; Bernard A. Muller, Jr., W7BKO; Edward C. Murphy, WB5AHI; Paul Newland, AD7E; Ray C. Newsome, WD8IYY; Richard J. Norton, AJ7S; Robert E. Nyire, WA2AJV; Charles B. Orr, Jr., W4NND; Chris Power, NR4S; James E. Pratt, Jr., WB3ANC; William E. Rhoads, Sr., WB3KTV; Gerald L. Richards, WD9HLI; Douglas James Rosengard, KA1AGD; David L. Sargent, NT4W; Brian L. Schukow, KA9AZI; James Sereda, WD0BTY; James T. Sharp, W3UFI; Jerry Shepherd, A19W; Michael J. Shovan, Jr., WB2KHE; Dunn J. Sibley, III, WB5HQV; Jack A. Speer, N1BIC; C. Frank Starmer, KB4GZ; Michael R. Tull, WD5FGY; Jack E. Ulstad, N6DDJ; Lauren A. Ward, K9CLF; Truman C. Waugh, N0APJ; Bernie J. Wilkerson, KD4EB; George R. Winship, Jr., WA5UIH; William W. Worstall, WD8LER; Michael H. Yaworski, WB6VUB.

List No. 3: Paul Anderson, KA1GI; John Robert Bartlett, VE3DHB; Larry G. Blumenthal, WA2RSB; B. M. Brigrance, Jr., KC5LR; Deborah L. Brookover, WD8EBI; Kenneth M. Cross, WD4IME; Truman Golden, WD4IVQ; Skeet Gray, WA1GWP; John Craig Hadley, A16O; Floyd B. Inks, Jr., W5KNA; Harvey Jacobs, WB2FFS; Hermann Kakucsi, WB7UAN; Marilyn McKeown, KA8OVD; Robert C. Mecum, KM9W; James J. Rybak, K8GI; James Sampson, KA8MSJ; John E. Thomson, WB5ZMT; William Toomer, WA2GYM; Stanley W. Vogel, W6QFE; Al Wendling, WB9ZBG.

Correspondence

Conducted By Peter R. O'Dell,* KB1N

The publishers of QST assume no responsibility for statements made herein by correspondents.

YUMMY!

□ I'm thinking of marketing a "Cable TV Dinner." It looks just like a regular TV dinner, but when you put it in the oven it leaks all over the place. — *Clark Stewart, W8TN, Ravenswood, West Virginia*

WOULD THAT BE 24 ZPM?

□ I used to experiment with "sleep learning" and applied this worthy concept to learning the Continental Morse Code. Recently, I have found switching on the tape recorder on my night table is an excellent instant cure for insomnia. After three minutes, I am fast asleep. My favorite speed for this is 24 wpm — and I have no recall in the morning. Does this mean something? (Nb: During my usual waking hours, I positively like cw . . .). — *F. Paul Kosbab, NF4E/5, Tulsa, Oklahoma*

KA1 CALLS NEVER RELEASED FOR USE IN JAPAN

□ [Editor's Note: In this column for July, Ray Burns, KA8RB, made the following statement: "KA 2 × 2 call signs were to be reserved for use in Japan; it was the FCC that issued them in the first call district." In fact, the FCC (which is responsible for the assignment of call sign blocks for government as well as non-government use) never released the KA1 prefix for use by the U.S. military in Japan. The KA2AA-KA0ZZ block was released for use by the Army in 1952; the KA2AA-KA9ZZ block was transferred from Army to Air Force jurisdiction in 1978, with KA0AA-KA0ZZ then reverting to the FCC. QST regrets having inadvertently compounded an already confusing situation!]

OUR EYES ON THE ROAD

□ Mobile stations frequently report highway emergencies, but, in most cases, become involved only after the occurrence. I believe that mobile operators, with the cooperation of local repeater organizations, could provide an invaluable service to the public, by reporting to the police any vehicle being operated in a hazardous manner. Clubs could contact the proper law enforcement agency, offer this service, and work out the procedures. I am not suggesting hams take any stronger action than reporting the incident to the police. — *John M. Stone, Jr., W4CLD, Richmond, Virginia*

ARMY TIME IS THE RIGHT TIME

□ There's no problem with times less than one day. We denote them in hours, minutes and seconds — largest unit to smallest (How Many Candles . . . Correspondence, July). Likewise, years, months and days seems to make sense. For clarity, you could write out the year. — *Norman D. Stockwell, N6NS, Redondo Beach, California*

UP TU, BRUTE?

□ I second the nomination of K9TTM as the official "UP" station, as mentioned in July Correspondence. He, however, shattered a dream of mine. I always thought the "UP" stations" were trying to help me out in the pileups, because of my weak signal! — *Barry Kutner, W2UP, Mineola, New York*

□ The guys who send "UP" are performing a good service, alerting newcomers to the pileups to transmit up frequency, since that is where the DX station is listening. Most guys do move up promptly and clear the frequency. I might have a clue as to why some guys refuse to move off, and keep calling on frequency. One day a particularly strong signal was calling on frequency, making it impossible for me to hear what the DX station was doing. Later, I worked him. He had a transceiver with no RIT, and no way to work split. Boy, I tell you! — *Ted Chernin, KH6GI, Honolulu, Hawaii*

BIGGER AN' BETTER

□ For Field Day or any other event, I believe more publicity can be obtained if more and larger groups are involved. This year, I helped combine the Field Day publicity efforts of four of the Milwaukee metro-area clubs. Net results — *fantastic!*

We made the Friday evening edition of the *Milwaukee Journal*. A larger article appeared in the Sunday edition. I was interviewed by WISN Radio News (50-kW station), and different portions of the interview were broadcast on the various Sunday newscasts. Channel 12 sent a camera crew to the Waukesha Club site, and used the material on the early and late telecasts. *Fantastic!* — *H. Charles Kaetel, W9SNK, Menomonee Falls, Wisconsin*

ULTIMA RATIO REGUM

□ I am appalled that the FCC may consider elimination of the code requirement for certain Amateur Radio licenses. Without having to learn the code, a 10-year-old could get an amateur license by memorizing the material now published in various license manuals. Amateur Radio bands would soon become overcrowded with people who didn't have to work to get their licenses.

Morse code is still practiced and widely used by amateurs. To delete the code requirement would radically change Amateur Radio as we know it. I hope all concerned amateurs will register their opposition when and if it becomes a matter of change in the rules. — *Mike Bigelow, KB7ZB, Boise, Idaho*

□ Before spouting off for no-code licenses and telephony expansion in the Amateur Radio Service bands, the proponents would do well if they would expend some of this energy in cleaning up the obscenity and profanity heard on the telephony segments. — *Paul Williams, W6WEQ, Santa Cruz, California*

□ It is very interesting to read about those who want no-code Japanese style. I was stationed near Tokyo when the Emperor declared

there was too much noise from car horns. He told them to stop blowing the horns, as of the next day. I had occasion to be in Tokyo the next day, and the only people who refused to stop blowing their horns were the Americans and other foreigners. Try that one in the good old USA. — *Bob Miller, KB9SU, Wolcottville, Indiana*

□ In 21 years in the Navy, they could teach me very little electronic theory, but I did retire as an E-8 (Senior Chief) in operations. Thus, my code is decent, and I am a whiz on a TTY keyboard. However, I may never get beyond Novice class because I have problems memorizing Bash. Since I am never going to use the electronics, why should I be required to memorize Bash? Those that have this faculty still do not know electronics of the grade of the ticket.

I propose you push for two grades of tickets. Let me keep my code and get a "general" so I can play with RTTY knowing only Novice class electronics. This would be an operational license. Let those who specialize in electronics get an engineering grade license without a code requirement. I suppose you should give them half the good frequencies to play with.

If I must memorize Bash for the electronics I will never use, the engineering types can learn the code they will never use. The code speed is far easier than the electronics. — *Graydon A. Lewis, KA7GX1, Eugene, Oregon*

□ I am not sure whether I agree with a no-code license. However, if it is to be, I think something should be added to the license requirements. My idea is to have something like an apprenticeship. The people who want a no-code license would have to join an affiliated ARRL club for a certain amount of time. During this time, they possibly would become a shortwave listener. After their period of time expires, the applicant would get the approval of, say, three club officers. This would not put a burden on the resources of the FCC. It would increase club membership, because people would probably stay with the club after getting licensed. Requiring the approval of other hams would limit any undesirable people from getting into ham radio. — *Tim Warneka, KA8KQF, Perry, Ohio*

□ Since we are evidently going to have a code-free license, perhaps we could derive some benefit from it. I think a code-free license would cause a relatively large influx of operators, who probably would descend on the already crowded 2-meter band. The possibility of an 800-channel CB band is frightening.

I would like to suggest an alternative. If the new-class licensees were restricted to the frequencies above 400 MHz, instead of 50 MHz as in the proposal, a very small percentage of the active amateurs would be affected. More utilization of these relatively unused bands could only help Amateur Radio in general. Also, the FCC might be more receptive to a modification of their proposal than to outright opposition, since they seem to be dedicated to the concept. — *Bob Moore, KA2CWQ, Samsonville, New York*

QST

Codeless U.S. Amateur License? Commission Tells Staff to Write a Proposal

The Federal Communications Commission has instructed its staff to prepare and release to the public specific proposals for creation of a new, no-code amateur license. Later this year the Commission will adopt a Notice of Proposed Rulemaking (NPRM) and assign a docket number to it. Interested parties then will have an opportunity to participate in the rulemaking through submission of written data, views or arguments. *QST* and *WIAW* will cover this action when it occurs, and provide information on how to file comments with the FCC.

ARRL officials attending FCC's announcement of its intentions report that the no-code-license proposal will contain two options. One will be to eliminate the five-words-per-minute telegraphy test requirement from the existing Technician class license and limit access to frequencies above 50 MHz. The present Technician class license requiring code and permitting access to the Novice bands would remain in force. The other option will be a codeless digital license, similar to Canada's Digital Radio Operator Certificate, which requires passing a stringent test on digital theory. A digital license either could be the only codeless license, or it could concur with a codeless Technician license.

It is not yet clear which bands will be proposed for the new codeless license. It is certain, however, that any codeless amateur license, if adopted, would permit no privileges below 30 MHz. International Telecommunication Union Radio Regulations require Amateur Radio operator telegraphy proficiency for operation below 144 MHz. At the 1979 World

Administrative Radio Conference (WARC), the United States attempted to get this telegraphy requirement deleted from the international regulations; however, efforts by the International Amateur Radio Union (IARU) led to the defeat of this proposal. The U.S. was nonetheless successful in lowering the code/no-code border frequency from 144 to 30 MHz.

The FCC's Private Radio Bureau advocates of a no-code amateur license. At an FCC meeting held July 1, the bureau's chief, James McKinney, offered four options to the full Commission: (1) A Canadian-style digitally oriented license requiring a difficult written examination. (2) The present Technician class minus its code test. (3) A "communicator class" proposal for an easy, no-code, entry-level license. (4) No change from the present (i.e., a code test for all amateurs). The Private Radio Bureau recommended the codeless Technician option.

The FCC's Office of Science and Technology (OST), another staff division within the Commission, advocated a modified digital-license option to the Commissioners at the same meeting. Michael Marcus, representing OST, offered a Canadian-style digital-license option, but the theory requirement would be scaled down in difficulty from the present Canadian license. According to Marcus, the Office of Science and Technology wants to encourage entry of computer scientists into Amateur Radio. McKinney, speaking for the Private Radio Bureau, pointed out that the Canadian Government has issued only 142 digital licenses, 77 of which went to persons already possessing amateur licenses. Marcus re-

joined by stating that the Canadian figures do not account for differences of interests in Amateur Radio shown by Canadians. According to Marcus, the ratio of amateurs to the total population in Canada is only half of what it is in the United States.

After discussion, the Commissioners directed the Private Radio Bureau to prepare a Notice of Proposed Rulemaking (NPRM) covering both choices: a codeless Technician and a Canadian-style digital license. The NPRM is to be unveiled sometime this fall.

Amateur Radio Community to Comment

The Amateur Radio community now must wait for the NPRM and its assigned docket number to be made public. A great flood of comments on the issue of a codeless amateur license before the NPRM is released would not accomplish anything.

The ARRL Headquarters staff, which has been carefully following the development of the codeless-license proposal, will be filing comments at the direction of the League's Board of Directors at the appropriate time. Amateurs will be encouraged to file comments also, once the Commission's proposal is made public. Further information will be carried in *QST*, and late-breaking news will be transmitted over *WIAW*.

The Private Radio Bureau already knows that the ARRL Board of Directors is on record as opposing a no-code license. In fact, the Bureau told the Commissioners when it made its no-code proposal that they could expect opposition from the ARRL.

BURBANK, ILLINOIS, ANTI-AMATEUR ORDINANCE

The Executive Committee of the ARRL Board of Directors has pledged the League's wholehearted support to the radio amateurs of Burbank, Illinois, in their fight to overturn one of the most anti-amateur ordinances adopted by an American city. The Committee also pledged \$7500 of ARRL funds to supplement funds being raised by other sources to pay for legal fees. The money will be used to challenge the ordinance on the basis that it is in violation of the U.S. Constitution and is an attempt to regulate matters preempted by the Federal Government.

Burbank, with a population of approximately 30,000, is located to the southwest of Chicago. Over 50 Amateur Radio operators and a large number of licensed CB operators reside within city limits. Until 1980, no permits were required for the erection of radio antennas of any type.

Over the last two years, however, aldermen on the City Council became involved with radio frequency interference problems, and began a campaign to eliminate or restrict radio operations by amateurs. The local amateurs made every effort to cooperate in eliminating the RFI problems, but these offers of assistance were refused. The aldermen also would not accept the fact that radio frequency interference is often curable only if design deficiencies of the consumer devices experiencing the problem are corrected.

Burbank Ordinance No. 9-4-82, adopted March 10, 1982, established the following:

(1) A moratorium on all new Amateur Radio or CB antennas shall remain in effect for a period of one year. (2) All existing antennas shall be allowed to remain within the city so long as the owner (a) registers the antenna with city officials, (b) puts his call sign on record, (c) submits proof of having taken out a \$5000 bond plus liability insurance, (d) conforms with existing codes, including a 35-ft height restriction, (e) submits to the building department a manufacturer's instruction sheet on proper installation so that it can be properly inspected, (f) pays an \$11 inspection fee, with a

\$10 annual fee to be assessed for subsequent inspections, and (g) causes no interference to television, musical instruments, phonographs or other electronic devices. (3) The ordinance also provides that a \$25 fine be assessed for the first violation of the ordinance, \$50 for the second offense, and quasi-criminal charges for the third. The ordinance also authorizes a maximum fine of \$1000 for each offense.

The radio amateurs of Burbank have retained Attorney James C. O'Connell, W9WU of LaGrange, Illinois, and are preparing to file suit against the City of Burbank and its officials in U.S. District Court for the Northern District of Illinois. The radio amateurs of Burbank also have established the Burbank Tower Fund. Its chairman is Roger Borowski, WA9EKA, 6107 West 80 Pl., Burbank, IL 60459.

SUBARU LETTER SUGGESTS STRANGE RFI CURES

This letter from a representative of Subaru to Albert Jacobs, of Silver Spring, Maryland, is indicative of a problem facing many consumers. A consumer suffers when a manufac-

*Deputy Manager, Membership Services, ARRL



SUBARU ATLANTIC, INC.

9050 RED BRANCH ROAD
POST OFFICE BOX 308
COLUMBIA, MD 21045
(301) 730-9003

May 4, 1982

Mr. Albert Jacobs
900 Holborn Street
Silver Spring, MD 20902

Dear Mr. Jacobs:

Pursuant to our telephone conversation this morning, Subaru of America, Inc. recommends that electrical transmission devices (CB's, HAM's, Garage door openers, etc.) not be installed on 1982 Subaru vehicles, since such installation may interfere with the ECC System and possibly result in erratic driveability.

If such a device is installed, care should be taken to route the antenna lead as far as possible from the ECM and ECM harness. Shielding the antenna may also help to cut down on interference. However, these procedures are not guaranteed to correct any interference problems.

The term "ECC" refers to the electronically controlled carburetor, and the term "ECM" refers to the electronic control module.

The interference, if any, is generated by close proximity of the transmission device's cables to the cables of the ECC system and ECM. There would be no interference caused by large commercial transmitters (radio, TV, microwave transmitters, etc.).

We trust this information will serve to answer your questions, and we appreciate having had this opportunity to be of service.

Sincerely,

C. Lynn Swinney
C. Lynn Swinney
Customer Relations Manager

/s/

cc: N. Demestihis
District Service Manager



ARRL General Manager David Sumner, K1ZZ, copies the historic message from VK3KAU at W1AW.

NR 1 R W1AW 42 NEWINGTON CT USA 1155 Z
JULY 8
TO: PETER WOLFENDEN, VK3KAU
PRESIDENT, WIRELESS INSTITUTE OF
AUSTRALIA
P.O. BOX 150
TOORAK, VIC 3142
AUSTRALIA

ARRL SENDS GREETINGS AND CONGRATULATIONS ON THE SUCCESSFUL CONCLUSION OF NEGOTIATIONS OF A THIRD PARTY MESSAGE AGREEMENT BETWEEN OUR TWO COUNTRIES X WE EXPECT THIS WILL ENHANCE THE TRADITIONALLY STRONG TIES BETWEEN THE RADIO AMATEURS OF AUSTRALIA AND NORTH AMERICA X 73

VIC CLARK, W4KFC
PRESIDENT, ARRL

450-MHz BAND RESTRICTED-POWER AREAS ADDED, ENLARGED

The Federal Communications Commission has announced that, effective August 16, 1982, the 50-W transmitter power limit for Amateur Radio stations operating in the 420- to 450-MHz band applies to two additional military areas. (Exceptions for amateur satellite operations appear in 97.421 and 97.422 of the rules.) Also, the restricted areas around two military areas already specified in the rules have been enlarged. Section 97.61(b)(7) of the Amateur Rules has been amended to read as follows:

(b) * * *
(7) * * *

- (v) In the State of Massachusetts within a 160 kilometer (100 mile) radius of 41°45'N., 70°32'W.
- (vi) In the State of California within a 240 kilometer (150 mile) radius of 39°08'N., 121°26'W. 149°10'W.
- (vii) In the State of Alaska within a 160 kilometer (100 mile) radius of 64°17'N.
- (viii) In the State of North Dakota within a 160 kilometer (100 mile) radius of 48°43'N., 97°54'W.

The above new rules translate into a protection zone of 160-km (100-mile) radii around Elmendorf Air Force Base, Alaska; Grand Forks Air Force Base, North Dakota; and Otis Air Force Base, Massachusetts; and a 240-km (150-mile) radius around Beale Air Force Base, California. The Commission dispensed "with the prior notice and public procedure provisions of the Administrative Procedure Act as unnecessary since national defense considerations (protection of air defense radar sites) require that Government radio operations be protected from potential interference from Amateur Radio stations."

Amateur Radio use of the 420-MHz band is on a secondary basis to the government. Case-by-case coordination with the military base protected in the radio amateur's area is necessary before the dc plate input power to the

turer uses poorly designed electronic products. Some manufacturers do make good on their products when a defect is discovered; others attempt to take care of the problem by offering strange suggestions. Shield the antenna? How about shielding the ECC System, Subaru?

PHILIP E. HALLER, W9HPG

Philip E. Haller, W9HPG, director of the ARRL Central Division from 1963 to 1976, died suddenly on June 29 after suffering a massive heart attack. He was 73.

A life-long resident of Chicago, Phil had retired from Commonwealth Edison Co. in 1970 after 44 years of service as an electrical engineer assigned to the radio department. Before becoming director, he was vice director of the ARRL Central Division from 1959 to 1963, director from 1963 to 1976, and served as emergency coordinator of Cook County for many years. He was active in local radio clubs, and had long served as secretary of the Chicago Area Chapter of the Quarter Century Wireless Association. Phil will be greatly missed by the amateurs in the Chicago area, as well as by those travelers through the area who were fortunate enough to sample his hospitality. He leaves his wife, Margaret, two sons and two

grandchildren. — David Sumner, K1ZZ, with thanks to QCC (QCWA) News

AUSTRALIA-UNITED STATES THIRD-PARTY AGREEMENT

A third-party agreement is now in effect between the U.S. and Australia. Radio amateurs of these two countries may handle messages on behalf of third parties provided the messages are of a nature that would not be sent via commercial channels.

The Presidents of the Wireless Institute of Australia and the American Radio Relay League exchanged the following messages in honor of the occasion:

NR 1 R VK3ADW 45 MELBOURNE, AUSTRALIA
JULY 9
TO: VIC CLARK, W4KFC
PRESIDENT ARRL
225 MAIN STREET
NEWINGTON, CT 06111 USA

I AM VERY PLEASED TO BE ABLE TO MAKE USE OF THE RECENTLY ESTABLISHED THIRD PARTY AGREEMENT BETWEEN OUR TWO COUNTRIES TO CONVEY MY GREETINGS TO YOU AND THE MEMBERS OF THE ARRL X HOPING FOR A CONTINUED CLOSE ASSOCIATION BETWEEN OUR TWO SOCIETIES X

PETER WOLFENDEN, VK3KAU
PRESIDENT WIA

final stage of a 450-MHz-band transmitter may exceed 50 watts.

GUSCHKE CASE (OKLAHOMA CITY) WILL GO TO TRIAL

An important ruling by a federal district judge in Oklahoma has opened the door for a valuable legal precedent for Amateur Radio to be made. U.S. District Court Judge David L. Russell (Western District of Oklahoma) has ruled that the suit filed by Charles M. "Chuck" Guschke, N5SW, against Oklahoma City "states a substantial federal question of the application of the Communications Act of 1934 . . ." The Judge, in the process, denied Oklahoma City's motion to dismiss the case for lack of federal jurisdiction.

Chuck Guschke sued Oklahoma City in June of 1981, charging that the city's zoning ordinances were too restrictive in not allowing him to maintain a 78-ft-high antenna tower. According to Guschke, the 78-ft antenna is necessary for proper operation of his station because of nearby topographical obstacles, among them nearby Lake Hefner Dam. The city will allow him a maximum of 50 feet.

Judge Russell's order will give Guschke a trial on the merits of his claim that Oklahoma City has deprived him of his constitutional rights of free speech and privacy, and of his liberty and property without due process of law. Guschke also hopes to knock down Oklahoma City's opposition to his antenna on the basis that the Federal Government has preempted its regulation by local government.

ARRL filed a *friend of the court* brief in March of this year, supporting Guschke's claims. In its brief, the League placed special emphasis on the fact that federal interests in Amateur Radio were being thwarted by the overly restrictive Oklahoma City ordinances. The League also emphasized that Amateur Radio operators are denied their civil rights, guaranteed by federal statute and the U.S. Constitution, when ordinances such as Oklahoma City's are enforced. Judge Russell, apparently in reference to the League's brief, distinguished between the city's rights to regulate commercial radio operation and its rights to regulate Amateur Radio operation, which is "usually incidental to residential property use."

No trial date has been set. Guschke's attorney is Micheal Salem, N5MS, of Rawdon and Salem, Suite 112, West Oaks Office Park, 2215 W. Lindsay, Norman, OK 73069. As this was being written, further participation in the Guschke case by the League was under discussion by the ARRL Board of Directors.

CONNECTICUT JUDGE RULES AGAINST TOWN OF MONROE

A Connecticut Superior Court judge has ruled against the Town of Monroe, and has refused to grant an injunction ordering Bob Linebarger, W1CCS, to immediately dismantle his 70-ft antenna/tower.¹ When Bob first decided to replace the 58-ft antenna/tower, which had stood on his property at 257 Barn Hill Road in Monroe, he had no hint of the trouble that was about to follow.

The chairman of the Town Zoning Board of Appeals did not like the new antenna. He complained to the Monroe zoning enforcement officer that the antenna violated a regulation restricting the height of buildings or other structures to 2-1/2 stories, or 35 feet. The Monroe building inspector, in turn, directed Bob to remove his antenna. When Bob appealed the inspector's order to the Appeals Board, chaired by the complaining individual, the Board, not surprisingly, rejected Bob's appeal.

Still, Bob refused to give in, so the Town took him to court in the summer of 1981 to compel him to remove his antenna. ARRL Hq. and the League's legal counsel provided Bob's attorney with legal research and advice to fight the Town's lawsuit. After an unsuccessful attempt to remove the case to federal court, Bob's attorney finally filed a brief in the State Superior Court in Bridgeport in opposition to the Town's request that the court immediately order that the antenna be taken down.

The court ruled that the Town of Monroe had not demonstrated sufficient reason for it to issue the injunction against Bob ". . . because of the doubt existing with respect to the question of irreparable injury infringement [sic] of the defendant's constitutional rights to freedom of speech and the possibility in [sic] inequitable enforcement of the zoning regulations given the existence of other towers of higher than the thirty-five feet . . ."

Though this ruling is fairly limited to the facts of this particular case, it sets an example for other hams around the country who are being hassled by local government officials because of their amateur antennas. Bob Linebarger stood up to the challenges made on his rights. Even though it will be some time before Bob and his family can recover completely from the financial and emotional stresses of lawsuit, he still feels he made the right decision.

REPEATER POWER LIMITS CHANGED

Effective July 29, 1982, Section 97.67 of the Amateur Rules, *Maximum authorized power, is amended as follows:*

(c) Within the limitations of paragraphs (a) and (b) of this section, the effective radiated power of an amateur radio station in repeater operation shall not exceed the power specified for the antenna heights above average terrain given in the following table:

Antenna height above average terrain in meters	Maximum effective radiated power for frequency bands above:		
	29.5 MHz	420 MHz	1215 MHz
Below 32 (105 feet)	800 watts	Paragraphs (a) and (b)	Paragraphs (a) and (b)
32-160 (105-525 feet)	400 watts	800 watts	.do..
160-320 (525-1050 feet)	200 watts	800 watts	.do..
Above 320 (1050 feet)	100 watts	400 watts	.do..

The rule change relaxes the effective radiated power (ERP) limitations on repeater operations in the 6-m band, and extends these limitations to repeater operations in the 10-m band. This action was the result of the Commission's decision in PR Docket No. 81-697. ARRL's comments appeared in March 1982 *QST*, page 59.

SENATORS AID ARRL EFFORTS FOR 10-MHz BAND

Last month's *Happenings* reports on ARRL's

continuing efforts to gain access for U.S. amateurs to the first of the three new amateur bands allocated at the World Administrative Radio Conference, 10.1-10.15 MHz. The League has made further progress, and on August 3, 1982, the following letter from the Committee on Commerce, Science and Transportation of the U.S. Senate was sent to FCC Chairman Mark S. Fowler:

Dear Mark:

On March 3, 1981, the American Radio Relay League (ARRL) filed a petition with the Commission urging adoption of rules necessary to allow amateur radio operators access to the 10-MHz band. The Commission denied that petition on March 12, 1982, on the basis that it had no authority to act until ratification of the Final Acts of the World Administrative Radio Conference. The ARRL filed an application for review of that decision on April 4, 1982. No action has been taken on that application.

There is a very real possibility that the Final Acts will not be ratified by the Senate before Congress adjourns this year. Therefore, in order to provide amateur radio operators access to a frequency assignment that is in use for such purpose in over 40 countries, we strongly urge you to take immediate action pursuant to section 115 of the present regulations of the International Telecommunication Union to provide interim operating authority for use of the 10-MHz band.

Sincerely,

/s/ Barry Goldwater
/s/ Harrison Schmitt
U.S.S.

copies to Commissioners
Quello, Washburn, Fogarty,
Jones, Dawson, and Rivera

ARRL FOUNDATION NEWS

With the excitement of a planned Phase III-B launch reaching a near fever pitch, support of the ARRL Foundation's Twentieth Anniversary Amateur Satellite Fund continues to pour in from the amateur community. Recently, a donation of \$500 arrived at Foundation headquarters from the Des Moines Amateur Radio Association to aid the efforts of the amateur space program. The donation was the largest single contribution ever made by the club. You too can support the space effort by making your tax-deductible contribution to the Amateur Satellite Fund, ARRL Foundation, 225 Main St., Newington, CT 06111. Become a part of tomorrow's telecommunications world today!



Wisconsin Governor Lee Sherman Dreyfus makes one of seven QSOs as Russ Fleming, WB9NYG, control operator and state RACES officer, looks on. The Governor stopped by the Amateur Radio booth at the spring Governors' Conference on Emergency Preparedness held in Madison. (W9LJR photo)

¹Planning and Zoning Commission, Town of Monroe v. Linebarger, 19-87-07, Connecticut Superior Court (Jud. Dist. of Fairfield at Bridgeport) Memorandum of Decision on an Application for Temporary Injunction, April 16, 1982.

Canadian NewsFronts

Conducted By Harry MacLean,* VE3GRO



CRRL Officers and Directors

President: A. Mitch Powell, VE3OT
Honorary Vice President: Noel B. Eaton, VE3CJ
Secretary: Thomas B. J. Atkins, VE3CDM

Directors: Albert G. Daemen, VE2J
Raymond W. Perrin, VE3FN
A. George Spencer, VE6AW

Counsel: B. Robert Benson, Q.C., VE2VW

CRRL, Box 7009, Station E, London, ON N5Y 4J9

INTERIM MINUTES OF CRRL BOARD MEETING NO. 4, JULY 2-3, 1982

Pursuant to due notice, the Board of Directors of the Canadian Radio Relay League, Inc., met at 0930 CST, Friday, July 2, at the Kelsey Institute, Saskatoon, Saskatchewan. Present were President Mitch Powell, VE3OT, in the Chair; Secretary Tom Atkins, VE3CDM; and Directors Raymond Perrin, VE3FN, and George Spencer, VE6AW. Also present as observers were Assistant Director Harry MacLean, VE3GRO, and Counsel Robert Benson, Q.C., VE2VW. Harry MacLean was appointed to record the minutes.

1) After considerable discussion, moved by Mr. Spencer, seconded by Mr. Perrin, unanimously VOTED to approve changes to the CRRL by-laws which would result in (a) the addition of two new directors to the CRRL Board, one from British Columbia, the other from the Atlantic region; (b) the CRRL president and the ARRL Canadian director becoming one and the same; (c) the CRRL vice president and the ARRL Canadian vice director becoming one and the same; and (d) the elimination of some small inconsistencies having to do with nomination and voting procedures for CRRL office. Under the CRRL Constitution, changes in by-laws require membership approval, either by mail vote or at an annual general meeting. It was decided to call a general meeting in Waterloo, Ontario, Saturday, October 2. An announcement would be posted in QST.

2) Moved by Mr. Spencer, seconded by Mr. Perrin, unanimously VOTED that Counsel Benson be appointed CRRL Assistant Secretary, to take effect when changes in the CRRL by-laws were approved by the membership.

3) Moved by Mr. Atkins, seconded by Mr. Spencer, unanimously VOTED that Mr. Benson continue as CRRL Counsel.

4) Moved by Mr. Spencer, seconded by Mr. Atkins, unanimously VOTED to appoint Mrs. Audrey Staines, VE3KGS, as manager of CRRL Box 7009 in London. Mrs. Taines is

being assisted by her husband, Ray Staines, VE3ZJ. For the past several months she has been processing inquiries, membership renewals, and orders for ARRL and CRRL materials in a speedy and efficient manner.

5) Moved by Mr. Perrin, seconded by Mr. Spencer, unanimously VOTED that QST be mailed to CRRL members from Canada. QST would be shipped to London, Ontario, in bulk. It would be turned over to a professional mailing service. The arrangement would be more cost-effective than mailing from the U.S., and would speed delivery to members.

6) Moved by Mr. Perrin, seconded by Mr. Spencer, unanimously VOTED that Jack Strangleman, VE3GV, be appointed CRRL National Emergency Communications Advisor, with a responsibility for developing a national ARES programme. Mr. Strangleman is Ontario SEC.

7) Moved by Mr. Perrin, seconded by Mr. Spencer, unanimously VOTED that CRRL reconstitute its submission to DOC on RFI, placing particular emphasis on interference to and from cable television systems, and that CRRL contact the Canadian Cable Television Association and offer to work with them on the problem.

8) Moved by Mr. Atkins, seconded by Mr. Perrin, unanimously VOTED that Harry MacLean, VE3GRO, and George Spencer, VE6AW, be appointed to formulate a response to FCC proposals to expand U.S. phone bands. A majority of the CRRL membership is opposed to such expansion.

9) After discussions, moved by Mr. Atkins, seconded by Mr. Spencer, VOTED to approve the following: (a) the minutes of CRRL Board Meeting No. 3; (b) CRRL budgets; (c) counsel action on antenna cases in Edmonton, Alberta, and Laval, Quebec; (d) counsel action with respect to the trademark dispute with CARF; CARF has challenged CRRL's right to use the name Canadian Radio Relay League, the term CRRL and the diamond logo; (e) CRRL assistant director appointments; (f) Canadian appointments to ARRL advisory committees; (g)

CRRL participation at hamfests and conventions to be held in Maple Ridge, BC; Brandon, Manitoba; Waterloo, London and Milton, Ontario; St. Hyacinthe, Quebec; and Summerside, PEI; (h) a proposal by Fred Hammond, VE3HC, to have pages in the CRRL Licensing Manuals sponsored by amateurs who would receive credit for contributing to Canadian Amateur Radio; Mr. Hammond has offered to look after the project; (i) establishment of a CRRL telephone "hot line" equipped with a recording device, to which members could direct inquiries and orders for materials; (j) CRRL participation in United Nations World Communications Year; Mr. Atkins and Mr. Benson formed a committee; and (k) CRRL participation in the IARU Region II Conference, to be held in Colombia in 1983. CRRL is the Canadian member-society of IARU.

10) The Board also discussed the general direction in which CRRL was moving. It noted a general wish among CRRL members that CRRL continue to become self-sufficient, while still maintaining ties with ARRL and retaining QST. It was agreed that, as CRRL moved in this direction, it would be important to maintain the excellence that had been established over the years by the League as a whole.

11) The Board also wanted to record a vote of thanks to Percy Crosthwaite, VE5RP, and his committee, who had organized and run an excellent 1982 CRRL Mid-West Convention.

On the first day of the meeting, the Board recessed from 1110 to 1540, and adjourned for the day at 1710. On the second day, the Board resumed at 0910. It recessed from 1030 to 1040, again from 1220 to 1310, and also from 1440 to 1600. On both days, the Board also held discussion meetings with SCMs from Alberta, Saskatchewan and Manitoba, and with other CRRL-ARRL officials. There being no further business, the Board adjourned at 1725 CST, Saturday, July 3. Total time as a board: 9 hours and 5 minutes; total time in other meetings: 2 hours and 40 minutes.

Respectfully submitted,
Harry MacLean, VE3GRO

CRRL NEWS

Have a question? Need some CRRL or ARRL publications or materials for you, your licensing class or club project? Telephone CRRL at 519-451-3773. If there's no one to answer, a recorder will take down your message.

Bill Gillespie, VE6ABC, has set up a western depot for CRRL and ARRL publications and materials. Contact Bill at 10129 90th St., Edmonton, AB T5H 1R5.

Nearly 400 amateurs from VE1 to VE7 attended the CRRL Midwest Convention, held in Saskatoon, Saskatchewan, July 1, 2 and 3. Yes, it was a huge success! We'll have photos and a more complete writeup in October QST.

CRRL "QST" bulletin service resumes this month. Listen for it!

DOC NEWS

DOC has informed CRRL of a new reciprocal licensing agreement with St. Lucia.

DOC will hold Amateur Radio Examinations across Canada on October 20. If you plan to write, register with DOC before the middle of this month.

CRRL AMATEUR OF THE YEAR

Nominations are still open. Deadline is September 15. The CRRL Board will vote on the final ballot shortly after this date. The award will be presented at the 1982 RSO Convention, to be held in Waterloo, Ontario, October 1, 2 and 3.

AND FINALLY . . .

Would your club like a set of computerized beam headings based on your QTH? Bill Bowman, VE4AFO, will gladly print up a set. Contact Bill at 744 Christoe Ave., Selkirk, MB R1A 2H9. Be sure to tell Bill your exact latitude and longitude, and please include a dollar to cover Bill's costs.

NOTICE OF GENERAL MEETING

The Annual General Meeting of the CRRL membership will be held at 2:30 P.M. Saturday, October 2, at the Waterloo Motor Inn, Kitchener/Waterloo, Ontario. This meeting has been timed to coincide with the 1982 RSO Convention. The purposes of the meeting are

1) to consider and, if it is deemed advisable, to approve, ratify and confirm, the enactment of proposed special By-Law "A" of the Corporation amending the by-laws in various aspects, but especially to increase the number of regional directors from three (3) to five (5) in order to provide more efficient geographical distribution and service to the membership; and

2) to transact such other and further business as may properly be brought before the meeting or any adjournment thereof.

Please notify CRRL of you plan to attend. This will allow organizers to reserve adequate space, and enable them to inform you of the exact place of the meeting.

[Signature]

The Restructuring of IARU

The IARU Constitution was last revised about 10 years ago, largely through the initiative of the Radio Society of Great Britain and Region I. The changes to the Constitution at that time recognized the emergence of the regional organizations and their Executive Committees, and more clearly defined the responsibilities of the president. Since that revision, the most noteworthy event that has challenged the leadership of IARU was WARC-79. Under the leadership of the Hq. society and the regional organizations, Amateur Radio prepared well and successfully for that conference. Nevertheless, despite the high quality of the preparation and the successful outcome, there were a number of societies whose officials believed that more of the decision making should have

been accomplished through a different process.

Past IARU President VE3CJ formed a Restructuring Committee, whose members comprised the Executive Committees of the three IARU regions. After three years of exchanging views, and after in-person discussions at a number of regional conferences and Executive Committee meetings, there has emerged a common view that the policies of the IARU ought to be decided upon by an Administrative Council, which would consist of the officers of IARU plus two representatives from each region. This concept has now been put to the membership of IARU through a formal proposal, which was mailed to all IARU members on June 30. The membership of IARU has, in accordance with the provisions

of the Constitution, five months to vote on this proposal.

A number of other changes ought to be made to the Constitution, and the present concept is that upon membership approval of the Administrative Council that body will meet and prepare additional Constitutional changes, which will then likewise be submitted to the IARU membership for approval. It is quite probable therefore, that in about a year's time the Constitution of the International Amateur Radio Union will have been extensively revised, and the much-desired restructuring of IARU will have been accomplished. If so, it will be entirely because of the hard work of a dedicated group of IARU officials throughout the world.

SEANET CONVENTION 1982

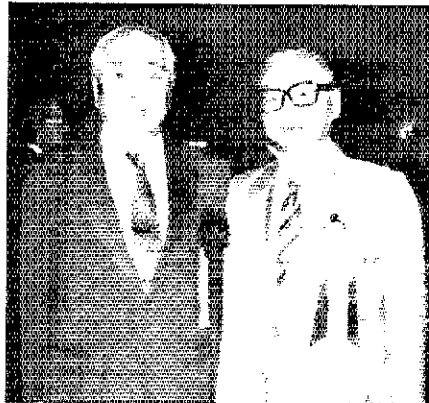
The Radio Amateur Society of Thailand is the host for the 12th annual SEANET (Southeast Asia Network) Convention, to be held this year at the Imperial Hotel in Bangkok. The SEANET meets nightly at 1200 GMT on 14,320 kHz, providing a wide variety of communications services, both emergency and routine, in Southeast Asia. The SEANET conventions have a reputation for outstanding fellowship. If you're interested in knowing more about the 1982 SEANET Convention, write to the Radio Amateur Society of Thailand, P.O. Box 2008, Bangkok, Thailand.

THE CARIBBEAN EMERGENCY NET

The Caribbean Emergency Net operates independently under the auspices of IARU Region II, providing a valuable service in a geographical area frequently subject to such natural phenomena as hurricanes. The net operates at 1500 GMT on Sundays, on 14,185 kHz, as well as at other times, and the net director is Steve Dunkerley, VP9IM, Uppington, 5 Rockville La., Pembroke 5-61, Bermuda. Contact him if you'd like additional info.

JA1AN HONORED

On June 1, 1982, which was designated "Radio Day" in Japan, Shozo Hara, JA1AN, was honored by the Ministry of Posts and Telecommunications of Japan. Minister Noboru Minowa presided at a testimonial for



Shozo Hara, JA1AN (left), president of the Japan Amateur Radio League, with Mr. Noboru Minowa, Minister of Posts and Telecommunications of Japan.

Mr. Hara in recognition of his years of service in the development of telecommunications in Japan. We are pleased to join in this salute to Mr. Hara and his accomplishments. In yet another recent event, Mr. Hara was elected to serve as president of JARL for two more years.

WEST GERMAN LICENSES

Last month in this column we pointed out the oh-sensible arrangement for reciprocal permittees in the Federal Republic of Germany, whereby they send their call signs as, for example, DL/W4KFC. We were reminded by DARC liaison DJ6TJ that apparently many visitors to Germany are not aware of the procedure to be followed in obtaining a short-term license. Briefly, six weeks before your visit you should make application via the DARC office of International Affairs, Postfach 1155, D-3507 Baunatal 1, Federal Republic of Germany. You should include the following information: (a) nationality of applicant; (b) first name and surname; (c) date and place of birth; (d) home address; (e) your call sign and class of license; (f) the dates of the three-month period for which you desire the license; (g) the German location at which you intend to operate or, if applicable, the registration number of the motor vehicle you will be using; (h) the address to which the license document is to be sent; (i) confirmation (i.e., photocopy of payment slip) that you have sent; a license fee of 15 DM to Postal Check Account No. 5613-430 at Postscheckamt Essen, BLZ 360 100 43, for DARC International Affairs, D-3507 Baunatal 1; (j) photocopy of your amateur license; (k) in what national amateur society you hold membership.

We have printed these instructions in some detail because of the number of North American amateurs who visit Germany. The Hq. also has information on how to obtain short-term (reciprocal) licenses in many other countries. If you're planning a trip overseas and want to operate your amateur station while you're out of the country, drop us a line for the latest information that we have.

David Siddall, K3ZJ (center), president of the Capitol Hill ARS, presents Keizo Obuchi, J11KIT, a member of the Japanese Diet (parliament) and president of the Diet ARC, with a certificate of honorary membership in W3USS. (photo by N4CFI)

QST congratulates . . .

□ Armin Meyer, W3ACE/ex-JH1YDR, on receiving the Order of the Rising Sun, First Class for his long and distinguished service as U.S. ambassador to Japan.

□ Captain Bernard Skoch, NH6I, of the Pacific Communications Division, Hickam AFB, Hawaii, on receiving the Air Force Communications-Electronic Professional Award for his technical expertise, professional competence and dedication to duty.

Strays

INTERNATIONAL LISTENING GUIDE AVAILABLE

□ Amateurs equipped to receive shortwave broadcasts may be interested in the *International Listening Guide*, published four times a year by DK9FI. The publication lists times, frequencies, target areas and program information for English-language news and other broadcasts. A free sample copy of the latest issue is available for return postage: 1 IRC in Europe, 2 IRCs elsewhere. Send to Bernd Friedewald, DK9FI, Merianstr. 2, D-3588 Homberg, Federal Republic of Germany.



YL News and Views

Conducted By Jean Peacor,* K1IJV

Celebrity from Worcester, Massachusetts

Worcester, Massachusetts, was recently the scene of a day of celebration. An exciting day it was for Gayle Sabonaitis, WA1OPN, since during the course of events she was presented with the "Key to the City," as well as being presented the Richard Kinney Challenge of Living Award by Mayor Sara Robertson. This was not Gayle's first reason for celebrating in 1982. She became an Extra Class licensee in March.

Gayle has been blind since she was 1-1/2, deaf since she was 15. An incurable nervous disorder restricts her freedom of movement, limiting her, at best, to a wheelchair. She demonstrates daily courage, and doesn't believe in the word "quit."

Amateur Radio entered her life as the result of writing a term paper for an English course while attending Perkins Institute in Water-

town, Massachusetts, in 1968. She chose radio and communication as her paper's subject. Two years later, she had her Novice license; Technician in 1973; General the same year; Advanced, 1975; her Extra Class in 1982. Special arrangements were made with the FCC for Dr. Sosnow, W1KY, to be her examiner for the Extra Class examination. Dr. Sosnow asked her the questions by tapping Morse code on the back of her hand. Gayle can communicate easily using Morse code. She also has the ability to speak, and can converse with anyone by placing her fingers on lips and the side of the throat, where she feels vocal chord vibrations. This allows her outside world adaptability.

Gayle lives in Worcester with her mother. Her home station consists of a transducer, which enables her through its vibrations to copy Morse code. She uses a Morgain antenna, an end-fed doublet dipole, up 60 feet on the

roof; this arrangement is necessary because of her location. It works fine with her present transmitter and receiver, but refuses to work with a solid-state rig that she would prefer to use. She would be most grateful to hear from anyone with information that might solve her antenna problem for the solid-state rig. Experience has taught her that trying to use it as it produces burned out finals in a hurry.

Gayle works in a local toy factory, loves music (which she can interpret through vibrations), writes poetry (Japanese Haiku), and is now teaching ham radio to two deaf-blind friends. Her first six years of hamming were spent on 40-meter cw. She then became active on WMN (Western Massachusetts Net), and 80 meters is now her favorite band. The key to the city is now hers, but the key to special insights in life has been Gayle's for many years.

RESULTS — DXYL TO NAYL CONTEST

Phone	CW	
<i>DXYL</i>	<i>NAYL</i>	<i>DXYL</i>
DJ2YL Gold Cup	WD4NKP 11M0 Gold Cup	KA3CUF
DJ2YL Second Place	WD5FOX DJ2YL Second Place	WA2NFY
5Z4CM Third Place	KA3CUF VK3KS Third Place	VE6AUP

Plaque Winners (Combined Scores)

<i>DXYL</i>	<i>NAYL</i>
DJ2YL	WD5FOX

Phone
DXYL
D10EK, 4760; DJ2YL, 3780; 5Z4CM, 3300; LX1TL, 2887*; DJ1TE, 2565*; OX3ZM, 1560; VK3KS 1290*; FSRC, 1250*; DL2SAP, 1140*; OK2BBI, 997*; G4EZI, 973*; DF3AO, 570*; ZL1BIZ, 531*; 11M0, 420; DL3LS, 312; VU2UGI, 240*; DL3SAR, 220; VK2NQL, 210*; ZL1BOR, 178*; DL8ZAR, 135*; DF6UL, 60*; PA3ADR, 9

NAYL
WD4NKP, 1485*; WD5FOX, 1062*; KA3CUF, 910*; KBBRT, 647*; VE6AUP, 617*; KM8E, 426*; KA2EAY, 330; WA2NFY, 310; WA2EFG, 300*; AK1R, 250*; K0EPE, 220; KB0TK, 220*; N1AOZ, 192*; W4DEV, 160*; WB9TDR, 144; KA2ESQ, 131*; WA8VXE, 131*; KA9ELB, 100*; K8PXX, 96; WB1EHS, 50*; WA8EBS, 40*

CW
DXYL
11M0, 364; DJ2YL, 338; VK3KS, 146*; DL2SAP, 105*; DF6UL, 96*; OK2BBI, 70*; LA6ZH, 52*; OK1ARI, 31*

NAYL
KA3CUF, 118*; WA2NFY, 108; VE6AUP, 87*; AK1R, 68*; KM8E, 56*; WD5FOX, 10*

*Low-power multiplier

CONGRATULATIONS TO WA4ZMA

At the 57th annual meeting of the Greensboro, North Carolina, Out-Our-Way Garden Club, Alice Wicker, WA4ZMA, received their Maslin Award. This highly

competitive award is given to the individual who has done the most to promote the work of the garden club in North Carolina.

YL NET DIRECTORY

Day	UTC	Frequency	Name of Net
Daily	1600	14.332	YLISSB System
	1600	14.336	County Hunters
	1700*	7.261	SPARCYL
	0200	3.943	County Hunters
	1300*	7.260	Shirts and Skirts
Mon.	1345	28.650	PIYL
	1400	3.922	UPYL
	1400	3.950	Buckeye Belles
	1400	3.980	WISYL
	1630	147.60/00	TRI-Larcs
Tues.	2200*	3.915	Honeybee Net
	0030	7.275	YLISSB System
	0100	3.973	Buckeye Belles
	0130	3.775	CLARA (4th Tuesday)
	0920	14.332	YLISSB System
Wed.	1400	3.933	Floridoras
	1500	7.288	Coffee Cup Net
	1530*	3.670	MINOW
	1700	7.235	Ironing Board
	1800	14.295	QCWW
Thurs.	1900	14.160	CLARA
	0030	7.275	YLISSB System
	0230	7.130	LARK
	1230*	3.910	Yankee Lassies
	1400	3.720	Novice CW Net
Fri.	1700	3.955	Gaylark
	1800*	14.288	YL Open House
	0100	3.926	YLISSB System
	0920	14.332	YLISSB System
	1300*	3.950	TASYL
Sat.	1400	3.940	TYLRUN
	1500	21.373	YLISSB System
	1800	14.295	Tangle Net
	0030	7.275	YLISSB System
	0300	146.13/73	Pinal Mt. YL Net
Sun.	0400*	3.933	Working Girls Net
	1300*	7.260	TASYL (1st Friday)
	1400*	3.945	SAYLARC
	1400	7.270	Midwest YL
	1500*	3.913	MINOW
Sun.	0300	14.332	YLISSB/ZL-VK System
	1400	3.910	Hawk Roost
	1400*	7.240	SAYLARC
	1600	14.332	YLISSB System
	2000*	3.770	Ontario Trilliums
Sun.	0130	7.275	YLISSB System
	1430	3.990	Western Pennies
	1500*	28.673	(1st Sunday)
	1600	14.332	YLISSB System
	1600	14.332	YLISSB System

*Country Club Dr., Monson, MA 01057

*One (1) hour later during winter (Standard Time)



Lenore Jensen, W6NAZ (left), and Ellen White, W1YL, QST "How's DX?" editor, were two of the guest speakers at the YLRL June convention, held in Washington, DC. Lenore's opening line, "I've come here to talk to you about ERA," quickly captured her audience. Her definition: "Enthusiastic Radio Amateur." Ellen revealed secrets for DXing that should find the DXCC lists growing by leaps and bounds.



The YLRL convention provided the opportunity for an international exchange of thoughts and ideas. Left to right are VU2UGI, PA3ADR, PA0ADC and VE3MR (in background).

EXAMINING PROPOSAL FEEDBACK

June's In Training column, page 79, detailed the League's proposal to restructure FCC examination procedures and asked for input from you, the League member. Response was spirited, and evident in each reply was the rallying cry, "Maintain the integrity of our amateur license."

Your greatest concern was about the League's proposal that for Technician and higher class license examinations the FCC certify organizations to in turn certify volunteer examiners to administer all tests except the Novice around the country. Under the proposal, the certified examiner must be at least 18 years old and must be an Extra Class licensee. Further, three certified examiners must be present at the examination, and all three must sign the applicant's 610 form. These provisions would keep the examination procedure honest and aboveboard. Many of you, though, took exception to the requirement that only Extra Class licensees be certified as volunteer examiners. Comments included these:

"The ARRL is making a serious mistake in its assumption that Extra Class amateurs have a corner on integrity."

"Some amateurs (Extra Class) who are giving volunteer exams even now are using questionable tactics."

"One does not have to be an Extra Class license holder to be honest. Recently the FCC 'lifted' some Extra Class licenses for obscenity."

"I see no reason why Advanced class hams shouldn't be used for Advanced and lower class licenses. Besides, to administer a test takes nothing but personal integrity anyway. I don't think it takes a genius to open an envelope and watch for cheaters."

Others saw a different implication in the Proposal.

"It seems to me that this is overkill in the pursuit of security. It almost implies that a guy who holds an Amateur Extra Class license can't be trusted on his own."

"I don't like the idea of anyone except the FCC giving the Extra Class examination. While it is a pain for some people to get to an FCC examination, the top license should be worth the effort. Credibility would therefore be added to our program in that all examiners would have passed the top amateur test administered by the FCC."

There was, however, some optimism and faith among respondents about the "Extra Class" provision.

"I believe in the integrity of our amateur fraternity, and any Extra Class ticket holder would uphold the honor of his office by his care and honesty as an examiner."

A few respondents shared suggestions of their own.

"In addition to your suggested criteria for appointment as a volunteer examiner, how about a tenure in ham radio of say 10 years or more? This would preclude propagation of poor testing practices through a group of people. In addition, most hams who are active enough to be interested in being a volunteer examiner after being a ham for 10-20 years have developed a strong concern for the future of ham radio and thus would be less likely to allow unqualified people to pass an examination."

"I am 15 years old and hold an Extra Class license, and I don't see why I would be less qualified to administer an exam than someone who has been an Extra for 10 years. If a person works hard to get a license, he should always be entitled to all of the privileges that

accompany that license, both on the air and off."

There are several reasons for the proposed provision that only Extra Class license holders be certified as volunteer examiners. H.R. 5008 (see Happenings, April 1981 QST, page 69) states that a volunteer examiner must have a higher class license than the class of license test that he or she is giving, except in the case of Extra Class. [As this is written, H.R. 5008 is awaiting action on the floor of the House and reconciliation with S-929, a similar bill that was adopted last September. — Ed.] The League proposed that only Extra Class hams be volunteer examiners so the examiners could give all types of license exams. Otherwise, Advanced class examiners could give only General class exams.

That position does not imply that only Extra Class hams are honest. Rather, examiners will avoid suspicion of conflict of interest if they are Extra Class hams because they will never see a test that they themselves might someday take. Also, with over 30,000 Extra Class hams in the U.S., there should be no real problems in implementing the proposal.

The League also proposed that to protect the integrity of exam questions, a bank of at least 500 questions be set up for each exam. A certified organization would then create a number of tests of 50 questions each from the bank, selecting items proportionately from each of the categories in the FCC Study Guide. Many respondents focused their concern on this area.

"It wouldn't take long till the 500-question pool was in a book form and readily available to anyone with the price of a manual."

Others took that same assumption one step further.

"In my opinion, getting a bank of 500 or more questions and choosing them more or less at random would help eliminate the present problem of the books that tell people exactly what the answers are to present questions. If a person would memorize the answers to 500 questions, he would deserve to get the license."

"With the right approach and subject coverage, anyone who memorizes the answers and applies what was memorized would be a first-rate ham in his class . . . if the examination system is designed to be comprehensive and to require knowing the answers to a large number of questions."

Practical-minded respondents expressed enthusiasm for one of the purposes of the League's proposal — greater opportunities for taking amateur examinations.

"The idea sounds good to me. For instance, my husband is still a General class licensee because he would lose a day's pay plus render a hardship on the company he worked for, and then there is the trip to take the exam. That spells bucks!"

"I am afraid that not enough concern is presently being given to us poor souls who live 150-200 miles to the nearest examination point."

"Upgrading is becoming increasingly difficult, especially for us senior citizens, not only because of the costs, but also because of the long distances to travel with the possibility of additional trips due to exam failures. Working applicants must take time off from their jobs. Many applicants live in remote areas, far from exam centers. If the exams were given in familiar surroundings, much of the nervousness attached to taking the tests would be decreased."

The majority opinion of those who responded expressed (mildly or blatantly) reservations toward the League's Proposal in toto.

"Sorry, I can't go along with the idea. I don't think we can test ourselves any more than we can police ourselves. I worked very hard to get my license, and I hate to see all the hard work and fun that I have had go down the drain. It is easy enough for someone to

get a license now; we don't need to make it any easier."

"Please let me know as soon as possible if it comes to hams giving hams tests. I will get rid of my equipment before it's too late. In all fairness, the majority of tickets will be earned, but there will be a percentage 'given away,' and it's that percentage that will do a favor 'in return' when he gets the chance."

Nonetheless, several inescapable facts remain. Foremost is that something must be done or we will find that relatively few FCC testing sites (if any!) will continue to offer exams — perhaps even as infrequently as every three months! The money isn't in the upcoming fiscal 1983 budget; without the money, the staff of the FCC will shrink dramatically. In fact, the reduction began some time ago — much less money, many fewer people, many fewer test opportunities. It's as simple as that.

In its volunteer examiner proposal the ARRL stressed the integrity of the licensing program. In no way will earning a license be easier. What will be easier will be finding testing opportunities. Exams will be both more frequent and closer to where exam takers live and work. Scheduling will be easier; the test itself will not be.

Does the proposal intend to maintain the integrity of the licensing program? No! The ARRL's intent is to restore the integrity of the licensing process. The examination procedure is now compromised. Let's not kid ourselves. The few exact questions and answers that are used are published.

Would the large pools of questions be published eventually? Probably. In fact, they could conceivably fall within the public domain from the outset. If the questions represent the material that must be known for a given license class, as specified in the FCC Study Guide for that class of license, and if the questions cover the proper areas thoroughly and in the proper depth, having access to them beforehand and determining the correct answers would represent learning the material. Any pool of questions will meet the stated criteria, or they won't be approved. Only those few students with "photographic memories" could handle so large a collection of questions and pass the test without having learned something about rules, regulations and radio. Is there a better way that is both practical and realistic, given the inescapable facts?

It's time to ask ourselves these and other penetrating questions. Are we amateurs steadfastly against change even in the face of inevitable government cutbacks and the ensuing differences in examination procedures? Should we concentrate less on emotional reactions to the proposals and more on the specifics and results involved?

One thought from you emerged loud and clear: We must work to restore the integrity of the amateur license. That integrity, however, must be resurrected in light of inevitable changes in our licensing system. These responses sum up the situation:

The Licensing Proposal . . . appears to be quite good, and I would hope that such a system would function in practice as well as it looks on paper. I support efforts to uphold the integrity and quality of Amateur Radio."

The comments concerning restructure of FCC examination procedures for licensing . . . as suggested by the ARRL are quite good. However, the ability to maintain the integrity of the volunteer testing program cannot be stressed too much. The entire reputation of the ARRL and the amateurs of this country are on the line regarding this proposed program. I do not believe that this importance to integrity can be emphasized enough." — Carol L. Smith, AJ2I, and Steve Place, WB1EY

I would like to get in touch with . . .

any old-timers who would be interested in participating in a project to record and preserve a cassette-tape history of early radio. Andy Clark, W4IYT, Florida Skip OT Library, P.O. Box 501, Miami Springs, FL 33166.

anyone interested in the Tesla Coil Builders Association. Send an s.a.s.c. to TCBA, RD 3, Box 181, Glens Falls, NY 12801.

Strays

RELIGIOUS INSTRUCTION

Is Luke 14:28-29 still used in the instructions for building an antenna? — Robert F. Jambor, New Brunswick, New Jersey

SCOTTY, PREPARE TO BEAM ONE UP

Let me quote from the 1982 *Radio Amateur's Handbook* (page 1-2): "But if there is ever such a thing as a Star Trek transporter unit, hams will probably have them!" That is a reasonable prediction, but in another sense you are already several years too late. At one time or another, the following hams have been involved with the *Enterprise* transporter on the old television series: N6AKY, W6DVZ, W6EJH, K6IKL, WA6MOS and N6VL. — Jim Rugg, W6DVZ, Los Angeles, California



Happy 25th Anniversary, NJDXA!

In September of 1957, 15 DX-minded New Jersey amateurs, comprising the North Jersey DX Association, began a distinguished career by submitting a proposal to ARRL General Manager John Huntoon to operate the ARRL 2nd District QSL Bureau (then averaging about 25,000 incoming cards monthly). NJDXA thus became the first organized club to handle one of the bureaus, a function performed previously by individuals.

The first club meeting in 1957 elected Ben Stevenson, W2BXA, as president, and membership increased rapidly to 30 — and then to the current maximum limit of 45 active members, plus 15 senior members. (Each active member is responsible for monthly distribution of incoming DX QSLs, sorted on a alphabetical-letter basis to participating 2nd District Bureau users.) This activity has continued throughout the intervening years and remains the outstanding contribution by this club to the DX fraternity — with a current card volume approaching a half-million DX QSLs yearly. The guiding spirit of this bureau in past years, as its manager from 1965 to 1982, was "The Digger," Vic Ulrich, WA2DIG. More recently, Joe Painter, W2BHM, assumed responsibility for managing the veritable avalanche of incoming pasteboards.

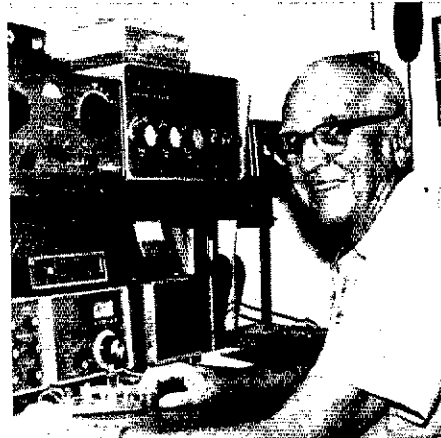
Readers of this column have found DXing to be a rewarding aspect of our beloved Amateur Radio. This endeavor becomes even more meaningful when you return something back into the "well" that those intangible rewards are derived from. NJDXA has done this in noteworthy fashion, all in addition to their outstanding ARRL QSL Bureau service.

The following list is just a partial compilation of many club member "firsts" and contributions:

- Donation of two plaques for All-Band-World Top CW and Phone Scores in the annual ARRL International DX Competition.
- Achievement awards for amateurs world-

wide for special contributions to the advancement of DXing and for working NJDXA members (including this year's special 25th Anniversary Award).

- ARRL DX Advisory Committee service, past or current, by W2FG, K2BZT, W2QM.
- Hosting of visiting DXers at regular monthly meetings and annual dinners, picnics and DX roundtables.
- Providing the legendary NJDXA hospitality suite at the annual Dayton Hamvention.
- Regular DXpeditions to FS7 and FP8, among others.
- Financial contributions to various DX-peditions.
- Service at 4U1UN for several years as QSL Manager (W2MZV) and operator (W2TO).
- SCM Field Organization service by W2ZZ and W2RQ.
- CQ Magazine Awards Column by member W2GT.
- Many services to the Antique Wireless Association by W2GK and W2LV.
- W2LV (then 2CQZ) establishing one of the first transatlantic QSOs with 8AB of France, after Schnell and Reinartz in 1923.
- W2BXA achieved WAZ no. 1 in 1947.
- Of the five OSCAR DXCC Awards issued to date, three have been earned by club members W2BXA (no. 1), W2LV (no. 2) and WA2CBB (no. 5).
- OSCAR WAS awards earned by W2RS, W2BXA, W2LV, WA2CBB and W2YY.
- Frequent ARRL Hudson Division Convention and National Convention programs on DX, OSCAR, the ARRL QSL Bureau.
- Hudson Amateur Radio Council (HARC) participation by W2TP (president), W2QM, W2MT and others.
- 29 club members have earned positions on the DXCC Honor Roll, and over 20 club members have merited 5BDXCC.
- The first two-way by satellite-to-satellite relay was accomplished by W2RS (K2QBW)-



Undenably the guiding spirit of the W2 ARRL QSL Bureau in past years and the epitome of the service aspect of the NJDXA, is Vic Ulrich, WA2DIG, "The Digger." (W2TO photo)

W2BXA, 1975.

- Early 1296-MHz moonbounce work by the Bell Labs group, which included member W2FZY.
- 160-Meter DXCC by W2DEO.
- 100+ countries worked via QRP by W2TO.
- 365 countries confirmed by W2AGW and W2BXA.
- 60 years continuous amateur licenses held by W2TP and W2LV.
- An early 50-MHz WAS earned by W3CWG (then W2RGV).
- The first CQ OSCAR DX Award won by W2RS, 1975.

Happy anniversary, NJDXA — an ARRL affiliated club setting a standard for service to Amateur Radio and excellence of member performance.

NJDXA SILVER JUBILEE AWARD

Work members during 1982, the 25th anniversary year. October will be the NJDXA "activity month," with members on the air frequently, all bands/modes, favoring the following frequencies: cw, up 35 kHz from the low edge; phone, 3880, 7280, 14,280, 21,380, 28,580. The award is free. Contacts required: for USA (the continental 48 states), 25 members; DX, 15; and OSCAR, 5 (DX only). All bands/modes. Send log data to: Ed Berzin, W2MIG, 47 Palisade Rd., Elizabeth, NJ 07208.

Members: K2s AGJ AIO BZT CM DSV RW YJ, W2s AGM AIW BHM BOK BXA DEC DIE FG FP FZY GK GT GUM GW GZZ HTI JB JLH JVV LNB LPE LV MIG MJ MS MT MZV NZG OEH OKM PK QM RQ RS SM TO TP TQC YD YY ZZ, WA2s CBB DIG ELS, WB2CEI, N2s DH JD, AI2K, W3CWG, W8RT.

A random drawing of award winners will determine the winner of the special club trophy.

THE CIRCUIT

Vhf: K1FJM operated from Antigua as V2ADX during the June VHF Contest, and as K1FJM/V2A during the remaining periods. Pete's island QTH was the Castle Harbor Motel, atop a 144-ft hill overlooking everywhere. QSL to his W1 *Callbook* address, via WB4OSN, or direct to Pete Hein, 19570 SW 264 St., Homestead, FL 33031.

Happy news: John and Sheila Strafull are active again as 8P6QI and 8P6QK, via Box 167, Bridgetown, Barbados. Anyone still needing a card from John's previous operations as 3B8CV, VP2DB, J7DB or J73B may use the above address.

VU record: W2AIW reports an enviable total of well past 1000 two-ways with India. Not a bad VU head count for the U.S. East Coast!

Ghana: About the time you read this, Larry, 9G1DJ, should have arrived stateside. He notes that all hamming, listening, QSLing, etc. is banned in Ghana. During a military search, all his QSLs and logs were confiscated. The good news is that copies of his logs were sent home. Anyone still needing his card should drop him a note at: Larry Rymia, 9G1DJ, Rte. 2, Box 303, Joquin, TX 75954. At this writing, there appears little hope for reestablishment of Amateur

Radio activity in Ghana in the foreseeable future.

Operating Aids: John Presley Software has been expanded to include DXCC Country Checklist, 5BWS Checklist, DXCC-country-name cross reference, WAS Checklist and DXCC Track Sheet. Full details from WD0EAO at Rte. 3, Box 117, Lebanon, MO 65536.

IR0: The May-June operation commemorated the centenary of the death of Giuseppe Garibaldi, "Hero of the Two Worlds," with Sardinia as the locale. QSL manager for the IR0ARI stint is IS0LLJ.

Roger, DA2CK, operated /HB0 in June. QSL to KA2JFY.

WB5DD1 has had no luck prying a card out of I2YAE for late-1980 two-ways with 600DX. Any tips?

QSLs for KA6ISE/CX (April '80-Jan. 8, 1982) should be sent (with large-size s.a.s.c.) to Jim Gordon, 8515 Farrell Dr., Chevy Chase, MD 20815.

VR1P, MP4BJI, MP4BEU — contacts in the late '60s; QSL information desired by George Armstrong, WA9URY/KM9J.

A new DX club has been formed in the SW suburban area of Chicago — the "Metro DX Club." It meets 4th Tuesday monthly at 8 P.M. in the basement of the Nurses Residence, Oak Forest Hospital, Oak Forest. Interested in DX? You're welcome to attend.

More information from Pres. K9UAA or Secy.-Treas. KB9LC.

□ G5DSD apologizes for card delays for his early spring GUSDSO stint. Cards should be received from the printer soon, and manager WA4WPO has promised speedy service. Look for GUSDSO from Guernsey before/after the late October CQWW, and G5DSD (Jersey) during the contest. Linda (WA4WPO) may join G5DSD for the fall trip, if plans jell.

□ Happy news via WIAW in early July: A third-

party agreement is in effect between the U.S. and Australia (check this month's Happenings column, and June 1982, QST, page 90, for the balance of countries with which the U.S. has such agreements).

□ The Amsterdam section of VERON, the Dutch society, has introduced an English translation of their Award and Certificate Guide. The price is modest, and any profits will go toward purchasing a new transceiver for their club station, PA6RCA. Outside EU, the booklet goes for \$4 U.S., via VERON, Box 9, 1000 AA Amsterdam, The Netherlands.

□ W9CN went back to ZD8JGN, 5/27-6/2/82. As before, cards should go to John G. Nauman, W9CN, 420 Patrick Ave., Merritt Island, FL 32952 (his home QTH). He hopes, also, to visit VP5JNX for short stints during the balance of this year.

□ If you heard a spectacular amount of French Polynesian activity the week of July 14, attribute it to their Fete, which coincides with the French Bastille Day. Unfortunately, details arrived too late to announce anywhere, but if you did contact three stations in French Polynesia on at least two different bands (ssb) July 15-21, send log data and 12 IRCs to "Special Tirac '82 Award," c/o FO8HL, B. P. 5006, Pirae, Island of Tahiti, French Polynesia, South Pacific. This will be an annual event, says WB6GFJ/FO8FB. *Maururu roa!*

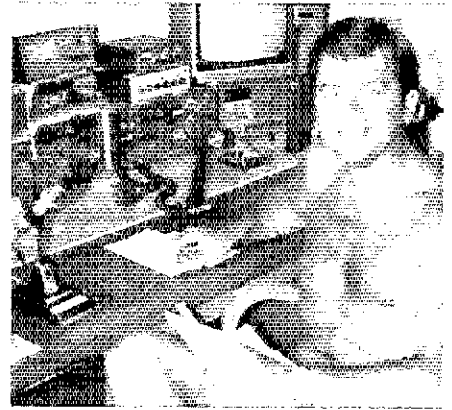
□ The Delta DX Association currently manages QSLs for: AH4AA; FG7TD (22 Dec. '69-16 May '72, 5 June '78-6 Sept. '79); KM6BI (8 July '78-30 Mar. '80); KM6FC (Midway only); OY8KH; S2BIF; TL8s CN JM WH; TR8s AC GDC; VP2A (Mar. '75, only); VP2LGR; VO9JJ; VU2DUE; WD4CEM/KH4; WH4s AAA AAA/KH7 — all via W5RU, Box 73, Metairie, LA 70004.

□ As of the beginning of this year, Austrian hams received a new 160-meter allocation: 1830-1850 kHz (cw only). They send regrets that they cannot operate in the "window" of 1825-1830 kHz.

□ VK3ANL, Darel Coolidge, is now KC7TE.

□ VK9NL, Kirsti from Norfolk, planned an interesting summer visiting East Malaysia, 9M8.

□ Whet your appetites with the news of the 12th annual Southeast Asia Network Convention, to be held in Bangkok Nov. 12-14. All kinds of interesting events

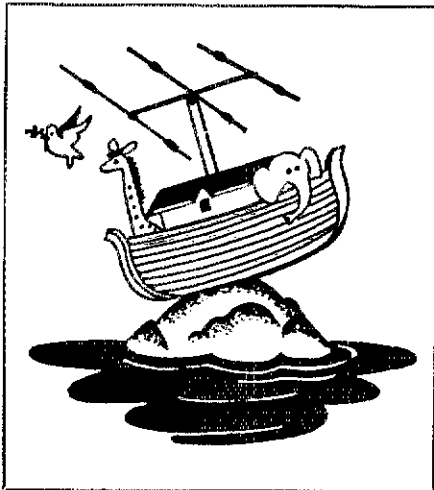


Sanford Hutson, K5YY, has something to smile about as he compiles the more than 7000 contacts he made on his most-recent DXpedition to St. Lucia and St. Vincent.

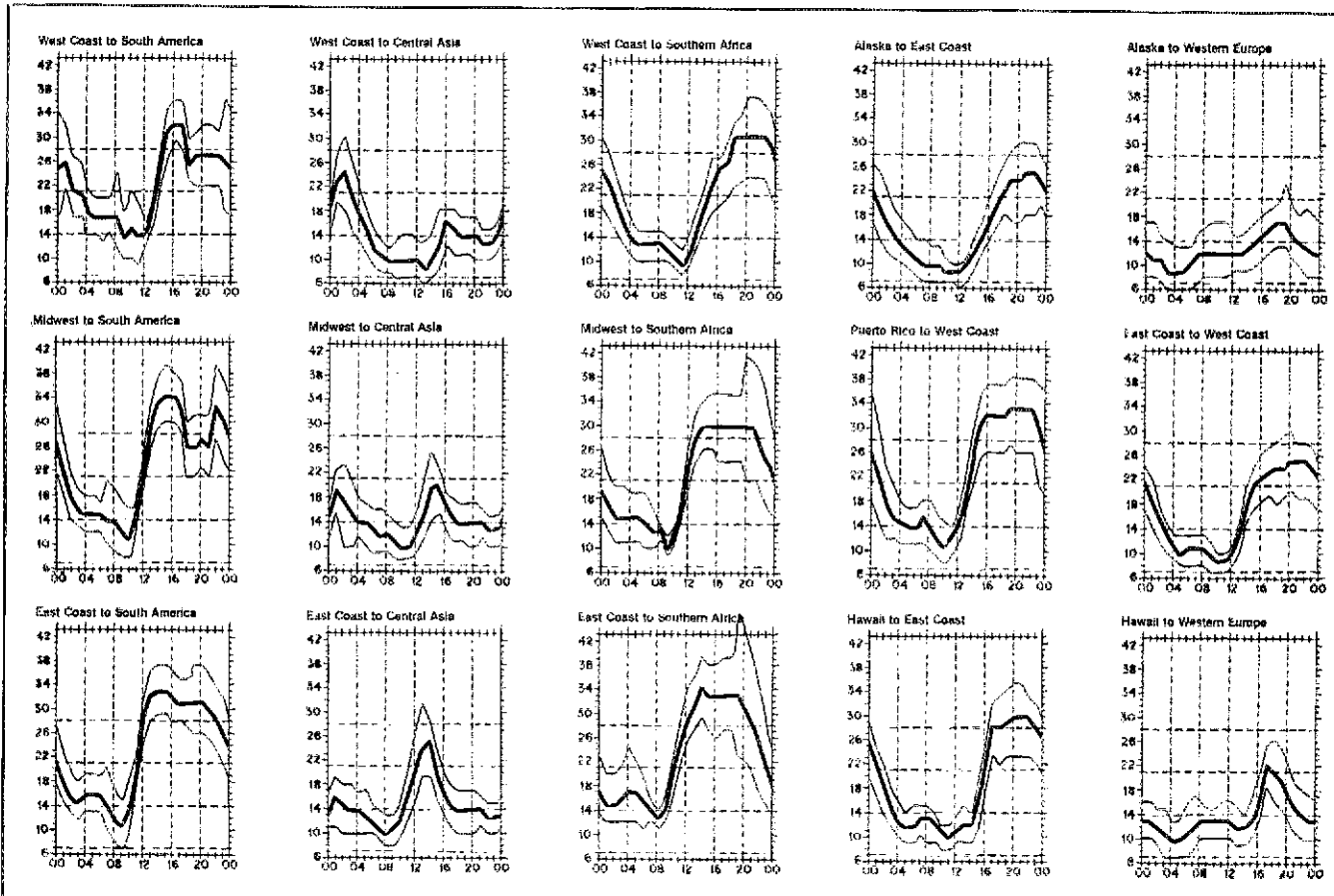
are planned for SEANET attendees. Airmail your request for further details to RAST Secretary, Box 2008, Bangkok, Thailand.

K5YY ADDS TO DX QSO TOTAL

K5YY/J6, newly reappointed to the ARRL DX Advisory Committee, returned midsummer from a swing to J8 and J6, trip number 9. San made 7050 contacts, lighting up the bands during a rather "dull" June. His objectives were (as with any non-rare spots): low bands for 5BDXCC, and cw for the CW DXCC. He ended up with 55% non-phone contacts, 54% DX two-ways and nearly 40% of all contacts on 80/40.



So far, so good . . . Now all we need is documentation. (Tx The DXer, Northern California DX Club, Inc.)



When are the bands open? These charts predict this month's average propagation conditions for high-frequency circuits between the U.S. and various overseas points. One chart for East Coast to West Coast is also included. On 10 percent of the days of the month, the highest frequency propagated will be at least as high as the uppermost curve (highest possible frequency, or hf). On 50 percent of the days of the month, it will be at least as high as the middle curve (maximum usable frequency, or muf). On 90 percent of the days of the month, it will be at least as high as the

Code contacts actually ran to 68% on St. Vincent. These 7000 contacts put his total DXpedition QSOs (since 1970) to 73,000+. San still hopes for S2 Oct./Nov., pending stabilization of the political climate, or PY0.

may send SWL cards to foreign amateurs. QSL managers: write for details.

Requirements

1) Presort your DX QSLs alphabetically by call sign prefix (A3, AP, C6, CE, F, FG, G, GI, GM, JA, 3A2, etc.).

2) Enclose the address label from the brown wrapper of your current copy of QST. This information shows that you are a current ARRL member. Family members may also use the service by enclosing their QSLs with those of the primary member. Include the appropriate fee with each individual's cards and indicate "family membership."

Sightless members who do not receive QST should indicate that the QSLs are from a "sightless member."

ARRL affiliated club stations may utilize the service when submitting club QSLs by indicating the club name. Club secretaries should check affiliation papers to ensure that membership is current.

3) Enclose payment in the form of a check, money order or cash. Sending large amounts of cash through the mail is not suggested. Please do not send stamps.

FO0JD P.O.B. 85, Papeete, French Polynesia
 FR0GGL Box 386, St. Pierre, Reunion
 HH2KR (W4AJX)
 IUBITU (I8MPQ)
 J88AY Box 93, St. Vincent, West Indies
 LX1BI (KB3MC)
 TI2WX (K4WVX)
 T32AI (KE0A)
 VK9ZR (VK2BIL)
 VP2MIX (W0IIN)
 VP5JEX (W4DR)
 VQ9XX (N6BFA)
 YB5AES (W4BBP)
 ZF2BN (W4HET)
 ZK1AF (SM3CX5)
 ZK2VU (DL1VU)
 ZL4GF/C (ZL4KI)
 3B8FK P.O. Box 1080, Port Louis, Mauritius,
 Indian Ocean
 4D9RG (DU9RG)
 4N9I (YU4EFR)
 4S7AJG (K9AJ)
 5H3BH (SM0EAI)
 5N8ARY P.O. Box 439, Kano, Nigeria
 5T5RR (FIANH)
 8Q7BQ (K9AJ)

QSL Corner

Administered by Joan Becker, KA1IFO

ARRL-MEMBERSHIP OVERSEAS QSL SERVICE

Send outgoing cards to this address: American Radio Relay League, 225 Main St., Newington, CT USA 06111.

This is an "outgoing" service that allows ARRL members to send DX QSL cards to foreign countries at a minimum of cost and effort. While QSLing direct to foreign amateurs is faster, it is also more tedious. Time spent searching for addresses in the foreign *Callbook*, addressing and stuffing envelopes, and mailing could be better spent operating DX. And, the cost of IRCs, airmail postage and envelopes can be prohibitive.

An unlimited number of QSLs may be sent for distribution 12 times per year. The fee is just \$1 per pound or portion thereof (155 QSL cards average a pound).

The ARRL-Membership Overseas QSL Service operates *only* in an "outgoing" capacity. To receive QSLs from DX stations, see "The ARRL DX QSL Bureau System," in June 1982 QST, page 72, or send an s.a.s.e. to ARRL QSL Bureau, 225 Main St., Newington, CT 06111.

U.S. amateurs may send SWL reports to foreign shortwave listeners. Unlicensed (associate) members

QSL Information

Here is some QSL information for those of you who would like to QSL direct to the station location. It is passed along as we receive it and therefore may not be accurate.

The call sign in parentheses is the QSL manager.

AM03BEN/B (EA3BEN)
 BV2B (K2CM)
 CT2ARA (AG1K)
 C31XO (F6GOW)
 DA1XR (N3BOR)
 EA6JD (EC6AL)
 EA9KQ P.O.B. 21, Melilla, Spain
 FK8CW (K2LJL)
 FK0AF (FK8DD)
 FM7BX P.O.B. 152, Fort de France, Martinique
 FM7CF (WB3AKI)

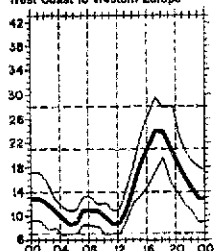
QSL MANAGER VOLUNTEERS

LA4YW WA4ICB

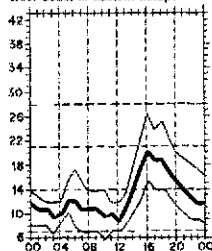
SPECIAL NOTES

- April 1982 QSL Corner listed the 5B4JE QTH incorrectly as P.O.B. 173, Limassol, Cyprus. *Correct* QTH is P.O.B. 1723, Limassol, Cyprus.
- N8BFK is not a QSL manager for any station.
- I2HOF is not the QSL manager for HV2CN.
- June 1982 QSL Corner, page 72, contains information and addresses for the Incoming Bureaus. For information on bureau operations (Incoming and Outgoing) send a self-addressed, stamped envelope to ARRL QSL Bureau, 225 Main St., Newington, CT 06111.

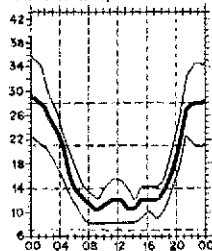
West Coast to Western Europe



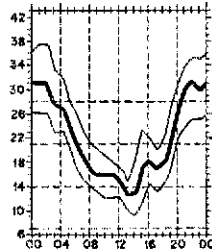
West Coast to Eastern Europe



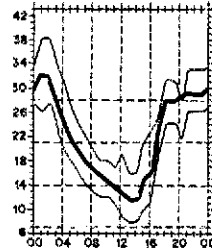
West Coast to Japan



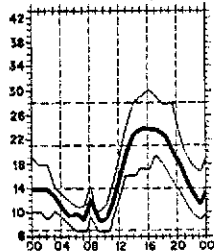
West Coast to Australia



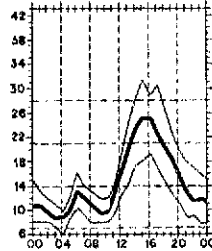
West Coast to South Pacific



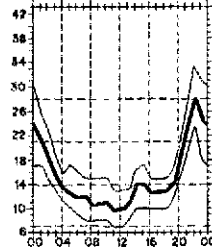
Midwest to Western Europe



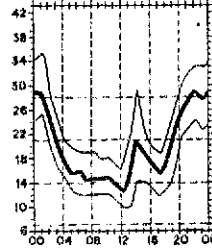
Midwest to Eastern Europe



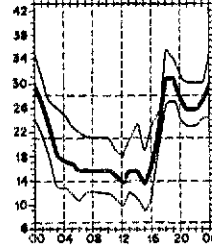
Midwest to Japan



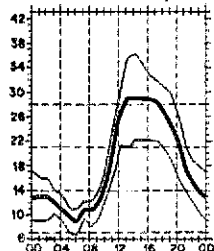
Midwest to Australia



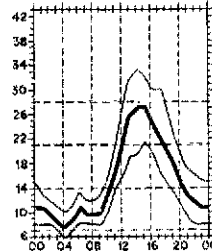
Midwest to South Pacific



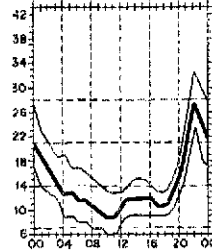
East Coast to Western Europe



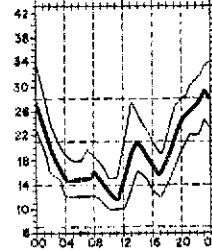
East Coast to Eastern Europe



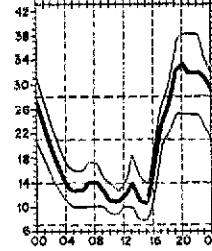
East Coast to Japan



East Coast to Australia



East Coast to South Pacific



lowest curve (optimum traffic frequency, or tot). See January 1977 QST, page 58, September 1977 QST, page 35 and January 1979 QST, page 11 for a complete explanation. The horizontal axis shows Coordinated Universal Time (UTC); the vertical axis, frequency in MHz. Data are provided by the Institute for Telecommunication Sciences, Boulder, Colorado. These predictions, for September 15 to October 15, 1982, assume a sunspot number of 93, which corresponds to a 2800-MHz solar flux of 141.

DX Century Club Awards

Administered by Don Search, W3AZD

The ARRL DXCC is awarded to amateurs who submit written confirmations for contacts with 100 or more countries on the official ARRL DXCC List. You may also submit cards to endorse your award in 25-country increments through 250, 10-country increments through 300, and in 5-country increments above 300. The totals shown below are exact credits given to DXCC members from May 1 through May 31, 1982. An s.a.s.a. will bring you the full rules for participation in the DXCC, the DXCC list and application forms.

New Members

Mixed

A71AD/249 DF1DB/302 DJ2PU/127 DK9OW/109 DL1ER/107 DL1NC/108 EA9GZ/174 E17CZ/104 EL2T/101 F6GBF/112 G4HF5/102 G4LDS/103	H81ALV/122 IS8MVE/179 I9TQC/154 JA1DCL/100 JJ1TEA/171 JA2NBS/152 JH7GFO/102 JA9GEK/122 JH8CP/107 LZ2JE/103 OK1JVX/116	OK3YEB/100 ON4SW/184 ON8HF/200 PY1DF/103 VE3JDO/104 VE4AV/105 VE6AM/107 VE6HH/109 VE7AZO/101 VE7FBA/125 YU3ACA/108	YV5AIE/109 ZL2VS/158 KA1UT/218 KI1Y/101 K2IQK/241 K2JF/206 KA2JMH/108 KE2M/202 KJ2D/104 KE2K/101 WA2ITH/104	WB2GYS/105 AF8E/101 KB3MN/109 N3TA/104 WA3AFS/102 K4FC/100 K4RIG/271 KA4LBD/103 KA4PKB/187 KA4IK/144 KD4YC/163	KE4FR/105 KE4HX/200 KE4QC/145 N4ATP/157 N4DEU/124 N4EED/117 N04UJ/108 WA4CDW/104 WA4GPA/125 WA4ODC/106 WD4GDC/100	WD4BO/183 WD4POF/138 WD4PWT/100 KB5YN/103 N5BL/105 N5DSK/185 K6XZ/100 KA6FBK/106 KD6TH/110 W6EKQ/110 WA6BSS/238	N7CZH/110 AD8I/286 K8EFS/217 KB8MR/263 KB8NW/133 KC8RA/100 KB8Y/107 N8BES/108 N8CFE/109 WB8YJF/100 WD8OTZ/184	WN8GUE/100 K9HLG/203 K9MNT/149 KA9IHG/125 KA9IHH/130 KB9K/104 KB9CG/102 KB9OK/104 WD9JKZ/100 K9HGA/103 W9RQO/109
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Radiotelephone

A71AD/249 E181L/107 CE8BBW/102 DF4JX/105 DH5BAE/117 DJ2PU/113 DK1UT/154 DK9OW/109 EA1JO/137 EA2SG/122	EA7BIV/109 EA9GZ/174 G3RPM/100 G643L/100 H17MBS/105 H81ALV/115 H14J/109 I2KUV/109 I4RXB/204	ISGWO/107 H81BV/104 JF2IGP/110 JH4FOG/100 JA9GEK/122 ON7SD/106 ON8HF/157 PA3AWA/129 VE8VEU/116	VE7FCK/106 YB2BOT/121 KA1BJ/118 K2IQK/241 WA2JGU/100 WA2NBS/121 WA2POW/119 K3SUH/101 KB3H/102	KB3V/102 W3PDF/102 K4RIG/271 KA4PKB/160 KA4QM/100 KA4HX/200 KE4CG/120 N4ATP/136 N4DEU/111	N4DIT/110 W4BL/106 W4KHL/124 WA4AKT/103 WA4ODC/103 WA4SFZ/166 KE4CG/120 WA4ZVK/103 WB4UFP/103	WD4CRG/127 WD4BO/152 N5BL/105 KD6TH/109 N8BRY/107 WB8GUX/103 K7MZZ/107 N7CZH/103 N7PS/107	W7EDA/106 AD8I/277 KB8MR/263 KB8NW/133 KC8NF/105 WB8XC/102 WD8OTZ/181 K9HLG/203 K9BNE/106	K89Q/104 N8BHS/104 WD9OK/106 K9MGA/102 KB6ZD/100 KD8U/110 K9BJ/103 WB9JK/104 WD9BTY/149
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CW

DF9HE/108 DL5BAG/102 EA3BEN/115 F6GXB/121	IS8MVE/113 JJ1TEA/106 JA7IC/130 PA2THD/102	PH1BVY/108 SM1ITJ/104 VE2QO/107 VE5BBQ/105	VP9GD/100 W1WO/114 WB2RAG/104 W3QA/104	K4MG/127 KC4IK/123 KC4UG/102 N4JF/173	N4KG/270 NU4N/108 NV4G/145 WB4FKM/126	WD4EXC/100 K5DYZ/152 KT5A/243 WB6VSK/104	N7BLD/101 W7NEJ/102 AD8I/282 KN8M/114	N8BMC/124 WB8YJF/100 WD8OTZ/104 K8GOO/111
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RTTY

IS#ESS W9HAH

5BDXCC

XE1QX W9PGI HH2VP	K8LZ N5CB	W7IVX JA1JWP	VE1AVX SM4BNZ	ON5SY SM5CLE	N2SS TG9AL	K3TC DF1DB	K3RX K8VNX	N9AV DK2XZ
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Endorsements

Mixed

DF7BZ/252 DL3BK/352 DJ6RX/332 DJ9ON/285 DK8NG/311 DK9F/321 DL3QH/333 DL7JY/287 EA1JO/202 EA3AJT/199 F3CB/277 F6GXB/188 G3JAG/333 GM3LY/217 HB9BF9/232 IIRB/J333 IBSCV/225 IS4DT/235 IT8LJA/298 IT9GO/258 JA1DNZ/182 JE2LQX/200 JA3AAW/327 JA5PUL/310 JA8TR7/203 JA9GPA/254 KL7H/285 LA3X/118 LA8BM/201 OH2BH/343	OH2MB/179 ON4SB/179 ON5SY/315 OZ1FAO/201 OZ2RC/226 OZ7T/324 OZ8BZ/326 PT7WA/272 PY2JSF/201 PY6AZ/176 PY7OD/260 PYZDZ/320 SM1CXE/338 VE3GMT/332 VE3II/312 VE3MJ/336 VE4AB/141 VE7IO/312 XE1ITR/251 YV5DF/322 Z24J/SJ33 ZL1HY/384 ZL3IS/353 ZL3Y/364 JA3AAW/327 JA5PUL/310 JA8TR7/203 JA9GPA/254 KL7H/285 LA3X/118 LA8BM/201 OH2BH/343	N1AKX/286 N1AOZ/271 N1APA/273 W1AM/323 W1CTF/126 W1ELR/339 W1GQ/330 W1GK/367 W1PV/272 W1RLV/307 W1SD/346 W1TN/254 W1VV/310 WB1FSW/228 AF20/282 K2BS/342 K2TW/199 K2UFM/314 K23MT/130 K2ZFM/270 KB2RV/266 KB2VP/196 KN2B/180 N2AWM/166 N2CGB/153 N2DL/305 W2AO/358 W2BBK/289 K1NA/334 KA1KQ/187	W2KN/260 W2NC/340 W2NY/292 W2YC/225 W2MNT/291 WA2NPD/240 WB2AIO/318 WB2SQU/127 G4S3/201 K3NN/318 KC3D/143 KB3AB/175 W3EV/288 WB3YL/248 W3NF/303 W3WGS/282 W3XM/332 WA3HUP/332 WA3YLN/134 AA4CJ/320 AD4F/237 AE4X/351 AE4Z/313 K4CM/224 K4CND/255 K4DY/335 K4EEK/326 K4FJ/339 K4GJ/310 K4HAV/230	K4IR/321 K4ITV/243 K4KJZ/285 K4LJ/287 K4MG/320 K4OAO/140 K4OMU/237 K4RDU/290 K4SE/301 KA4ETJ/150 KA4LRM/129 KB4CD/201 KB4YG/257 KC4CM/304 KC4CT/283 KC4DY/281 KC4LE/188 KC4QT/129 KC4UG/239 KF4H/211 KR4F/259 KU4J/296 N4AI/153 N4CCA/125 N4CD/218 N4CRA/159 N4DSR/206 N4SA/324 N4WJ/311 NC4U/275	NF4U/305 NR4B/234 NX4C/139 W4A1/364 W4DJJ/303 W4DZZ/306 W4IO/300 W4OQ/349 W4OTX/323 W4QM/348 W4RJC/321 W4VN/270 W4WV/352 W4YH/307 W4YKH/308 WA4OXD/232 WA4PSF/226 WA4SZ/229 WB4FKM/130 WB4NDY/311 WB4VMS/184 WB4YOL/178 WD4CRN/142 WD4HFV/153 WD4ILV/158 WB5P/295 WB4GJ/328 KT5A/279	N5RQ/300 K5TA/281 KB5FV/204 N5NO/233 W5GO/353 W5IR/333 W5JC/337 W5KC/384 WB5CRG/272 WB5ZKR/251 AB8R/255 K6JAD/314 K6JB/319 K6RSY/284 K6TMB/229 K6YCM/313 K6ZM/346 NG6S/249 NGCW/338 K8DL/280 WB8YJ/287 WB8G/306 WB8YH/351 WB8ND/274 WB8UM/331 WB8YJ/178 WB8FX/313 WB8GJ/341 W8XS/170	W6ZZ/304 WA6JDB/181 WB6APX/323 WB6NHV/285 WB6YNI/253 K7BR/320 K7EQM/284 K7NO/300 N7BFN/315 W7DH/311 W7ED/302 W7EE/126 W7FY/283 W7ID/227 W7KSG/325 W7CWM/288 WA7OBH/259 WB7WM/249 AD8I/282 N8CWS/315 K8DL/280 WB8YJ/313 K8AT/269 K8DF/207 WB8ND/274 WB8COQ/275 WB8UM/331 WB8Z/327 WB8IO/300 K8MC/251 K8LHA/285	K9RR/226 K9T/202 KA9JKQ/240 KB9M/181 KB9MI/200 KB9OX/181 KCGA/200 KC9AT/225 N9AGB/151 W9CA/370 W9DE/323 W9DY/353 WB9ND/282 WB9TJ/283 WB9IJK/291 AG9A/211 K8CL/312 K8QZ/271 N9ASA/135 W9CAW/315 W9DU/363 K9AJK/230 WB9B/289 K9BF/207 WB9YV/251 WB9UT/230 WA9BNX/131 WB9RSH/199 WB9SAX/253
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Radiotelephone

CT1UA/304 CX4BW/150 DF1DB/300 DF6RP/149 DF7BZ/250 DJ2YL/285 DJ7EV/177 DK8NG/303 DL7GN/227 DL7KY/129 DL8DY/327 EA5DS/202 EA7H/191 F3DJ/345 F5OK/307 F8FVV/200 F8GXK/171 G3KLL/225 G4GEE/175 G5AFA/327 HP1XKZ/229 IIRB/J333 I2RSB/250 IG6A/253 I9EKM/203	HGFP/260 HSGF/253 IS8MVE/163 JH1QJA/254 JE2LQX/181 JA5PUL/303 JH8GWW/251 JA9GPA/201 JT1BG/160 K7TH/277 K8AER/128 LA2TO/177 LA3X/118 LA8BM/171 OE3WVW/324 ON4DZ/356 OZ1HJ/304 PA8HBK/283 PB8DT/259 PY2BU/321 PY2JSF/201 PY6ON/311 SM5VS/282 VE2QO/204 VE3GMT/332	VE3MJ/338 VK9NS/245 VP9CP/289 VP9GD/152 XE1JTR/251 XE1NI/298 YV3AZC/272 YV5DFI/322 ZL1HY/383 ZL3NS/335 ZP3CBL/244 ZS8BBP/321 ZS8RM/345 AD1V/281 K1CMI/312 K1EFJ/256 K1EFS/270 K1GXU/300 KA1KQ/182 W1GKK/347 W1SD/330 W1TN/233 W1VKQ/300 W1WXZ/289 WB1EAZ/253	AF20/282 K2AOR/283 K2BS/338 K2QIL/204 K2UFM/311 K2YI/302 KE2M/200 KB2HZ/264 N2BA/158 N2CGB/153 W2A0/310 W2CKR/282 W2H2/325 W2QVS/339 W2SSC/280 W2Y2/120 WA2LCW/286 WA2SRM/280 WA2WQJ/226 WB2AIO/284 K3DYZ/159 K3AZU/201 W3N/J/129 W3WGS/281	W3XM/331 W3YV/202 WB3GOP/211 W4B/126 W4B/126 W4B/126 K4CS/285 W4CYG/312 W4DJJ/298 W4DQO/258 W4DPS/331 W4EBO/297 W4GJO/151 W4KKP/201 W4LX/350 W4MOM/152 K4YQ/257 K4C/282 K4DY/280 K4NI/157 K4DYC/158 K4E4R/290 K4LJ/225 N4BLX/270 N4CRA/159 N4DRC/186 N4JF/236	N4KG/280 NF4U/297 W4BBL/326 W4B/126 K4CS/285 W4CYG/312 W4DJJ/298 W4DQO/258 W4DPS/331 W4EBO/297 W4GJO/151 W4KKP/201 W4LX/350 W4MOM/152 K4YQ/257 K4C/282 W4YH/284 WA4BM/283 WA4HSE/297 WA4OIB/252 WA4OXD/205 WA4QH/151 WB4CTW/209 WB4GFO/130 WB4NDX/310	WD4HFV/153 K5AQ/320 K5DBM/130 K5MA/125 K5BE/226 N5DSK/184 NSNO/233 W5JJA/322 W5KC/335 W5TJQ/251 W5TJQ/251 WB5CRG/271 W5DDBV/290 K6JAD/314 K6RSY/291 K6TMB/223 K6YCM/312 K6YJ/301 K6SH/237 K6DGN/158 K6DKF/178 WB6AXH/317 WB6HYG/347 WB6G/301 WB6FX/304	W6ZZ/300 WA6DTG/280 WA8RTA/323 WB6ALQ/205 WB6VNI/282 WB6SD/296 WB7G/272 WB7NH/150 WB7YZ/131 WA7CWM/222 WA7KMK/291 WA7OBH/259 WB7WM/249 K8CSG/315 K8YJ/287 K8YCM/312 K8SH/237 K8BVT/280 K8BGN/242 K8BVO/228 WB6AXH/317 WB6HYG/347 WB6G/301 WB6FX/304	W8GJ/298 WB8MAW/305 WB8PUG/280 K9BLY/175 K9LHA/282 KA9JKQ/230 KB9K/285 KB9MI/200 N9AGB/148 N9AZK/177 WB8A/228 WB8Z/283 WB9DE/288 WB9FNJ/273 WB9ND/225 WB9LEF/204 K8CL/275 K8YJ/287 K8BVT/280 K8BGN/242 K8BVO/228 WB9QD/319 WB9CHS/126 WB9WGN/200 WD9AWL/286
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CW

DK8NG/290 DL3BK/251 F8CRT/280 G3GHY/127 GM3LY/206 HH2VP/180	JA1DNZ/160 JH3LPT/270 JA5PUL/234 JA8TR7/189 K8BJWK/175 OZ1FAO/189	VE1AXT/171 VE2CU/125 VE3II/226 YV5DFI/151 K1EFI/185 W1TN/189	K2JF/144 KA2EAO/150 W2C/280 W2PQZ/180 KA3P/157	AE4X/211 K4ITV/242 K4SE/281 KF4H/179 KR4F/198	KU4J/217 NA4RO/125 W4DJJ/263 W4ZT/162 WA4SZ/144	K5AQ/280 W5KC/285 A8BR/136 K6YCM/253 W6GO/287	W8MUL/202 WB8VJP/149 WA7CWM/131 K8DL/214 K9BLY/124	W9CA/160 WB9CU/227 AG9AJ/200 K8QJ/192 WB9B/240
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The New Frontier

The World Above 1 Gig

Conducted By Bob Atkins,* KA1GT

RF Connectors

A large number of different rf connectors show up from time to time on equipment available to amateurs. I thought it might be useful to indicate some of the features — and limitations — of the types you might run into. In contrast to the lower bands, where you can get away with using just about anything from phono plugs to binding posts as rf connectors, it can be very important to use the right type of connector on the microwave bands.

UHF Series — Whatever these connectors are good for, they are *not* good for uhf! They have a nonconstant impedance, and are not recommended for use much above 200 MHz.

N Series — These are a medium-size, weatherproof, threaded-coupling connector designed for use up to microwave frequencies. Typically, they show a VSWR of <1.3 up to 11 GHz, and have a maximum insertion loss of 0.15 dB at 10 GHz.

C Series — Electrically similar to N series connectors, C connectors have a two-stud bayonet coupling. They are similar in size to the N series, but have a larger-diameter center pin.

SC Series — A threaded-coupling version of the C connector.

BNC Series — Small, weatherproof bayonet-coupling connectors designed for use up to 4 GHz. They typically exhibit a VSWR of <1.3 and an insertion loss of <0.2 dB at 4 GHz.

TNC Series — A threaded-coupling version of the BNC connector with a frequency rating up to 11 GHz at a VSWR of <1.3. Typically, they show an insertion loss of <0.18 dB at 9 GHz. They can be useful in applications where the slight "rocking" freedom of the BNC connector can produce rf noise.

LC Series — Not a very common connector, the LC series is designed to accept RG-17/18 cable. They are rated only to 1 GHz, but can carry high power (5 kW at 1 GHz).

HN Series — Similar to the N series, but only rated to 4 GHz, the HN series have a higher dielectric withstanding voltage. They also have a captivated contact design to prevent contact recession under temperature and/or mechanical stress.

SMA Series — This is a miniature connector rated to 18 GHz when used with semi-rigid cables, and 12.4 GHz when used with flexible cables. They are probably the preferred connector for use at microwave frequencies, especially above 5 GHz. Their small size makes

them ideal for interfacing to microstrip circuitry.

JCM Series — Miniature connectors that are fully mechanically compatible with the SMA series, but are rated for use up to 4 GHz only. Their advantage over SMA connectors is their lower cost.

There are many other connector types you will probably never run across in amateur work, such as the APC series and the SUB-minax series, but the above connectors should cover most amateur needs.

The choice of a connector for a particular application can be an important part of equipment design. For permanent connections handling high power levels, N connectors should be used. If the connection needs to be made and broken quite often, for example on a portable system, then C connectors are a better choice. BNC connectors are suitable for low-power use on the lower microwave bands, but should probably not be used in critical applications, such as the input to very-low-noise preamps. In such applications, SMA connectors should be used when available, though TNC or N connectors can be used when their physical size does not rule them out. Don't pick the first connector that comes to hand; try to pick the one that will do the best job.

*103 Division Ave., Millington, NJ 07946

ALFORD SLOT ANTENNA

The Alford slot antenna for 1296 MHz was described in the June 1982 New Frontier column. I have had a number of inquiries concerning method of operation, so I will try to give a brief explanation of how it works.

As is well known, a vertical half-wave slot antenna cut in a flat sheet of metal radiates as the equivalent of a horizontal half-wave antenna. In the case of the Alford slot, the slot behaves as a transmission line shunted by inductive loops (the solid cylinder acting as a line of infinitely close loops). The size of the slot and loops gives rise to a cut-off frequency below which waves cannot propagate along the transmission line (analogous to the cut-off frequency in waveguide). Above the cutoff, however, waves can propagate, and the closer they are to the cut-off frequency the longer their wavelength will be. The dimensions of the Alford slot of the June column are such that at 1296 MHz the wavelength in the slot (transmission line) is about four times the free-space wavelength (i.e., the transmission line has a velocity factor of four). This occurs at 1.03 times the cut-off frequency. The Alford slot design published in this column now can be seen to be a ver-

tical slot dipole. Since the wavelength along the slot is four times its free-space value, the antenna is about four times as long as a free-space dipole. The gain comes about because it has the same effective gain as four free-space half-wave dipoles fed in phase, or about 8 dBi. This may be a rather simplistic view of what is happening in this antenna, but I hope that it gives some insight into how it works.

1296-MHz NEWS

Al Ward, WB5LUA, has written with news of some fairly spectacular DX on 1296 MHz. Contacts reported are: WB5LUA — WA4PGJ, 475 miles; W5HN — WA4PGJ, 485 miles; WB5LUA — W4ODW, 650 miles; W5HN — W4ODW, 640 miles; N4JS/5 — WB5LUA, 470 miles; WB5LUA — K4KJP, 650 miles; W5HN — K4KJP, 640 miles; W4ODW — W9ZIH, 800 miles; W5HTZ — W5LDV, 400 miles.

Quite a remarkable series of DX contacts, all made over the period of June 7 to June 9, 1982. Perhaps the most remarkable were the contacts made by Terry Young, K4KJP, who was using a varactor tripler with 900 mW output to a single 10-element quagil Power at

the antenna was later measured at 370 mW. The receive converter was a direct mixer (no preamp) and, with about 4 dB of feed-line loss, must have had an effective noise figure well in excess of 10 dB.

Although QRP operation on 1296 MHz is not to be recommended if you want to work very far very often, this shows what can be done when conditions are favorable, and should serve to encourage other low-power stations to give the DX call when they hear it!

REQUEST FOR SKEDS

John Bilodeau, W1GAN, is looking for skeds on 1296 and 2304 MHz. He has 100 W of cw/ssb, a 1 dB NF receive system and a 4-ft dish on 1296 MHz, and 15 W of cw, a 1.25-dB receive system and a 4-ft dish on 2304 MHz, so long-haul skeds should be possible. John comments that he used to run nightly skeds with New Jersey stations on 1296 MHz back in the late '60s with 99% success. He would also be able to get on any of the other microwave bands (narrowband only) if there was a sked interest there. John's address is: 9 South St., Salem, MA 01970, tel. 617-745-8061 (h) or 617-681-6578 (w).

Strays



I would like to get in touch with . . .

□ anyone who served at Naval Radio Station NSS, Annapolis, Maryland, between 1942-46. Laurence Hoepfer, N7BJT, Box 334, Columbia Falls, MT 59912.

□ any amateurs with railroad telegraph experience interested in participating in a demonstration of

American Morse telegraphy on a steam railroad at North Freedom, Wisconsin. Sidney Vaughan, N0DJD, 705 N. 8th St., Mount Vernon, IA 52314.

ARRL Counsel Chris Imlay, N3AKD (center), presents an ARRL flag to Harvey Little, WD5BSJ (right), president of the Jackson ARC, at the Mississippi State Convention/Capitol Area Hamfest in Jackson last April. Hamfest Chairman Don Elder, KC5VD, observes the presentation of the flag, which formerly hung in the office of the League's late general counsel, Bob Booth, W3PS. (photo courtesy K5QNE)



Hamfest Calendar

[Note: Sponsors of large gatherings should check with League Headquarters for an advisory on possible date conflicts before contracting for meeting space. Dates may be recorded at ARRL Hq. for up to two years in advance.]

Alabama: The Central Alabama ARA will hold its 5th annual hamfest Sunday, Sept. 19, at the Civic Center, downtown Montgomery. Free admission and parking, 22,000 ft² of air-conditioned activities, including a flea market. Setup at 6 A.M., doors open from 8 A.M. to 3 P.M. Restaurants and motel accommodations located within short walk of Civic Center. Refreshments available in Civic Center. Talk-in on 04/64, ragchew on 31/91, 78/18 or 147.645/045. For further information or flea market reservations, write to Hamfest Committee, 2141 Edinburgh Dr., Montgomery, AL 36116, or call Phil at 205-272-7980, evenings.

Alabama: The Calhoun County ARA hamfest will be held in the Anniston City Auditorium Saturday, Oct. 2, from 9 A.M. to 5 P.M., and Sunday, Oct. 3, from 9 A.M. to 2 P.M. Admission is free. Forums, FCC exams Saturday, tour of Anniston Museum of Natural History, hospitality house, free overnight parking for RVs. Talk-in on 69/09 and 10/70. For further information, write to Dale Boothe, KA4LRL, 3430 Greenwood Ave., Anniston, AL 36201, tel. 205-238-8804.

Connecticut: The Candlewood ARA fleamarket and auction will be held Sunday, Sept. 19 (rain or shine) at the Essex House, Rte. 6, Newtown, Exit 8 off I-84, from 10 A.M. to 4 P.M. Admission is \$1; tables are \$6.50. Prizes, dealers, magic show for the kids. Refreshments available. Talk-in on 72/12. For advance table reservations, send to: CARA, P.O. Box 188, Brookfield Center, CT 06805. For more info, call George (WB2THN) at 914-533-2758, Ken (KA1GDS) at 203-744-6953, or George (AF1U) at 203-438-0549.

Florida: The Melbourne Hamfest, sponsored by the Platinum Coast ARS, will be held at the Melbourne Auditorium Sept. 11-12. Hours are 9 A.M. to 5 P.M. on Saturday, and 9 A.M. to 4 P.M. on Sunday. Admission is \$3 in advance, \$4 at the door. ARRL forums, MARS, net meetings, technical talks, commercial exhibits. Unlimited parking, tailgate area, air-conditioned swap and exhibit area. Food and drinks available. Room accommodations at Ramada Inn, U.S. 1, Melbourne; for info, call 305-724-4422. Talk-in on 25/85 or 52. For further information, tel. 305-254-5116.

Georgia: Augusta ARC's annual hamfest will be held Sept. 19, at the Julian Smith Casino. Admission is \$3. Tailgating is \$2. Six dealers, barbecue, prizes. Hospitality room, Sept. 18, 4 P.M. to 11 P.M., Ramada Inn-West, Rm. 108-110. Talk-in on 72/12. For information, contact John Schumacher, N4DOU, P.O. Box 3072, Augusta, GA 30904, tel. 404-860-4460, 6 P.M. to 9 P.M. EDT.

Georgia: The 9th Annual Lanierland ARC Hamfest will be held in Holiday Hall at the Holiday Inn, Gainesville, on Sept. 26, starting at 9 A.M. Admission is free. Left-foot cw contest, boat-anchor auction, food and drinks, flea market. Free tables and inside display area for dealers and distributors. Please register early. Talk-in on 07/67. For further information, write to Phil Loveless, KC4UC, 3574 Thompson Bend, Gainesville, GA 30506, tel. 404-532-9160.

Illinois: On Sept. 12, the 26th annual Sarafest, sponsored by the Shawnee ARA, will be held on the campus of John A. Logan College, located on Hwy. 13 near Carterville. Hamfest will be held in air-conditioned gymnasium. Tables and electricity available. No charge to dealers for first three tables. Prizes, auction, flea markets (inside and outside), forums, computer activities, women's activities. Special events station on the air. Admission is \$2 in advance, \$3 at the door. Talk-in on 25/85, 52 and 3.925. For information, contact William May, KB9OY, 800 Hilldale Ave., Herrin, IL 62948, or an SARA member.

Illinois: Peoria Superfest '82, sponsored by the Peoria Area ARC, will be held at the Exposition

Gardens, W. Northmoor Rd., Peoria, on Sept. 18-19. Gate opens at 6 A.M., commercial building at 9 A.M. Advance admission is \$3; at the door, \$4. Forums, Amateur Radio and computer displays, huge free flea market, Sunday bus to Northwoods Mall, full camping facilities. Saturday night informal get-together at the Heritage House Smorgasbord, 8209 N. Mt. Hawley Rd., Peoria; free movies at the hamfest site. Talk-in on 16/76. For information, send s.a.s.e. to Superfest '82, 5808 N. Andover Ct., Peoria, IL 61615.

Illinois: Expo '82, sponsored by the Chicago F.M. Club, will be held on Sept. 25-26, from 9 A.M. to 4 P.M., at the Lake County Fairgrounds, intersection of U.S. Rte. 45 and IL 120, Lake County. Admission is \$3 in advance, \$4 at the gate. Huge flea market, commercial exhibitors, programs for women and children, seminars, food, telephone, camper facilities. Talk-in on 16/76 and 222.5/224.1. Expo Hotline: tel. 312-588-3976.

Illinois: The Sangamon Valley RC of Springfield holds its seventh annual hamfest Sunday, Sept. 26, at the Sangamon County Fairgrounds, New Berlin, 12 miles west of Springfield on Rte. 36. Indoor display and covered pavilion for fleamarket. Exhibits, prizes, children's activities and food. Overnight camping. Tickets: \$2 in advance, \$2.50 at the gate. Information from Ben Kinningham, K9IDQ, 2428 South State, Springfield, IL 62704.

Illinois: RA-COM '82, sponsored by the Mt. Prospect ARC and the Cook County ALERT, will be held on Oct. 3, at Prospect High School, 801 W. Kensington, Mt. Prospect. Large indoor electronic flea market, commercial exhibits, seminars, prizes and more. Doors open at 8 A.M. Advance tickets are \$1.50; \$2 at the door. Talk-in on 52. For more information and flea market or commercial-booth reservation forms, contact "RA-COM," P.O. Box 89, Mt. Prospect, IL 60056. Please send an s.a.s.e.

Indiana: The Grant Co. ARC will hold its hamfest on Sept. 11, at McCarthy Hall, Marion. Admission: \$2 advance, \$3 at gate. Advance table reservations: \$2 per 8-ft table. Talk-in on 19/79 or 52 simplex. Tickets/information, contact Beecher Waters, WB9YHF, RR 1, Box 357, Converse, IL 46919.

Kansas: The Wichita ARC hamfest will be held on Sept. 12, at the Salvation Army Camp Hiawatha in Wichita. Admission at door is \$4; pre-registration is \$3.50.

Maine: The Windsor Hamfest, sponsored by the Augusta Emergency ARU, will be held at the Windsor Fairgrounds, Rte. 32, Windsor (10 miles east of Augusta, off Rte. 17 — watch for signs), on Sept. 10-12. Tech talks, net meetings, women's programs, prizes, food, camper hookups, baby sitting. New England Division Director John Sullivan, W1HHR, and ARRL International Affairs Vice President Richard L. Baldwin, W1RU, will take part in the programs. Great Northland Ham of the Year Award will be presented at Saturday-evening banquet. Talk-in on 22/82, 10/70 and 3.936. Admission is \$1. For additional information, write to Bill Crowley, K1NIT, RFD 1, Box 1589, Hallowell, ME 04347, or call 207-729-3369 (days), 207-623-9075 (nights).

Maryland: The Foundation for Amateur Radio 1982 Gaithersburg Hamfest (25th anniversary) will be held on Sunday, Sept. 12, at the Montgomery County Fairgrounds, Gaithersburg. Flea market vendors and individuals on hand, dealers and manufacturers' displays in main exhibit area. New all-day Saturday program featuring technical session, FCC and ARRL forums will be held at the Gaithersburg Marriott. Admission: \$4 each day, or combination ticket for \$7.50 in advance or at door on Saturday. All checks payable to The Foundation for Amateur Radio. Further information from Stuart Meyer, W2GHK, 2417 Newton St., Vienna, VA 22180, tel. 703-281-3806 (home), 703-525-6286 (office).

Massachusetts: The Whitman (MA) ARC will hold its annual general merchandise flea market on Labor Day, Sept. 6 (rain date Sept. 12), at Safflers parking lot, junction of Rtes. 18 and 14 in Whitman, near Toll House restaurant. Spaces for tables available to hams; advance notice requested. Any info or correspondence directed to club President Ed Hummel, KA1CZS.

Michigan: The Grand Rapids ARA, Inc., will hold its annual Swap and Shop on Saturday, Sept. 18, at the Hudsonville Fairgrounds. There will be prizes and dealers, with indoor sales area and outdoor trunk-swap area. Gates open at 8 A.M. Talk-in on 16/76. For more information, write to Grand Rapids ARA, Inc., P.O. Box 1248, Grand Rapids, MI 49501.

Michigan: The L'Anse Creuse ARC will hold its 10th Annual Swap and Shop at the L'Anse Creuse High School, Reimold St., Mt. Clemens, on Sept. 19, from 9 A.M. to 3 P.M. ARRL and FCC representatives. Prizes, free parking, food concession. Talk-in on 69/09 and 52. Advance tickets are \$1; \$2 at the door. For more info or tickets, send an s.a.s.e. to

Maurice Schietecatte, N8CEO, 15835 Touraine Ct., Mt. Clemens, MI 48044.

Michigan: The 10th annual hamfest sponsored by the Adrian ARC will be held on Sunday, Sept. 26, at the Lenawee County Fairgrounds, Adrian. Talk-in on 31/91. For tickets, tables, info, write to Adrian ARC, Inc., P.O. Box 26, Adrian, MI 49221.

Michigan: The Central Michigan ARC is hosting HAM-FAIR '82 at the Grand Ledge High School, 7 miles west of Lansing, on Oct. 10, starting at 8 A.M. Registration, \$2.50; tables 75 cents per foot. Latest in ham gear, accessories, computers and electronic equipment for the home. Prizes, parking, demonstrations, swap shop, cafeteria — a family-oriented event. Talk-in on 34/94 and 52. For more information, call 517-626-2237, or write to HAM-FAIR '82, P.O. Box 10073, Lansing, MI 48910.

Michigan: Blossomland Blast, sponsored by the Blossomland ARA, will be held on Sunday, Oct. 3, 8 A.M. to 3 P.M. (early setup available), at Lake Michigan Community College Convention Center, near Benton Harbor. Take Exit 30 from I-94 East to Yore Rd., and head north to the community center. Admission is \$2 in advance, \$3 at the gate; children under 12 (with families) free. Tables: 6-ft, \$5. Prizes, Brasspounders contest, Western MI Army MARS Meeting, dealers; entirely indoors. Self-contained overnight camping (no hookups). Talk-in on 22/82 and 52. Information and reservations from BARA, P.O. Box 175, Saint Joseph, MI 49085.

Minnesota: Oct. 9 is the day for a hamfest in the Middle School gym in Park Rapids, sponsored by the Headwaters ARC. Hours are 9 A.M. to 5 P.M. Admission is \$2. Display tables are \$3 each; commercial companies \$5 each. Talk-in on 30/90. Prizes, dealers, lunch available.

Mississippi: The 6th annual Ham/Swap Fest, sponsored by the Mississippi Coast ARA, will be held at International Plaza (west end of Biloxi/Ocean Springs bridge), Biloxi, on Oct. 2, from 8 A.M. to 5 P.M., and Oct. 3, from 8 A.M. to 2 P.M. No admission charge. Tour, seafood/shrimp boil, MARS meeting, and ARRL, computer, DX forums. Limited parking and hookups for self-contained RVs. Talk-in on 13/73 and 52 simplex; backup on 144.73/145.33. Further information from John Belham, W5PDD, 2302 Middlecoff Dr. (or P.O. Box 1785), Gulfport, MS 39501, tel. 601-896-3884.

New Hampshire: The 6th annual Connecticut Valley FM Assn. Hamfest/Flea Market will be held on Sunday, Sept. 26, from 9 A.M. to 5 P.M., at the King Ridge Ski Area, New London. Admission is \$2; children under 16 free. Flea market setup is \$5. Food available. For further info, write to F. B. Callahan, KA1BWE, Box 173, East Wallingford, VT 05742.

New Jersey: The Electronic Technology Society of New Jersey will sponsor the E.T.S. NJ-Greenbrook Hamfest, at the Union County Vocational Technical School in Scotch Plains, on Sept. 19, from 9 A.M. to 4 P.M. Admission is \$2. Prizes and dealers. Talk-in on 34/94. For further info, call Mark Scherer, tel. 201-232-9598.

New Jersey: The South Jersey Radio Assn. hamfest will be held Sept. 19, from 9 A.M. to 4 P.M., at Pennsauken High School, Rte. 73 and Remington Ave., Pennsauken. Admission is \$3. Talk-in on 22/82 and 52 simplex. For further information, contact Fred Holler, Jr., 348 Bortons Mill Rd., Cherry Hill, NJ 08034, tel. 609-795-0577.

New York: HAM-O-RAMA '82 will be held on Friday, Sept. 10, from 6 P.M. to 9 P.M., and Saturday, Sept. 11, from 7 A.M. to 5 P.M., at the Erie County Fairgrounds, near Buffalo. Equipment displays, computers, technical programs, women's programs, valuable awards and more! Tickets are \$3.50 in advance, \$4.50 at the gate. Children under 12 free. Outside flea market, \$3 per space; inside, \$10 per space. Advanced-ticket deadline is Sept. 1. S.a.s.e. to Dave Bacco, WA2TWT, 130 Vegola Ave., Cheektowaga, NY 14225. Talk-in on 31/91. This event is sponsored by the Buffalo Amateur Radio Repeater Assn., the Radio Assn. of Western NY, the South Town ARS and the Amateur Radio Assn. of Tonawandas.

New York: The Hall of Science ARC annual indoor/outdoor, rain-or-shine hamfest will be held on Sunday, Sept. 12, 9 A.M. to 4 P.M., at Municipal Parking Lot, 80-25 126th St. (1 block off Queens Blvd.), Kew Gardens, Queens. Sellers donation \$3; buyers \$2; women and children free. Walk/talk-in on 145.520. For info, contact John Powers, KA2AHJ, tel. 212-847-8007, or Tony Russo, WBZOLB, tel. 212-441-6545.

New York: The Seaway Valley Hamfest, sponsored by the Seaway Valley Hamfest Committee, will be held at the Firemen's Municipal Arena, behind the fire station in Louisville (near Massena) Sept. 18, from 9 A.M. to 4:30 P.M. Admission is \$2.50 in ad-

vance, \$3 at the gate. ARRL forum, technical talks, OSCAR demo, magic show, flea market, commercial displays (computers and others), snack bar open all day, chicken barbecue from 11 A.M. Camping and motels nearby. Talk-in on 31/91, 04/64 and 52. Information and reservations from Lois G. Ierlan, WA2RXO, 725 Proctor Ave., Ogdensburg, NY 13669, tel. 315-393-3297.

New York: The Elmira ARA will present the 7th annual Elmira International Hamfest at the Chemung County Fairgrounds on Sept. 25. Gates open at 6 A.M.; breakfast available. Friday night camping on limited basis at fairgrounds; many campgrounds in area. Tech talks, free flea market, dealer displays, prizes. Advance tickets \$2; at the gate \$3. Talk-in on 96/36, 10/70 and 52 simplex. For tickets, write to John Brees, 340 West Ave., Horseheads, NY 14845. Make checks payable to Elmira A.R. Assn.

New York: Long Island Mobile ARC, Inc. (LIMARC), will sponsor Long Island HamFair '82, at the Islip Speedway, Rte. 111, Islip Ave., Islip, on Sept. 26, from 9 to 4. Admission is \$3; sellers, \$5 per car space. Vhf tune-up clinic, ARRL information booth, many awards. Talk-in on 146.85. For information, contact Sid Wolin, K2LJH, tel. 516-379-2861, or Hank Wener, WB2ALW, tel. 516-484-4322.

New York: The Radio Amateurs of Greater Syracuse (RAGS) will hold its annual hamfest Saturday, Oct. 2, from 9 A.M. to 6 P.M., at the Art and Home Center, New York State Fair Grounds, Syracuse. An indoor hamfest, featuring commercial exhibitors and a large indoor flea market. Breakfast and lunch served. Prizes, tech talks, program on DX-peditions, women's activities, contests and entertainment. Admission is \$3; indoor flea-market space \$6. Outdoor flea-market space also available. Talk-in on 90/30 and 31/91.

New York: The Yonkers ARC will sponsor the Yonkers Electronics Fair and giant flea market at Yonkers Municipal Parking Garage, corner of Nepperhan Ave. and New Main St., Yonkers, on Sunday, Oct. 3 (rain or shine), from 9 A.M. to 5 P.M. Demonstrations all day, prizes, giant auction at 2 P.M., refreshments, parking. Admission is \$2, children under 12 free. Sellers: \$6 per parking space (1 admitted), bring tables. For further information, call 914-969-1053.

North Carolina: The Maysville Hamfest, sponsored by the Maysville Hamfest Club, will be held on Oct. 3, from 9 A.M. to 4 P.M., at Community Park, Maysville. No admission charge. Flea market, prizes, socializing, barbecue lunch. Talk-in on 146.685. For further information, contact Grover Cook, WA4PID, 1101 Plantation Dr., Cary, NC 27511, tel. 919-467-0424.

North Carolina: The Western Carolina ARS will hold its 7th annual Autumnfest on Oct. 9, from 9 A.M. to 5 P.M., at the Asheville Civic Center. Admission is \$3 in advance, \$4 at the door. Flea market tables, \$5 at the door. Prizes, dealers, flea market, McElroy Memorial cw competition, ARRL booth, weather booth. Refreshments available. Camping facilities reasonable. Talk-in on 31/91, 16/76 and 52. For information and reservations, contact WCARS, P.O. Box 1488, Asheville, NC 28802, or R. F. Sawinski, R.R. 2, Box 267A, Leicester, NC 28748, tel. 704-683-9839.

Ohio: The Findlay Hamfest will celebrate its 40th anniversary this year on Sept. 12, at the Hancock Recreational Center Arena, from 6:30 A.M. to 5 P.M. Arena is just east of I-75, Exit 161, North Main St. Tickets are \$2 advance, \$3 at the entrance. Exhibit tables are \$5 per table; flea market sales \$2 per space. Open Saturday for setup, with evening entertainment. Talk-in on 75/15; check-in on 52. Write for reservations and tickets with an s.a.s.e. to Findlay Radio Club, P.O. Box 587, Findlay, OH 45840.

Ohio: The 45th annual Cincinnati Hamfest will be sponsored by the Greater Cincinnati ARA, Inc., on Sunday, Sept. 19, at Sticker's Grove, on State Rte. 128, 1 mile west of Ross (Venice), north of Cincinnati. Admission ticket \$5. Exhibits, prizes, flea market (radio-related products only), hidden-transmitter hunt, sensational air show by the Hawks. For further information and reservations, write to Lillian Abbott, K8CKI, 317 Greenwell Rd., Cincinnati, OH 45238.

Ohio: Cleveland Hamfest, sponsored by the Cleveland Hamfest Assn., will be held at the County Fairgrounds, Berea, on Sunday, Sept. 26, from 7 A.M. to 5 P.M. Admission is \$2.50 in advance, \$3 at the gate, children under 12 free. Flea market, seminars, women's program, meeting space and groups welcome, prizes, refreshments. Talk-in on 52. For information and reservations, write to CHA, P.O. Box 27211, Cleveland, OH 44127. Dealer info, tel. 216-734-3788; general info, tel. 216-282-4256.

Ohio: The Northwest Ohio ARC will hold its sixth

annual hamfest on Sunday, Oct. 10, at the Allen County Fairgrounds in Lima. Indoor flea market tables are \$5 for 8 ft table, \$3 for half table. Advance tickets are \$2.50; at the door, \$3. Doors open at 6 A.M. Overnight camping available on grounds. Talk-in on 07/67, 63/03, 34/94 and 52. For further information, write to NOARC, Box 211, Lima, OH 45802.

Pennsylvania: The 33rd annual W3PIE Gabfest will be held on Saturday, Sept. 11, on the club grounds located on the Old Pittsburgh Rd., just off Rte. 31 and the 119 bypass in Uniontown. Pre-registration fee is \$2, or 3 for \$5. Prizes, contests, demonstrations, food, free swap and shop setup with registration. Talk-in on 147.045/645, 144.57/145.17 and 52. For further information, contact UARC Gabfest Committee, c/o John T. Cermak, WB3DOD, P.O. Box 433, Republic, PA 15475, tel. 412-246-2870.

Pennsylvania: The Butler County ARA will hold their annual hamfest on Sunday, Sept. 11, from 9 A.M. to 4 P.M., at the Butler Farmshow Grounds, Roe Airport, Butler. Check-in on 96/36 and 52 simplex; directions on 84/24. Admission is \$1, children under 12 free. Overnight campers welcome; handicap parking available. Indoor flea market space \$3 per 8 ft table; free outside flea market. Many prizes. Overnight accommodations available at Butler Holiday Inn, tel. 412-287-6761. For information, contact Leighton Fennell, Crestmont Dr., RD 6, Butler, PA 16001, tel. 412-586-9822.

Pennsylvania: The Skyview Radio Society will hold its annual hamfest on Sunday, Sept. 19, from noon till 4 P.M., at the club grounds on Turkey Ridge Rd., New Kensington. Talk-in on 04/64 and 52 simplex. Registration fee \$2, vendors \$4. Awards.

Pennsylvania: The York Hamfest, sponsored by the Keystone VHF Club, Inc., the York ARC, Inc., the Hilltop Transmitting Assn., Inc., and the Pen Mar RC, Inc., will be held at the York Fairgrounds Sept. 26, from 8 A.M. to 4 P.M. Admission is \$3. Contests, prizes, food, overnight camping. Unlimited tailgate spaces at \$3 (plus registration); indoor tables (with electric) \$5. For further information, write to Leroy Frey, K3POR, 170 S. Albemarle St., York, PA 17403, tel. 717-854-1203.

Pennsylvania: The Pack Rats Sixth Annual Mid-Atlantic VHF Conference will be held Saturday, Oct. 2, at the Warrington Motor Lodge, Rte. 611, Warrington. Advance registration \$3; \$4 at door. Price includes admission to 11th annual Pack Rat HAMARAMA on Sunday, Oct. 3, at the Buck County Drive-In Theater, Rte. 611. Admission to flea market \$2; tailgating \$4 per space. Bring your own table. Gates open at 7:30 A.M. Talk-in via W3CCX on 52. Information for both events available from HAMARAMA "82," P.O. Box 311, Southampton, PA 18966, or Lee A. Cohen, K3MXXM, tel. 215-635-4942.

South Carolina: The Western Carolina ARS II will sponsor a swapfest at Piedmont Technical College Campus on Sept. 18. Displays limited to ham radio related equipment only. No fee. For more information, send an s.a.s.e. to Western Carolina ARS II, P.O. Box 3111, Greenwood, SC 29648.

South Carolina: The York County ARS will hold its 31st annual hamfest on Sunday, Oct. 3, at Joslin Park in Rock Hill. For information, contact YCARs, Box 4141 CRS, Rock Hill, SC 29730.

Texas: The Wichita ARS hamfest will be held at the National Guard Armory, Wichita Falls, on Saturday, Sept. 25, from 8 A.M. to 5 P.M., and Sunday, Sept. 26, from 8 A.M. to 2 P.M. Admission is \$4 in advance, \$5 at the door. ARRL forum by WSEDZ, computer demonstrations, QCWA meeting, 3933 Net, QLF contest, large inside flea market (reserve your table), women's programs and shopping, prizes. Sunday church service, free RV parking — no hookups. Talk-in on 34/94 and 75/15. For further information and reservations, write to WARS Hamfest, P.O. Box 4363, Wichita Falls, TX 76308.

Washington: The Walla Walla Valley RAC will hold its 36th annual hamfest at the Milton-Freewater, Oregon Community Building, Saturday, Sept. 25, and Sunday, Sept. 26. Doors open at 9 A.M. New-gear displays, swap shop, antique, homebrew and repeater displays, ARRL booth, awards. Free registration. Dinner at 12:30 Sunday is pot-luck. Talk-in on 20/80 and 52. For more information, write to W7DP, P.O. Box 321, Walla Walla, WA 99362.

Wisconsin: The Kettle Moraine RAC will hold its annual Ham, Computer, Video Fest on Sunday, Oct. 10, at the Waukesha County Expo Center, Hwy. F and FT, Waukesha, starting at 8 A.M., rain or shine. Indoor facilities. Prizes, food, commercial exhibitors. Tickets are \$2 in advance, \$3 at the door. Reserved tables are \$3 for each 4 ft length. Reservations accepted until Oct. 1. Send check payable to KMRA Club, P.O. Box 411, Waukesha, WI 53187. — Conducted By Marjorie C. Tenney, WB1FSN

Coming Conventions

September 11-12

Georgia State, Warner Robins

September 17-19

Dakota Division, Moorhead, Minnesota

October 2-3

New England Division, Boxboro, Massachusetts

October 1-3

West Gulf Division, Houston, Texas

October 8-10

Pacific Division, Santa Cruz, California

October 9-10

Virginia State, Virginia Beach

October 23-24

Tennessee State, Chattanooga

October 29-31

Hudson Division, McAfee, New Jersey

ARRL NATIONAL CONVENTIONS

October 7-9, 1983

Houston, Texas

July 20-22, 1984

New York, NY

GEORGIA STATE CONVENTION

September 11-12, 1982, Warner Robins

The Central Georgia ARC (CGARC) welcomes you to the ARRL Georgia State Convention and fourth annual Central Georgia Hamfest, to be held on Saturday and Sunday, Sept. 11-12, at the Warner Robins Recreation Center, 800 Watson Blvd., Warner Robins. Dealers' area and meeting rooms are air-conditioned. There will be indoor and outdoor flea markets with a charge of \$3 per space per day. Bring your own table.

Meetings and forums include the annual meetings of the Georgia SSB Assn. and the Georgia Cracker Net, a Sunday morning breakfast for the Georgia State CW Assn., an ARRL forum, ARES and Air Force MARS meetings. All meetings, with the exception of the CW Assn. breakfast, will be held in the Houston County Library, directly across from the hamfest site. The CW Assn. breakfast time and place will be announced. There will also be activities for women and children.

Talk-in will be on the Frank King Memorial Repeater, 146.25/85. Ample motel space nearby. The hospitality room will open Friday night, and there will be pickin' and grinnin' on Saturday night.

There is no registration fee. Donation tickets will be available at the door at 1/\$1, 6/\$5 and 13/\$10. For more information, contact Jim Piper, W4HON, 618 American Blvd., Warner Robins, GA 31093.

DAKOTA DIVISION CONVENTION

September 17-19, 1982,

Moorhead, Minnesota

The Red River Radio Amateurs would like you to come spend the weekend with us at the ARRL Dakota Division Convention, to be held at the Ramada Inn, I-94 and U.S. 75, Moorhead. The Ramada has ample space for our large commercial and flea market displays.

Here are just a few of the programs: DXing with AD6S; a cw seminar; Digital Electronics-Microprocessors applied to the Amateur; Antennas; RTTY; Field Day Ideas; a program put on by Jeff Solum, KA0NEX, radio operator aboard the Viking Ship Hjelmkomst; W0SFA will have a seminar on "Building Homemade Junk," and the ARRL Forum with Tod Olson, K0TO, Dakota Division Director. A women's luncheon and program are on tap for Saturday afternoon.

A Saturday evening banquet will begin at 7:30 P.M., with League President Vic Clark, W4KFC, as guest speaker. At 9 P.M., we tune up with the sounds of ADOS and his band playing the best of the '50s and '60s music. There will be a Wouff Hong Ceremony at midnight.

Talk-in on 16/76 and 3.910. We will be happy to reserve a room at the Ramada for you; room rates — \$30 single, \$36 double, and kids under 19 free. General registration is \$4.50 in advance, \$6 at the door. For more information, contact Dr. Ken Covey, P.O. Box 675, Moorhead, MN 56560.

KENTUCKY STATE CONVENTION September 25-26, 1982, Louisville

The ARRL Kentucky State Convention and Greater Louisville Hamfest, sponsored by the Greater Louisville Hamfest Assn., will be held on Sept. 25-26 at the completely air-conditioned Kentucky Fair & Exposition Center, West Hall & Pavilion in Louisville.

The Friday Night Bash, on Sept. 24, at 8 P.M., will be at the Executive Inn's Dolphin Room, directly across from the hamfest site, sponsored by the SHG Radio Club. On Saturday night, there will be a banquet and "Surprises," followed by the Wouff Hong initiation ceremony, sponsored by the Arts Club. Women's programs and activities are planned. Featured are prizes, meetings and forums, contests, exhibitors area and flea market, all indoors. Hours are 9 A.M. to 5 P.M. Talk-in on 13/73 and 10/70. Admission is \$4 in advance and \$5 at the door. Children 12 and under are free when accompanied by an adult. Free camping is available on the grounds — no hookups. For information, contact Guy Partridge, K4KZH, P.O. Box 34444, Louisville, KY 40232.

WEST GULF DIVISION CONVENTION October 1-3, 1982, Houston, Texas

The ARRL West Gulf Division Convention will be held on Oct. 1-3, in conjunction with Houston Convention 82, the annual Houston Hamfest sponsored by Houston Ham Conventions, Inc. (HHC). This year, 14 Houston-area clubs have given their financial and individual support to help make Houston Convention a successful event.

The Astro Village Hotel complex will be the location for this year's convention. This complex of three hotels, restaurants and shops is located next to the Astro dome and Astroworld, at 2350 South Loop (I-610), at the Kirby Drive exit. Talk-in on 69/09 and 222.66/224.26. Mention Con-Vent 82 when you contact the hotel for the special convention room rate.

We will feature the Southwest's largest air-conditioned exhibit area and a greatly expanded covered flea market. Thousands of new and used communications and computer items will be available — the latest state-of-the-art in communications equipment — as well as many prizes.

Convention activities include a transmitter hunt, homebrew competition, a Saturday night banquet featuring ham-astronaut Tony England, W0ORE, as speaker, a Wouff Hong Ceremony and a NASA-JSC tour. Seminars and forums will present the latest information on Amateur Radio, microcomputers, ATV and electronics. The annual Houston Con-Vent DX and Contest Forum features such notables as K5VT, N6CW and K1MM presenting their most recent DXpeditions to exotic locations, as well as presentations on Superstations, code-recognition competition, contest panel discussion, etc.

Family activities are plentiful for women and children. Advance registration is \$5; at the door, \$7. Covered flea market spaces are \$10 for both days (includes table and one chair). For full information and advance registration materials, write to Houston Con-Vent 82, P.O. Box 79252, Houston, TX 77279, or call 713-481-4586.

NEW ENGLAND DIVISION CONVENTION October 2-3, 1982, Boxboro, Massachusetts

The Federation of Eastern Massachusetts Amateur Radio Assns. will present the ARRL New England Division Convention at the Sheraton-Boxboro Hotel, Rte. 495 at Rte. 111. Flea market and exhibits will be open Saturday, Oct. 2, from 9 A.M. to 5 P.M. and Sunday from 10 to 5.

Saturday night's features will be a dance with a live orchestra and live entertainment. At midnight, a special Wouff-Hong ceremony will be presented by the Radio Amateur Society of Norwich (Conn.). This is the group famous for its theatrical excellence and special Wouff-Hong souvenir buttons!

Women's programs will be offered both days featuring makeup, African violet culturing, how-to programs in photography and vegetable gardens, round-the-world travels and other features. Dr. Robert Suding, W0LMD, will unveil his new computerized, fully compatible "hands-off" full-color SSTV system. As of this writing, there are more than 30 exhibitor booths signed up to show the latest in ham radio. Features will include extensive seminars on both days, as well as fox hunts for hand-helds on 146.52. There will be a homebrew contest and display as well.

Early-bird reservation is \$4; banquet, dance and

show is \$13.50. Contact Arthur Tomkinson, W1THT, 9 Oliver Terr., Revere, MA 02151 (s.a.s.e., please). Make checks payable to FEMARA.

PACIFIC DIVISION CONVENTION October 8-10, 1982, Santa Cruz, California

The Santa Cruz County ARC is proudly hosting the ARRL Pacific Division Convention, to be held Oct. 8-10 at the Holiday Inn, 611 Ocean St., Santa Cruz. Activities this year include an exceptional variety of manufacturer and dealer exhibits and a well-rounded group of forums and technical speakers. The facilities are located near the beach, with the Boardwalk and many other attractions available. Santa Cruz is a great vacation spot for the entire family; bring them along!

The convention gets underway on Friday evening, with the exhibits open, a League session and a hospitality room. Activities will continue all day Saturday, Sunday morning, with a banquet early Sunday afternoon to wind up the convention.

Look for our Convention Radio Station, K6BJ, which will be operating from the fifth floor of the Holiday Inn during the convention. We will have a special QSL card for those who work us.

Pre-register early, as there is a limited number of banquet seats. Full registration includes the banquet, the women's program (with lunch), and all forums and technical talks. Pre-registration is \$23 per person through Sept. 15. For forums and talks only, pre-registration is \$6; after September 15 the price will be \$7. Booths are \$100. For registration forms and/or more information, please write to SCCARC CONVENTION, P.O. Box 238, Santa Cruz, CA 95061, or call 408-426-6691.

VIRGINIA STATE CONVENTION October 9-10, 1982, Virginia Beach

The ARRL Virginia State Convention and Tidewater Computer Show-Hamfest-Electronic Flea Market, will be held at the Virginia Beach Pavilion, Saturday and Sunday, Oct. 9-10.

Featured are dealers, special displays, forums, computers and satellite equipment. Special women's programs and a free jitney bus to the beach for shopping or beach activities will be available. There will be a cocktail party on Saturday night. Showtime is 9 A.M. to 5 P.M., both days. Admission is \$3.50, and includes both day's events. Flea market tables are \$5 one day, \$8 both days. Commercial flea market tables are \$15 both days. Commercial booths are \$30 both days. For info and tickets, write to or call Jim Harrison, N4NV, 1234 Little Bay Ave., Norfolk, VA 23503, tel. 804-587-1695.

Special Events

Conducted By Mark J. Wilson,* AA2Z

Aruba, Netherlands Antilles: Aruba ARC will operate throughout the month of September to celebrate its 25th anniversary. Activities include a Field Day from 1200Z Sept. 4 until 1600Z Sept. 5. Special station P43A will also operate weekends during the month from 1400Z Sat. until 1900Z Sun. Award for working 3 Aruban (PJ3) stations, including P43A. Mail log data by Nov. 30 to: Aruba ARC, P.O. Box 273, San Nicholas, Aruba, Netherlands Antilles.

Davenport, Iowa: Wood Jr. High School ARC will operate WB0MMV from 1700Z Sept. 4 until 1800Z Sept. 5 from the Palmer College of Chiropractic, the first of its type. Frequencies: phone — 7.250 14.325 21.400 29.125 146.52; cw — 7.115 14.075 21.125 28.125. Phone on odd hours UTC, cw on even hours. Special QSL for s.a.s.e. to: KA0IFG, 3739 Lorton Ave., Davenport, IA 52807.

New Rochelle, New York: Comm. Club of New Rochelle will celebrate its 25th anniversary with operations the weekend of Sept. 4-6. Look for club members on 20-10 meters from 1300-1600Z and 1700-2000Z each day. Club station K2YJC will operate 1300-1600Z on 15M and 1700-2000Z on 20M except for Sept. 6 when it will be on 40M from 1300-1600Z and on 15M from 1700-2000Z. Frequencies: 50 kHz inside General bands; some Novice operation. Certificate for large s.a.s.e. to: WB2MZI, 2727 Gifford Ave., Bronx, NY 10465.

Piqua, Ohio: Piqua ARC will operate W8SWS/8 from 1400-2400Z Sept. 4-6 from the Col. John Johnston

Farmstead, an Indian museum. Frequencies: phone — 3.900 7.250 14.290 146.46; cw — 7.115 from 1800-2000Z. Special QSL and certificate for s.a.s.e. to: W8UO, 811 N. Sunset Dr., Piqua, OH 45356.

Tombstone, Arizona: KCTMG will operate from 1500Z Sept. 4 until 2400Z Sept. 6 from the OK Corral in conjunction with the First Annual Rendezvous of Gunfighters. Frequencies: phone — 7.280 14.280 21.380 28.680; cw — 7.130 21.130. Certificate for large s.a.s.e. with 2 units of First Class postage to: KCTMG, P.O. Box 1555, Benson, AZ 85602.

Atlantic City, New Jersey: Southern Counties ARA will operate K2BR from Sept. 4-12 from the annual Miss America Pageant. Frequencies: phone — 25 kHz inside General bands, 80-10 meters and 146.52; cw — 65 kHz up from low end; some Novice operation on 40 and 15 meters. Special QSL for s.a.s.e. to: SCARA, Box 121, Linwood, NJ 08221.

Moscow, Iowa: Area amateurs will operate KJ0H, the "Moscow International Friendship Station," from 2300Z Sept. 10 until 2300Z Sept. 12 primarily to exchange greetings with stations in Moscow, U.S.S.R., but exchanges with all stations welcome. Operation 50 kHz up from lower cw-band edges, 80-10 meters. Special QSL for s.a.s.e. to: KJ0H, 1515 Lucas St., Muscatine, IA 52761.

Canisteo, New York: Canisteo Valley Amateurs will operate WB2SQX from 1400-2100Z Sept. 11 to commemorate the 50th anniversary of the world's largest living sign. Frequencies: 7.245 14.285 21.375 28.650. Special QSL for business size s.a.s.e. to: J. Babbitt, Square Woods Dr., Canisteo, NY 14823.

Richfield, Minnesota: KN6S/6 will operate from 1300-2200Z Sept. 11 during the 4th annual Burnsville Fire Muster. Frequencies: phone — 7.250 14.340 21.400; cw — 7.125 in the morning hours. Certificate for large s.a.s.e. to: KN6S, P.O. Box 23349, Richfield, MN 55423-0349.

Canaan, Indiana: Madison ARC will operate W9EFU from 1200-2400Z Sept. 11 to commemorate the only remaining official Pony Express route in the country. Frequencies: phone — 20 kHz up from lower General class band edge; cw — 20 kHz up from lower Novice band edges. Certificate for QSL and large s.a.s.e. to: E. Taylor, Rte. 1, Hanover, IN 47243.

Palmyra, Wisconsin: Marengo Over-The-Hill Electric RS will operate WA9TAH from 0700-2100Z Sept. 12 from "Palmyra." Operation 30 kHz inside cw bands and 30 kHz inside General class phone bands. Special QSL for s.a.s.e. to: WA9TAH, 545 Willow Rd., Marengo, IL 60152.

Minneapolis, Minnesota: A19P will operate from 1400-2400Z Sept. 11-12 during the 22nd reunion of the USS Natoma Bay Assn. Operation in General class portions of 80-10 meters. Certificate for large s.a.s.e. to: A19P, 4825 Wallbank Ave., Downers Grove, IL 60515.

San Juan County, Utah: Moab ARC will operate K7QEO, N7EFV, W7JBW, WB7UQM and WB7VWA from the Natural Bridges National Monument, marking two years of successful operation of the world's first 100-kW stand-alone photovoltaic power system. Operation will take place from 1800Z Sept. 11 until 2000Z Sept. 12 in the phone bands, 20

kHz down from the upper band edges. Some Novice operation also planned. Special QSL for s.a.s.e. to: K7QEQ, P.O. Box 1267, Moab, UT 84532.

Pea Patch Island, Delaware: Independent AR Group of DE members will operate from Fort Delaware, a Civil War prison, from 1500-2100Z Sept. 11-12. Operation in General class hf bands. Special QSL for large s.a.s.e. to *Callbook* address of station worked.

Marathon County, Wisconsin: Wisconsin Valley RA will operate W9SM from 1200-2400Z Sept. 12 from one of the four "corners" of the world at the intersection of the 45° North parallel and the 90° West meridian. Operation 25 kHz from the bottom of the General class hf phone bands. Special QSL for s.a.s.e. (certificate also available) to: WVRA, Box 363, Wausau, WI 54401.

Mason City, Iowa: North Iowa ARC will operate W6JUI from 1700-2300Z Sept. 12 during Cider days at the Kinney Pioneer Museum. Frequencies: 7.250 21.380 28.750. Special QSL for s.a.s.e. to: KC0CC, 609-4th Ave., NW, Hampton, IA 50441.

Morton, Illinois: W9EEB will operate from 2300-0200Z each day Sept. 15-19 during the Pumpkin Festival. Operation 25 kHz up from bottom of 40- to 10-M General class phone bands. Pumpkin Award for log data and large s.a.s.e. to: WD9ADU, 701 Columbus Ave., Morton, IL 61550.

Waldo, Alabama: Anniston Goodtime Gang will operate NN4R from 1230-0030Z on Sept. 18-19 during

the annual Syrup Sopping Festival. Operation on 3.965 7.255 14.285 21.385 28.585. Certificate for large s.a.s.e. to: 1215 Crescent Ave., Anniston, AL 36201.

Dubuque, Iowa: Great River ARC will operate from the historic sidewheeler, *William M. Black*, during the Riverfest on Sept. 18-19. Operation 25 kHz up from lower General class phone-band edge, 80-10 meters. Special QSL available; information will be given on the air.

Foxboro, Massachusetts: Foxboro Company ARC is again sponsoring the Foxhunt Contest from 1300-2100Z Sept. 19 on 7.265 and 21.365. Work WB1EMT, then work two other Foxboro stations you'll be directed to find on the band. Each Foxboro station will send a QSO number with the prefix F, O or X. Send log information including calls of stations worked and numbers received for certificate (include large s.a.s.e.) to: W1XA, 42 Saddleback Hill Rd., Bellingham, MA 02019.

Nashville, Tennessee: Ensworth School and Radio and Transmitting Society will operate W4PQP to celebrate the school's founding. Operation 1500-2300Z Sept. 24-26 in lower 25 kHz of General and Advanced class bands, 40-10 meters. Special certificate for large s.a.s.e. with 2 units First Class postage to: J. Wilmerding, WB2SKA, Ensworth School, Ensworth Ave., Nashville, TN 37205.


Beaumont, Texas: Beaumont ARC will operate W5RIN from 1700-2300Z Sept. 25-26 during the Gladys's City Boom Days, commemorating

Spindletop's 81st anniversary. Frequencies: phone — 7.280 14.280 21.280; cw — lower 25 kHz of 40-, 15- and 10-M Novice bands. Certificate for large s.a.s.e. (include contact number) to: BARC, P.O. Box 8358, Lumberton, TX 77711.

Visalia, California: The 1982 California Balloon Festival, Sept. 25-27. See page 13 for details.

St. Clements Island, Maryland: St. Mary's Co. ARA members will operate from the island during the 15th annual Blessing of the Fleet, commemorating the colonists' first landing in the state. Operation from 1400-2000Z Sept. 26 20 kHz up from General class band edges on 20- and 15-M phone and cw, and on 21.120. Special QSL for s.a.s.e. to: N3CRU, P.O. Box 123, Avenue, MD 20609.

Poyen, Arkansas: Metropolitan ARC members will operate from Grant Co., beginning at 1300Z Sept. 26. Phone operation near the bottom of General class bands, and cw operation in Novice bands. QSL for s.a.s.e. via home call or MARC, P.O. Box 9050, Little Rock, AR 72119.

Note: The deadline for receipt of items for this column is the 15th of the second month preceding publication. For example, your information would have to reach Hq. by September 15 to make the November issue. 

Conducted By Sally O'Dell,* KB10

Club Corner

YOUR THOUGHTS ON AN IMPROVED AFFILIATED-CLUB PROGRAM

Club and Training is gearing up with new ideas for an improved affiliated-club program. Last year, the Long-Range Planning Committee submitted a formal report to the ARRL Board of Directors, which discussed the need for greater support by the League to its local affiliated clubs.^{1,2} We have been receiving comments about the proposed program since then. Club members have strong feelings (some positive, others not so positive) that they want to express.

This program is designed to help local-area, general-interest clubs to grow and to run more efficiently. The program will recognize those clubs already involved in the many phases of Amateur Radio that help make a general-interest club stronger. In addition, the program is aimed at helping other clubs that are not extremely active to become so.

Under the proposed program, at their option, clubs would undertake new responsibilities. If a club feels it is too small to satisfy them all, it can form an alliance or a federation with other clubs in the area. No affiliated club will lose anything, but clubs who elect to participate in the new program will be eligible for additional recognition and benefits.

At one time, the name Blue-Ribbon Club seemed appropriate; the negative response we received, however, suggested the need for a better name. The name recommended to the Board at its July meeting was "Special Service Club."³ We are responsive to comments from our affiliated clubs and will continue to be.

Ten percent of all affiliated clubs are organized in schools from Elementary through College. Though school and youth clubs are important to the League, their special problems and needs have not been addressed in this program. We have concentrated instead on general-interest clubs, for the moment, and will address school and youth clubs in the future.

Some of the comments we received follow: NOARS would very much like to become a "Blue Ribbon" club. NOARS does conduct programs in all of the areas mentioned in your letter — plus many more. Our membership is now over 600 (Mike Bokulich, K8US, Northern Ohio ARS). The term, Blue Ribbon club, was received with mixed enthusiasm. Perhaps the League would consider an Honor Roll of clubs that meet certain objectives. Blue Ribbon sounds like something placed on a prize pig. We are all hams but... (Paul Bachorz, KB2T, Schenectady ARA, NY). The Blue Ribbon club program is still a few months off, but it is definitely on the way. This is an exciting time in Amateur Radio, and for years to come

Flash!

The Special Service Club Program has been approved by the Board of Directors. See minute 23 in Moved and Seconded (page 49). An overview of this program will follow in an upcoming Club Corner.

(Steve Kercol, AA4AK, RAC of Knox County, TN). The Long-Range Planning Committee proposal to establish a new category of club affiliation was briefly presented to the membership at large. After discussion of the proposal, a poll of the membership was taken to determine if our club was interested in supporting such a proposal. The result of the poll indicated more than a two-to-one margin in favor of supporting the proposal as outlined in your bulletin sent to affiliated clubs (C. Thomas Massey, K2TM, Bergen ARA, NJ). We are responsive to that kind of constructive thinking and look forward to further development of the subject. I was instructed to respond to you in that vein. We will give more thought and discussion to the subject, and will convey to you any appropriate thoughts that are generated (Bryant Chandler, WB6TXT, Estero ARC, CA). Our club, for one, would certainly be interested in a higher level of club affiliation as a local chapter, or whatever it is finally called (Richard Tucker, W0RT, Parsons Area ARC, KS). The Board of Directors of the Rochester ARA reviewed the LRPC proposal for a new category of club affiliation. We are in agreement with the proposal, and believe early implementation of the plan is desirable. We prefer the name "Chapter" (Donald H. Dremman, W2EBF, Rochester ARA, NY). The Garland ARC is wholeheartedly in favor of an expanded club-affiliation category as discussed in the LRPC report. It would go a long way toward dispelling the notion that the League is "that building up north." We recommend that the term "Chapter" be used, as "branch" denotes a business relationship and "Blue Ribbon Club" sounds like an award. The proposed activities for this status are good (Richard T. Casey, N8CSU, Garland ARC, TX). The Fort Wayne Radio Club agrees with the LRPC that change is required in the ARRL organizational structure to increase the effectivity of the League at the local level and to increase the individual member's feeling of belonging to and benefiting from the League. We agree that the present club affiliation program needs overhauling. We feel that the establishment of special category clubs is an excellent idea and that belonging to a special category club should entail special responsibilities on the members' parts. We feel, too, that the ARRL organization should offer special support in return. In particular, we feel that more travel should

be allowed to special category clubs by upper-level League officials. We feel that considerable mutual benefit can be realized by formulating a closer working relationship between individual amateurs, local clubs and the ARRL organization. We agree with the basic thrust of the LRPC observations concerning these subjects, and urge their timely detailed formulation and adoption (Ron Koczor, K9TUS, Fort Wayne RC, IN).


Notes

¹D. Sumner, "Long Range Planning," *QST*, Dec. 1981, p. 56.

²The complete text of the LRPC report, as it relates to the affiliated club program, was sent to active affiliates.

³The Membership Affairs Committee recommended Board action on a "Special Service Club" proposal at the July Meeting of the Board. For a report on the Board's action, see "Moved and Seconded" elsewhere in this issue.

SFDXA IS A 100% CLUB

In 1981, the South Florida DX Association (Plantation, Florida) was a 100% club — that is, 100% of its members were ARRL members. Because of an oversight, they were not listed with all the others in December. Our apologies! 



That Isn't Abraham Lincoln in the picture, it's Nelson McCann, N8CAJ, city manager of Washington Court House, Ohio. One of the Fayette ARA's recent projects is this communication van that started as a mail van.

*Club Program Manager, ARRL

The World Above 50 MHz

Conducted By William A. Tynan,* W3XO



Some Comments on 145-MHz FM

In the June column, I suggested that more use might be made of the area around 145 MHz for fm simplex operation. I wondered if this part of the band could not be used for more "traditional" hamming — as opposed to the "commercial" style of procedure encountered frequently on the fm channels — and whether such use might help solve the "fm in contests" problem that always seems to be with us. Most comments received on this proposal have been favorable, but one in particular was not. A dissenting opinion was expressed by Jim Eagleson, WB6JNN. Because I believe he offers some thought-provoking ideas on the subject, I am devoting this month's lead space to presenting his views.

I read with interest your article concerning promoting fm simplex in the 144.9- to 145.1-MHz area. While this could promote some activity during contests, the 20 available simplex channels at 146 and 147 (if one assumes 20 kHz spacing, which is taking hold in several parts of the country) have not. The reason everyone wants 52 is that no one makes contacts on 55 or 58, etc., during contests. That 52 is "standard," or "universal," is its very appeal! That many hams do not have any kind of synthesized rig is also apparent; thus, your 145 solution to the contest problem is no better solution than suggesting 146.49 as "the vhf contest channel."

I've never used fm in a vhf contest, but the above reflects the comments of most active users of that mode in the San Francisco Bay Area.

Truly, as you state in June QST, there is a problem with incursion of fm simplex into 145.5 to 146.0 MHz. The most common frequency in this area is 145.830, very close to UoSAT's 145.825-MHz beacon. As Technical Director for Project OSCAR, I have brought this to the attention of those using this frequency, without too much success to date.

ON THE BANDS

6 Meters — More than most, the 1982 E₂ season can probably be described as having its ups and its downs. There certainly have been days at a time when not much happened. If one was not paying very close attention to the band, and listened only occasionally, the conclusion could be reached that openings have been few. For those who stuck with it, however, the rewards have been very handsome. Many of the faithful have added four or more countries to their totals, and a few more WASs have been completed.

K8EFS is certainly one of those stalwarts. On July 1, Andy's vigilance paid off with a TI2NA QSO. The following day, it was country number 51 in the form of KA3BUJ/RK1, along with a number of good West Coast contacts. On the 3rd, another new DXCC country was added as a result of working 4U1UN, not an easy task from Michigan.

Other alert 6-M operators were also getting their share of DX. Through K5ZMS I learn that YS1ECB was worked by WB4PFB and WB4UCW on June 20, and one week later by WD4NMV, W4UJ and W4NVV. These fellows obviously took the trouble to tune up to 50.180 and listen carefully for the a-m signal emanating from the SMIRK loaner rig dispatched to El Salvador a few months ago.

VE1BNN found the period from July 4 to 8 particularly productive. On the 4th, Reg accomplished a crossband QSO with CT2EE, as have many others over the June-July period. It is absolutely amazing how many times the path from the East Coast to the Azores has been open. Would that John could get permission to transmit on 6 meters. On the 7th, VE1BNN

A second consideration, in looking at your suggestion, is the use of linear translators on 2 meters. This is the only band with sufficient activity for experimentation with this technology in any meaningful way. Project OSCAR, for example, will soon place in operation an experimental linear translator for use in developing SYNCART satellite hardware. [SYNCART stands for Synchronous Amateur Radio Transponder, and consists of an electronic package similar to those that have been used in many OSCAR satellites to date but for installation aboard a large synchronous satellite put up for other than amateur purposes. — Ed.] Planned inputs are a 30-kHz band centered on 145.050 MHz, and another centered on 1296.3 MHz, with others possible. Planned outputs are 145.650 and 435.415, with a possible 1269 interlink to Phase III-B.

Linear translator development has been hampered by fm activity on the 145 segment already. The only U.S. linear translator WA6HIP/R Oakland, 144.52/145.12, has been hemmed in on one side by an fm repeater 10 kHz below it, and on the other by one directly on its "second channel." This shows how much attention has been paid to the Band Plan published in the ARRL Repeater Directory, which calls for the first 100 kHz of the 145-MHz repeater band to be set aside for linear translators. I bring this up to point out the need for a segment in the repeater subband designated for narrowband modes, including linear translators. One suggestion would be to set aside 144.45 to 144.50 for linear-translator inputs paired with 145.050 to 145.10 MHz. The use of this input band would require changes to current FCC rules. This should make both groups happy; however, some objections might be encountered from other users inhabiting the 144.0 to 144.5 region. Certainly, with amplitude companded sideband (ACSB) and other narrowband developments on the horizon, an uncontested 2-M frequency to support them should be designated and maintained. Up to 10 ssb "channels" or five ssb/cw dual channel systems could be set up, even in this narrow slice of spectrum.

heard FY7THF with very strong signals. Reception of this beacon has been mentioned in many reports over the past month or so. Also on the 7th, Reg's country total climbed to 55 as a result of a contact with KA3BUJ/RK1. Apparently, Steve is making quite good use of the FT-620B lent by W2IDZ for his stay in Guyana.

Much of the excitement for the period was furnished by the big DXpedition to St. Paul Island. The group, which used calls VE1SPI (on most bands) and usually VE1ASJ (on 6 meters), hit a lucky streak in terms of propagation during their stay from July 8-13. A strong, but short, opening on July 10 brought the new country to many of us in the mid-Atlantic states. But the big break came Sunday evening, July 11. At that time, a massive and strong E₂ opening stretched across much of the country, affording many stations the opportunity to snag the rare catch. KB7Q's report on that evening's festivities doesn't show a St. Paul QSO, but Gene does mention making 97 contacts in 24 states from Vermont to Washington. And he still had time for 2 meters, which produced the real excitement of the evening (see the 2-meter section).

I hope to have a more complete story on the St. Paul Island operation next month.

2 Meters — It goes without saying that the main 2-meter stories for the 30 days between June 15 and July 15 are the fantastic E₂ opening the evening of July 11/12 and the massive and intense aurora two evenings later. We finally may have what we have been seeking for years: widespread evidence of double-hop E₂ on the 144-MHzband in our part of the world. Rumors of two-hop contacts surface from time to time, but hard evidence is never presented (they usually take the form of reports that a friend of a friend worked someone on the other coast, call unknown). In instances when I have been presented with calls, the principals themselves have not reported the incident to me; at-

tempts to follow up by long-distance phone have been met with unlisted numbers or no one being home. So, it is refreshing to get several reports from people I trust listing full particulars. One such report comes from W2RS Glen Rock, New Jersey. Ray writes that on Sunday evening local (0135Z July 12) he worked K0WLU/7 Gillette, Wyoming, a distance of 1610 miles. While distances of this magnitude have been cited for 2-M E₂ on a number of occasions when double-hop did not appear to be involved, this time other circumstances point to multi-hop propagation. For one thing, W2RS notes that he was not hearing any stations west of eastern Minnesota, but he was hearing Wisconsin, and had heard Michigan stations a few minutes before. K0WLU reported hearing Michigan stations, along with the East Coast. Incidentally, the contact brings the state total for W2RS to 34, a nice way to land a rare state. K0WLU's state total must have taken a significant jump, as he was doing a land-office business with East Coast stations. Another who reports working him is KA1BXB Connecticut. Don phoned K0WLU after the opening, and was told that the count was 34 stations. Best DX is estimated as 1700 miles. W2RS, who was also on the headline after things died down, got K0WLU's current address. He is not okay in the *Callbook*. QSLs should go to Bill Mitchell, 904 Bobolink, Gillette, WY 82716.

Another piece of evidence indicating the presence of double-hop that evening comes by way of a report that K0UIDZ Rapid City, South Dakota, was one of those working VE1SPI St. Paul Island. According to my calculations, the distance is 2064 miles.

This E₂ opening probably was one of the most widespread on record. Reports indicate that it extended from the East Coast to the West Coast. One example of its extent comes from KB7Q Bozeman, Montana. Gene had 32 QSOs in Missouri, Nebraska, Kansas, Wisconsin, Minnesota, Iowa and Illinois. Undoubtedly, the most popular station participating, and

Another potential use for the 144.9 to 145.1 segment is for the establishment of "gateway" satellite-access stations for mobile operation through the satellite. This is a secondary exploration goal for the Project OSCAR linear-translator system. Input and output on 2 meters, coupled with the 1269 uplink and the 436 downlink through the Phase III-B or future satellites, could add an entirely new dimension to this broadband microwave to uhf transponder. It could also reduce capital outlay for many, including beginners, who want to take part in satellite communication. The possibilities, once SYNCART is in orbit, can be even more interesting and useful providing, as it will, access for conventional and specialized modes of communication to the wide-area coverage that high-orbiting satellites can provide.

We have a great deal of 2-M fm simplex activity here in the Bay Area, as one would expect with a total population of almost 7 million people. Even during heavy-usage periods, however, I do not believe that very many of the available 146 and 147 simplex channels are in use at the same time. May I recommend an alternative to your proposal? "Push" the use of these channels, including 20-kHz spacing. — Jim Eagleson, WB6JNN, Watsonville, California

I believe the question of 20 kHz versus other spacings is discussed more appropriately in the FM and Repeaters column, but some of Jim's other points are germane to these pages. The arguments he advances are illustrative of a problem that is certain to be with us as long as radio; namely, how best to divide the limited spectrum among the various types of users and modes of operation. I thank WB6JNN for taking the time to give us the benefit of his thinking on a very important topic: how we can best use the precious resource represented by our frequencies. What do you think?

*Send reports to Bill Tynan, W3XO, P.O. Box 117, Burtonsville, MD 20866, or call 301-384-6736 to record late-breaking information.

1-1/4 Meter Standings

Listing is call, state, U.S. states worked and call areas worked. Call areas are the 10 U.S. call areas, KH6 and KL7, each VE and XE call area, and DXCC countries not located within the continental limits of the U.S., Canada or Mexico. Those not showing some indication of activity or interest in remaining in the standings over the last two years have been deleted.

K1FO	CT	22	7	K2DNR	NY	15	6	WA3JUF	PA	12	5	WB5LUA	NM	12	7	WB8BKC	MI	23	9	W0PW*	CO	14	6
W1JR*	MA	20	9	WA2FGK	NJ	14	6	K3IUV	PA	12	4	N4JS/5	MS	11	8	W8IDU	MI	15	7	W0SD	SD	9	5
K1PXE	CT	18	6	W2CRS	NY	14	5					W5FCI	OK	10	5	K8AXU	OH	12	7	WA0QLP	SD	4	2
W1YTW	ME	14	8	WA2FUZ	NY	14	5	W3IY/4	VA	23	10	K5JL	MS	7	4	K8HWW	MI	11	6	K09W	ND	3	1
W1GXT	MA	14	8	W2SEU	NY	13	5	WA4SBC	VA	14	5	K5SW	OK	5	2								
W1HDQ	CT	13	5	K2YGO	NY	12	5	WA4CQG	AL	14	—	WA5VJB	TX	3	2	K9MRI	IN	29	9	VE2YU		8	3
W1QXX	MA	13	5	WA2YWP	NY	6	2	K4LHB	VA	13	6					K9HMB	IL	23	10	VE2DFO		7	5
K1JIX	MA	12	4					N4CD	VA	13	5	WB6NMT		10	6	WB9SNR	IL	22	9	VE2HW		5	2
W1AZK	NH	10	3	W3GPY*	PA	25	10	K4GL	SC	6	2	W6WSQ		6	4	K9KFR	IN	11	6				
K1BFA	MA	10	3	W3UJG	MD	15	8	K4IXC	FL	5	3					K9XY	WI	10	5	VE3EMS*		28	12
				N3AHI	PA	15	7					W7JF	MT	8	5					VE3AIB		10	8
K2CBA*	NY	19	7	W3RUE	PA	13	6	K5FF*	NM	23	12	K7NII	AZ	16	11	W0VB*	MN	34	13	VE3DSS		3	4
W2PGC	NY	16	10	W3IP	MD	13	6	W5HN	TX	20	6	W7CNK	WA	6	3	WB0TEM*	IA	34	—				
W2DWJ	NJ	15	6	W3HMU	PA	13	4	W5FF*	NM	18	10	K7ICW	NV	4	2	K0DAS	IA	16	7	XE2BC*		2	3

*Indicates some states worked via EME.

the most easterly I have heard about so far, was the St. Paul Island DXpedition. Although I have not received a tally from them as yet, a number of people I have heard from report working them. One of these is W3EP/9 Bloomington, Indiana. Emil says that he heard VE1SPI working many stations throughout the Midwest. The most westerly station to report, directly to me, a contact with the St. Paul Island station is AE9G Ottawa, Kansas. Larry notes that the eastern part of the opening lasted from 0128 to 0125Z during which time, in addition to VE1SPI, he and his neighbor, WA0HVU, worked VE2DFO and VE3RM. Later, from 0230 until 0245, they worked W7HAH Montana, KB7N Idaho and KA7BZJ Washington. Other reports came from KIHTV/3 near Washington, DC and W3CLQ Pennsburg, Pennsylvania. Both list contacts with many upper-Midwest stations. A particularly interesting contact is noted by KIHTV. Rich says that one station worked was N8DEJ/Mobile in Michigan. This represents quite short skip for 2-M E₃, and contacting a mobile station via that mode is also somewhat unusual.

The other blockbuster came just two evenings later, in the form of a tremendous aurora. KIHTV's report serves well to set the stage for sketching the tale of what was certainly a wild evening all across the country. Rich and son Andy, KA1GD, noted the first buzz signals at 2015 July 13, with 1s, 2s and 8s being heard. Conditions built steadily over the next few hours. At 2314, W8HTL Michigan, who was running 9 watts, was worked. A string of contacts with stations from central Kansas N0LL to Florida W5HUQ/4 followed.

Probably the most notable QSO was made on ssb by KA1GD/3 with "W2HJA Dallas, Texas." That station's failure to clearly state "W2HJA/5" almost resulted in Andy not calling him. Luckily, however, he did manage to hear the wispy voice say "Dallas, Texas," and thus added a new state to his total. Unfortunately, signals faded before Rich could make the contact also.

Another Big D resident, W5HN, spent most of his time on 220, but did listen to this band. Leroy reports hearing stations in New Mexico, Montana, Nevada, Wyoming, Colorado, West Virginia, Illinois, Nebraska, Iowa, Missouri, Kansas, Minnesota, South Dakota, Pennsylvania, Indiana, Ohio, South Carolina, Virginia, Mississippi, Louisiana and Arkansas. W5HN says that, in 60 years of hamming, he has heard only two other auroras — and they produced only weak and spotty signals — but this one was something else.

Even farther to the south, another Texan was equally enthusiastic in his description of the event. WA5LYX San Antonio has been a very diligent observer of various types of propagation for quite a few years, and he comments that he has never experienced aurora before. He was ready, however, after hearing WWV broadcast A Index readings of eight for both the 2100Z and 0000Z updates. Pat noted aurora effects on TV channels 2 and 3 at about 0015Z on the 14th. By 0032 he was hearing W0PW Colorado, and worked that station a few minutes later for state number 18. Other auroral signals, mostly 5s, were also heard. Signals on 2 meters faded at 0100, with 6-M signals gone by 0120.

From Florence, South Carolina, another locale from which one would not expect to receive aurora reports, comes one submitted by N4TJ. Tommy was hampered by precipitation static and lightning crashes, but still managed to work 26 stations from New Jersey to Nebraska from 2328 on the 13th to 0236 on the 14th. During a lull in the aurora lasting from 0043 until 0207, N4TJ noted signs of tropo enhancement. Other reports speak of similar effects. Incidentally, the following morning may have produced an E₃ opening, as Tommy reports that at about 1300Z the

157-MHz two-way radio in his car "went wild with mobiles from who knows where."

W3EP/9 characterizes the aurora as "the best I have heard." Using 100 watts to an 8-element Yagi at 20 feet, Emil worked stations in 25 states from Massachusetts to the northeast, Georgia and Louisiana to the south, and Kansas to the west. He noted that, in many instances, signals were best with the beam to the east or west, rather than the northerly directions normally associated with aurora. He also observed that many 10-W stations were making contacts on ssb, another indication of the intensity of the reflected signals.

1-1/4 Meters — No one should be surprised that the dominant news this month is the aurora of July 14. The close proximity of the opening to the deadline for this column results in less information being available than I would like, but from the reports received so far one can glean a pretty good idea of the magnitude of the opening. One of the newer up-and-coming proponents of this band, W3IY/4 in the Virginia suburbs of Washington, certainly made the most of a golden opportunity. Bill completed QSOs with K9IMM Wisconsin, WB8BKC and K8MD Michigan, W9SR Indiana, W1AJM and N1QC Vermont, W1GXT Massachusetts, W3GPY Pennsylvania, K4PKV North Carolina, KA0Y Iowa, K5CM Oklahoma, WB5LUA Texas and W5RCI Mississippi, as well as VE2DFO. The evening's work netted him five new states. WB0TEM in western Iowa grabbed state number 34 by contacting K5CM, in addition to hearing W5FF and K7NII.

As intrigued as he was by those funny-sounding signals on 2 meters, W5HN concentrated his efforts on this band. Leroy's efforts were rewarded by state

number 20, by virtue of a contact with W0PW Colorado. From his far-south location, his 40 watts was, unfortunately, not quite enough to attract the attention of some of the other stations heard. They include K4PKV, W3IY/4, K5FF/W5FF New Mexico, K3HZO Maryland and W4WD/7 Utah.

Phoenix, Arizona, is hardly a place one would expect to encounter aurora. For K7NII, at least, it was a first. Even more amazing, it reached the 220-MHz band. The only station heard or worked was W4WD/7 in Utah, but, for Tom, it was a real thrill, even if the contact didn't represent a new state.

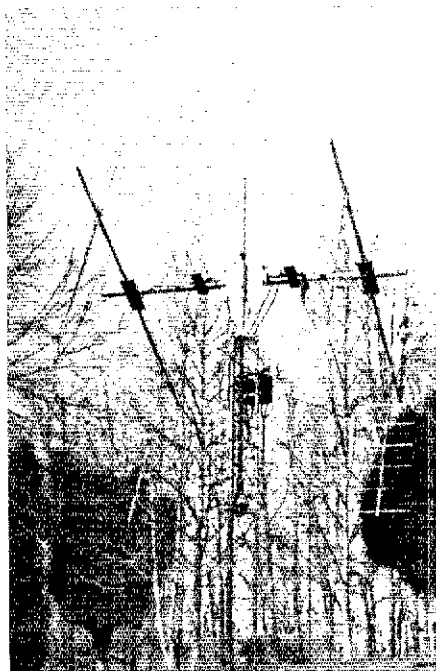
Another one of these "almosts" occurred the eve of the big E₃ opening, July 11/12. WB0TEM had been working W1JR near Boston on 2 meters, and decided to see if they could make it here. As soon as Mark began listening on 220 MHz, he heard Joe's signal well over S-9. But, almost immediately, it began to fade rapidly between S-9 and the noise level. Unfortunately, by the time W1JR stood by, only seconds later, it was all over. As they used to say in Brooklyn: "Wait till next year!"

70 Cm — Not too surprisingly, the tremendous aurora of July 13/14 was felt on 70 cm as well as the lower-frequency vhf bands. K1PXE Milford, Connecticut, reports working K8DIO and K8DW Ohio, W0RAT Iowa and W3RUE western Pennsylvania between 2340 and 2355Z on the 13th. Having split his time between this band, 1-1/4 meters and 2 meters, he probably did not work as many 70-cm stations as he could have if he had stayed on the one band. (That's what comes of being a well-rounded vhf'er, Pete.) Later, he heard a good ssb signal from K4CAW North Carolina. K1PXE comments that he has improved his setup on this band with an 8874 amplifier that delivers about twice the power he had previously. An interesting observation comes from WB0TEM in western Iowa. Mark concentrated his efforts on 1-1/4 meters, but did do some listening on this band. At 0800Z on the 14th, long after most reports indicated the aurora had disappeared, Mark heard good ssb signals from K9KFR in Indiana.

23 Cm — K6ZMW in the Los Angeles area characterizes conditions on 23 cm during the June Contest as some of the best in 10 years of operating. Joe's log shows a total of eight multipliers, including such usually difficult sections as Santa Clara Valley, Arizona and Nevada. He notes that even Utah was worked from southern California.

W5HN Dallas passes along the information that there are two new 23-cm stations on to work when conditions are better than average. They are W5HTZ in Oklahoma and K4KJP in Florida. Leroy says that both put in fine signals despite their low power, about 1 watt. K4KJP says that his power is more like 400 milliwatts. He uses a diode tripler feeding a 10-clement quagi at 30 feet. From his Fort Walton Beach QTH, results to date include contacts with W4ODW 126 miles, and W5HN and WB5LUA (Dallas), plus WASTBE in Corpus Christi at 670 miles.

N3FL Laurel, Maryland, reports that activity on 23 cm in the Washington/Baltimore area has picked up considerably over the past year. Regulars now include, in addition to himself, W3IP, W3IY/4, K3ICH/4, W2KFC/4, WA3NZL and K3DUA. Some are able to work WB2ONA East Brunswick, New Jersey and other stations to the northeast consistently when better-than-average conditions prevail. Normal rallying time is 2200 local time on Thursday evenings, but the gang has recently added Sunday mornings. They get together at about 8 A.M. to take advantage of the enhanced propagation that often prevails at that time of day. In addition to the stations already mentioned, K1PXE Connecticut, K8WW Ohio and W8YIO Michigan frequently show up.



The 220-MHz EME array at K4PKV. Dick uses four 3.2-λ Yagis.

Silent Keys

It is with deep regret that we record the passing of these amateurs:

WB1AMO, Mark A. Danzer, Norwalk, CT
KA1EIP, Joseph P. Jodoin, New Bedford, MA
WA1TAH, Alphonse J. Czajkowski, Jr., Paxton, MA
WB1EDN, Albert C. Ahare, Ludlow, MA
KB2DD, Martin A. Sandage, Sr., N. Tonawanda, NY
W2ELK, Richard P. Amy, Seaford, NY
K2HGH, Burke J. Mumken, Ridgefield, NJ
K2HT, Isadore P. Lyman, Pittsford, NY
A1Z1, Derryl M. Weed, Rochester, NY
WB2JGP, William R. Donnell, Penns Grove, NJ
WA2LGI, Julian E. Modeste, Bronx, NY
K2QVT, Edward M. Benford, Hawthorne, NY
K2TXA, Alfonso Caponetti, Elmont, NY
*W2UTF, Marion A. Noakes, Rochester, NY
W3AHZ, James A. Beaver, Roslyn, PA
K3EDV, Chester E. Parks, Johnstown, PA
WB3EHP, Edward F. Willoughby, Sewickley, PA
W3ETM, H. Kenneth Richter, Hatboro, PA
WA3EXZ, Raymond H. Machado, York, PA
WA3LGM, David W. Richmond, Mahanoy City, PA
KB4AA, Neil W. Cox, Freeport, FL
WA4NB, Clarence L. Crisp, Greenville, TN
W4BSP, William S. Gillis, Maitland, FL
KA4CGY, Michael J. Callahan, Winter Park, FL
WA4GGV, William H. Doster, Greenfield, TN
W4MMS, George E. Dodge, Sr., Bonita Springs, FL
K4MRR, Albert A. McCambell, Marietta, GA
K4MY, Ralph E. Jordan, Deltona, FL
W4NGB, Earnest F. Scott, Parsons, TN
WA4PVF, Gordon Rex, Fort Lauderdale, FL
K4QLH, Roger L. Titus, Warrenton, VA
K4ROR, James C. Blackmon, Tusculumbia, AL
KA4SPO, James M. Blackburn, Racoon, KY
WA4WFS, Mayward C. Douglass, Silver Spring, MD
K4WLJ, Charles V. Wynn, Duluth, GA
N5AMY, Richard A. Tye, Arlington, TX
W5CZK, Leo D. Harris, Plano, TX

W5DMT, John E. Smith, Jemez Springs, NM
W5FNH, Cedric R. Toler, Kerrville, TX
W5HJT, John A. Hays, Ft. Smith, AR
W5HUE, Norman Sartain, Houston, TX
K5JBC, Clinton C. Aberly, Sr., Covington, LA
W5LBT, James P. Winburne, Little Rock, AR
W5QFL, Charles I. Carpenter, Fort Worth, TX
WA5QZS, John R. Smith, Houston, TX
W5SJI, Jessie J. Boyd, McCamey, TX
WA5SRX, Marian I. Leffingwell, Corpus Christi, TX
K5YSO, Edward G. Samford, Nederland, TX
W5ZX, Lyle L. Sanders, Portland, TX
WA6AYA, E. Grant Sawyer, Hemet, CA
WA6BFD, Robert E. Cundiff, Sun City, CA
W6BFB, Roland D. Zehr, Kelseyville, CA
N6CPB, Vernon R. Heyer, Hemet, CA
W6DWJ, Gus W. Hilpisch, Belmont, CA
WB6FKD, Lee H. Farnsworth, Dellwood, MO
N6FQF, Arthur L. Coen, Hemet, CA
WA6GTG, Wilbert K. Mackinder, Jr., Santa Maria, CA
WA6HMV, Robert E. Wolfe, Stockton, CA
W6HMV, Donald D. Landaker, Seattle, WA
WA6HUE, Alex Sheriff, Canyon Country, CA
W6MOT, The Rev. John A. Weber, San Francisco, CA
W6VS, William S. Davis, Berkeley, CA
W7ADS, William G. Lay, Yakima, WA
WB7ALV, K. Robert "Bob" Murphy, Everett, WA
W7BXR, Raymond G. Webster, Hereford, AZ
KN7DMI, James L. Conley, Cottage Grove, OR
W7DVF, Clarence "Rosy" Layne, Twin Falls, ID
W7GMC, Richard W. Rose, Yakima, WA
W7HHH, Beatrice N. Austin, Bend, OR
W7IIM, Donald M. Beaudine, Sun City, CA
W7LHQ, Noel A. Clark, Carson City, NV
W7NTT, Lydia G. Crowson, Ashland, OR
WA7SOT, Harry D. Stockwell, Olympia, WA
W7TQ, Robert H. Sproul, Reno, NV
*K8LMK, Carl I. W. Durban, Marysville, OH
WA8NMC, Howard W. Pengelly, Livonia, MI

W9DLF, M. Lynn Woodward, Lopel, IN
**W9HPG, Philip F. Haller, Chicago, IL
W9LNV, Bryan W. Stolpe, Wheeler, WI
W9NHS, Joseph P. Vitous, Madison, WI
W9NUM, Thomas A. Baker, Bunker Hill, IL
WB9NWB, John W. Ealy, Indianapolis, IN
W9NXX, Lawrence R. Goetz, Monticello, IN
W9OKO, Charles R. Myers, Pinellas Park, FL
W0CGB, Sidney W. Schulz, Burnsville, MN
K0EJB, Adna J. Spillman, Branson, CO
W0EWZ, Fred Lamb, Newport, NE
W0EXL, Mervit A. Powlishta, Cedar Rapids, IA
WD0FQN, Sister Jude Godfrey, Little Falls, MN
W0GGG, Cecil L. Koon, Cedar Rapids, IA
WA0JAR, Aaron J. Clem, Osseo, MN
K0LEZ, John F. Fuhrman, Sr., Sioux City, IA
W0LIT, Fred A. Kline, Minneapolis, MN
K0YDU, Edward A. Sonnenberg, Platte City, MO
K0ZIO, The Rev. Albert A. Godlewski, Elyria, NE
VE2KB, Gaston Dontigny, Quebec, PQ
VE4IX, Arnold Geith, Virden, MB
ex-VE5ME, George Tanaka, Mississauga, ON
CX4AW, Eduardo Ponce de Leon, Montevideo, Uruguay
DF9QS, Berthold Buschmann, Emsdetten, West Germany
ON4PA, Paul Anthierens, DePinte, Belgium

*Life Member, ARRL
**Charter Life Member

In order to avoid unfortunate errors in the Silent Keys column, reports of Silent Keys will henceforth be confirmed through acknowledgment only to the family of the deceased. Thus, those who report a Silent Key will not necessarily receive an acknowledgment from Hq.

Note: All Silent Key reports sent to Hq. must include the name, address and call sign of the reporter as well as the name, address and call of the Silent Key in order to be listed in the column. Please allow several months for the listing to appear in QST.

50 Years Ago

September 1932

□ "An Intermediate-Frequency and Audio Unit for the Single-Signal Superhet" is Technical Editor Jim Lamb's concluding article on this outstanding receiver development.

□ Well-known DX man Charles Perrine, W6CUH, tells how to get "Thirty-Three Watts Per Dollar from a Type '52" in a provocative account of his experiments. The secret: operation at a high plate voltage (4500), high excitation, and high L/C ratio in the plate circuit.

□ "Sticks That Have Stuck" is a collection of descriptions by Hq. hams of their "sky hooks." These range from Jim Lamb's 40-foot support made from three 2 x 2s to Advertising Manager Beekley's 80-foot wooden lattice mast and WIMK op Bob Parmenter's 4-inch diameter gutter-pipe mast.

□ Ed Miller, W8CCJ, announces that "56 Mc. Rolls Up Its Sleeves," an account of the communications provided by hams at the second National Glider Meet at Elmira, New York.

□ George Grammer is speaking of vacuum-tube types in "And Still They Come." Among those most likely to be of interest to amateurs are the Type 42 pentode, a 6.3-volt indirectly-heated cathode 247, and the 89, a versatile multi-grid tube that can be connected for triode or pentode Class-A operation and for triode Class B. Also of interest are the 83, a full-wave mercury-vapor rectifier, and the Wunderlich, a special tube for push-pull power grid detection that also delivers a voltage that can be used for automatic volume control of a receiver.

□ Ed Handy, WIBDI presents the "A.R.R.L. Affiliated Club Directory," and points out some of the difficulties in maintaining the list (some famous club names here).

□ Mr. William D. Terrell, chief of the new Division

of Field Operation, Federal Radio Commission, speaking at the Atlantic Division Convention in middle June, reports that the latest figures show there are 31,859 licensed amateur stations in the country, an increase of about 40 percent in the past year.

□ A photo on page 57 shows the 1924 Hq. station, 1MK, at 1045 Main Street, Hartford. The 77-meter rig used four UV202s in a parallel Hartley circuit; the receiver was breadboard UV200-UV201 with Lorenz coils.

25 Years Ago

September 1957

□ Howard F. Wright, W1PNB, an early sideband enthusiast, writes about "The Third Method of S.S.B.," a system devised by D. K. Weaver and described in the *Proc. I.R.E.*, December 1956. The circuit involves audio filters, four balanced modulators and two simple phase-shift networks; W1PNB's version is typical "ham haywire" construction, but works well and generated considerable interest during many 75-meter QSOs.

□ Vernon Chambers, W1JEQ, tells of his "V.F.O. Control for the ARRL Model 6-60-90," an under-the-dash companion unit for the mobile a.m. rig he described last month.

□ "Transistors in Speech Equipment," by Hans J. Albrecht, VK3AHH, treats the use of available transistors as low-level audio amplifiers. Transformer vs. RC coupling is discussed, and a practical three-stage circuit is included.

□ Carrying earlier audio-selectivity devices a step further, L. I. Albert, W1PLM, tells how to get "Greater Selectivity with the C.W. Clipper-Filter." Bandwidths of 200 to 600 cycles at -40 db. are obtained with two cascaded filters.

□ Dave Geiser, W1ZEO, discusses "The Effect of

Capacitance on Power-Supply Filter Bounce," an interesting treatment of choke-input filters and their effect on dynamic regulation. (Mercury-vapor rectifiers were used; subsequently, silicon rectifiers and their higher peak-to-average current ratings were to make such discussions academic.)

□ A *Technical Topic* by Technical Editor Grammer reviews the background for "Satellite Tracking," a soon-to-be "hot" item in ham radio. To prove the observation, John Firor, of the Carnegie Institution, describes "A Radio Telescope," a phase-switching radio interferometer; Roger Easton, of the Naval Research Lab, writes about "Mark II Minitrack Base-Line Components," a broadside array of eight dipoles.

□ Getting down to more earthy subjects, Lew McCoy, W1ICP, discloses "A \$1.69 Keying Monitor," a neon-bulb oscillator to be used with cathode-keyed transmitters. Also basic is "How's Your Soldering?" by John Magnusson, W0AGD — excellent advice on another "hot" subject.

□ The E. F. Johnson Viking "Valiant" is reviewed in *Recent Equipment*. This a.m./c.w. rig uses three paralleled 6146s in the output stage, and features time-sequenced keying on c.w. and clipping and filtering on 'phone. The output stage can be used as a linear amplifier when driven by an external s.s.b. generator. Coverage is 160 through 10 meters.

□ T. E. Stewart, W2TBD, tells of the trials and tribulations of "Transmitter Hunting — South Jersey Style." This is 2-meter "hare and hounds" — a 2-meter cubical quad is one of the weapons.

□ R. B. Bourne, W1ANA, treats "Side Band" in his distinctive style (no verbs). (It entertainingly reflects the attitude of a high percentage of "old-timers.")

□ In "The World Above 50 Mc.," columnist Ed Tilton, WIHQ, recounts the outstanding work of John Chambers, W6NLZ, and Ralph "Tommy" Thomas, KH6UK, in setting their record "first" on 2 meters: a 2540-mile QSO. As Ed says, it did not "just happen." They tried for about eight months with absolutely no encouragement before they caught the right conditions on July 8. — *Byron Goodman, W1DX*

Simulated Emergency Test Announcement

Go for it on October 16-17

By Robert Halprin,* K1XA

No activity has attracted more favorable or consistent public attention than the instances when amateurs have kept communications open during and after floods, forest fires, hurricanes, ice storms and the like. And no activity gives the amateur a stronger sense of fulfillment, of pride in a job well done, than to aid his neighbors in time of crisis.

The Amateur Radio Service is unique in its combination of substantial numbers of widespread geographical distribution, its long-distance capability, its variety of equipment and bands, its freedom to serve all relief agencies voluntarily and on equal footing. Other services can do a little something when the chips are down, but a trained group with pre-tested equipment and well-laid-out plans can do much more.

A League objective for many years has been to improve our emergency communications training and capabilities, through the sponsorship of the Amateur Radio Emergency Service (ARES) and the National Traffic System (NTS). ARES and NTS get their workout in the ARRL Simulated Emergency Test. At the national level, Hq. provides a framework within which local groups can practice and prove the procedures they'll follow when a real test of their ability arises. But SET is a grassroots show; League officials in the ARRL field organization are in the driver's seat within their areas of jurisdiction. The form the SET takes is up to these League officials.

If you are a member of ARES, hold the weekend of October 16-17 open, and check with your local Emergency Coordinator about his plans. If you're a participant in an NTS net, try to be on hand during the weekend (and the following week).

If you're neither an ARES member nor a net operator, isn't it time you were? Contact your local Emergency Coordinator to ask about details of participation. If neither you, other hams, nor the local radio club know the EC's name, contact your Section Emergency Coordinator (see list) or your Section Communications Manager (see page 8) for the info. There's a place for you, whatever your frequency band and mode. Listen a few evenings to catch on to the procedures used on ARES/NTS nets, then wade in. Most control stations will be patient,

courteous and genuinely glad to welcome a new recruit.

The preceding words were taken from the editorial in October 1963 *QST*, and the message has stood the test of time. But how does one participate in SET, 1982-style? Here's how.

Most local activity, particularly of an ARES nature, will occur on 2 meters. If you have a 2-meter fm transceiver, you're golden. Contact your local or district EC, and volunteer to help (your SEC or SCM can tell you who your EC is).

Many ARES groups work closely with RACES and civil preparedness entities, Red Cross, Salvation Army, REACT, and other agencies. Thus, there should be more than enough assignments for everybody. If it turns out that your locality does not have an EC, perhaps you or another qualified amateur could volunteer for that role. Let your SEC and/or SCM know.

With 2-meter fm capability, you can also enjoy the many NTS local nets that exist on that band. If you are unfamiliar with formal traffic-handling procedures, we suggest you read up

Table 1
NTS Schedule During SET, October 16-17

Cycle ONE	Cycle TWO	Cycle THREE	Cycle FOUR
10:00 A.M. Section	1:00 P.M. Section	4:00 P.M. Section	7:00 P.M. Section
10:45 A.M. Region	1:45 P.M. Region	4:45 P.M. Region	7:45 P.M. Region
11:30 A.M. Area	2:30 P.M. Area	5:30 P.M. Area	8:30 P.M. Area
12:30 P.M. Region	3:30 P.M. Region	6:30 P.M. Region	9:30 P.M. Region
			10:00 P.M. Section

THE AMERICAN RADIO RELAY LEAGUE			
RADIOGRAM			
NUMBER <u>17</u>	DATE <u>TEST P/B</u>	TO <u>WILLOU ARL'S</u>	FROM <u>Plainville, CT</u>
To <u>Larry Lunchbucket</u> <u>General Hospital</u> <u>La Porte, Texas, Kansas</u>		THIS RADIO MESSAGE WAS RECEIVED AT NAME _____ PHONE _____ STREET ADDRESS _____ CITY AND STATE _____	
TELEPHONE NUMBER <u>555-8451</u>			
<u>Test</u>	<u>Message</u>	<u>X</u>	<u>ARL</u>
			<u>FIFTEEN</u>
<u>CHAD LORIS</u>			
REC'D FROM <u>K5XA</u>	DATE <u>10/17</u>	TIME <u>1700Z</u>	SENT TO DATE TIME
<small>THIS MESSAGE WAS HANDLED FREE OF CHARGE BY A LICENSED AMATEUR RADIO OPERATOR WHOSE ADDRESS IS SHOWN IN THE BOX AT RIGHT ABOVE. AS SUCH MESSAGES ARE HANDLED SOLELY FOR THE PLEASURE OF OPERATING NO COMPENSATION CAN BE ACCEPTED BY A HAM OPERATOR. A RETURN MESSAGE MAY BE FILED WITH THE NAME DELIVERING THIS MESSAGE TO YOU. FURTHER INFORMATION ON AMATEUR RADIO MAY BE OBTAINED FROM ARRL HEADQUARTERS, 225 MAIN STREET, NEWINGTON, CONN. 06111.</small>			<small>THE AMERICAN RADIO RELAY LEAGUE, INC. IS THE NATIONAL MEMBERSHIP SOCIETY OF LICENSED RADIO AMATEURS AND THE PUBLISHER OF QST MAGAZINE. ONE OF ITS FUNCTIONS IS PROMOTION OF PUBLIC SERVICE COMMUNICATIONS THROUGH AMATEUR OPERATORS TO THAT END THE LEAGUE HAS ORGANIZED THE NATIONAL TRAFFIC SYSTEM FOR DAILY NATION-WIDE MESSAGE HANDLING.</small>
<small>PRINTED IN U.S.A.</small>			

Fig. 1 — An example of a properly filled-out SET radiogram

*Deputy Communications Manager, ARRL



The control station is the boss for all SET activities. (photo of K8RO courtesy K8QLM)

on the information contained in the *Public Service Communications Manual, Operating An Amateur Radio Station* and *Net Directory Manual*, which is available at your local radio book counter.

Those of you who are low-band oriented can get in on the SET action by helping out on the section-level NTS nets. Most every ARRL section has a traffic net meeting on 75/80 meters. In an emergency, it is imperative that all stations go about handling communications in a standardized format. So it is important to be aware of the procedures spelled out in the above publications, as well as to monitor and report into net sessions before the SET. The National Traffic System will expand into four cycles (see Table 1) during SET weekend to deal with the expected traffic overload. There will be plenty of net control, liaison and delivery functions to go around, so your presence will be greatly appreciated.

For SET, all nonroutine Test messages should carry the word TEST before the precedence, e.g., Test Priority on phone or TEST P on cw. As a further step to ensure that test messages will not be construed as the real thing, use the words TEST MESSAGE in the first two words of the text. See Fig. 1 for a SET message in correct form.

Do not use TEST in the precedence or in the text of a routine message. A routine message is a routine message, regardless of whether or not it was drafted for the SET. And for improved efficiency — and fewer migraine headaches — avoid using long words such as participating, communications, etc., in texts whenever possible.

To prevent SET messages from dragging out beyond the SET period, the handling instruction HXB is used. Loosely interpreted, HXB means "cancel message if not delivered within the SET period; send a service message to originating station." For SET messages sent during exercises held on a date other than the primary weekend, use HXB48, which means "cancel message if not delivered within 48 hours of filing time; send a service message to originating station." If a message is not a test message and you would like to have it delivered even after SET is over, don't use HXB at all.

Although October 16 and 17 is the official SET weekend, groups are free to hold their

Section Emergency Coordinators of the American Radio Relay League

Alabama: Carl Weaks, N4DMA, 1341 W. Navajo Dr., Alabaster 35007
Alaska: Will Darsey, AL7AC, SR Box 80660, Fairbanks 99701
Arizona: Erich J. Holzer, N7EH, 3526 E. March Pl., Tucson 85713
Arkansas: Joel Harrison, WB5IGF, 1403 Forrest Dr., Searcy 72143
California:

East Bay: Dwayne L. Eskridge, W6LKE, P.O. Box 5502, Walnut Creek 94596
Los Angeles: John Walsh, N6UK, 1260 E. Sierra Madre, Glendora 91746
Orange: Joe H. Brown, W8UBQ, 5444 La Sierra Ave., Riverside 92505
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San Diego: Arthur R. Smith, W6INI, 4515 Melisa Way, San Diego 92117
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Florida:

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Idaho: Harold Short, WA7UHW, 923 - 10th St., Rupert 83350
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Iowa: Ralph Wallo, W4RPK, RR 4, Indianola 50125
Kansas: W. D. Bemmels, W4KLL, 40 Rockwood Dr., Ottawa 66067
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Louisiana: *John J. Meyer, N5JM, 112 Sherwood Forest, New Orleans 70119
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Massachusetts:

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Missouri: James Bair, N6AJI, 136 N. Lawn, Kansas City 64123
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Nevada: Richard N. Dresbach, WA7KCD, 9250 Spearhead Way, Reno 89506
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New Jersey:
Northern New Jersey: Robert Weingaertner, WB2VUF, 21 Brook Dr., Morris Plains 07950
Southern New Jersey: Austin B. Prastwood Jr., W2HOB, 6 Kingsley Rd., Mount Holly 08060
New Mexico: R. B. Goodman, W5ALR, 2821 A Palo Verde NE, Albuquerque 87112
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Western New York: James M. Mozley, W2BCH, 126 Windcrest Dr., Canillus 13031
North Carolina: Charles M. Davis, N64L, 304 Atchison Dr., Garner 27522
North Dakota: Mike Menkey, W4TTE, 1218 Pocattello Dr., Bismarck 58501
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Oregon: Wesley A. Allen, K7YWG, 2870 S.W. 199th Pl., Aloha 97005
Pennsylvania:

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Western Pennsylvania: Paul Cherish, AB3Q, 304 Bluff St., Kittanning 16201
Rhode Island: Edmond H. Cote Jr., KA1EHR, 309 Franklin St., Warren 02885
South Carolina: Lotus Allison Jr., K4SUG, Rte. 5, Box 15, 5 Gaston Dr., Travelers Rest 29690
Tennessee: Melvin L. Chandler, K4TKQ, Rte. 4, Box 312, Rockwood 37854
Texas:
Northern Texas: Charles T. Byars, W5GPO, 4217 Meadowbrook, Wichita Falls 76308
Southern Texas: Allen R. Guy, WA5RVT, 122 Ash Ln., Lake Jackson 77566
Utah: George A. Mackley, WB7BZJ, Box 523, Sunset Estates, Irving 84738
Vermont: Read A. Garfield, WB1ABQ, P.O. Box 571, Lyndonville 05851
Virginia: John Parker, WB4UHC, 177 Ira Dr., Yorktown 23692
Washington: Steve Hart, K7SH, 1568 E. Ocean Bay Hwy., Cathlamet 98612
West Virginia: George Puzzuolo, K8QEW, 3618 Morgan Dr., Weirton 26062
Wisconsin: Gary D. Maples, W9OAK, 1006 Marquardt Rd., Wausau 54401
Wyoming: Gregg G. Wood, WB7EIN, 901 Cahill Dr., Cheyenne 82001
West Indies: Jose Vazquez, KP4CU, P.O. Box 2864, Bayamon, PR 00619

Canada

Alberta: E. Roy Ellis, VE6XC, P.O. Box 2, RR 1, Ft. Saskatchewan T8L 2N7
British Columbia: H. E. Savage, VE7FB, 4553 W. 12th Ave., Vancouver V6R 2R4
Manitoba: Richard B. Maguire, VE4HK, 588 Tremblay Ave., Winnipeg R2J 0N8
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Ontario: Jack W. Strangeman, VE3GV, 512 Pinetree Dr., London N6H 3N1
Quebec: Adrien Michaud, VE2DEA, 1630 St. Croix Blvd., Montreal H4L 3Z8
Saskatchewan: Lawrence W. Kyle, VE5II, Box 2022, Melville S0A 2P0

*No appointed Section Emergency Coordinator; Section Communications Manager listed.

SETs on any two-day period between September 1 and October 31 to coincide when amateur activity, public service value and mass-media exposure can be the greatest. This year, however, special emphasis will be placed on having section-wide SETs on the official SET weekend (details on this will be included in the annual SET Bulletin, mailed to all League officials), but all SETs held within the two-month period will be included in the SET results in QST. The deadline for all reports is January 31, 1983.

While all League officials automatically receive the necessary reporting forms, those of you who are not ARRL field-organization leaders can request the SET Bulletin from ARRL Headquarters. These reports are necessary so that the actions of Amateur Radio

operators in this nationwide public service exercise can be documented.

Effective public service communicating often requires emergency power. Would you be able to communicate if you suddenly lost commercial power? This is commonplace in many emergencies. Some exercises and net sessions will operate on the assumption that electrical service has been disrupted. Equip yourself with some sort of emergency-power source or battery-operated gear.

Quicker than you can say "Larry Lunchbucket," you'll be having fun with whatever aspect of SET you choose to participate in. But don't accept any third-party traffic, as it were, for it. Experience this activity firsthand. Or, to use the slogan of the 1980s, "Go for it!"

Rules, Sixth ARRL International EME Competition

In response to overwhelming input from the EME contest participants, the next ARRL EME Contest will be held this fall, on the weekends of October 9-10 and November 6-7. This should give more stations a chance to get things working during the warmer months. Also, there is some hope that conditions will be better than during the spring. Pray for an absence of aurora!

The rules are essentially the same as the spring contest, except that both single-band and multi-band entries will be recognized. This recognition will come in the form of QST listings and in the awards offered.

An s.a.s.e. to ARRL Hq. will get you the official entry forms. Good hunting!

Rules

1) **Object:** Two-way communications via the earth-moon-earth path on any authorized amateur frequency above 50 MHz.

2) **Contest Period:** Two full weekends, Oct. 9-10 and Nov. 6-7, full 48-hour period UTC each weekend.

3) Categories:

(A) Single Operator: one person performs all operating and logging functions, equipment adjustment and antenna alignment.

(1) Multi-band.

(2) Single-band: Single-band entries on 50, 144, 220, 432, and 1296-and-up categories will be recognized in awards offered. Contacts may be made on any and all bands without jeopardizing single-band entry status. Such additional contacts are encouraged and should be

reported. Also see Rule 8, Awards.

B) Multioperator: Two or more persons participate; includes neighboring amateurs within one call area, but with EME facilities for different bands on different team members' premises, as long as no two are more than 50 km (30 miles) apart. Multioperator neighborhood groups cannot use the same call signs at each location; all calls will be listed in the results.

C) Commercial equipment: Stations using equipment that is not amateur (such as a dish antenna for lab equipment owned by an institution or government agency) will have their scores listed separately.

4) **Exchange:** For a valid contact to occur, each station must send and receive both call signs and a signal report in any mutually understood format, plus a complete acknowledgement of the calls and report. Partial or incomplete QSOs should be indicated in your log, but not for contest credit.

5) Scoring:

A) QSO Points: Count 100 points for each complete EME contact.

B) Multiplier: Each U.S. and Canadian call area, plus each DXCC country (not U.S./Canada) worked via EME on each band.

C) Final score: Multiply QSO points by sum of multipliers worked on each band for your final score.

6) Miscellaneous:

A) Fixed or portable operation is permitted. Stations operating outside traditional call areas *must* indicate so, identifying the call area of the operating site.

B) Contacts may be on cw or ssb. Only one signal per band is permitted.

C) A transmitter, receiver or antenna used to contact one or more stations under one call sign may not be used subsequently under any other call sign during the contest, except for family stations where more than one call has been issued, and then only if the second call sign is used by a different operator.

D) There is no specified minimum terrestrial distance for contacts, but all communications must be copied over the moon-bounce path, regardless of how strong (or weak) a nearby station's terrestrial signal may be.

7) **Reporting:** Entries must be postmarked no later than 30 days after the contest and must include complete log data. Your summary sheet should indicate the total number of QSOs on each band, multipliers per band and final score. If possible, include details of your station set-up and a photo.

8) **Awards:** Certificates will be issued to the top five stations worldwide in each of the entry categories: single operator multiband; single operator single band (separate awards for each band); and multioperator. Additional awards will be issued where significant achievement or competition is evidenced. In addition, each station that successfully completes at least one EME contact during the contest period will receive a certificate commemorating that achievement.

9) **Disqualification:** See January QST, page 92.

Results, June VHF QSO Party

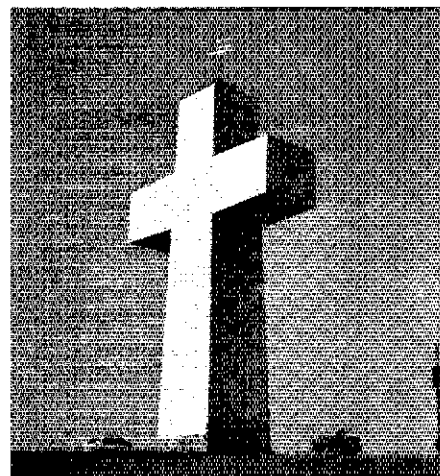
By Mark J. Wilson,* AA2Z

The 1982 ARRL June VHF QSO Party will be remembered by many vhf enthusiasts as one of the best vhf contests in years. Participants were treated to the best of everything propagation had to offer this time, including excellent aurora in the afternoon and early-evening hours both days, sporadic E (including coast-to-coast double-hop E_s) and some extended tropo.

The contest got off to an uneventful start, with spurts of single-hop E_s on 6 meters and average conditions on the higher bands. But a few hours into the contest, the experienced hands started noticing auroral buzz on some signals, and the excitement was on! Most of the northern half of the country was treated to a

prolonged aurora that enhanced signals as high as 432 MHz. On 6 meters, the aurora allowed stations to fill in the gaps between E_s and tropo range. And witness the following 2-meter section totals: W8VP, 36; WB8IGY, 34; W3GNR and K9MRI, 32; VE3ONT and W9IP, 31. The midwestern stations, usually left out in the cold on 2, did very well.

The aurora also brought with it a golden opportunity for those with 220 capability to show their stuff. W3GPY brought his EME equipment out to the W3BBS site and cleaned up, working an all-time high of 31 sections on that band. K1WHS lugged his 220 EME array up to the W1FC mountaintop, only to work via aurora all but one of the stations he worked via the moon. Up on 432, K2RIW reports that he heard W9ZIH on the aurora. As if one day wasn't enough, the aurora appeared again the



No cross-band work for the operators of AA9D. With antennas atop the 111-ft Bald Knob Cross, they easily took the top multiop position in Illinois.

second afternoon, much to the delight of those missing it the first time around.

On Saturday night, an excellent extended tropo opening made for easy contacts between stations in the Northeast and the Carolinas and northern Florida. There was also a very brief opening to Florida for those W9s lucky enough to be in the right place at the right time. Several Northeastern 432 ops also worked down the coast to northern Florida, while K4QIF from Virginia was pounding in on 1296. Out west, several W6s report good coastal openings and a high level of 1296 activity.

We have come to expect some E_s during the June contest, and this year was no exception. There were short single-hop openings for everyone throughout the contest. Then, on Sunday evening, everything broke loose with an excellent opening that lasted right on through to the end of the contest. The big multiops and single-band 6-M ops had to work at least 55 multipliers to be competitive. Many worked more than 60, while W2CNS/8 found 73 and K5CM hunted down 72.

With conditions like these, it's not surprising that 13 new all-time division records were set, and that we now have new all-time single-op and multiop records. Single op K1FO took home the honors this time from his river-bottom location in Connecticut. Steve's 109,855 points represent an understanding of

the various modes of vhf propagation honed by years of experience, allowing him to juggle his operating time expertly to get the most out of each band. W2SZ/1, operating from Mt. Greylock in western Massachusetts, set the new record in the multiop category, taking it back from W1FC, who grabbed it last year. Aside from a nice showing on the "lower five," the 'SZ group is expanding into the microwaves with QSOs on 2.3, 3.4, 10, 24 and 48 GHz.

Other new single-op division records include WB81GY's Great Lakes score, which is almost 20,000 points higher (thanks, aurora!) than the WA8TTS score from 1979. In the Hudson Division, WB2DNE (operating K2CBA) just barely beat WA2FGK's record, set last year, while W0RT squeaked past the 1980 WB0TEM Midwest Division record. Up in Canada, VE3ASO added 12 kilopoints to VE2DFO's 1981 record score.

Aside from W2SZ, seven other multiop groups have added their mark to the division record box. In the Atlantic Division, the Pack Rat Crew at W3CCX added 36,000 points to their 1981 record. In the Dakota Division, W0SD's record, set just last year, fell to the dedicated vhf group at W9UD/0, who used aurora and E_s to up the ante by 25,000 points. W8VP upped the 1980 WA8ONQ Great Lakes record by 28 kilopoints, while the W2CNS/8 group jumped their own 1981 record by 61,000. Out in the Rocky Mountain Division, AA0L surpassed the 1981 N0BRI record by 7500 points, and West Gulf Division leader K5CM's score is 18 kilopoints higher than the 1980 K5LZO record. Perhaps the biggest surprise was the Top Ten score from VE3ONT that increased the group's 1974 record by just over 100,000 points! Congratulations to all the division leaders for setting some June records that may stand for years to come.

This year's June party was different from past years in several respects. Single-band categories were introduced, and the use of 146.52-MHz simplex was prohibited, while the

time limit on 223.50 simplex was lifted. The single-band entry categories, designed to give those with only one band a chance to compete, appear to have been successful. Of the 593 total entries we received, 225 were for single-op, multiband, and 224 were for single op, single band. The overall number of entries is up about 8 percent from last year's 547. The vast majority of operators commenting on the single-band entry classes liked the idea, and more than a few of the single-band entrants indicated that the new categories gave them the incentive to get on and try.

While there were a few ops who were vehemently opposed to the elimination of 146.52 simplex as a contest frequency, a large majority were in favor of the new rules. In fact, unsolicited comments from all areas of the country suggested taking it one step farther and eliminating 2-meter fm as a contest mode or restricting its use to the 144.9- to 145.1-MHz region. The top two single ops, K1FO and W9IP, both asked to be put on record as having used no fm at all. If you have an opinion on the use of fm during contests or on anything else connected with vhf contesting, transmit your ideas to the Ad Hoc Committee for VHF/UHF Contesting via W1XX at ARRL Hq.

And finally, here are a few administrative notes. We can't seem to stress this point enough: The only requirement for a complete and valid June VHF QSO Party (and September, too!) QSO is call sign and the name of the ARRL section in which you are located. You must send this information for each contact, and you must receive and log it for each valid QSO you claim. RST-type signal reports are *not* required for the QSO Parties. They never have been, ever since the very first June Party was held in 1949. Also, a signal report is *not* required for the WAS or DXCC cards. If you *also* wish to exchange and write down signal reports, that's fine; but we don't even look at any signal reports written in the log when considering whether a contact is valid or not.

Several stations probably will notice that their scores are not reported in the listings. The mailing deadline was 30 days after the contest (in this case, July 13), which is about the same time this copy was prepared for inclusion in September *QST*. You must mail on or before the deadline, or the *QST* deadline dictates that your score will not be listed. With *QST* space at a premium these days, the June contest results must appear either in September or December, and we think you like to see them as early as possible.

SOAPBOX

The operation of our contest radio wasn't complete chaos, but close. All of the operators except me hadn't been in a contest before, but what they lacked in experience they made up for in enthusiasm (N4NY). I probably worked more stations on 6 meters on Sunday than I have in the past 20 years! (VE2AEJ/3). Best 23-cm activity during a contest to date — 20 QSOs, 8 sections, 420-mile DX (K6ELQ). Where the heck did XE1JJU/XF4 come from? Could have used more like that (N0BRI). Probably the most-fun contest experience in many years. Never a dull moment. Good meteor scatter for appetizers, a steady repast of aurora for two days and a delicious dessert of E_s that refused to quit. Came tantalizingly close to division record — gives me something to shoot for next year (W0XG). Picked up three new states on 220 MHz (K0DAS). 800 miles round trip, a bad carburetor, 40-mph winds, just to make three 1296-MHz QSOs — and my wife, WB6OPA, brought lite beer! (N6CA/7). It certainly will be many years before we again have a contest as good as this one (ACIT). My measly 15 watts just

Top Ten

Single Operator	Multioperator	Points
K1FO	W2SZ/1	342,855
W9IP	W1FC	311,298
K1EM	W3CCX	276,675
K2CBA	W3BBS	257,094
WB81GY	W1VD	217,626
W2CRS	W2CNS/8	214,472
WA1UQC	K1TR	202,184
W9OEH	VE3ONT	182,582
WB1CJT	WA2SNA	150,921
VE3ASO	K3YTL	142,921

Multiplier Leaders

Single Operator

50 MHz	144 MHz	220 MHz	432 MHz	1296 MHz
WA1UQC — 64	K1FO — 29	K1FO — 18	K1PXE — 17	K1FO — 8
W2LT — 65	KC2ME — 26	W2CRS — 18	K2RIW — 26	W1JR
A3T — 62	K3SXA — 26	K3SXA — 17	K3SXA — 17	K2LNS — 10
N4MM — 64	N4AR — 28	W3IY/4 — 8	K4QIF — 18	W3IP — 6
	W4UJH — 13			K4QIF — 9
K5ZD — 80		N4JS/5 — 5	(4 stns) — 6	WB5LUA — 4
N8BXP — 46	WA6LHD — 11	WB5LUA	(3 stns) — 8	K6ZMW — 8
KB7Q — 46	KB7Q — 9	WA6EKD — 7	K7KOT — 3	K7GNV/7 — 4
	W7HAH	K7KOT — 3	WB7UUP	
WB81GY — 68	WB81GY — 34	WA8TXT — 17	WA8TXT — 9	K8WW — 11
W9OEH — 72	W9IP — 31	W9IP — 18	WB8SNR — 13	WB8SNR — 6
W0XG — 58	K0DAS — 19	W0VB — 16	W0RT — 6	
VE3ASO — 80	VE3ASO — 27	VE3ADJ — 18	VE3LNX — 7	VE3LNX — 2
				VE3BFM

Multioperator

50 MHz	144 MHz	220 MHz	432 MHz	1296 MHz
W1VD — 85	W2SZ/1 — 30	W1FC — 28	WB1FGW — 24	W2SZ/1 — 14
K2KLP — 61	WA2SNA — 29	WA2GBG — 16	W2SZ/1	K2BWR — 9
W3BBS — 66	W3GNR/3 — 32	W3BBS — 31	W3BBS — 21	WB3CCX — 16
WA8LXJ/4 — 65	W4IY — 28	W4IY — 14	W3CCX	WB4NMA — 1
K5CM — 72	K5CM — 19	N5DL — 9	W4IY — 13	K5CM — 3
			N5DL — 9	
W6XJ — 54	WA6EJO — 12	WA6EJO — 8	K5CM	WA6EJO — 9
	K1RZ/6		WA6EJO — 11	
K7OO — 63	K7OO — 9	K7OO — 5	N7BPA	N7BPA — 7
		N7BPA	W2CNS/8 — 29	
W2CNS/8 — 73	W8VP — 36	W2CNS/8 — 29	W2CNS/8 — 21	W2CNS/8 — 4
				K3LNX/8
K91MM — 65	K9MRI — 32	K91MM — 16	AA9D — 8	K91MM — 2
AA0L — 66	W9UD/0 — 25	W9UD/0 — 16	W9UD/0 — 10	W9UD/0 — 3
VE3ONT — 65	VE3ONT — 31	VE3ONT — 22	VE3ONT — 18	VE3ONT — 6

Helping the NCS

Here's a new one for your log of Amateur Radio abbreviations: NCS. No, that's not a dupe, because it doesn't mean net control station. It means National Communications System.

The National Communications System, established by a presidential memorandum in 1963, is an alliance of U.S. government agencies and departments, such as the Federal Emergency Management Agency, the Federal Communications Commission and the Department of Defense. Its mandate is to provide "necessary communications for the Federal Government under all conditions ranging from a normal situation to national emergencies." A 1979 presidential directive reaffirmed NCS's responsibility to plan, coordinate and maintain a national plan for federal government telecommunications support in the event of a national disaster or emergency, when normal communications are likely to be disrupted.

NCS officials are aware that the large number of experienced and trained amateurs in the ARRL field organization is a fantastic — and tax-free — national resource for providing emergency communications. These officials know the attributes of the Amateur Radio Service, that amateurs traditionally have been active in volunteer public service communications, that amateurs are innovative, that many amateurs have portable and mobile equipment and emergency power capability. Federal officials also understand that the ARRL field organization is decentralized for simplicity, flexibility and efficiency of operation, and is very dependable in emergencies.

Because of the desire of federal officials to have a closer working relationship with amateurs, NCS has sponsored two rather simple and limited message-handling exercises this summer. They were designed to demonstrate the capabilities, reliability and

procedures of the Amateur Radio Emergency Service and the National Traffic System (MARS has also been involved). Some of the readers of this column have coordinated these activities in specific localities, activities that were designed to evaluate our message accuracy and efficiency, message-routing procedures, interface among originating officials and the ARES/NTS leadership in the areas, and so forth.

No, a skywriter wasn't hired to inform all of the ARES/NTS leadership of these tests in advance, because amateurs have been working with NCS-member agencies for years. So this is nothing radically new; the few extra messages entered in the system are no big deal. More importantly, if everyone were looking out for those messages (or what might be those messages), prepared to exert some sort of extraordinary or unusual handling, then what kind of test of *existing* networks and procedures would that be? The answer, of course, is self-evident.

Not to worry, however. Each ARRL section will have an opportunity to add some NCS flavor to the Simulated Emergency Test, October 16-17. Details on the NCS tie-in are contained in the "SET Bulletin," which is mailed to all leadership officials in the ARRL field organization. (A general overview of SET appears elsewhere in this issue.)

So, what the NCS has done is simply taken the great emergency and public service communications job that amateurs perform at the local, state and regional level, and extrapolated that to the national level. In addition to amateurs' (primarily the League's field organization) providing emergency government communication, NCS anticipates that hams would play a crucial role in establishing an "order wire" to restore communications among population centers in a national emergency.

What is an order wire? Be advised that this writer is not an expert on technical details or government jargon, but as I understand it, the order wire is actually *wireless*. The order wire is conceptualized as an hf Amateur Radio network that would help "glue" everything back together in the event of a national disaster. That is to say, it would be an absolute-priority network that would assist the highest levels of government, telephone and microwave agencies in restoring broadband, landline/microwave networks. The only transmissions allowed on such an order wire would be critical national communications and traffic on behalf of the aforementioned essential common carriers. Again, these vital communications would be handled by radio amateurs.

Now, this order-wire stuff is a far cry from the initial steps of relaying a few messages through NTS during the summer, but this should give you an idea about the major role Amateur Radio could play in the NCS scheme of things.

Whether the order wire will even be activated is an open question. We all hope it *never* is, because it will probably follow widespread suffering. Nevertheless, in an era in which amateurs are often in the confrontation mode with civil authorities about tower ordinances and RFI problems, and when some very important Amateur Radio-related legislation is pending on Capitol Hill, it behooves us as a service to maintain high visibility and participation in such programs as NCS. The age of the hermit ham has ended; we must be out front and in force, particularly in the emergency/traffic realm.

Could the Amateur Radio Service effectively link the broadband communications network of the National Communications System? That can be answered by another question: Who else could do it?

AMATEURS ASSIST CAP

It started with a routine CAP (Civil Air Patrol) search for an emergency locator transmitter (ELT) in the area northeast of Hartford, Connecticut. It ended with a successful "find" of an active ELT in an aircraft on the ramp of the Hiller Airport, about 10 miles north of Brookfield, Massachusetts. Before it was over, it provided as beautiful a demonstration as I have ever witnessed of the spontaneous involvement of two volunteer organizations in the public interest: CAP and Amateur Radio.

CAP is chartered by Congress as an auxiliary of the U.S. Air Force. One of its primary missions is SAR (search and rescue). One of the most frequent SAR missions is locating active ELTs, which are required by law to be carried by every private aircraft. ELTs can be activated by excessive G forces, which could be encountered in a crash or a very hard landing. The CAP, because of a two-frequency vhf-fm restriction and

economics, has only a single repeater in Connecticut (Middletown). The range of this repeater is, at best, north to the Connecticut/Massachusetts border. Because of the hilly terrain, there are many areas, even within this coverage, where access to the CAP repeater is not possible for ground teams.

Enter ham radio. Without hesitation, the members of the Pioneer Valley Radio Association (PVRA) not only made the 146.19/79 repeater in Vernon, Connecticut (WAIKGG), available to CAP amateur operators, but also assisted the CAP ground teams very actively. Throughout the search, these Amateur Radio operators provided communications via autopatch between the ground team locations in Massachusetts and the CAP mission base at Brainard Airport, in Hartford. Using sectional maps and detailed knowledge of their local areas, the hams vectored the ground teams to little-known airports, where checks were made for ELT signals. Finally, and most importantly, these hams relayed vital coordinates to the ground teams, as well as the most safe and effective ways to reach them, based upon information compiled from a CAP member of the Massachusetts wing, Westfield Squadron, who was also a ham. This was information the ground teams could not hear because of terrain problems.

While KAIBR and WIVMY were the most active, many PVRA members on the 79 repeater provided helpful information, while many other members stood by so as to not interfere with important communications. It went like clockwork. We were lucky; the ELT was found in a parked aircraft. No crash, no injuries, no fatalities. This is not always so. In incidents involving injuries, time is of the essence. ELTs have only a 48-hour lifetime in cold weather.

Rapid, reliable communication is absolutely essential to an SAR mission, especially when an ELT is involved. The splendid cooperation of both the CAP and Amateur Radio operators was a key factor in the radio location of this ELT. CAP would like to take this opportunity to thank the members of PVRA for their personal help and the use of the 79 repeater. — Ed Sommerfeld, W2FJT, Captain, Connecticut Wing, CAP

PUBLIC SERVICE DIARY

□ Woodland Park, Colorado — April 23. WBØFLU spotted a structural fire in a housing subdivision a few miles outside of town. Using WØJAW/R, he contacted NØCJG, who then notified the Teller County Sheriff's office of the situation. WBØFLU remained at

*Deputy Communications Manager, ARRL

the site to direct fire-fighting units to the fire. Through his efforts, the fire fighters were able to prevent any further damage or danger to the nearby national forest. (NØBXI)

□ Fairfield, Iowa — June 18. While traveling on a rural road, WBØBHF came across a two-truck collision. After stopping, he found two persons sitting dazed in one truck and one person lying on the road, bleeding from the nose and mouth. After applying first aid to those injured, WBØBHF called in the emergency to the Fairfield Law Center. Emergency personnel were dispatched immediately. Fortunately, no one suffered serious injuries from the accident. (KØHYH, DEC SE Iowa)

AMATEUR RADIO EMERGENCY SERVICE REPORTS

□ Greensboro, Georgia — Feb. 25. A derailed railroad tank car, containing phosphorous trichloride, forced the evacuation of nearly 3000 residents. Ten ARES members responded to the telephone call-up. AA4U and K4ZCI drove to the Red Cross shelter that had been set up in nearby Union Grove to house about 350 of the evacuees. Once at the shelter, they set up and used a 2-meter simplex station to relay information to officials. They also installed a 75-meter station, which served as the primary communications link to the GEMA office in Atlanta. (WB4HXE, SEC Georgia)

□ Jonesboro, Tennessee — March 16. A train carrying various dangerous chemicals derailed. As a preventive measure, everyone within a half mile of the wreck was evacuated. Washington County ARES members were summoned into action by EC WB4SQ, who went to the Johnson City EOC to work with other RACES operators. Although the actual crisis lasted only about seven hours, the hams stayed on standby alert until the next day. Fortunately, no injuries related to the accident were reported. (AB4V, AEC Washington Co.)

□ Alviso and San Jose, California — March 31-April 5. Nearly 90 ARES members supported the Red Cross by setting up communications at two RC shelters that were being used for housing flood victims. During the six-day period, the ARES operators provided communications for the damage-assessment teams, and dispatched vehicles for the Red Cross. (KA6R, EC San Jose Red Cross)

□ Marion County, Florida — April 9-10. Local amateurs were needed to perform support communications for civil defense officials after flooding (which led to the appearance of some "sinkholes") left many people homeless. The hams also conducted damage-assessment trips for c.d. personnel, checking on reports from around the area, on the Marion County ARES Net on K4GSO/R. (W4UEA, DEC West Central Florida)

□ Kahului, Hawaii — April 24. Maui ARES provided communications for the annual March of Dimes Walk-America. Amateurs were stationed at each of the 10 checkpoints and at the start/finish line. These hams, along with others in mobile units, linked the checkpoints with pickup vehicles and medical teams. The Wailuku repeater, KH6HG, was used during the entire event. (KH6H, EC Maui Co.)

□ Erie and Genesee Counties, New York — May 2. Eighteen local hams provided communications, assisting officials with a sports car rally open only to persons legally blind. During the rally, there was one minor accident. KB2VI and KA2PAO went to the scene and transmitted details over WB2IID/R to race officials. (KA2GOH, AEC Genesee Co.)

□ Springhill, Louisiana — May 20. An explosion that nearly destroyed a local refinery resulted in a fire that burned out of control for several hours. ARES members were summoned by state and local officials to assist with communications between Red Cross and c.d. personnel. The town of Cotton Valley was evacuated because of burning chemical tanks, and information regarding the evacuation was passed using N5IL/R and N5JH/R. (K5WOD, EC Webster Parish)

□ Kanawha County, West Virginia — May 29-30. Substantial rains caused flash flooding throughout the area, leaving many persons homeless and severing most of the communications to and from the area. On Sunday, May 30, the state Office of Emergency Services requested that EC KB8ZM activate the Kanawha County ARES. KB8ZM and state RACES Radio Officer K8BS proceeded to the OES in Charleston to put the station at the Emergency Operations Center on the air. A general call for flood information was placed over the primary repeater, W8FG/R, and the areas that suffered the heaviest were determined. Local hams then were dispatched to Red Cross centers in Charleston and Chelyan to establish a communications link between the two centers. (KB8ZM, EC Kanawha Co.)

□ Pinellas County, Florida — June 18. An unexpected storm left 7-10 inches of rainwater, causing severe flooding around the bay area. Because the flooding necessitated the preparation of evacuation shelters, Pinellas County ARES members were called out to man EOC stations and to conduct communications between Red Cross and civil defense officials, as well as with other local agencies. Shelter communications were conducted to the ARC and c.d. headquarters using K4SCL/R, and other emergency information was passed over W4DPH/R and K4IJY/R. (W4GPL, EC Pinellas Co.)

COMMUNICATIONS SERVICE OF THE MONTH

□ The Texas tornado season is a time when radio amateurs throughout the Lone Star state keep a watchful eye on the sky. On Friday afternoon, April 2, 1982, an intense low-pressure front spawned a devastating tornado that ripped through the city of Paris, 90 miles northeast of Dallas. The twister touched down at the west edge of town, and cut a 2-block-wide, 5-mile-long path completely across this city of 25,000. The final toll stood at eight dead, 160 injured and an estimated 50+ million dollars in damage and destruction.

Grayson County ARES member K5OUK had been alerted by the National Weather Service that severe weather might develop. As it passed over his area without incident, he realized the potential fury of the storm. He picked up W5KKJ, and followed it east. When the tornado touched down in Paris, K5OUK was in touch with Dallas via 40-meter mobile. For two long hours that followed, K5OUK was the only communications link out of the Paris area, with W5KKJ as liaison to the EOC.

Shortly thereafter, amateur groups throughout northern Texas swung into action. K5PC, the ARRL section communications manager, and W5GPO, section emergency coordinator, were soon on the scene, and RACES emergency operations centers in Dallas, Fort Worth, Paris and the state capital, Austin, were all in communication by means of a 75-meter voice link. A state police communications link between Paris and Dallas was also established on 75 meters that evening. A dozen hams from the Garland Amateur Radio Club arrived with their portable 2-meter repeater. That night, 50 to 60 outgoing messages were sent on behalf of families in the affected area. The traffic totals from the Paris EOC (K5PC/5) were: seven emergency, 42 priority.

Throughout the night and into the next day, members of the Dallas ARES and other area hams manned radios and telephones at a Dallas blood bank, collecting incoming Welfare inquiries for the Red Cross.

Over that weekend, nets were established and maintained on several 40-meter frequencies, with operations transferred to 75 meters during the night. Over 900 Welfare messages had been received, serviced and responded to, with replies sent through Red Cross hf stations K15A and K5AVA by 6 P.M. Sunday. Of these, 163 necessitated house-to-house searches, which were coordinated on 2-meter fm.

All in all, a job well done by the amateur community. As DEC W5KZA put it: "The hams knew what needed to be done, set up their stations and went to work."

A partial list of groups that were involved include the Grayson County ARES, Dallas County ARES, Tarrant County ARES, La Mar County ARES, Denton County ARES, Fannon County ARES, Sabine Valley ARC and the Garland ARC. A "thank you" to all who helped, and also to those who monitored on low-band nets, but did not transmit unless assistance was needed. It couldn't have been done without your help, too. — Rich Casey, N5CSU

ARRL SECTION EMERGENCY COORDINATOR REPORTS

□ For June, 38 SEC reports were received, denoting a total ARES membership of 20,996. Sections reporting were: AL, AB, AZ, AR, CO, CT, ENY, IN, KS, KY, ME, MI, MN, NE, NH, NLI, NC, NTX, OH, OK, ON, ORG, PAC, RI, SV, SDGO, SJV, SC, SFL, STX, TN, UT, VA, WV, WMA, WNY, WA and WI.

REPEATER LOG

According to reports received between June 21 and July 21, the following repeaters were involved in the delineated public service events.

	Weather Emergency	Medical Activity	Vehicular Emergency	Search and Rescue	Public Safety Fire	Power Failures	Drift Alerts	Total
W1KGO					1			1
W1XJ					5			14
W1TEA							1	1
K1HF							1	1
K1FFK					1			1
W2PAV			2		10	3		15
W2AET							1	3
K2CY					4			2
W2VL			2		20			23
K2QJ							1	5
W2ZWP					2			3
W3BFL					3			4
N3AIA					1			1
W3UER					1			1
W4SWF			2		1	4		7
N4CKE								1
K4SCL							1	1
K4ACL								1
W4LET							1	1
W4QES					1	8		9
W4KJH							1	1
W4QBG								1
K4YFT								1
W4PEA								1
W5GIX					3			3
W5JGF			3		1		4	10
K5KD			6		4		4	19
W5FGX				1	4			5
W5AWP					7			7
W5HUK								1
W5IY					1	6		7
K5JE							1	1
W5RDU								1
N5Z								1
W7WGW					3	6	3	12
K7FA								2
K7CC					1	3		4
W7HSG								1
K7OMR					8	1		9
W7TPY								1
K8DDG								3
W8ARB					2			2
W8CCI					1			1
K8WNJ							2	2
W8ULB					4			4
W8MKG								1
W8NXD					2	1		3
W8BIE								1
N8AG					1			1
W8EWD								1
W8WEM								1
W8VTD								1
W9KXG					4			4
W9VCF					1			1
W9OFF								2
W9BIT								1
W9HAC					1			1
W9BQM								1
W9VQR								1
W9CMC					1	2		3
W9ILO								1
K9CY								1
W9KUJ					6			6
W9MME					5			5
W9AFT								1
W9BAEV					3			3
Total	41	9	7	110	11	4	44	69

NATIONAL TRAFFIC SYSTEM

The ARRL Simulated Emergency Test is October 16-17, 1982. All NTS and ARES officials receive a special SET newsletter from ARRL Hq. with complete details. See also the SET announcement, this issue. Welcome Curt, KBØMB, new TEN/c2 manager, succeeding Helen, WBØHOX. K2KIR reports that representation (on EAN/c4) has improved, but band conditions haven't. Incidentally, congratulations are in order to Bud, as he has become the vice director for the ARRL Atlantic Division. WA2IPB and W2UYE received 2RN/c2 certificates; K4WWQ, NQ4J and K5WOD received RN5/c2 certificates. All traffic handlers should be aware that it is now legal to handle messages between the United States and Australia, as a result of a new third-party traffic agreement. Canada has had such an agreement with Australia for quite some time.

June Reports

	1	2	3	4	5	6	7
Cycle Two Area Nets							
EAN		30	818	27.3	.606	68.9	

CAN PAN*	30	735	24.5	.436	100.0
49	545	11.1	.333	76.7	
Region Nets					
1RN	55	183	3.3	.217	61.7
2RN	80	211	3.5	.215	83.0
3RN	25	124	5.0	.321	75.0
4RN	80	532	8.9	.374	77.4
RN5	30	348	11.6	.310	95.0
RN6	60	588	9.8	.365	88.3
RN7	70	357	5.1	.647	59.0
8RN	52	178	3.4	.262	62.2
9RN	59	297	5.0	.311	100.0
TEN	30	246	8.2	.232	71.1
ECN					83.3
TWN	47	178	3.8	.303	41.3
TCC					66.7
TCC Eastern	82 ¹	529			
TCC Central	75 ¹	308			
TCC Pacific	66 ¹	401			
Cycle Four Area Nets					
EAN	30	1434	47.8	1.19	96.7
CAN	30	1101	38.7	.954	99.4
PAN	30	1158	38.5	.987	98.9
Region Nets					
1RN	89	483	5.2	.384	90.7
2RN	60	275	4.6	.395	96.6
3RN					100.0
4RN					96.6
RN5	54	700	13.0	.575	80.9
RN6	80	725	12.1	.397	100.0
RN7	60	528	8.8	.850	97.1
8RN	52	364	7.0	.378	79.4
9RN	80	462	7.7	.438	94.0
TEN	52	295	5.7	.328	49.8
ECN					100.0
TWN	58	462	8.0	.354	90.7
TCC					96.6
TCC Eastern	82 ¹	529			
TCC Central	75 ¹	308			
TCC Pacific	66 ¹	407			
Sections ²	6508	29,183	4.5		
Summary	7800	44,970	5.8		
Record	10,319	50,268	18.4		

*PAN operates both cycles one and two.
¹TCC functions not counted as net sessions.
²Section and local nets reported (223): APSN ATN (AB), AENB AENC AENJ AENR AENR ATNM (AL), ATECN CN HARC (AZ), NGN NCTN (CA), CN CPN NVTN RSTN WCN (CT), DEPN DTN NQ2MN SEN (DE), DEN FAST FMSN FMN FPMN GN PEIN QFN OFNS SEFTN SPARC SWFTN TPTN (FL), ICN ITEN TLO (IA), ABY IMN MSN (ID/MT), ILN (IL), ICN IPN ITN QIN (IN), GSTN KPN KSN KWN QKS QKSS (KS), BARES GARES 11ARES BARES CARN CGEN KNTN KPON KRN KSN KTN KYN LCARES MKPN PAVTIN PAWN TSTMN (KY), LAN (LA), CTN MERN MMN MTN WRIN (MA), EM2MN EMRI EMRPN EMRISN HHTN NEEP (MA/RI), AEN CMEN MPN PTN SGN SPSN (ME), MACS MITN MNN QMN UPN (MI), MSN MSPN MSSN MWXN (MN), ACE NEMOE (MO), MTN (MS), CFARS OMN CN CNCTN CSN JFK M2MEN NQSSBN PCTN RARS THEN (NC), MNARES NCHN NE40 NE75 NMPN NSN PARC2MN PV2MN SBARES NUN (NE), GSPM GSPN NHN (NH), JSARS MCN NJN NJPN JSN NJVN QBTTN TCETN (NJ), NSN (NJ), CNYTN HVN NJLPN NYPN NYN OCTEN SDN STAR WDN (NY), BARP BN BRTN HCAN HCARES LCNWOARES MCTN NCTV QBMN OSSBN OSN TATN (OH), OFON OLZ OPEN OTWV (OK), KMN LN OLN OPN OSN (ON), BSN MPARES ORARES OSN PTTN SOFMN WCN (OR), D3ARES D8ARES EPA EPAETN PFN PTTN WARCVTN (PA), WQVUARES (PQ), GPD2MN LC2MN SCNTN SCSSBN YC2MN (SC), TNOW TPN TNV TNV TSNR (TN), BARC DFV HATN TEX TSN TTN (TX), BUN UCN (UT), STARES SVEN VEN VLN VN VNTN VSN VSN (VA), VTN (VT), EVTIN NTN WSSB PSTS, SCARES WARTS WSN (WA), BEN BWN NWTN WIN WNN WSN WSSN (WI), WVARN WVFV WVVH WVMON WVN WVVN (WV).

1 - NET 5 - RATE
 2 - SESSIONS 6 - % REP.
 3 - TRAFFIC 7 - % REP. TO AREA NET
 4 - AVERAGE

Transcontinental Corps

The following poetry was QSPed by K0DJ, copyright 1999:
 All skeds are subject to malfunctions proportional to how well the ether is doing its thing.
 Either it is or it ain't.
 Brave helios, wake up your steeds —
 Bring us the conditions our skeds needs.

1	2	3	4	5
Cycle Two				
TCC Eastern	120	68.3	1066	529
TCC Central	90	83.3	616	308
TCC Pacific	120	71.7	808	401
Summary	330	74.4	2490	1238
Cycle Four				
TCC Eastern	140	84.3	1062	582
TCC Central	60	91.7	988	504
TCC Pacific	120	88.3	1467	755
Summary	320	88.1	3517	1841

1 - AREA 4 - TRAFFIC
 2 - FUNCTIONS 5 - OUT-OF-NET TRAFFIC
 3 - % SUCCESSFUL

TCC Roster

The TCC Roster (June) Cycle Two - Eastern Area (N2YL, Director) - K1s CE EIC, N1BH, W1s QYY XX, AH2M, K2s KIR PH, KB2HM, K02H, N2s CER YL, W2s CS XD ZQJ, WB2s IQJ MCO, K3JSD, WB3GZU, WA4CCK, WB4PNY, AF8V, WB8MJ, WB8YDZ, VE1WF, VE3s GOL HTL, Central Area (WB9JU, Director) - KA4MZ, WA0GG, WD4HF, W5s CTZ KLV TFB URN, NSAMK, WB5YDD, K5s BHF KUN, W9s JUJ NXG, WB9WGD, Pacific Area (W0HXB, Director) - KV5U, W5JOV, K8s HAP OWA UYK, KM6, KN6C, KT6A, KU6D, N6GIW, N16A, W6FAS, KA7CPT, KF7R, W7s DZK GHT VSE, WA7s BZY WQE, WB7s DZX TQF WOW, W9OBV, K0DJ, KB0MB, N9s ACW CXY, W0HXB, WD9AIT, Cycle Four - Eastern Area (W2CS, Director) - N1NH, W1s EFV KX NJM QYY, WB1CPF, W2s CS FR GKZ XD ZQJ, WA2SPL, AH2M, N2CER, K3RZR, K13C, W3s ATQ FAF, WB3GZU, K4ZK, WA4U, WA4CCK, WB4s PNY UHC, AF8V, WB8MJ, WBBITT, N8XX, VE1WF, VE3GOL, Central Area (W5GH, Director) - W4s WXH ZJY, K5s GM TL, KB5W, N5TC, W5s RB TFB, W9CXY, WB9UYU, AE0R, K0EZ, W6s AM HI, Pacific Area (K0DJ, Director) - N6FTQ, W6s EOT VZT, KN6C, KT6A, K7s HLR KSA, KN7B, W7s AK DZX EP GHT LYA VSE, WA7GYQ, WB7NHR, N7AKX, K8s BN DJ, KC0D, W9s GMD HXB OGH, WD9AIT, VE7ZK.

Independent Nets (June 1982)

1	2	3	4
Amateur Radio Telegraph Society	30	821	276
Central Gulf Coast Hurricane Clearing House	30	145	1884
Empire Slow Speed	29	53	251
Hit and Bounce Slow	30	43	310
IMRA	30	75	306
Midwest RTTY	28	478	975
Mission Trail	30	81	190
North American SSB Traffic	30	152	1106
Southwest SSB Traffic	26	101	238
West Coast Slow Speed	30	60	1006
75-Meter ISSB	29	89	325
TZ90 Traffic	30	481	1013
	48	593	2988

1 - NET 3 - TRAFFIC
 2 - SESSIONS 4 - CHECK-INS

Public Service Honor Roll June 1982

This listing is available to amateurs whose public service performance during the month indicated qualifies for 60 or more total points in the following nine categories (as reported to their SCM). Please note maximum points for each category: (1) Checking into cw nets, 1 point each, max. 30; (2) Checking into phone/RTTY nets, 1 point each, max. 30; (3) NCS cw nets, 3 points each, max. 12; (4) NCS phone/RTTY nets, 3 points each, max. 12; (5) Performing assigned NTS liaison, 3 points each, max. 12; (6) Delivering a formal message to a third party, 1 point each, no max.; (7) Handling an emergency message, 5 points each, no max.; (8) Serving as emergency coordinator or net manager for the entire month, 5 points, max. 5; (9) Participating in a public service event, 5 points, max. 5. This listing is available to Novices and Technicians who achieve a total of 40 or more points.

184	117	W2AET	W0OTF
WD4COL	KA1ON	W2MTA	100
	WA1TBY	106	KK5B
147	115	WD4JYJ	VE3GT
K5CXP	N7BGY	WD4CNQ	98
141	114	WD4ALY	99
WD8LRT	K4SCL	WA1UAX	WB8NTN
138	113	N4BZH	KS7I
WB7WOW	W1EOF	K8OZ	WB7DZX
136	W7VSE	105	N5EFG
NW4P	112	WD8RHU	KT6A
WB7OGA	WB0YH	W2AHV	KA5KRI
WB3GZU	WB1HIH	WB2MCO	W7VSE
132	WB1GXZ	W5DTR	KE4OI
NG4J	W1IDK	W2GLH	WB7WOW
127	111	W2XLD	WA0TFC
KE4OI	AF8V	104	WB5YDD
WA4PFK	110	W1GUX	97
WD4HIF	WB4EA	WB5YDD	W4ANK
	W9LAE	KB5W	KD5P
121	KY4U	103	KB5EK
W9JUJ	K2ZM	WB9IGH	96
120	W4WXH	WA4CCK	WB7TQF
KA3CDQ	109	K4JST	W7LNE
119	KI1M	KA8CPS	KA9IKR
KB2HM	AG2R	102	W2ZQJ
WB9CV	WA4QXT	KA4GFU	N5AMK
WB2IQJ	108	KD4PJ	KT8V
118	K4VWK	K7GXZ	95
WA4JDH	107	W1UD	KA5CXW
WD9ESZ	104	W1CKS	W1TN
			KB2WI

94	84	W4HON	WD4FTK
KA4ASZ	N2BOP	K4EV	WB4NTW
KC5SF	KA9HPQ	KA2NMA	K0CY
KA3DLY	KA5HDT	AC3N	W30WOW
N8DSW	KB2KW	71	83
93	WB7OEX	K0DJ	WA4JTE
K6UYK	83	WP4AOH	KA3DTE
WA0TFC	W5WZ	WB2IDS	WB0UD
WA3WYI	W5GHP	N4EDH	KD4QZ
92	WA2HEB	N7AJH	K1NAN
KC9CJ	82	WA6QCA	N2AKZ
WB2PKG	KA4BSG	N7DNG	WA7DPK
KC5NN	K3JL	70	62
W4GPL	KE1U	WB5MMI	N3ADU
VE3DPO	81	WB4FDT	WA8PIM
91	W8HUJ	N4DZW	N4GIY
WB8GX	N0BDG	69	WA2YBM
WA4EIC	W2YJR	K4ZN	K9BVE
WB6QBZ	W0OGH	AK2E	WA2KOJ
90	79	KA6MPK	VE3GOL
KA6BNW	N5BT	88	W6RNL
KY4K	K8YD	W3DKX	W7EP
W5CTZ	78	KB5NX	WB9FFI
89	KB3XO	AB5X	WB7WVD
AG9G	WB3FKP	WA3EHD	WB9QAM
KA4SAA	KV5N	W7LG	N4UF
W9NXC	77	KA4BBA	W2BDW
K1JHC	KA1BBU	WD8KBW	WD4BSX
88	KA4MGQ	87	60
KA4AUR	NT4S	WB4UHC	WA8YAD
K8KQJ	78	KD4TY	WA3WQP
N5TC	N3CKQ	WA4EYU	AA4AT
87	W1KK	AF8O	WB9WGD
KA1BJY	K0SI	WA4LXP	WA4ZPZ
W0KJZ	75	AF2K	WB9QLW
KA3GJT	VE3HTL	66	WB9UM
KT8D	VE3WM	WB5LBR	WB8YTD
WB4WII	KA4MGR	KA6M	KA2JMH
86	74	KT7X	KC4LA
KF8J	W5JOV	KK9N	WA8DHB
KB3UD	WA7LGN	K3RZR	47
W4OQG	WB8GMT	KC2QQ	KA8NCR/N
N9BYK	KA4EJG	65	44
N2CER	73	N8ATP	KA8GGZ/T
WB8PW	72	KS2G	42
85	WB8HG	WB9JJ	WB2ANK/T
KB0MB	WB4AID	K2ZVI	KA9BGM/N
KB4OZ	W2BIW	WB8YDZ	40
N8BOK	72	KA4BCM	N4ECP
W8BMIO	N7CSP	43	K3ZJJ/T
N1ARI	WD5GKH	64	N2CPX/T
KA7ELI	K5OA	K5TL	N8BZC/T
WA2ARC	N4PL	KA2GSX	WD4SH/T

Brass Pounders League June 1982

BPL Medallions (see April 1979 QST, page 77) have been awarded to the following amateurs since last month's listing: W2AET, N3ADU, N4EFS, KY4K, KS8T.
 The BPL is open to all amateurs in the United States, Canada and U.S. possessions who report to their SCM a message total of 500 or a sum of originations and delivery points of 100 or more for any calendar month. All messages must be handled on amateur frequencies within 48 hours of receipt in standard ARRL form.

1	2	3	4	5	6
W3CUL	715	889	1317	49	2960
N0BQP	33	1350	262	782	2427
KA9CPA	51	1163	161	910	2285
WA9HJZ	30	734	30	504	1298
W9JUJ	1	518	518	15	1045
WA4JDH	2	472	390	17	881
WBACH	30	377	407	0	814
WB2IQJ	28	390	331	18	785
KS6T	3	349	330	2	684
NG4J	179	161	264	25	629
WB7OGA	86	221	260	47	614
WB7TQF	28	226	339	21	614
WB3GZU	29	288	269	35	601
KT6A	4	264	295	14	577
W3VR	217	98	252	9	576
W5SHN	12	278	280	4	574
K8NCV	32	248	280	6	568
W1EOF	4	196	343	17	560
WD4HIF	6	238	256	31	531
W7VSE	15	260	231	16	522
KE4OI	4	239	246	21	510
WB7WOW	35	163	225	82	505
WA0TFC	0	194	310	0	504
WB5YDD	3	243	214	41	501
K6UYK	119	212	161	9	501
W3CUL (May)	724	819	1341	39	2923
W3VR (May)	210	111	273	12	806
W1EOF (May)	2	196	376	13	587

BPL for 100 or more originations plus deliveries:
 K0PCK 141
 KA9JQG 125
 WD4COL 124
 W1UD 112

1 - CALL 4 - SENT
 2 - ORIG. 5 - DLVD.
 3 - RCVD. 6 - TOTAL

Operating News

Conducted By John F. Lindholm,* W1XX

BREAKER! BREAKER!

"Heebee, did you know that in a 36-hour weekend cw contest it is possible to send BK at least 2880 times?"

"That's incredible, Jeebee!"

"That's simple arithmetic, Heebee. A contestant has, say, a 40-QSO-per-hour contest average and sends BK twice per QSO for 36 hours."

"Why would he want to do that?"

"Apparently he believes that sending BK is necessary to communicate. But wait, there is more. Since each BK is approximately one second long, the operator consumes a total of 48 minutes of contest time in the 36-hour period while sending it. This is time that could have been used to contact an additional 32 stations."

"Well then, Jeebee, to offset that obvious minus, there certainly must be a plus or two for sending BK 2880 times."

"There is, Heebee. First, by not contacting those 32 stations the operator has not worked as hard as he would have otherwise in the same length of time. And of those 32 stations, there may have been up to five new multiplier stations whose operators were saved the time and trouble of contacting him. They probably didn't need him anyway. This is a good example of indirect operator courtesy. Another example of this is sending BK to operators who do not use BK. You well know how the non-BKers appreciate that! This gives the non-BKers tiny rest periods they would not get normally."

"I see. Then the non-BKer QSO totals are also reduced proportionally, preventing them from working harder than necessary during the contest?"

"You've got it, Jeebee."

"Sending BK 2880 times must be a great finger exercise, too."

"Right on, old pal. But more importantly, this hypothetical contest operator has proved conclusively, by using BK, that he is not a point hog. When he sees the contest final scores of other stations, he probably smiles knowingly."

"Jeebee, I am now aware that the prosign BK can be very influencing. Those BK boys are all business."

"True, Heebee. And sending BK lends an authoritative sound to one's delivery, too, if nothing else." — Dean E. Lewis, W7TC, Klamath Falls, Oregon

SCM APPOINTMENTS

In the Idaho Section, Dennis L. Hall, KK7X, has been appointed to complete the term (until September 30, 1982) of Norman E. Spidell, K7RT (resigned).

In the Northern New Jersey Section, Curtis R. Williams, W5DTR/2, has been appointed to complete the term (until June 30, 1983) of Robert E. Neukomm, KB2WI (resigned).

W1AW NOTE

The complete W1AW summer operating schedule appears in April QST, page 84. A W1AW schedule also is available on request from ARRL Headquarters. Please enclose an s.a.s.e. See the Contest Corral section of QST for times and dates of W1AW Code Proficiency Runs.

Amateur Radio Satellite Schedule

Date (UTC)	AMSAT-OSCAR 8			Soviet RADIO 5		Soviet RADIO 6		Soviet RADIO 7		Soviet RADIO 8	
	Ref. Orbit, Mode	Time (UTC)	EQX W. Long. (Deg.)	Time (UTC)	EQX W. Long. (Deg.)	Time (UTC)	EQX W. Long. (Deg.)	Time (UTC)	EQX W. Long. (Deg.)	Time (UTC)	EQX W. Long. (Deg.)
1 Sept.	22,887X	0055	88	0136	225	0147	230	0054	215	0026	207
2 Sept.	22,901A	0059	89	0130	225	0131	228	0044	214	0024	208
3 Sept.	22,915A + J	0104	90	0125	225	0116	225	0034	213	0021	209
4 Sept.	22,929J	0108	91	0120	226	0100	223	0025	212	0018	209
5 Sept.	22,943J	0112	92	0114	226	0045	221	0015	211	0015	210
6 Sept.	22,957A	0117	94	0109	226	0030	218	0005	211	0012	211
7 Sept.	22,971A + J	0121	95	0104	226	0014	216	0155	240	0009	212
8 Sept.	22,985X	0125	96	0058	226	0158	243	0145	239	0007	213
9 Sept.	22,999A	0130	97	0053	226	0142	241	0136	238	0004	213
10 Sept.	23,013A + J	0134	98	0048	227	0127	239	0126	237	0001	214
11 Sept.	23,027J	0138	99	0042	227	0111	238	0116	236	0158	245
12 Sept.	23,041J	0143	100	0037	227	0056	234	0107	235	0155	246
13 Sept.	23,054A	0004	76	0032	227	0041	232	0057	234	0152	247
14 Sept.	23,068A + J	0008	77	0026	227	0025	230	0048	233	0149	248
15 Sept.	23,082X	0013	78	0021	227	0010	227	0038	232	0147	248
16 Sept.	23,096A	0017	79	0016	228	0153	255	0028	232	0144	249
17 Sept.	23,110A + J	0021	80	0010	228	0138	252	0019	231	0141	250
18 Sept.	23,124J	0026	81	0005	228	0122	250	0009	230	0138	251
19 Sept.	23,138J	0030	82	0159	258	0107	248	0159	259	0135	252
20 Sept.	23,152A	0034	83	0154	258	0052	245	0149	258	0132	252
21 Sept.	23,166A + J	0039	85	0148	259	0038	243	0139	257	0130	253
22 Sept.	23,180X	0043	86	0143	259	0021	241	0130	256	0127	254
23 Sept.	23,194A	0047	87	0138	259	0005	238	0120	255	0124	255
24 Sept.	23,208A + J	0052	88	0132	259	0149	266	0110	254	0121	256
25 Sept.	23,222J	0056	89	0127	259	0133	263	0101	253	0118	257
26 Sept.	23,236J	0101	90	0122	260	0118	261	0051	253	0115	257
27 Sept.	23,250A	0105	91	0116	260	0103	259	0041	252	0113	258
28 Sept.	23,264A + J	0109	92	0111	260	0047	256	0032	251	0110	259
29 Sept.	23,278X	0114	93	0106	260	0032	254	0022	250	0107	260
30 Sept.	23,292A	0118	95	0100	260	0016	252	0013	249	0104	261
1 Oct.	23,306A + J	0122	96	0055	261	0001	250	0003	248	0101	261
2 Oct.	23,320J	0127	97	0050	261	0144	277	0152	277	0058	262
3 Oct.	23,334J	0131	98	0044	261	0129	275	0143	276	0056	263
4 Oct.	23,348A	0135	99	0039	261	0114	272	0133	275	0053	264
5 Oct.	23,362A + J	0140	100	0034	261	0058	270	0124	275	0050	265
6 Oct.	23,375X	0001	76	0028	262	0043	268	0114	274	0047	266
7 Oct.	23,389A	0005	77	0023	262	0027	265	0104	273	0044	266

Orbit predictions by Project OSCAR, K1HTV, KA1GD and W9KDR. To keep abreast of the latest developments, tune in the regular phone and cw bulletins over W1AW, or the AMSAT nets. Tuesday — East Coast and Mid States at 9 P.M. and West Coast at 8 P.M. local time on 3850 kHz. Saturday — International at 2200 UTC on 28,878 kHz. Sunday — International at 1800 UTC on 21,280 kHz and 1900 UTC on 14,262 kHz. OSCAR 9 orbits are no longer listed — because of its low altitude, long-range predictions are not always accurate. Use W1AW and AMSAT Bulletins for weekly updates. OB modes of operation are Monday and Thursday — Mode A, Tuesday and Friday — Modes A + J. Wednesday is reserved for authorized experiments or recharge of the batteries. Do not operate through the OSCAR or RADIO satellites on Wednesday UTC. Do not use more power than is needed to operate through the OSCAR or RADIO satellites. Your downlink signal should never be stronger than the satellite's telemetry beacon. Reduce your uplink power to prevent overload causing 10 dB attenuation of received signals. Advise operators whose signals are stronger than the telemetry beacons.

Orbit numbers will not be used for the Radio satellites.

Satellite	Period (min.)	Increment (deg.)	Inclination (deg.)	Height (km)
OSCAR 8	103.1677	25.7941	98.79	919
RADIO 5	119.5555	30.0157	82.95	1682
RADIO 6	118.7174	29.8061	82.95	1632
RADIO 7	119.1966	29.9260	82.94	1654
RADIO 8	119.7640	30.0679	82.95	1681

RADIO 3 and RADIO 4 orbital data will not be listed because those satellites are for Soviet experiments. QSLs and telemetry reports should be sent to Box 88, Moscow.

Spacecraft Frequencies

	Uplink	Downlink	Beacon
OSCAR 8			
Mode A	145.850-145.950 MHz	29.400-29.500 MHz	29.402 MHz
Mode J	145.900-146.000 MHz	435.200-435.100 MHz	435.095 MHz
RADIO 5	145.910-145.950 MHz	29.410-29.450 MHz	29.330/450 MHz
RADIO 6	145.910-145.950 MHz	29.410-29.450 MHz	29.410/450 MHz
RADIO 7	145.960-146.000 MHz	29.460-29.500 MHz	29.340/500 MHz
RADIO 8	145.960-146.000 MHz	29.460-29.500 MHz	29.460/500 MHz
RADIO 5 ROBOT	145.826 MHz	29.331 MHz	
RADIO 7 ROBOT	145.835 MHz	29.341 MHz	

RADIO 3 and RADIO 4 are for experiments only to be announced by USSR.

OSCAR 9
Hf Beacons — 7.050, 14.002, 21.002 and 29.510 kHz. On-off keying with Morse telemetry.
Interspersed with a carrier or continuous carrier.
Vhf Beacon — 145.825 MHz nbm ± 5 kHz. ASCII, Baudot, voice, afsk and Morse.
Uhf Beacon — 435.025 MHz nbm ± 5 kHz. ASCII, Baudot, voice, afsk and Morse.
S-Band Beacon — 2401.0-MHz nbm ± 10 kHz. ASCII, Baudot, voice, afsk and Morse.
X-Band Beacon — 10.470-GHz steady carrier. S- and X-band beacons use lhcp.

Mode J Club: Become a member of the Mode J Club. Complete eight Mode-J contacts. QSL cards are not required. Just list the call sign of each station worked, date, orbit number and station equipment used. Send this information along with \$3 in U.S. funds, a one-time charge to cover the certificate and newsletter costs, to Mode J Club, c/o Larry Roberts, W9MXX, 3300 Fernwood, Alton, IL 62002.

OSCAR 8 QSL: To receive an OSCAR 8 QSL card, send a copy of the telemetry from the 29.402- or 435.095-MHz beacons. Please send your report, along with s.a.s.e., to ARRL Hq.

Further information on the radio amateur satellite program can be obtained free of charge from ARRL Hq. The OSCARLOCATOR package is now available: \$7 U.S., \$6 elsewhere.

Contest Corral

A Roundup of Upcoming Operating Events



Conducted By Mark J. Wilson, AA2Z

SEPTEMBER

1
West Coast Qualifying Run, 10-35 wpm, at 0400Z Sept. 2 (9 P.M. PDT Sept. 1). W6OWP prime, W6ZRJ alternate. Frequencies are approximately 3590/7090 kHz. Underline one minute of the highest speed you copied, certify that your copy was made without aid, and send to ARRL for grading. Please enclose your full name, call (if any) and complete mailing address. A large s.a.s.e. will help expedite your award/endorsement.

RTTY Art Contest, sponsored by the Southern Counties Amateur Teleprinter Society, from Sept. 1 through Nov. 30. Open to amateurs worldwide. Complete details are available from Norm Koch, K6ZDL, P.O. Box 1351, Torrance, CA 90505.

4-5

Corona 10-Meter RTTY Contest, Aug. QST, page 82.
Four Loud QSO Party, Aug. QST, page 82.

8-10

YL Howdy Days, Aug. QST, page 82.

11-12

ARRL September VHF QSO Party, Aug. QST, page 73.

European DX Contest, phone, July QST, page 84.

G-QRP-Club Activity Period, see Feb. QST, page 88, for details.

IARS/CHC Contest, cw, Aug. QST, page 82. Note date change.

13

WIAW Qualifying Run, 10-35 wpm, at 0200Z Sept. 14 (10 P.M. EDT Sept. 13). Transmitted simultaneously on 1.835 3.58 7.08 14.08 21.08 28.08 50.08 147.555 MHz. See Sept. 1 listing for more details.

18-19

CAN-AM Contest, phone, Aug. QST, page 82.

College Radio Scrimmage, Aug. QST, page 82.

New Mexico QSO Party, Aug. QST, page 82.

IARS/CHC Contest, phone, Aug. QST, page 82.

Kansas State QSO Party, sponsored by the Boeing Employees ARS, from 0100-0700Z Sept. 18, 1300Z Sept. 18 until 0700Z Sept. 19 and 1300Z Sept. 19 until 0100Z Sept. 20. All bands, phone and cw. Work stations once per band and mode. Exchange signal report, serial number and QTH (county for KS stations; state, province or country for others). Suggested frequencies: cw — 1.805 3.560 7.060 14.060 21.060 28.160; phone — 3.925 7.260 14.280 21.380 28.580; Novice — 3.725 7.125 21.150 28.160. Count 2 points per phone QSO, 3 points per cw QSO. KS stations multiply by total states, provinces and countries worked; others multiply by total KS counties worked (max. 105). Non-KS stations also add one multiplier for each group of 8 contacts with the same KS county. KS-to-KS QSOs allowed. Awards. Mail logs by Oct. 20 to: BEARS/Ø, Mike Thornton, 5256 S. Madison, Wichita, KS 67216.

North American Sprint, cw, sponsored by the National Contest Journal, from 0100-0459Z Sept. 19 (phone contest 0100-0459Z Sept. 26). Contests are separate. 80, 40, 20 meters only. Suggested frequencies: cw — 3.530-3.550 7.030-7.050 14.030-14.050; phone — 3.870-3.910 7.210-7.240 14.260-14.290. For a valid QSO, you must send and receive all of the following information: other station's call, your call, serial number (consecutive starting with 001), your name and state (or province/country). An operator may use only one call sign during the contest. Multiply valid QSOs by sum of states, provinces and North American countries (not W/VE). KH6 is not counted as a state or NA country. VE multi. are Maritimes (VE1, VO1, VO2) and VE2 through VE8 (8 max.). Non-North American countries do not count as multipliers. Special QSY rule: Stations soliciting a call by sending CQ, QRZ, etc., are permitted to work

only one station in response to those solicitations. They must thereafter move at least 1 kHz before working any other station, or at least 5 kHz before again soliciting calls. Team competition: Each team has a maximum of 10 members as a single-entry unit. Clubs having more than 10 members may submit more than one team entry. To qualify, the name and call sign of each operator (and station operated, if a guest op) must be registered with W6OAT. The team information may be contained either in a letter received by W6OAT before the start of the Sprint or in a Western Union mailgram dated at least 24 hours before the start of the Sprint. There are no distance or meeting requirements for a team entry. Cw and phone teams are separate. Entries must be received no later than 30 days after the Sprint. Mail cw entries to: Rusty Epps, W6OAT, 948-H Kieley Blvd., Santa Clara, CA 95051. Phone entries go to: Rick Niswander, K7GM, 1914 W. Cortez Circle, Chandler, AZ 85224.

Scandinavian Activity Contest, cw, sponsored by Eksperimenterende Danske Radioamatører (Denmark), from 1500Z Sept. 18 until 1800Z Sept. 19. Work LA/LB/LG/LJ, JW, JX, OF/OG/OH/OI, OH0, OJ0, OX, OY, OZ, SK/SL/SM and TF stations on 80-10 meters. Single op, all band; multiop, single transmitter (stay on a band at least 10 mins. at a time); and multiop, multi-transmitter (includes club stations) categories. Exchange signal report and serial number. Multi-multi stations start 001 on each band. Non-EU stations count 1 point per QSO on 14-21-28 MHz and 3 points per QSO on 3.5-7 MHz. Multiply QSO points by sum of number of different call areas worked per band (LA1 = LB1 and SK3 = SL3 = SM3, etc) for final score. Suggested frequencies: cw — 3.505-3.575 7.005-7.040 14.010-14.075 21.010-21.120 28.010-28.125; phone — 3.600-3.650 3.700-3.790 7.050-7.100 14.150-14.300 21.200-21.350 28.400-28.700. Mail entries by Oct. 30 to: Leif Ottosen, OZ1LO, Bankevej 12, Kong, DK-4750 Lundby, Denmark.

Washington State QSO Party, sponsored by the Boeing Employees ARS, from 0100-0700Z Sept. 18, 1300Z Sept. 18 until 0700Z Sept. 19 and 1300Z Sept. 19 until 0100Z Sept. 20. All bands, phone and cw (no cw QSOs in phone bands). Work stations once per band and mode. Exchange signal report, serial number and QTH (county for WA stations; state, province or country for others). Suggested frequencies: cw — 1.805 3.560 7.060 14.060 21.060 28.160; phone — 3.925 7.260 14.280 21.380 28.580; Novice — 3.725 7.125 21.150 28.160. Count 2 points per phone QSO, 3 points per cw QSO. WA stations multiply by total states, provinces and countries worked; others multiply by total WA counties worked (max. 39). Non-WA stations also add one multiplier for each group of 8 contacts with the same WA county. Awards. Mail logs by Oct. 20 to: BEARS, Willis Propst, K7RS, 18415 38th Ave. South, Seattle, WA 98188.

22

WIAW Qualifying Run, 10-35 wpm, at 1300Z (9 A.M. EDT). See Sept. 13 listing for more details.

25-26

CAN-AM Contest, cw, Aug. QST, page 82.

North American Sprint, phone, see Sept. 18-19 listing.
Scandinavian Activity Contest, phone, see Sept. 18-19 listing.

Classic Radio Exchange, sponsored by the Southeast ARC, from 2000Z Sept. 26 until 0300Z Sept. 27. Object is to talk with those who restore, operate and enjoy older equipment. A classic radio is one built since 1945, but is at least 10 years old. Exchange name, signal report, state/province/country, receiver/transmitter type, etc. Add numbers of different transmitters, receivers and states/provinces/countries worked for each band and mode. Multiply that total by total QSOs on all bands. Multiply that total by Classic multiplier — total years old of all transmitters and receivers used, three QSOs minimum per unit (transceivers multiply years old by 2). Suggested frequencies: phone — 3.910 7.280 14.280 21.380 28.580; cw — 60 kHz up from low end; Novice — 20 kHz up from low end. Send logs to: Stu Stephens, K8SJ, 1407 Hollywood, Sandusky, OH 44870.

Delta QSO Party, sponsored by the ARRL Delta Division, from 1800Z Sept. 25 until 2400Z Sept. 26, with a mandatory rest period from 0600-1200Z Sept. 27.

Work stations in AR-LA-MS-TN. Work stations once per band and mode. Work mobiles and portables again as they change county. Exchange serial number, signal report and QTH (county and state for Delta stations; ARRL section for others). Suggested frequencies: phone — 3.990 7.290 14.290 21.390 28.590; cw — 80 kHz up from low end; Novice — 25 kHz up from low end. Count 1 point per QSO. Delta stations multiply by total ARRL sections worked (DX contacts count for QSO point credit only); others multiply by total Delta counties worked (max. 316). Awards. Mail logs by Oct. 21 to: Malcolm Keown, W5XX, 213 Moonmist, Vicksburg, MS 39180.

Elettra Marconi Contest, sponsored by the Italian YLRC, from 1300Z Sept. 25 until 1300Z Sept. 26. 80-10 meters, phone and cw. Work stations once per band, regardless of mode. Categories: YL all band; OM all band; SWL. YL-to-YL and YL-to-OM QSOs only. Exchange signal report and serial number. Italian YLRC members add "RC" after number. Count 1 point for QSOs with same country, 2 points for different country but same continent, and 3 points for different continent. Multipliers: Count 1 multiplier for each DXCC country and JA/VE/VK/W call area worked per band; count 5 multipliers for each YL member of Italian YLRC worked on each band (YLRC members can't get this one); and count 5 multipliers for each 25 different DXCC countries contacted. Final score equals sum of QSO points times sum of multipliers. Awards. Mail logs by Oct. 31 to: Awards Manager, YLRCI, 15 AZX Maria Grazia Doni, S. Rocco N. 9, 57025 Piombino, Italy.

Maine QSO Party, sponsored by the Portland Amateur Wireless Assn., from 2300Z Sept. 25 until 2359Z Sept. 26. Work stations once per band and mode. Exchange signal report, serial number and QTH (county for ME stations; state, province or country for others). Suggested frequencies: cw — 1.805 and 60 kHz up from low end; phone — 3.930 7.280 14.280 21.380 28.580; Novice — 20 kHz up from low end. Count 3 points per QSO. ME stations multiply by total ME counties, states, provinces and countries worked; others multiply by total ME counties worked. Awards. Mail logs by Dec. 1 to: PAWA, P.O. Box 1605, Portland, ME 04104.

Massachusetts QSO Party, sponsored by the Greater New Bedford Contesters, from 1600Z Sept. 25 until 0200Z Sept. 27. Work stations once per band and mode. Work portables and mobiles again as they change county. No crossband or repeater QSOs. Cw in cw bands only. Exchange signal report and QTH (county for MA stations; state or province for others). Suggested frequencies: phone — 3.960 7.260 14.290 21.380 28.590 50.110; cw — 1.810 and 60 kHz up from low end; Novice — 7.120 21.120 28.120. Count 2 points per phone QSO, 4 points per cw QSO. MA stations multiply by total MA counties, states and provinces worked. DX contacts count for QSO point credit only. Others multiply by total MA counties worked. Add 100 points to score for each sponsor worked (KA1GG, N1AVA, K1KJT — max. 300 points). Club competition. Awards. Mail entries by Oct. 31 (include 50¢ in postage for results) to: Ed Peters, K1KJT, 29 Greenbrier Dr., New Bedford, MA 02745.

OCTOBER

2-3

California QSO Party, sponsored by the Northern California Contest Club, from 1600Z Oct. 2 until 2159Z Oct. 3. Single ops may operate only 24 hours; off-times must be marked in log and be at least 15 minutes each. Multiops may operate full 30 hours. Work stations once per band and mode. Cw QSOs in cw bands only. No MCW QSOs. Stations changing counties may be reworked for credit. Exchange serial number and QTH (county for CA stations; state, province or country for others). Suggested frequencies: phone — 3.985 7.230 14.280 21.365 28.560; cw — 1.805 and 60 kHz up from low end; Novice — 25 kHz up from low end. Try cw on the half hour and 160 M at 0500Z. Count 2 points per phone QSO and 3 points per cw QSO. CA stations multiply by total states and VE call areas worked (max. 58). Others multiply by total CA counties worked (max. 58). Awards. Mail entry by Nov. 1 (include large s.a.s.e. for results) to: Kip Edwards, W6SZN, 1928 Hillman Ave., Belmont, CA 94002.

SWOT Open QSO Party, sponsored by Side Winders on Two, from 0000Z Oct. 2 until 0600Z Oct. 4 and 0000Z Oct. 9 until 0600Z Oct. 11. Single-op only. 2 meters, ssb and cw only. No repeater or satellite QSOs. Work stations only once, regardless of mode. All contacts must be made from one geographic location. Exchange signal report, ARRL section, SWOT number, county, call signs. Count 2 points per SWOT-member QSO, 1 point for others. Multiply by total counties worked. Mail summary sheet (no logs, unless requested) by Nov. 1 to: Jerome Doerrie, K5IS, Rte. 2, Box 72, Booker, TX 79005.

VK/ZL Oceania DX Contest, phone, sponsored by the New Zealand Assn. of Radio Transmitters, from 1000Z Oct. 2 until 1000Z Oct. 3 (cw, 1000Z Oct. 9 until 1000Z Oct. 10). Work stations once per band. Exchange signal report and serial number starting with 001. Count 2 points per VK/ZL QSO, 1 point for QSOs with non-VK/ZL stations in Oceania. Multiply by sum of VK/ZL call areas worked on all bands (the same call area may be counted once per band). Awards. Mail entries (include IRC for results) to be received by Jan. 31, 1983, to: NZART Contest Manager Jock White, ZL2GX, 152 Lytton Rd., Gisborne, New Zealand.

5 West Coast Qualifying Run, 10-35 wpm, at 0400Z Oct. 6 (9 P.M. PDT Oct. 5). See Sept. 1 listing for more details.

9-10 ARRL International EME Competition, Part 1, this issue, page 77.

ARRL CD Parties, phone and cw, for Communications Department appointees and ARRL officials. See the fall issue of QCD for details.

SWOT Open QSO Party, Part 2. See the Oct. 2-3 listing.

VK/ZL Oceania Contest, cw. See the Oct. 2-3 listing.

Rhode Island QSO Party, sponsored by the East Bay Amateur Wireless Assn., from 1700Z Oct. 9 until 0500Z Oct. 10 and 1300Z Oct. 10 until 0100Z Oct. 11. Work stations once per band and mode. No repeater QSOs. Exchange signal report and QTH (city or town for RI stations; state, province or country for others). Suggested frequencies: phone — 3.900 7.260 14.300 21.360 28.600 50.110 144.200 146.52; cw — 1.810 and 50 kHz up from low end; Novice — 10 kHz up from low end. Count 2 points per phone QSO, 3 points per cw QSO. Novices and Techs. count 5 points per QSO. RI stations multiply by total states, provinces and countries worked; others multiply by total RI cities

and towns worked (max. 39). Club competition. Awards. Mail entry by Nov. 15 (include large s.a.s.e. for results) to: EBAWA, P.O. Box 392, Warren, RI 02885.

Worldwide SSTV Contest, sponsored by the German AR Teleprinter Group, from 0600Z Oct. 9 until 0600Z Oct. 10. All entrants must take a 6-hour off-time anytime during the contest. 80-10 meters, SSTV only. Work stations once per band. Exchange call signs, signal report, serial number (starting with 001) and GARTG membership number if a member. Count 1 point for each 80-, 40- or 20-M QSO; 2 points per 15-M QSO; and 5 points per 10-M QSO. Multipliers: countries as defined by WAE and ARRL countries lists (including KL7, KH6 and W/K), and JA, PY, VE/VO and VK call areas. Count multipliers once per band, and multiply by sum of QSO points. Multiply that total by the number of continents worked per band. Add 50 bonus points per GARTG member contacted. Mail logs to be received within 2 months after the contest to: Wolfgang Punjer, DL8VX, P.O. Box 90 1130, D-2100 Hamburg 90, Fed. Rep. of Germany.

21/28 MHz Telephony Contest, sponsored by the Radio Society of Great Britain, from 0700-1900Z Oct. 10. 21 and 28 MHz, phone only. Single and multioperator. Exchange signal report and serial number starting with 001. Contact British Isles stations only (G, GD, GI, GJ, GM, GU, GW); GB stations do not count for contest credit. Count 3 points per QSO, and multiply by sum of different G prefixes worked on each band. Mail entry to arrive by Dec. 1 to: Dr. E. J. Allaway, G3FKM, 10 Knightlow Rd., Birmingham B17 8QB, England.

12 W1AW Qualifying Run, 10-40 wpm, at 0200Z Oct. 13 (10 P.M. EDT Oct. 12). See Sept. 13 listing for more details.

16-17 AC-DC Contest, sponsored by the Canadian Ladies ARA, from 1800Z Oct. 16 until 1800Z Oct. 17. Open to both YL and OM amateurs. Each station may be worked twice, either once on phone and once on cw, or on two different bands. Exchange signal report, QTH, name and call sign. Suggested frequencies: phone — 3.775 3.900 7.150 14.160 14.280 21.300 28.488 28.588; cw — 3.690 7.035 14.035 21.035 28.035. Everyone count 1 point per QSO, except 3 points per bonus station. Non-CLARA members work YLs only. Multiply by total Canadian provinces/territories worked. Awards. Mail entry by Dec. 31 to: Lynn Boothroyd, 673 Tackaberry Dr., North Bay, ON P1B 8R1, Canada.

Jamboree on the Air, sponsored by the World Scout Bureau, from 0001 local time Oct. 16 until 2359 local time Oct. 17. Look for activity on the following frequencies: phone — 3.940 7.240 14.290 21.360 28.990 51.150; cw — 3.590 7.030 14.070 21.140 28.190; SSTV and RTTY on the usual frequencies. Certificates available for s.a.s.e. to: JOTA Coordinator W2GND, 216 Maxwell Ave., Hightstown, NJ 08520.

Pennsylvania QSO Party, sponsored by the Nittany ARC, from 1700Z Oct. 16 until 0400Z Oct. 17 and 1300-2200Z Oct. 17. Work stations once per band and mode. No repeater QSOs. Work mobiles again as they change counties. Exchange signal report, serial number and QTH (county for PA stations, ARRL section for others). Suggested frequencies: phone — 3.890 7.280 14.280 21.380 28.580; cw — 40 kHz up from low end; Novice — 10 kHz up from low end. Count 1 point per phone QSO, 1.5 points per cw QSO and 2 points per 80-M cw QSO. PA stations multiply by total ARRL sections plus PA counties, plus max. 1 DX country. Others multiply by total PA counties (max. 67). Stations on county lines count for 1 QSO credit but multiple county multipliers. Mail entry by Nov. 15 (include 37¢ postage for results) to: Douglas R. Maddox, W3HDH, 1187 S. Garner St., State College, PA 16801.

QRP CW QSO Party
RTTY DX Sweepstakes
WA-Y2 Contest
RSGB 21 MHz Contest

20-21 YL Anniversary Party
23-24 Maryland-District of Columbia QSO Party

24 W1AW Qualifying Run

30-31 CQ Worldwide DX Contest, phone.

NOVEMBER

6-7 ARRL November Sweepstakes, cw.
ARRL International EME Competition, Part 2.

20-21 ARRL November Sweepstakes, phone.

Strays



Tri-City Amateur Radio Club (Connecticut) President Bob Dargell, KA1BB (right), presents his club's contribution to ARRL Foundation President Robert York Chapman, W1QV, in support of the Foundation's Twentieth Anniversary Amateur Satellite Fund. The ARRL Foundation is committed to providing financial support to AMSAT's Phase III-B satellite project and to the future of the amateur space program. (photo courtesy Rick Booth, N1BYH)

NY/NNJ REPEATER OFFERS DIGITAL PACKET MODE

□ The Ramapo Mountain ARC Repeater WA2SNA/R on 223.34/224.94 MHz at Oakland, New Jersey, has been reconfigured, and is now active as both a "voice" and a "digital packet" machine. This local-area network, which serves the New York-northern New Jersey metropolitan area, is scheduled to be connected to an East Coast backbone network that is now in the planning stage. Use of this packet repeater by all area amateurs is invited. For further details, send inquiry with an s.a.s.e. to Ramapo Mountain ARC, Attn: Steve, W2FPY, P.O. Box 364, Oakland, NJ 07436.

I would like to get in touch with . . .

□ ex-radiomen who served in the U.S. Coast Guard VPB-6 squadron in Greenland in 1944-45. Don Holmes, W9MYB, 7220 Creekside La., Indianapolis, IN 46250.

□ anyone who has assembled a Tandy Model II or Z80 computer. Emile Alline, WA5WUJ, 1119 Pennsylvania Ave., Slidell, LA 70458.

Electronics Technician Second Class Kenneth Klarfeld, WA2OX6 (top), Lieutenant Keith Roberts, K5LSM (middle), and Commander Alan Swinger, K9MBQ, position a Hustler 5BTV vertical antenna on the superstructure of the USS John A Moore, one of the Navy's newest guided-missile frigates. Hams aboard the ship recently installed an amateur station to keep crew members in touch with home. (photo courtesy K9MBQ)



Section Activities

Coordinated by Jim Clary, WB9IHH

A-1 OPR → EC → DXCC → ROC → WAS → STM → OES → ORS → NM → SCM → ARES → OVS → SEC → OBS → TCC → OO → NTS → WAC → CP

CANADIAN DIVISION

ALBERTA: SCM, E. Roy Ellis, VE8XC — SCM/SEC: VE8XC, ASCM: VE8AMM, STM, NM (ATN), AN/M (APSN): VE8AV, ECs: VE8AGH VE8AFO VE8AMM VE8AHC VE8BVC VE8ABC VE8ASL VE8AVV. The Red Deer Hamfest, put on by the CARL, that was held on the 19 & 20 June, was another great event in spite of fewer people showing up this year. No doubt the economy was a factor. It was as per usual with the exception that at about 19:57 all bands went dead for about 12 minutes, then they slowly came back into operation. An explanation for such unknown at this time. Suspect a solar flare of some kind. Traffic: VE8CHK 27, VE8ABC 20, VE8XC 5.

BRITISH COLUMBIA: SCM, H. E. Savage, VE7FB — BCEN is feeling the sunny evening and poor band conditions. B.C. Public Service phone net is also struggling with poor conditions. VE7QC NM reports net high 150, low 90, total 3457, average 115. All this reflects are shown in poor traffic reports. VE7IL, 80 yrs QGWA, was in hospital with heart problems and am pleased to say he is out and OK. VE7CB still not improving quickly from double surgery. VE7LL's XYL is progressing with her broken hip, and now we hear that BCEN NM VE7CSI's XYL broke her leg on holidays. VE7EZN and XYL celebrated their 52 years of marriage. Traffic: VE7ZK 102, VE7FAZ 58, VE7CSI 40, VE7FB 38, VE7BN 9, VE7BZ 6.

MANITOBA: SCM, Peter Guenther, VE4PG — ASCM: JP. SEC: HK. STM: RO. NMs: VJ TE ACEX NM HW. The Manitoba marathon was again a success and mostly due to Amateur Radio control. Congrats to all. Lots of meetings and one convention is keeping me busy, so this column is rather skimpy. Have a good summer. MTN QNI 85, QTC 11, sess. 18. MNN QTC 37, QNI 363, sess. 31. WRN QNI 148, QTC 2, sess. 8. MFPN QNI 621, QTC 18, sess. 30. OTN QNI 94, QTC 16, sess. 27. Traffic: VE4TE 29, VE4JA 27, VE4R0 27, VE4AA 15, VE4KH 10, VE4ID 9, VE4TL 7, VE4GB 6, VE4CR 4, VE4LB 4, VE4DT 2, VE4NE 2.

ONTARIO: SCM, Larry Thivierge, VE3GT — ASCM: VE3GLO, SEC: VE3GV, STM: VE3GFN, NMs: VE3AJ, JLN, CYS, FPI, GJM, GH, GIN. The section has members: VE3C, CDS, GAR, LOW, CYP, KMV, NPG, JPC, DVM, KMG, KLK, NJN and FHC were active during the cross country horse jumping trials in Wendover. CARTG's 22nd Annual RTTY DX "Big Smoak" is scheduled for 0200Z Oct. 16 to 0200Z Oct. 18. VE3LYV and VE3DHH are new members of the Quinte ARC bringing the club membership to 70. DOC exam dates for 1983 are: Feb. 9, Apr. 20, June 19 and Oct. 19. Regretfully I must report VE3AAB and VE3HOI have become Silent Keys. VE3HOI had been the EC for York Region. RSO Convention advance registration must be in by Sept. 13. The third generation VE3NRS rpt, all solid state, has been placed into service. Record attendance was noted for the successful Guelph area market. VE3KX and VE3FZ were bicycle mobile to work during the summer months on VE3TWO. Five major projects moving ahead rapidly for the Toronto FM Communications Society. However, they have lost a fine amateur, VE3NAA (N8AJK/VE3), who has left for good to live in Ohio. VE3FRG, with the help and co-operation of many people, has installed a first class station, VE3XSC at Extensicare in Oakville. ORS VE3GFL has moved to Keswick and is back on the air. VE3GT has been appointed EC for Stormont, Dundas and Glengarry Cos. If you feel that we should implement the recommendations of the LRPC regarding the reorganization of the division, please send me to the Journal issue of QST, pages 53 thru 56, please let me know. This is your opportunity to participate — your help is needed and any volunteers may contact me. Traffic: VE3KK 201, VE3HTL 10, VE3GT 122, VE3GOL 117, VE3DPO 84, VE3KXB 54, VE3GFN 49, VE3KCF 47, VE3FPI 32, VE3VM 23, VE3VG 22, VE3LNN 21, VE3JSM 20, VE3BZ 16, VE3DUK 15, VE3AWA 11, VE3AVZ 10, VE3KLX 8, VE3EWD 7. (May) VE3VAE 19.

QUEBEC: SCM, Harold Moreau, VE2BP — SEC: VE2DEA, STM: VE2PJ, NMs: VE2PJF V2FA. Again this year, Field Day was a great day and all are looking forward for the November issue of QST for results. Speedy recovery to our STM, VE2JJ, who is in hospital. Congrats to the following VE2CC members, (E2EY (mixed) and VE2DRJ (ph one)). With deep regret I have to report the passing of the oldest amateur in our section and long time League member, VE2AB. Felicitations a deux nouveaux amateurs de la Mauricie, VE2FJR et VE2JV. VE2RGM est maintenant relie en chaine avec VE2FX. C'est avec regret, que je dois vous annoncer le décès du doyen de nos amateurs, VE2AB. Traffic: VE2BP 38, VE2EC 31, VE2EKC 22, VE2FSA 11.

ATLANTIC DIVISION

DELAWARE: SCM, Harold K. Low, WA3WIV — STM: WD3KX, SEC: W3CP, PSHR: WA3WJ, K3JL, WD3KX. Congrats to W3QLS and W3JL, who have moved to WEBC and high band manager. New officers of AWARE club: AC3U, pres: WB3DPJ, v.p.: WAZZMN, treas.: V. White, secy: N3CAK, exec. dir: AWARE net meets Sat. 146.955/355 at 8:00 P.M. DRA Rptr Club net, Tues. 7:313 at 7:30 P.M. SARA furnished roving comms in cooperation with police at the Old Fashioned 4th of July Celebration in Georgetown, with an estimated attendance of over 8000. DTN QNI 288, QTC 53, DEPN QNI 43, QTC 10. SEN QNI 47, QTC 17. New Castle Co. 2-Meter Net QNI 38, QTC 2. Traffic: W3QO 102, WB3DUG 49, WA3WIV 47, WD3KX 45, K3JL 29, W3GWD 20, WA3PWT 16, WA3DUM 14, W3EFL 11, N3AXH 4, K3ZFX 4.

EASTERN PENNSYLVANIA: SCM, Karl W. Pfell, W3VA — SEC: WA3PZ, PSHR: W3JL, NMs: W3JL, W3VA, W3QX, K3CQK, K3CQV, K3CQW, N3BFL, N3CJUP, W3EKC.

Net	Freq.	Time	QNI	QTC	Sess.
EPAEPTN	3917	8 M. Dy	165	30	53
EPA	3510	7:10 P.M. Dy	332	185	53
PEN	3958	5:30 P.M. Dy	254	227	29
PTTN	3810	8:30 P.M. Dy	121	28	30

Local and vhf nets reporting (QNI, QTC, sess.): D3ARES

191, 12, 4: D6ARES 31, 13, 4; WARCVTN 36, 23, 4. OO reports: W3GOA W3GTM W3GVR W3FAF KB3XO W3KEK OBS reports: K3EBZ W3CL W3ID W3VA W3AENE W3BFVJ. OVS: W3GOA, PSHR: KA3DLJ, KA3EJG, KA3GJT, KB3XO, KE3U W3GOA W3VA W3AEND W3WOP WB3FKP. Field Day messages received from AK3M K3II K3YTL KF3N N3KZ N3WV W3BN W3EKT W3FM W3MN W3OK W3PM W3UJ, KB3UD sporting a new IOT730 and mobile hf antenna. N3CXA new ham in Shenandoah. Upgrades: N3AGQ WB3CQM WB3EPU to E. N3BHF to A. KA3CHU KA3H, KA3HVA to T. Con. EA (KA3CHU). EPA and PITN welcome KA3AKY. K3CAK moved to Lebanon. Schuykill Area supplied comms for the Motorcycle Enduro and the Shenandoah Run. KB3LF obtained General Radio Telephone ticket. DL7FR visited with W3XN while on vacation. W3KEK finally got his quad repaired after a visit from Murphy. AA3B, NM EPA, needs NCS and 3RN reps. Please give him a call if interested. W3BBS and W3CXC report very successful VHF QSO Party, but we had did not cooperate. New officers for the following: DL-ARC: N3BIB, pres.; N3BHF, v.p.; K3NWM, secy.; K3RJI, treas. Mobile Sixers RC: WB3BDP, pres.; N3AHP, v.p.; WA3KFT, secy.; KA3APT, treas. Mt. Airy VHF PC (Pack Rat): K3KTY, pres.; WA3DF, v.p.; W3NSI, secy.; W3ZD, cor. secy.; K3GAS, treas. Warminster ARC: K3BJV, pres.; KA3CB, v.p.; KA3FBP, secy.; K3BXC, treas. West Branch Area: KA3CPA, pres.; K3QDA, v.p.; K3CM, cor. secy.; WB3HOI, rec. secy.; N3BII, treas. Was nice to hear so many EPA section stations active on Field Day. Traffic: WA3WQP 194, KA3GJT 180, AA3B 116, W3DP 115, W3PFX 104, KB3UD 82, KA3DLJ 76, W3VA 74, KB3XO 60, WA3EHD 49, KA3EJG 42, WB3FKP 38, W3TWW 36, WA3DFO 34, W3FAF 26, W3ADE 21, KB3LF 20, W3CL 17, K3CXC 15, W3AQN 13, N3BFL 12, WB3FVJ 12, W3ID 12, K3NB 12, KE3U 12, K3KW 5, N3AKO 2, K3EBZ 2, AF32 1.

MARYLAND — DISTRICT OF COLUMBIA: SCM, Karl F. Medrow, W3FA — STM: WB3GZU, SEC: WA3TAL, KA3FWB has upgraded & has new call N3CQZ. Congrats — Field Day msgs from W3VPR K3AA, AJ3Y WA3WRC KD3B K3PN, K3EF W3NKF and WA3NAN. Good luck to all. KA3CQD says don't forget the MTN 3737 kHz at 1930 local time Mon. thru Fri. Get it going here! WB3GZU consistently makes BPL despite his work taking him out of prime radio time. N5EAZ3 since last heard from has gotten married, moved, upgraded to Extra and is back to thinking about antenna arrays! FB. Vacations or planning same: W3DQI WA3VPL WB3KJT W3IK, N4DR/3 years for 10 MHz. W3JZY gives wooden nickels for his 50th anniversary, 58 years a ham and a young 90. How about our ANDY! K3GKC makes a permanent move to Florida. KA3CWH has a new disguise — K3ABV. WA3BM was appointed PIO Montgomery Co. Congrats. KA3R and W3MR submit OO reports. The Frederick Hamfest was a nice cozy friendly gathering. KA3HLK is about situated in Balto. City. W3LDD is a MEPN regular. WB3LTA has a good mobile rig. WA3FYZ checked in from home one night and scared every one! W3ZNW is our most consistent reporter. W3CDD resumes skeds in September. KJ3E, after 22 years, is having a ball in the modern radio world. WA3VUQ announces 1981 MDC QSO Party certificate winners: W2EZ WB2IPX KA1HE AD8J3 and KF1B. Local winners were: WB3CFD WA3VJQ WB3FNS K54B3 N3ACM WA3YHE W3JL, K3B5H and WA3EOR. Congrats N3AC. WA3 mobile in 6 counties! Next party 23 Oct 82 1800Z to 2100Z Oct 24, sponsored by the Columbia Area. KB3WL says it is getting hot up in the mountains. WB3BFK is NCS of many nets. Sorry to report W3CJT and W3KA are Silent Keys. With the nets: Net/Manager Sessions/Traffic/RFI avg., MFPN/WB3GZU 31/3624.9. No taper, but WB3BFI and W3FA missed less than 3. Big helpers were KA3CDD W3DKX W3FA W3GZU and KB3VP. WR PON/WB3BFK 22/27/14.3. WC 2 MTR/W3ALNW 5/0/20.9. May MDD/W3PQ 62/203/8.9. Brass W3FA K3JL and W3QD. W3PQ needs those QNS reports on time to let me know! Traffic: WB3GZU 501, W3FA 130, KA3CDO 87, W3FVJ 51, K3B5H 40, W3DQI 32, KJ3E 27, WB3BFK 21, WA3VPL 17, W3ZNW 11, W3LDD 10, N4DR/3 5, WB3KJT 4, WB3LTA 4, N5EAZ3 3.

SOUTHERN NEW JERSEY: SCM, Bill Luebckemann, Jr., WB2LCC — SEC: W2HOB, STM: N2CER. As usual for the month of June, Field Day was the operating highlight. Many clubs were active throughout the section on the last weekend of the month, operating from sites ranging from schools and residences to backwoods and the pine barrens. Surprisingly few, however, took advantage of the opportunity to send a message to the SCM, worth an extra 100 points in their final score. I'm sure that most know that in addition to being a contest and a jolly good time, Field Day is also an emergency preparedness activity. One important thing that will be needed in coming emergency conditions is message handling capability. Of course, operating with emergency generators and portable radios is important also, but only if you know what to say when you push the mic button. Now might be a good time for those of you not proficient in message handling to learn it, as you never know when your skills may be needed. Meanwhile, special congrats to those clubs that sent me messages with the proper info. Traffic: WB2JQ 785, N2CER 347, WB2PKG 110, WA2HEB 51, KM2E 48, W2ZQ 36, WB2GF 34, KA2KTR 18, WB2JCE 12, WB2LCC 10, KA2GSL 9.

WESTERN NEW YORK: SCM, William W. Thompson, W2MTA — SEC: W2BCH, STM: W2ZOJ, ASCM: W2GLH, DEC: WA2AI, K2BHF, WB2CJF, WA2ZE, W2BNAO, NMs: N2AEP, N2BLV, W2FR, K2OH, K2KIR, WA2KOJ, K2KOC, W2ZTA, WA2PUJ. Totals of 3,223 League members and affiliate clubs in WNY. Assembly Bill 10233 would exempt ham gear from NY sales tax; write your state senator and assembly member; where do you stand on this issue? Appt: EC-WA2OEP, Lewis; WA2CAM, Wyoming; ORS-WA2FJJ. Thanks to WB2VSJ for past EC services in Delaware Co. Club officers: RARA-N2EH K2KGE K2SPO WB2UTI; RAGS-WA2VSU

WA2URK K2SDD WB2KFA WA2PUJ; LARS-W2XJ WA2GUP WA2ZJG; GRAM-KB2VS WB3JSU WA3PKH WA2HWL; Bonville-W2AD2X W2VYI KA2HWS KA2FOR; Osego-WB2PEE KA2MUS KC2FY. Rome Fest Ham of Year-W2ODC. Rochester area bulletins K2KWK: Mon 12:30/14.7, 1930/145.31; Sun 20:05/148.79 and 148.88. Notice Hatch RARA: N2EH KA2J AF2K WB2ZJY KA2NHP. THANKS! Hamfests: Aug. 28 Trumansburg, Sept. 11 Hamburg, Sept. 18 Seaway at Louisville, Sept. 25 Elmira, Oct. 2 Syracuse. COMMS: RARA had Squanahannock and Victor Rallies and Scotch Bonnett YF; Camden Field Days by N2AGO K2DH AC2I KB2DP; Many helped KA2FXX and HJENK0MST ssm New York; Field Day messages: KA2AEZ N2APB W2BMX K1GQI2 K2IQ K2JL W2LV W2LQ W2QF WB2QK K2RN W2RR W2RUI K2SA W2SEW W2TKE W2JXC. NYS/1* 103-73-25, NYS/CN 32-9.4, THIN 0-4, NY/ON* 588-288-30, NYS/PTEN 677-96-30, STAR/E 55 310-43-30, OCTEN* 503-88-30, QY2 439-7-30, STARRS* 50-20-17, WDNV* 527-92-30, NYS/2* 332-164-30, SLVARES 300-0-4, JCARCN 549-2-29, QARC/N 90-1-5, VHFHTN 95-0-5, BRVSN 284-2-30, CNVNTN 496-63-30, STARRL* 83-25-22, WDNV* 788-102-30, NYB3* 288-241-30, *NTS nets (QNI-QSP-QND). Syracuse area: SALT City DX Assoc. Net Mon 2030/147.45, K2NY, NY Net SKYWARN Net had 51 QNI, W2AET, PSHR, W2AET W2GLH WB2IDS AF2K WA2KOJ, W2MTA WB2OYK, K2CZQ (KOH) W2ZOJ, REORGANIZATION of the State Section volunteers will begin officially next January, with full implementation by Jan. 1985 when all 73 sections will have held elections of SECTION MANAGERS, formerly entitled SCMs. WNY will be "official" October 1984. This should be a boon to affiliated clubs and a "challenge" to the SM, especially to the State Government Liaison, since Albany is not in this Section; need good lobbyist and letter writer for this position. Interested? Get in touch with the SCM/SM. An Affiliated Club Coordinator charged with care and feeding of new or faltering clubs and continuing support of strong, healthy clubs is needed too. Interested? See W2MTA. Traffic: W2ZOJ 341, W2MTA 325, W2FJJ 204, K2OH 170, W2AET 168, WB2IDS 156, WA2HSB 134, WB2OZO 107, W2FR 95, AF2K 92, KA2CLT 82, KA2BHD 72, KG2D 63, WA2ZOK 58, W2GLH 53, N2ARD 40, WB2OJK 32, W2TZ 29, N2ABA 20, K2RPN 16, WA2RHO 14, KA2BDD 13, WB2LJK 12, WB2NAO 12, AF2A 6, K2VR 6, WA2VIA 5, WA2OEP 4, KA2LHO 2. (May) KA2BHB 26. (Apr.) KA2BHB 14.

WESTERN PENNSYLVANIA: SCM, Otto L. Schuler, K3SMB — ASCM/STM: N3EE, NMs: AC3N N3ADU W3NEM W3MML, SEC: AB3C, DEC: on request.

Net	QNI	QTC	Sess.	Freq.	TD/DP
WPACW	343	193	30	3585	7:00/PD
WPAFTN	529	112	30	3983	6:15/PD
WPAZMTN	431	87	30	148-28/88	8:00/PD
NWPAZMTN	451	87	30	148-28/88	8:00/PD

PFN not recvd. The PTTN is on 3810 at 2230Z daily, the WPA RACES Sat at 9:00A EDT on 3990.5. New Notices: KA3S JCN JAO JXK JNW JST JUU JJJ JCV JXC JIG JAD JFQ; To Tech: WA3ITS; To Extra: W3RST. Congrats to all. The youngest ORS in the WPA section is KA3ETC, age 11, code speed at 30. WB3GUK is his OM. Field Day reports rcvd from Irwin Area ARC, Bedford Co. ARC, North Hills ARC, Cumberland Valley ARC, Foothills ARC, Steel City ARC, Penn State ARC, Nittany ARC, Fort Venango Mike & Key Club, W3IW & Gang on Laurel Mtn. I hope I did not miss any who reported to me. It was a great weekend and from reports everyone who participated had a fine time. Congrats to all and a big E to each. Add Washington Amateur Comm. to the above list. Please advise me if you operated in Field Day for my records. If your club has not advised the League of changes in mailing addresses, please do so or you will be put in the inactive list. Please make the changes as soon as possible. Traffic: N3ADU 304, AC3N 170, N3CKO 144, KA3CVD 122, K3CR 82, WA3QNT 78, W3OKN 71, N3FM 68, W3SVM 58, K3SMB 50, W3JA 45, W3RUL 44, W3MML 42, W3EGJ 39, K13C 37, K3HCT 33, W3NGO 33, W3AHK 28, W3PQD 27, N3V5 25, KB3UO 23, N3BKU 18, W3KUN 15, KA3ETC 14, W3JUV 12, K3FJ 12, KA3B3 11, W3J3SN 10, W3KMX 8, N3BKV 7, WB3GUK 7, N3KB 7, K3LTV 6, W3TNN 5, K3VQV 5, W3L0D 3.

CENTRAL DIVISION

ILLINOIS: SCM, Larry M. Keeran, K9ORP — SEC: W9OBH, STM: WB9JSR, ASCM: WD9EBO.

Net	Freq	Times/Days	QTC	Sess.
ILN	3690	2330/0300 Dy	194	58
II Phone	3915	2130 Dy	90	30
NCPN	7270	1215 Dy	14	21
	3915	0700 Dy	54	26
IEN	3940	1400 Sat	4	4
ITN	3705	1900 Local Dy		

D9RN 100% stations: W9HOT W9NWX WB9WGD K9BVE DRNG (CAND) 100% stations: W9NXG W9HOT WB9WGD. W9VEY Memorial Station had a QTC of 10 during 4 sessions. The Electron reports that WB9TGM graduated from West Point in June, and the Sterling-Rock Falls ARS held a reception in his honor at the home of his parents. After Field Day '82, KA9BYB and W9ZMH served 35 pounds of roast beef to 50 people attending the celebration. Then, a plaque was presented to K9BMR from the Macon Co. ARES for recognition of outstanding services performed as "net control operator" during the past emergency weather conditions. WB9JUS reports that the new 443.7 MHz rpt at Normal needs a range check. Bulletins: WD9EBC 407. Traffic: K9BVE 231, W9NXG 231, KB9X 121, W9JII 111, W9OK 105, WB9WGD 94, KN9BA 80, W9KR 73, N9DR 71, W9TUL 42, WB9LQ 32, K9ORP 29, W9D9CB 14, W9D9PU 13, W9A9RM 7, W9D9HZ 3, WB9RLX 2, W9SXL 2, WB9UUR 2, KA9GJN 1.

INDIANA: SCM, Bruce Woodward, W9UMH — SEC: WB9ZQE, STM: W9JLJ, NMs: ITN-W9QY, QIN-K9J; ICN-W9D9CSZ; VHF-W9PMT; IWN-N9BHT; IPN-W9KJM.

Net	Freq	Time/UTC/Dy	QNI	QTC	QTR	Sess.
ITN	3910	1330/2300	1881	247	1919	59
QIN	3858	1430/0100/0400	649	387	1825	89

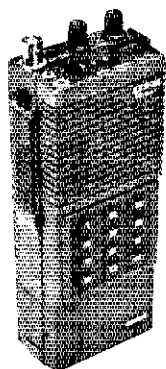


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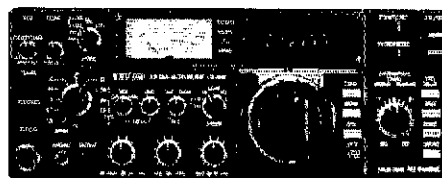
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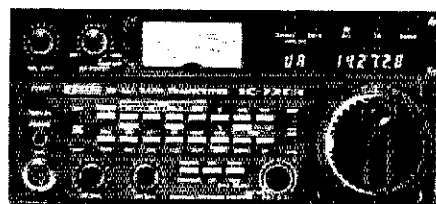


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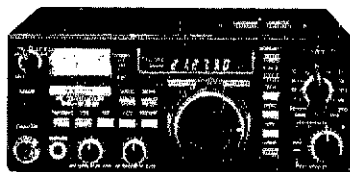
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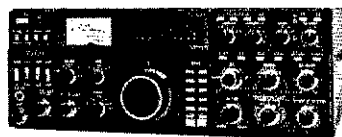
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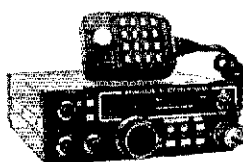
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TS-930S

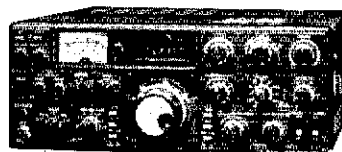
TR-2500



TR-7730/MC46



TS-830S



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TS-830S Transceiver
SP-230 Speaker
YK-88C CW filter

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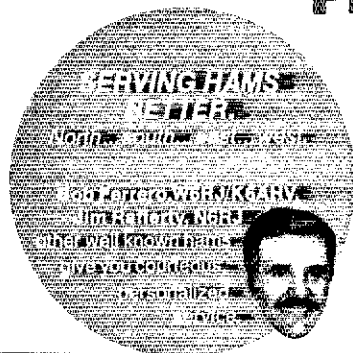
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KENWOOD TS 130SE
ICOM IC730



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SONY ICF 2001

PANASONIC RF3100

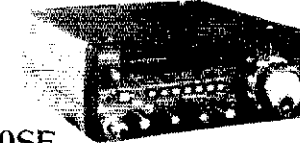
KENWOOD R600/R1000



KENWOOD HYGAIN
YAESU KLM
ICOM HUSTLER
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JIL ETO



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KENWOOD TR2500
YAESU FT 208R/708R



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ICN 3708 0015 74 21 430 30
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GSSB 50150 0030 359 15 3675 30
Hoosier vhf nets: QNI 4818, QTC 151, QTR 5844,
bulletins 19 for 23 nets. D9RN 100%, 297 messages in
956 minutes. IN stns W9UO W9JW K9CGS W9SMK
W9ARMZ KJ9J. CAND 735 messages in 30 sess. IN stn
W9JWJ. Appointments: WET Net mgr. N9BHT. ECs-
KA9EVC, Davies Co.; W9TOW, Clinton Co. W9PRD,
Decatur Co. Silent Keys: K9LBF W9WS W9WIN. The In-
dianapolis Red Cross RC has a new health and welfare
policy out. It is very good. Clubs or ECs interested might
contact WA9BVS or WB9ZQE for this information.
W9EY and W9MOY and the Indiana Radio Club Council
have again gotten Governor Orr to sign a proclamation
declaring the week of October 10-16 as Amateur Radio
Week in Indiana. This week ends with the annual SET
Oct 16/17. The new CD comm officer for Wayne Co. will
be KA9KXJ. Congrats. K9UJK's comments in the MAARC
EXCITER about ARES cards for identification purposes
are well taken. I suspect that most ARES groups should
update or issue cards. I was pleased to read WB9PXT's
article in the FWRC HAMSPLATTER. I've always known
about tornadoes but did you hear of Evansville's hurri-
cane? Revisited the MAHC SPARKS for the first time.
Thanks. N9AOJ W9TDI K9WG and the CCARC are on the
public service events trail again. Terry says things went
very smoothly. They ought to; they've had lots of practice.
The latest edition of the IRCC by JASON was great.
Those interested in joining IRCC should contact Wade,
a chairman. I enjoyed the Terra Haute Hamfest. Made a
pitch for WET Net members in the Wabash watershed.
Still need them. The WET Net has grown to 140 daily
checkins. We could use members in Fountain, Warren,
Benton, Newton, Dearborn, Jefferson and others. If you
can help contact me or N9BHT. Thanks. Traffic: W9JWJ
1045, W9UYU 229, KJ9J 217, W9QLW 155, W9QYU 102,
W9URQ 96, W9EI 96, KM9B 92, K9NHH 67, W9WKM 66,
W9UMI 65, K9FZX 58, W9QCC 49, K9VWJ 42, W9PMT
29, K9ON 28, N9FEM 25, W9UEM 22, W99AVI 20, W99AVI
19, W9JZV 19, W9AOK 17, W9LKV 16, W9DWD 15,
K9K9 14, K9FVN 11, W9BZQE 11, N9GCE 10, W9MOY 8,
N9AST 5, N9BLK 4, W9RTH 4, W9BDP 3, K9OUF 3.
WISCONSIN: SCM, Roger A. Pedersen, K9FH1 SEC;
W9QAK STM: K9LTO, BWN 391, K9N 113, QTC 1164, QTC
1324, W99YPY, BEN 3985 1700Z QNI 596, QTC 143
W9BESM, W9BN 3985 2200Z QNI 880, QTC 373 W9ESZ,
W9N 3723 2300Z QNI 144, QTC 26 KA9HPQ, W9SN 3645
2330Z QNI 148, QTC 26 N9BYK, WIN-E 3662 000Z QNI
386, QTC 188 W9YCV, WIN-L 3662 0300Z QNI 329, QTC
147 K9LGU, XPO 3925 1731Z QNI 329, QTC 24 W9AKY,
N9WTN 341.94 2330Z QNI 616, QTC 40 W99YPY, Gr. Bay
.721.12 0145Z Tue. QNI 13, QTC 2 W99NRK, W9WTN
.317.91 2330Z QNI 393, QTC 41 N9AUG, W9BN BWN cer-
tificate to KA9EJW, BWN certificate to N9BIR & N9CRO.
WIN-E certificate to W9CBE. 50-year members of QCWA
of Wisconsin are W9ZG W9LJF & W9ZFE have
QCWA are W9LUY & W9CBE. W9LJF & W9ZFE have
Advanced. KA9KDV has General. KB9NM had top score
in 1982 VHF Sweepstakes for Wisconsin section. Sons,
daughters and wife of W99VPP are Novices as follows:
KA9NHX KA9NHX KA9NHX KA9NHZ KA9NIA, New
Novices Park Falls area KA9NPP KA9NPO father and
son, and KA9NPN. Sorry to report W9ELY & W9LBW as
Silent Keys. Don't forget WNA picnic September 11
Northwood Co. Park, BRING YOUR OWN FOOD. Grills
will be available, beer, pop will be there. Come join the
fun. KA9MOD is now N9DFZ. KA9HOX N9CKW KA9GYD
have Extras. KA9HXN is now N9DFZ. KA9EOL is now
KC9OD. KA9LGI is now N9DGL. KA9BIL has Tech.
W9WTN certificates to W9KTG KA9GT F N9CRO K9EC
N9AWG KA9D KA9GMW K9HDI. K99N9 W9FYI
W99PKY, BPL to KA9CPA. Sorry to hear Phil Haller
W9HPG a Silent Key. (Watts Snool (Flambeau) (Foxtales)
Traffic: KA9CPA 2285, W9ESZ 388, W9CXY 217, W9YCV
200, K9FH1 179, W99YPY 174, K9GDF 141, W9IEM 115,
KA9HZD 109, N9AZI 104, N9BYK 97, W99ICH 96,
W99WYS 91, W9UCL 88, KA9HPQ 88, KA9IKR 82,
N9AUG 70, KC9CJ 64, AG9G 64, W9AGYV 64, W9D9FI
63, W9B9SM 61, W9KTO 61, W9LDO 52, K9LGU 51,
W99JISW 42, K9JPS 38, W9IHW 38, W9AZT 38,
W99RGO 36, K9HDF 35, N9AW 34, K9LTO 33, K9GBB 29,
N9BDL 32, W9SO 32, K99GW 31, W99JGA 31, K99N9
31, K9AKG 28, N9ATP 29, N9DFZ 27, W9FDY 26, K99GO
26, KA9GYD 26, W9CBE 25, KA9MFV 22, W9UW 22,
W99IMZ 21, W99NRK 20, W99PKL 19, K9EC 16, KA9IHR
16, K99FM 15, KA9EJW 12, W9SFL 12, K9EC 8, K99TC 4,
(May): K9LGU 38, AD9X 10, K9EC 6, KA9MFV 6, W9AJW 4.

DAKOTA DIVISION

MINNESOTA: SCM, Helen Haynes, WB0HOX - STM;
AD9S, SEC: KN6J, ASCM: KC0T. Thanks to all who have
sent SARs and braved the band conditions to participate
in the section nets, and a special thanks to all the net
managers. Our totals are down but summer is short here
- enjoy. Congrats to KA9NCV & N9DUQ for their new
Tech tickets, to KA9MZJ KA9NCW KA9NFF to General,
N9DTR to Advanced, & W99NZB to Extra. A moment of
remembrance for W9RVO. He will be missed. 73 de
AD9S.

Net	Freq	Time	QNI	QTC	Mgr
MSN/1	3695	6:30	310	90	W9DM
MSN/2	3685	10:00	172	48	K9JCF
MINWX	3929	8:15	481	284	W9DCGM
MSN	3710	7:00	112	11	W9WJU
MSPN/N	3945	12:10	513	130	W9AIN
MSPN/E	3929	5:30	1028	167	K9BT

Traffic: WA9TFC 504, K99MB 401, W9HZU 151, KA9IAQ
137, W9DM 111, KC9NF 102, KA9JUX 99, KA9EPY 94,
AD9S 45, W9NZB 42, N9CLS 38, WA9AIN 34, W9DBGS
27, W9GRW 24, K9CE 22, KN6J 20, KA9JW 11,
KA9GDS 6, N9DUQ 5.

NORTH DAKOTA: SCM, Lois A. Jorgensen, WA9RWM -
Officers of BARK are AK0T, pres.: W9DATT, v.p.: KC0MN,
secy.: KC0IW, treas.: WA9MSJ, member at large,
N9DDS, newsletter ed. Congrats to Novice, KA9NFB
and to those who upgraded to Tech, KA9NUG KA9NUB
KA9NTZ, and to Gen, KA9NIP. Herb Leupp went from
Novice to Advanced but doesn't have his call sign. FORX
ARC was active in two public service events, the UND
Special Olympics and United Hospital Marathon. Con-
grats to KM0W, the Dak Div. leader of 1981 November
ARRL SS/Phone. W9GFE got the Sioux Award at UND of
Class '32 for contributing to science. His was on
Freeman Head-Bolt Heater.

Net	Freq	Dy/UTC	Sess.	QNI	QTC
Goose River	1990	SH 1400	4	53	2
DATA	3996.5	Dy 2330	28	224	12

There were good reports on Field Day activities. Not all

AGL Electronics

We're AGL, North Texas' AUTHORIZED Dealer for more than 70 different product lines of Amateur Radio Equipment. Need antennas and towers? We got 'um—just call Bill (K5FUV) or Gordon (N5AU) for your special requirements. Mike (K5F) can advise you on transceivers and accessories. Let Gary (KM5X) box it up and send it your way, while Bob (W5AH) stands ready to help with your service and warranty needs. We like to talk radio, DX, contests, or tell jokes...get Gordon to tell you the Catfish Joke!

CUSHCRAFT

A3 3el triband beam	\$174.00
A4 4el triband beam	\$227.00
A743 7-10 mhz add-on kit	\$62.00
A744 7-10 mhz add-on kit	\$62.00
20-3CD 3el monobander	\$172.00
20-4CD 4el monobander	\$240.00
15-3CD 3el monobander	\$96.00
16-4CD 4el monobander	\$108.00
10-3CD 3el monobander	\$76.00
10-4CD 4el monobander	\$89.00
A32-19 1el 2m "Boomer"	\$84.00
214B 14 elem. SSB "Jr. Boomer"	\$69.00
214 FB FM "Jr. Boomer" 2m	\$69.00
ARX2B 2m "Ringo Ranger II"	\$35.00
ARX4B0B450 mhz "Rng. Rngr."	\$35.00
A-147-20T 20el 2m	\$62.00

HY GAIN

V2S 2m gain vertical	\$34.37
TH7DX 7el tribander	\$339.00
TH5DXS 5el tribander	\$220.20
TH3MK3S 3el tribander	\$199.54
TH2MK3S 2el tribander	\$130.72
TH3JRS 3el ir tribander	\$154.80
HQ-2S 2el quad	\$240.85
402BAS 2el 40m	\$185.79
205BAS 5el 20m	\$275.27
204BAS 4el 20m	\$213.32
203BAS 3el 20m	\$116.97
155BAS 5el 15m	\$165.13
153BAS 3el 15m	\$68.80
105BAS 5el 10m	\$116.97
103BAS 3el 10m	\$55.02
DB1015A \$3el duobander	\$150.68
64BS 4el 6m	\$48.16
66BS 6el 6m	\$96.31
18 HTS hy tower vertical	\$326.88
18AVT/WBS 6 band vertical	\$89.00
14AVC 4 band vertical	\$54.00
214 14el 2m	\$32.00
2BDQ 2 band dipole	\$49.00
5BDQ 5 band dipole	\$89.00
BN86 balun	\$14.00

Note: Part numbers with S on the end denote stainless steel hardware. Some small quantities remain of older stock; call for prices.


KLM

KT34XA 32 ft. boom tribander	\$449.00
KT34A 16 ft. boom tribander	\$309.00
7-2-1 40m dipole	\$155.00
7-2-2 40m 2el beam	\$289.00
7-2-3 40m 3el beam	\$439.00
7-2-4 40m 4el beam	\$599.00
5el 20m "Big Sticker" mono	\$429.00
6el 20m "Big Sticker" mono	\$610.00
6el 15m "Big Sticker" mono	\$389.00
6el 10m "Big Sticker" mono	\$225.00
144-148-131B 2m "Long-Boomer"	\$75.00
144-150-16C 2m circular	\$95.00
432-16L B 432mhz "Long-Boomer"	\$59.00
420-470-18C 450mhz circular	\$57.00

KLM antennas may be shipped from California or Texas, Freight Collect. Most require truck shipment. Call for details.


HUSTLER

5BTV 6 band trap vertical	\$99.00
Mobile antenna resonators:	
vtd super	
10m.	\$10.00 \$15.00
15m.	\$10.00 \$15.00
20m.	\$12.00 \$18.00
40m.	\$15.00 \$21.00
75m.	\$17.00 \$32.00
BM-1 bumper mount	\$16.95
MO-1 fender mount mast	\$22.36
MO-2 bumper	\$22.36
CGT-144 2m colinear w/mount	\$46.70

SANTEC ST-144 


August Special
\$285.00

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FT-102 

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FT-ONE 


Top of the Line
It's what the Competition is trying to Equal!

ICOM IC-740 

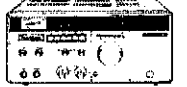
The NEW I-Com Transceiver

AEK 

The Serial Number Memory Keyer

CKZ 

Other AEA Products Available

KWM-380 

CALLING AND CAN'T GET THROUGH?
In their infinite wisdom, the phone people require that we have twice as many lines as people to answer them. Just be patient and try again later; we aren't going belly-up any time soon. Also, we can't keep someone down here to answer the phone at night or on weekends, and we're too busy to answer the WATS on Saturdays.

TEXAS FOLKS
Please note that we're open until noon on Saturdays just for you. Visitors are welcome, too. We're in Keystone Park Shopping Center, across from Texas Instruments. Look for us under our two towers.

TELREX ANTENNAS

WARNING: These antennas are not for the faint of heart. They are heavy. They are large. They are expensive. They also work. These antennas require truck delivery and come in large boxes.

	WT.	Area
10m523 5el 10m beam	64lb.	4.5
10m636 6el 10m beam	85lb.	6.0
15m532 5el 15m beam	95lb.	10.0
15m845 5el 15m beam	140lb.	14.0
20m436 4el 20m beam	108lb.	12.0
This is a custom antenna.		
20m636 5el 20m beam	113lb.	13.5
20m546 5el 20m beam	n/a	n/a
This is a custom antenna.		
20m646 6el 20m beam	178lb.	17.0
40m329 3el 40m beam	110lb.	12.6
40m346 3el 40m beam	177lb.	13.8
TB5EM 5el tribander beam	49lb.	7.0
TB6EM 6el tribander beam	85lb.	10.0

Call for pricing - F.O.B. Dallas.

ROHN TOWER

25G 10 ft. section	\$40.50
45G 10 ft. section	\$91.90
25AG4 top sec. req. bearing	\$54.00
45AG4 top sec. req. bearing	\$103.00
GA25G guy bracket with bars	\$22.00
GA45G guy bracket with bars	\$43.00
SB25G short base section	\$19.00
SB45G short base section	\$43.00
EP 2534-3 3 hole equalizer plate	\$9.95

Self Supporting Towers

H8X56 56 ft. self support	\$335.00
HDBX40 40 ft. self support	\$249.00
HDBX48 48 ft. self support	\$305.00

Our BX series towers include the base stubs. Beware those who charge extra for them. Also, freight collect from Dallas may save over freight pre-paid because of varying distances and routing. Drop ship or factory pick-up prices may be higher due to factory pricing policies. West Coast/Rocky Mountain prices may be 10% higher depending upon shipping point. Call for firm quote before ordering.

ROHN FOLD-OVER TOWERS

FK2548 48 ft. 25G foldover	\$699.00
FK2568 68 ft. 25G foldover	\$869.00
FK4544 44 ft. 45G foldover	\$981.00
FK4564 64 ft. 45G foldover	\$1170.00

Freight prepaid on foldover towers. Sales tax may be applicable in some areas. West Coast/Rocky Mountain prices 10% higher.

HY-GAIN CRANK-UP TOWER

HG-52 SS 52 ft. self support	\$777.50
HG-54 HD 54 ft. self support	\$1287.50
HG-70 HD 70 ft. self support	\$2187.50

Above shipped from Lincoln, NE. Sales tax required in some areas, freight collect on some items. Call for details on these and other Hy-Gain items.

PHILYSTRAN GUY CABLE

This is RF transparent, sun resistant, guy cable. Avoid those hours of putting insulators into steel cable. Enjoy the advantages of freedom from unwanted resonances that can soak up your radiated RF energy.

HPTG 4000 4000 lb. test cable	\$.44/ft.
HPTG 6700 6700 lb. test cable	\$.60/ft.
9901LD potting head	\$4.99
9902LD potting head for 6700 lb.	\$5.49
Sockethead potting compound	\$.90/pt.

TOWER HARDWARE

3/16" EHS steel guywire	\$12/ft.
1/4" EHS steel guywire	\$15/ft.
3/16" ccm cable clamp	\$29 ea.
1/4" ccm cable clamp	\$39 ea.
3/8 x 6" TBE&E turnbuckle	\$5.39
1/4" th thimble	\$24 ea.
3/16" preformed guy grip	\$1.75
GAS604 screw anchor	\$12.00
GAR604 concrete guy anchor	\$12.00
M200H 2" x 10' steel mast	\$37.00
500D guy insulator	\$85
502 large guy insulator	\$180

Note: Some items too large for UPS shipment. Call before ordering to check shipment mode.

HY-GAIN PACKAGE # 1

TH7DX	7el Tribander
HG 52SS	Self Supporting Tower
Ham IV	Rotor
COA	Coax Arms (3 Furnished)
HG-10	10 ft. steel mast
HG-TBT	Thrust Bearing

Your Price!!! **\$1,381.00**
FREIGHT PRE-PAID!!!

May require 4 to 6 weeks delivery. Sales tax may be applicable in some states. Shipped from Lincoln, NE. Cashier's check or money order in advance required—no credit cards. Sorry, no substitutions on this package.

HY-GAIN PACKAGE # 2

HG-52-SS	52 Ft. Crank-Up
HG-10	10 Ft. Mast
HG-TBT	Thrust Bearing
HG-COA	(3) Coax Arms
Ham IV	Rotor

ALL FOR ONLY \$1,090 !!!
Shipped from Lincoln, NE. Allow 4 to 6 weeks for delivery.

ROTORS

Ham IV	\$175.00
T2X	\$247.00
HDR300 for LARGE arrays	\$386.00
Alliance HD73	\$94.00

CABLE

Saxon RG213 50 ohm coax	\$.31/ft.
RG 11U 75 ohm coax	\$.31/ft.
LD-F4-50 Andrews HELIAX	\$1.40/ft.
8 cond. rotor cable	\$.18/ft.
8 cond HD rotor cable (for 150+ft.)	\$.36/ft.
Min 8 52 ohm small coax	\$.16/ft.

Helix cannot be shipped by UPS as it cannot be coiled tightly enough to conform to size restrictions without damage.

CONNECTORS

Amphenol PL-259 (Silver Plated)	\$1.25 ea
Amphenol 82-61 type n	\$2.85 ea
Andrews L44U UHF female	\$15.80 ea
Andrews L44PUHF male	\$15.80 ea

CLEARANCE SPECIALS

Limited to quantities on hand.	
Drake TR5	\$.657.00
Drake PS75	\$161.92
Hal ST 6000-H	\$599.00
Hv Gain TH6DX	\$225.00

Sorry, we can't accept personal checks for mail orders, and can't ship C.O.D. Due to the Yen rate, manufacturer's whims, increasing costs, and the 90 day lead time, all prices are subject to change without notice or obligation: they may go up or they may come down.

Quantity discounts begin at 100 units, except for cable and tower hardware. **PLEASE NOTE:** All drop ship orders, Hy-Gain tower orders, and Rohn foldover towers require payment by cashier's check or money order in advance. We won't accept credit cards for those items only.

CALL TODAY 1-800-527-3418

In TEXAS - Call 1-214-699-1081 (See, it's easy and free, at least to you!)

or visit us at 13929 North Central Expressway, Suite 419 • Dallas, Texas 75243



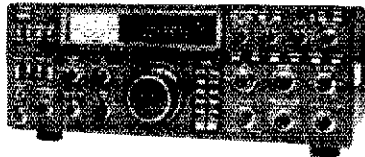
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TO PLACE YOUR ORDER**



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NEW TS-930S



**CALL FOR
YOUR PRICE
AND
AVAILABILITY**

**Amateur Net
\$1799.00**

Superior dynamic range, auto. antenna tuner, QSK, dual NB, 2 VFO's, general coverage receiver.



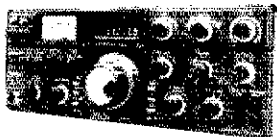
TR2500

**CALL FOR
YOUR PRICE**

**Amateur Net
\$329.95**

Full stock of accessories available.

TS-530S



**CALL FOR
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PRICE**

Amateur Net \$739.95

An excellent choice for the budget minded operator.

TS-830S

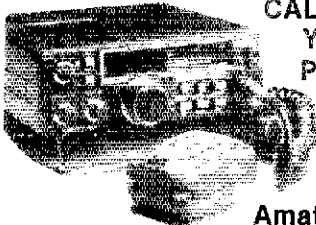


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PRICE**

Amateur Net \$949.95

An outstanding performer. Full range of matching accessories available.

TR-7730

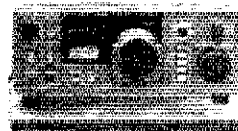


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\$349.95**

An incredibly compact, 25W, 2M FM mobile transceiver with 5 memories, memory scan and band scan. With encoding microphone.

R-1000



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surface**

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\$499.95**

Easy to operate communication receiver covering 200 KH2 to 30 MH2.

YAESU

FT-208R



**Full
Stock of
Accessories
Available**

**CALL
FOR YOUR
PRICE**

**Amateur
Net
\$359.00**

DRAKE TR7 A



**Full Stock of
Accessories Available**

SPECIAL DEALS

**AEA 2M
ISOPOLE SALE**

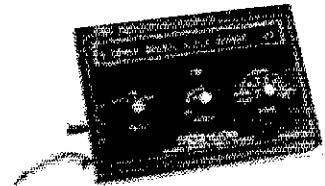
- Achieve maximum attainable gain for a twin 5/8 wavelength antenna.
- Patterns independent of mounting or feedline length.
- Greater than 9 MHz band width.
- Completely weather protected matching network and RF connections.
- Easiest to assemble. Mounts on standard TV master (NOT SUPPLIED).

SALE PRICE \$29.95

Amateur Net \$39.95

**Other models
also available**

AEA mba READER

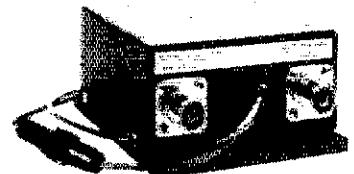


Morse, Baudot, and ASCII code reader with full 32 character vacuum fluorescent display

SALE PRICE \$265.00

**With Free UPS Surface
Amateur Net
\$299.95**

MIRAGE B23 AMPLIFIER



SALE \$79.00

With free UPS surface

**Amateur Net
\$89.95**

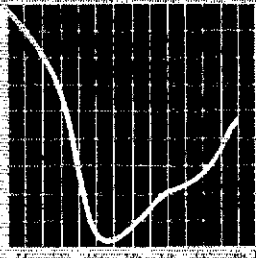
2W IN — 30W OUT
Automatic antenna change over
All-mode SSB, FM and CW

Dealers For: AEA, ALLIANCE, ALPHA, AVANTI, BENCHER, B&W, CDE, COLLINS, CUSHCRAFT, DAIWA, DRAKE, FLUKE, HUSTLER, HYGAIN, ICOM, IN-LINE, KANTRONICS, KENWOOD, KLM, LARSEN, LUNAR, MIRAGE, MFJ, NPC, NYE, ROHN, SHURE, TEMPO, TELEX, TEN-TEC, VIBROPLEX, YAESU, AND MORE.

We accept



1981 MIDWEST VHF CONFERENCE
220 MHz AND 432 MHz
ANTENNA MEASURING CONTEST
BOOMER BEATS ALL COMMERCIAL ANTENNAS



Boomer

6 and 2 meter High Performance Yagis

Two Meter Boomers
Whether you have the space for the 3.2 λ 32-19 or the compact 2.2 λ models, two meter Boomers are your best choice. They offer the maximum gain available for their boom length (See NBS no. 688). They feature trigon elements for additional front-to-back ratio and clearer elements. All stainless steel hardware and heavy gauge heat treated aluminum are used throughout. Whatever your choice of two meter amateur activity, the Boomer will fill your needs. For FM use the 228FB or 214FB. For CW/SSB on the band use 32-19 or 214B, in EME, DX or just reliable QSOs the Boomer will perform for you.

Six Meter Boomer
The new six meter Boomer offers more boom and more gain than its new element spacing. The six meter Boomer has the same attention to detail, including T match feed, balanced balun, and extra heavy duty mechanical construction. The key to this Boomer's super performance and relatively low weight is special element spacing and boom length.

Specifications

Model No.	32-19	214B	214FB	228FB	617-6B
Frequency Range (MHz)	144-146	144-146	144.5-148	144.5-148	50.0-51
Forward Gain (dBd)					
Front to Back Ratio (dB)					
E-plane beamwidth (deg)	2x14	2x17	2x17	2x17	2x19
H-plane beamwidth (deg)	2x17	2x18	2x18	2x9	NA
Side Lobe Interference (dB)	>60	>60	>60	>60	>60
SWR less than (typ)	1.2:1	1.2:1	1.2:1	1.2:1	1.2:1
Impedance (ohm)	50	50	50	50	50
Recommended stacking distance					
E-plane (ft)	14	10	10	10	NA
H-plane (m)	4.27	3.05	3.05	3.05	NA
E-plane (ft)	12	10	10	10	23.5
H-plane (m)	3.66	3.05	3.05	3.05	6.66
Weight (lbs)	12	8	8	22	26
kg	5.44	3.63	3.63	9.98	11.79
Length (ft)	22	15	15	15	34
m	6.71	4.57	4.57	4.57	10.36
Longest element (in)	40 1/2	40 1/2	39 1/2	39 1/2	113 1/2
cm	102.5	102	100.3	100.3	289
Turning radius (ft)	11	7.5	7.5	9.5	17.7
m	3.35	2.29	2.29	2.90	5.39
Windload (sq ft)	3.5	1.7	1.7	4.0	4.8
sq m	.33	.16	.16	.37	.45

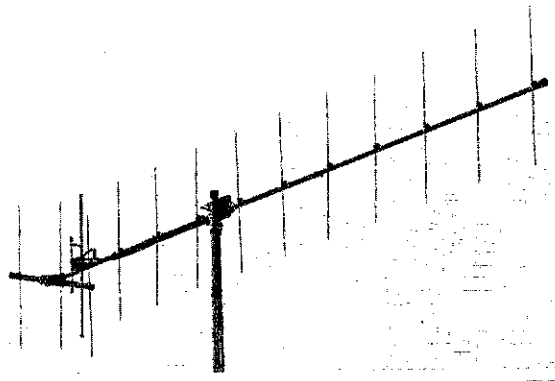
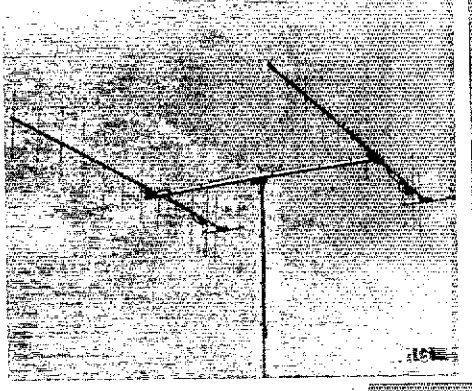
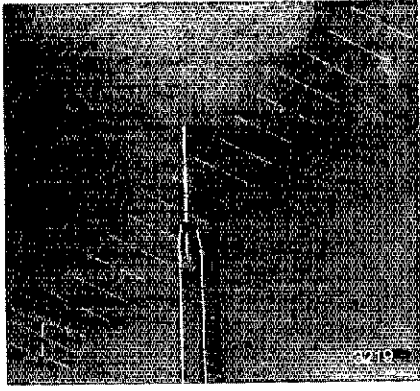
Stacking Kits

When stacking two Boomers, use the following coax harness and power divider kits.
32-19 = 32-SK 214B = 22-SK 617-6B = 617-SK
When stacking four Boomers, use the following complete stacking kits. They include H frame, harness, hardware and complete instructions.
32-19 = 324-QK 214B = 224-QK

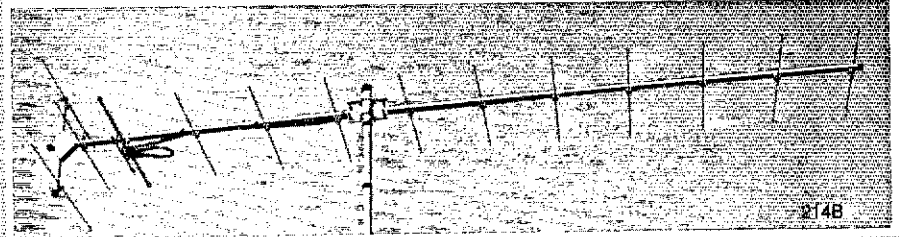
Specifications, Stacked Boomers

Antenna	2x214-B	2x32-19	2x617-6B	4x214-B	4x32-19
Forward Gain (dBd)					
Front to Back Ratio (dB)					
E/H plane beamwidth (deg)					
E-plane	34°	28°	35°	17°	12°
H-plane	19°	17°	20°	19°	15°
Stacking Dist. Vert (ft)	10	12	34	10	12
(m)	3.05	3.66	10.36	3.05	3.66
Dist. Horiz (ft)	---	---	---	10	14
(m)	---	---	---	3.05	4.27
Wt approx (lb)	18*	26*	62*	69	97
(kg)	8.16	11.79	28.12	31.30	44.00
Turn radius (ft)	9	11	18	9	13.4*
(m)	2.74	3.35	5.49	2.74	4.06
Wind Area (F/2)	3.4*	7.0*	9.6*	8.3	15.2
(sq m)	.32	.65	.89	.77	1.41

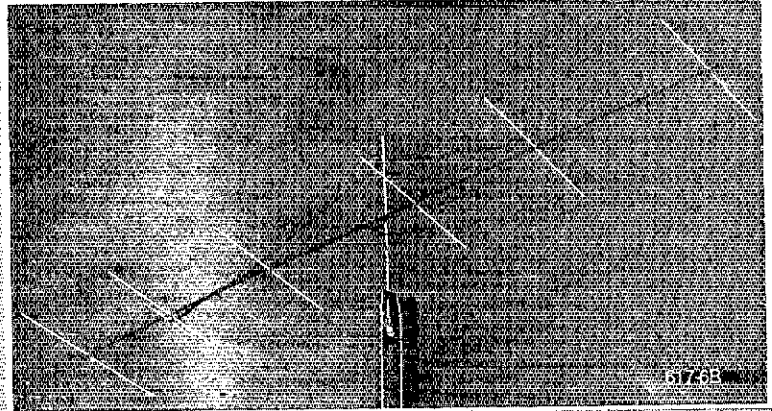
*Support mast not included
The nominal dimensions and weights listed are for complete



214FB



214B



617-6B



The Antenna Company
48 Perimeter Road, P.O. Box 4680
Mesa, Arizona 85205

SHACK SUPPLIES

R. L. DRAKE SALE!

TR7/DR7 Transceiver - List \$1599 - Call for Special Price !!
 R7/DR7 Communications Receiver - List \$1549 - Save & Call!
 L7 2KW PEP Linear Amplifier Less Tubes Special Price! \$969
 L75 1.2KW Linear Amplifier Less Tube - Save! - Save! \$619
 EIMAC 3-500Z Tube - when purchased w/L7 or L75 only \$891
 NM2700 2KW PEP 160-10 mtr. antenna tuner - Special price \$319
 CS-7 Remote Antenna Switch. \$148
 WH7 SWR/Wattmeter. \$116
 THETA 7000E Communications Terminal - Save! \$979
 TR930 Video Monitor for Theta 7000E terminal - Special \$169
WE ARE A FACTORY AUTHORIZED STOCKING DEALER FOR ALL DRAKE AMATEUR PRODUCTS - CALL FOR OUR SUPER PRICE ON ACCESSORIES!

ASTRON POWER SUPPLIES

RS7A	5 Amps Cont. - 7 Amps ICS	\$ 49
RS12A	9 Amps Cont. - 12 Amps ICS	\$ 69
RS20A	16 Amps Cont. - 20 Amps ICS	\$ 89
RS20M	Same as RS20A with meter	\$109
RS35A	25 Amps Cont. - 35 Amps ICS	\$135
RS35M	Same as RS35A with Meter	\$149

AZDEN

PCS3000	2-mtr 25W FM Transceiver w/TT paid kit	\$299
PCS300	New 2-mtr. Handheld Transceiver	\$289
HT-LC	Deluxe Leather Case F/PCS300	\$ 28
HT-ESM	External Spkr/Mic for PCS300	\$ 28

CALL for Price & Delivery on other AZDEN Accessories

BENCHER

BY-1	Keyer Paddle with Black Base	\$ 36
BY-2	Keyer Paddle with Chrome Base	\$ 44
YZ-2	Audio CW Filter	\$ 65
ZA1A	3.5-30 Mhz Balun	\$ 16
ZA2A	14-30 Mhz Balun	\$ 20

DAIWA/MILLER

AT2500	2KW PEP Automatic Antenna Tuner	\$699
CNA-1001	500W PEP Automatic Antenna Tuner	\$299
CN620B	1.8-150 Mhz SWR/Power Meter	\$112
CN630	140-150 Mhz SWR/Power Meter	\$129
CN720B	1.8-150 Mhz SWR/Power Meter	\$149
CS201	2-Pin Cavity Type Coax Switch	\$ 21
CS401	4-Pin Cavity Type Coax Switch	\$ 64
RF440	RF Speech Processor w/AC Supply	\$129

DENTRON

Clipperton I	2KW PEP w/pair 672B Tubes	\$689
Gulfon II	2KW PEP w/pair 3-500Z Tubes	\$999
MLA2500C	2KW PEP w/pair 812Z Tubes	\$899
Station One	25W-3 Band CW XCVR	\$199

We are an authorized Dentron Dealer - Call for Special Prices on other Dentron Products!

ENCOMM/SANTEC

ST144 Up	2-mtr Handheld	\$289
ST-77T	450 Mhz Handheld - SPECIAL!	\$269
ST-LC	Leather Case for HT1200	\$ 29
ST-5BC	Base Charger for HT1200	\$ 65
SM-1	Remote Speaker/Mic for HT1200	\$ 29

ETO/ALPHA AMPLIFIERS

76A	2KW PEP with 2 8874 Tubes	\$1595
76PA	2KW PEP with 3 8874 Tubes	\$1895
374A	2KW PEP no Tuner with 2 8874 Tubes	\$1995
78	2KW PEP no Tuner with 3 8874 Tubes	\$2695

We will meet or beat any legitimate price on Alpha Amplifiers.

HAL COMMUNICATIONS

GWR6850	Teletreader Terminal	\$899
CTX100	RTTY Terminal	\$749
DS3100	Deluxe Terminal-list \$2195- Call for special price!	

We are an authorized Hal Communications Dealer and can help you with your equipment selection - CALL!

ICOM

730	80-10 mtr HF Transceiver with Mic	\$699
251A	2-mtr All Mode Transceiver w/AC supply	\$549
451A	432 Mhz all mode Transceiver w/AC supply	\$779
25A	2-mtr 25W Transceiver	\$309
560	6-mtr All Mode Transceiver	\$419
ZAT	2-mtr. HT w/touch Tone & Charger	\$238

TEN-TEC SALE!

PRICE REDUCTION ON TEN-TEC TRANSCEIVERS AND AMPLIFIER!

GMNI-C 160-10 mtr. transceiver	\$ 969
Delta 160-10 mtr. Transceiver	\$ 699
Argosy 80-10 mtr. Transceiver	\$ 439
Hercules 1.2KW Linear Ampl w/full break in	\$1299
215PC microphone w/coiled cord	\$ 29
229 2KW PEP Antenna tuner w/SWR meter	\$ 229
234 RF Speech Processor	\$ 119
243 Remote VFO for Omni-C	\$169
Complete Stock of all TEN-TEC Filters and Accessories on hand - CALL FOR SPECIAL PRICING!	

JANEL LABS

OSA5	2-mtr Preamp w/switching	\$ 39
OSA6	6-mtr. Preamp w/switching	\$ 41
PM-1	2-mtr. Preamp Module	\$ 16
30PB	10-mtr. Preamp	\$ 21
50PB	6-mtr Preamp	\$ 21
144PB	2-mtr. Preamp	\$ 21
220PB	220 Mhz Preamp	\$ 21
432PK	420-560 Mhz Preamp	\$ 31
432PL	Low Noise 420-450 Mhz Preamp	\$ 53

KENWOOD

TS530S	160-10 mtr. HF Transceiver	\$699
TS830S	160-10 mtr. HF Transceiver	\$839
TS130S	80-10 mtr. HF Transceiver	\$649
TR2500	2-mtr. FM HT Transceiver	\$289
TR8130	All Mode 2 mtr. Transceiver	\$489
TR7850	2-mtr. FM 40W Transceiver	\$349
TR8400	450 Mhz FM 10W Transceiver	\$429
TR9000	2-mtr. All Mode Transceiver	\$429
R1000	Communications Receiver	\$389

Call for Price & Delivery on other Kenwood Products -

MFJ PRODUCTS

102	24 Hour Clock	\$ 30
202	RF Noise Bridge	\$ 49
250	2KW Dummy Load with Dil.	\$ 25
260	300W Dry Dummy Load	\$ 25
262	1KW Dry Dummy Load	\$ 53
422	Pacesetter Keyer w/Bancher Paddle	\$ 89
482	4 Message Memory Keyer	\$ 89
484	12 Message Grandmaster Keyer	\$123
494	Keyboard w/50 Character Buffer	\$239
496	Keyboard w/256 Character Buffer	\$289
525B	RF Speech Processor	\$105
624	Hybrid Phone Patch	\$ 53
721	CW/SSB Audio Filter	\$ 53
751	Tunable CW/SSB Audio Filter	\$ 63
901	300W Tuner w/Balun	\$ 53
940B	300W Tuner w/SWR mtr. & AMT SW	\$ 72
941C	300W Tuner w/SWR mtr. AMT SW & Balun	\$ 78
949B	Deluxe 300W Tuner	\$125
989	Deluxe 3KW Tuner	\$259

MIRAGE PRODUCTS

B23	2W in 30W out 2 mtr. Amplifier	\$ 79
B108	10W in - 80W out 2 mtr. Amplifier	\$159
B1016	10W in - 150W out 2 mtr. Amplifier	\$249
B3016	30W in - 150W out 2 mtr. Amplifier	\$209
C106	10W in - 80W out 220 Mhz Amplifier	\$179
D1010	10W in - 100W out 430-450 Mhz Amplifier	\$289
RC1	Remote Cable	\$ 24
MP1	HF SWR/Watt Meter	\$ 99
MP2	VHF SWR/Wattmeter	\$ 99

PLUS - FREE UPS SHIPPING ON ALL MIRAGE PRODUCTS

RF POWER LABS AMPLIFIERS

A1000	160-15 mtr. KW w/AC Supply	\$1149
V76	6-mtr. 5-15W In-120W Out w/AC Supply	\$ 349
V360	6-mtr. 5-10W In - 450W out w/AC Supply	\$ 949
V720	2-mtr. 10-15W in - 90W out w/AC Supply	\$ 299
V71	2-mtr. 1-3W in - 90W out w/AC Supply	\$ 348
V180	2-mtr. 6-15W in - 200W out 2/AC Supply	\$ 498
V350	2-mtr. 10-20W in - 400W out w/AC Supply	\$ 949

Fan Kits and Rack Adapters Also Available - CALL!

VOCOM PRODUCTS

5/8 Wave 2-mtr HT Antenna	\$ 19
2C025-2 2W in-25W out Amplifier	\$ 75
2C050-2 2W in - 50W Out Amplifier	\$109
Power Pocket Mobile Unit for IC2A	\$189

reports in to see who is top in ND. Traffic: KA9F5M 32, WA9RWM 30.

SOUTH DAKOTA: SCM, Erwin Heimbeck, K6OTZ - Congrats to all the Field Day operators for the efforts during the weekend. Reports came from groups in Huron, Mobridge, Sioux Falls and Spink Cos. W0UZA joined the ranks of Silent Keys and will be missed by all. The vhf contest saw a group from the Hills area attack Cicero Peak and operate on 50, 144, 220 & 432 with a fine effort and score as well. Appointees in SD; if you do not want to continue with your appointment let me know as I am reappointing everyone that is still active. Net reports received from NJC, SD Evening Net, SD Morning Net, and SD Sn Emergency Net. That's it for this month. Next month I will be writing this in conjunction with the new SCM. Traffic: W0HOJ 168, K0AIE 104, WA9VRE 52, W9KJZ 35.

DELTA DIVISION

ARKANSAS: SCM, Dale Temple, W5RXU - SEC: W5BGF - Field Day reports received from: Clinton ARC, MARIAC, Faulkner Co. ARC, NWAARC, Hot Springs ARC, Ft. Smith FC, Central Ark. DX Assn, SCARC, CAPEN, MARC participated in Riverfest 1982. Let's call or District Emergency Coordinators. If you are interested, contact Joel Harrison W5BGF, SEC ARK. Net Reports May: Razorback 866 checkins, 73 tic, time 549 min.; OZK 102 checkins, 6 tic, 348 min., Mockingbird Net 380 checkins, 6 tic, 8 hrs 30 min. SCARC 2-Meter 53 checkins, 2 tic, 117 min. Ark. Phone Net 385 checkins, 35 tic, 1007 min. Searcy Rptr on 147,991.39. Traffic: W5DFD 108, W5QFY 95, W5TUM 48, W4AZJ 11, W5ELJ 8, W5BQQH 8, W5UJU 7, W5KLE 6.

LOUISIANA: SCM, John Meyer, N5JM - ASCM: KC5SF, STM: W5GHP - Emergency preparedness cannot be over-emphasized. The reason for this is immediately as in the tragic crash of Pan Am's Flight 759 into a Keller suburb on July 9th. Coverage began immediately on 2, moving to 75 for out-of-state coverage. Thanks to all who worked hard to make the emergency comms successful. If you are not prepared to tackle a similar situation on short notice, better see your EC for details on what to do before something happens. Welcome to ACSR new EC for Cameron and Calcasieu Parishes. New ham and Jefferson ARCs. MTA and BRARC have fall classes scheduled. LARG is giving some thought to a beacon on 2304 MHz. KB5GQ, who cranks out 850 copies of the ART radio newsletter monthly, is the newly elected vice chairman of the LARG; he likes work. Statewide Field Day was great; the usual sunburn and bugs.

Net	Freq. (kHz)	Time	Mgr.
LAN	3815	7 & 10 P.M. Dy	KC5SF
LTN	3910	8:30 P.M. Dy	N5ANH
LSN	3703	7:30 P.M. M-F	W5DCWK
LRN	3587.5	8:30 P.M. Sn	W5GHP

Traffic: W5GHP 189, W5LQ 156, K5TL 154, KC5SF 135, KA5HDT 85, AC5R 67, WB5LBR 37, W5VMY 37, N5ANH 31, N5BFV 24, W5DCWK 17, WA4MUW 14, K5W0D 10, KD5MA 9, N5ADF 5, W5AJ57 2.

MISSISSIPPI: SCM, Paul Kemp, KW5T - SEC: K5QNE, STM: KB5W, Freq. Coord. WD5DCI, Congrats to KA5NIJ, who upgraded to General, New Novices: KA5OOR, KA5OGB. KB5W wishes to thank person who nominated him to A-1 Operator. G5EN made news by alerting the NWS of severe weather on coast. This is the type of alert operations we need. With regrets, WD5DCI has resigned position of Freq. Coord. ord. He has done fine job. Will be looking for someone to fill this important and necessary function. KA5GGG now N5ERX. Congrats to new MSBN mgr. N5DSK. TNX to WD5EYM who has done fine job for 2 years. CAND (W5KLV) sess. 30, QTC 735, M5 rep 100%, DRN5 (W55YD) sess. 30, QTC 348, M5 rep 100%, MTN (K5OAF) sess. 30, QNI 146, QTC 73, MSBN (K5DSK) sess. 30, QNI 1868, QTC 40, MN/RA5CS (W5BRMW) sess. 29, QNI 567, QTC 18, MSN (N5ERX) sess. 18, QNI 100, QTC 25, G5EN (KB5W) sess. 28, QNI 296, QTC 12, CAEN (KA5AGD) sess. 4, QNI 77, QTC 2. Traffic: KB5W 384, N5AMK 328, K5OAF 152, K5TZ 53, W5HKK 36, KD5P 32, W5WZ 30, W5L5G 3, N5XA 3.

TENNESSEE: SCM, John C. Brown, NO4Q - STM: K4YOL, SEC: K4TKQ. The active part of the year 1982 is just in front of us now; that is the Memphis and Chattanooga hamfests (last for the season) and the 1982 SET. All you fellows and gals get out the emergency equipment and all that and get it all checked out for plenty of busy time. We are looking to the biggest year in many years. That is what the SEC has been telling me anyway. I had not planned on saying much more about the continued upgrading the section, but with the advent of the new Extra class in WA4F and WA4R, I just had to say something. It is in all classes. That is mighty fine news to hear. Keep up the line work. If you haven't worked the WA4KFS yet, better get to it. It will close soon. The honor rolls are still going fine - TSN: WA4UCE W4BY5N, KA4PWU N04J, K4K1K N4EFB N4X4, TN: W4VWX W4DDK W4OQG. The TN lists net certificates for past six months as W4VWX W4DDK N4EAM KB4G N4M4W N04Q W4ZJY K4VM K4AMC W4OQG K4WOP K4JGV. Congrats. Section traffic: LF- sess. 99, QNI-3720, QTC-209, VHF- sess. 110, QNI 2834, QTC 521, CW- sess. 58, QNI 451, QTC 179, RTTY- sess. 31, QNI 74, QTC 3. Traffic: N04J 380, W4VWX 380, W4OQG 188, W4DDK 133, W4ZJY 128, N4DZW/KA4E 81, N4EFB 68, N04Y 87, KA4BSG 50, K4YOL 38, K4WOP 28, K4ON 26, WA4UCE 25, KE4OL 23, W4PP 20, W4DAS 20, W4TVY 15, W4BTD 12, W4PSN 10, KA4US8, N4M4W 8, W4DEKA 6, W4EWR 3, W4DPO 1. (May): W4MRD 38, K4YOL 18.

GREAT LAKES DIVISION

KENTUCKY: SCM, Dave Vest, K24G - STM: KA4GFU, SEC: WA4JQA.

Net	Freq.	Time/Day	QNI	Tic	Sess.	Mgr.
KRN*	3980	0830 M-F	482	43	23	W4JIUW
MKPN*	3960	0830 Dy	1056	121	30	WA4JTE
KTN*	3959	1900 Dy	944	122	30	WD4BSC
KNTN*	3727	1900 Dy	302	34	38	KB4OZ
KYN*	3600	2000 Dy	164	88	30	KA4JLX
KSN*	3600	2200 Dy	168	73	28	K4AWN

(NTS net) Other public service nets reporting: BARES CCEN KYPON LCARES PAWN PAEWTN TSTMN BARES 11ARES. Total activity: 98 sess, 1059 QNI, 98 QTC, D-9RN: 100%. TNX to WB4APC K4ABCW WA4EBN N4ELP KA4MZU WA4JTE N4W4P and KA4SAA. Groups reporting active during FD: BARS LCARC LTRAC PARA RCARC WRAPC PSHR. K4ABCW WD4BSC N4ELP KA4GFU WA4JTE KB4X N4W4P KA4SAA KA4ZU KA4ZL KA4ZV to WA4AGH for OBS activity. Update on KA4ZY to Tech. SEE YOU IN LOUISVILLE ON SEPTEMBER 25 and

TEXAS TOWERS

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1108 Summit Ave., Suite 4

Plano, Texas 75074

Mon.-Fri.: 8:30 a.m.-5:30 p.m., Saturday: 9:00 a.m.-1:00 p.m.

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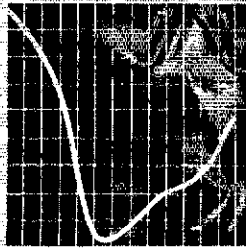
PRICES SUBJECT TO CHANGE WITHOUT NOTICE



1981 MIDWEST VHF CONFERENCE
220 MHz AND 432 MHz
ANTENNA MEASURING CONTEST
BOOMER BEATS ALL COMMERCIAL ANTENNAS

Boomer

6 and 2 meter High Performance Yagis



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Six Meter Boomer

The new six meter Boomer offers more boom and more gain from its new element spacing. The six meter Boomer has Cushcraft's typical attention to detail, including T match feed with balun, and extra heavy duty mechanical construction. The key to this Boomer's super performance and relatively lightweight is special element spacing and boom length.

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Forward gain (dBd)					
Front to back ratio (dB)					
E-plane B/wth (deg)	2x14	2x17	2x17	2x17	2x19
H-plane B/wth (deg)	2x17	2x18	2x18	2x9	NA
Side lobe attenuation (dB)	>60	>60	>60	>60	>60
SWR less than (typ)	1.2:1	1.2:1	1.2:1	1.2:1	1.2:1
Impedance (ohm)	50	50	50	50	50
Recommended stacking distance					
E-plane (ft)	4.27	3.05	3.05	3.05	NA
E-plane (m)	1.30	0.93	0.93	0.93	NA
H-plane (ft)	12	10	10	10	22.5
H-plane (m)	3.66	3.05	3.05	3.05	6.86
Weight (lbs)	12	8	8	22	26
(kg)	5.44	3.63	3.63	9.98	11.79
Length (ft)	22	15	15	15	34
(m)	6.71	4.57	4.57	4.57	10.36
Longest element (in)	40 1/2	40 1/2	39 1/2	39 1/2	113 1/2
(cm)	102.5	102	100.3	100.3	289
Turning radius (ft)	11	7.5	7.5	9.5	17.7
(m)	3.35	2.29	2.29	2.90	5.39
Windload (sq ft)	3.5	1.7	1.7	4.0	4.6
(sq m)	.33	.16	.16	.37	.45

Stacking Kits

For stacking two Boomers, use the following coax harness and power divider kits.

32-19 = 32-SK 214B = 22-SK 617-6B = 617-SK

When stacking four Boomers, use the following complete stacking kits. They include H frame, harness, hardware and complete instructions.

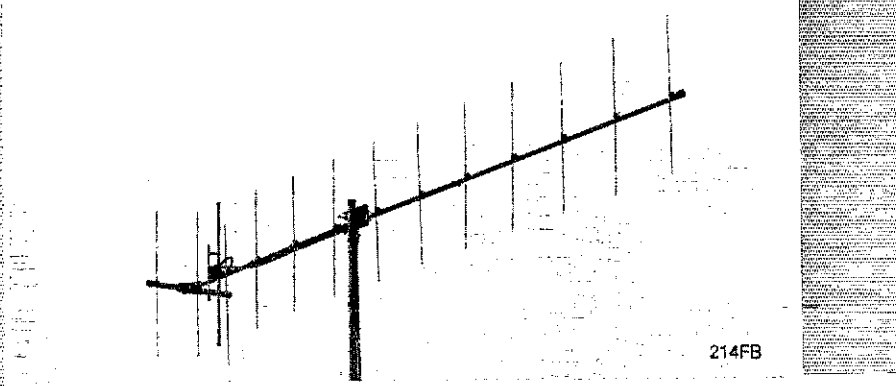
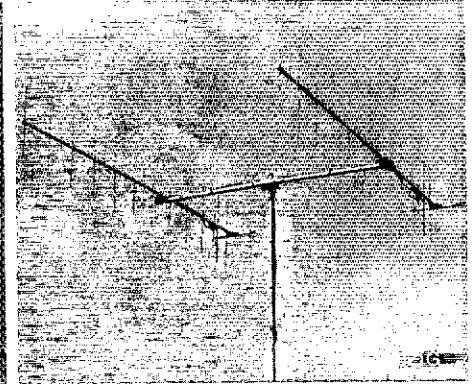
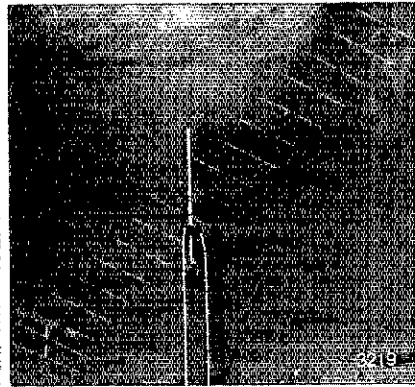
32-19 = 324-QK 214B = 224-QK

Specifications, Stacked Boomers

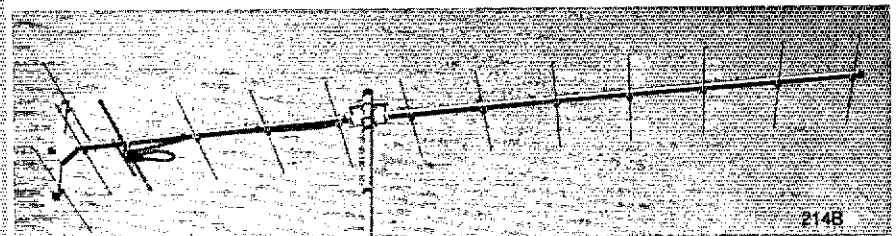
Antenna	2x214-B	2x32-19	2x617-6B	4x214-B	4x32-19
Forward gain (dBd)					
Front to back ratio (dB)					
E/H plane beamwidth (deg)					
E-plane	34*	28*	35*	17*	12*
H-plane	19*	17*	20*	15*	15*
Stacking dist Vert (ft)	10	12	34	10	12
(m)	3.05	3.66	10.36	3.05	3.66
Horiz (ft)	9	11	18	9	13.4
(m)	2.74	3.35	5.49	2.74	4.06
Wt approx (lb)	18*	26*	62*	69	97
(kg)	8.16	11.79	28.12	31.30	44.00
Turn radius (ft)	9	11	18	9	13.4
(m)	2.74	3.35	5.49	2.74	4.06
Wind Area (F ²)	3.4*	7.0*	9.6*	8.3	15.2
(sq m)	.32	.65	.89	.77	1.41

* Support mast not included

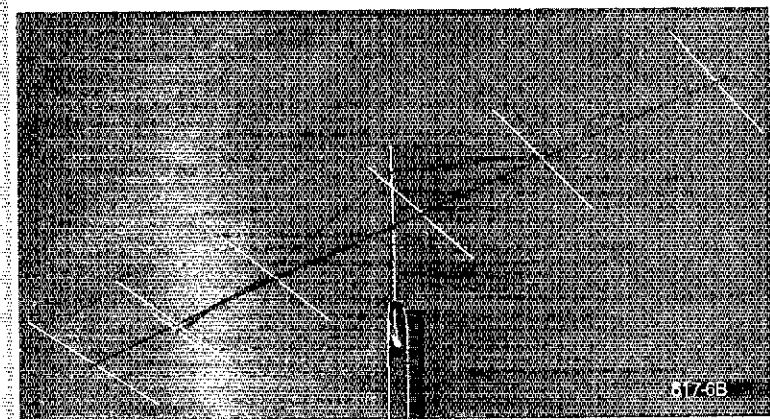
The nominal dimensions and weights listed are for complete arrays. The antennas and stacking kits must be ordered separately.



214FB



214B



617-6B

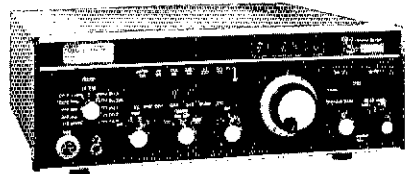


CORPORATION

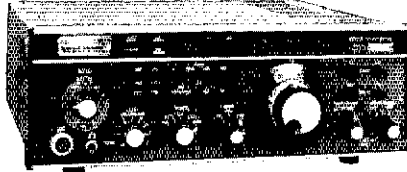
The Antenna Company

48 Perimeter Road, P.O. Box 4580
Manchester, NH 03108

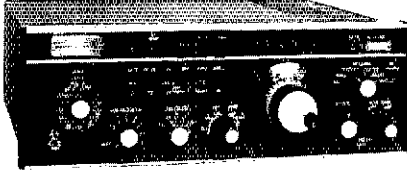
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 NB-5 Noise blanker (Reg. \$90) NOW 81⁹⁵



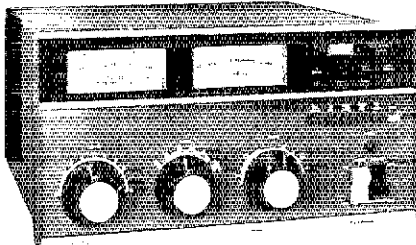
TR-7A 160-10m transceiver (Reg. \$1699) NOW 1489⁰⁰



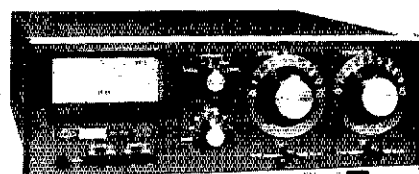
R-7A 0-30 MHz receiver (Reg. \$1649)..... NOW 1449⁰⁰

TR-5/TR-7A/R-7A Accessories:

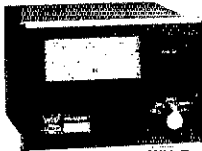
- PS-7 25A power supply (Reg. \$299) NOW 269⁹⁵
- PS-75 15A power supply (Reg. \$199) NOW 179⁹⁵
- MS-7 Speaker 49⁰⁰
- RV-7 Remote VFO (Reg. \$195) NOW 174⁹⁵
- RV-75 Syn. remote VFO (Reg. \$299⁹⁵) NOW 269⁹⁵
- MMK-7 Mobile mounting kit (Reg. \$79) NOW 71⁹⁵
- FA-7 Cooling fan for TR-5/TR-7A/PS-7 29⁰⁰
- AUX-7 Range program board 45⁰⁰
- RRM-7 Range receive module 8⁵⁰
- RTM-7 Range transceiver module 8⁵⁰
- WARC-7 WARC band kit (3-RTM's) 24⁹⁵
- SL-300 300 Hz CW filter (Reg. \$59⁹⁵) NOW 54⁹⁵
- SL-500 500 Hz CW filter (Reg. \$59⁹⁵) NOW 54⁹⁵
- SL-1000 1 KHz RTTY filter (Reg. \$59⁹⁵) NOW 54⁹⁵
- SL-1800 1.8 KHz SSB/RTTY filter (Reg. \$59⁹⁵) NOW 54⁹⁵
- SL-4000 4 kHz AM filter (Reg. \$59⁹⁵) NOW 54⁹⁵
- SL-6000 6 KHz AM filter (Reg. \$59⁹⁵) NOW 54⁹⁵
- 7073 Hand microphone w/plug 29⁹⁵
- 7077 Desk microphone w/plug (Reg. \$49) .. NOW 45⁹⁵
- HS-7 Headset 19⁹⁵
- 1544 R-7A/RV-75 Adaptor kit 29⁰⁰
- 1548 R-7A/TR-7A cable interface kit 29⁰⁰



L-7 2kw linear w/tubes (Reg. \$1400) NOW 1149⁹⁵
 L-75 1.2kw linear w/tube (Reg. \$854⁹⁵) .. NOW 729⁹⁵



- MN-2700 1kw. ant. tuner (Reg. \$349) NOW 309⁹⁵
- MN-75 200w. ant. tuner (Reg. \$259) NOW 229⁹⁵
- B-1000 4:1 balun 29⁹⁵
- AK-75 Multiband antenna 39⁹⁵
- AA-75 Antenna insulator kit 34⁹⁵



WH-7



P-75



CW-75

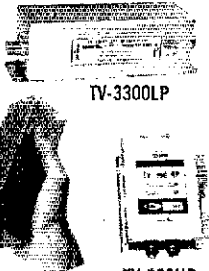


SP-75

- P-75 Phone Patch (Reg. \$79⁹⁵) NOW 72⁹⁵
- LA-7 600 ohm balanced line amplifier 49⁹⁵
- CW-75 Electronic keyer (Reg. \$79⁹⁵) NOW 72⁹⁵
- SP-75 Speech processor (Reg. \$159) NOW 142⁹⁵
- WH-7 160-10m wattmeter (Reg. \$129) NOW 109⁹⁵
- 1525EM TTP microphone (Reg. \$49⁹⁵) NOW 39⁹⁵



DL-300



TV-300HP

Dummy loads:

- DL-300 300w dry dummy load 26⁹⁵
- DL-1000 1kw dry dummy load (Reg. \$59⁹⁵) NOW 54⁹⁵
- FA-7 Cooling fan for DL-1000 29⁰⁰

Equipment protectors:

- 1549 200w antenna surge shunt 24⁹⁵
- 3001 Replacement "pill" element 5⁰⁰
- RP-700 Receiver front-end protector 90⁰⁰

TVI Filters:

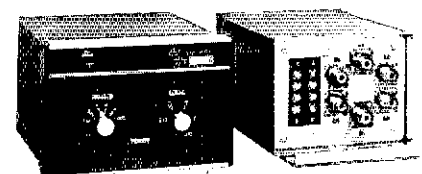
- TV-42-LP 100w 80-10m low-pass filter 14⁹⁵
- TV-3300-LP 1kw 80-10m low-pass filter 29⁹⁵
- TV-300-HP 300 ohm high-pass filter 14⁹⁵
- TV-75-HP 75 ohm high-pass filter 17⁹⁵

Line Filters:

- LF-2 2-outlet AC line filter (Reg. \$39⁹⁵) NOW 34⁹⁵
- LF-6 6-outlet AC line filter (Reg. \$69⁹⁵) NOW 59⁹⁵

Test Equipment:

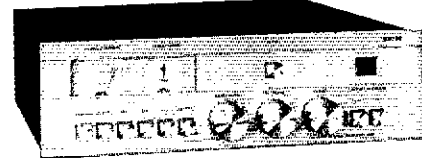
- DMM 2350 Digital multimeter (Reg. \$95⁹⁵) NOW 86⁹⁵



- CS-7 1533 Remote ant. switch (Reg. \$195) NOW 174⁹⁵
- 1534 Control console only for CS-7 117⁰⁰
- 1535 Remote switch only for CS-7 78⁰⁰

Misc.

- 550 Rec. only terminal (Reg. \$499⁹⁵) NOW 449⁹⁵
- TR-930 Panasonic 9" monitor (Reg. \$185) NOW 159⁹⁵
- Service manuals for TR-5, TR-7A & R-7A ea. 35⁰⁰
- 7037 Extender card service kit, R-7A/TR-7A 50⁰⁰
- 1982 World Radio/TV Handbook 16⁵⁰



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- ESR-24 Rcvr. SC/ESR24 conv. (Reg. \$995) .. NOW 889⁹⁵
- ESR-24 Rcvr chassis only* (Reg. \$745) NOW 669⁹⁵
- SC/ESR Down conv only* (Reg. \$250) NOW 224⁹⁵
- SA-24 Stereo adaptor (Reg. \$349⁹⁵) NOW 314⁹⁵
- Modulator for Ch. 3 or 4 (Reg. \$79⁹⁵) NOW 69⁹⁵
- SPH-24 Splash proof housing (Reg. \$30) NOW 26⁹⁵
- TM-24 Remote tuning meter (Reg. \$49) NOW 43⁹⁵
- RT-24 Remote control w/ 30' cable (Reg. \$69) NOW 59⁹⁵
- Internal mounting kit TBA

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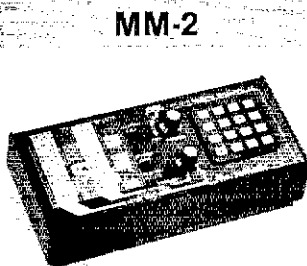
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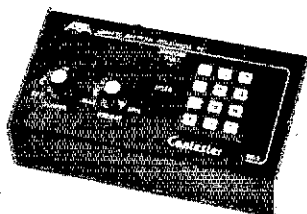
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Message Resume After Paddle Interrupt	Yes	N/A	Yes
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Automatic Word Space Memory Load	Yes	N/A	Yes
Instant Start From Memory	Yes	N/A	Yes
Message Editing	Yes	N/A	Yes
Automatic Stepped Variable Speed	No	No	Yes
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Automatic Trainer Speed Increase	Yes	Yes	N/A
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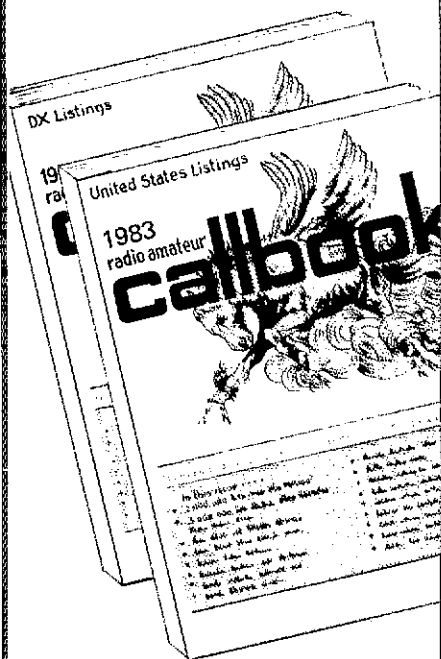
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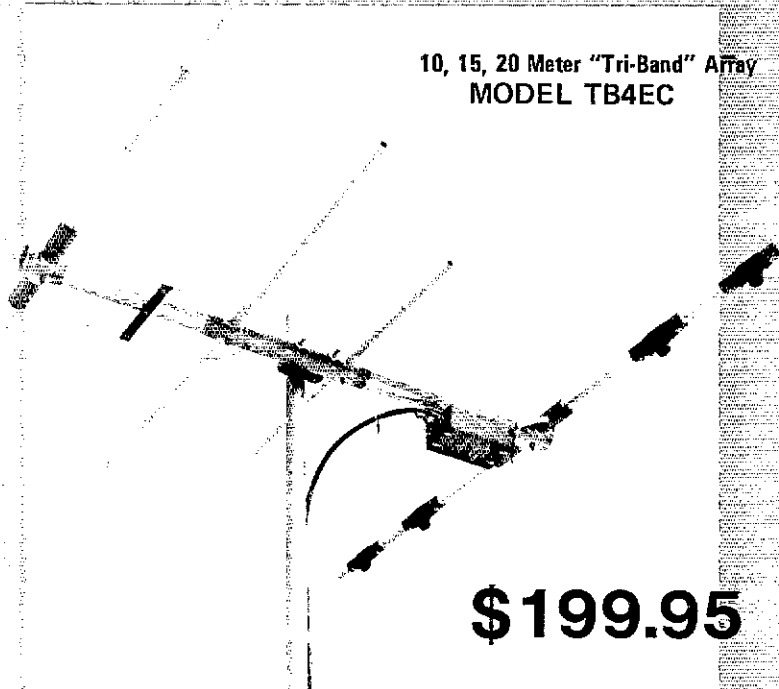
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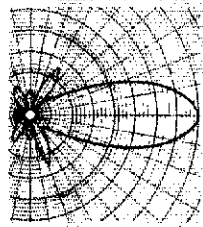
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MICHIGAN: SCM, James R. Seeley, WB8MTD - ASCM: WA8DHB, SEC: WA8EFK, STM: WD8RHU, DEC: K8BTH, N8CUB, WD8MBB, K8RCT, W8WVY, NMS: WA8DHB, N8DSW, K8LNE, K9KMQ, WD8LRT, WA8PIM, W8SCW, KV8U, WB8YDZ, WB8YQ, K8ZJU.

Net	Freq	Time/Day	QNI	Tic	Sess.	Mgr.
MITN*	3953	1900 Dy	590	367	30	WD8LRT
OMN*	3683	1800 Dy**	827	254	60	WA8PIM
MNN*	3722	1730 Dy**	355	118	60	N8DSW
MACS*	3953	1100 Dy**	491	107	30	K8LNE
UPH*	3922	1700 Dy	537	66	34	WA8DHB
WSSBN	3953	1900 Dy	417	30	30	WB8SUR
BR	3930	1730 M/S	301	15	25	WB8ZGP
MEN	3930	0900 Sn	131	7	4	WB8SUR
TASYL	3922	1900 M	6	2	4	KM8E

*NTS nets. Times local. **OMN late net, 2200; MNN late net, 2000; MACS Sn, 1300. VHF nets 6 rpts, QNI 396, tic 15, sess 29, mgr WD8RHU. 3932 is MI emer. freq. ARES net Sn, 3932, 1730, Traffic Workshop Sn, 3953, 1600. New ORS: KA8NCR. New General: KA8BDJ. How's your memory, OT's? Chuck, K4ZN, who writes the traffic column in *Worldradio*, tells me in pre-WWII days in Detroit he was WB8UF and was active in QMN. Motor City RC celebrates their 50th anniversary this year, with gala banquet meeting set for Dec. 4. Pres. WB8PIM invites any former members to get in touch. Black River ARC has succeeded in renewing the expired club license of the old Van Buren ARC. WB8JUU now is BRARC's club callsign. KIBZ trustee. Thus one more classic call is preserved. Excellent work! How often do you hear, sometimes knocking, sometimes appreciating, "QST prints traffic totals as small as one." My view is that, however small the total, the interest is there and deserves recognition. There are no "piddly amounts" of any volunteer public service activity. SCM/SEC FD messages received this year totaled an even 50, an all-time record, I believe. I even had one relayed by a Canadian station, E5SM. That's real F/D spirit! Traffic: K8BCPS 382, AF8V 295, N8DSW 195, WD8LRT 169, WB8MTD 165, K8KQJ 140, K8KMQ 118, WD8RHU 110, WA8DHB 92, WB8PDP 82, N8BNC 77, K8RX 70, K8GXV 68, WB8YDZ 65, WA8WZF 63, WB8ITT 62, WD8MJV 61, WB8HX 60, W7LVB 59, K8TV 58, WA8PIM 50, K8OCP 48, KV8U 48, WB8VZ 40, K8LNE 36, WB8QH 36, WB8GBR 33, WB8YRY 32, N8DTZ 30, W8ECK 32, K8TG 30, KU8H 30, WD8EIB 29, W8VPW 29, KA8NCR 28, WA8RXI 25, WB8YQ 23, WD8JQL 22, WB8SYA 22, K8ZJU 21, N8BBY 18, WD8XZ 18, WB8CW 14, WB8DJS 12, WD8OEP 12, WA8CAF 12, WA8AXF 11, K8Q 11, K8UPE 11, WB8CUP 10, WD8LIP 8, WB8RQ 8, N8DGN 7, WB8LS 7, WB8SUF 7, WB8MCF 6, WB8IYA 5, WD8CJQ 5, W8SJK 4, WB8HN 3, WB8LOU 2, KF8M 1. (May): WB8SYA 33, N8DGN 7, WB8IYA 3.

OHIO: SCM, Allan L. Severson, AB8P - ASCM: WB8MOK, SEC: K8AN, STM: K8OZ, NMS: WA8UW, WA8DYX, W8EK, WA8GMT, KF8J, WD8KFN, WB8YTD.

Net	QNI	QTC	Sess.	Time (local)	Freq.
BN	340	239	59	8:45/10 P.M.	3.577
BNR	---	---	---	6 P.M.	3.605
ONN	---	---	---	6:30 P.M.	3.708
OSN	182	95	31	8:10 P.M.	3.577
OSSBN	2141	841	90	10:30 A.M.	3.9725
				4:15 & 6:45 P.M.	
OSSN	200	115	30	6:45 A.M.	3.577
OHN	464	41	30	9:00 A.M.	50.180

Thanks to all the Ohio section members who, by not running, back-doored me into another two-year term as your SCM. Hopefully, two years from now some of the multi-talented folks we have in Ohio will want to take on this most fulfilling position. And since I have another two years to fill this space, I hope you will continue to feed me tidbits of Ohio news. Tidbits of Ohio news: Welcome to new affiliated club, Highland ARA and WA8KIW, coordinator. Congrats to WB8KO, DEC, COARES and the 70 amateurs who again helped to make bicycling's tour of the Scioto River Valley (TOSRV) a world renowned event. By linking Columbus and Chillicothe rptrs, plus using a portable rptr, reliable comms were maintained over the entire route for the two-day event. Another local net has started in the great Northeast: the North Coast Traffic Watch, 220 auto-start RTTY, with WD8AYH as net manager. Appointments: EC-W8KVK, Athens Co.; KC8GI, Trumbull Co.

Local Nets	QNI	QTC	Sess.
ALERT	61	16	4
BAFF	102	58	22
BRTN	479	243	30
Ham. Co. ARPSC	83	3	4
IE Net	75	5	5
LCNWOARES	827	152	55
MASER	228	8	4
MEDINA CO.	323	34	30
NCTW	19	28	8
TATN	319	96	30
TSRAC	1241	79	37

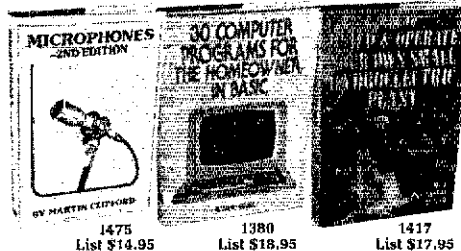
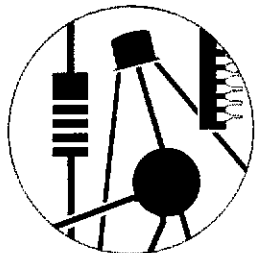
Traffic: K8NCV 566, WD8MJO 451, K8OZ 379, WD8KFN 371, WB8PMJ 339, WB8M 301, N8BOK 278, WB8GX 231, AB8P 197, K8BYR 196, WA8HGH 179, WB8MZZ 178, KF8J 119, K8YUJ 112, W8QZK 98, WB8DMF 94, WD8KBW 94, W8SKF 94, N8DSU 90, WB8YTD 90, WD8YV 84, WB8KKI 83, WA8CYJ 82, WD8RIB 82, K8GJV 74, K8JLI 74, W8MOK 71, WB8JRR 67, WB8QH 60, WB8OHU 55, WB8SIO 51, WD8DOV 49, K8AN 45, K8LIUK 42, WB8EG 42, N8AIH 41, WD8IKK 37, WB8MRL 33, AF8O 30, K8BYS 30, K8DL 29, KA8MBE 27, WD8RZG 27, N8BZC 26, WA8DYX 26, WA8SSI 25, WB8JGW 24, WD8AYH 23, WD8RGS 22, N8DMN 20, WA8HD 20, W8UCY 20, WB8VOA 20, N8CJS 18, WB8HHZ 18, WB8GA 18, K8NJQ 18, K8BVE 18, AF8C 17, WB8FUP 17, WD8NEC 17, WA8ZID 17, WD8AYI 16, K8CJL 16, K8BLN 14, W8TP 16, WB8YQ 16, WD8HDZ 14, WB8TXV 14, WB8WNH 14, N8CGM 12, KA8DJZ 12, KA8GGZ 12, KA8GRH 12, WB8HL 10, KA8KFW 10, K8JE 9, WB8G 9, K8CKY 8, K8B 8, WA8DAD 7, N2NS 7, KA8PHB 6, N8B 6, WD8DO 6, K8VAV 6, WB8WV 6, K8BDG 5, WD8EKI 5, WB8NHV 5, W8OOL 5, N8AEH 4, N8AKS 4, WB8KWD 4, K8CMR 3, WD8JAJ 3, K8BND 2, AC8X 2, (May) WB8MZZ 186, N8JR 22, N8AEH 9, WB8HHZ 8.

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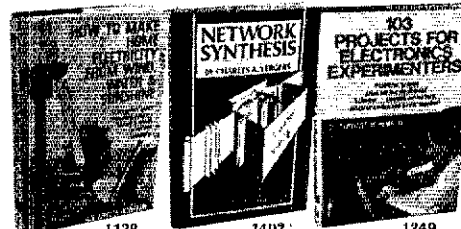
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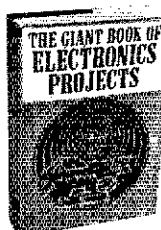
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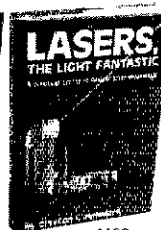
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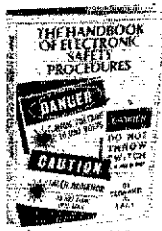
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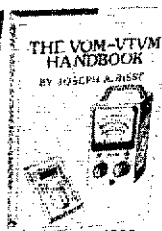
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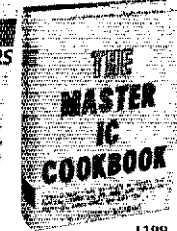
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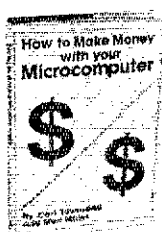
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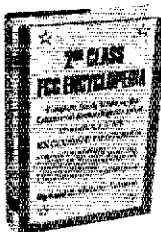
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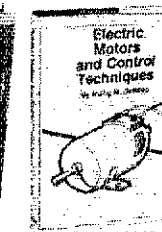
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```

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6 (BRAG ) 7 (CONTEST) 8 (          )
9 (          ) (          ) (CR LF )
/ (TIME ) (          ) (COUNT )
    
```

RCV (NORM) ASCII 7 110 DYL - A DIDS
170 K - 072 WM ICL 1237.46

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TRS-80 NORMAL DISPLAY

```

Line 1
Line 2      (Four line edit window
Line 3      to create text.)
Line 4
    
```

RCV (normal window) ASCII 7 110 DYL - A DIDS 170 K - 072 WM ICL 1237.46

RCV (oldest received data)

XMT (transmitted data)

RCV (received data)

XMT (most recent transmitted data)

RCV (most recent received data)



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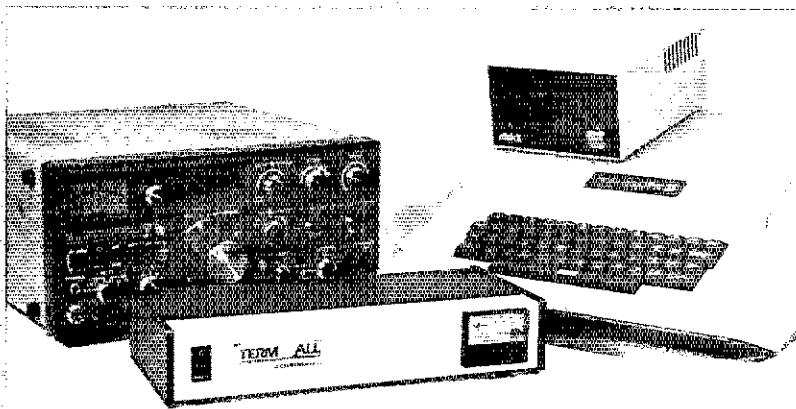
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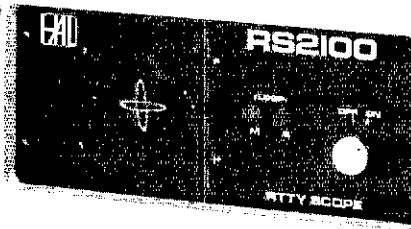
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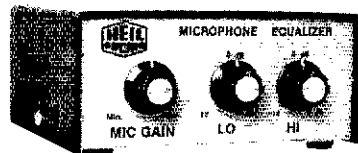
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— SEC: KB2KW, STM: WA2SPL, NM (CW): N2APB, WB2EAG, W2WSS, NM (SSB): WB2MCO, K2KCC, NM (RTTY): W2ODC, NM (FM): WB2ZCM, N2BDW, K2ZVI, WB2HJU. No news from clubs this month because of summertime. As a result of the staff meeting in Watervliet on the 11th of July, several ideas were brought up. Among them is the change of the ENY staff net to Sunday evenings on 3.902 at 10:15 P.M. Hope more can make it on Sunday evenings. The idea of an ENY newsletter was suggested and the possibility of such a newsletter is now being investigated. We are looking for people to take leadership positions, ASCMs to take care of DX, contests, vhf and experimentation, public service and other such positions. If anyone would like such a position, please let me know. ENY staff can use some good help! Don't forget the SET in October. Details will be given on the ENY staff nets. Don't forget the HARC convention the last weekend of October. PSHR: WB2EAG, K2ZM, WB2MCO, KB2KW, W2YJR, W2BIW, AK2E, K2ZVI, WA2YBM, N2BDW, N2CPX, K3ZJJ. Traffic: WA2SPL 41, WB2EAG 372, WB2MCO 180, K2ZM 124, WA2JCL 100, KB2KCC 38, WB2MCO 68, K2ZVI 62, AK2E 59, WA2YBM 56, N2BDW 42, W2YBM 41, W2YJR 40, AZ2Y 34, WB2OHR 28, K3ZJJ 20, N2CPX 17, KC2T 11, N2CSX 8, K2MI 8, WA2CJY 6. (May) WA2CJY 51.

NEW YORK CITY — LONG ISLAND: SCM, John Smale, K2IZ — SEC: WA2KKJ, STM: K2GCE.

NLI CW*	3630	1900/2200	W2LWB
NLIPN*	3928	1815	KS2G
NLS*	3720	1930	WB2EUF
NCVHF	6.04/64	2100 MWTH	N2BZL
SCVHF	4.77/5.37	2030 M-F	WA2ARC
BAVHF	7.915/315	2030 M-F	N2BMF
LIMARC	6.25/85	2100 F	N2BZL
ESS	3590	1800	W2WSS
NVY	3677	1900/2200	KA2CTU
NYS	7077	1900 M-S	KA2CAG

*Denotes section nets. All times are local. Please try and help out by checking in whenever you can. Time is running out, plan to attend the Hudson Division convention being held at what used to be the Playboy Club at Great Gorge, NJ, Oct 29-31. I wish to thank WB2BNY for all the work he did as STM. He has stepped down from the job, and K2GCE has replaced him. W2LWB has taken over duties as NM for the cw net. Suffolk Co. ARC will hold their annual flea market at the Odd Fellows Hall, Jayne Blvd, Port Jefferson Station on Sun, Sept. 12th. Rain date is Sept. 19th, talk in on 145.21/144.61. For additional info, contact WA2SDI at (516) 234-9376 after 6 P.M. The Metroplex 441.750 UHF rpt is up and running better than ever, there is NO requirement for PL tone. For more info contact K2KLN or WB2MGB, WB2NLA upgraded to Extra and is now KV2V. It is with deep regret that we list KA2GAQ as a Silent Key. WA2ARC has started a newsletter for the Suffolk Co. VHF Net, called SORD. For info on what that stands for, why not check into the net and get a copy of the newsletter sent to you. KA2FFC has upgraded to Advanced. NLIPN welcomes W2TZO, who was high QNI in his first month on the net. July saw the first meeting on Long Island of some of the biggies in NTS, W2MTA & W2XD to name a few. Thanks to KA2NH for securing the LILCO Hq. for the meeting. KV2D upgraded to Extra, and received a NLI CW net certificate along with K2IZ. K2IZ is now a member of SOWP. Traffic: W2AHV 106, WA2ARC 84, N2AKZ 60, K2GCE 56, KA2NMA 55, W2KGF 46, K2IZ 28, W2TZO 17, W2DBQ 15, KR2B 11, KS2G 7.

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NJN/L	3695	10 P.M. Dy	30	158	111
NJSN	3735	6:30 P.M. Dy	30	235	110
OBTTN	7/212	8 P.M. Dy	30	566	119
TCETN	95/55	7:30 P.M. Dy	30	332	57
NJVN	49/46	10:30 P.M. Dy	30	396	114
NJRTTY	147.51	Autostart	—	—	—

This is my last month as SCM. I want to thank all amateurs who have helped me in my job. W5DTR has been appointed SCM by W1XX and all reports should go to his address: RD 3, Box 175, Fox Run Rd., Califon, NJ 07830. WB3HWX now N2DPV. KA2JMH has earned DXCC mixed. The following groups sent me FD messages: Morris Co. ARES, Spillrock Rptr, Metuchen RC, Old Bridge Trash and Traffic ARC and Cherryville Rptr Assn. Tri-County RA reports they would like speakers on how to operate in a traffic net (Tony, check into the NJRTTY net for Mary WB1GX2 who will be glad to help you on that score. Mary was a Novice 2 years ago and is now an Amateur Extra with an excellent "tist". She's a retired school teacher — I won't tell her age, but she was awarded the "Certificate of Merit" at the July NJ Traffic Picnic.) W2HWW is also looking for DX contesters (How about W2RQ and his gang?) to talk on DX contesting and also RTTY contesting (call W2PSU who has over 100 confirmed on RTTY and holds RTTY DXCC). N2CXX was awarded the W2UEX award for the "Rookie of the Year." Metroplex reports its rarest Metroplex DXer is AH5AC on Johnston Island. Listen on any of their repeater frequencies for Westlink Radio Network bulletin board when given on 441.750 UHF rpt is up and running better than ever. There is now NO requirement for a PL tone, your UHF carrier will access the rpt. Ramapo Mountain ARC reports Novice class course starting the week of September 23. In-person information, call: Mr. Joe Simon, Director, Pequannock Township Public School 835-5800 ext. 35, 9 to noon and 1 to 4. Are you interested in learning more about "packet radio"? If so, contact WB2CAM on the 49/49 machine for more details on how it can be incorporated into the NTS and your station. The Sussex Co. ARC reports a Novice class is to start sometime in the middle of Sept. to be held at the Sussex Co. Vo Tech. For further information, contact N2BNB. You can always find him on cw on 3695 or 3735 during the traffic nets (see above for net times). I'd like to hear from anyone via the Arizona-New Mexico cw traffic nets from September on when I'll be at my new QTH in Mesa, Arizona. 73. Traffic: AG2R 251, W2XD 167, KB2HM 150, N2BOP 87, N2BNB 61, W5DTR 61, KA2JMH 41, KA2GSX 38, KB2WI 37, WB2KLF 22, WB2RM 22, W2ZEP 21, N2BC 19, WA7DPK 17, WB2ANK 15, W2CC 13, N2SU 7. (May) 10.

MIDWEST DIVISION

IOWA: SCM, Bob McCaffrey, K6CY — SEC: W6RPK, STM: KA0X, NMS: WB6AVV, WA6AUX, W6YLS, W6DND. Many good reports from Field Day. It looks like Iowa was very active, good show. Time to look ahead for 1982 SET. Both the NTS nets and ARES groups should be ready. Let's have a good showing from all areas. Contact the

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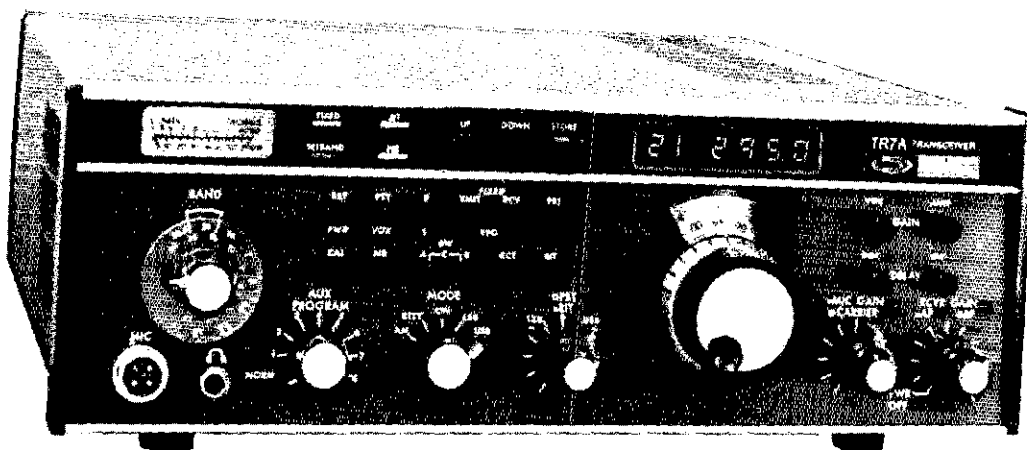
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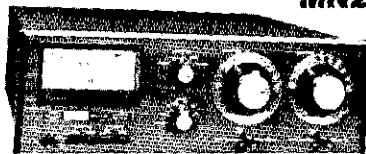
SURGE SHUNT

TR5



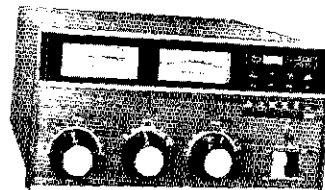
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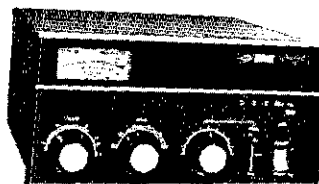
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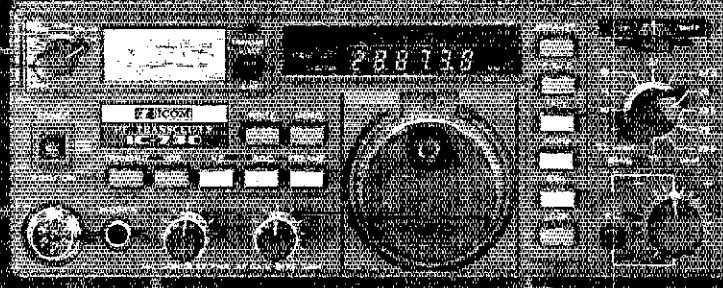
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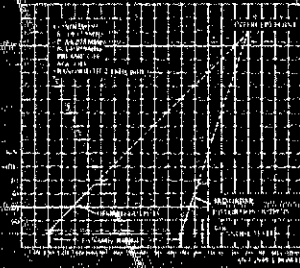
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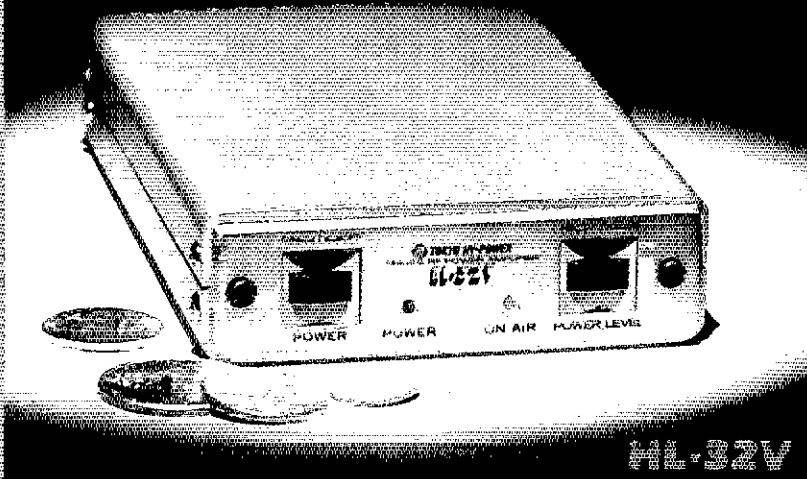
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SEC or me if there are any questions. Call your EC and volunteer your help. KA6JQG has his first BPL, Congrats. The Des Moines club handled over 100 third party message during special event operation. Thanks to all who took part in the HAGBRAI message relay, a good PR project statewide. Need reports of activities during recent storm watch season. Good traffic month for Iowa, many reports. Even if you handle a small amount of traffic, report to me, very interested in the total traffic activity for IOA. Net for DTN. K8ARC now KTBL. KA8HE is now General. KA8MON now Tech. Congrats to WD8FTC for DXCC. K8RAJ heard on OSCAR. Still need OBS in northwest Iowa. Need some active OOs. Keep the reports coming, and let me hear from you. Keep the mailman wondering!!!

Net	Freq	UTC	Days	QNI	QTC	Sess.
TLCN	3560	2330	0300	Dy	341	211 60

75M
Phone 3970 2300 1730 M-S 1708 134 52
Traffic: WA8AUX 370, KA8JQG 340, W8SS 229, A8RKA8X 163, WB8CAM 160, K8GP 120, W8YLS 88, K8CY 81, WA8JL 81, WA8AK 42, KA8UL 34, KC8SC 31, WB8AVW 28, KA8GBG 25, W8WB 16, KA8ADF 13, WB8JFF 12, W8FQ 10, K8OZ 6, K8ZO 6.

KANSAS: SCM, Robert M. Summers, K8BXF — SEC: W8KL STM, W8OYH. NIMS: Phone-KA8CUIF CWV-WB8ZEN; Slow Speed/Novice-N8DBG, K8BN QNI 1078, QTC 158, KPN QNI 450, QTC 50, KWN QNI 933, QTC 600, CSTN QNI 1545, QTC 118, OKS QNI 221, QTC 76, OKS-SS QNI 33, QTC 3. In looking over a few of the call-up sheets recently, I find that we do have weak areas, that is areas that we do not have regular representation from. Listen in on the nets and when you find your area not well represented, check in. Like Uncle Sam used to say, 'WE WANT YOU'. Received an inquiry from WA8LBB, reference to the tenure of the KWN, and I must admit at the time of this article I have no idea, but I will see if I can pull out the details for next month. Well, preparing for Field Day probably fits us all a little bit different. Mine came June 6 thru 14 this year with a storm watch start and a flood watch in the middle, followed by storm cleanup at the end. I am now ready for at least a 72-hour Field Day without sleep, or at least I think I am. I just did one, maybe I can't make it 2 in a row. How about you? Are you ready? Traffic: W8FRC 242, W8OYH 124, WB8ZEN 123, W8HI 100, W8FIR 88, KA8CUIF 84, W8AM 68, W8FDJ 49, W8CHJ 27, K8BXF 17, W8QMT 16, W8PB 15, W8BO 14, N8BDG 13, WB8YLP 11, KA8E 10, W8MI 6, K8GSC 6, KC8GL 6, W8KL 6, W8RT 3, W8OWH 1.

MISSOURI: SCM, L. G. Wilson, K8RWL — ASCM: W8OTF, STM: KM8L. SEC: N8AJI. Field Day messages were received this year from the Callaway ARC, Carthage ARC, St. Louis ARC, Stockton ARC, Mid-Mo ARC, St. Louis Police ARC, Central Mo. ARC, Three Rivers ARC, Independence FM Club, Emerson RC and Heart of America RC. The Hannibal RC has a new president for the remainder of this year, KK8P. The 2nd Annual KC DX Club Golf Tournament is to be held the end of this month. Although everybody is sure to have a good time and some might even play golf, we don't think Tom Watson has anything to worry about.

Net	QNI	QTC	Net	QNI	QTC
ACE	31	2	CMEN	127	4
HBN	352	25	MEOW	377	83
MON	187	29	MEMOE	90	3
MON2	20	48	M8SBN	596	148

Congrats to the following new licensees: Novice — KA8OIA KA8OLI; Tech — WB8ZNE KA8GXC KA8NGU KA8NMN; Advanced — KA8NJZ; Extra — W8NKO. Get well wishes to KC8CL, and deepest sympathy to WB8JVQ who lost her husband recently. Traffic: KC8AS 450, K8PCK 298, K8SI 184, K8K 110, W8BMA 108, K8BM 86, W8OTF 75, W8OOD 75, W8NUB 65, KG8L 59, K8RWL 10, KM8L 5.

NEBRASKA: SCM, Shirley M. Rice, KA8BCB — SEC: N8AIIH, STM: W8BOG. Our sympathy to family & friends of W8DJJ. Glad to hear W8GWR back on after his stay in the hosp. Hope you all heard the wedding bells ringing June 8 for W8JCP & his new XYL. Congrats & 161 to you both. Then we celebrated K8SFA & his XYL's 50th anniv. May you have many more. Hats off to W8YMK & KA8IRW who upgraded to Gen. & to K8LJK to Adv. North Platte QRV Newsletter says they have 12 RTTY stations in their club & are ready to start a RTTY net on 2 meters. FBII N8AIIH received two reports for FD & I received seven. Sounds like you were all busy and sure hope you had fun along the way. Would appreciate some news for this column. You can find me on the nets or mail to me. Next is SET Oct 16 & 17. Will be anxious to hear all about your disasters. 1811 Traffic: K8DKM 80, KA8BCB 34, W8HOP 31, W8ZNI 25, W8GWR 12, KA8OJ 12, W8HTA 10, KA8OM 8, W8NIK 8, K8TUH 8, K8ODF 6, W8PCO 5, K8SFA 5, W8AXY 4, W8GMQ 4, W8YFR 2.

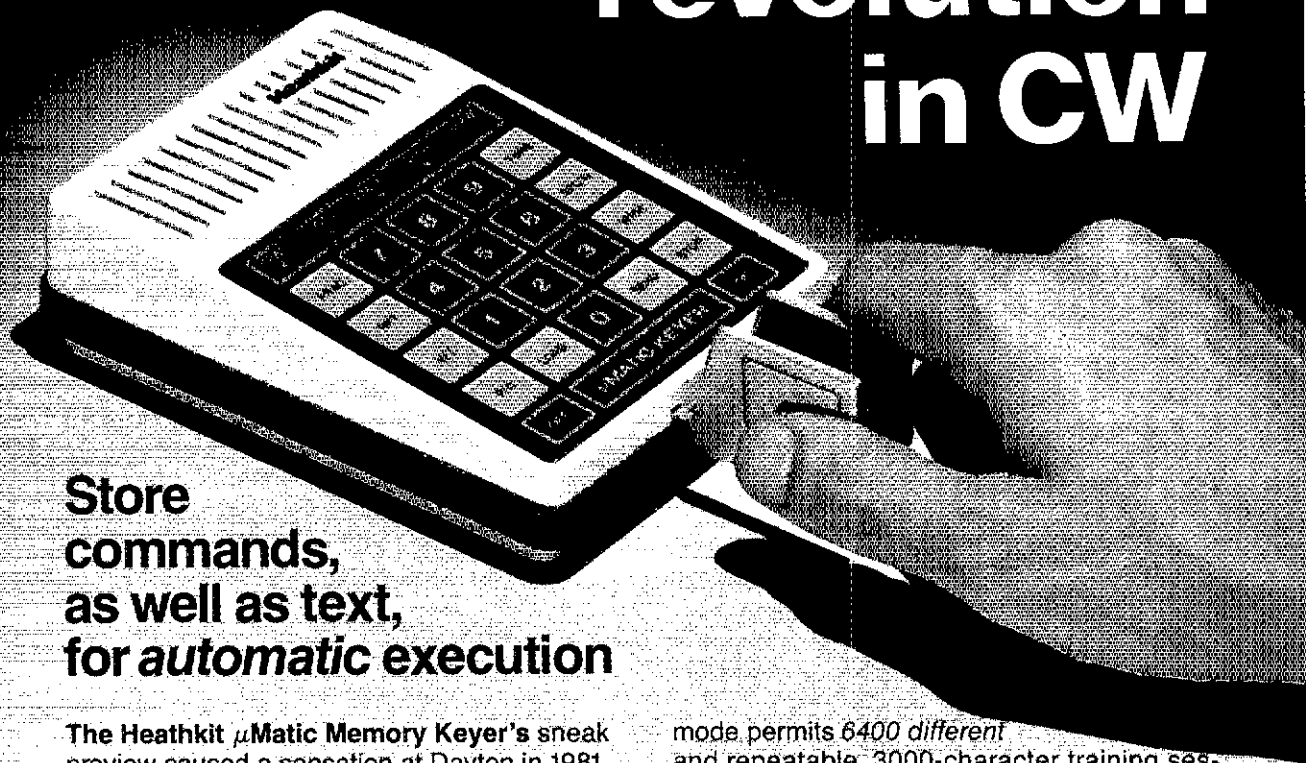
NEW ENGLAND DIVISION

CONNECTICUT: SCM, Pate Kemp, KA1KD — SEC: K1WGO, ASEC: KA1AMK K1AH, STM: K1EJC.

Net	Freq	Local Time	QTC	QNI	NM
CN	3640	1900/2200	227	371	K1EIR
CP	3965	1800 Dy/1000 Sn	79	313	WB1AIJ
NVTN	28/88	2130	44	285	WB1ELA
WCN	78/18	2030	46	398	W1DPR
RTN	13/73	2100	50	239	WB1ESJ

High QNI: CNK; WQE W1QJM WA1JAX; CPN-WA1UAX K1QF KA1KD N1BPD; NVTN-N1BPD. Be prepared, the SET is coming. KA1ECL new QES. Upgrade Extra. W1RS WB1GXZ; Adv-WA1MAC; Gen-KA1GPE KA1IUP KA1DSX; Tech-KA1EEZ KA1HYG KA1HFV. New Novices on the air include KA1JAF & KA1JAE. Call changes: N1BMV/K1JN WB2THN/K2QF. FD messages rcvd from K1BCI W1QI KA1BB K1MUJ W1TR W1WP W1BCG K1DW N1AD KA1IAO. A BIG TNX to SCRAMS for their assistance to RTN. New officers SARC: KA1ESH, pres.; W1TKG, 1st v.p.; KC1A, 2nd v.p.; K1UVR, secy; KA1BHT, treas.; WB2INE, MAA; W1BDN, chap. Congrats to KA1ESH, SARC Ham of the Year. Make your views known on the FCC's NRRM No-Code amateur license. K1QF KA1KD note that we now have a 3rd party agreement with Australia. Bethel M.S. Novice FD group was surprised by a herd of cows in the early A.M. It is suggested that those operators doing business with the W1 buro do not send money, but instead send up some s.a.s.e.s. KA1BIJ has a new homebrew 12 ele 8M up and is looking for action. Be watching this column next month for the Section Reorganization Plan. Many Hq staffers were busy during July's Radiosport Contest putting VE1SPI on St. Paul Island on the air. Happy anniversary to WA1OEH & WA1OEI married 21 years on the 4th of July. Hope to see you in Boxboro Oct 2/3 for the New England Regional ARRL Convention. WB1DXZ is enjoying his new TH7DX. W1DPR & WA1DOR have been

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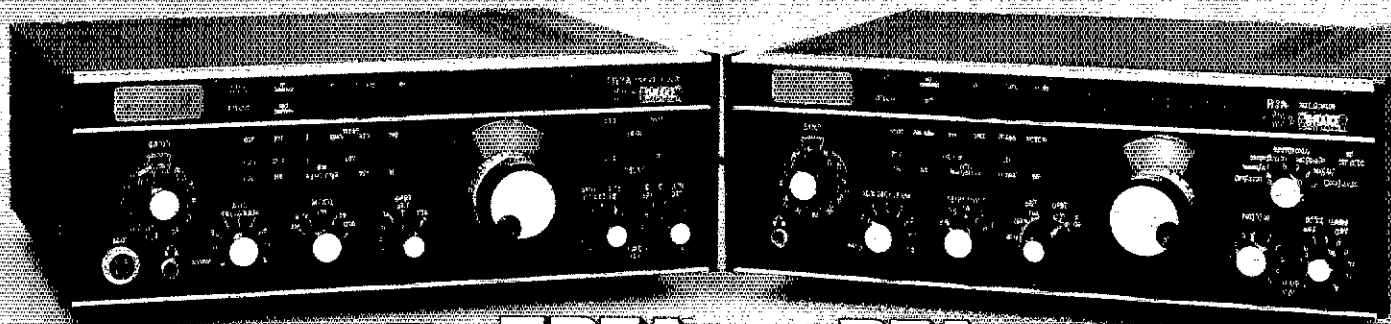
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New! Built in lightning protection avoids damage to solid-state components from lightning induced transients.

New! Mic audio available on rear panel to facilitate phone patch connection.

- **State-of-the-art design** combining solid-state PA, up-conversion, high-level double balanced 1st mixer and frequency synthesis provided a no tune-up, broadband, high dynamic range transceiver.

R7A Receiver

- **CONTINUOUS NO COMPROMISE** 0 to 30 MHz frequency coverage.

- **Full passband tuning (PBT).**

New! NB7A Noise Blanker supplied as standard.

- **State-of-the-Art features** of the TR7A, plus added flexibility with a low noise 10 dB rf amplifier.

New! Standard ultimate selectivity choices include the supplied 2.3 kHz ssb and 500 Hz cw crystal filters, and 9 kHz a-m selectivity. Capability for three accessory crystal filters plus the two supplied, including 300 Hz, 1.8 kHz, 4 kHz, and 6 kHz. The 4 kHz filter, when used with the R7A's Synchro-Phase a-m detector, provides a-m reception with greater frequency response within a narrower bandwidth than conventional a-m detection, and sideband selection to minimize interference potential.

- **Front panel pushbutton control** of rf preamp, a-m/ssb detector, speaker ON/OFF switch, i-f notch filter, reference-derived calibrator signal, three agc release times (plus AGC OFF), integral 150 MHz frequency counter/digital readout for external use, and Receiver Incremental Tuning (RIT).

The "Twins" System

- **FREQUENCY FLEXIBILITY.** The TR7A/R7A combination offers the operator, particularly the DX'er or Contester, frequency control agility not available in any other system. The "Twins" offer the only system capable of no-compromise DSR (Dual Simultaneous Receive). Most transceivers allow some external receiver control, but the "Twins" provide instant transfer of transmit frequency control to the R7A VFO. The operator can listen to either or both receiver's audio, and instantly determine his transmitting frequency by

appropriate use of the TR7A's RCT control (Receiver Controlled Transmit). DSR is implemented by mixing the two audio signals in the R7A.

- **ALTERNATE ANTENNA CAPABILITY.** The R7A's Antenna Power Splitter enhances the DSR feature by allowing the use of an additional antenna (ALTERNATE) besides the MAIN antenna connected to the TR7A (the transmitting antenna). All possible splits between the two antennas and the two system receivers are possible.

Specifications, availability and prices subject to change without notice or obligation.



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for additional information.



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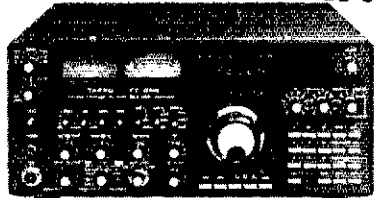
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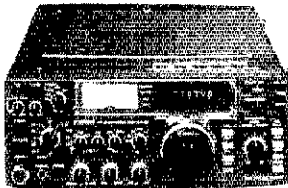
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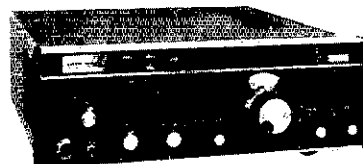
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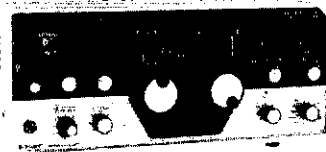
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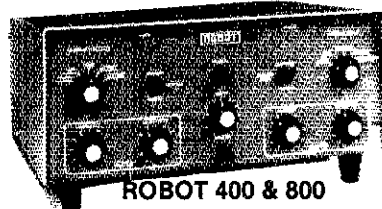
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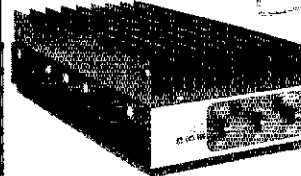
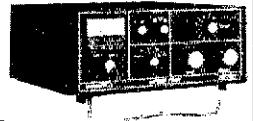
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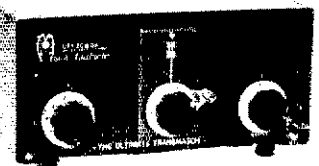
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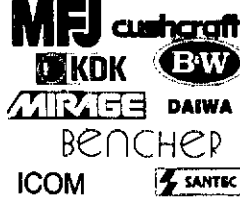
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spending a lot of time in their respective gardens this summer. Maybe next summer they will consider an alternative? Traffic: WA1UW 355, W1EFW 182, WB2PJU 164, WB1GXZ 121, K1OUE 107, W1WIM 103, K1EIC 83, KA1KD 60, WB1ESJ 47, K1WGO 30, K1ACE 23, W1BDN 27, KA1BHT 21, W1DPR 14, W1CUH 5, W1QV 3, W1FAI 4, WB3ANC 2, K1XA 2, N2BQA 1, K1OQG 1.

EASTERN MASSACHUSETTS: SCM, Rick Beebe, K1PAD — STM: WA1TBY. SEC: WA1BLG. ASCM: K9HI.

Net	Mgr	Freq	Time/loc/Dy	QNI	QTC
EMRI	WA1LPM	3.658	1900/2200/Dy	428	311
EMRIPN	KA1BJY	3.949	1730/Dy	279	210
EM2MN	N1BNI	23/63	2000/Dy	252	59
N2EEN	K1BZD	3.945	0830/Sh	61	25
HHTN	K1BSO	04/84	2230/Dy	510	218
EMRISS	N1BHH	3.715	2030/Dy	206	74

One of the problems with Field Day is that the results don't come out till the November issue. So in the hopes that this will reach you earlier than that, I have compiled some very unofficial scores. I apologize in advance to any group I left out as I was unable to reach some clubs by my deadline. The following listing is by group name/call/class/score. An * after the score means that it does not include any bonus points. W1MJ group/W1MJ/J/1A/8995; Hanscom MARS group/W1BXI/1A/892*. Chelmsford club/W1LUS/2A/400 QSOs; Wellesley club/W1TKZ/2A/3004*; Billerica club/K1AR/3A/8000*; Norwood club/K1JMR/3A/77008*; North Shore RA/W1CE/3A/5000*; Acton-Boxboro club/AB1X/3A/5000*; Colonial Wireless/AK1V/3A/17704*; Sturdy Memorial/K1ZZJ/4A/2516; Cape Ann W1RW/4A/1832*; Algonquin club/W1BK/5A/3600*; Greater Lawrence/FUL/5A/352; Whitman club/WA1NPO/5A/3400*; CapeMay club/K1BU/8/8690; Sharon club/K1JNG/3A/4158. New president of Yankee Clipper Contest Club is K2VV; Norwood club looking for help with instructors for its Novice class and are taking advantage of their new coffee pot. Middlesex club had an interesting review of their club's history in its newsletter. Massasolt club had an interesting talk by WA1ZJG on his solar heating system. Greater Lawrence club had its 2nd annual picnic. New Whitman club officers KA1CZS, pres.; N1BVZ, v.p.; KA1FAP, treas.; KA1CCM, secy. Colonial Wireless provided comms for the Battleground Run in Lexington. AK1J coordinated comms for a 10km road race in Milton. Your SCM is looking for a volunteer who has some working knowledge of state and/or local government. Under the new organization, this individual would coordinate and initiate liaison with state government on things like the license plate bill, potential tower legislation, etc. An ideal candidate would be a ham who works closely with state government on a regular basis. Any takers? Traffic: WA1TBY 368, N1BHH 347, W1IDK 131, KA1ON 125, KA1BJY 104, KE1U 86, KA1BBU 85, N1AJJ 67, WA1DXT 62, N8TM 39, K1BZD 28, KA1GBS 28, KA1MI 27, AE1X 24, W1DMH 23, W1CZB 12, WA1FNM 10, K1LCC 8, W1CE 8. (May) KA1GBS 55, KA1R 5.

MAINE: SCM, Cliff Lavery, W1RWG — SEC: KL7JG/1. STM: AK1W.

Net	Sess.	QNS	QTC	Mgr.
AEN	5	76	10	WA1YNZ
SGN	26	961	140	K1GUP
PTN	53	457	215	W1HDC
CMEN	9	134	17	W1WCI

Many Maine hams, working with clubs and groups, participated in Field Day. The weather cooperated. Need bulletin stations and observer stations. PSHR: AK1W K1NA. Traffic: AK1W 333, W1AHM 84, N1BJW 81, W1KX 81, W1RWG 87, KA1TJ 67, WB1BY 52, KA1AVU 48, K1NAN 41, WB1EIL 40, KL7JG 36, W1HDC 33, K1GUP 25, W1BMX 24, W1CTR 22, K1PV 19, N1BCE 16, KA1EUV 15, WA1ZJL 14, W1WCI 11, WA1YNZ 7, KA1ENL 6, KA1FTL 6.

NEW HAMPSHIRE: SCM, Robert C. Mitchell, W1NH — STM: W1TM. SEC: AK1E. N1NH, K1OSM, W1VTP. The CNEN meeting/banquet/auktion will be at the Whig-O-Will in Bristol on Sept. 18. Yours truly enjoyed visiting the various clubs at their FD sites. W1TAC and KA1DUJ Novice classes show KA1IXL, KA1JAW and KA1JAX as results. AF1T getting close to WAS on 50 MHz. CS comms officer WA1ZPW toured FD sites with SEC AK1E. The Great Bay RA working on kits for dish antenna program. Contact WA1PTU for details. WA3BZM reports the ARES net on 85 going fine. W4GOW and W4GXZ back in NH for summer. QCWA nets: Phone — Sn at 8:30 on 3903; CW — Wed at 7:30 on 3645. W1GUX says two broken bones and cast on foot at slowing him down in traffic work. The report originates from Kancamagus Hyway campsite while monitoring the voice of the North country, K1OIQ/R. IS KA1BRG the northernmost ham in NH? Traffic: K11M 159, W1GUX 142, W1TN 120, N1NH 94, W1VTP 83, KA1R 70, KA1BJ 55, K1OSM 50, AK1E 44, W1MHX 44, N1ALM 39, W1ALE 33, KB1A 33, KA1CJZ 32, K1YMH 28, W1CUE 18, WA3BZM 18, K1ACL 7, W1NH 6.

RHODE ISLAND: SCM, Gordon F. Fox, W1YNE — SEC: KA1EHR. STM: KC1G. NM: WA1OSL, RIEM2MTN. Sorry no report for May because of hospitalization and family matters. Silent Keys WB1FDC, W1ZPG and AEC, W1AGB. OSARG 220 rpt in operation from permanent site. RI Teleprinter Net needs QNI. Will fold if activity does not pick up. RIEM2MTN report: Sess. 22, QTC 23. Past SCM W1YXC became Silent Key in June. Will be sadly missed. Next month will have some Field Day observations. Tnx to the RI clubs for hospitality. Traffic: W1EOP 580, K1AOS 39, KA1SO 26, KB1G 4, WA1CSO 22, KC1G 12, AE1S 10, N1RI 6, KA1DRI 4. (May) W1EOP 587, KA1DRI 77, KB1G 39, KA1EHR 21, KA1SO 20, AE1S 4.

VERMONT: SCM, Bob Scott, W1RNA — SEC: WB1ABQ. STM: N1ARI. The VT FM tic net was off to a very good start. It operates nightly at 2100 hours local time, on 146.34/94, W1KOO rpt for the purpose of moving tic, local and thru. It is hoped other 2-mtr rpt groups in VT will tie-in and make this a full coverage via 2-mtr for VT for the same purpose and including emergency work. VFMN 30/328/109; VSBN 29/458/108; VTN 29/12/88; Carrier 20/448/39; GMIN 26/369/35; RFD 4/82/18; VFN 4/57/5. Those wishing to check on VFMN, with or without tic, are welcome. Be PROMPT as the net only runs while tic is pending, formal or informal. Traffic: W1RNA 137, KA1GID 113, K1BQB 93, WB1ABQ 79, N1ARI 75, W1KRW 46, W1KJG 9.

WESTERN MASSACHUSETTS: SCM, William J. Hall, W1JUP — SEC: WB1HIH. STM: W1UD. ACC: W1YI. We have definitely hit the summer doldrums. Activity is down in the traffic area, clubs have gone dormant, and newsy items are about as rare as BY1PKI! That only confirms that hams in W. Mass. are well rounded and are pursuing other season related activities, probably spending some badly needed time with their neglected families. ORS W1ZPB is taking advantage of his summer



THE HISTORY OF ARRL AND AMATEUR RADIO

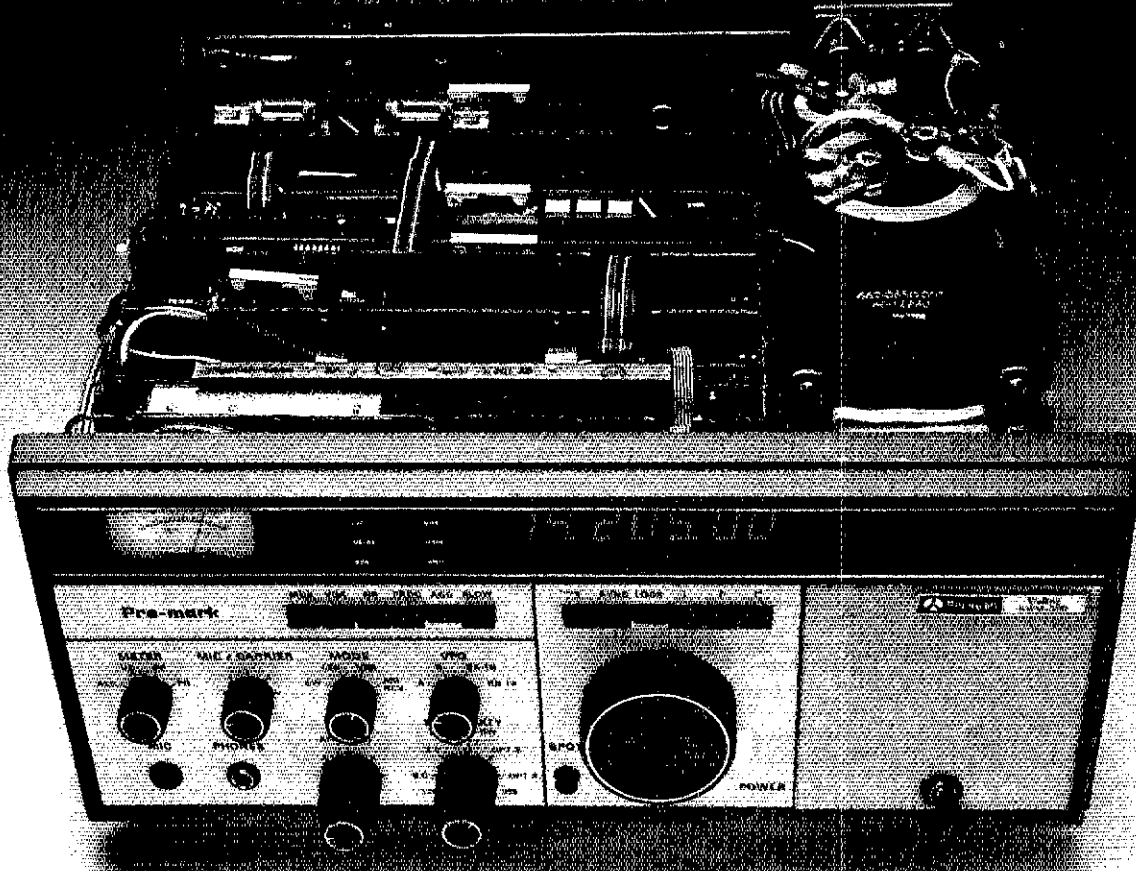
200 METERS & DOWN by Clinton B. DeSoto. Chronicles the exciting evolution of Amateur Radio from the pioneers who perfected the "wireless art" up through the technical advancements of the mid-1930's. Tells first-hand how the A.R.R.L. came about and how the League saved Amateur Radio from certain oblivion during the early years. Copyright 1936 (reprinted in 1981). 184 pages. \$4.00.

FIFTY YEARS OF A.R.R.L. A reprint of the golden anniversary articles that appeared in the 1964 issues of QST. Packed with photographs of old gear. "Old Timers" can relive their own amateur experiences, and newcomers can learn the fascinating tale of Amateur Radio's early years up through the early 1960's. Copyright 1965. 151 pages. \$4.00.

HIRAM PERCY MAXIM by Alice Clink Schumacher. A fascinating biography of the father of Amateur Radio, who was also a car builder, author, and inventor. Copyright 1970. 153 pages. \$4.50.

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The ROM-116 is housed in an attractive 10 x 7 x 3 inch grey cabinet. The cabinet contains a terminal strip for interfacing the TTL and RS-232 input and output signals; controlling the transmitter and audio input for the CW decoder. Also provided on the back panel is a two prong connector for the 60 MA. loop and a DB-25 connector (RS-232 or 20 MA.) for connecting to an ASCII printer or modem.

FEATURING:

- Two Serial Ports
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1200 BAUD OPERATION. Not limited to 110 baud because of timing loops. 60, 66, 75 & 100 W.P.M. Plus 110, 150, 300, 600 & 1200 baud operations possible.

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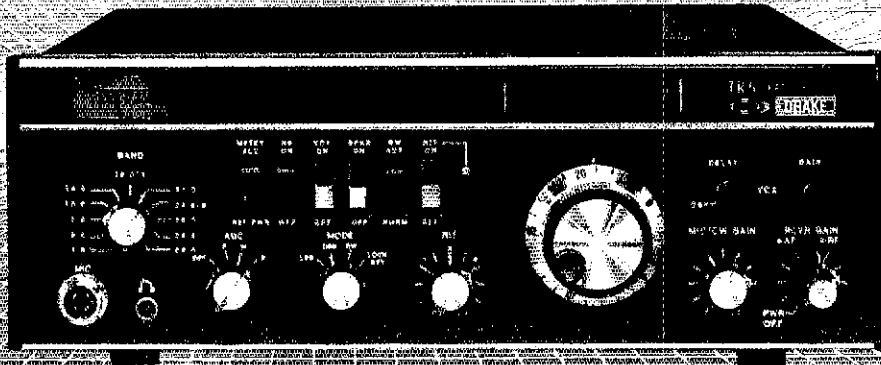
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- 160-10 Meters Plus WARC Bands and MARS Coverage*•

Front panel switching allows independent MODE and optional crystal filter selection.

A passive double balanced mixer is employed in the receiver front end. This stage is preceded by a low noise high dynamic range bipolar rf amplifier to provide good, strong signal performance and weak signal sensitivity.

Accurate digital readout of operating carrier frequency is displayed to 100 Hz.

A rugged, solid-state PA provides continuous duty in SSB and CW modes. A cooling fan (FA7) is available for more demanding duty cycles, such as SSTV or RTTY. The PA also features very low harmonic and spurious output.

VOX GAIN, VOX DELAY, VOX disable, QSK, selectable AGC time constants, RIT and noise blanker selection are front panel controlled for ease of operation.

The TR5 is designed with modular construction techniques for easy accessibility and service.

GENERAL

Frequency Coverage: 1.8-2.0*, 3.5-4.0, 7.0-7.5, 10.0-10.5, 14.0-14.5, 18.0-18.5*, 21.0-21.5, 24.5-25.0*, 28.0-28.5*, 28.5-29.0, 29.0-29.7* MHz. (*With accessory range crystal).

Modes of Operation: Usb, Lsb, Cw.

Frequency Stability: Less than 1 kHz drift first hour. Less than 150 Hz per hour drift after first hour. Less than 100 Hz change for a $\pm 10\%$ line voltage change.

Readout Accuracy: ± 10 ppm ± 100 Hz.

Power Requirements: 13.6 V-dc regulated, 2 A. 12 to 16 V-dc unregulated, 0.8 V rms maximum ripple, 15 A.

Dimensions:

Depth: 12.5 in (31.75 cm), excluding knobs and connectors.

Width: 13.6 in. (34.6 cm).

Height: 4.6 in. (11.7 cm) excluding feet.

Weight: 14 lb. (6.35 kg)

TRANSMITTER

Power Input (Nominal): 150 Watts, PEP or Cw.

Load Impedance: 50 ohms.

Spurious and Harmonic Output: Greater than 40 dB down.

Intermodulation Distortion: Greater than 30 dB below PEP.

Carrier Suppression: Greater than 50 dB.

Undesired Sideband Suppression: Greater than 60 dB at 1 kHz.

Duty Cycle:

Ssb, Cw: 100%.

Lock Key (w/o FA7 Fan): 30%, 5 minutes maximum transmit.

Lock Key (w/FA7 Fan): 100%.

Microphone Input: High Impedance.

Cw Keying: Instantaneous full break-in, adjustable delay.

RECEIVER

Sensitivity: Less than 0.5 μ V for 10 dB S + N/N except less than 1.0 μ V, 1.8-2.0 MHz.

Selectivity: 2.3 kHz minimum at -6 dB, 4.1 kHz maximum at -60 dB (1.8:1 shape factor).

Ultimate Selectivity: Greater than -95 dB.

Agc: Less than 5 dB output variation for 100 dB input signal change, referenced to agc threshold.

Intermodulation: (20 kHz or greater spacing) *Intercept Point:* Greater than 0 dBm. *Two-Tone Dynamic Range:* Greater than 85 dB.

I-F Frequency: 5.645 MHz.

I-F Rejection: 50 dB, minimum.

Image Rejection: 60 dB, minimum below 14 MHz. 50 dB, minimum above 14 MHz.

Audio Output: 2 watts, minimum @ less than 10% THD (4 ohm load).

Spurious Response: Greater than 60 dB down.

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Model 7021 SL300 CW Filter
Model 7022 SL500 CW Filter
Model 7027 SL1000 RTTY Filter
Model 7023 SL1800 RTTY Filter

Model 7026 SL4000 AM Filter
Model 7024 SL6000 AM Filter
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Model 1545 RV75 Synthesized Remote VFO

Model 1531 MS7 Speaker
Model 1507 CW75 Keyer
Model 1558 NB5 Noise Blanker
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A147-4 146-148 MHz 4 Element FM	22.50
A 147-11 Element FM; 146-148 MHz	33.00
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back from teaching to tackle some homebrewing and antenna projects. We received another exciting OVS report from K15F. He caught the 2-meter E₃ opening on June 7 to Texas, Okla., Mo. and Ark. Your SCM managed a QSO with an Ark station via local 146.87 FM rpt, so the MUF was right up there! We hear news of a new 2M rpt going up in Peru (MA). The Spruce Hill location is to be abandoned owing to excessive lightning. The Mt. Greylock gang reminds strong fixed stations to give weaker mobile units plenty of room to break in between transmissions should conditions arise. PSR: WB1HIH W1UD K1JHC W1KK Traffic: W1UD 368; WB1HIH 136, K1JHC 83, W1KK 88, W1ZPB 51, KB1W 33, KA12V 33, K1FFK1 25, K1PUG 23, W1JP 13, W1BVR 7.

NORTHWESTERN DIVISION

MONTANA: SCM, Les Belyea, N7AIK — Many thanks to the Capital City ARC for a great newsletter. The tri-club (Butte, Helena and Bozeman) held a picnic on Canyon Ferry Lake on August 15th and was well attended. Over 150 members from the Wally Byam ARC with pres. K86FP held their 25th annual rally here the last week of June. Many people were here during Field Day. House guest of K7BND and K7CZO was W7MTD. The Libby repeater has a new frequency of 146.92/32. WB7FO has a repeater on 449.4 in/444.4 out in operation. K8PP has a remote base station in 146.52 and reports good coverage. Billings repeater is now on 147.98/36. Roosevelt Co. EC WB7QDN and others put together a very complete emergency guidebook. Yellowstone County EC WB7BVZ and crew provided comms for a simulated crash of a 727 jetliner at the Billings airport. PSR: WB7VVD WB7DZX.

Net	Sess	QNI	QTC	NM
IMN	22	162	68	K7JUV
NTN	22	186	79	K7TGM
BSN	12	178	22	WB7UTJ

Traffic: WB7DZX 284, N7AIK 99, W7HAH 10, W7LKB 2.
OREGON: SCM, William R. Shrader, W7QMU — STM: W7VSE. SEC: K7WVG.

Net	Time/Dy	Freq.	QNI	QTC	NM
OSN	0230/0600Z Dy	3587	609	528	KA7ELI
BSN	0145Z Dy	3908	828	42	W7FO
WCN	0300Z Dy	3702	326	89	WB7RKU
OARES	0115Z Dy	3993.5	530	88	W7HLF
PTTN	0300Z Dy	148.76	245	37	W7LRB
MPARES	0300Z Tth	147.02	118	0	WA7ZAF
SOFM	0330Z T	146.64	129	4	W7FDU

LBARES (May) QNI 722, QTC 19. Upgrades: Novice: KA7AD (Act), KA7MWK, KA7GNO, KA7MCF, KA7NRC, KA7MA, KA7KDU, KA7MIE, KA7MZZ, General: N7DUX, KA7LE, KA7FSE, KA7HII, Adv: KA7KC, KA7LMS, KA7IAX, KA7MDM, KC7SR now K7TX and is 15 years old. KA7KIS Novice to Extra in less than year. KA7MDM/KA7KDU first/second in Novice Roundup for Oregon section. Congrats to all! Hearty thanks to WB7SIC and W7GWC, chairmen, and to all the gang that made Oregon convention, Seaside, such a success. Salem ARC coffee stop on I-5 super success. WB7QVI number 1 for Oregon in ARRL 10-Meter Contest. KA7MVD won OTVARC IC-2AT at Seaside and K97HG won the big prize! Oregon "Council of Clubs" being formed. Please support them. M7ARC (McMinnville) got a super FD writeup in local paper. Traffic: W7VSE 522, N7BGY 194, K7ATL 188, Adv: N7G, W7ELI 133, W7ZB 128, W7LNE 108, K7TX 58, WB7OEX 57, KA7AD 12, W7LT 6. (May) W7DAN 4.

WASHINGTON: SCM, Joe Winter, WA7RWK — ASCM: KD7G. SEC: K7SH. STM: W7GB.

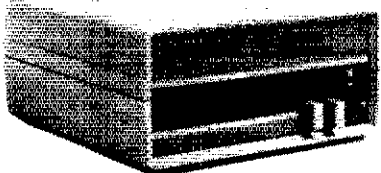
Net	Freq.	Time(Z)	QNI	QTC	Sess.
WARTS	3970	0100	2510	254	30
NWSSB	3945	0130	613	38	30
SCARES	147.18	0230 (Wed)	20	2	5
NTN	3970	1830	966	54	30
PSTS	145.33	0030/0630	125	95	60
WSN	3590	0145/0445	582	214	59
EWTN	146.84	0030/0430	84	48	45

75 mbs of the NW Chapter QOWA saw W7FNC installed as 1982-83 chairman at annual meeting June 19th in Wile, WA. He succeeds W7SFT. M7COW not elected. WATLL, pres.; K7MFS, v.p.; WA7ZVQ, secy./treas. Good luck ladies. Radio Club of Tacoma/ARES; K7AFU reports 15 hams worked with him on 1st Puuyallup Kiwanis 14 mi. River Raft Race. Abt 200 floating "craft" made trip. WB7CRR patrolled river on jet sled. Pierce Co. EC WA7GHE rpts 24 ARES mbrs worked with officials on two day Special Olympics event, and six hams worked on Sound to Narrows Run in Tacoma with over 8000 runners. Radio Am's, Skagit Co. schedule extensive work on rpt and erection of new 100 ft tower. KA7HPI is in charge. WB7OPZ was elected new rpt trustee. Inland Empire VHF Radio Ass. elected new officers: W7LJP, pres.; W7ELR, v.p.; K7JDD, secy.; N7BGS, treas.; WB7RYS, director. April's Spokane Swapiest called a rousing success by LEVHF Club, with their thanks to KA7DDU and all who helped. N7DHY of Clallam Co. ARC rpts good progress on Victoria/P.A. Int'l picnic 8-1-82 in Port Angeles. N7AGG State RO presents program to CCARC on ES comm's and the amateur radio resource. WWDXC rpts the "Gang of Four" (China trip) were invited to present a program at the ARRL Nat'l Conv. in Cedar Rapids. KC7CF & K7LAY will attend with W7EA & K7HJ as back up. AF7J received his DXCC-SSB & DXCC-Mixed Certs. Congrats to all those who worked so hard to get so few contacts with such good band conditions during Field Day. Let's look to next year for greater improvement. Remember Wash. State Am. Radio Week Sept. 13th thru 19th and the W.S. OSO Party Sept. 17th thru 19th. W8YRM towed in disabled cabin cruiser, arranged for repair & took crew to P. A. airport. Congrats! Mike & Key Club mbrs WA7EKH & WA7ELI rpt big bucks were made on newspaper drive for the ladies aux. W7ZHZ, of LCARA, was awarded an honorary membership to the club. K7WF now has new ant on tower tnx to KA7JVW WA7SHN KA7CPS. Traffic: WB7OGA 614, WB7TQF 614, WB7WOW 505, K571 356, W7CSP 258, W7DFY 236, N7AFY 124, W7HNA 120, N7DNG 110, K7GXZ 105, W7GB 99, K7COP 77, K7VW 75, N7ANE 72, W7IEU 58, WA7BDD 57, N7AFZ 57, WA7RCR 58, W7GIP 44, WA7JEB 41, N7DDP 40, KR7F 27, W7BUN 24, KD7G 14, W7ASP 11, K7BFL 11, K7OZA 11, K7OXL 6.

PACIFIC DIVISION

EAST BAY: SCM, Bob Vallo, W8RGG — ASCMs: W6ZF N6DHN VE2AQVW8. SEC: W8LKE. STM: N6IA. I rvd FD mbrs from HARC (K6EAGI6), MDARC (W6XG), EBARC (W6CIS6), FDARTS (W6AEU26). The section's FD activity sound very good from my vantage point as a guest operator with HARC! Part of their standard FD equipment is a blender, from which daquiris & fizzes flow continuously! EBARC planning on participating in

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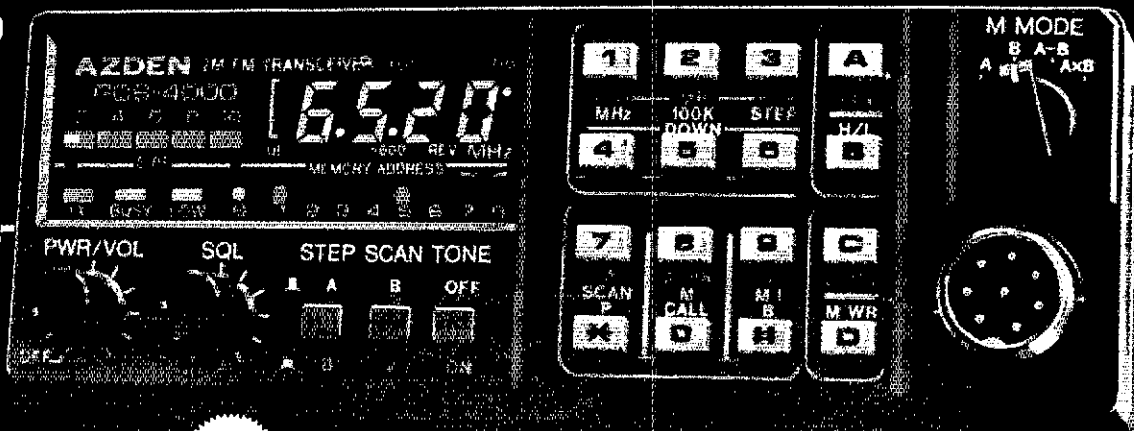
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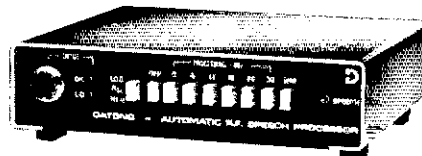
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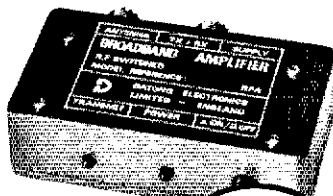
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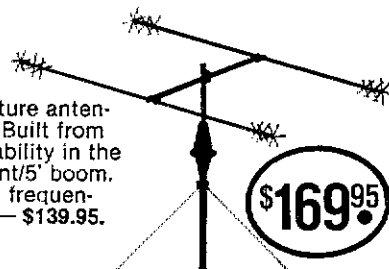
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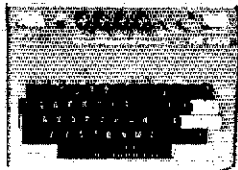


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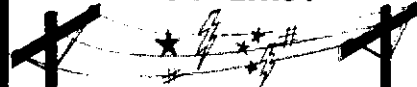
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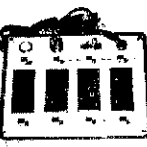
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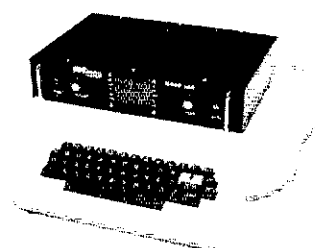
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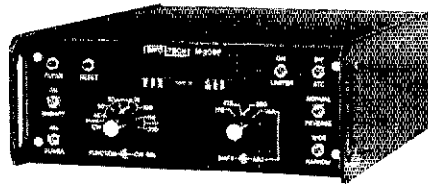
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Cal Div of Forestry's "Volunteers in Fire Prevention" (VIP) program. LARK's "Klutz-of-the-Month" award was won by K6DZU for "bandswitching a new crystal improperly. Their new officers are: N6DUQ, pres.; WA855A, v.p.; KE6GR, svt; KA6GAV, act.; AD6X, W6QA, dir.; N6FKK, ed.; KA6GB, assoc. ed.; W6GR, K6DRI, refreshments. New members are: K6GOK & KA6OOK. W6JOQ has upgraded to NK6N. MDARC helped provide comms for the more than 7000 runners who showed up for the Devil Mtn Run in Danville. Their new upgrades are KA6TNW to Novice and N6EEQ & KA6DXY to Advanced. SBARA provided comms for the Prima Vera Century Bike-a-thon. Traffic: K6APW 101, W6BUZ 30.

PACIFIC: SCM, Army Curle, AH6P — SEC: KH6B, ECs: Hawaii — AH6K, Kauai — KH6S, Maui — KH6H; Oahu — KH6NP; Guam — KH6TL. Field Day was a roaring success in the islands in spite of some less than perfect propagation. Kauai set up at Lydgate Park and got some great publicity in the local papers. Maui had 3, count em, 3 FD set ups with KH6RS and AH6EE in 1A class and KH6NO in 1A battery. Oahu had several set ups with the one at Bellows Field using a rhombic and powered by the wind. His is a 2A set-up at the Waiala visitors center. Thanks to the hard work of our Radio Week proclamations were obtained from the Governor and the Big Island Mayor. Kauai's Mayor also issued a proclamation. Great fun was had by all! Traffic: KH6B 122, KH6JJP 22, KH6S 2.

SACRAMENTO VALLEY: SCM, Norman Wilson, N6JV — SEC: N6AUB, ASCM: K16T. New officers for the River City ARCS are: WA6VTL, pres.; WA6RPB, v.p.; W6BYKJ, treas.; Marle Martin, secy.; WA6APC W6BNPC W6BROS W6BYLK KA6LQ, directors. A new Novice in Woodland is KA6UYD, and within a month KA6UME received his Novice ticket and passed his Tech. exam. KA6LAG now N6GXR. W6RFF and N6JV attended meetings of the Shasta Cascade ARS and the QOVA meeting in Paradise. The surprise talk, dampened the Shasta Cascade's Field Day effort. Their officers include KC6A, pres.; N6CNG, v.p.; KA6LAG, secy.; WA6OZZ, treas.; KR6M N6AUR WA6KBA, BOD. Traffic: K6BNO 14, N6EPG 4, N6JV 4, W6CFQ 2, K6LRN/6 1, AC6T 1, WA6YEU 1.

SAN FRANCISCO: SCM, Bob Smith, NA6T — SEC: N6BLN, STM: K6TP. Amateur Radio lost one of the great OMs, W6BYS. He passed away 6-9-82, and will be missed by all. K6BCD operated from 4U1ITU while in Europe. SFRC rpt is moving to new site in July. MARC has great clubhouse and radio station. It's on a hill, has a 300' tower, plus a radio station — CQ DX! And all of this for a \$1,000 yr at HAFB. Enjoyed Field Day on Angel Island with HEDXA signing AE6H. 2000 people stopped by after they got to the top of Mt. Livermore. The FWRA-HARC effort was a rousing success at the Mad River. Del Norte ARC has 3 Extra and 3 General upgrades on the last trip to Portland. AG6C had a good story in YL News in July QST. SCRA used solar power on 2 meters on FD. VOMARC swap meet is in late July. Traffic: W6NL 294, W6IPL 180, W6RNL 60, K6TWJ 23, W6BRT 19, W6GGH 15, NA6T 7, WA6QXV 2.

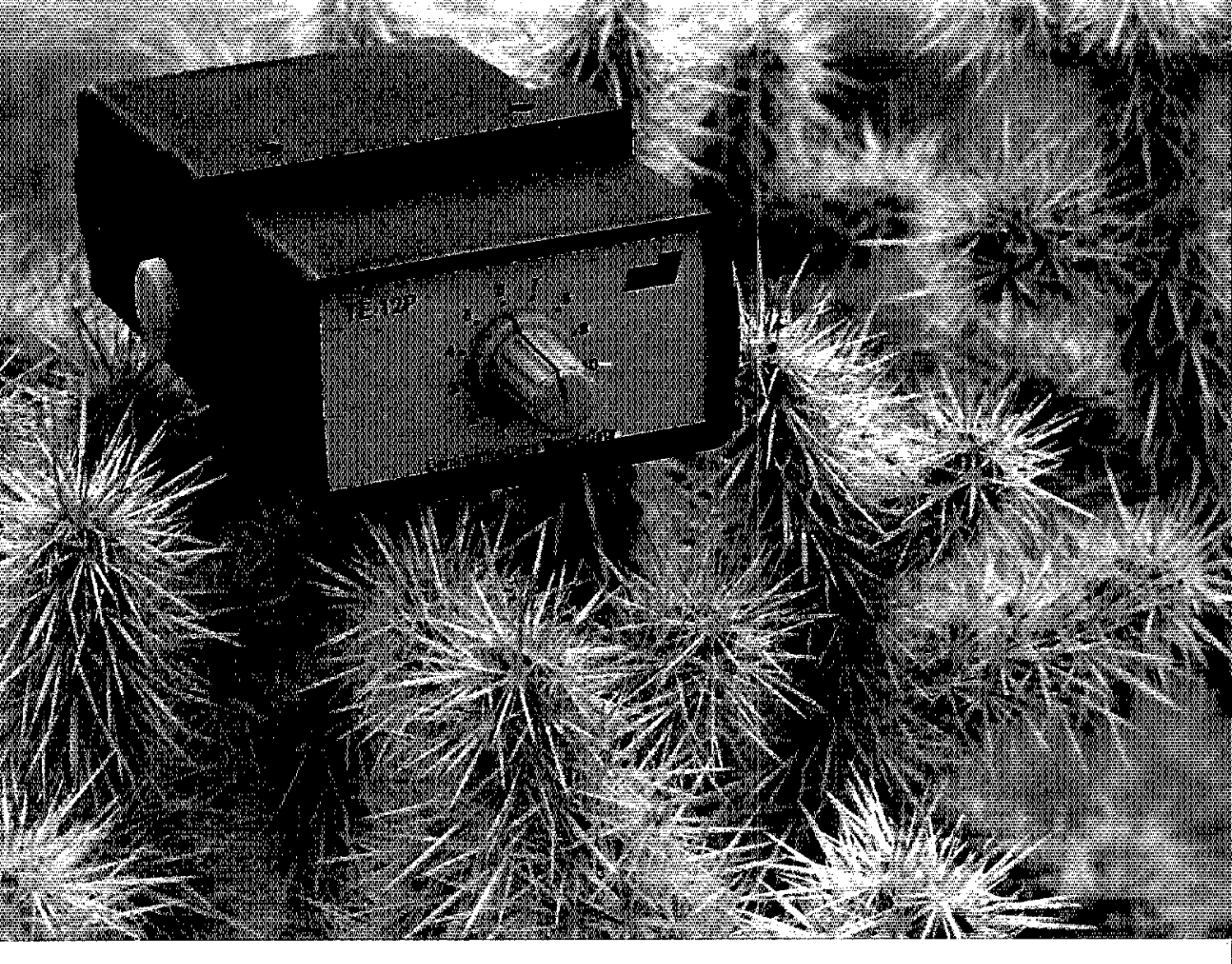
SAN JOAQUIN VALLEY: SCM, Charles McConnell, W6DPD — SEC: WA6YAB, STM: N6AWH, ASCM: K6YK NF6K. New officers of Fresno ARC: K6UBA, pres.; WA6HSW, secy.; WA6LDJ, treas. W6BRBP is a SILENT KEY. Appt renewed: W6MRT, EC. KA6SSA KA6SKD KA6RUB W6BZXH KA6SSI KA6MOK KA6ICA and W6BGBM are Tech. KA6GVH and KA6LXM are General. KA6CF is Advanced. KA6LW is new Novice. KA6OWZ is a KE6VJ. KA6OEI, KE6UN, W6BGF, W6BGF, KE6PZ, KB6GJ is NK6C. KA6UPT KA6UPR KA6IUPS KA6UO KA6UON and KA6RKL are new amateurs in the SJV. W6DFHC has a FT902DM and FT625RD. W6BJHN has a TS130S. W6BEHH constantly changes equipment. K6PKO has 10 M DXCC. Amateurs are needed for Official Observer, RFI, Technical, and Affiliated Club Coordinators, Public Information Officer and Bulletin Manager, starting Jan. 1, 1983, under the new section structure. Don't forget the ARRL PACIFIC DIVISION CONVENTION in Santa Cruz Oct. 8-10, 1983. Traffic: N6AWH 139, WA6YAB 25, W6DPD 13, W6SX 11, K9YBM 7, W6DFRS 4, WA6JDB 4.

SANTA CLARA VALLEY: SCM, Jettie Hill, W6RFF — SEC: W6BIZF, STM: W6ZRJ. This will be my last Section Activity report for Santa Clara. Next month's report will be by Ross Forbes, W6BGF, your new SCM. All monthly reports to be sent to him. I want to thank all those who helped during the last four years to make my job easier, especially W6BIZF who did much to organize a viable Amateur Emergency Radio Service organization, as the Section Emergency Coordinator, and W6ZRJ, Section Traffic Manager, who made many aware of traffic handling procedures and requirements, the National Traffic System, traffic during times of emergency and the many DEC, EC, AEC, ORS, OBS and OD appointees who kept the system running. W6BYV and W6KZJ must also be commended for the large amount of traffic handled each month on NTS nets! As vice director, I am still interested in these areas of Amateur Radio. Keep in contact. Many clubs planning on how to make their Field Day score larger next year. The SLVARC has new officers and is incorporating PAARA was treated to a talk on "Care and Feeding of Repeaters" by K6GSJ. Their annual picnic was a huge success. A worthwhile way to spend an hour or two is to visit the Foothill Electronics Museum at Foothill College in Los Altos Hills, open Thur, Fri and on Sun afternoon. More info at (415) 948-8590 X383. FARS and EMARC held a joint picnic in Sunnyvale. Don't forget the Pacific Division Convention in Santa Cruz on October 8-10. See you there. I have thoroughly enjoyed your reports as your SCM, especially meeting so many of you in person. If I can be of help give me a call. 73. Traffic: W6BYV 260, W6KZJ 222, W6ZRJ 45, W6RFF 31.

ROANOKE DIVISION

NORTH CAROLINA: SCM, Ian Black, WD4CNR — STM: W4EAT, SEC: NB4L.
Net Time Freq. Seas. QNI QTC Mgr.
CMN 1145Z 3.927 29 421 183 W4EAT
JFKN 2300Z 3.923 30 686 121 W4WUJ
THEN 2300Z 3.923 30 849 185 WA4OBR
CSN 2200Z 7.115 48 143 48 K4PJ
GN 2300/0200 3.574 58 508 324 AB4S

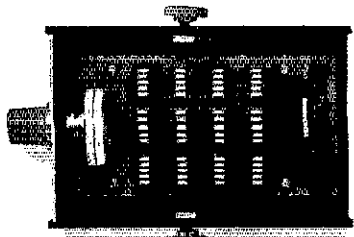
Another bad month for the tic system. Old timers' comments indicate this summer one of the worst ever for propagation. No lack of action on vhf. Club activity high this month with Field Day producing good turnouts. And yes, this op roped into helping local group. Surprise! I enjoyed it. Seems to me greater effort being made on club newsletters. FARS still holding leading edge. Sorry about that, Sherman. Some real good ones are catching



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74.4 WA	91.5 ZZ	110.9 2Z	136.5 4Z	167.9 6Z	
77.0 XB	94.8 ZA	114.8 2A	141.3 4A	173.8 6A	
79.7 SP	97.4 ZB	118.8 2B	146.2 4B	179.9 6B	
82.5 YZ	100.0 1Z	123.0 3Z	151.4 5Z	188.2 7Z	

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1500	852 1477	1700	1950	2250	2500
2175	941 1633	1750	2000	2300	2550
2805		1800	2100	2350	

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There's a certain thrill to using efficient, reliable digital communications equipment on the air. That's the fun of RTTY. Spice up your Amateur Radio operation with the silent video system that does it all, the Microlog ACT-1. Even if you own a home computer and are considering an out-board interface/program, remember, we've put it all in one RF1 tight enclosure that's ready to go as soon as you power up. And, with the "Battery-backed" mem-

ory option, you won't even lose your pre-programmed messages if there's a "blink" in the A.C. The ACT-1 has features that the competition doesn't even have on the drawing board! Check for yourself, you could spend a lot more and still come up short.

ATR-6800 vs ACT-1 The most often asked question we hear is "What's the difference between the ATR-6800 & the ACT-1?" The ACT-1 is a dedicated system for RTTY/CW/SSTV. It provides all the functions and features you need for a multi-mode station. Along with this superior "ON-the-AIR" performance, the ATR-6800 extends your operation into the realm of automatic station control and computer programming. Plug-in applications modules expand the ATR's memory to add new HAM oriented programs which are enabled by simple keyboard commands. By adding the BASIC option package, you'll have pre-programmed full community mailbox, contest dupe sheet, personal station log, message editor, BASIC computer language and 16k of battery-backed (non-volatile) memory. We also provide a subroutine list so that you can write programs to directly control the ATR-6800 in easy to use BASIC language. The ATR-6800 then is the expandable, "do everything" system where your imagination is the only limit! The ACT-1 is designed for the HAM who needs the essentials of a complete video system for digital communications.

TECHNICAL SPECIFICATIONS ATR-6800 & ACT-1

INPUTS Speaker Audio Digital **RS232	100mv min. TTL, Kever, Hand Key ± 12V 3.0 Ohm Source	SYNC: Transmits "Blank-Fill" in RTTY and BT in Morse when Text Buffer is empty and unit is in transmit. Keyboard command on/off.	TUNING INDICATORS Audio Rel. Tone Visual Scope	600 Hz Keyed Regenerated LED on Mark (Keydown) Tuning ellipse for RTTY
OUTPUT TO TRANSMITTER FOR CW/RTTY/SSTV + Voltage Keying - Voltage Keying **Mercury Relay TR Change Over	+40VDC @ 30ma Max. 150VDC @ 50ma Max. 200VDC or 2 amp (20VA Max.) N.O. & N.C. ATR - Relay ± 30V @ 2 amp N.O. & N.C. ACT-1 - Transistor +12VDC @ 300 ma GND on 4MT	REAL-TIME CLOCK: Keyboard set, always on screen display, hours, minutes, seconds. Can also be inserted in transmit text buffer by keyboard command.	PROGRAMMABLE MEMORIES	10-40 character messages (400 total) or 10-40 character messages (400 total) battery backed 15 characters maximum in standard 10 and 17 in RTTY ID
AFSK Tones, Range AFSK Tones, Level Slow Scan	Keyboard Programmable 500 Hz to 3000 Hz Mic Compatible 30-50mv Audio Mic Compatible Audio, Sync 1200 Hz, Black-1500 Hz, White-2400 Hz	WORD WRAP AROUND: Prevents spilling words at the end of a line. Works in receive as well as transmit	MEMORY	Up to 15 characters ATR - 4 memories, up to 15 characters each ACT-1 - 2 memories for printer on and printer off
MISCELLANEOUS CONNECTIONS RS 232 Printer Driver	± 12VDC, 330 Ohm Source Impedance, Negative Mark ATR - ACT-1 -	CODE PRACTICE: Random 5 char generator sends at any speed you set via the keyboard. Hand Key Input allows use in code practice oscillator that will also read your sending!	**COMPUTER CAPABILITY	Standard unit has 4000 bytes of RAM for user program. Basic package adds 16K. Basic or Motorola M6800 Input, Output, Load, Go with Break Point, or Normal Basic Store Programs on Audio Cassette
Tape Recorder "Brag Tape" Scope	Mike ± 100 mv Audio Speaker ± 200 mv Audio Horizontal and Vertical Outputs to Scope for RTTY Tuning Aid	STATUS DISPLAY can be called up to show the condition and control commands for 23 programmable parameters, such as AFSK tone pairs, UNOS, printer, etc. Useful as a "HELP" command in case you misplace the manual. There's also a constant "TOP-LINE" display of Time, Mode, Speed, & Code in use.	Language Commands	
Morse Speed Tracking	Automatic or Speed Lock	DETECTION MODES Direct	TAPE INTERFACE	
VIDEO OUTPUT 1 Volt Peak to Peak, Negative Sync Composite Video (American Standard) European standard available upon request.		Phase correlation detector with AGC controlled bandpass filter (100 Hz nominal width - 600 Hz center frequency)	POWER	115 VAC, 60 Hz 60 VA Max, Act-1, 30 VA Max (230 VAC, 50 Hz optional) 12 volt version available External input for charging expanded battery backed memory, 5-15VDC @ 10 ma max
VIDEO FORMAT Normal 20mm Black on White or White on Black Display Split Screen	24 lines, 40 characters per line 12 lines, 20 characters per line	Demodulator	MECHANICAL ATR 6800: Size Weight ACT-1: Size Weight ATR 6800 & ACT-1: Color Material	14 1/4" W x 12 1/4" D x 4" H 15 lb. 17 5/8 W x 3H x 9.5D 7 lb. Beige Top, Black Base AL5052 Aluminum Alloy
SSTV	Keybaord selectable Any location Line 0 (Off) to Line 20, keyboard selectable 3 lines, 8 characters per line + graphics	**Terminal		
TEST MESSAGES: Quick Brown Fox and RYRY's in Baudot, U*U* in ASCII. *V in Morse		DATA RATES Morse Baudot ASCII Slow Scan		
		5-199 WPM Keyboard selectable in 1 WPM steps. Auto speed tracking or speed on receive All standard 45, 50, 57, 74, 100 Baud (60, 66, 75, 100 and 132 WPM) 110 & 300 Baud normal & synclock using internal Modern ATH adds speeds up to 9600 Baud. 2 seconds per frame		
		OUTPUT OPERATING MODES Character outputs when typed Words sent after "Space Bar" Line sent after "Return" Send entire contents of text buffer		

*Standard on ATR, Optional on ACT-1
**Standard on ATR, Not available on ACT-1

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It's Hard To Be Humble When You're Number One On 2 Meters!



We wish we could take about ten pages in this magazine and reprint the stacks of rave notes that come back in with the warranty cards from our happy KDK owners. Then again, we wish we could take the space to go on and on about how the many thousands of KDK owners have put us in the number one spot in two meter FM equipment.

Better still, we think that just to show you the picture and give you the specifications and then slyly suggest you ask any KDK owner about the radio, will convince you. If that won't convince you, well, you just can't be convinced of anything!

- KDK continues the tradition of being the ultimate in VHF FM mobile operations. We make maximum use of multiple function, multiple shaft controls and only three sets of knobs are located on the front panel. Still many new features have been added, such as digital RIT, reverse button, memory channel readout number and more!

- The new KDK 4 bit microprocessor chip has in-house developed software which makes all these new features possible.

- Modern styled front panel with dials intelligently arranged so you can best utilize the multi-function, easy to handle controls. We gave it a very heavy textured paint finish that is highly resistant to scratching!

- Frequency coverage 143.005 - 148.995 mhz. S/N better than 35 db at 1 uv input. Better than .2 uv at 12 db SINAD. Squelch sensitivity better than .15 uv. Bandwidth at -6db: ±6khz, at -60db: ±16khz. Image ratio better than 70db. Double superhetrodyne. Transmitter uses variable reactance frequency modulation with maximum deviation set at ±5khz.

- RF power is a good, clean no spurious signal of 25 watts on high and 5 watts (adjustable) on low.

- Good audio with the famous KDK audio output capability of 1.5 watts . . . you can't blow out our audio IC!

- Nicads for memory retention built in, nothing extra to buy. Disconnect the FM2030 from the power source and the memories remain!

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- 10 memories in 2 memory banks of 5 each (A&B). Any memory can be changed instantly.

- Control functions: Select memories, show memory channel number, or select memories and show frequency of channel, or dial frequencies with two speed selectable control. Instant choice of either 5 or 100 khz tuning steps. Programmable band scan limits and memory scan.

- Frequency shown in 5 bright LED digits. LED indicator shows when signal is received (unsquelched), LED indicator shows transmit. Modern LED bar meter shows signal strength of received signal and on transmit shows relative output power.

- Microphone includes tone pad, and up and down buttons to change dial frequency or memory channels.

- A standard microphone with up-down buttons only is available separately.

- The FM 2030 is basically as easy to use as a crystal receiver with rotary switch frequency selection for full "eyes-on-the-road" mobile operation.

- And, in case we forgot to mention it, we are proud to continue our famous KDK quality and ruggedness!

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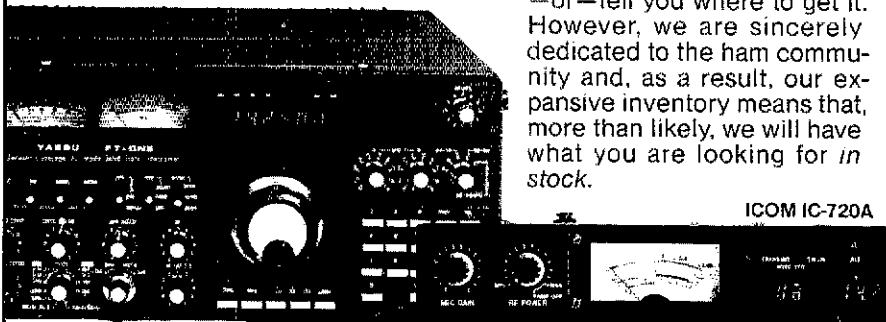
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up fast, like NZ4T combining imagination with professionalism to make the SMOKE TEST enjoyable reading. K4EG doing good reporting with place, name, and event coverage for Alamance Co. ARC. NN4P has informative newsletter. Two attaboys for spelling SCM's name right. And Gabarrus ARS getting the good word well from WAABHC. I can't name 'em all so a big thank you and good luck to all you editors, contributors, folders and mailers throughout the state. The staff and I are still working hard at getting state-side organization of vhf nets. This is a tough job. Just getting an accurate list of these nets has proved to be frustrating and time consuming. Add to that the incredible job of establishing capabilities. Who can link with whom? What coverage does that rpt have? Who do they liaison with? Do they have an emergency plan? And on and on. I can remember last year when NB4L didn't drink and W4EAT had a full head of hair. Traffic: K4GCN 340, WD4CNR 249, WB4WII 215, WD4CNO 199, KD4PJ 162, W4EAT 152, AB4S 131, KU4W 120, WD4RG 100, WA4SD 78, WA4OBR 74, WB4JS 71, KA4KJ 68, N4CJJ 53, KZ4A 46, WD4HE 38, WB4CYN 34, N4CYG 33, NE4J 28, NN4P 25, NT4K 24, WD4CEB 23, WA4TF 19, K4FTB 18, NB4L 15, KA4DHP 12, N4CCK 11, W4EHT 10, WD4LOO 9, W4RVE 8, KA4LKF 6, WB4SLF 3. (May) WD4CEB 68, NE4J 34.

SOUTH CAROLINA: SCM, Jimmy Walker, WD4HLZ — ASCM: WB4UDK, SEC: K4SUG, STM: W4ANK, NMs: K4PFC KC4LA KD4PJ AB4S, WB4NBK tolled burglary using his handle-talkie. KA4DGG became DX hound with new TH6DXX at 100 feet. Need to polish up on your cw? If so, check into the Carolina Slow Net (CSN) on 7115 kHz at 6:00 P.M. EDT daily. Field Day activities high for SC amateurs. Received messages on Field Day activities from the following clubs: Anderson, Keowee-Toxaway, Blue Ridge, North Augusta-Belvedere, York and Western Carolina. Field Day HFDLUCK AWARD goes to the Grand Strand ARC (WA4KGN, WA4YBD and WB4QYN. Checkin/Traffic: SC65B 990/132, CN 508/289, SC Noon Time 280/52, CSN 183/49, Blue Ridge 2502/90, Greater Pee Dee 949/96, York 450/87, Western Carolina 388/21, Newberry 66/8, Carolina State Line 58/3. Traffic: K4ZN 226, W4ANK 135, KA4AJR 92, K4ZB 85, KE4OZ 77, W4NTO 73, W4FMZ 62, K4FRX 61, KC4LA 43, KA4LRM 39, WB4UDK 32, N44TO 27, KE4WC 26, WD4NMF 22, WD4PLB 12, WD4FJP 8, NN4N 8, W4DRF 6.

VIRGINIA: SCM, Phil Sager, WB4FDT — ASCM: K3RZR, STM: KY4K, SEC: WB4UHC, Chief OO: W4HU, Chief OVS: N4CD.

VA: Non 7260 WD4FTK
YBNS 6:00 P.M. 3247 WANIM
YSN 8:30 P.M. 3705 K4VWK
VN 7:10 P.M. 3680 W3ATQ/K4JST
VLN 10:15 P.M. 3947 WD4LY

(During the summer the VNTN will be meeting on 3907 kHz.) Virginia amateurs: Are you a "hidden" ham? Are you content by just operating your radio and never communicating your knowledge to other amateurs in your town? Do you know many amateurs in your town? Do they know you? Are you interested in other aspects of Amateur Radio but hesitant to ask others? Why do you hide? Go out and join your local radio club. They need you. Don't kne if there's a local club in your area? Just drop the line. Contacts to K4JST, K4JG and WB4UHC, this year's recipients of the Virginia Section Distinguished Achievement Award. I bet most Virginia amateurs don't realize that there are over 20 two-meter traffic nets in the state. The two most active are the South Tidewater ARES net (STARES) and the Shenandoah Valley Emergency Net (SVEN). STARES net manager, KA4JXE, reports 31 sess., 40 QTC and 599 QNI (!). SVEN net manager, NT4S, reports 30 sess., 33 QTC and 452 QNI. VPI club station K4KDJ averaged 456 handling points per month during the 1981/82 school term. Congrats to WB2OMZ and all the other operators for their efforts. Congrats to new QRS appointees NW4O WD4CNG K4RC W4HIR N4TE and AJ4E WB4GTG now living in Pittsburg. Also understand WB4NNO now living in New Jersey, AF4O (WA4AJF) and WB4KSG new homeowners. The Virginia Nets picnic will be held Sunday, August 21 at the QTH of K3RZR/KA3DTE in Dunnsville (Essex Co.) All members of any Virginia net are invited. Traffic: W3ATQ 443, WA4CCK 292, K4JST 254, KA3DTE 233, WD4LY 218, WD4FTK 161, WA4LJ 196, KY4K 121, WB2RBA 118, N4YO 104, AA4AT 99, KB4WT 97, W2NWM 89, KB4PW 81, K4VWK 81, NN4J 73, WB4FDT 72, W4M 72, K4S 61, W4FA 58, KA4JUM 52, W4UO 48, W4HIR 47, KB4OC 47, KD4C 31, WB4UHC 21, K3RZR 38, KA4JXE 35, WA1VBL 33, W3BBO 29, W3BBN 24, W4PVA 23, K4RC 23, N4EPO 17, W4LXB 15, K4MLC 16, W4KXE 15, N4FNT 14, WD4GZ 10, WB4MAE 10, N4LE 9, NC4B 8, WA4TVS 8, KC4HN 7, WB4ODZ 7, K14W 7, WD4DUU 6, NT4U 6, KM4X 6, WB5KIT 5, N4YE 2. (May) N4BJX 4.

WEST VIRGINIA: SCM, Karl S. Thompson, K8KT — SEC: K8QEW, STM: KD8G, NMs: N8AJC, W8LYV, W8FZP, WB8TJN. Nice attendance at the Jackson's Mill hamfest in spite of rain. K8JF was selected WV Outstanding Amateur of the year for 1982. Congrats, 1981 Field Day Award was won by the WVDXA, N8AJC was selected as the new WVFN mgr. replacing K8MHR who will become N8AJC's assistant. W8LYV is the new WVFN mgr. Certificates of Merit were given to W8BUDY, WD4KHL and K8KT. These were presented by Director Philius, W4UG. W4KFC was presented a WV honorary citizenship certificate on behalf of our governor. Check-ins desperately needed on WVN at 7:00 on 3567 daily. See you there. Traffic: W8JWX 115, W8HZA 98, K8KT 61, K8MHR 42, K8QEW 35, WB8TJN 16, KC8CR 14, N8DLK 5, W8BUDY 3, W8BWEZ 2.

ROCKY MOUNTAIN DIVISION
COLORADO: SCM, Lawrence E. Steimele, W0ACD — SEC: K3PLR, STM: W0BAIT, NMs: W0HXE, W0LAE, W0EJD, W0DAIT, WA0RYL. Field Day is over and as usual there were a lot of Amateur Radio Operators giving their hand at seeing how many contacts they could make in the allotted time. Some took to the high country and others to the plains, with some using elaborate antenna systems and low power while others chose high power to pile up their scores. One thing for sure everyone had a good time and went home tired. Many of the operators are starting to make plans for the SET later on this fall. This too is a big event and draws a lot of amateurs' interest. Both Field Day and SET activities are good places for everyone to practice message handling and just the art of communicating, which is so necessary during an emergency. The FCC proposal for a codeless Amateur Radio license will no doubt be of great interest to every licensed operator. If you have comments on the subject be sure to respond when the time comes, as the FCC is interested and will consider all replies. Nets:

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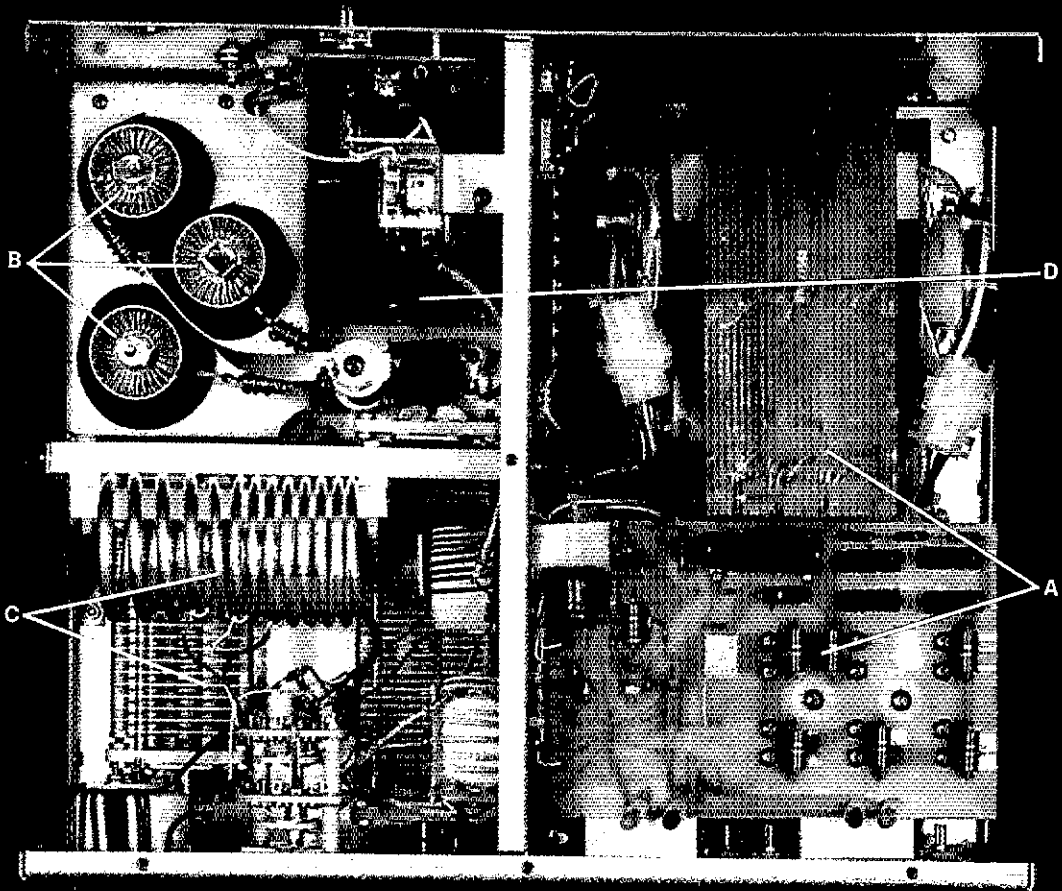
- 200 ohm, 50 ohm, and 100 ohm loads (12, 15, 20, 25, 30, 40, 50, 60, 75, 100, 150, 200)
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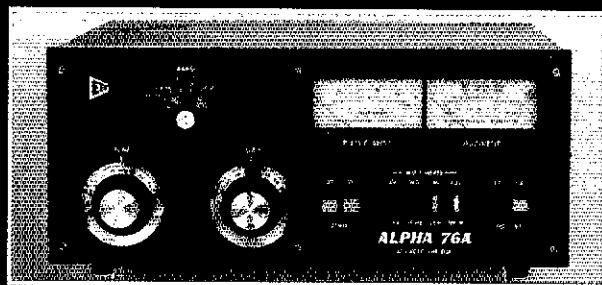
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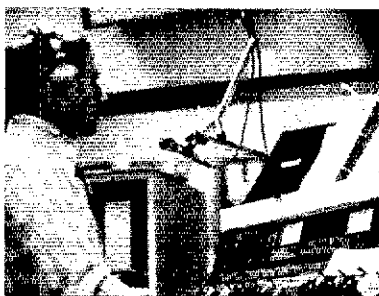
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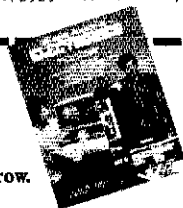
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NEW MEXICO: SCM, Joe T. Knight, W5PDY — SEC: W5ALR, STM: KV5U, NMS: WA5UNO KB5LI W5VFO. Southwest Net (SWN) meets daily on 7.083 at 19:30 local and handled 143 msgs with 191 stations in. New Mexico Roadrunner Net (NMRRN) meets daily on 3.939 kHz at 0100 Zulu and handled 93 msgs with 882 stations in. New Mexico Breakfast Club meets daily on 3.939 kHz at 0700 local and handled 86 msgs with 858 checkins. Yucca 2 Mtr Net 147.78/18 handled 8 msgs with 659 checkins. Caravan Club 2 Mtr Net 14.685 handled 4 msgs with 658 checkins. Trx: W5BPSL & W5BPSM for good service on Yucca Net & congrats to W5BLO new Yucca Net Mgr. Also trx to W5BLO KD5CC and W1PC for installing the new 147.93/33 rpt on Buck Ridge. FB job. Traffic: W5DAD 280, W5JOV 120, KV5U 115, W9OBV 105, W5ENI 59, KB5LI 25.

UTAH: SCM, Leonard M. Norman, W7PBV — SEC: W87BZY, STM: W7OCX, W7OCX is retiring as NM for the Beehive Net and as Army MARS State Director after 25 years of service. We'll miss you. KA7KOH and KA7FGK are chasing DX. N7ARE received QRP certificate for sbb on 40M. KA7LUK has new tower and beam. N7CQT is reported to be the highest scoring Technician in the 10M contest. N7KM is out of the hospital and doing a lot of DXing while recuperating. W6UK7 is enjoying mobility between engagement and is active on 10M from home QTH. KA7KOH and KA7MAY have both upgraded to General. KC7OZ and KC7QA issued Beehive Net certificates. Borderline ARC officers: N7CQT, pres.; KA7BPP, v.p.; KA7ERC, secy. Traffic: K7HLR 225, WA7MEL 100, WA7KHE 90, WB5TJP7 69, WB7UJ 27, KN7U 25, KO7H 20, W7OCX 20, W7PBV 9.


WYOMING: SCM, Dick Wunder, WA7WFC — Field Day was quite active, with many participants enjoying the fun. High Plains ARC special events station at Old Ft. Laramie was a success on July 4th. KC7AR was chairman. Severe weather was a problem this month. WA7VEX/R in Rawlins went into emergency status during a tornado. National Weather Service in Cheyenne requested the SE Wyo. Severe WX Net to be activated on numerous times. Congrats: WB7RRZ, NCS, and to all participants for a job well done. Recent upgrades: N7BRQ KA7MSV, Gen., W7ENA, Tech.; KA7NAB, new Novice. WTN: 31 QNI, 27 QTC, 14 ssss.; Wyo. Cowboy Net: 504 QNI, 22 QTC, 23 ssss.; Wyo. Jackalope Net: 411 QNI, 0 QTC, 25 ssss. Traffic: W0OGH 215, WB7NHR 105, K7VWA 86, K7SLM 30.

SOUTHEASTERN DIVISION

ALABAMA: SCM, H. H. Wheeler, W4IBU — STM: WA4PZ, SEC: N4DMA, ASCMs: N4DRV KA4WVU, WD4LYX is to be commended & congratulated for the months of effort on his part that resulted in the 14 x 4 feet highway signs on all the major highways entering the Mobile area. These signs show the rpt freqs in the general area. Congrats also go to the officials, who by their support indicated their recognition of the value of the Amateur Radio Service. Is statewide coverage possible? The Alabama ARRL Info Net is being revised. Checkins from interested amateurs are requested. All ARRL appointees are invited to provide input and to field questions in their specialty. Field Day has come and gone. With FD came the thunderstorms, QRN, QRM, bands going into blackout so rapidly that antennas and coax were checked for faults, the modulus and loss of sleep. But, with FD, came a sense of competition, some learning and, above all, a lot of fun and pure pleasure. Let's do it again next year. Watch for an FCC NPRM seeking to establish a codeless license. Write and let them know your sentiments. CAND represented in state 100% by W4CK5, DRN5 100% by WA4JDH W4CK5 NW4X W4IBU W4WJF WA4RAJ & K4LYV. Traffic: WA4JDH 881, W4CK5 122, WA4XP 108, W4IBU 59, K4AOZ 56, NW4X 41, WA4ZP 17, WD4DH 12, WA4JPK 12, WA4CEA 9, K4GXS 8, WB4TVY 8, WA4HRV 4, K4UMD 4, WA4WJF 3.

GEORGIA: SCM, Eddy Kosobucki, K4JNL — SEC: WB4IXE, ASEC: K4SWJ, STM: W4WXA, Chief OBS: W4BIA, NWS Liaison: WA4PZD. During the month of September the section will host three hamfests, the ARRL GA State Convention at Warner Plains on the 11th & 12th, Augusta on the 19th, followed by Gainesville on the 26th. All there were planned without conflict because of good coordination. If your club or group is planning a hamfest in 1983 please send the dates and any other info to both the ARRL & to W4RH our S.E. Director right now. By so doing it will cut down on any duplication, etc. In recent years the number has increased. Remember we have several bordering states with their events, which, if on the same date, could hurt your attendance. Also if your club is ARRL affiliated you can qualify as an ARRL hamfest which has many advantages. If you are planning one, write to W4RH for the forms. Again do this ASAP because it requires Board approval. We have many, many FB club monthly publications in the section. I carried all that I had received to the Atlanta hamfest & let Steve Place, WB1EYI, the ARRL Club & Training Dept. Mgr. review them at the League booth. He said please encourage all the Georgia clubs to send him at ARRL Hq a copy. Congrats to K4EV W4HON & WB4NTW for continuously making the PSHH. I know that there are many more of you who can qualify, so add up your points & get them to me by the 5th of each month. I have been reviewing League appointments & find that some of you haven't been reporting as you should. Let me know something even though you might have been inactive for awhile. I am writing this while on vacation in July so by the time you read this maybe the wx will be cooler. I'm hoping to see you at one of the forthcoming hamfests. Traffic: WB4NTW 93, K5TF 64, K4EV 48, K4JNL 48, W4HON 32, K4AATM 23, W4FIZ 14, W4BIA 8, K4BAI 5, K4PIK 3, W4BTZ 2.

NORTHERN FLORIDA: SCM, Billy F. Williams, Jr., N4UF — SEC: WA4EA, STM: WD4HF. New officers of the Tallahassee ARS are: KA4DCF, pres.; KA4BBZ, v.p.; KN4Y, secy.; K4VRT, treas. W4MLE continues as newsletter editor. There's a new rpt in Wewahitchka on 147.90/30. Other machines in the area are 147.87/27 (St. Joe) and 146.10 (Clarksville). K4KNI WD8QLT and WB4COG became Silent Keys. New officers of the West Volusia ARS are: N4DOT, pres.; KD4IV, v.p.; KB4FD, secy.; N4FTF, treas. Duval Co. ARS participated in hospital drills. NO4A operated from Red Cross Hq. and N4GIH from disaster van with other hams in local



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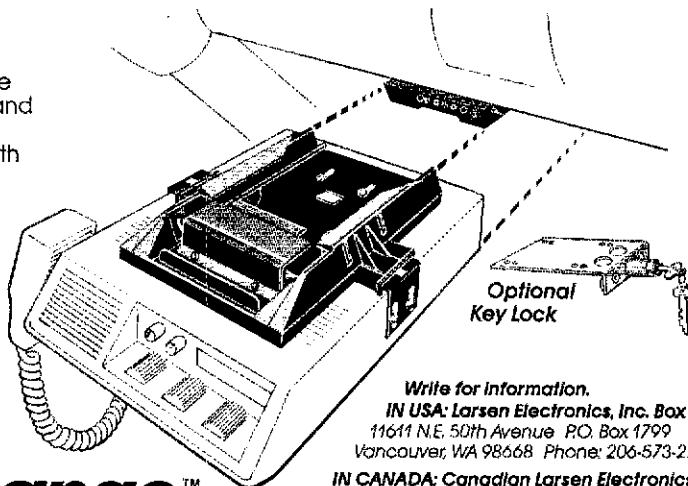
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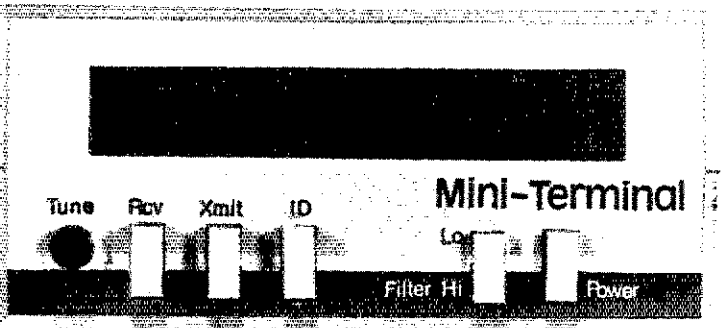


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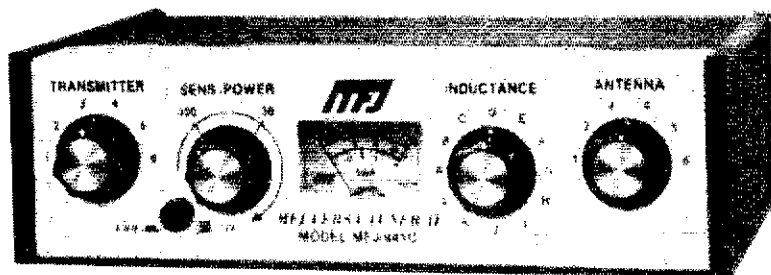
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MFJ-941C 300 Watt Versa Tuner II

Has SWR/Wattmeter, Antenna Switch, Balun. Matches everything 1.8-30 MHz: dipoles, vees, random wires, verticals, mobile whips, beams, balanced lines, coax lines.



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Run up to 300 watts RF power output.

SWR and dual range wattmeter (300 & 30 watts full scale, forward/reflected power). Sensitive meter measures SWR to 5 watts.

Flexible antenna switch selects 2 coax lines, direct or through tuner, random wire/balanced line, or tuner bypass for dummy load.

12 position efficient airwound inductor for lower losses, more watts out.

Built-in 4:1 balun for balanced lines. 1000V capacitor spacing.

Works with all solid state or tube rigs.

Easy to use, anywhere. Measures 8x2x6", has

SO-239 connectors, 5-way binding posts, finished in eggshell white with walnut-grained sides.

4 Other 300W Models: MFJ-940B, \$79.95 (+ \$4), like 941C less balun. MFJ-945, \$79.95 (+ \$4), like 941C less antenna switch. MFJ-944, \$79.95 (+ \$4), like 945, less SWR/Wattmeter, MFJ-943, \$69.95 (+ \$4), like 944, less antenna switch. Optional mobile bracket for 941C, 940B, 945, 944, \$3.00.

MFJ-900 VERSA TUNER



MFJ-900

\$49⁹⁵
(+ \$4)

Matches coax, random wires 1.8-30 MHz.

Handles up to 200 watts output; efficient airwound inductor gives more watts out. 5x2x6".

Use any transceiver, solid-state or tube.

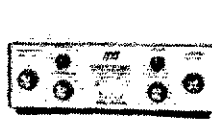
Operate all bands with one antenna.

2 OTHER 200W MODELS:

MFJ-901, \$59.95 (+ \$4), like 900 but includes 4:1 balun for use with balanced lines.

MFJ-16010, \$39.95 (+ \$4), for random wires only. Great for apartment, motel, camping, operation. Tunes 1.8-30 MHz.

MFJ-949B VERSA TUNER II



MFJ-949B

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Matches everything from 1.8-30 MHz, coax, randoms, balanced lines, up to 300W output, solid-state or tubes.

Tunes out SWR on dipoles, vees, long wires, verticals, whips, beams, quads.

Built-in 4:1 balun. 300W, 50-ohm dummy load. SWR meter and 2 range wattmeter (300W & 30W).

6 position antenna switch on front panel, 12 position air-wound inductor; coax connectors, binding posts, black and beige case 10x3x7".

MFJ-962 VERSA TUNER III



MFJ-962

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(+ \$10)

Run up to 1.5 KW PEP, match any feed line from 1.8-30 MHz.

Built-in SWR/Wattmeter has 2000 and 200 watt ranges, forward and reflected.

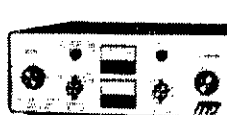
6 position antenna switch handles 2 coax lines (direct or through tuner), wire and balanced lines.

4:1 balun. 250 pf 6KV cap. 12 pos. inductor. Ceramic switches. Black cabinet, panel.

ANOTHER 1.5 KW MODEL: MFJ-961, \$189.95 (+ \$10), similar but less SWR/Wattmeter.

MFJ-10, 3 foot coax with connectors, \$4.95.

MFJ-984 VERSA TUNER IV



MFJ-984

\$329⁹⁵
(+ \$10)

Up to 3 KW PEP and it matches any feedline, 1.8-30 MHz, coax, balanced or random.

10 amp RF ammeter assures max. power at min. SWR. SWR/Wattmeter, for/ref., 2000/200W.

18 position dual inductor, ceramic switch.

7 pos. ant. switch. 250 pf 6KV cap. 5x14x14".

300 watt dummy load. 4:1 ferrite balun.

3 MORE 3 KW MODELS: MFJ-981, \$239.95 (+ \$10), like 984 less ant. switch, ammeter.

MFJ-982, \$239.95 (+ \$10), like 984 less ammeter, SWR/Wattmeter. MFJ-980, \$209.95 (+ \$10), like 982 less ant. switch.

MFJ-989 VERSA TUNER V



MFJ-989

\$329⁹⁵
(+ \$10)

New smaller size matches new smaller rigs — only 10-3/4Wx4-1/2Hx14-7/8D".

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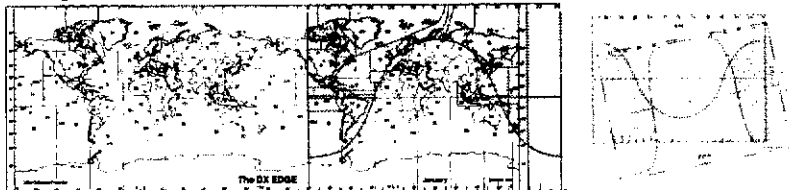
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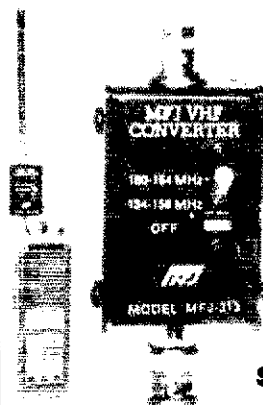
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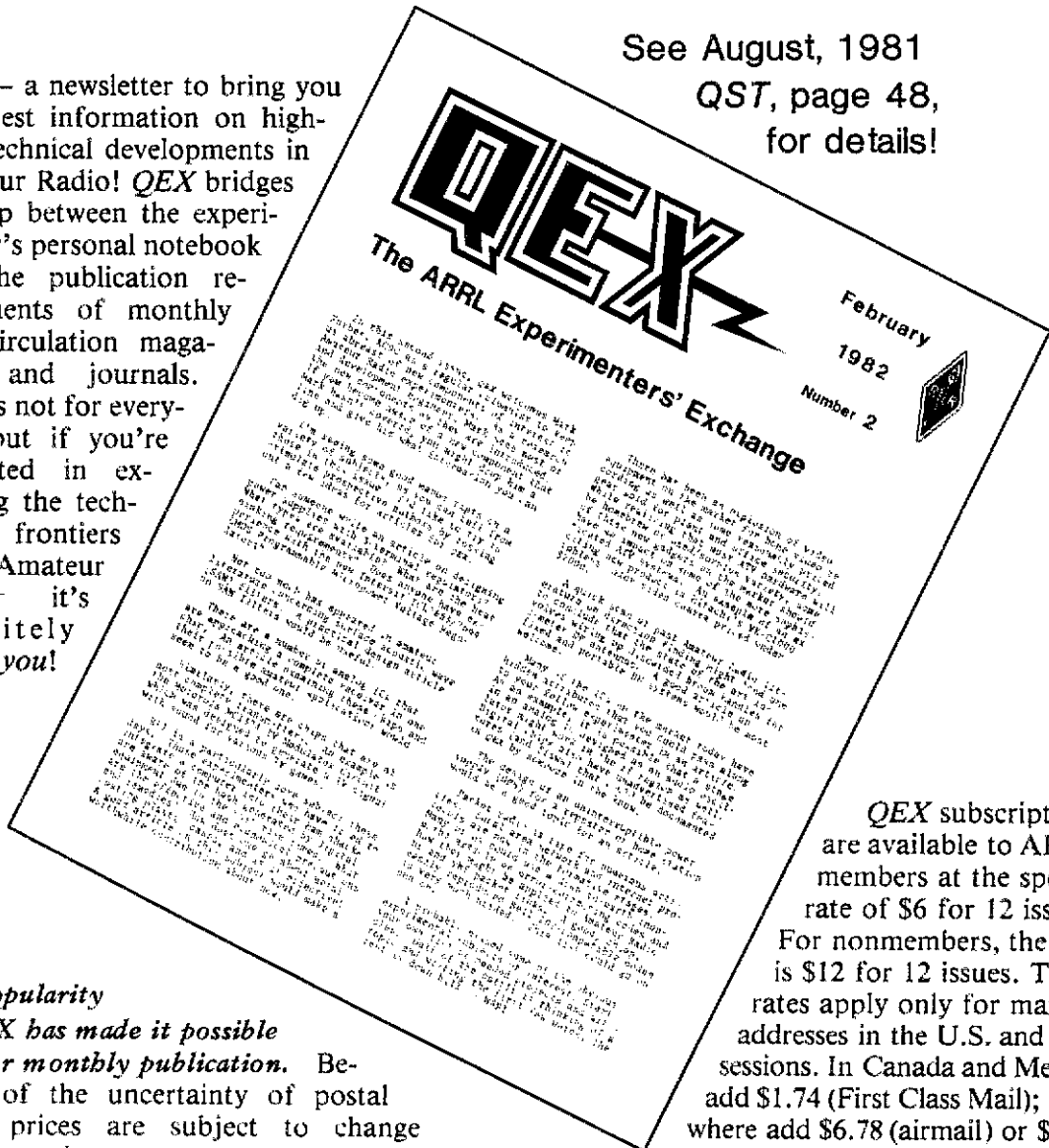
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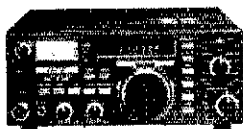
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sheriff over July 4 beach crowd control. KE8LO led RTTY demo Conejo Valley. ELO & W6HWK attended ARC Disaster Institute; KA6JWK new SB Sectn tlc NM. Congrats K6YD for organizing active tlc net. N8FTQ stepped down as STM. Hvy tlc & personal schedule. Many thanks Terry! SARO S.M. hamfest well attended. Good time by all. Tnx W6FLL es team! SMRA's WR6AGH now WB2ZTX/R 13773. Siml Settlers new rpt 146.165/785. Members pledged duplexer. Condor Rptr Assn. News first edition by KD6PN-good job! Known PD stns reported: K6MEP K6TZ WBAB N8VY W6OUL WA6BMH K6FM K6FI. ARRL 10-Mtr Contest SB Sectn winners: K6GKU-CW; WD5JEA/P. W6TKF-Mixax. N6CQ demonstrated portable computer msg handling at SB quake drill. WAL Link "backbone" ptr system across CA to include hi-speed data. Contact WB6QEV for info. WA6000 volunteers as Tucson Packet Beta test site. Traffic: K6YD 60, W6JGS 20, W6JTA 17, KA6BPH 16.

WEST GULF DIVISION

NORTHERN TEXAS: SCM, Phil Clements, K5PC — ASCM: WA5QFD. SEC: W5GPO. STM: W5VMP. NMs: K5CFX KA5MAY AA5J WD5YJ1 AE5I. From what I saw and heard, Field Day 1982 was a super event! QTC from: K5RWK K5GJ WD5GSC W5WVD K5JU K5CJ1 WD5CWS K5KB. W5QY W5CFR W5FC W5BRDD N5DZY K5SNN W5ZAV W5PPT K5BTZ K5LXR. Hope everyone had as good a time as we did! N5CSRU had a FB article on the Paris tornado, printed in World Radio News. N5CAN has been appointed CD Director for Childress Co. K5YUT/EC Nacogdoches Co. doing FB job with cd officials, with lots of good newspaper PR for ARES. W5ACNG is new EC for Rusk Co. Greenville area group had a joint exercise with Army National Guard and city cd. Participating in the mock tornado were: K5MVT W5TXY WB5TVD K26CU. The Greenville SKYWARN Group was also called up later that same evening owing to threatening wx. All of this while they were trying to operate Field Day! Alvin and Bertie Todd received a FB write-up in the Paris News in May, re their work during the tornado and their public service dedication in general. The cd director of Paris has requested \$21,900 to relocate the EOC and for more amateur equipment to serve as back-up for city radio equipment. PSHR: N5BT K5SNN K5KB WD5YJ1 WDASIH. Be sure to send copies of your Field Day snapshots in to Hq. Let's not let the Yankees hog the FD issue in QST again this year! Traffic: N5BT 213, WD5YJ1 202, KK5B 88, KA5AZK 75, W5ERT 59, K5CFX 44, WDASIH 44, WA5QFD 38, W5OYL 31, K5PC 26, W5PBN 14, KB5UL 2.

OKLAHOMA: SCM, Leonard Holler, WA5FSN — Summer doldrums, propagation or what? Some of the nets had to hold abbreviated sessions. But the "Old Hand" traffic handlers did get the job done with W5RN and W5REC really fulfilling the meaning of OTH with the good help of many other operators. KA5OFY KA5OLA RA5OMH and KA5ONV latest graduates of the Wheat Straw Radio classes. Congrats. We are hearing of more public schools considering radio classes. FB. Rcvd quite a few FB reports from Field Day stations, showing a lot of participation. Many included the whole family, also saw some excellent publicity in the media. We visited Wheat Straw and West Central OK at Clinton 2 FB operations. In looking at OO reports, we see quite a few reports of out-of-band operation, particularly at the top end of the band. KA5LBM and WD5KCD interested in EC appointments, will fill 2 blanks in western OK. Traffic: K5CXF 189, W5RFB 189, W5REC 177, WA5AS 148, K5BEX 140, KA5CXW 126, W5REL 102, WA5FN 78, WA5OUV 57, W5VXU 53, W5BEAY 48, WD5IFB 41, W5VYL 23, W5VOR 18, W5SUG 17, WA5ZOO 17, N5IN 9, WB5LSW 5.

SOUTHERN TEXAS: SCM, Arthur R. Ross, W5KR — STM/ASCM: N5TC. SEC: WA5RVT. BPL: W5SHN W5BYDD. ORS K5GM became a member of the A-1 Operator Club. ORS N5DAA advanced to Advanced Class. Congrats to both. KY5B, new EC for Kerr Co., says the job looks good to him. Williamson Co. ARC newsletter announces 8 new amateur ops, thanks to Elmer KV5P: KA5OGI KA5OGK KA5OJ5 KA5OJG KA5OGF KA5OGG KA5OGL KA5OGH. Southern Texas section represented 100% on DRNs by W5VLT WA5RVT W5CTZ N5AMH W5KLV W5SHN W5URN W5TLK N5CRU K5JL W5MTO K5DKO WA5OCH WA5BYDD. The section was also represented 100% on CAND by N5CRU W5TUK W5URN N5AMH W5SHN W5BYDD W5KLV W5VLT W5VLT W5CTZ K5KJN K5BCT and W5TFB. Brazosport ARC worked with police emergency unit and a local REACT group to provide comms for the March of Dimes Walkathon/Bikathon. N5EM won the QRP Texas Traveling Trophy running on battery power, according to "The Southwest QRP'er", published by W5QJM. The Corpus Christi ARC bulletin, "The Call Letter," reports that W5QEM has worked all counties in the United States. Traffic: W5SHN 574, W5BYDD 501, W5CTZ 240, KY5B 132, K5HZR 127, N5TC 100, W5EFG 97, A5X 60, W5KR 41, K5GR 37, KA5RI 37, W5BGE 35, W5SMMI 35, K5RG 29, K5SIX 15, WD5GKH 13, N5FN 9, W5EFP 3.

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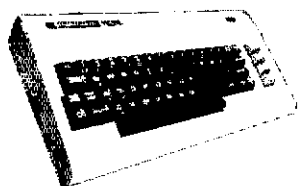
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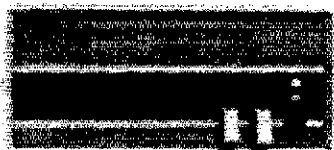
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(4) Closing date for Ham-Ads is the 20th of the second month preceding publication date. No cancellations or changes will be accepted after this closing date. Example: Ads received August 21 through September 20 will appear in November QST.

(5) No Ham-Ad may use more than 100 words. No advertiser may use more than two ads in one issue. A last name or call must appear in each ad. Mention of lotteries, prize drawings, games of chance, etc. is not permitted in QST advertising.

(6) New "commercial" advertisers must submit a production sample of their product (which will be returned) and furnish a statement in writing that they will respond appropriately to customer complaints and will stand by and support all claims and specifications mentioned in their advertising before their ad can appear.

The publisher of QST will vouch for the integrity of advertisers who are obviously commercial in character, and for the grade or character of their products and services. Individual advertisers are not subject to scrutiny.

Clubs/Hamfests

QCWA Quarter Century Wireless Association is an international nonprofit organization founded in 1947. You are eligible for membership if licensed 25 or more years ago, and presently licensed. It is not necessary to have been licensed the entire 25 years. Members receive QCWA publications and participate in QCWA activities. Come grow with us! Write QCWA, Inc., 1409 Cooper Drive, Irving, TX 75061.

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IMRA-International Mission Radio Association Helps missionaries by supplying equipment and running a net for them daily except Sunday, 14.280 MHz, 1900-2000 GMT. Br. Bernard Frey, 1 Pryer Manor Rd., Larchmont, NY 10538.

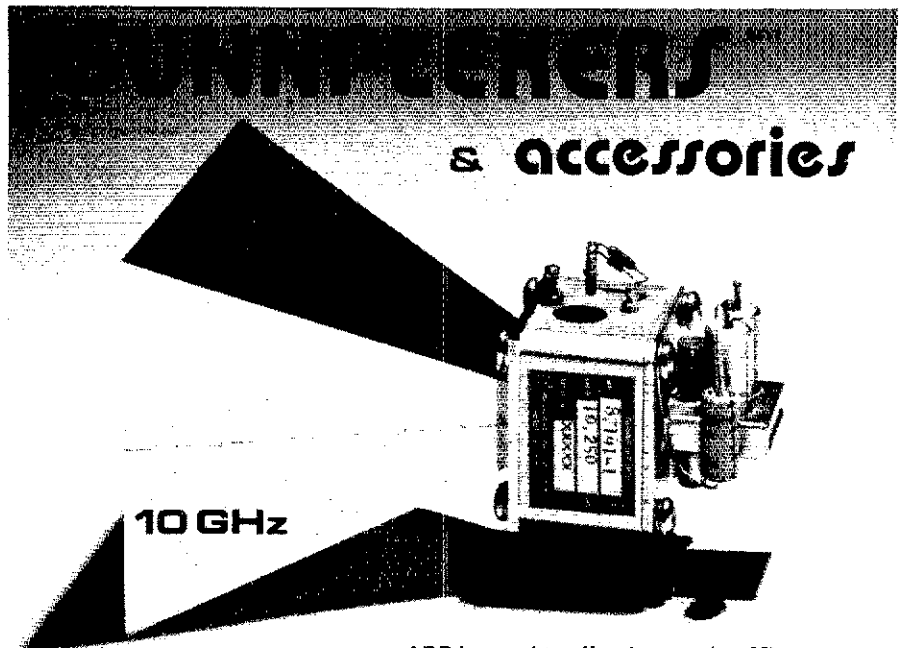
THE Veteran Wireless Operators Association, a non-profit organization of communications people founded in 1925. Invites your inquiries and application for membership. Write V.W.O.A., 118 River Drive — Bay Ridge, Annapolis, MD 21403.

HAMBURG, New York - Ham-O-Rama '82 - Friday, September 10th 6:00 PM-9:00PM and Saturday, September 11th 7:00AM-5:00PM at the Erie County Fairgrounds near Buffalo, New York. New equipment displays, computers, technical programs, ladies programs, valuable awards and more! Tickets \$3.50 advanced or \$4.50 gate. Children under 12 free. Outside flea \$3 per space. Inside flea \$10 per space. Talk-in 146.31/91. Advanced ticket deadline September 1st. S.A.S.E. to Dave Baco, WA2TVT, 130 Vegola Avenue, Cheektowaga, NY 14225.

ARRL Virginia State Convention and Tidewater Computer Show-Hamfest - Electronic Flea Market Oct. 9-10 at the Virginia Beach, VA Pavilion. Dealers, special displays, forums, computers, satellites, special XYL programs, XYL bingo and lounge. Free Jitney Bus to the beach. Admission \$3.50. Advance ticket drawing for hand held transceiver plus many valuable awards. Flea market tables \$5 one day, \$8 both days. Commercial flea market tables \$15 both days. Commercial booths \$30 both days. Info and tickets, write Jim Harrison, N4NV 1234 Little Bay, Norfolk, VA 23503, 804-587-1695.

THE NORTHWEST Ohio Amateur Radio Club will host their 6th annual Hamfest on Sunday October 10, 1982 at the Allen County Fairgrounds in Lima, OH. Heated, indoor, two buildings, tables available \$5. full, \$3. 1/2. Advance tickets \$2.50. Tickets at door \$3. Camping available. Doors open 8:00 AM. Talk-in 07/67, 63/03, 34/94, 52/52. Write N.O.A.R.C. P.O. Box 211, Lima, OH 45802.

NJ Computer Show/Fleamarket (fourth show). Sat./Sun. Sept. 11-12, Holiday Inn (North) - Newark - Exit 14 NJ Turnpike. Buyers \$3., Sellers \$8./space. In case of rain held indoors (150 tables). W2TGH, 201-297-2526, Kengore, 3001 Route 27, Franklin Park, NJ 08823.



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KA4FJE

As present owner of TEN-TEC 544, I have been very happy with it. Now that I need a rig for a 2nd QTH—it, of course, must be a TEN-TEC.

WA2YHF

This is my third TEN-TEC rig. This new one is best yet! Triton IV is now back-up to new Omni C.

AD1P

This is a wonderful rig with all the serious Ham should need. All reports remark of clean keying and good quality SSB.

N4LS

It is a well thought out piece of equipment. I especially like the QSK and the convenient controls.

W8NOT

I was impressed with your reputation for providing good service and satisfying the customer.

W4JSP

In almost 27 years of Hamming, this is the best rig I've ever owned. Thank you all very much!

W7WKH

Super piece of equipment!!

N3RG

The transceiver has been on the air for 5 days, and I am more than satisfied. It is in my estimation a superb product and does exactly what I expected it to do. Signal reports are most flattering.

N2CER

Fantastic Rig, and I use on SSB ONLY.

KB9VB

I decided on TEN-TEC because of the excellent service policy of your company.

WA4RRC

I'm impressed! Will need time to take proper advantage of all of its good features. This should give the "Rice Burners" a real goal to shoot for!

W8UGT

Very fine Radio. I'm proud to be an Omni-C owner.

WD4SFY

The Omni is a beautiful transceiver. Worth every penny!

KJ5G

The Omni C is a joy to operate. My first contact was Romania.

W4REW

Numerous comments over the air pertaining to product and quality of service were very complimentary.

W5VYT

A prominent local amateur told us, "I have never met a man who bought a TEN-TEC and didn't like it." Also we wanted to buy American.

AJ0S N0CEQ

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I am extremely pleased with the OMNI-C. I have owned the best (Collins, Drake, etc.) but this product has them all beat for sheer performance and operator convenience. You are to be congratulated for producing such an outstanding piece of equipment—right here in the U.S.A.!

W9SC

I'm very pleased, after 14 years of DX'ing and contest operations and many more different rigs, this one tops them all. Super RX!

KJ2H CX1BBV

I've owned the Triton 1, then the Triton 4, now the Omni-C. Is there any other rig?

W1ZQI

Have had a Triton IV the past four years. I would not own anything but TEN-TEC. Super rigs and fantastic service.

W5TI

Had Omni-C, then tried most other rigs on market—went back to the best—The American made Omni-C.

KC5WC

I have previously owned Triton IV. Now have Omni-D Series B, your prompt and courteous attention to minor problems in the past together with fine equipment induced me to buy this one.

N5CN

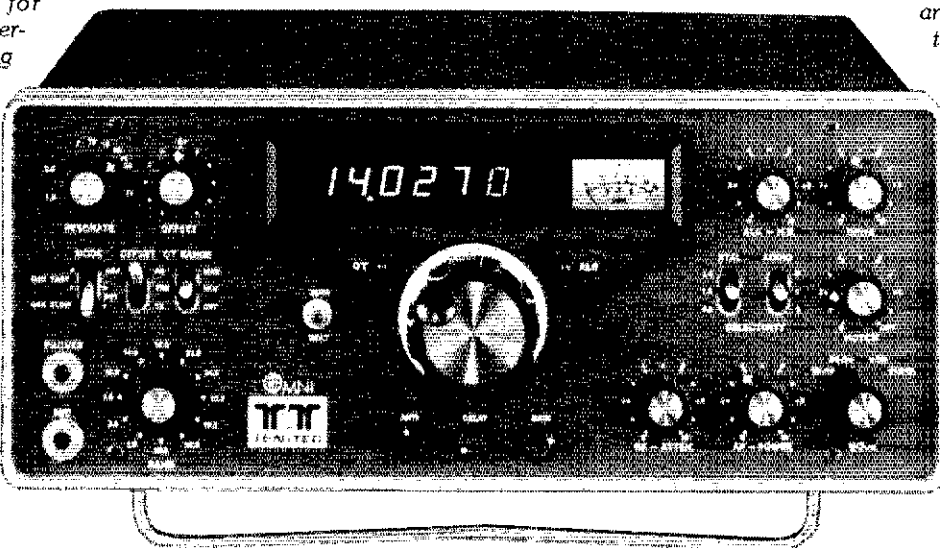
Decision was on previous experience. Traded in a 544 on this rig & the only thing I would have traded that one for is another TEN-TEC—Great rig!

WD4NZP

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KA5GKO

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W5QNT

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K8IST

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KA4GYU

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W7GOY

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SOUTHERN Illinois — Shawnee Amateur Radio Association's 26th Hamfest will be September 12 at John A. Logan College in Carverville, Illinois. Offerings include Air Conditioned Flea Market - Awards - Forums - Computers Refreshments - Contests. For details QSL Bill May, KB9QY, 800 Hilldale, Herrin, IL 62948, or 618-942-2511 days.

ILLINOIS: Sept 18 & 19, The Peoria Area Amateur Radio Club presents Peoria Superfest '82 at Exposition Gardens, W. Northmoor Rd., Peoria, IL. Tickets \$3 advance or \$4 gate. Gate opens 8:00 A.M., commercial building 9:00 A.M. Talk-in 146.16/76 call W9UV1. Forums, latest Amateur and computer product displays, huge free flea market, free ladies bus to Northwoods Mall on Sunday. Full camping facilities. Sat. night informal get together at Heritage House Smorgasbord 8209 N. Mt. Hawley Rd. For tickets and info SASE to Superfest '82, 5808 N. Andover CT, Peoria, IL 61615.

INDIANA: The Grant Co. Amateur Radio Club will hold its Hamfest Sept. 11 at McCarthy Hall Marion, Indiana. Major awards. \$2 advance \$3 gate. Talk in 146.19/79 146.52 simplex. Tickets/information contact WB9YHF Beecher Waters RR 1 Box 357 Converse, IN 46919.

SEPT. 26, LIMARC, Long Island Mobile Amateur Radio sponsors the 26th APRIL Hamfest '82 at the Islip Speedway, Islip, NY. Islip Ave (Rte. 111) just south of Exit 45, Southern State Parkway or South from Exit 56 on the L.I. Expressway. No reservations needed, over 350 exhibitors. Information call Sid Wolin, K2LJH, 516-379-2861 or Hank Wener, WB2ALW, 516-484-4322. Talkin 146.85. Many awards will be made during the Hamfair. 9 AM to 4 PM. General Admission \$3, exhibitors \$5 per car space.

AUGUSTA Amateur Radio Club's Annual Hamfest will be held September 19, 1982, at the Julian Smith Casino. Admission is \$3 per person, which includes one award ticket. Extra tickets are \$1 each or 6 for \$5. Tailgating will be \$2. Six dealers to serve you. Barbecue and Bingo for the family. Hospitality Room September 18, 4 P.M. - 11. Great awards P.M. Ramada Inn West, Room 108-110. Talk-in 147.72/12. For information, John Schumacher N4DOU, P.O. Box 3072, Augusta, GA 30904 or 404-860-4460, 8 P.M. - 9 P.M. EDT.

HALL of Science Amateur Radio Club annual indoor/outdoor, rain or shine Hamfest will be held, Sunday September 12, 1982, 9 A.M. to 4 P.M. at Municipal Parking Lot, 80-25 126th Street, (1 block off Queens Blvd.) Kew Gardens, Queens, New York City. Sellers: donation \$3. Buyers \$2. XYL's, kids free. Walk/talk in frequency 145.520. For info, contact John Powers KA2AHJ 212-847-8007, Tony Russo, WB2OLB 212-441-6545.

HIDDEN transmitter hunt-Madison County Amateur Radio Club-Anderson, Indiana, October 17. Awards. Contact WA9JWL 317-642-1237.

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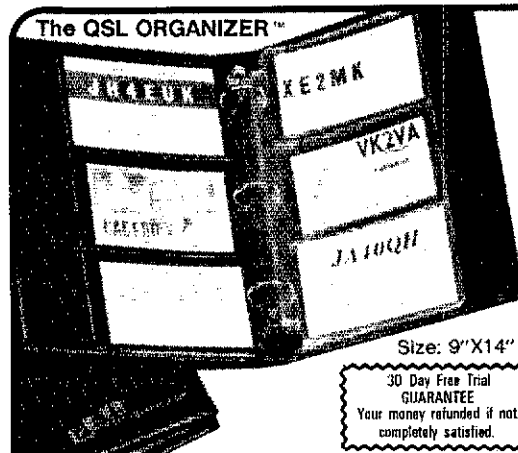
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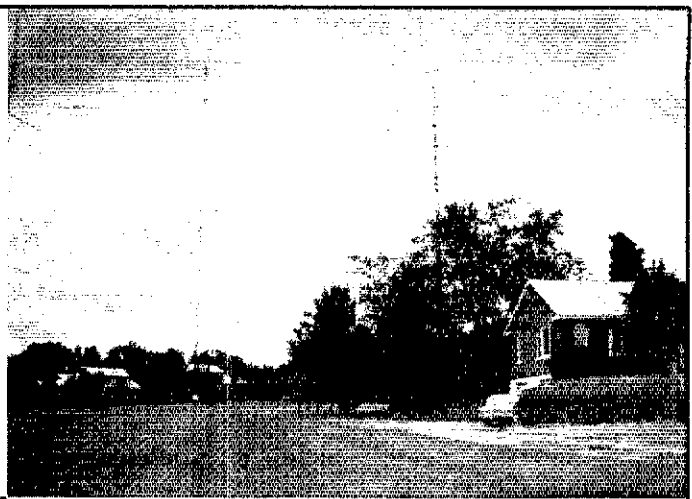
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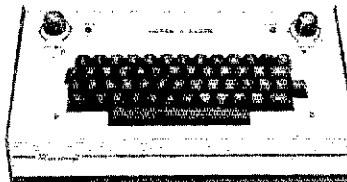
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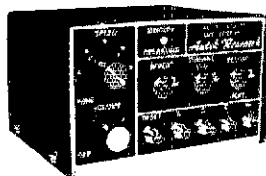
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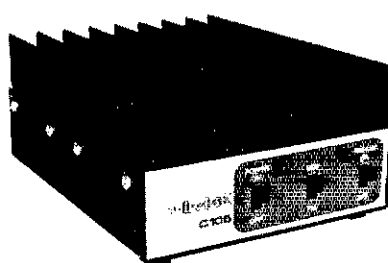
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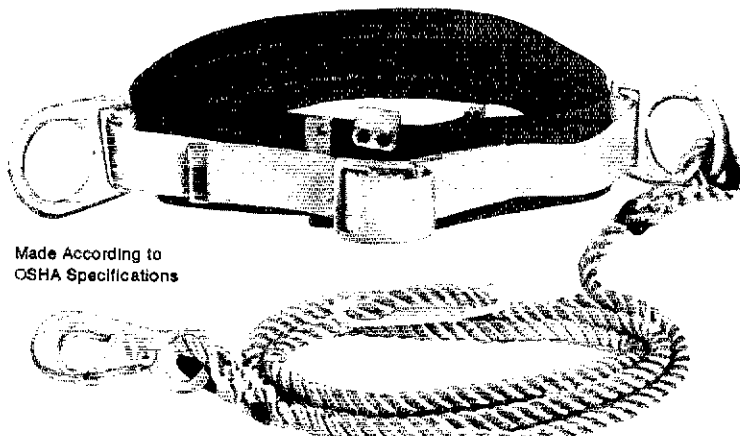
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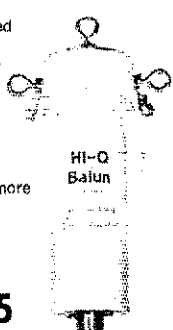
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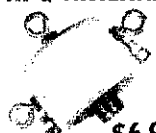
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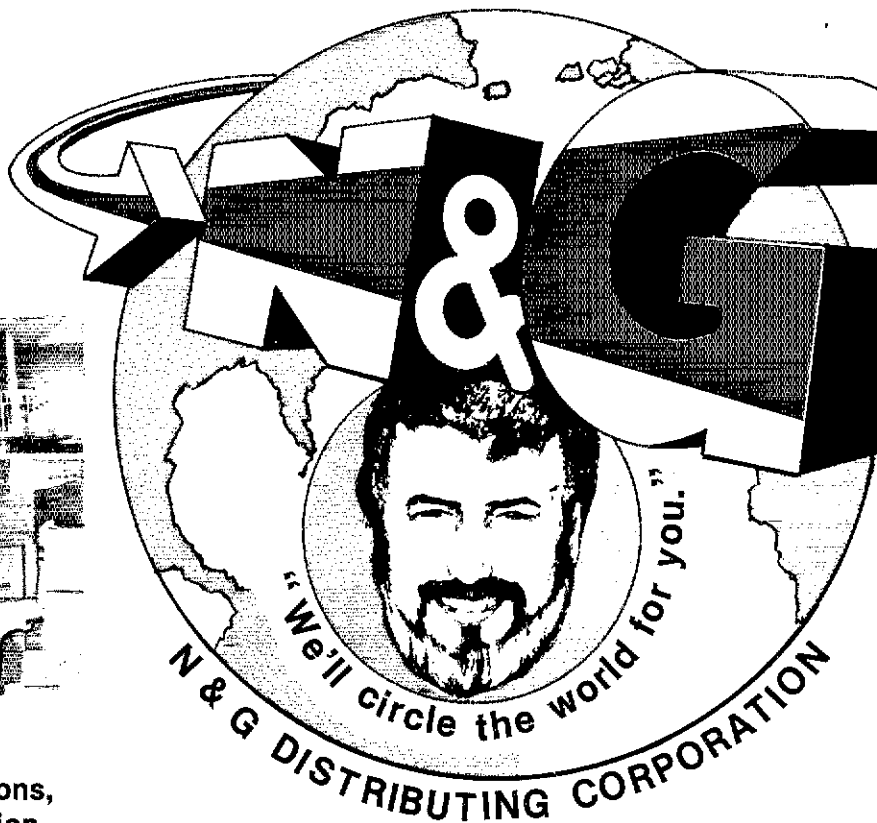
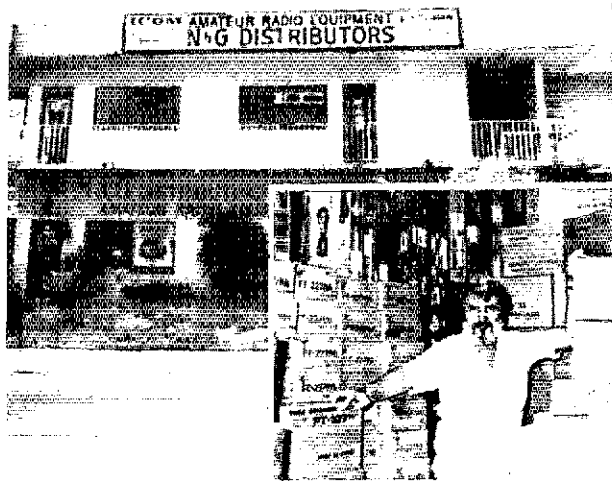
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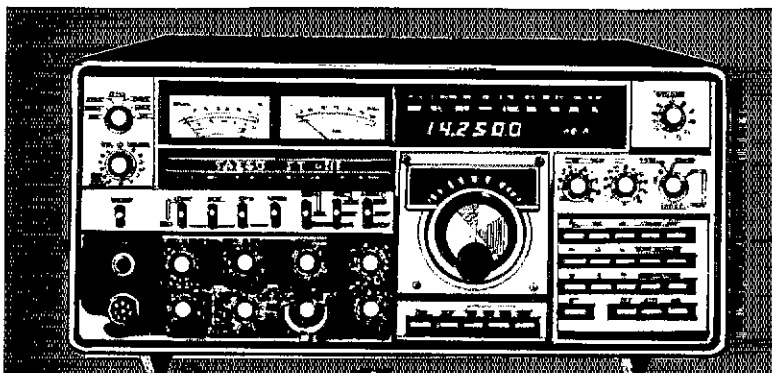
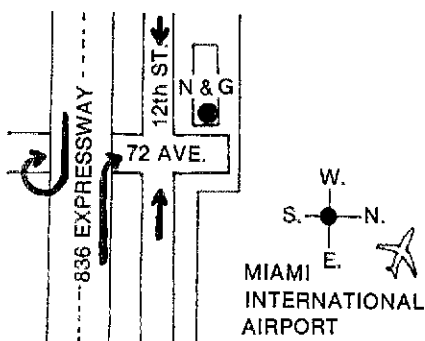
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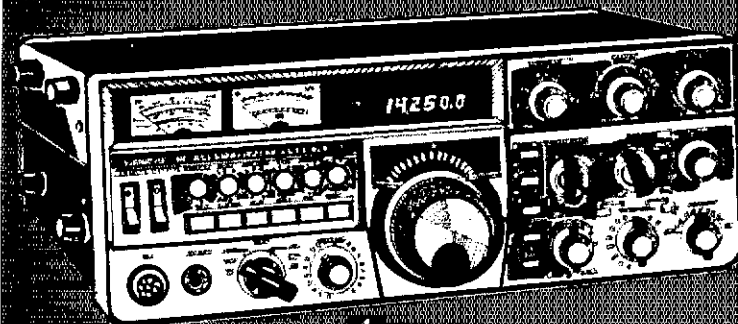


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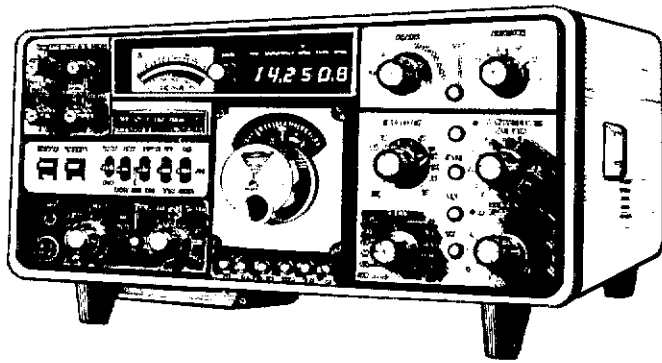
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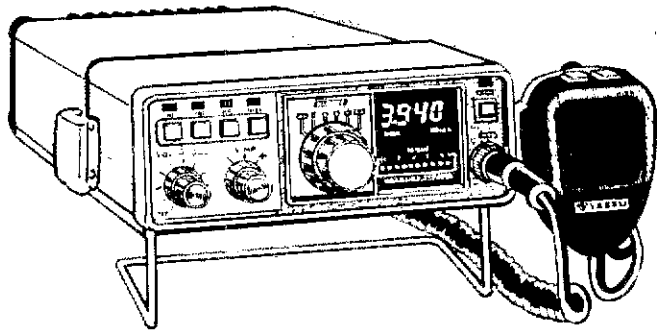
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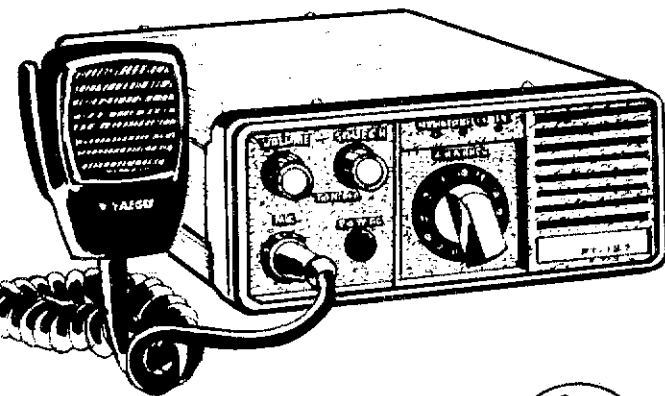
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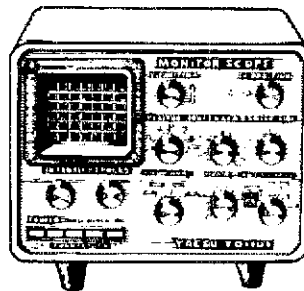
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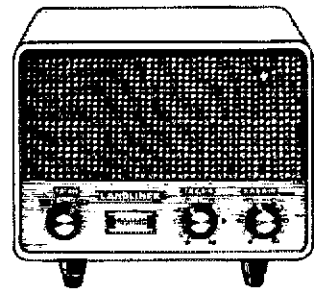
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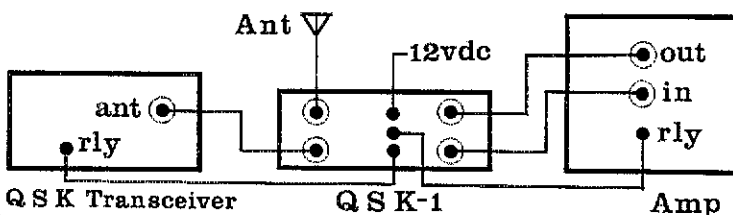
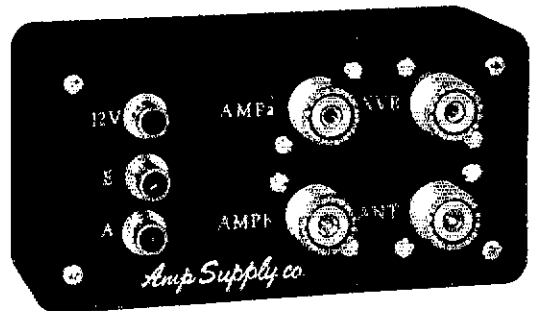
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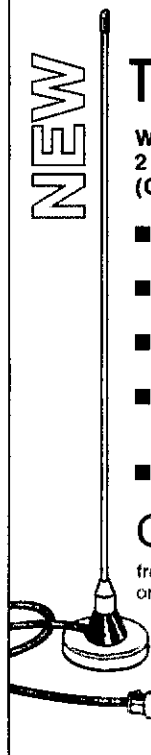
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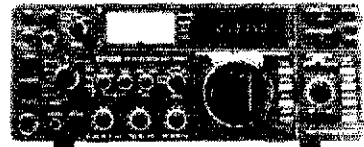
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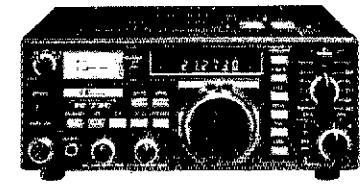
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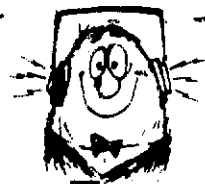


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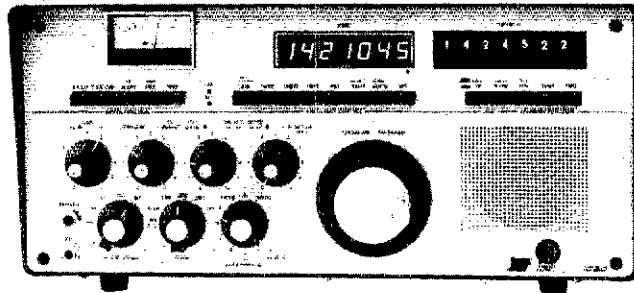
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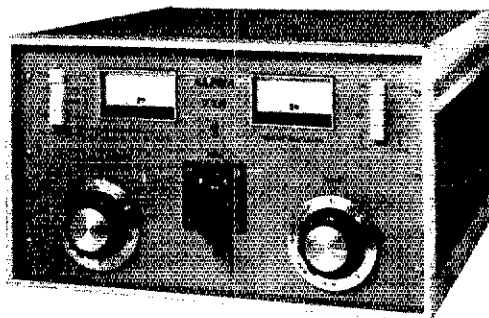


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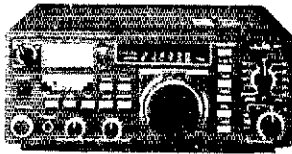
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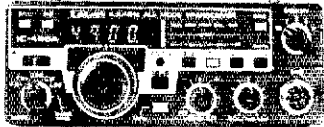


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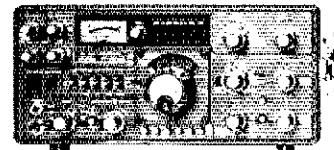
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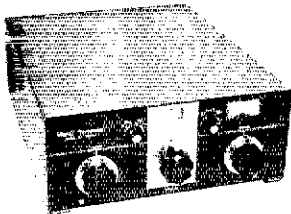
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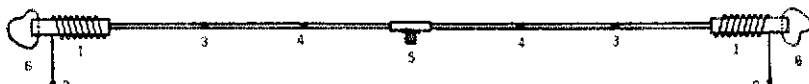
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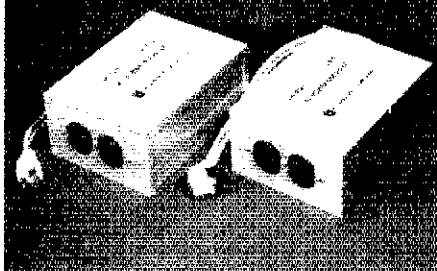
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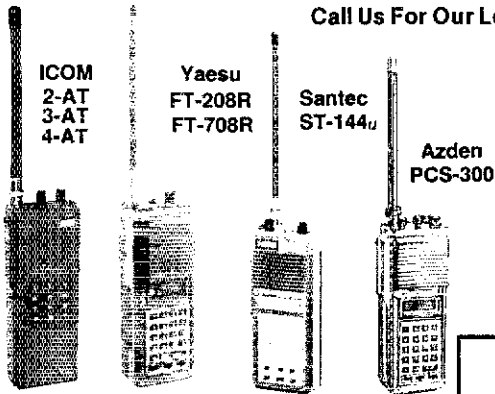
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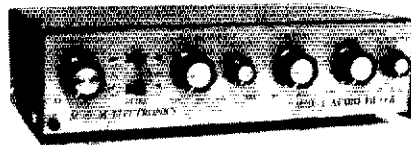
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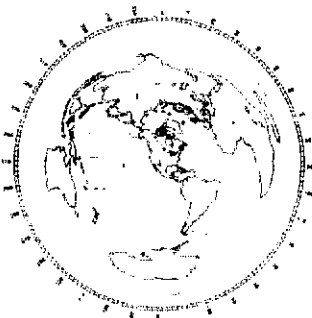
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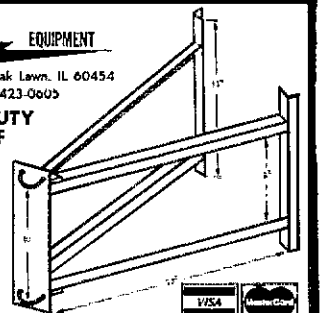
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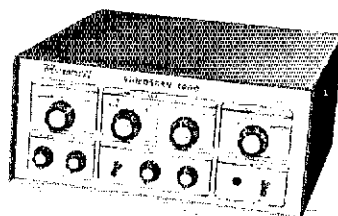
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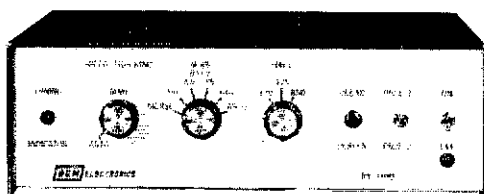
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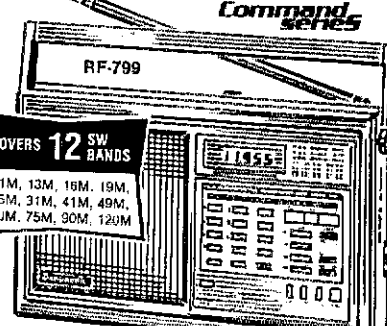
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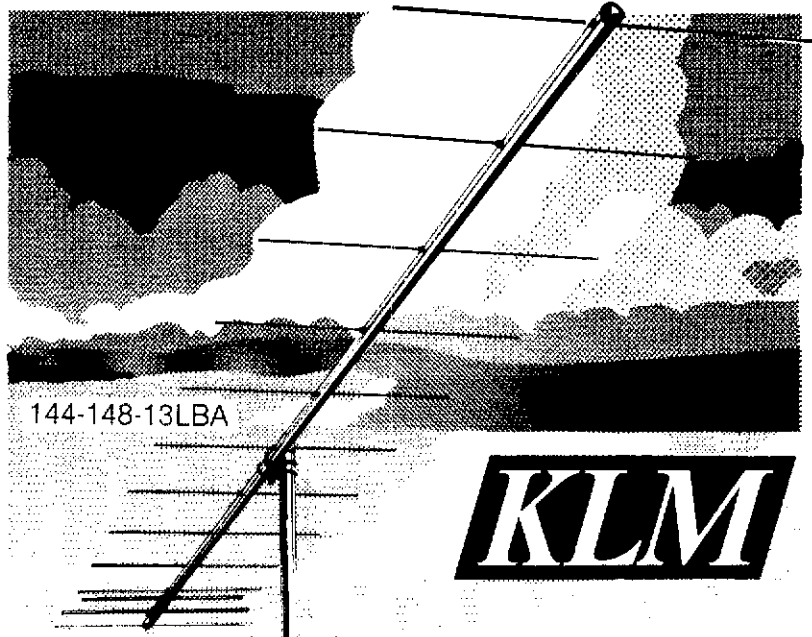
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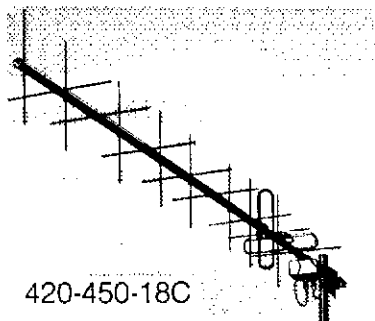
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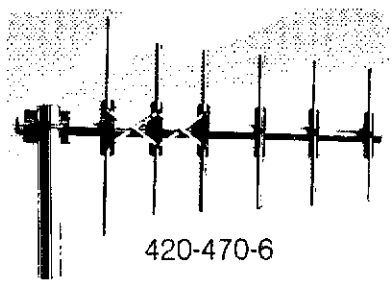
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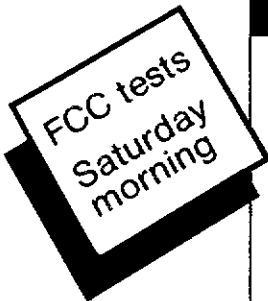
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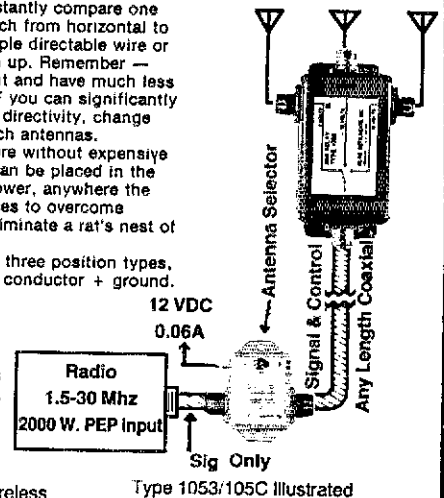
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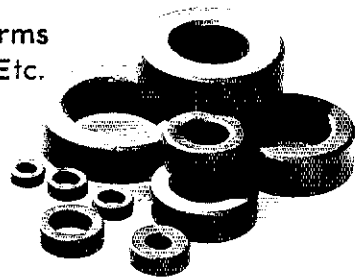


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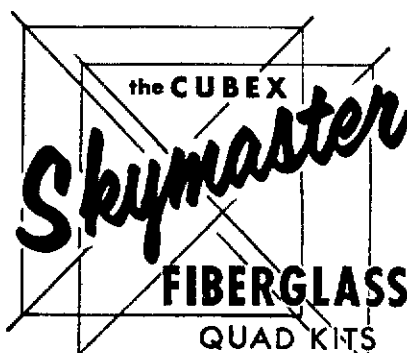
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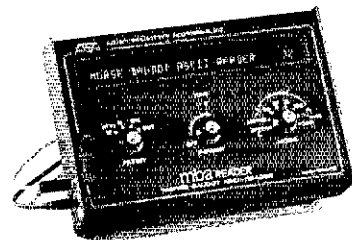
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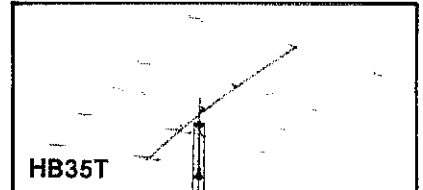
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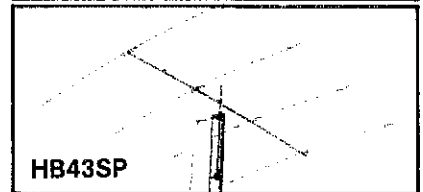
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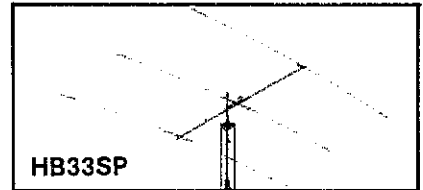
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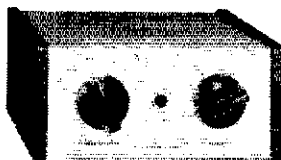


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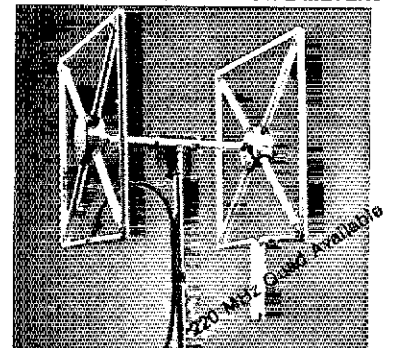
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NEED schematic: Measurements Corp 59 G.D.O. Fred Tucker W8YBS 6122 East Pierson, Flint, MI 48506.

COLLINS 75S-1 \$225; Hamtronics CA-432-5 \$50, P-432 w/case \$20; Heathkit SB-500 \$125; KLM 420-450 18C w/divider \$70; all have manuals, David Wells, 3522 Boston Ave., Oakland, CA 94602 415-531-2800.

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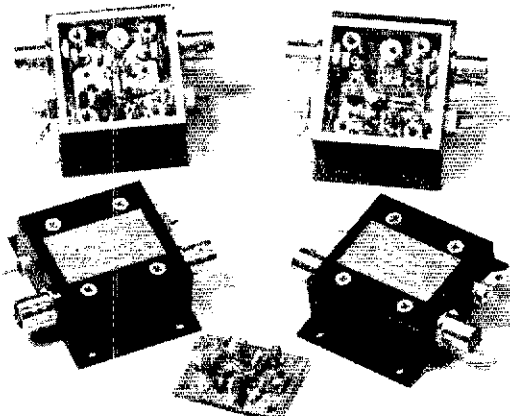
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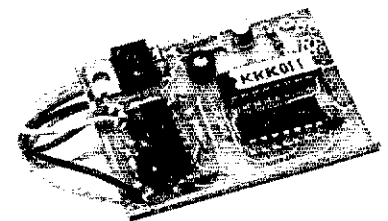
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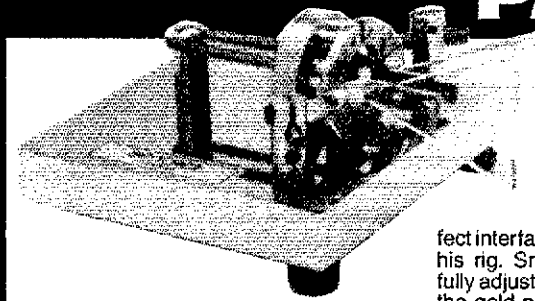
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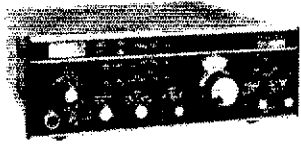
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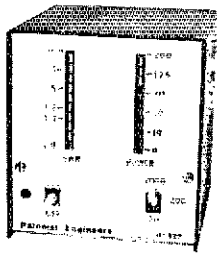
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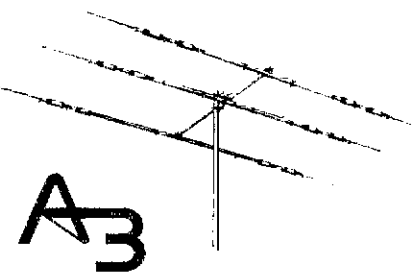
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Foldover Towers Freight Paid-10% Higher West of Rockies. ALL ROHN ACCESSORIES IN STOCK - CALL!

GALVANIZED STEEL TWR. HARDWARE

3/16" EHS Guywire (3990 lbs.)	\$12/100 ft.	\$111/1000 ft.
1/4" EHS Guywire (6000 lbs.)	\$15/100 ft.	\$139/1000 ft.
5/32" 7 x 7 Aircraft Cable (2700 lbs.)	\$11/100 ft.	
3/16" CCM Cable Clamp (3/16" or 5/32" Cable)	\$0.30	
1/4" CCM Cable Clamp (1/4" Cable)	\$0.40	
1/4" TH Thimble (fits all sizes)	\$0.25	
3/8 EE (3/8" Eye & Eye Turnbuckle)	\$6.50	
3/8 EJ (3/8" Eye & Jaw Turnbuckle)	\$6.50	
1/2 EE (1/2" Eye & Eye Turnbuckle)	\$8.50	
1/2 EJ (1/2" Eye & Jaw Turnbuckle)	\$9.50	
3/16" Preformed Guy Grip	\$1.65	
1/4" Preformed Guy Grip	\$1.85	
6" Diam - 4 ft. Long Earth Screw Anchor	\$12.50	
2" Diam - 10 ft. Long Heavy Duty Steel Mast	\$39.00	
500D Guy Insulator (5/32" or 3/16" Cable)	\$0.95	
502 Guy Insulator (1/4" Cable)	\$1.95	
5/8" Diam - 8 ft. Copper Clad Ground Rod w/camp.	\$11.00	

ANTENNA WIRE & ACCESSORIES

12 Ga. Solid Copperwire (Multiples of 50 ft.)	\$6/50 ft.
14 Ga. Solid Copperwire (Multiples of 50 ft.)	\$6/50 ft.
14 Ga. Stranded Copper (Multiples of 50 ft.)	\$5/50 ft.
14 Ga. Stranded Copper (170 ft. coil)	\$ 7.00
14 Ga. Stranded Copper (140 ft. Coil)	\$ 14.00
18 Ga. Copperwire (1/4 mite snool)	\$30.00
Heavy Duty B&W End Insulator	\$4/Pair
HYGAIN Model 155 Center Insulator	\$ 9.95
HYGAIN Model 157 Center Insulator w/S0239	\$11.95
450 OHM H.D. Low Loss Ladder Line	\$ 14/ft.



TEXAS TOWERS

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SPECIALTY MODES

from the specialty mode company

THE ROBOT MODEL 800 SUPER TERMINAL

Using microprocessor technology, Robot has created the most complete specialty mode terminal ever built for amateur radio.

The Model 800 has all the features you need (Baudot, ASCII, Morse, and SSTV graphics) built-in as standard equipment. While most other units require the purchase of several accessories to make a complete operating system, all you add to the Robot 800 is a monitor. Everything else is included in the unit, and in the price!

The terminal unit and the send/receive terminal are both in the same package. The built-in demodulator is superior in quality to any built-in RTTY demodulator on the market,



due to its use of separate two tone active discriminator filters for demodulation of the RTTY signal.

Get everything you want for specialty mode operation all in one package that connects directly to your stations transmitting and receiving equipment.

Get your hands on the Super Terminal at your Robot dealer. Call or write for our full color brochure.

THE ROBOT MODEL 400 SSTV SCAN CONVERTER

Makes operating SSTV fun,
and inexpensive.

The Model 400's solid state design makes operating SSTV simpler than ever before. You send and receive clear, complete pictures easily seen on a conventional TV monitor and they can be stored indefinitely on an audio tape recorder for later viewing or photographing.

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SATURN SSTV TAPE AVAILABLE

SSTV pictures of Saturn and its moons are available on a standard audio cassette. Send your \$7 check to:

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Pasadena, Ca 91109



- SSTV picture display on any standard CCTV monitor.
- Frame freeze from any standard CCTV camera, broadcast video, or video tape source.
- Automatic or manual TV frame switch.
- Permanent picture storage.
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- Capable of real time display of digitally processed fast scan video.

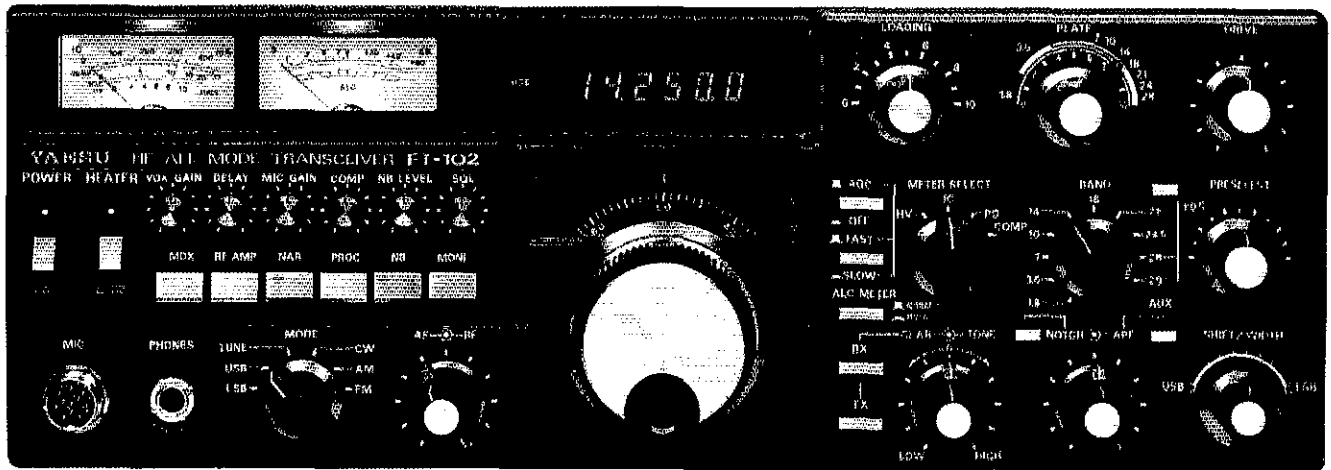
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World Leaders in Slow Scan TV, Phone Line TV and Image Processing Systems

New Yaesu FT-102 Series Transceiver of Champions!



The long-awaited new generation of Yaesu HF technology has arrived! New research in improved receiver filtering and spectral purity is brought to bear in the competition-bred FT-102, the HF transceiver designed for active Amateurs on today's intensely active bands!

Unique Cascaded Filter System

The FT-102 utilizes an advanced 8.2 MHz and 455 kHz IF system, capable of accepting as many as three filters in cascade. Optional filters of 2.9 kHz, 1.8 kHz, 600 Hz, and 300 Hz may be combined with the two stock 2.9 kHz filters for operating flexibility you've never seen in an HF transceiver before now!

All New Receiver Front End

Utilizing husky junction field-effect transistors in a 24 volt, high-current design, the FT-102 front end features a low-distortion RF preamplifier that may be bypassed via a front panel switch when not needed.

IF Notch and Audio Peak Filter

A highly effective 455 kHz IF Notch Filter provides superb rejection of heterodynes, carriers, and other annoying interference appearing within the IF passband. On CW, the Audio Peak Filter may be switched in during extremely tight pile-up conditions for post-detection signal enhancement.

Variable IF Bandwidth with IF Shift

The FT-102's double conversion receiver features Yaesu's time-proven Variable Bandwidth System, which utilizes the cascaded IF filters to provide intermediate bandwidths such as 2.1 kHz, 1.5 kHz, or 800 Hz simply by twisting a dial. The Variable Bandwidth System is used in conjunction with the IF Shift control, which allows the operator to center the IF passband frequency response without varying the incoming signal pitch.

Wide/Narrow Filter Selection

Depending on the exact combination of optional filters you choose, a variety of wide/narrow operating modes may be selected. For example, you may set up 2.9 kHz in SSB/WIDE, 1.8 kHz in SSB/NARROW, then select 1.8 kHz for CW/WIDE, and 600 Hz or 300 Hz for CW/NARROW. Or use the Variable Bandwidth to set your SSB bandwidth, and use 600 Hz for CW/WIDE and 300 Hz for CW/NARROW! No other manufacturer gives you so much flexibility in selecting filter responses!

Variable Pulse Width Noise Blanker

Ignition noise, the "Woodpecker," and power line noise are modern-day enemies of effective Amateur operation. The FT-102 Noise Blanker offers improved blanking action on today's man-made noise sources (though no blanker can eliminate all forms of band noise) for more solid copy under adverse conditions.

Low Distortion Audio/IF Stage Design

Now that dynamic range, stability, and AGC problems have been largely eliminated thanks to improved technology, Yaesu's engineers have put particular attention on maximizing intelligence recovery in the receiver. While elementary filter cascading schemes often degrade performance, the FT-102's unique blend of crystal and ceramic IF filters plus audio tone control provides very low phase delay, reduced passband ripple, and hence increased recovery of information.

Heavy Duty Three-Tube Final Amplifier

The FT-102 final amplifier uses three 6146B tubes for more consistent power output and improved reliability. Using up to 10 dB of RF negative feedback, the FT-102 transmitter third-order distortion products are typically 40 dB down, giving you a studio quality output signal.

Dual Metering System

Adopted from the new FT-ONE transceiver, the Dual Metering System provides simultaneous display of ALC voltage on one meter along with metering of plate voltage, cathode current, relative power output, or clipping level on the other. This system greatly simplifies proper adjustment of the transmitter.

Microphone Amplifier Tone Control

Recognizing the differences in voice characteristics of Amateur operators, Yaesu's engineers have incorporated an ingenious microphone amplifier tone control circuit, which allows you to tailor the treble and bass response of the FT-102 transmitter for best fidelity on your speech pattern.

RF Speech Processor

The built-in RF Speech Processor uses true RF clipping, for improved talk power under difficult conditions. The clipping type speech processor provides cleaner, more effective "punch" for your signal than simpler circuits used in other transmitters.

VOX with Front Panel Controls

The FT-102 standard package includes VOX for hands-free operation. Both the VOX Gain and VOX Delay controls are located on the front panel, for maximum operator convenience.

IF Monitor Circuit

For easy adjustment of the RF Speech Processor or for recording both sides of a conversation, an IF monitor circuit is provided in the transmitter section. When the optional AM/FM unit is installed, the IF monitor may be used for proper setting of the FM deviation and AM mic gain.

WARC Bands Factory Installed

The FT-102 is factory equipped for operation on all present and proposed Amateur bands, so you won't have to worry about retrofitting capability on your transceiver. An extra AUX band position is available on the bandswitch for special applications.

Full Line Of Accessories

For maximum operating flexibility, see your Authorized Dealer for details of the complete line of FT-102 accessories. Coming soon are the FV-102DM Synthesized VFO, SP-102 Speaker/Audio Filter, a full line of optional filters and microphones, and the AM/FM Unit.

Price And Specifications Subject To
Change Without Notice Or Obligation

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Watts to see...



Big LCD, Big 45 W, Big 21 memories, compact.

TR-7950

Outstanding features providing maximum ease of operation include a large, easy-to-read (direct sunlight or dark) LCD display, 21 multi-function memories, automatic offset, programmable priority channel, memory and band scans, built-in lithium battery memory back-up, built-in 16-key autopatch, and a choice of a hefty 45 watts output (TR-7950), or 25 watts output (TR-7930).

TR-7950 FEATURES:

- **NEW, large, easy-to-read LCD digital display**
Easy to read in direct sunlight or dark (back-lighted). Displays transmit/receive frequencies, memory channel, repeater offset, (+, S, -), sub-tone number (F-0, 1, 2, 3), tone, scan, and memory scan lock-out. Includes LED S-RF bar meter, and LED indicators for REVERSE, CENTER TUNING, PRIORITY, and ON AIR.
- **21 NEW, multi-function memory channels**
Stores frequency, repeater offset, and optional sub-tone channels. Memories 1 through 15 for simplex or ± 600 kHz offset. Memory pairs 16/17, and 18/19 are paired for non-standard repeater offset. Memories "A" and "B" set upper and lower scan limits, or for simplex or ± 600 kHz offset. In MEMORY mode, a circle of light appears around the memory selector knob. When the memory selector knob is rotated in either direction to channel 1, an audible "beep" will sound.
- **Choice of 45 or 25 watts output**
The TR-7950 provides a hefty 45 watts output, while the TR-7930 features a more modest 25 watts. A HI/LOW power switch allows power reduction to approx. 5 watts.

- **Long-life lithium battery memory back-up**
Built-in lithium battery has an estimated 5 year life.

Automatic offset

The microprocessor is pre-programmed for simplex or ± 600 kHz offset, in accordance with the 2 meter band plan. "OS" key allows manual change in offset.

Programmable priority alert

The PRIORITY channel may be programmed in any of the 21 memories. With ALERT switch "ON" a dual "beep" sounds when a signal is present on the PRIORITY channel. An OPER switch allows an easy move to the PRIORITY channel.

- **Programmable memory scan lock-out**
"LO" key for programming scan to skip selected memory channels, without erasing the memory.

Programmable band-scan width

The lower limit may be programmed into memory "A" and the upper limit into memory "B".

Center stop during band-scan, with indicator

Stops in center of channel during band-scan, with center tuning indicator.

Scan resume selectable

Scan stops on busy channel. Selectable automatic time resume-scan (approx. 5 sec., adjustable), or carrier operated resume-scan. A scan delay of approx. 1.5 seconds built-in.

Scan control using up/down microphone

Momentarily pressing UP or DOWN button on microphone tunes one step in the selected direction, on memory or on 5-kHz step tuning. Holding the button for about 2 seconds starts UP or DOWN automatic scan action. Scan start also possible using "SC" key on keyboard. Scan may be cancelled by momentarily pressing the PTT switch, or by pressing both UP/DOWN buttons simultaneously.

Programmable sub-tone channels

Optional TU-79 3 frequency sub-tone unit provides keyboard selectable sub-tone channels, which may be stored in memory.

Built-in 16-key autopatch, with monitor

The keyboard functions as a 16-key autopatch during transmit. DTMF tones appear in the speaker output when a key is pressed during transmit.

Front panel keyboard control

Used for selecting frequency, offset, programming memories, controlling scan, and autopatch encode. Keyboard lighting is provided.

Extended frequency coverage

Covers 142.000-148.995 MHz, in 5-kHz steps.

Repeater reverse switch

Locking-type switch, with indicator.

"Beeper" amplified through speaker

Compact, lightweight design

Easy-to-install adjustable-angle mobile mounting bracket

Optional accessories:

- TU-79 3 frequency tone unit.
- KPS-12 fixed-station power supply for TR-7950.
- KPS-7 fixed-station power supply for TR-7930.
- SP-40 compact mobile speaker.

More information on the TR-7950 and TR-7930 is available from all authorized dealers of Trio-Kenwood Communications, 111 West Walnut Street, Compton, California 90220.

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