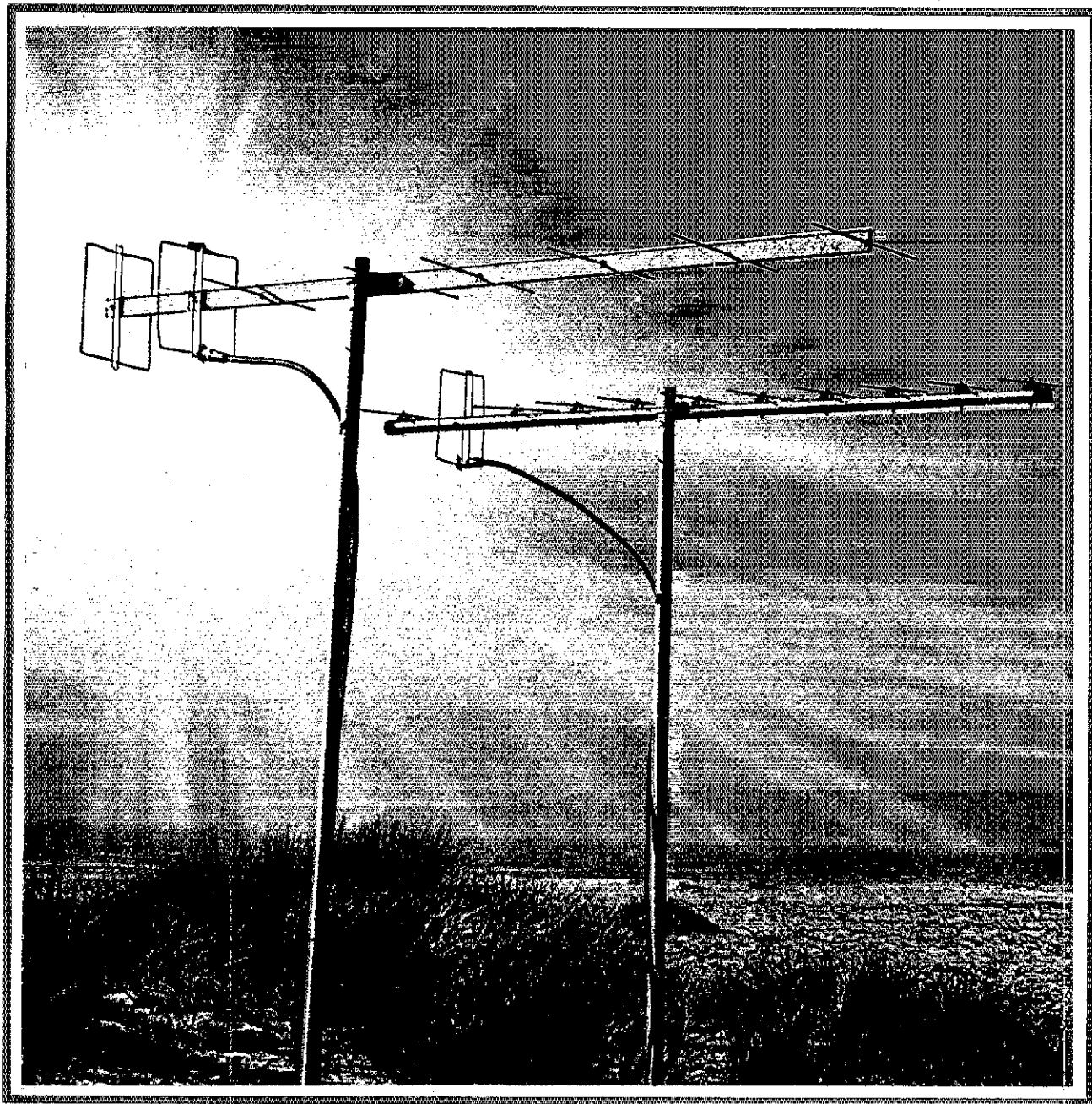


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Page 13

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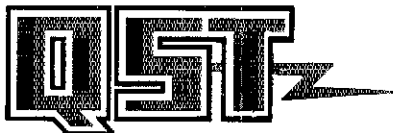


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OFFICES
 225 Main Street
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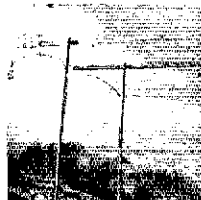
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THE COVER

Antennas on a sea-side test range set the stage for "An Introduction to the World Above 50 MHz." See page 13.



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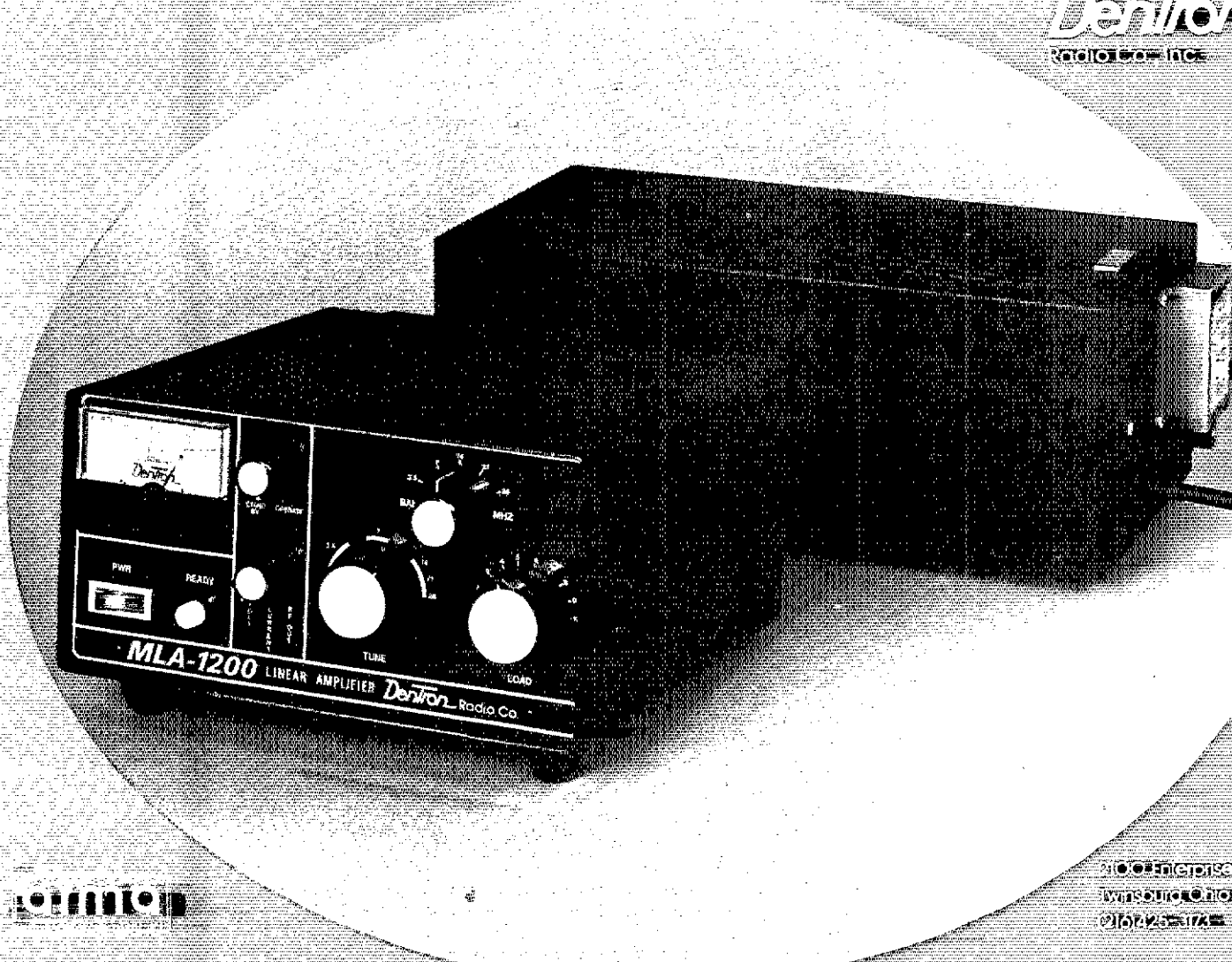
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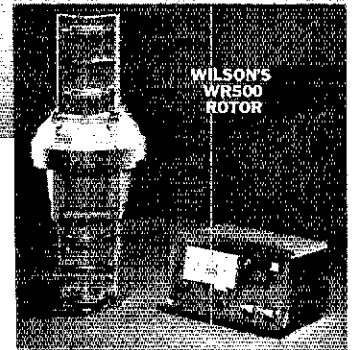
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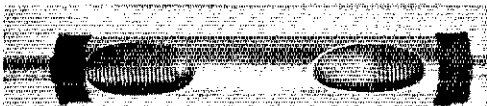
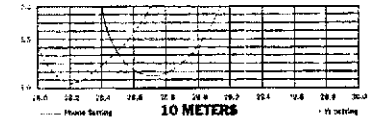
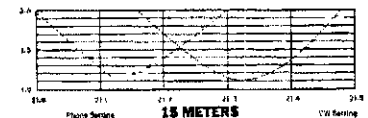
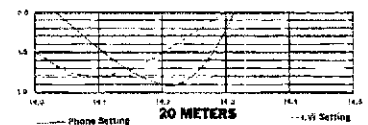
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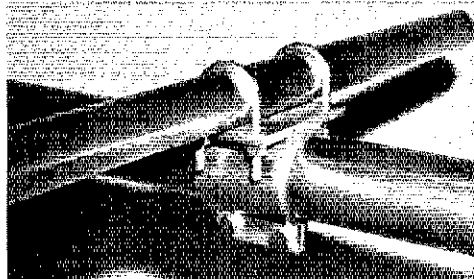
Matching Method:	Beta	Boom Length	26'	Mast Diameter	2" O.D.
Band MHz:	14-21-28	Boom Diameter	(2" O.D.)	Surface Area	7.3 sq. ft.
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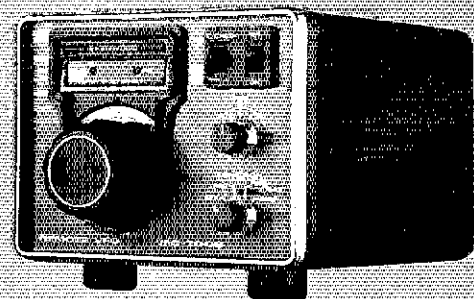
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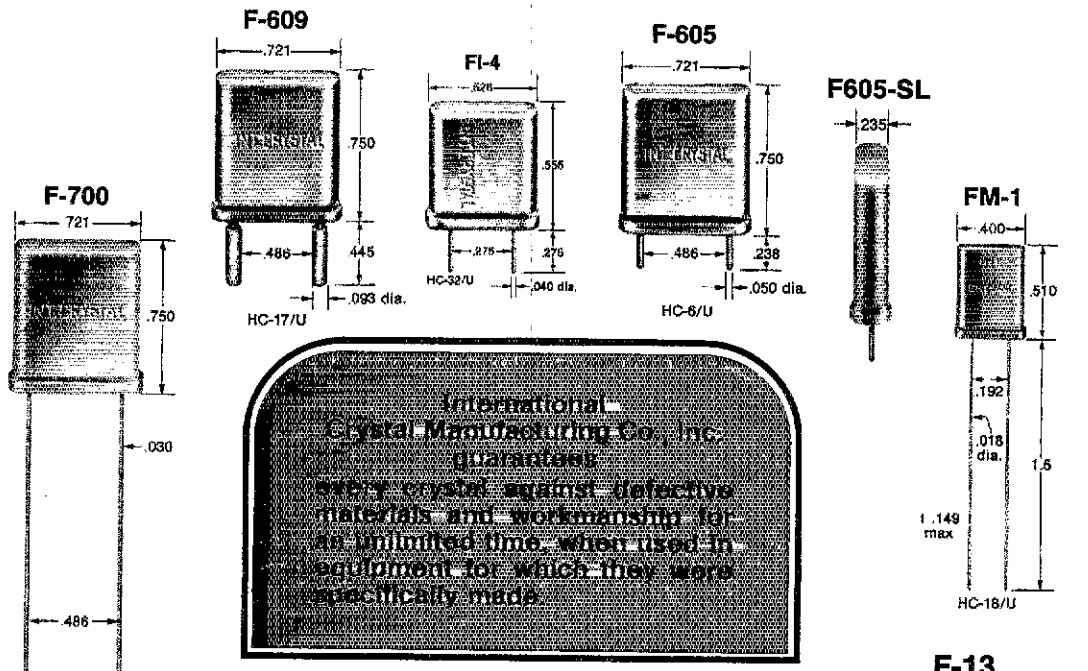
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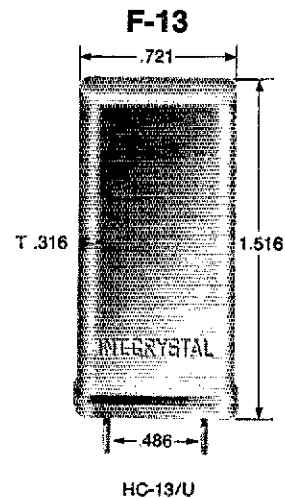
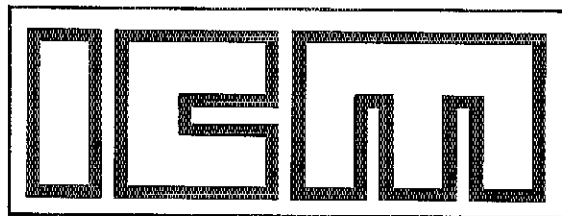
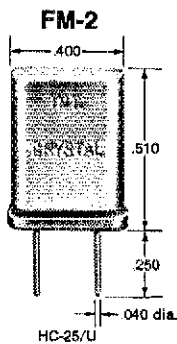
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The American Radio Relay League, Inc., is a noncommercial association of radio amateurs, bonded for the promotion of interest in amateur radio communication and experimentation, for the relaying of messages by radio, for the advancement of the radio 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 practically every worth-while amateur in the nation and has a history of glorious 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 prerequisite, 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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"It Seems to Us..."

Self-Regulatory—Are We?

We amateurs like to tell people that we are self-policing and self-regulatory, and so let's discuss some interesting things about self-regulation that have been happening in amateur radio.

A few years back, amateur radio went through a period of over-regulation by the FCC. We were hit with innumerable rules, particularly for repeater stations and repeater operation. Your League struck back at the behest of its members — and very strongly, we might add. We told the FCC that we were self-policing and self-regulatory and why not give us a chance to prove it — ease up on some of the stringent rules being inflicted on us. So the FCC listened and reacted and we entered an era of deregulation, or, as the FCC called it, "reregulation." No difference, the result was considerable easing of *all* rules. Little or no logging — portable and mobile operation requirements eased, automatically controlled repeaters, and on and on. What FCC was really saying was OK, you say you can handle yourselves, then do it.

The latest FCC rules changes in Docket 21033 carry drastic changes. One has to appreciate repeaters and remote base operation to really see how far the FCC has moved in placing its trust in our ability to do the job ourselves.

Self-regulation? Let's see what it means. A few years back when repeaters first started up, the very thought of amateurs operating on fixed channels, mind you we said "channels" not frequencies, drove other amateurs into fits of rage. We were told it would never work; operation *had* to be as it was on 75 or 40 meters. Through the formation of councils and groups interested in *self-regulation*, the emphasis was placed on well-regulated, orderly amateur operation. And we all know it worked — yes, with a few glitches — but it worked and is continuing to work. Channelized communications came to amateur radio with a vengeance and has become a way of life with us. The councils and groups mentioned above appointed frequency coordinators who, on a purely *self-regulatory* basis, assigned channels for use by clubs, groups or individuals. Suddenly, we had spectrum management on a large scale. Let's not forget that for years, we have been fairly successful in assigning net frequencies for traffic operation, but not on the scale where literally thousands and

thousands of amateurs were affected. And on our vhf and uhf bands that is what has happened.

With our latest FCC changes amateurs, *any amateur* (except a Novice), will be allowed to put a repeater on the air, or a remotely controlled station (remote base), *without notifying* the FCC. Moreover, FCC has opened up an additional 1000 kHz in the 2-meter band to repeaters and practically every frequency above 220 MHz. Perhaps the majority of amateurs operate on repeaters and in these days and strong growth is continuing and that is the way it should be. What about the other modes though? Weak-signal vhf and uhf work? Moonbounce? And also important, OSCAR and satellite operations? How do we allow space for these modes when the crunch is for repeaters? There isn't the slightest doubt that we have to make such allowances. And, it is apparent that the FCC isn't going to step in and set aside a little band segment here and another one there for specialized communications. No, the answer is spectrum management by us amateurs (ourselves). And that means self-regulation — and most important, self-policing.

A good example of what we are talking about is the new band plan for 2 meters described in "FM Repeater News," this issue. The plan was formulated almost simultaneously by groups in several parts of the country and quickly approved by groups in other sections of the country. Thoughtfully, 200 kHz was set aside in the *center* of this subband for nonrepeater-type operations — weak signal, ssb, and so on — primarily for the Technician license holder who doesn't have other room for his experimental work. Let's be clear on one point. This 200 kHz will be set aside by a majority decision. We could say by gentlemen's agreement but we better say by common consent — and that means a majority. In any case, this means self-regulation. Oh, we are pretty sure that some clowns will want to put a repeater in this area but our own spectrum management should be strong enough to show that we can do the job.

The great American way seems to be to "do our own thing." While this is a great philosophy, it is difficult to justify with crowded band conditions. The key is self-regulation and self-policing. We know we can make it work, so let's do it. — *WIICP*

League Lines...

Repeater rules change on November 4! Technician and repeater frequencies will expand on 2 meters. All this and more from FCC action on Docket 21033. Be sure to see "Happenings" and "FM Repeater News" this issue.

2-meter users: Remember the OSCAR uplink passband between 145.8 and 145.95 MHz. The satellite will pick up your simplex fm, so move down the band for your local communications. Please give satellite users a break; they can't QSY.

Wanted: Applicants for Training Aids job at ARRL hq. Amateurs should be familiar with visual and audio media, such as photography and sound recording, be personable and communicate well. Starting-level salary for the full-time job. Contact Chod Harris at Hq.

Two antenna advertisements in the October issue (Wilson Electronics and Cushcraft) showed forward-gain and/or front-to-back ratio figures. QST has consistently declined to carry such data in advertisements since neither the manufacturers nor the League has agreed upon standards for such measurements. It is still our policy to refrain from publishing this information and we regret our oversight that permitted it.

Call signs: 2X2 calls with AA prefixes will be made available to Extra Class licensees only when all W, K and N prefixes for 1X2 calls have been assigned in that particular district.

Worked any KN, WN or WV prefix stations on the Extra Class segments recently? Not bootleggers, but totally legal. Some former Novices, now getting back into ham radio, have been mentioning their old call on the 610 and getting their exact Novice call back again, even though they may have passed the Extra!

Extension: Special-event station NN3SI at the "Nation of Nations" Smithsonian Institution exhibit in Washington, DC, has had its license extended to June 5, 1981, through special waiver of Section 97.41(d) of the Commission's Rules.

"Grandfather" credit ("Washington Mailbox," May and September, 1977) will no longer be given by FCC after March 1, 1978. Pre-May 1977 licensees wanting credit for Extra under provisions in 97.25(c) must achieve General and apply before that date.

Code sending tests have been eliminated as part of FCC-administered examinations since this past August. However, the sending test is still required as part of every Novice examination.

FCC district offices desperately need amateurs to administer exams to disabled applicants unable to travel. Write Hq. for a volunteer registration form.

Green light for traffic! The attractive new ARRL Net Directory with info on over 600 public service nets and tips on handling traffic is waiting for you. Just send a 35-cent stamped, self-addressed envelope of at least 9 X 12 inches to ARRL hq. for your free copy.

Recent FCC busts of illegal operators in the "hf band" between 10 and 11 meters have yielded some amateur as well as CB violators. Those caught could possibly lose every radio license held; amateur, CB or others. Be sure to encourage all new amateurs to be 100-percent legal in all their radiocommunications.

Say "Cheese!" All commercial Radiotelegraph Operator Certificates issued after January 1, 1978, must bear the photograph of the holder. You will be required to furnish two passport-size photographs of yourself with your application.

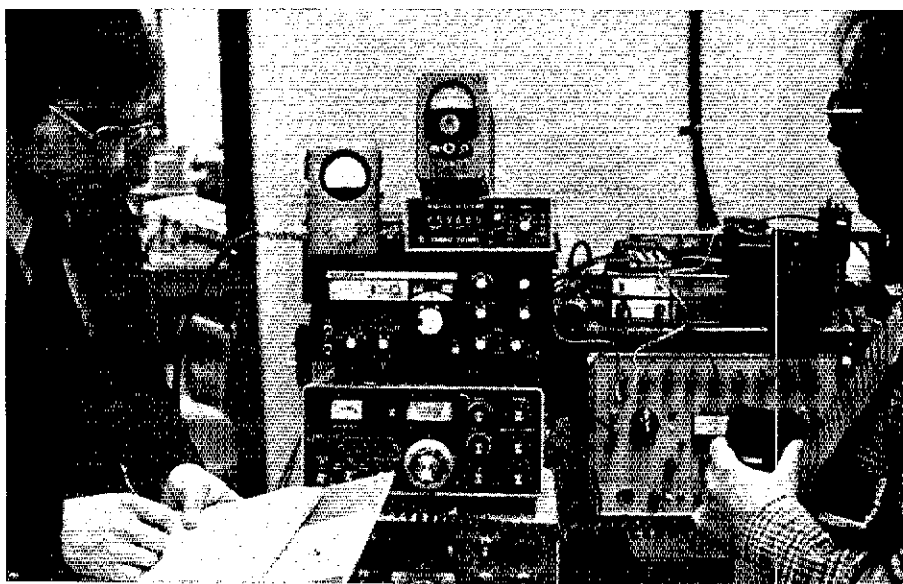
ARRL Code of Ethics

The League takes steps to stem exploitation of amateur gear. A display plaque will help you recognize retailers pledging their support of the licensed amateur radio operator.

By Lee Aurick,* W1SE

We Support the ARRL Code of Ethics

The legal use of amateur radio transmitting equipment requires an amateur license. We support the Amateur Radio Service and its long tradition of operating in the public interest. Therefore, it is the policy of this organization that amateur radio transmitters, transceivers and amplifiers be sold at retail only to persons who can show that they are properly licensed to operate that equipment.



FCC engineers catalog some of the "bootleg" rigs picked up in their 1976 crackdown on illegal radio operators.

Sixty-five thousand dollars worth of amateur radio gear used by unlicensed people was swept up by U.S. marshalls and FCC investigators in just one series of raids a year ago (see *QST*, December 1976, page 62). Perhaps a hundred times that much equipment is being sold right now to unlicensed individuals. With the boom in personal communications has come a healthy influx of new amateurs — as well as a host of new problems. An increasing number of outlets offer ham rigs to all comers, by mail and over the counter. As the September 1977 editorial pointed out, it is not presently illegal for a dealer to sell amateur equipment to anyone who wants it. At most, some mail-order

outfits may have somewhere in their ad a small disclaimer that an amateur license from the FCC is required. Face to face over the counter, who knows what is said by a clerk anxious for a sale?


What can be done in the face of a worsening epidemic? One useful step is to identify those outlets and manufacturers that *are* ethical, to recognize them, to publicize them, and to patronize *only* them. Endorsed in principle by the Board of Directors at its July meeting, the ARRL Code of Ethics will

single out at each level of the distribution system, those who support amateur radio by seeing to it that amateur-type gear is sold only to licensed amateurs. Any business — whether importer, manufacturer, distributor or dealer — may sign a pledge adopting this Code of Ethics. The ARRL will furnish a plaque to any retailer wishing to display it. Though you need not be an advertiser to participate, all advertisers engaged in the distribution of transmitters, transceivers and amplifiers at any level of the distribution chain, must complete a

*Advertising Manager, ARRL

signed statement in support of this code. ARRL will supply the necessary forms.

Approximately once each quarter, QST will publish a list of companies supporting the code. In this way amateurs will be able to identify those who place the best interests of amateur radio over the opportunity to make a fast sale. The League urges amateurs to support companies which endorse the code. In turn, we urge all amateurs to join us in censuring those who would help destroy amateur radio by selling amateur equipment to unlicensed individuals.

Within a few months you will begin to see this emblem on counters, in advertisements and on literature. Look for it. It is your indication that the company asking you to purchase its products in turn endorses use of the amateur bands by you, the licensed amateur. 

We Support The ARRL Code of Ethics



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Strays

CLEANING UP THE AIRWAVES, OBP-STYLE

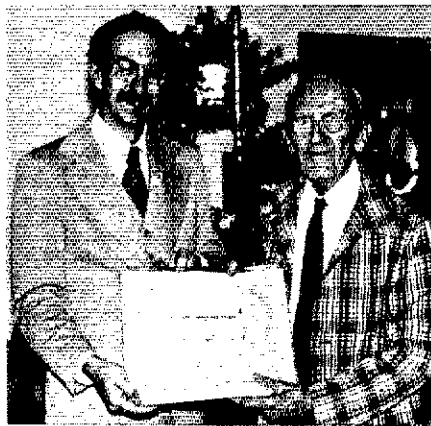
□ The bands are full of poor-quality signals, improper operating and profanity. There seems to be little control. Undertrained and understaffed government monitors turn to local amateurs for assistance in cleaning up the airwaves.

Sound like 75 meters? 11 meters? Wrong. The wavelength is closer to 200 meters; the time, 1924. The lack of receiver selectivity combined with broad signals are wreaking havoc on the amateur bands. Despite a few regulations adopted by the National Radio Conference of 1922, there is still little official enforcement. Amateurs are self-regulated, mainly through the new affiliated club system of the ARRL.

The situation is particularly bad in St. Louis in 1924. The Radio Inspector from Chicago looks to a particularly active amateur, Dr. Charles Klenk, 9AAU, an ARRL member since 1919, for help. He gets it, and more.

"Doc" Klenk organizes a secret group of young amateurs like himself in the area to act as a monitoring and vigilance group to clean up the amateur airwaves in the St. Louis area. Restricted to 10 ARRL members, with the Doc the only one publicly identified, the club meets with great success in returning violators; whether amateurs or commercial broadcast stations, to the straight and narrow.

The club's name? The OBP, Chapter 1. Not Order of Brass Pounders, just



ARRL Club and Training Manager Charles Harris, WB2CHO, left, presents Doc Klenk with his unique club's 50-year affiliation certificate. Doc has been its only president.

OBP. Order of Boys and Pleasure/Penalty, if you like.

This pleasant trip through nostalgia has actually been nothing of the sort. The OBP remains an active ARRL-affiliated club, more than 50 years after its formation, continuing its public service activities through amateur radio. Among its recent projects was construction of an amateur station for the Missouri School for the Blind and a training program to help its students earn ham tickets.

This writer traveled to St. Louis recently to present the club's president with a small token of the League's appreciation for 50 continuous years of support — a special 50-year certificate.

As you may have guessed, the president is none other than Dr. Charles Klenk, the only one the club has ever had!

Now "about 93," Doc still actively participates in club affairs. His enthusiasm is contagious, and the small club's high level of interest and activity is apparent even to the first-time visitor.

What's ahead for the OBP and its president? Few who know him doubt that Doc is looking forward to receiving his unique club's certificate for 60 years of ARRL affiliation! — WB2CHO

MOVE OVER, OSCAR 7

□ Amateur satellite enthusiasts will soon have a new piece of orbiting hardware to use, as the first of a series of Russian amateur satellites is scheduled to go into orbit soon. The launch is expected to commemorate the 20th anniversary of Sputnik 1, the world's first artificial satellite.

RS-1, the first Russian amateur spacecraft, will utilize frequencies similar to those of AMSAT-OSCAR 7, Mode A. The uplink passband of the first satellite will be 145.8 to 145.9 MHz, while it will transmit between 29.3 and 29.4 MHz. As with A-O 7, the recommended effective radiated power (erp) into the satellite will be 100 watts. In addition, your present OSCAR receiver and antenna should be more than adequate to tune in RS-1. Thus, present satellite communicators will have no difficulty working the first RS amateur satellite.

With a healthy A-O 7, the upcoming launch of a new AMSAT-OSCAR (now called A-O D) and work progressing on AMSAT-Phase III, the future of amateur space communications looks bright indeed.

An Introduction to the World Above 50 MHz

The land of vhf, uhf and microwaves is a fascinating one. If you've never been there (or even if you have), come along with us on this guided tour.

By James E. Kearman,* W1XZ

When you first become interested in vhf, it seems like an area where the normal laws of nature are suspended. Visions of rack upon rack of mysterious equipment are conjured. The typical vhf enthusiast takes on the appearance of a mad scientist. Certainly, a successful vhf'er is privy to the secrets of black magic! After a closer look, the aura of mysticism is swept away.

Vhf, it turns out, is in many ways not unlike the lower frequencies. Ohm's Law still holds true. The thrill of DX is still to be found. But the vhf'er, rather than being an alchemist, is more an explorer. Left alone on bands where most hams think DX is impossible, the vhf'er develops systems capable of bouncing signals off the moon, and works DX. Not content to stay in his own backyard, a vhf'er will go to the mountaintops and seashores searching for favorable propagation conditions.

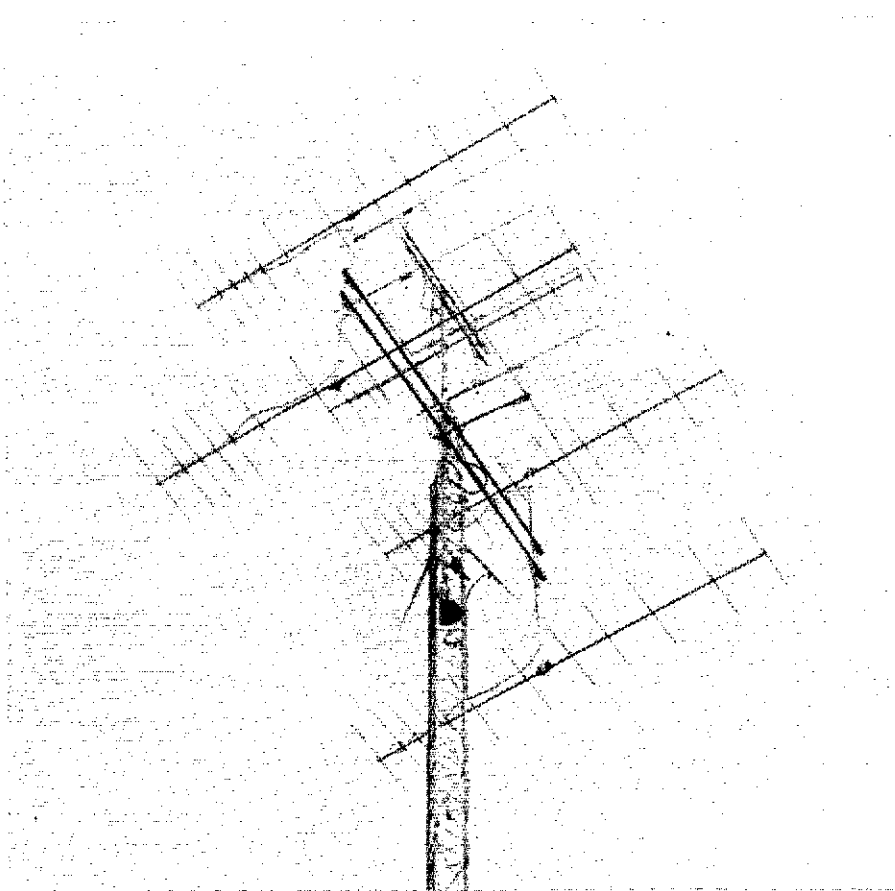
Hordes of vhf'ers may leave their backyards for other reasons, as well. (Taking a page from the low banders' log, a group of vhf'ers transported an entire moonbounce station to South America last year, providing K2UYH with his sixth continent and the world's first 432-MHz WAC (Worked All Continents) award.^{1,2})

Most of the propagation conditions found on the vhf/uhf bands are far different from those at hf. In this article we'll study each band in turn, learning its secrets and special attractions. We'll find out why the higher part of our frequency spectrum, once thought to be useless, holds such an attraction for so many hams.

Six Meters (50-54 MHz)

Perhaps the most varied band of all, "six" is the ideal point to start our tour.

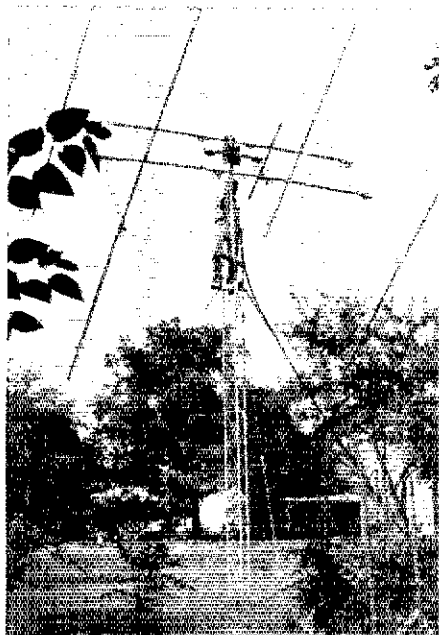
*Asst. Technical Editor, ARRL
¹References are listed on page 18.



K1FO's impressive stack of 144-, 220-, 432- and 1296-MHz Yagis, all on a lightweight tower.

At different times of the year and of the sunspot cycle, 6 meters often provides spectacular contacts all over the world. During a sunspot high in the late 1950s, the muf (maximum usable frequency) often exceeded 50 MHz, and communications via the F-layer of the ionosphere were an everyday occurrence. Solar astronomers tell us it may be 40 years before we again see such activity on the sun, but activity on 6 meters continues.

During the early summer months especially, clouds of ionized atoms are generated in the lower latitudes and drift in a northwesterly direction. Because the clouds are formed at the altitude of the ionospheric E-layer, they give rise to a propagation condition called "E skip."³ No one totally understands how or why the clouds are created. Due to their erratic comings and goings, the scientific name for



At vhf, you don't need large antennas to have a big signal. At left, K1FO adjusts his 2-meter moonbounce antenna. At right, W3HMU tests an array of four 432-MHz Yagis.



E-skip is "intense sporadic E," or just sporadic E, abbreviated Es. The muf of sporadic-E clouds often exceeds 50 MHz, frequently extending into the 2-meter band.

An opening may last from a few seconds to several hours. Signals reflected from cloud to cloud in a longer opening have permitted communications from the East Coast to Hawaii, and from the West Coast to Japan. When a good opening comes along even QRP stations can work DX. Running only a few milliwatts of *double* sideband to a 2-element beam, W7ZOI in Oregon has successfully worked stations in New England.

Equipment

Using a-m on 6 meters was frequently the cause of many TVI complaints, mostly in areas where a TV station operated on TV channel 2 (54-60 MHz). Ssb rigs and their associated linear amplifiers have greatly reduced this problem. While a-m is still in use, the dominant mode on 6 is ssb. A number of 6-meter-only rigs have been marketed, most of them providing power inputs in the 150-watt range. An ssb transceiver for 6 is perhaps the most convenient method of getting on the band. If you already have an ssb rig, you might want to consider a *transverter*. To transmit, a transverter mixes the low-level output of an hf transmitter with an internal crystal oscillator. The resulting vhf signal is amplified and sent on, either to the antenna, or to another linear amplifier. Received signals are similarly heterodyned down in frequency, to be detected on the hf receiver.

Most of the activity on 6 is very near 50.1 MHz. In the U.S., Technician-class licensees are not permitted to operate below this frequency. Cw is rarely heard on 6, an unfortunate circumstance considering its usefulness in weak-signal reception. Most operators monitor 50.110 MHz, with 50.105 another favorite. If the only rig you have handy is a cw unit, don't be afraid to call phone stations you hear. They may be a bit rusty on cw, but they'll welcome a new station to the band. During band openings (which can happen at any time) and during contests, more cw is heard on the band.

FM and Radio Control

A little further up the band, the fm repeater has made its stand. Most repeaters operate between 52 and 53 MHz, but a few are positioned above 53 MHz. The common simplex frequency is 52.525 MHz. Hams who are radio-control enthusiasts use frequencies above 53 MHz. Operation is crystal controlled on channels separated by 100 kHz. Before trying any model control on 6, make sure the frequency you choose isn't occupied by a repeater!

Welcome to the Club

To stimulate activity on 6 meters, ARRL sponsors the 600-Club Award. To qualify, applicants must submit QSLs confirming contacts with enough stations to earn 600 points. Points are determined as follows: each QSO, two points; each ARRL section, six points; each country, 25 points. VE8 and each of the Maritime provinces count as separate sections for this award. Applicants in the U.S. and Canada must be

League members. Only contacts made after January 1, 1977, may be counted. Contacts made through a repeater do not count. Stations may be worked only once.

Two Meters (144-148 MHz)

Two meters is frequently the first vhf band many hams encounter. This is largely due to the popularity of fm and repeaters, which totally dominate the upper half of the band. Unfortunately for them, many fm operators think the only DX possibilities on 2 are through repeaters. This is definitely not the case, as we'll soon discover.

The diminutive size of a 2-meter beam makes operation on this band attractive to mountaintoppers and those with limited roof space. While there's always been activity on the bottom half of 2 meters, two products of modern technology — OSCAR satellites and multimode transceivers — have brought many newcomers to the band. OSCAR satellites now orbiting the earth use the 2-meter band as both an input and an output frequency for their transponders. Many OSCAR users have been persuaded to try terrestrial communications on 2 meters when no satellites were overhead, and have become ardent vhf enthusiasts. A recent series in *QST* gave information on listening to and communicating through the satellites, so we'll only briefly discuss them.⁴ When a satellite is near your horizon, it is possible to work stations up to 2500 miles (4000 km) away under normal conditions. Power and antenna requirements are minimal.

In the U.S., Technician-class hams may not operate below 144.5 MHz. To avoid the interference from stations operating a-m above 145 MHz, higher class licensees moved below 145 MHz for DX work. Only cw is permitted below 144.1 MHz, and it is in this area that much of the weak-signal work takes place. Although sporadic E is not as common on 2 meters as it is on lower frequencies, contacts in excess of 1000 miles (1600 km) may be made when the Es muf gets up to 144 MHz. As we found on 6, high power on 2 meters is not mandatory: W1FB in Connecticut has worked Minnesota while running 10 watts input. The antenna at W1FB was a 10-meter beam!

Inversions and Ducts

When referring to band openings on 2 meters, one word often bandied about is "tropo." Tropospheric openings are generally the result of a *thermal inversion*, a cold-air mass sitting above an area of warm air. The boundary area between the bodies of air may refract, or bend, radio signals, allowing contacts far beyond the radio horizon. The best indication of an inversion is a high-

pressure system that is not in motion. Smaller inversions occur just after dawn and just after sunset, most notably during the summer months. Actually, the term *tropo* is a misnomer, as the openings do not take place because of activity in the troposphere at all.

The term is correctly applied when describing another type of propagation with similar attributes: *tropospheric ducting*. Ducts in the troposphere are probably the result of high-altitude wind-shear forces which separate two masses of air. One end of the duct may be at a high elevation while the other end is close to the ground. A mobile operator driving along the California coast may suddenly find a Hawaiian mountaintop repeater coming through like it was in the next town. To further improve conditions the mobiler might drive up a nearby mountain, only to find the band has gone "dead." In fact, the duct probably did not extend very far inland or very high in altitude on the California end. Recent reports of North and South American stations being heard in Africa and southern Europe would indicate that ducting exists across the Atlantic, as well. By the time this article appears in print, a contact may have been made.

Some of the invisible radiation from the sun is responsible for excitation of the ionosphere, allowing long-distance contacts on the hf bands. Following a solar flare, large quantities of high-energy particles are thrust out from the surface of the sun. When these particles, which travel at less than the speed of light, approach earth, the geomagnetic field deflects them toward the polar regions. The intense ionization which results often creates the moving, fluorescent curtains called aurora. Frequently, the ionization is so great that the aurora is capable of reflecting radio signals. Contacts via auroral reflection are common on 6 meters but the other propagation modes on 6 will provide the same range.

On 2 meters however, auroral contacts may be made with stations unworkable by most other modes. An auroral curtain is in constant motion, causing a Doppler shift in the signal frequency, and giving auroral signals an unmistakable quality. A cw signal is usually just a hiss, and an ssb signal sounds like a ghostly whisper. No matter how pure the note, a cw signal will sound rough, so the letter A is substituted for the number denoting tone in the signal report. For example, a cw signal of readability 5 and signal strength 8 would be reported as being "58A." During an auroral opening all stations point their antennas generally north. Depending on the width of the curtain and the level of ionization, contacts of up to about 2000 miles

(3200 km) are possible. Once again, high power is not necessary. The writer has made auroral contacts on cw while running 50 watts output and a single Yagi antenna. The effects of Doppler shift preclude the use of a-m or fm in contacts.

In addition to solar radiation, our atmosphere is constantly being penetrated by meteors. Some of the larger objects appear as "shooting stars." Smaller meteors leave only a trail of ionized air as they burn up, but it is possible to reflect radio signals from this trail.⁵ Meteors are constantly entering the atmosphere and "meteor scatter" contacts are possible year round.

At certain times during the year, large clusters of meteors in orbit around the sun enter the atmosphere in large numbers. When these meteor showers occur, schedules are hastily arranged between stations wishing to work each other. Meteor "bursts" are usually of short duration, so high-speed cw is commonly used. An occasional long burst may allow a quick contact, but these are rare. To prevent the misfortune of having both stations transmitting at once, the schedules are arranged so that one station transmits during the first half of a one-minute period, the other during the second half. Both stations must have accurate means of determining both time and frequency.

Meteor contacts have been made on ssb, but with its narrower bandwidth, cw is preferred by most operators. The big event for "meteor jockeys" is the Perseids meteor shower in late July and early August. High-power and high-gain antennas are useful for meteor-scatter work, but not essential. If you are content to work only the big guns, about 100 watts and a good single Yagi will do. Contacts may take several hours

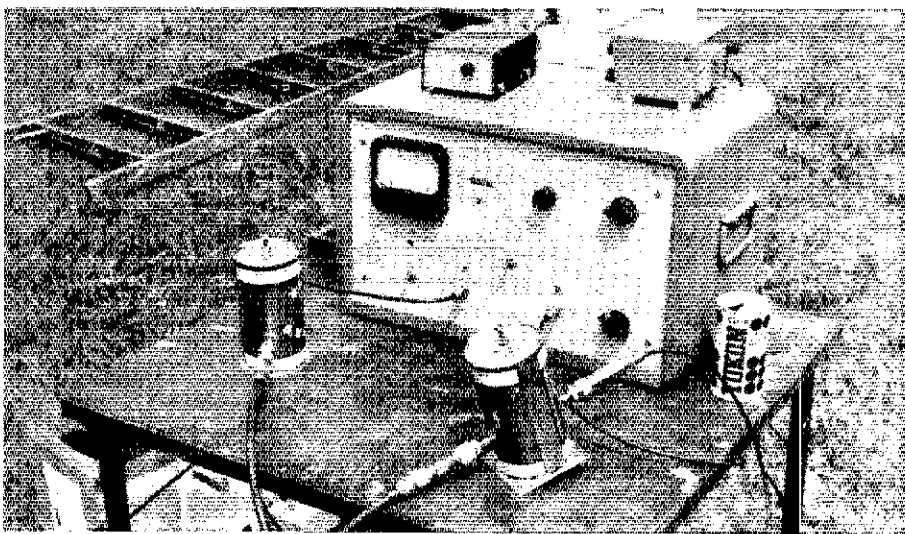
to complete, and are almost always prearranged.

From the Earth to the Moon — and Back

Thanks to the efforts of dedicated experimenters, "moonbounce" has become established in the amateur vocabulary. Early EME (earth-moon-earth) tests were conducted on 2 meters more than 20 years ago when W3GKP and W4AO successfully recorded echoes from the moon in January, 1953.⁶ After nearly a quarter century of research and countless hours of tests, moonbounce is fully within the capability of almost every ham. Advances in receiving preamplifiers and more efficient power amplifiers now enable the moonbouncer to have solid contacts with an antenna system as small as four Yagis. A good receiving converter and a manually steered array will permit the curious to eavesdrop on moonbounce activity. Most moonbouncers start out as SWLs (listeners) until they assemble the transmitting system.

The majority of moonbounce activity is conducted very near 144.0 MHz. Many larger stations use collinear arrays, known for wider bandwidth, allowing contacts to be made above 145 MHz. A 160-element collinear array, such as those in use at K1WHS, K2RTH and WA2BIT, is awesome in size and sometimes "big enough." But these big stations encourage lesser stations, providing contacts that could not otherwise be made. EME activity on 2 meters has grown to such proportions that it is not possible to call CQ when the moon is accessible and have an excellent chance of being answered!

The standard cw calling frequency on 2 meters is 144.095 MHz. Common ssb calling frequencies are 144.110, 145.025 and 145.100 MHz. Cw activity



Some of the "sophisticated" test equipment used at antenna-measuring contests. The large instrument is a ratio meter purchased for \$15 at an auction. WA2ZZF converted the beer cans to serve as high-Q cavities.

is much more visible on 2 than on 6. If your transmitter is "rock bound" (crystal controlled), some means of "pulling" the crystal a little will be useful, as activity tends to spread out somewhat during openings. Antenna polarization on the "low end" is universally horizontal. If your antenna is vertically polarized and you can't flip it over, you'll still be able to make plenty of contacts, though signal strengths won't be nearly as high as they could be. Horizontal polarization has become the standard for non-fm work on all the vhf/uhf bands, because it produces better results over long paths. If you're thinking of doing much cw/ssb work in addition to fm, some means of working both polarizations is needed: either separate antennas or by the use of Yagis having separate sets of elements for each.

1-1/4 Meters (220-225 MHz)

In the last few years, 220 has probably been the subject of more heated discussions than any other single band. Lacking a nearby commercial two-way radio band to provide rigs suitable for conversion, 220 has never shared the popularity and respect accorded the 50- and 420-MHz bands. Despite this handicap, hams who have spent any amount of time on 220 are lavish in their compliments.

Signals on 220 seem more favorably suited to inversion openings, and the ambient noise level is less than on 2 meters. With the exception of a few courageous repeater groups (compared to the number on 2 meters), activity on 220 is quite low. A large number of amateurs are interested in 220, but are reluctant to commit themselves to the expense of establishing a station when the threat of Class E CB still exists. In fact, there are many stations equipped for cw and ssb on 220, just waiting for new activity. Moonbounce and meteor-scatter contacts on 220 are not much

more difficult than on 144. Antennas of equivalent gain are 25 percent smaller on 220 than their 2-meter counterparts. WB6NMT, a prime mover in 220 EME, is planning to construct another station for this mode. Other stations known to be interested in 220 EME are well-known 432-MHz enthusiasts WISL and N6NB. An FCC action removing the threat of loss of the 220-MHz band would do much to stimulate growth on this band.

70 Cm (420-450 MHz)

As the subhead above tells us, the 70-cm band is wider than the entire spectrum from dc to the top of the 10-meter band! Here we find lumped-constant (coil and capacitor) circuits barely hanging on, while modern strip-line circuits really come into their own. This is the lowest band where wide-band television transmission is permitted by FCC. Thanks to the nearby commercial two-way radio band, converted fm rigs have encouraged the construction of repeaters. An OSCAR satellite subband at 432.125-432.175 MHz is the input range for the OSCAR 7 Mode B transponder. Future amateur satellites will have their inputs and outputs near 435 MHz.

DX and weak-signal work are conducted near 432.0 MHz. This choice of frequency was not arbitrary; it is the third harmonic of 144 MHz, and many transmitters in use employ triplers from the 2-meter band. Moonbounce activity is flourishing, with stations active on every continent. South America was represented in the past by two stations, FY7AS and HK1TL. FY7AS was only active a short time because the antenna, a 43-foot (13-m) parabolic reflector originally used for satellite tracking, was soon scrapped.

HK1TL, another short operation, was carried out by members of the Mt. Airy (PA) VHF Society. Transporting all necessary equipment to Columbia,

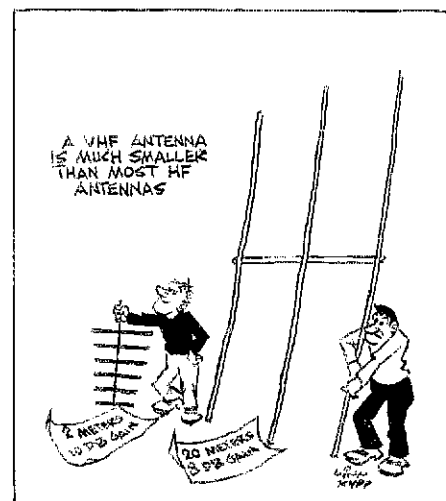
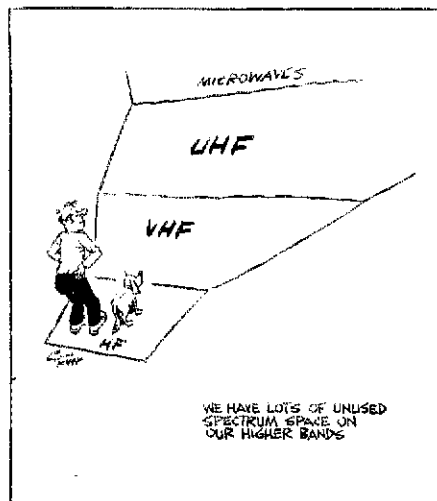
the "Pack Rats" made the first EME contacts from South America and provided K2UYH with the QSO he needed to earn the first EME WAC. Peter, YV5ZZ, is currently on the air, and other South American stations are expected to be operational shortly. Peter's signal originates from a home-made 32-foot (10-meter) parabolic reflector, or "dish." Moonbounce on 70 cm can be accomplished with completely store-bought equipment, if desired, although most of the successful stations are largely home built. Four manually steered Yagis and a good converter/preamp combination are all the SWL needs to hear signals off the moon on 432 MHz.

While thermal-inversion conditions on the 70-cm band are similar to those on lower frequencies, the "path loss" or attenuation is greater. Nevertheless, contacts of several hundred miles are not uncommon. Meteor-scatter contacts on 432 are more difficult than on the lower frequencies, because the duration of that portion of a meteor trail capable of reflecting signals this high in frequency is short. Similarly, the ionization of the auroral curtain is not sufficient to sustain communications on 432 MHz for any great length of time. Maximum contact range on 432 is generally less than that at lower frequencies.

Perhaps because of the ready availability of commercially manufactured transverters, amplifiers and antennas, 432-MHz activity nights are nearly as well attended as those on 2 meters. The portability of competitive 432-MHz stations is best exemplified by N6NB's pickup-truck moonbounce station with the antenna system on a lightweight trailer.^{7,8}

23 Cm (1215-1300 MHz)

As we continue our journey, we reach the somewhat rarefied heights of the world above one gigahertz (GHz), pronounced jig' a hertz. Not to worry,

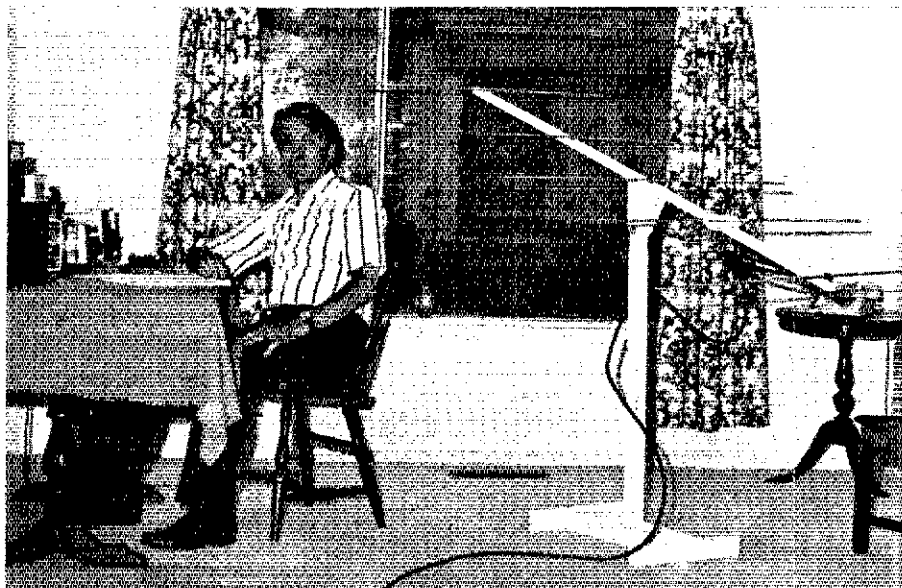


though. Our path has been well marked by pioneering radio amateurs who went before. The first real activity surge on 23 cm occurred back in the early 1960s when the APX-6 transponder first appeared on the surplus market.

Enterprising hams, with the guidance of W1CUT and W1HDQ, quickly converted these black boxes to transceive at about 1230 MHz.⁹ Some units were even tweaked up as high as 1296 MHz. With a little cutting and hacking, you ended up with a modulated oscillator on transmit and a rather shaky super-regenerative receiver. Early narrow-band converters for reception on 1296 MHz used the WVI standby 1N23 diode in the front end. The noise figure worked out to 10 dB if you were lucky, and the vacuum-tube local-oscillator string consumed its share of energy, but undaunted experimenters like K6UQH kept plugging. Some more adventurous souls built parametric amplifiers, but the difficulties of adjusting cantankerous klystron pump oscillators convinced most hams to look for a better route to low-noise receivers.

A 2C39-tube tripler was, and still is, a popular means of generating the watts. WB6IOM, W1BU and others had successful EME contacts using huge klystron amplifiers, but the road to general occupancy of the 23-cm band had not yet been paved.^{10,11} Happily, it appears that a superhighway is now within our grasp. Commercial receiving converters, hardly larger than a pack of cigarettes, may be purchased for less than \$75. At least one manufacturer retails a preamp having a 3-dB noise figure in the \$50 range.

The hot-carrier diode has replaced the 1N23 mixers, and transistors take the place of bulky parametric amplifiers. Varactor triplers providing potential outputs of some 20 watts are also commercially available. Progressive home stations are sprouting "antlers" for 1296, and no competitive contest operation would be without a 1296 rig. The small size and power consumption of modern 23-cm converters, preamps and triplers makes mounting all the hardware at the antenna a viable



Vhf antennas need not be large or mounted high in the air. Using a multimode transceiver, homemade 30-watt amplifier and the homemade 5-element beam shown, G8VR/W1 has worked 10 countries and 19 states through OSCAR 7 Mode A. Ken has also worked seven states on the terrestrial modes, including aurora. Before coming to the U.S., Ken worked 16 countries on 2 meters. He plans to be on 432 MHz soon. (G8VR photo)

proposition. This reduces feed-line losses considerably and allows use of less expensive coaxial cable.

The 1977-78 edition of the *ARRL Repeater Directory* lists four repeaters as operating on the 1215- to 1300-MHz band, and no doubt others will soon be operational. Because the 70-cm band is filling up, much ATV work will be conducted on 23 cm in the near future. With new stations getting on every week, 23 cm is shedding its frontier trappings and taking on all the appearance of a civilized band. At this writing, VK6WG and VK5QR hold the world record for terrestrial work on 23 cm. These two stations, running less than 20 watts each and using three-foot dishes, worked each other over an almost 1200-mile (2000-km) path. The low power and small antennas indicate that better-equipped stations can greatly exceed this distance under the right conditions. Records were, after all, made to be broken!

Thermal inversions provide the most consistent openings on 23 cm. At least five stations in the world are ready for EME contacts now, with several more in the construction stage. EME starts to get tricky at this frequency. A well-constructed dish at *least* 10 feet (3 m) in diameter, a 2-dB noise figure at the front end and 500 watts of output should provide marginal results. Perhaps the most economical methods of improving the situation are a better (and more expensive) transistor in the front end, and a larger antenna. With current amateur technology, 50-percent efficiency in the transmitting amplifier is laudable. If being a pioneer tickles your

fancy, don't despair. It can be done. And on the way to EME there are plenty of stations waiting to work you on the terrestrial modes.

13 Cm (2300-2450 MHz)

If you've been watching the signposts as we climbed, you'll notice we're really in the land of wide-open spaces. Imagine, a single band 150 MHz wide! And we've still got four more stops to go! Activity on the 13-cm band concentrates around 2304 MHz, the 16th harmonic of 144 MHz. Solid-state mixers and preamplifiers are economically feasible and component prices are dropping rapidly. Our old friend the 2C39 vacuum tube will still give a good account of itself up here. With some wire mesh added to fill up the holes, a seven-foot dish of the type used for fringe-area uhf-TV reception has about 30 dB of gain. Some amateurs are experimenting with microwave-oven magnetrons, attempting to phase lock them for generating high power at 13 cm. When these systems are operational, we can expect to see records set and broken on a regular basis. Difficulties in constructing efficient transmitting amplifiers and low-noise converters at 13 cm are partially offset by the small size of a high-gain antenna. Future amateur satellites will carry transponders operating in the 13-cm band, which should provide an impetus for further development of the band.

10 Cm (3300-3500 MHz) and 5 Cm (5650-5925 MHz)

The current activity level on these bands is quite low. When surplus

Table 1

U.S. and Canadian vhf, uhf and microwave allocations. Altogether, we have 1503 MHz of spectrum space on our higher bands!

Band	Frequency
6 meters	50-54 MHz
2 meters	144-148 MHz
1-1/4 meters	220-225 MHz
70 cm	420-450 MHz
23 cm	1215-1300 MHz
13 cm	2300-2450 MHz
10 cm	3300-3500 MHz
5 cm	5650-5925 MHz
3 cm	10,000-10,500 MHz
1.25 cm	24,000-24,250 MHz

klystron tubes became available after WWII, activity on 5650 experienced a surge, then declined.¹² The 10-cm band has never been heavily used. As the prices of microwave semiconductors decline, equipment for the 3300-MHz band will probably resemble that on 1296 and 2304 MHz. Surplus waveguide mixers suitable for use at 3300 MHz are beginning to show up on the market. Formerly used in telephone service, units seen by the writer did not have local-oscillator chains.

The 416B tube, once a favorite front-end tube in amateur uhf converters, should be useful in multiplier chains of 10-cm converters. These little gold-plated planer triodes are available at flea markets for less than \$1 each. Narrow-band work on 10-cm will probably center at 3456 MHz, the 18th harmonic of 144 MHz. Gunn diodes are available for operation on 5 cm, and future experimenters on this band will likely use them for transmitting and for receiver local oscillators.

3 Cm (10,000-10,500 MHz) and 1.5 Cm (24,000-24,250 MHz)

As we arrive at our last ports of call, some fellow travelers may be a bit turned off by the dizzying height of these bands. The truth of the matter is, operation on these bands is much simpler than on the bands below. War-surplus klystrons, such as the 723A/B can be tweaked into operation on 3 cm commonly referred to as "X band." Devices like the polaplexer, described in *QST* many years ago, allow full-duplex operation on 10,000 MHz.^{12,13} Gunn and Impatt diode oscillators, originally designed for radar applications at about 10,525 MHz will work well on the 3-cm band, and similar devices may be tweaked for operation on 1.5 cm.

One manufacturer provides a Gunn oscillator with a varactor diode for tuning and a Schottky-barrier diode for

receiver mixing, set up for operation on the 3-cm band, for about \$90. Hams all over the world are using these units now, pumping new life into the band. The record distance for contact on 3 cm is over 300 miles (480 km), using similar equipment and small dish antennas. This record was set in England, and is likely to remain there for some time, as the British take their microwaves seriously. A system of beacons has been set up throughout the country, providing a signal for adjusting equipment and to aid in determining band openings. Contacts across the English Channel are old hat now. The only factor likely to prevent British stations from continuing to be at both ends of a record-setting contact is the small size of the country!

A Gunn diode looks like any other microwave diode from the outside. When mounted in a cavity or a section of waveguide resonant at its design frequency, the Gunn diode will oscillate when operating voltage (about 10 V dc) is applied. Power outputs in excess of one watt are possible. This may not seem like much, but if a four-foot (1.2-m) dish is used, the effective radiated power is 10,000 watts! Both klystron and Gunn diode oscillators are inherently unstable in terms of frequency, but various schemes for minimizing drift have been developed. The small size and low power requirements of Gunn oscillators should encourage many hams to head for the mountains on weekends. Ease of operation makes them appealing for anyone interested in microwave experimenting, but with limited resources.

Climbing Back Down

Now that we've come to the end of our tour, you've seen that the world above 50 MHz isn't quite as strange as it first appeared. Should you decide you'd like to do some further exploring, either solo or with the company of friends,

ARRL hq. has some road maps to guide you. Bibliographies of *QST* articles on microwaves, moonbounce and historical references are free to members. (A stamped, self-addressed business-size envelope will help speed the information along to you.) Also available is a listing of companies known to have vhf, uhf and microwave equipment for sale to amateurs. Many of these companies have established their reliability with Hq. and their ads appear in *QST*. If you're looking for contacts on the higher frequencies, let us know what you're running and on what frequency. We'll try to put you in touch with hams in your area who have indicated similar interests. Inquiries may be directed in care of this writer. Hope you've enjoyed the tour! See you on vhf?

QST

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- ³ Wilson, "Midlatitude Intense Sporadic-E Propagation," *QST*, in two parts: December, 1970 and March, 1971.
- ⁴ Kearman, Harris and Kleinman, "Getting to Know OSCAR - from the Ground Up," *QST*, in five parts, January through May, 1977. (A reprint of the series, including several other OSCAR articles, "Getting to Know OSCAR," is now available from ARRL for \$3 in the U.S., \$3.50 elsewhere. Also included is an updated OSCAR-LOCATOR, an aid to determining the position of the satellites.)
- ⁵ Bain, "VHF Propagation by Meteor-Trail Ionization," *QST*, May, 1974.
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- ¹⁰ Orr and Harris, "Project Moonbounce," *QST*, September, 1960, p. 62 and p. 65.
- ¹¹ Smith, "1296 E.m.e. Notes," *The World Above 50 Mc.*, *QST*, January, 1969, p. 78.
- ¹² Prechtel, "Experimental Transceivers for 5650 Mc.," *QST*, August, 1960.
- ¹³ Bredon, "Let's Go Microwave," *QST*, June, 1958.

Strays

QST Congratulates . . .

□ George Jacobs, W3ASK, who was awarded a 1977 Marconi Memorial Gold Medal of Achievement by the Veterans Wireless Operators Association. He was honored for his leadership in developing international broadcasting systems and for his ability as a negotiator at numerous international telecommunication conferences. He joined the Board for International Broadcasting last fall after 27 years as an official with the Voice of America. One of the founders of

AMSAT, Jacobs is a Charter Life Member of the ARRL and has been propagation editor at *CQ* magazine since 1951.

□ the Rev. David E. Heil, WB4VBH, who helped families of the victims of the Beverly Hills fire (*QST* for August) identify remains of loved ones at the temporary morgue in Fort Thomas, KY. After performing this painful task the entire night following the tragedy, he went home, showered and conducted three church services before getting any sleep. His thoughts on the disaster were

published recently in *The Living Church*, a national Episcopal magazine. — **WB4KTR**

□ Robert H. Mitchell, N5RM (ex-W9DD) and W5FL), one of only 16,000 persons listed in the latest *Who's Who in the World*. President of the Memcor Division of E-Systems, Inc., Huntington, IN, the former Marine pilot is also an active amateur, having garnered 5BDXCC under both his former call signs. He recently was transferred to Dallas, TX.

Homemade Differential Capacitors

Building an Ultimate Transmatch? Try a "Rollerless Ultimate" using a homemade differential and save yourself some bucks.

By Andrew Pavlowski,* W3QPU

For those having difficulty finding roller inductors for building an Ultimate Transmatch, the "Rollerless Ultimate" (Fig. 1) described in the 1974 *Radio Amateur's Handbook* (page 586) is a likely alternative. Differential capacitors for use in the Rollerless Ultimate are, however, expensive if purchased new, and nonexistent on the surplus market. This article describes construction of an appropriate dual-differential variable capacitor using single capacitors from the ARC-5 command transmitter, commonly available at surplus houses and flea markets. These units are readily available at reasonable prices. In addition to the two variables, additional materials as listed in Table 1 are needed.

Modification

One of the ARC-5 capacitors is used as is; the other must be modified as

*503 Hayes St., Old Forge, PA 18518

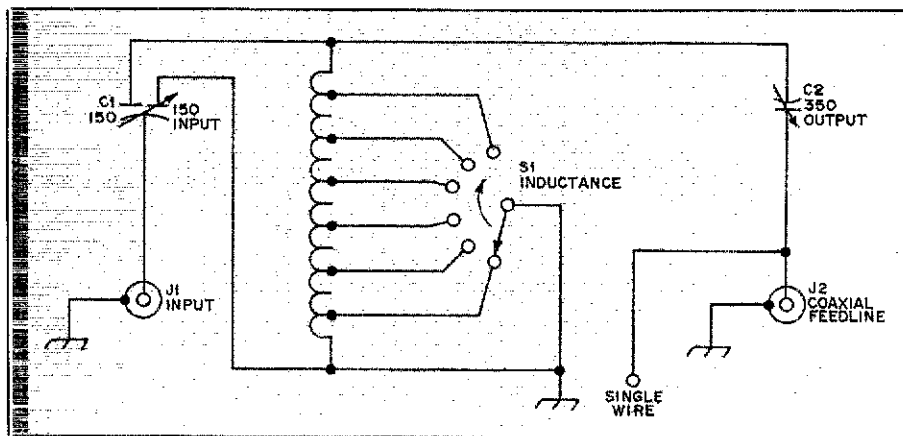


Fig. 1 — Circuit diagram for the Rollerless Ultimate.

C1 — Dual differential, 150 pF per section.

See text for details.

C2 — Air variable, 350 pF maximum (E. F. Johnson 154-10).

L1 — 24 turns, 2 inch dia, 6 tpi, No. 12 wire

(Barker and Williamson 3025 Miniinductor).

If 160-meter operation is not anticipated, a total of 12 turns should be suitable.

S1 — High-voltage-insulated rotary switch (Millen type 51001 suitable).

Table 1

Additional Materials Needed

- 2 — Aluminum or brass straps, 1/32 to 1/16 inch thick, 5/8 X 2 inches.
- 4 — Pan head screws, No. 6-32 X 3/16 inch.
- 1 — Shaft, 1/8 in. dia X 7/8 inch long.
(The shank of a 1/8-inch twist drill works fine.)
- 1 — Shaft coupling, 1/2 to 5/8 inch OD, 1/4 inch ID, with setscrews.
- 1 — No. 6-32 Allen head setscrew, 1/4 inch long.
- 1 — Split bushing, 1/8 inch ID X 1/4 inch OD X 5/16 inch long.

shown in Fig. 2, by following these steps:

1) Remove the four screws holding the tension spring on the rear end of the capacitor.

2) Grind down the ball bearing, staked in the end of the rotor, so it is approximately flush to the end of the rotor. Hold the 1/4-inch-diameter end of the rotor in a small bench vise while performing this operation. Use a small grinding wheel in a hand grinder or electric drill.

3) Using a small pin punch, tap the

edge of the flattened ball so as to make it turn upside down; this will dislodge the bearing.

4) Still using the vise, drill a 7/64-inch hole in the end of the rotor. The hole follows the pocket originally occupied by the bearing. Be careful that the hole is drilled straight and to a depth of about 7/16 inch.

5) Ream the 7/64-inch hole to 1/8-inch diameter.

6) Reposition the capacitor to horizontal, again holding the 1/4-inch-diameter end of the rotor.

7) Drill one No. 36 (0.1065-inch) diameter hole through the wall of the 1/8-inch-diameter hole; position the No. 36 hole approximately 5/32 inch from the end. Tap the No. 36 hole with a 6-32 thread through one wall.

8) Remove the capacitor from the vise and clean off all drilling and tapping chips, etc. Drill and ream the hole in the spring-tension plate using a 7/64-inch drill and 1/8-inch reamer.

Reassembly

Reassemble the modified capacitor as follows:

1) Deburr the ends of the 1/8-inch-dia shaft. File a small flat on the end of the shaft for a setscrew contact.

2) Insert the shaft into the end of the rotor and secure in place with a No. 6-32 setscrew.

3) Slip the tension-plate ring on the 1/8-inch-dia shaft and reassemble to the capacitor frame; this will be the driving end of the new capacitor.

4) Place the two capacitors front to front; attach the two 1/4-inch-dia shafts together using the coupling.

5) Drill and tap two No. 6-32 holes on each side of the combined capacitor, to fit holes in the straps. Assemble two straps to the capacitor sides using four No. 6-32 x 3/16-inch pan head screws.

6) Loosen one setscrew in the coupling. Position the rotor of one capacitor so it is fully meshed and the other rotor fully open. Retighten the setscrew.

7) Position the split bushing on the 1/8-inch-dia drive shaft. This completes the construction.

Final Comments

The shaft may not be perfectly true to the axis of the capacitor, due to

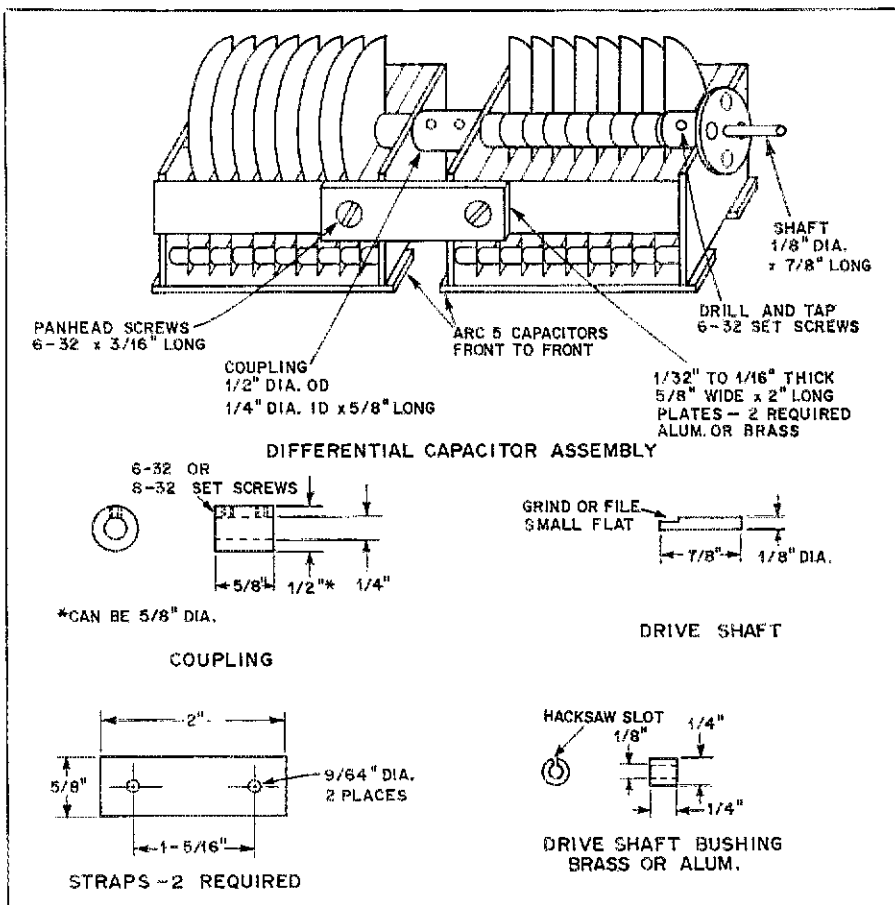


Fig. 2 — Construction details of the homemade differential capacitor.

“walk off” in drilling the 1/8-inch shaft hole. A flexible insulated coupling is recommended to connect the drive shaft to a 1/4-inch shaft through the front panel of the Transmatch.

You will probably want to mount

the completed capacitor on ceramic standoff insulators. When the Transmatch is completed, ease of tuning may be enhanced by slightly changing the relationship between the plate settings of the two differential halves. **QST**

Feedback

□ With reference to the article “Full Break-in and RIT for the HW-8 QRP Transceiver” by Ben Saylor, K6TG, (QST for July, 1977), the author advises that the QRT components listed are actually Sprague Q-Line items appearing in Sprague Q Mart Catalogs K-1200 and K-1200A. While these components are available at many Radio Shack stores in California, they are not carried by all Radio Shack outlets, particularly in the East. Sprague products also are available at many other parts distributors. K6TG also indicates that QRT-102 is superseded by QRT-102A.

□ In the article, “A Delayed Brake Release for the Ham-II” (QST for August, 1977, pp. 14-16), the GE-750 metal-oxide varistor shown in the parts list for Fig. 1 is more commonly shown in GE semiconductor listings as part no. V150LA20A, a type-L varistor. Cramer Electronics, nationwide distributors, handles GE semiconductors. In addition, the connections in Fig. 1 for U1C and U1D should be corrected to show U1D pin 12 connected to U1C pin 10 and U1D pin 11 connected to U1C pin 9.

To achieve a time constant for the U4 timer circuit, use a 2.2-MΩ resistor for R and a 1.0-μF capacitor for C.

The bridge rectifier in Fig. 2 is Radio Shack part no. 276-1151.

□ Among the “Silent Keys” listed in QST for July was Dave Miller, WB9GCS,

of Peoria, IL. He is actually alive and well, and now operates with the call sign N9SS.

VHF Sweepstakes

Results in August QST incorrectly show W3ZD in the Delaware Division. Should be Eastern Pennsylvania.

1977 DX Competition

□ Operators of WA4UFW should have been listed as WA4UFW and WB4YKU.

□ Three sets of call signs and rankings were transposed in the DXCC Honor Roll listing (Radiotelephone) in QST for September. The correct ranking should be W2FGD 331/312, W2LV 342/312, W3AZD 333/312, YS10 337/311, ZP5CF 345/311, W1HX 341/311.

A Versatile Digital Frequency Display

If you've been putting on bifocals to read your receiver dial to the nearest kilohertz, then trade in your glasses for this slick digital dial. The four-digit display reads out to the nearest hundred hertz!

By Philip S. Rand,* W1DBM

Like many other hams, this writer has enjoyed designing and building receivers and other radio gear over the years. With the advent of the many goodies now available to home builders at reasonable prices, the urge to build a super receiver to end all receivers returned.

By today's standards, a receiver must have among other things a rock-stable tunable oscillator, a 500-kHz tuning range and a 1-kHz readout. It is not too difficult to build a stable oscillator that will cover approximately 500 kHz, but it is extremely difficult to build one that is also linear to within 1 kHz over the 500-kHz range. Even if you were successful, there are no tuning dials available that would match the tuning range of your oscillator and give a 1-kHz readout. In an effort to solve this problem the author turned to the design of a digital display type of "dial" that would be independent of tuning-shaft rotations, or the bandspread or linearity of the oscillator. In fact, this display would be designed so that it could be used on any receiver or transceiver, whether homemade or commercially built, regardless of the tunable oscillator frequency or the direction in which it tuned!

Many hams who observed this unit in operation expressed a desire to build a copy for themselves. A few said they would like one, but since they had not kept up to date with transistors or ICs and were not electronic engineers, they could not possibly comprehend what went on inside these tiny devices. I

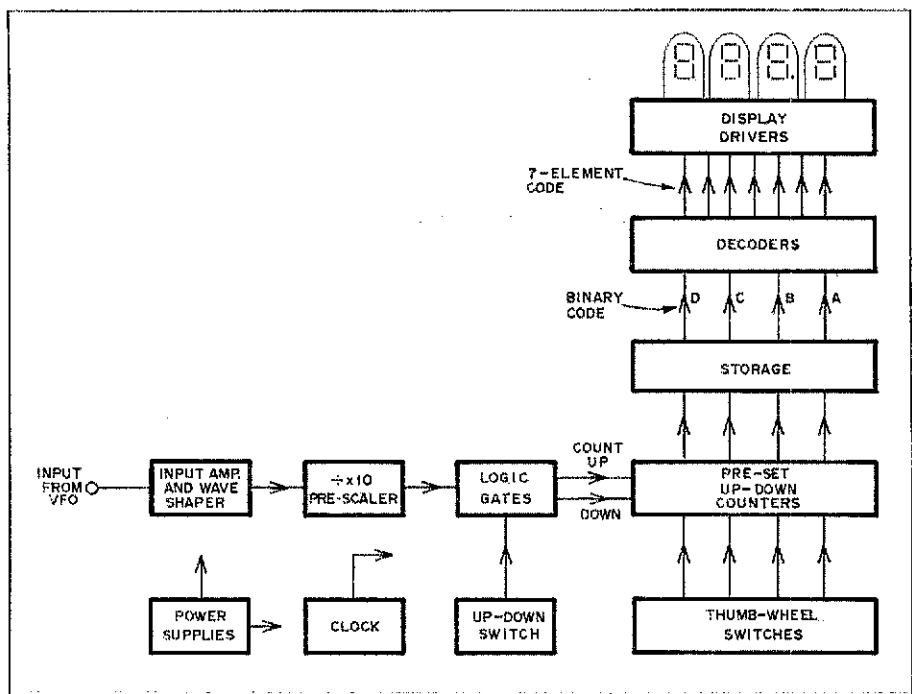


Fig. 1 — A block diagram of the digital-dial display circuit. Note that the signal is in binary code until it passes through the decoders. At this point it is changed to the seven-element code before going to the display drivers.

asked, "What do you guys do for a headache?" They said, "Why, take a couple of aspirin." I said, "Gee, I didn't know you were chemical engineers working for a pharmaceutical house. How else would you know how aspirin tablets are made, what's inside them, and how they work?" The point is, you do not have to be a chemist to take

aspirin and neither do you have to be an electronic engineer to use ICs!

Various Designs Tried

The project was researched through back issues of *QST*, various handbooks and other ham publications. The first model built sampled the frequencies of the three oscillators in my SB-100 trans-

*P. O. Box 8, Haverhill, NH 03765

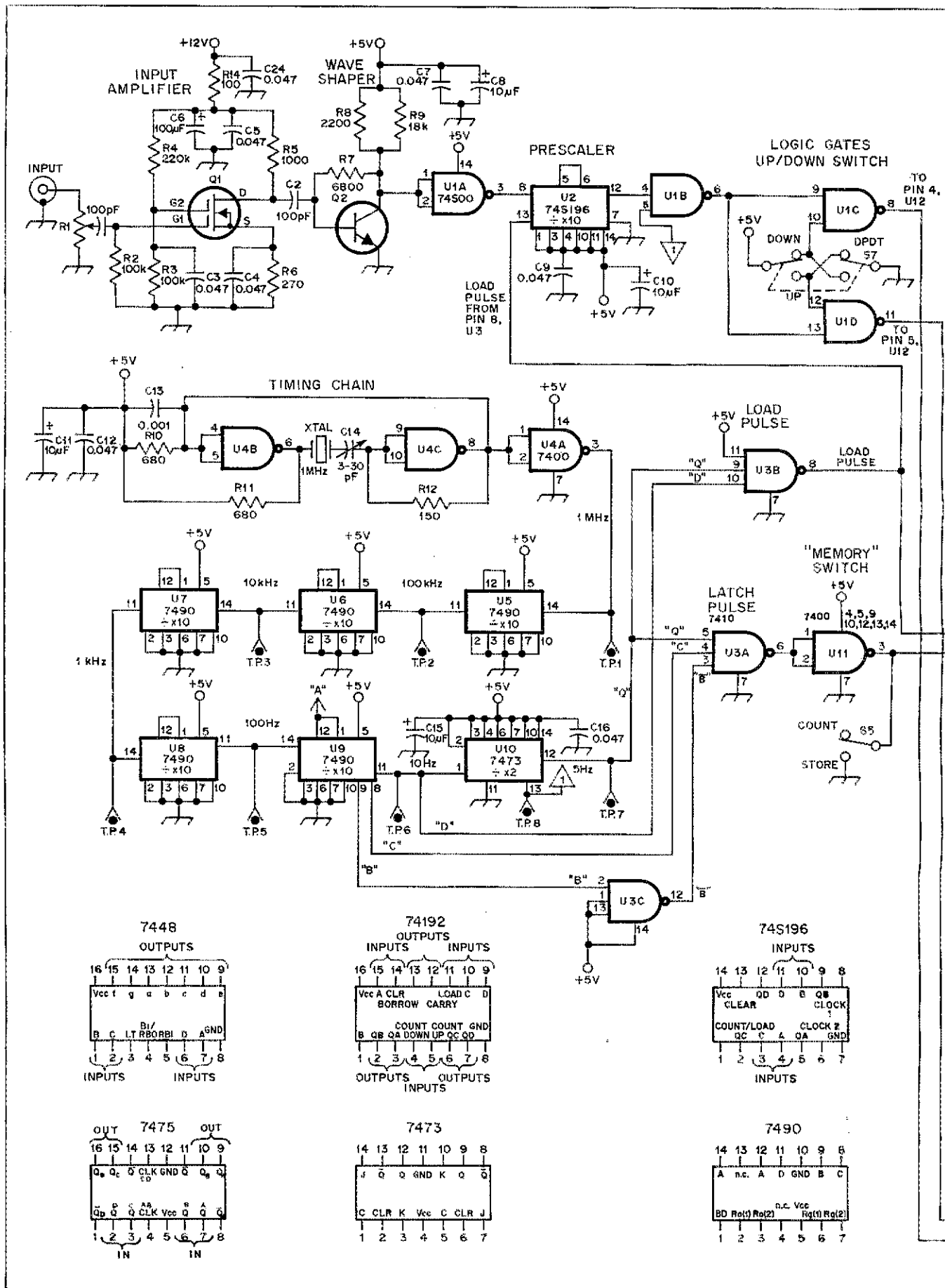
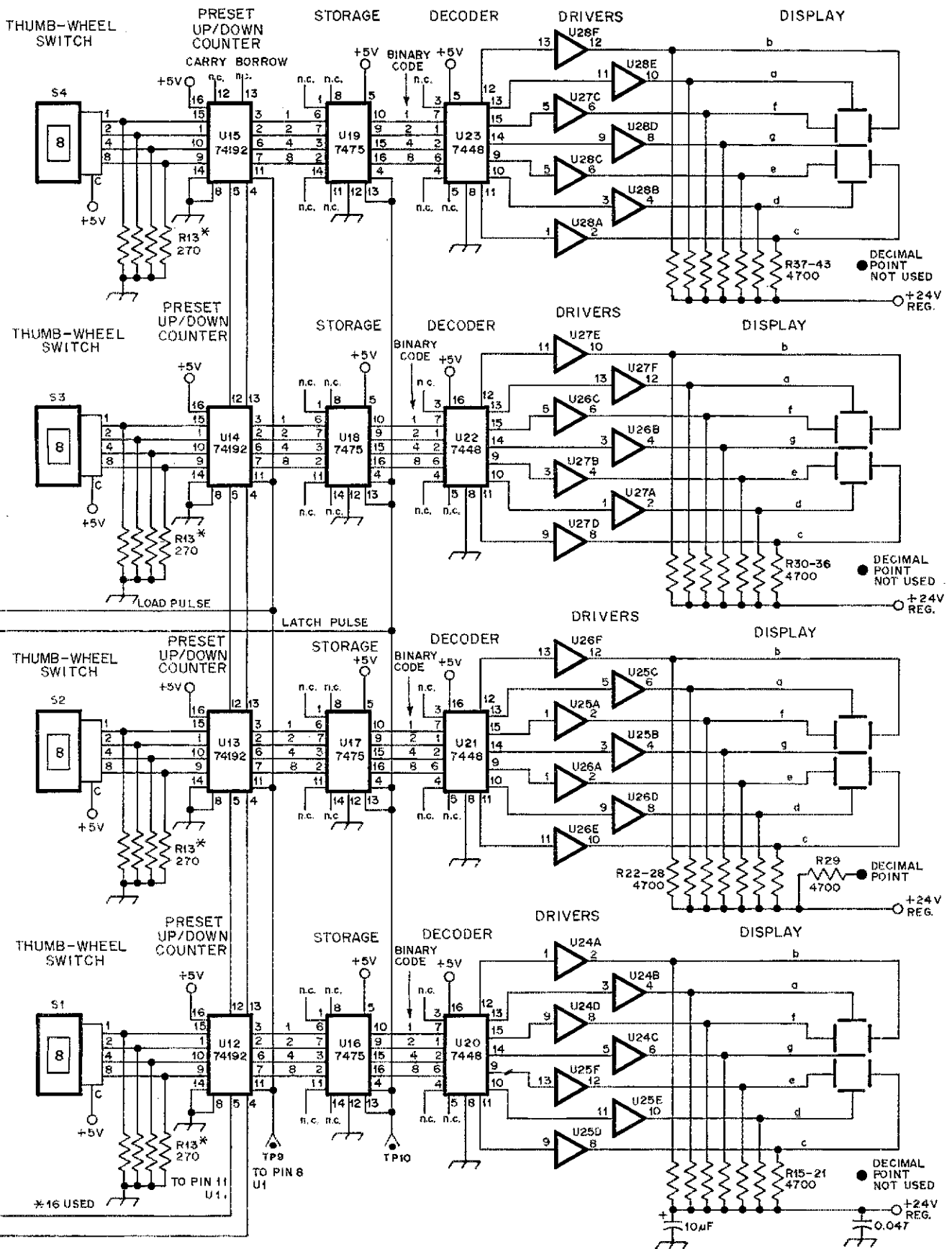


Fig. 2 - Schematic diagram of the digital-dial display (except power supply) showing interconnecting points between integrated circuits and associated components. Only 3/4 of U4 is used, and only one decimal point is used in the display (between least significant digit and the next)



digit). Note the test points in the clock section of the counter, and the associated frequencies available at these points. Circuit board and parts placement templates are available from ARRL. Parts list appears in Table 1 on page 24.

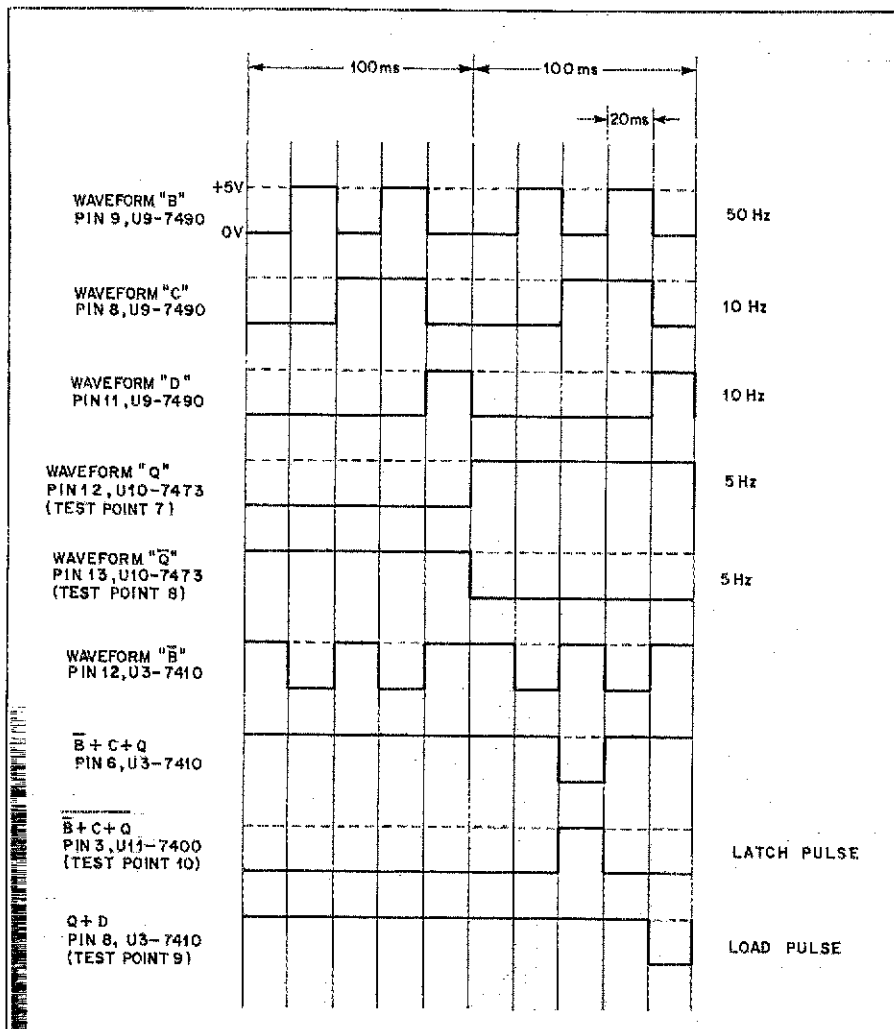


Fig. 3 — Timing chart of the various waveforms generated and used by the digital-dial display. The letters used to identify each waveform are also shown in the schematic diagram at the point where each is available.

Table 1

C1, C2 — 100 pF, silver mica.	Ave., San Carlos, CA 94070); consists of
C3, C4, C5, C7, C9, C12, C16, C17, C19, C21, C23, C24 — 0.047- μ F, 50-V disk, Radio Shack no. 272-134.	4 — SF21, 10-position BCD; 1 pr. — SFEP, end plates; 3 — SFDP, divider plates; 1 — SFHB, half body.
C8, C10, C11, C15, C18, C20, C22, C25, C26, C27 — 10- μ F, 35-V tantalum, Radio Shack no. 272-1411.	S5, S6 — Spst toggle switch (count/store, on/off).
C6 — 100- μ F 35-V electrolytic, Radio Shack no. 272-1016.	S7 — Dpdt toggle switch (count-up/count-down).
C13 — 0.001- μ F, 50-V disk, Radio Shack no. 272-126.	U1 — 74S00.
C14 — 3- to 30-pF variable padding capacitor.	U2 — 74S196.
Q1 — 40673.	U3 — 7410.
Q2 — 2N2222A.	U4, U11 — 7400.
R1 — 1000- Ω circuit-board-mounting potentiometer.	U5 through U9 — 7490.
R2, R3 — 100 k Ω , 1/4-watt.	U10 — 7473.
R4 — 220 k Ω , 1/4-watt.	U12 through U15 — 74192.
R5 — 1000 Ω , 1/4-watt.	U16 through U19 — 7475.
R6, R13 — 270 Ω , 1/4-watt.	U20 through U23 — 7448.
R7 — 6800 Ω , 1/4-watt.	U24 through U28 — 7407.
R8 — 2200 Ω , 1/4-watt.	Y1 — 1-MHz crystal, CY1A (James Elect.).
R9 — 18 k Ω , 1/4-watt.	
R10, R11 — 680 Ω , 1/4-watt.	Miscellaneous
R12 — 150 Ω , 1/4-watt.	16 — 14-pin standard gold plated solder-tail sockets (James Elect.).
R14 — 100 Ω , 1/4-watt.	12 — 16-pin standard gold plated solder-tail sockets (James Elect.).
R15 through R43 — 4700 Ω , 1/2-watt.	4 — 10-pin circuit-board-mount Novar tube sockets.
S1-S4, incl. — Thumbwheel 0-9 BCD output (James Electronics, 1021-A Howard	4 — Tung-Sol Digivac fluorescent display tubes, Radio Shack no. 276-063.
	1 — 7 x 9 double-sided circuit board.

ceiver. These were mixed together and the proper beats were separated with tuned circuits to come up with the operating frequency. This was then fed to a Heathkit frequency counter and displayed. The system worked fine during transmit, but of course there was no chance to receive any signals while a 5-volt square wave was being generated on the same frequency.

The second model used up/down counters and logic that divided the three oscillator frequencies by four, then counted one of them upward and the other two downward. This resulted in an output that was not on the operating frequency and therefore caused no interference to the receiver. This unit used six LEDs for the readout. It worked fine, giving an accurate frequency readout regardless of frequency drift in any of the three oscillators. There were several drawbacks, however. The LEDs were not bright enough to see in daylight and consumed too much current, overheating the 5-volt power supplies. The unit required three input amplifiers, three square-wave generators and rather complicated logic to generate the three counting periods. And lastly, it would only work with transceivers using the same kind of frequency conversion as the SB-100. (It would not work on my Swan 350 or the contemplated super receiver.)

Therefore, I decided to build a simpler, more universal model using the brighter fluorescent tubes for the readout. This model would be programmable so as to work with any existing or future rig.

The Final Model

The final circuit is a one-channel programmable up/down counter. It is preset to start the count, in the case of an SB-100 Heathkit, at the difference between the HFO and the BFO crystal oscillator frequencies, and to count down or subtract the variable oscillator frequency (VFO) from the difference of the other two. For example, when my SB-100 is tuned to 14,250 kHz, the high-frequency oscillator frequency is 22,894.3 kHz and the upper sideband BFO crystal frequency is 3,396.3 kHz. Subtracting: 22,894.3 minus 3,396.3 equals 19,498.0. This is the count starting point. Ignoring the 19, we preset the thumbwheel switches to 498.0. Now if we subtract the VFO or tunable oscillator frequency (5,248.0 kHz) by counting down, we get (19)498.0 — (5)248.0 equals (14)250.0 kHz. For reasons of simplicity and economy, and since the band switch is in the 14-MHz position, we will only display 250.0.

Just to give you an idea of how the display can be used, let me explain the setup procedure. It is only necessary to tune in a known signal such as one from

your 100-kHz crystal calibrator. Tune the receiver to exactly zero beat with this signal and then simply flick the thumbwheel switches on the front panel until the readout displays the proper frequency. For example, if you are tuned to 3800.0 kHz, the readout should read 800.0 The 3 is not displayed since you know the band switch is set for 3.5 MHz. Similarly if you are tuned to 7200.0 kHz, the readout should read 200.0.

Next, tune the receiver 10 kHz higher. If the display reads lower, you are counting in the wrong direction. If this happens, change the up/down count switch to the other position. After determining the correct count direction and thumbwheel switch settings for each band, mark them down on a card for future reference.

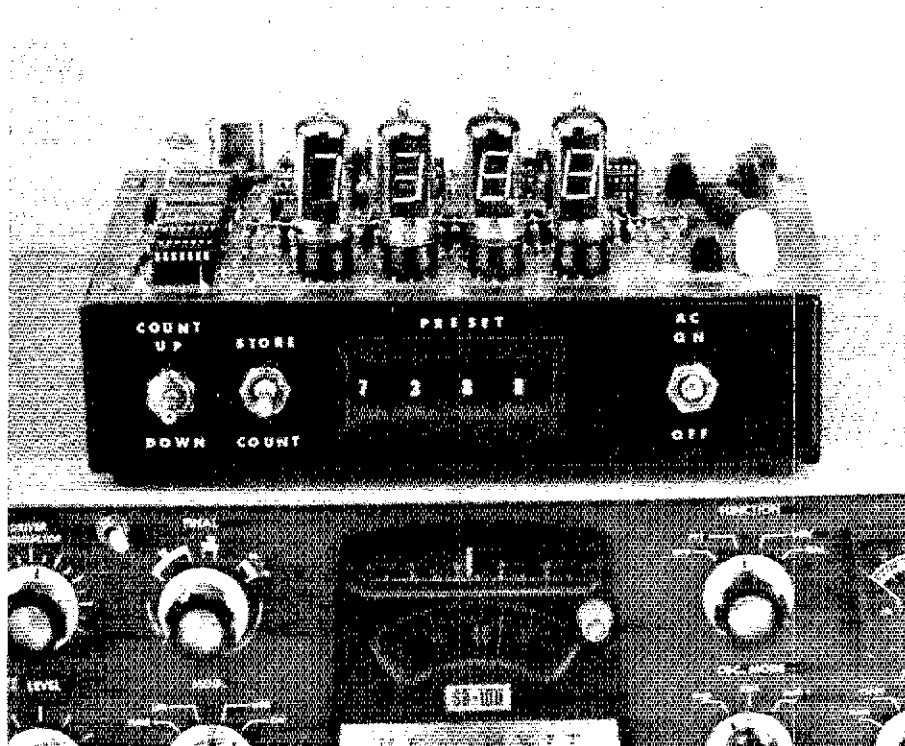
If you're thinking the hookup to your rig might be difficult — relax. Many existing transceivers have a VFO output jack on the rear apron which may be used to couple a small amount of rf to the counter. In other sets it may be necessary to connect a 10- to 100-pF capacitor to the output stage of the VFO, then route the rf through a shielded cable to a phono jack mounted on the rear of the chassis. If this is done, use only as large a capacitance as is necessary to get a reading. Try not to connect to the oscillator itself or you may affect its operation. It is best to have at least one stage between the oscillator and the counter if pickup point to act as a buffer.

Circuit Description

The final circuit is shown in block diagram in Fig. 1. Aside from the input amplifier, power supply and display tubes, everything else uses transistor-transistor-logic (TTL) ICs of the 7400 family. Since these digital ICs work on 0.5 volt square waves, it is necessary to first amplify the weak VFO sine wave from the receiver oscillator and change it to a 5-volt square wave.

The input amplifier consists of a 40673 MOSFET followed by a 2N2222. This provides good high-frequency response with enough gain to drive the wave shaper, one section of a 74S00 connected as an inverter. The base of the 2N2222 is biased by a 6800-ohm resistor connected between the base and the collector. Since the collector is directly connected to the input of the inverter, the value of its resistor establishes the operating point for the 74S00 section. Experiments showed that a 1960-ohm resistor was best. This is obtained by paralleling a 2200-ohm and an 18-k Ω resistor. Refer to the schematic diagram in Fig. 2.

In some receivers such as the Swan and Atlas, the VFO frequency (which we must count) runs between 8 MHz



A close-up view of the frequency display unit being used with the SB-100. The thumbwheel switches are used to preset the counters, and the VFO frequency is subtracted or added, depending on the position of the up/down count switch.

and 25 MHz. Since it is also desirable to measure the output frequency of a 6-meter transmitter, our counter should be able to count up to about 60 MHz. This is almost impossible using an ordinary TTL counter IC. Therefore, a high-frequency prescaler was included which would divide the input frequency by 10, producing a 6-MHz signal for the counter to handle. I selected a 74S196 which is rated to about 100 MHz.

The prescaler and all the TTL ICs which follow are controlled by a clock, which establishes a precise counting period, and the proper pulses to reset the counters and update the display. The UIB connections in Fig. 2 show how the VFO signal, divided by 10, is gated into the counter. Note that when Q (inverted Q) is plus, the gate opens for exactly 100 ms (1/10th second) and passes the stream of square waves from the VFO to the counter. The last half of the 74S00 (see Fig. 2) is used to switch the gated VFO signal to either the "up counter" or the "down counter."

The clock is controlled by a 1-MHz crystal oscillator using a 7400. The output is a 0- to 5-volt square wave at 1 MHz. (In TTL ICs, the output never quite gets to 0 V or to 5 V. Typically it is 0.3 V to 3.3 V.)

The crystal-oscillator frequency is divided by 10 in five successive stages to get an output of 10 Hz. A final division by two gives us two 100-ms periods, one for counting and one for generating

latch and load pulses. Thus our dial will update and display the frequency five times a second. The logic gates controlled by the clock generate the necessary latch and load pulses and determine the counting periods. The actual frequency counting is done by four presettable up/down counters. The presettable input to the counters from the thumbwheel switches as well as the counter output is in binary form, BCD (binary coded decimal). The decoders take this binary code and change it to a seven-segment code for driving the display tubes' segments.

The power supply shown in Fig. 4 consists of two regulated 5-volt supplies, one regulated 12-volt supply, one regulated 24-volt supply and a 6.3-volt filament supply for the display tubes.

Logic

The term "computer logic" or just plain "logic" usually scares most hams half to death. It simply means the logical arrangement of something to accomplish a desired result. In our case, the logic simply consists of a handful of gates. They turn on and off or "gate" the information flow to the counters and tell them to display the information at precise time intervals as determined by the clock.

To determine just how to hook up the gates to perform the required logic requires that you draw a timing chart. See Fig. 3. This consists of various

waveforms that are available from the clock frequency-divider ICs. The waveform at the top of the chart labeled B is what you would see if you connected an oscilloscope to pin 9 on U9, the last 7490 divide-by-10 IC. All 7490s divide by 10 in two steps: a divide-by-two stage is followed by a divide-by-five section. Pin 9 of the 7490 is the B output of the four binary-coded decimal outputs. Note that it is not symmetrical.

The next two lines of Fig. 3 show the waveforms C at pin 8 and D at pin 11, the output of the divide-by-10 step. The frequency is now 10 Hz. Waveform A at pin 12 is not used in the logic so it is not shown in the timing chart. These outputs, A, B, C and D, are sometimes referred to as Q1, Q2, Q4 and Q8 and are the binary outputs of this IC.

Binary-coded decimal is the code used to represent a decimal number. It is a code similar in some respects to Morse code or the teleprinter code. It is a four-place code where four zeros or ones are used in various combinations to represent numbers. Binary code is sent in parallel while Morse and the teleprinter codes are sent serially.

These zeros and ones represent either a no or a yes (the only thing any computer can say), current not flowing or flowing, or +0.3 V or +3.3 V (logic "0" and logic "1" respectively). In our case, we are saying yes and no between 5 and 5-1/2 million times a second. The SB-100 VFO frequency varies from 5 to 5.5 MHz.

The fourth line in the timing chart shows the waveform Q at pin 12 of U10, the 7473 divide-by-two IC. We are not using the second half of this IC. The 7473 is a dual J-K level-triggered flip-flop with preclear. A flip-flop has two outputs which are opposite, Q and \bar{Q} (inverted Q). The \bar{Q} is available at pin 13 and its waveform is +3.3 V when Q is +0.3 V and vice versa. The waveform labeled B (inverted B) is just that. Waveform B is passed through an inverter and comes out inverted as shown, B.

Counting Period

To turn our stream of square waves going to the counter from the VFO on and off for a precise 100 ms, we will use a TTL "gate" and the waveform shown in the timing chart as \bar{Q} , from pin 13 of the 7473 IC. Since we want good high-frequency operation we will choose 1/4 of a 74S00, U1, as a NAND gate. 74S00s are high-speed versions of the 7400.

The 7400 and 74S00 each contain four 2-input NAND gates which may be used independently. If either of the two inputs of a NAND gate is at logic 0 then the output is at logic 1. Only when both inputs are at logic 1 does the output

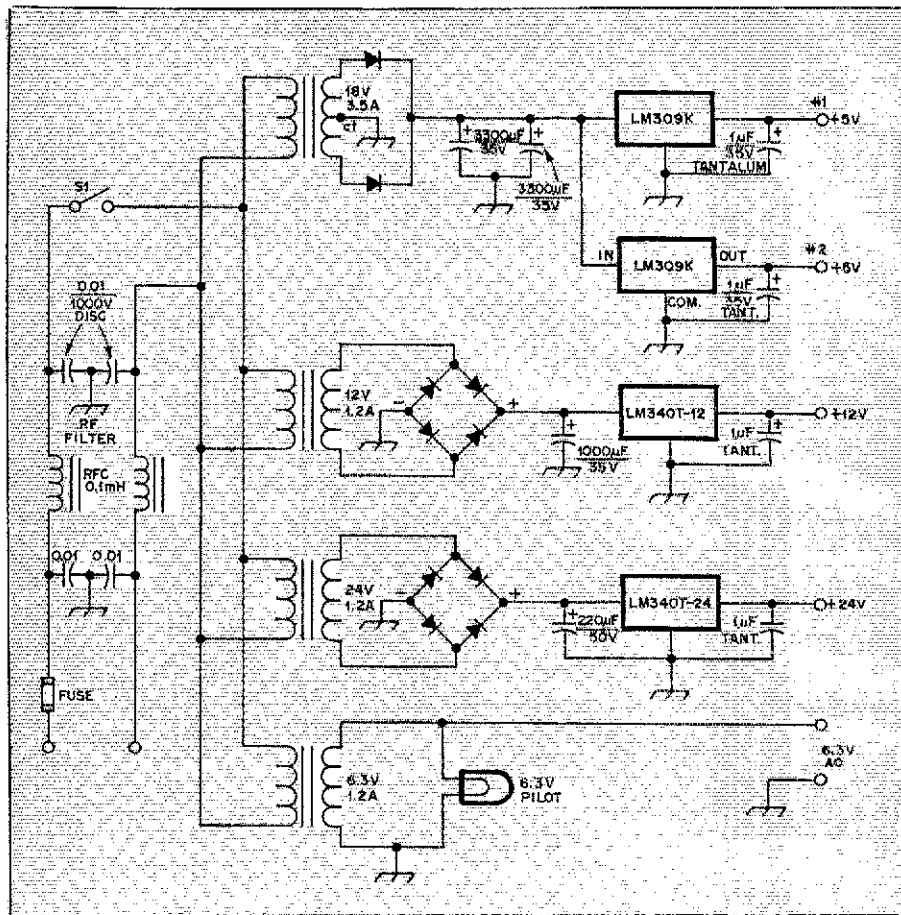


Fig. 4 — This schematic diagram shows a possible solution to power supply requirements for the digital-dial display. Four voltages are needed to power the project.

change to logic 0. In other words a NAND gate is an inverting gate. Thus we see that the 74S00 gates or passes the VFO signal to the counter only during each of the 100-ms periods that Q goes to +3.3 V. This happens five times a second.

We must now make a provision for switching the gated VFO signal to either the up-count input, pin 5, or the down-count input, pin 4 of U12, the first 74192 counter. A convenient method is to use two more of the NAND gates in our 74S00. See Fig. 2. The gate that has one of its inputs switched to +5 V is the one that will pass the signal on to the counter. The up/down switch is shown in the count-down position. Note that one input to the other gate is at ground to prevent it from gating the VFO to the up counter.

At the end of each 100-ms counting cycle we must tell the 7475 storage ICs to "latch" onto the count from the 74192s. Then we must reset the counters to zero and load them with whatever numbers are set in the thumbwheel switches. To obtain a latch pulse we will use the waveform labeled Q. Refer to the waveform chart in Fig. 3. You will note that this goes positive during the

second 100-ms period. We will also use waveform B and waveform C. If you superimpose these three waveforms you will see that there is a 20-ms interval in the middle of Q where all three inputs are "up" at the same time. Therefore if we feed each of these, Q, B and C to the three inputs of U3, a 7410 3-input NAND gate, we will get a 20-ms negative pulse at the output. Since the 7475 IC needs a positive latch pulse, we will have to invert this negative pulse with 1/4 of a 7400, (U11) hooked up as an inverter. This pulse is fed to pins 4 and 13 of all 7475s in parallel.

Memory

A "memory" or "store" switch is included in the digital display to freeze the dial reading for as long as desired. This allows the operator to "remember" the frequency of a QSO, net, or rare DX station while he tunes around the band. He can come back later to the approximate frequency, and then by switching to COUNT he can zero in on the original frequency.

The means of accomplishing this is to disable the latch pulse. This is done by switching pins 4 and 13 of all 7475 ICs to ground, thus preventing them

from updating the count every 200 ms. Fig. 2 shows how this switch is connected in the circuit.

After the latch pulse but before the next counting period occurs we must generate a negative-going load pulse. We feed it to pin 11 on all of the 74192 up/down counters and to pin 13 on the 74196. To do this we will again use waveform Q, but will combine it with only waveform D from the timing chart. Thus we have a negative-going 20-ms pulse just before the counting starts.

Note in Fig. 2 that we have converted a 3-input NAND gate into a 2-input NAND gate by simply tying one input to +5 volts. The third 3-input gate of this IC will be used as an inverter for waveform B by tying two of the three inputs to +5 volts and feeding the signal to be inverted to the remaining input as shown in Fig. 2. We could have used one of the unused gates in U11, however it was more convenient in the circuit board layout to use the last third of the 7410 as shown. Electrically it makes no difference.

It is interesting to note one big difference in building a rig using 7400-series TTL ICs as compared to using vacuum tubes or individual transistors — nothing is connected between the ICs except a piece of wire or circuit-board foil. There are no coupling devices, capacitors or resistors. All input and output buffering devices are already built into the ICs! Only when you convert a 7400 IC to a crystal oscillator do you need a few resistors or capacitors. However, a few well-placed

0.01- to 0.05- μ F disk-ceramic and some 10- μ F electrolytic capacitors are recommended on the circuit board to despike the +5-V buses. My unit worked without these capacitors but it is good engineering practice to include them. Their placement will be discussed later.

The thumbwheel switches used in this unit are 10-position, 0 through 9, with a binary output (see Fig. 5). In other words, when the switch is in position five, the output is 0101. Each switch deck has five terminals labeled 1, 2, 4, 8 and C. A 270-ohm 1/4-watt resistor is connected from ground to the 1, 2, 4 and 8 terminals while the C terminal is connected to +5 V. Thus when the switch is in position five, the terminals are 0 V, +5 V, 0 V and +5 V when read with a dc voltmeter. When these switch terminals are directly connected to the binary input load terminals of the 74192, pin 15 (L1) pin 1 (L2), pin 10 (L4), and pin 9 (L8), the 74192 will start its count from the value 5 instead of from 0. With no VFO input, the display will read the number that is set in the thumbwheel switches.

Use as a Counter

To use this device as a regular counter, set the thumbwheel switches to 000.0 and the up/down switch to count up. The counter will now count in the conventional manner from 000.1 kHz to 999.9 kHz. It will of course count higher, up to the limit of the input circuits — possibly to 100 MHz — but you must have some other means of determining the approximate frequency.

(My BFO crystal is somewhere around 3400 kHz. The counter connected as above gives a readout of 396.3. The frequency therefore is 3,396.3 kHz.)

Last-digit flicker or jitter, sometimes called "1 digit bobble," is very annoying and common to most counters. It results when the signal frequency being counted is not synchronized with the clock frequency. There are several ways of synchronizing the two signals, but perhaps the simplest solution is to not display the bobbling digit. This is the method used here. We use five counters but only display the four most significant figures. If we had counted for a full second and displayed all the digits the readout would have been in hertz. By counting for only 1/10 of a second our readout would have been in tens of hertz. Now by throwing away the right-hand digit our readout is in hundreds of hertz or 0.1 kHz. We do not display the count of the 74S196.

Display Tubes

The display tubes are Tung-Sol Digi-vac fluorescent type and were chosen for their brightness, size and low power consumption. G.E. also makes a similar tube, readily available from several sources.¹ They use the same principle as a cathode-ray tube (CRT). Seven small segments, coated with a green phosphor material, fluoresce with only 24 V applied at 0.5 mA per segment. The filament voltage is 1.5 V at 4.5 mA per tube. Fig. 6 shows the segment and filament connections. The 1.5 V for each filament is obtained by putting the four filaments in series across a small 6.3-V filament transformer.

The type of sockets used for the display tubes is left to the builder. The fluorescent tubes shown in the photo will fit any nine-pin NOVAR socket provided they do not have a decimal point (pin 10). Tubes with a decimal point have a 10th pin halfway between pins 1 and 9, and require a 10-pin socket. Buy your sockets before making the circuit board to be sure the sockets will fit the completed board. The sockets shown in the photos are the 10-pin, NOVAR type for circuit-board mounting, with pins 2 and 7 bent toward the center.

All segments of each tube are connected to the regulated 24-V supply through a 4700-ohm 1/4-watt resistor. With the 7407 driver ICs out of their sockets, all tube segments should light up so that 888.8 is displayed.

The 7407 is a noninverting hex driver that can stand up to 30 V on each of its outputs when its inputs are high

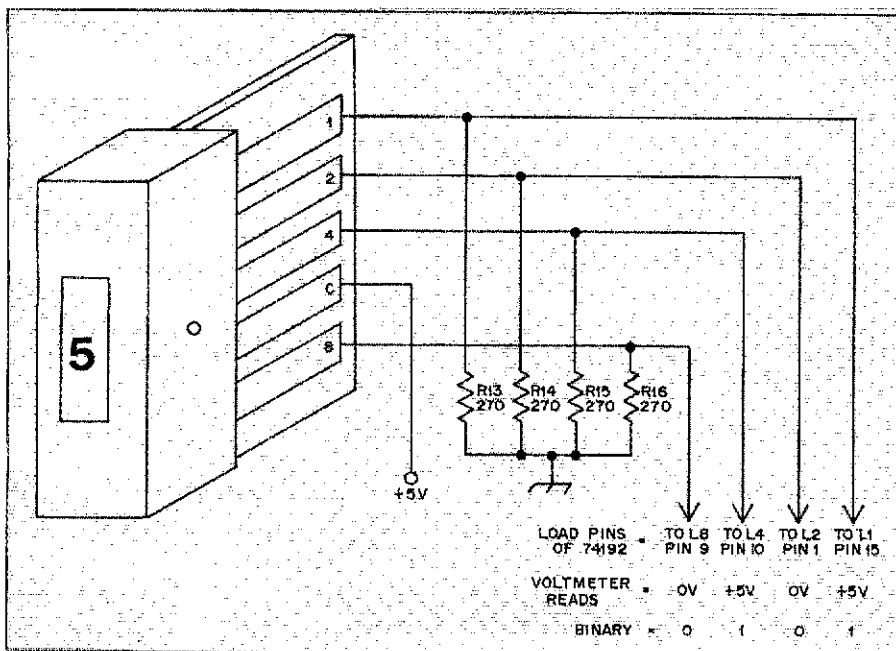


Fig. 5 — Thumbwheel switch connections. Note the dc voltage values at each output terminal when the switch is turned to the number 5.

¹ Radio Shack, 1977 Cat., no. 276-063; James Electronics, 1977 Cat., 1021 Howard Ave., San Carlos, CA 94070; Poly Paks, Cat. no. 220, P. O. Box 942, South Lynfield, MA 01940.

(logic 1), and can sink 30 mA when its inputs are low (logic 0). Its function in this circuit is to short all the display-tube segments to ground except those segments that the 7448 decoder says are required to form the particular figure being displayed. When a segment is shorted to ground in this manner, the 4700-ohm resistor only carries 5 mA of current — well within the sinking capability of the 7407. This is only 0.1 watt so a quarter-watt resistor is ample.

You will note that since there are seven segments to drive in each tube and only six drivers in each 7407, it will take five 7407 ICs to drive the four display tubes. This leaves two drivers unused.

Careful placement of parts and short interconnecting leads are required in the input amplifier, wave shaper, VFO gates, 74S196 prescaler, 1-MHz crystal oscillator and first divide-by-10 7490. All other circuits are at audio frequencies and some are practically dc, so these leads — or foils, in the case of a printed circuit board — can be any length required for a convenient placement of components. Test points are short (1/4-inch) lengths of tinned wire protruding from the top side of the circuit board and soldered to both sides. These are indicated in Fig. 2.

My advice on wiring is to be sure to color code all wires and mark them down in your notebook for reference. Be sure to make all your color-coded wires from the chassis to the circuit board long enough so that the circuit board may be removed from the chassis and turned upside down for testing. A good source of color-coded wire is to

purchase 10 feet of Belden multiconductor cable and remove the jacket.

Power Supply

Although the power supply shown in Fig. 4 may be built into the counter chassis by using smaller transformers, it does contribute quite a bit of heat to the circuit, and I therefore feel it is better to have a separate power supply. Furthermore, a separate supply would be suitable for powering any other experimental projects you build.

Be sure to include the rf filter in the supply ac line, as this keeps rf from your transmitter out of the display while keeping all the counting "birdies" in the display from reaching your receiver via the ac line. You will need an 8-pin connector and socket for the power supply cable if you want a remote on/off switch on the display. Each wire of this cable should also be bypassed with a 0.01- to 0.05- μ F disk capacitor in the bottom of the display chassis where the cable enters.

Initial Test

The power supply should be checked out first. A 5-volt regulator such as the LM-309K requires an input at least 2 volts higher than the output when under load. Therefore, check to be sure the dc input to these two regulators is at least 7 volts, and preferably 8 to 9 volts. If the input voltage is too high, such as 12 to 15 volts, the regulators will run too hot. If it is too low, the regulator will not regulate and the output will have lots of ac ripple on it, resulting in false counting.

Power to the main circuit board has

been divided, with one 5-V supply feeding the right-hand side and the other 5-V supply feeding the left-hand side. This gives some measure of isolation between the clock and two counters on one side, and the input amplifier, logic and the other two counters on the other. Each half of the board should draw approximately 1/2 ampere. To test the two 5-V supplies, rig up a dummy load of 10 ohms at 5 watts, and connect it across each supply in turn. Measure both the input and output voltages under load. If possible, check the 5-V dc output with an oscilloscope for possible self-oscillation. A regulator of this type usually requires a small capacitor — preferably a 1- μ F tantalum — connected with short leads directly from the output terminal to the case to prevent this oscillation. If the rectifier and main filter are some distance away from the regulator IC, also put a 100- μ F electrolytic capacitor across the regulator input terminals.

While we're on this bypassing discussion, note that it is good practice to solder a 10- μ F tantalum capacitor and a 0.047- μ F disk capacitor in parallel between the 5-V bus and ground for every four ICs or for every three inches of bus. These capacitors can be soldered to the foil on the top side of the circuit board.

Do not attempt to measure the 1.5 V ac on the filaments before plugging in all the tubes, because the filaments are in series. All segments should light with no ICs in the sockets. Now check to see if the 24-V regulator is regulating. Over 30 volts will damage the 7407 ICs.

When you are satisfied that the correct voltages are coming from the power supply, then plug the ICs into their sockets. Make sure that the ICs are not turned around in their sockets when you plug them in. All IC pins should go into the socket holes without bending.

If you have a correctly etched circuit board, there are no solder bridges or unsoldered pins and all the ICs are good, then the unit should work right off the bat. At least, the "readout" should show the number dialed into the thumb-wheel switches. With no VFO signal input to the unit, rotate each thumb-wheel switch from 0 through 9. If the corresponding display tube shows each number that is dialed into the switches, everything is working from the thumb-wheel switches to the display tubes.

Next, check to see if the counter will count. Connect the input terminal to test points 1, 2, 3, 4 and 5 on the clock part of the circuit board, using a short piece of coax. The display should show 000.0, 100.0, 010.0, 001.0 and 000.1 respectively, provided the thumbwheel switches are set to 000.0 and the up/down count switch is in the "up" position. With the switch in the count-

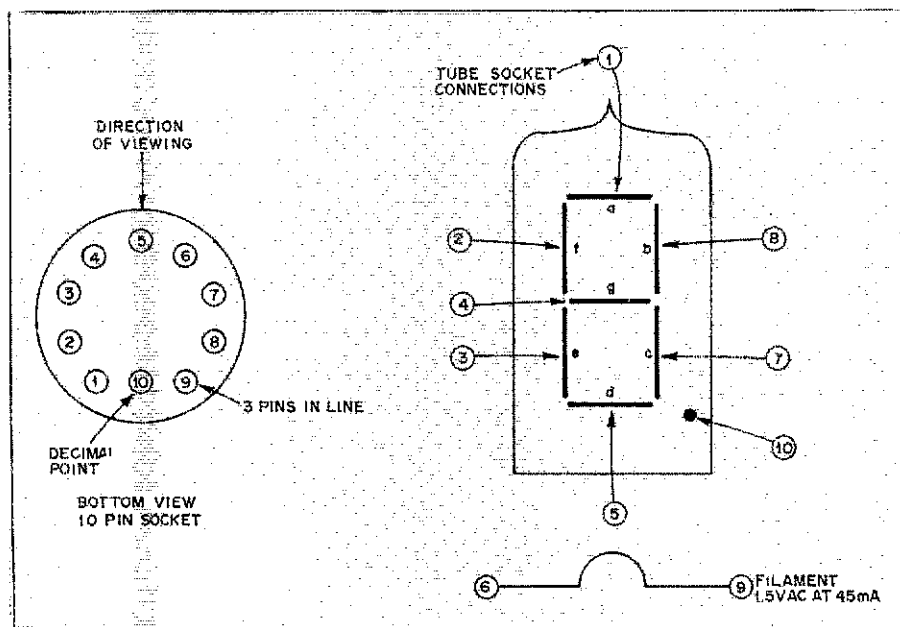


Fig. 6 — Each segment and filament connection is shown with pin numbers corresponding to those on the pin base. The 10-pin fluorescent tubes all contain decimal points, but only one is used. Similar 9-pin tubes without decimal points are also available.

down position, the readings should be 000.0, 900.0, 990.0 and 999.9 respectively. If you get these readings your unit is working!

Calibration and Use

It is now necessary to set the 1-MHz crystal oscillator to exactly 1 MHz. Adjust it to zero beat with WWV. A close approximation may be had by coupling a small amount of 10-kHz rf energy from test-point 3 to a broadcast-band receiver and adjusting the padding capacitor (C14) for a zero beat with any one or several a-m broadcast stations. These stations are spaced at 10-kHz intervals and are required by the FCC to maintain their carriers to within 20 hertz of their assigned frequency.

If you have an rf signal generator and an audio-frequency signal generator, you can now practice measuring frequencies from 100 Hz to 999.9 kHz. If you plan to use your counter at audio frequencies, you might want to increase the value of the 100-pF input capacitors with perhaps a 0.1- or 10- μ F tantalum capacitor.

When connected to the VFO in your receiver or transceiver as described earlier, the counter will measure the exact frequency of the oscillator, providing you have the thumbwheel switches set at 000.0 and are counting up. For example, readings taken every 10 minutes from a cold start can be plotted to show the amount and direction of your VFO drift. A second set of readings could be taken after temperature compensating the oscillator and compared with the earlier ones.

A short piece of hookup wire fastened to the input connector should pick up enough rf to read your transmitter frequency with the key down. Remember, most rigs offset the transmitter frequency slightly when in the cw or in-tune position. On receive, you may have to reset the thumbwheel switches when changing sidebands.

Problems

Most kit manufacturers will tell you that 95 percent of all malfunctioning home-built rigs don't work due to poor

soldering. This is probably true, so if this frequency display doesn't work initially, first recheck all solder joints on both sides of the boards with a good light and a strong magnifying glass. Look for solder bridges between adjacent foils and socket pins, unsoldered connections and cold solder joints. Also look for broken foils.

Assuming the soldering and circuit board are okay, then the problem must be a bad component or an IC plugged into its socket backwards. The clock must be working in order to program the counting and develop the latch and load pulses.

Check for operation of the clock by listening on a nearby a-m broadcast set for a loud signal at 1000 kHz on the dial. Check the frequency dividers by connecting a 5-V dc meter to test-point 6, shown in Fig. 2. The pointer should flick to 1/4 scale 10 times a second.

If the 1-MHz crystal oscillator is working, the 7490s are all dividing by 10 and if the 7473 is dividing by two, then you should be able to detect a 5-Hz signal at test-points 7 and 8 with a 5-V dc meter. Remember, with no pulses at test-points 6, 7 and 8, you will have no load or latch pulses and the unit will not work — not even the thumbwheel switches.

If an oscilloscope is available, check the latch and load pulses at test-points 9 and 10. These pulses have intentionally been made 20 ms wide so that they can be seen easily on an inexpensive scope. They should be as shown in Fig. 3. Be sure the STORE COUNT switch is in the COUNT position. The load and latch pulses are derived in the 7410 (U3). The inputs to each of the 3-input NAND gates must be as shown in Fig. 2.

If you find an area in the circuit that looks suspicious, try replacing that IC with a known good one. If that does not correct the problem, examine the back side of the board again with a magnifying glass. Try reheating each socket connection with a small soldering iron. Sometimes the trouble can lie in a bad IC just ahead of where the problem is indicated; therefore also try replacing this IC.

The easiest way to correct an erratic display is by substitution with known good ICs. For example if one counter decade programs correctly from thumbwheel switch to display tube, you can assume that 74192, 7475, 7448, 7407 ICs and the display tube are all okay. Substitute these one at a time for the questionable components in another decade section and when the trouble clears up you have found the bad IC. If the trouble does not clear up, the problem may be an incorrectly wired thumbwheel switch.

Random counting, when all four tubes seem to be flashing meaningless numbers, can be caused by self-oscillation in the input amplifier, oscillation in a voltage regulator, too low an input voltage to the regulator (causing excessive ripple on the 5-V or 12-V buses), or rf pickup from your transmitter. If the display is erratic in the count-up but is steady in the count-down mode or vice versa, then you probably have a damaged 74192, where either the carry or borrow output is bad. Try replacing the 74192s until a steady display results.

If you have a well-stocked junk box, make your own circuit board and shop around in the flyers and catalogs for the best price, you should be able to build this frequency display for about \$75. If you buy everything where it is most convenient, the cost should not exceed \$160. When you are finished, not only will you have a better idea exactly where you are operating in the hf bands, but your digital dial will serve double duty as a frequency counter! And who knows? Maybe you'll learn something while you're building it!

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- Hall and Watts, "Learning to Work with Integrated Circuits," *QST*, January-July, October, 1976; June, 1977.
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- The Integrated Circuits Catalogue for Design Engineers*, Texas Instruments, Inc., Dallas, TX, 2nd ed., 1976.

Strays

STOLEN EQUIPMENT

□ HW-2036 transceiver, serial no. 00647. Contact Detective Robbins, Old Bridge (NJ) Police Dept., tel. 201-721-4000.

□ A reward is being offered for information leading to the recovery of solar

panels that operated three TV translators near Boulder, NV. Designed by W7NVY, the system allowed color reception of stations in Las Vegas to reach the tiny resort community, located deep in the Colorado River canyon. Each panel is 2-foot square and one-quarter inch thick, and contains 36 3-inch round solar cells. Persons with informa-

tion about them should call me person-to-person collect at 602-767-3311. — *W E. "Butch" Webb*

□ SB-220 linear, serial no. 14445, CD Ham-II rotor control and Demco modulator. Marshall Damoth, WB8LUM, 517-275-8371 collect, Roscommon, MI 48653.

The Resistance Synthesizer

Ten million resistance values with only 28 resistors and some switches. Not a bad deal, eh?

By Fred Brown,* W6HPH

Any mathematician can tell you that the lowly number two raised to the 28th power is 268,435,456. That's how many different combinations are possible with 28 two-position switches. If you could change the combination once every second, working night and day, it would take more than 8-1/2 years to go through all of them.

These facts are made use of in the resistance synthesizer to provide any resistance value from 1 ohm to 10 megohms in 1-ohm steps. The advantage over an ordinary resistance-substitution box should be immediately apparent — and commercial versions of the resistance synthesizer are now on the mar-

ket. It's a simple matter for the experimenter to build his own, however, and at a considerable saving if salvaged or junk-box parts are used.

Switches

Much drudgery can be avoided if you can find an array of switches already mounted on a panel; such switch arrays are fairly common in this computer age. My array was sawed from a larger panel containing about 150 switches. Two of these panels were purchased at a local flea market for \$5. That works out to be less than 2 cents per switch — not bad, when you compare the catalog price of miniature toggle switches.

Notice in Fig. 1 and the photograph that 35 rather than 28 switches are

used. Only 28 would be needed if switches were perfect, but they're not. The "on" resistance is never quite zero ohms. Each switch in the bottom row shorts out all four switches above it. Without the bottom row, the resistance of as many as 27 closed switches would be added to the desired value. This, of course, would be negligible on the 1-megohm or even the 1-kilohm positions, but on the 1-ohm or 2-ohm positions it would cause a substantial error. According to my measurements, each closed switch has a resistance of about 0.016 ohm. So, 27 in series would add up to 0.432 ohm. The bottom row of switches makes it possible to have, at most, only nine switches in series with the desired value, rather than 27. Even so, these nine add in a total of about 0.144 ohm,

* Box 2053, Rancho Santa Fe, CA 92067

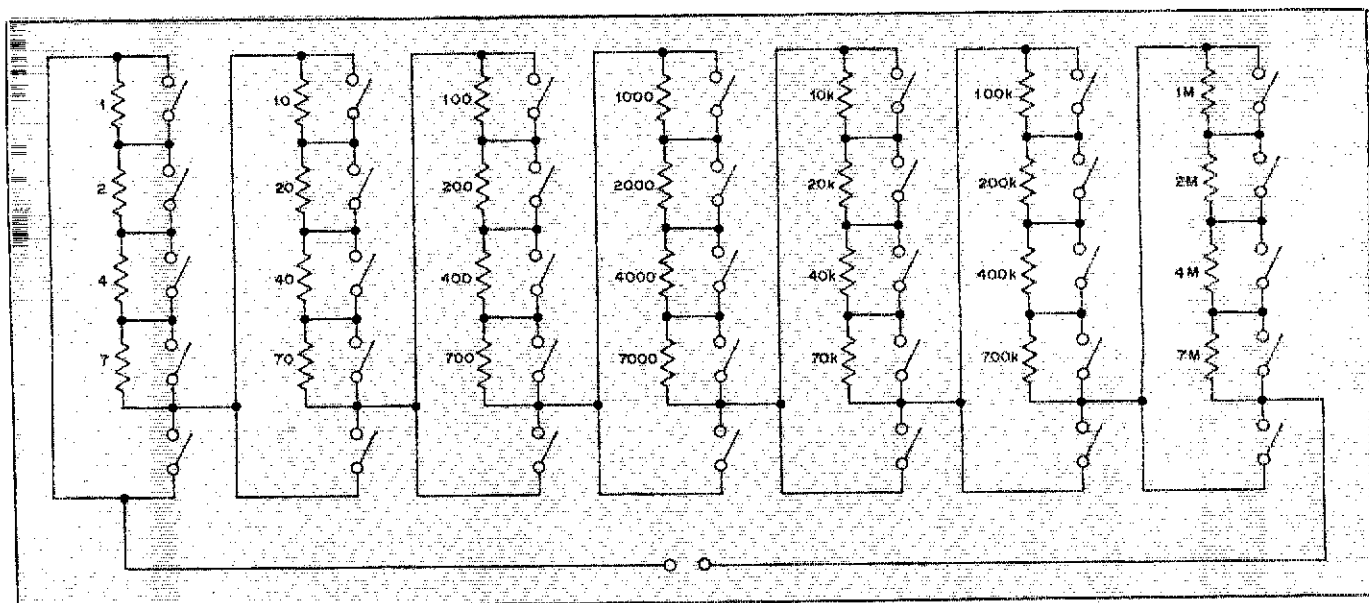


Fig. 1 — Circuit diagram of the resistance synthesizer. All resistors can be half-watt composition. In all, 35 spst switches are used; the bottom row of switches is redundant, but useful in reducing the cumulative resistance of the other 28 switches.

so the "1-ohm" value specified in the diagram should actually be 0.856 ohm, the "2-ohm" value should be 1.856, etc.

Resistors

The accuracy to which you can synthesize any resistance will, of course, depend on the tolerance of resistors used in the synthesizer. Particularly important is the accuracy of the higher values. Let's say, for instance, you wanted to synthesize 5432 ohms. You would switch in the 4000-, the 1000-, the 400-, the 20-, the 10- and the 2-ohm resistors. Obviously, if the 4-kilohm value were off by only 1 ohm, you would not hit the target, and this is asking for a tolerance of 0.025 percent on that 4-kilohm resistor! Normally, we can expect nowhere near that kind of precision from ordinary resistors. This means there inevitably will be some small gaps in the numerical sequence between 1 and 10 million ohms. But, fortunately, it's very seldom that we need such extreme precision in electronics, and even if we could get it, a temperature change of only a few degrees would take it away from us.

I used ordinary half-watt composition resistors in this unit. Of course, this limits maximum power input to 500 milliwatts continuous, or maybe one or two watts for a few seconds. But for most circuit work this is adequate.

It's fairly easy to get each resistor to within 1 percent of the desired value by series or shunting an ordinary 5 or 10 percent tolerance nominal value. Since shunting is generally easier, it's best to use a nominal value slightly higher than the target value.

An easy rule-of-thumb to determine shunt resistances is to select a value N times the desired value, where N is 100 divided by the percentage difference between the nominal value and the target value. For instance, if the target value was 1000 ohms, and the measured

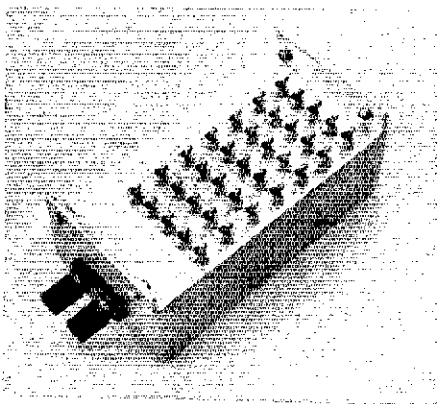
value was 1050 ohms (5 percent high), we would shunt with a value of 20 kilohms (that is, $100/5 \times 1000$ ohms). This is easy to figure in your head. Or you can work out the exact value if you want to go through all the algebra.

On the other hand, if you are completely adverse to mathematics, you can simply shunt with a high-resistance pot, adjust the combination to the exact value, measure the pot resistance, and substitute a fixed resistor close to that value.

The 1, 10, 100, etc. series and the 2, 20, 200 series are standard RETMA values. For the 4, 40, 400 series use the 3.9, 39, 390, etc. standard values and select individual resistors having slightly higher-than-marked resistances. The 7, 70, 700 series can be handled in the same way, using 6.8, 68, 680, etc. standard RETMA values.

For the "1-ohm" resistor I used an appropriate length of resistance wire to give the desired 0.856 ohm. All resistors were mounted directly on the switch terminals.

The accuracy of the synthesizer will also depend, of course, on the accuracy of your ohmmeter or whatever instrument you use to measure and adjust the individual resistors. I used a General Radio impedance bridge, but a good digital multimeter would have been even better.



The computer-surplus switch panel is retained intact and mounted directly inside a home-made box.

Strays

OSCAR 6: GONE BUT NOT FORGOTTEN

□ AMSAT-OSCAR 6, by far the longest-lived OSCAR, brought worldwide acclaim to the amateur satellite program. Now permanently removed from active service due to battery failure, the satellite is only a pleasant memory for the estimated 3,300 amateurs who used it. Untold thousands heard its beacon and saw live classroom demonstrations featuring OSCAR 6 during its 56-month lifetime.

The batteries on the spacecraft have been degrading since January 1, 1977. On June 15, the satellite failed to respond to ground command and remained in the "on mode" until orbit 21,405 on June 21, when the beacon ceased transmitting shortly after acquisition in Minneapolis.

Launched aboard a Thor-Delta rocket from Vandenberg Air Force Base, CA, on October 15, 1972, A-O 6 was an international venture by amateurs in Australia, Canada, Germany and the U.S.

The satellite's accomplishments are well known to those who have followed them on the pages of *QST* and the *AMSAT Newsletter*. The following is a partial list of some of its more publicized successes: first amateur communications satellite capable of responding to telemetered commands; first amateur satellite with dual beacons of 29.45 MHz and 435 MHz; first longlife amateur satellite with regular two-way communication capability; first use of Code-store for the automatic retransmission of a telemetered message; was the cornerstone of the OSCAR Education Program and *Space Science Involvement*, the curriculum booklet used by schools around the world for classroom instruction; was used in the development of a downed-aircraft emergency location transmission (ELT) system in a joint venture between the Canadian and U.S. governments; made possible the discovery of the inverted Doppler propagation mode; using the 435-MHz beacon; used in numerous tests involving transmission of medical data between medi-

cal institutions and field mobile to medical institutions; the basis of numerous successful propagation experiments; allowed regular communication among all continents involving more than 100 countries and 3300 amateurs; first inter-satellite communication, involving AMSAT-OSCAR 6 and AMSAT-OSCAR 7; and first transmission of meteorological data using 110-baud ASCII from a remote platform.

Thanks to the efficient operation of command stations around the world, A-O 6 remained in orbit more than four years, despite its design lifetime of but one year. Without the dedication of the members of the International Command Network, AMSAT-OSCAR 6 would have failed after only a few months of operation.

To all involved in the commanding and operation of AMSAT-OSCAR 6, a sincere thank you from the world's amateurs.

Congratulations are due AMSAT, the International Command Network and the users of AMSAT-OSCAR 6 on a very successful program. And last, but not least, thank you AMSAT-OSCAR 6 for thousands of hours of enjoyment. — Adapted from George Fox, *WØLER*, "Farewell Old Friend," *AMSAT Newsletter*, September, 1977.

How to Tune Your Transmitter

Tuning up old faithful should be a painless and effortless procedure. But if you get weak knees at the sight of Bakelite knobs or you've been going through tubes faster than you can neutralize them, maybe it's time for a review.

By Jim Bartlett,* WB9VAV

Judging by the number of questions we've been getting from Novices asking how to tune their transmitters, there must be some folks who could use a refresher course. Since the pi network is probably the most common type of output tuning stage in use at this time, we will limit our discussion to this type of circuit.

A pi network consists of three parts, two capacitors and an inductor. Fortunately, most commercial rigs as well as homemade units utilize pi networks that have their inductors tapped for each band. This gives a fixed value of inductance leaving only two "variables" in the circuit. When this is the case, tuning is fairly simple.

Fig. 1 is the schematic diagram of a typical final-amplifier stage in a transmitter. C1 is the pi-network input or plate-tuning capacitor. This is usually labeled "plate" on commercial rigs. L1 is the coil or inductor which is tapped at several points (one for each band). C2 is the variable loading capacitor, usually labeled "load."

Only "Dummies" Don't Use 'Em

When you start tuning your rig, always begin on a "dummy" antenna or dummy load, not on the antenna itself. The dummy load is a device that looks the same to the transmitter as your antenna, except that it is not resonant at one frequency and does not radiate rf while you are using it. By using the dummy load you can try various adjustments of your transmitter without putting a signal on the air. To keep the signal *inside* the dummy load, you should use a noninductive shielded type such as the Heath Antenna. These

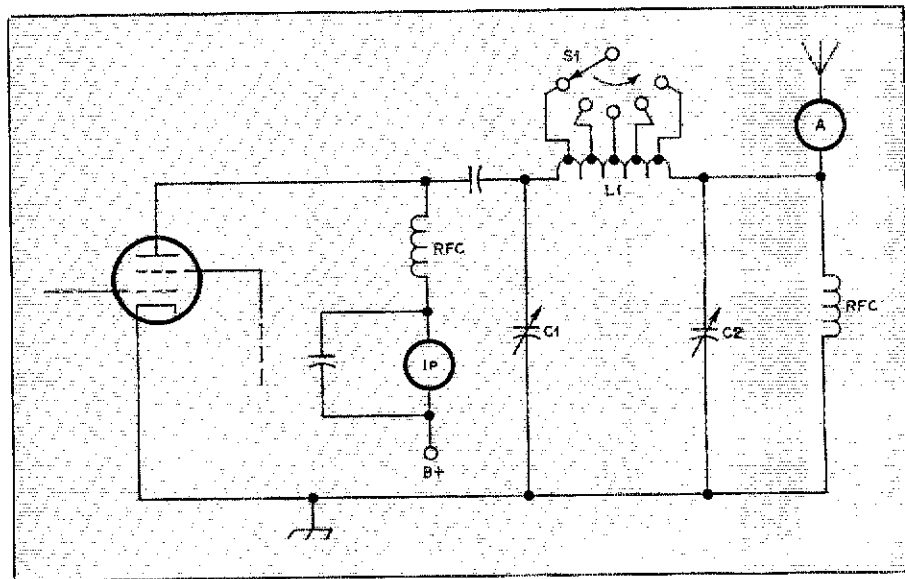


Fig. 1 — A pi-network coupling system to match the plate circuit to the antenna transmission line.

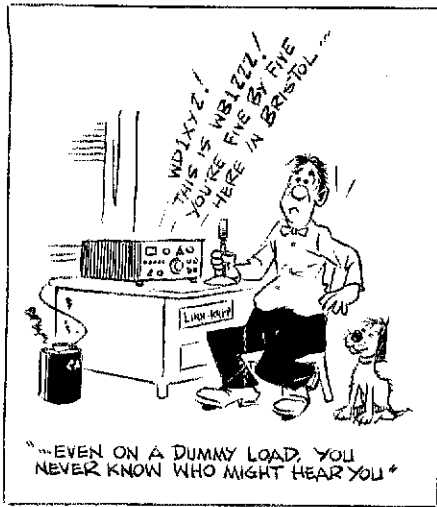
radiate much less signal than those without shielding, but even so you should watch what you say — many hams can tell you of QSOs held on just such dummy loads, this writer included! After you have tuned up on the dummy load, change over to the antenna and make any small changes in tuning that are necessary.

It is also a good idea, if your transmitter has no rf-output meter, to put an inline relative rf-output meter or wattmeter between the transmitter and the dummy load or antenna. This allows you to monitor your output level during the tune-up process.

Before turning on the juice to the transmitter or closing the key, the output or load capacitor should be set at its maximum capacitance point. This

means that C2 should be turned so that its plates are fully meshed. Some manufacturers may supply information in owners' manuals telling which directions are maximum capacitance for the plate and load controls.

Now that you have the wattmeter and dummy load attached to the output, the band switch turned to your favorite band and the load control at maximum capacitance, you are ready to begin. When you turn on the power and key the transmitter, the plate-current meter will probably read higher than normal for the tube. This is because the output circuit is not tuned to resonance. But as you turn the plate control C1 through its range, you will find a point where the plate current will suddenly drop. This will be indicated on the



meter as a "dip" in plate current. As you continue to turn the control past this point the plate current will quickly rise to its original value or possibly higher. The correct tuning point is where the plate current is at its lowest point — the dip. This point is referred to as the point of plate current dip, or point of resonance.

Keep That Dip!

The transmitter should not be operated out of resonance (plate current not dipped) any longer than it takes to tune the output circuit. If this has to be done slowly or the operator is not sure of himself during the process, the transmitter should be shut off frequently so the tubes can cool off. When the transmitter runs too long with the final stage out of resonance, the tubes can be heated to the point where they may be permanently damaged. This happens because the tube is not as efficient when being operated out of resonance. Therefore it must dissipate more of the input power itself in the form of heat instead of passing it along to the antenna as rf energy.

It is possible that on the first trial, the plate current will dip to a very low value and the wattmeter may deflect only a little or not register anything at all. The low value of plate current means the tube is not drawing very

much input power, and therefore we can't expect much output power. By increasing the coupling to the load, we can make the tube draw more input power. This is done by adjusting the load control C2.

Turn the load control slowly from its present maximum-capacitance position toward its minimum-capacitance position. Simultaneously, monitor the plate current shown on the meter. Adjusted to its "dip," the plate current will start to rise as you turn the load control. As soon as it has risen a noticeable amount, stop and readjust the plate control for the dip again. This time the dip will not be to as low a current value as it was before. Then return to the load control and continue turning toward the minimum-capacitance setting. Again, the plate current will rise from its dipped value. By this time you should notice the wattmeter starting to rise, indicating that, as the tube takes more input power, it is also producing more rf output. Also note that if the plate control is turned away from the dip point so that the plate current rises, the output power displayed on the wattmeter will decrease.

Continue adjustment as above, alternating between the plate and load controls — first dipping the plate, then adjusting the load for maximum plate current — until you reach the maximum plate current stated by the manufacturer in the owner's manual, or until the maximum obtainable current is reached. The plate-dip adjustment should always be done last to be sure the circuit is as close to resonance as possible.

When the tune-up procedure is completed and the transmitter is fully loaded, the dip observed in the plate current will have become much broader and less defined. Adjustment of the plate and load capacitors will become much more critical as the frequency of operation is increased.

Double Checking for "Doubles"

In most commercial and homemade transmitters the tuning range of the



plate control is either restricted or marked by frequency so that operation on frequencies other than those desired is not likely to happen by accident. But in some rigs the plate tuning range is so great that both the correct frequency and its second harmonic (twice the fundamental) can be tuned. In such cases, the dip found near the maximum-capacitance end of the tuning range is the correct one, and the minimum plate current dip found at the other tuning extreme is the harmonic.

Naturally, you must avoid tuning to the second harmonic. One way to check what frequency you are tuning when you dip the plate is to use a grid-dip meter, absorption wavemeter or frequency counter. Either of the first two can be placed next to the transmitter output and swept through their tuning range until the frequency is indicated. When using a frequency counter, you may be able to actually pick up the rf from the air by attaching a length of wire to the counter input jack and reading the frequency directly. If the signal isn't of sufficient strength using this method, the counter can be loosely coupled to the output of the transmitter with inductance or capacitance.

Once you get the hang of it, the procedure should become automatic and much less time-consuming. The whole process should take one minute at the most!

Strays

Elected were PZ1AC, president; PZ1AU, vice president; PZ1BK, secretary; PZ1BR, treasurer; PZ1AP, QSL manager; PZ1AK and PZ1BQ, directors.

AND 25 YEARS LATER . . .

When Bob Fried, K4FZU, neared eligibility for Quarter Century Wireless Association last spring, he got out his old QSL cards, including the confirmation from W3TD for his first QSO.

Out of curiosity Bob checked the current *callbook* listing and, sure enough, P. Wilson Redcay was still listed for W3TD. They corresponded, setting up a sked for exactly 25 years later. Though it was on 20 meters this time, they did meet again on April 25. Just as both had coincidentally used 6L6s in 1952, each happened to be running Swan 500s 25 years later. Once more Wilson sent a card to Bob. It, too, was exactly the same.

SURINAME OFFICERS ELECTED

Congratulations to the newly elected officers of the Vereniging van Radio-amateurs in Suriname. The VRS is the amateur radio society officially representing the amateurs of that country.

A Passive CW Filter to Improve Selectivity

Thin out that crippling QRM — don't fight it with flailing fists and a short temper! Build this simple passive cw filter that discriminates against undesired signals and reduces noise. And the cost is negligible. You'll like it!

By Frank Noble,* W3MT

Outside it is a cold winter night. In the moonlight, snow can be seen piled-up against the barn. A bitter northwest wind bites at the eaves. The very framework of the house snaps from the sub-zero weather. Inside, however, the cold winds of the midwinter scene are all but forgotten. A human form in the ham shack can be seen bent over a key. A hand nervously twists a receiver dial back and forth. The operator knows that it is late on a Saturday night. In full swing is the midwinter DX contest. Then suddenly — a fist forcefully slams against the table, followed by strong words of exasperation that left no doubt about the operator's mood.

What happened in that brief span of time might have occurred at any of a number of stations on such a night. For a few moments, coming into the clear, appeared a much sought-after DX station. Ah! Those extra points that catch would bring! Then just to one side on the dial came a blocking signal roaring in with a CQ. And before the age could regain any composure, another station opened up lower in frequency, smashing in like a Panzer division.

With that economy receiver, there wasn't even a chance to make a successful contact. If this sounds familiar, keep in mind that it has happened time after time at stations clear across the continent. So for the fellow with less than the best of equipment, what to do?

There should be little reason to question that many home-built and low-priced commercial receivers are unable to adequately separate code signals in today's crowded bands . . . especially at contest time. Amateurs who find themselves in this situation would do well to consider the advantages of a

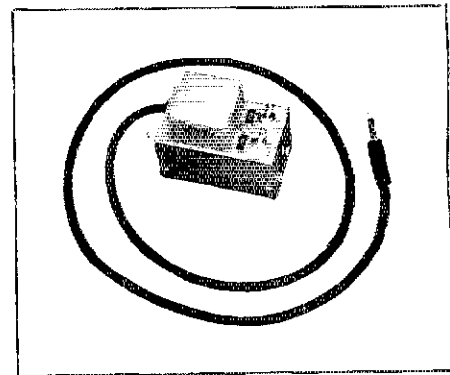
simple passive cw filter. This article describes an audio band-pass filter designed for connection between the normal speaker jack on the receiver and an external speaker or pair of headphones. The filter has a half-power bandwidth of about 70 Hz but rolls off gradually so that it does not ring.

At lower frequencies the filter looks like a large capacitive reactance, while at higher frequencies it resembles a large inductive reactance.

As shown in Fig. 1, a series inductance-capacitance combination is connected in the hot line to the external speaker. At resonance, the LC combination looks like a resistance of about 5 ohms, with the result that the signal amplitude is reduced by about half. At lower frequencies the filter looks like a large capacitive reactance, while at higher frequencies it resembles a large inductive reactance. Either situation will produce large attenuation. Hence, the filter will discriminate against all frequencies except the resonant frequency. A switch selects either 760 or 1070 Hz as the frequency of resonance.

There are two reasons for this. First, if the interference is at the audio image for 760 Hz, it cannot be at the image for 1070 Hz and vice versa.¹ Secondly, different operators find one or the other frequency easier to copy. Worth mentioning is that if this filter is used to back up a crystal or other type of filter in the receiver, the peak frequencies must be tailored to match. This can be

¹ For a discussion of the audio-image problem, see *The Radio Amateur's Handbook*, 54th edition, 1977, pp. 244 and 256-257.



The complete passive cw filter. A high-quality surplus Sprague Vitamin Q dual capacitor is mounted on top. Switches are FILTER IN-OUT and SPEAKER-PHONES. Jacks for phones and speaker are located on the front drop. The rear drop supports the input cable and the filter frequency switch. Other components are inside the 2-1/4 X 4-inch Minibox.

accomplished easily by capacitance adjustment in this filter.

When the filter is switched out, a 5-ohm 1-watt series resistor is substituted for the LC circuit. While unnecessary, this refinement produces

A very low resistance termination is required to make the filter sharp, since increasing the termination resistance directly reduces the series circuit Q.

about the same attenuation for all frequencies as the filter attenuation at resonance. Switching the filter in will not appreciably affect the signal level at the resonant frequency, but will discriminate against undesired signals and materially reduce noise.

The phone jack is shunted with two 10-ohm half-watt parallel resistors approximating the speaker resistance. A very low resistance termination is required to make the filter sharp, since increasing the terminating resistance directly reduces the series circuit Q. The level is adequate for headphones of average sensitivity.

The coil is an 88-mH telephone toroid with the two windings connected in parallel aiding. As supplied, the two identical windings are connected in series aiding. Hence, each winding has an inductance of 22 mH. The parallel aiding connection will also have an inductance of 22 mH because the coils are unity coupled on a common core. The parallel connection behaves as though the wire were larger. One could therefore expect that the Q would be larger than the value for a single winding. Incorrect phasing will result in failure of the filter to perform; a matter that can be corrected by simply reversing the connections of one winding.

The mechanical arrangement is so unimportant that no layout is included here. All components were placed in a 2-1/4 x 2-1/4 x 4-inch Minibox. The capacitor is a dual Sprague Vitamin Q bathtub type mounted on the top of the utility box. Since the toroid has no external field, it is mounted directly on the chassis with a screw and two insulating washers. The toroid is available from

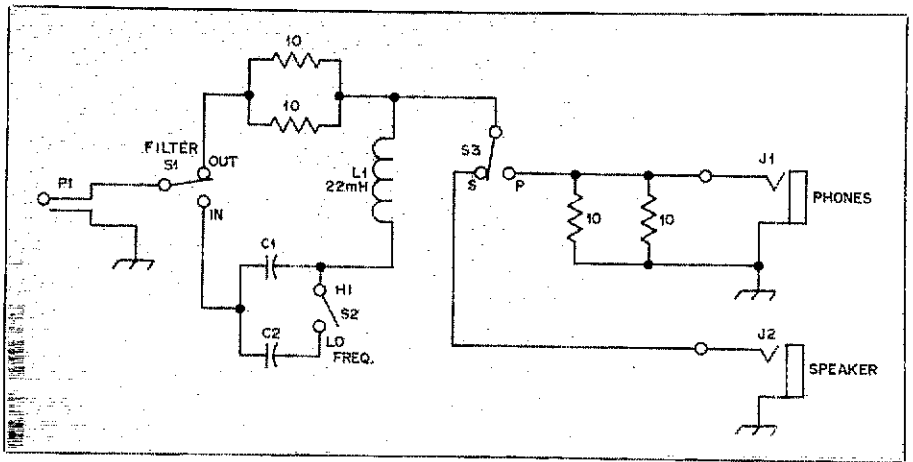


Fig. 1 — The simplicity of this passive audio filter belies the effectiveness of the circuit to improve selectivity for cw reception. Resistors are 1/2 watt. C1 and C2 are 1 μ F each. S1 and S3 are spdt switches. S2 is an spst switch. J1 and J2 are standard phone jacks. P1 is a standard phone plug.

several dealers listed in *QST* advertisements and elsewhere. Toroids are available, usually in sets of five, for about 50 cents per unit. Other amateurs may also have toroids which may be obtained at a nominal price.

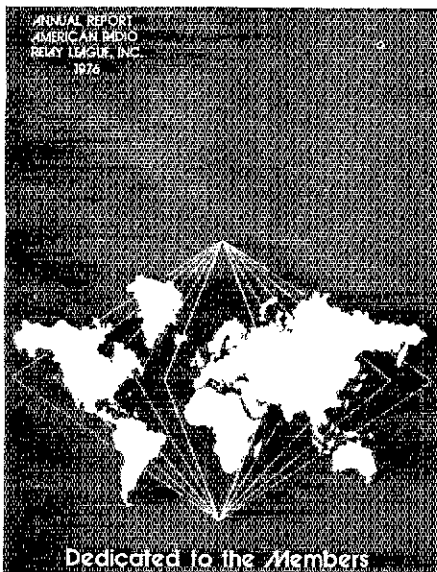
The Q of the tuned circuit alone, inferred from the fact that it looks like approximately 5 ohms at resonance, is 21 at 760 Hz and 30 at 1070 Hz. When the 5-ohm termination is included and the source resistance is neglected, the

effective Q values of the filter are 10.5 and 15, respectively. Hence, the bandwidth is about 70 Hz for either frequency.

Inexpensive to build, this filter is a simple device which will improve the selectivity of a receiver without requiring modification of the set in any way. The frequency stability of the receiver, however, should be such that the signal remains within the passband of the filter.

QST

Strays



The 1976 ARRL Annual Report is crammed full of fascinating data about the League and amateur radio. It is available now for \$3.

ANNUAL REPORT AVAILABLE NOW

□ Quick — how many *Handbooks* have been sold since the first edition in 1926? What impressive milestone will be reached this year regarding the worldwide amateur population? What specific function does each department at League hq. perform?

If you'd like the answers, and a lot more, you need a copy of the attractively illustrated ARRL *Annual Report* for 1976. A limited number of the 82-page booklets are still available for \$3 (to cover printing and shipping) from ARRL, 225 Main Street, Newington, CT 06111.

1978 OSCAR 7 CALENDAR AVAILABLE

□ The 1978 edition of Skip Reymann's *Orbital Calendar*, used the world over to track the OSCAR satellites, is now

available. It includes all orbits for AMSAT-OSCAR 7 for the year 1978, as well as the spacecraft frequencies and telemetry decoding equations. Also included is step-by-step information on how to determine times of passage of the satellite.

The W6PAJ orbital calendar is available postpaid for \$5 U.S. funds or 30 IRCs (\$3 to AMSAT members and free to AMSAT life members). Overseas orders will be airmailed. Orders and payments should be made in U.S. currency to Skip Reymann, W6PAJ, P. O. Box 374, San Dimas, CA 91773 USA.

To speed handling of your order, please include a gummed, self-addressed label. Proceeds from the orbital calendar benefit AMSAT.

ARRL NEWSLINE

□ When something important happens and ham radio is involved, please remember to call ham radio NEWSLINE so that we can help you get the maximum publicity. Just dial 203-667-0138 and leave your name, call, phone number and the essential details of your story; Hq. will take it from there.

A Combination Fixed-Voltage Supply

Another power supply? Yep — but this one may be just what the doctor ordered. Cliff shows us how to get those popular voltages easily — and homemade yet!

By Clifford J. Appel,* WB6AWM

It seems that every other month at least one of the amateur radio publications has an item about a power supply. It may be that this is just one more to add to the collection. On the other hand, it may appeal to people who have needed a unit such as the one I will describe.

For quite some time I had been using dry-cell batteries for dc power for my transistor and IC projects. Usually these batteries are inconvenient for TTL IC operation since they require 5 V, whereas dry cells provide 4.5 or 6 V. Also, it's a real pain to wire the batteries together to come up with the necessary voltage. And you can bet that within 10 minutes after you swipe the ones from your flashlight, the neighborhood suffers a power failure and you are stuck in the dark with a useless flashlight.

*9436 S. Wales Way, Elk Grove, CA 95624

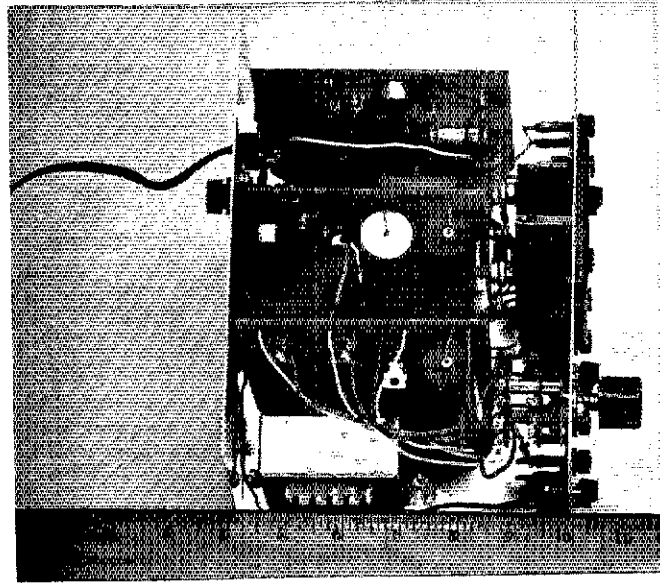
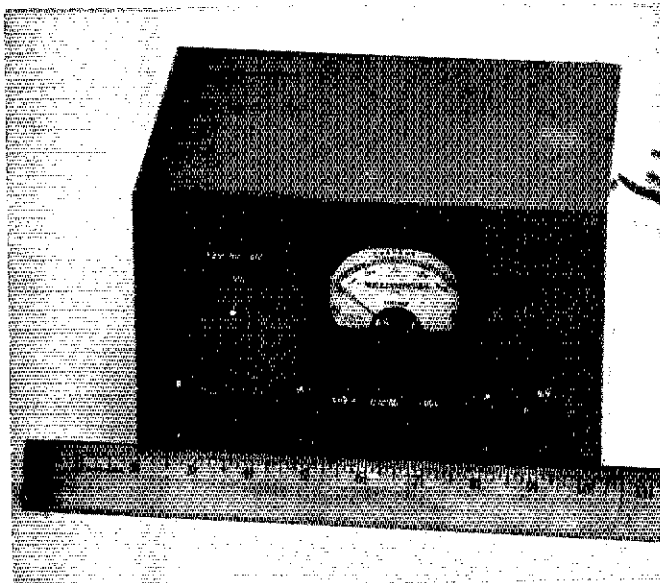
Perhaps the biggest disadvantage of using batteries as a power supply for design projects is that they won't deliver large amounts of current for too long a period before they get weak and the voltage drops. The point is, though, I was just getting tired of fooling with a bunch of batteries.

Adjustable power supply articles have appeared on many occasions. However, for my work I found that I was using "standard" voltages such as +5 V, +6 V, +12 V, etc., and that I really didn't need the adjustable feature. Also, I found that I was "mixing" voltages in a project such as +5 V for TTL and ± 15 V for op amps in one circuit or +12 V for transistors and ± 15 V for op amps in another circuit. Thus, these voltage combinations would require more than one adjustable power supply. Well, why not have all the voltage combinations

available at the same time in one fixed power supply?

The photos show the supply I came up with. One pair of terminals provides +5 V at 1 A, another set provides ± 15 V at 100 mA, and the remaining pair provides a choice of +12.0 V, +8.2 V, or +6.0 V, all at 1 A. All of these voltages are derived by using regulators. There is no need for Zener references or pass transistors. The meter measures current from the +5-V supply. I have found from experience when using TTL in a moderately sized project that it doesn't take too many chips to pull a large amount of current. The meter helps me keep tabs on my TTL supply. My transistor and FET projects seldom come close to pulling one ampere so I didn't bother with a meter on the other supplies.

If 8.2 V does not seem to fit your



On the left, the completed supply. The switch at the upper left is used to select the 12-, 8.2- or 6-V output from one of three supplies. Terminals and connectors for the various supplies are arranged along the bottom, and at the right the homemade circuit boards, mounted vertically, straddle the transformers. It may look crowded but there is adequate room in the cabinet.

category of "standard" voltage, I agree. Actually I wanted a 12/9/6-volt supply but there is no +9-V regulator available that I could find. So, I consider the +8.2 V to be +9 V.

The schematic, Fig. 1, shows the three separate power supplies. The first thing to observe is that the commons on each supply (the 12/8.2/6 is considered one supply, not three) are not connected together. I did this to be able to wire them in series if ever I wanted some other voltage for whatever squirrely reason (example: +5 V and +12 V for +17 V or ±15 V and +6 V for 36 V, etc.). The rectifier diodes are 100 PIV at 1 A. The 12-, 8.2- and 6-V regulators are the LM-340 variety which are available in TO-3 or TO-220 packages. The +5-V regulator can be the LM-340 in a TO-3 or TO-220 package, or LM-309 in the TO-3 package. The 4195 is an eight-lead TO-66. The manufacturer recommends that the input of the regulator be three to five volts greater than its specified output voltage. The 12-, 8.2-, 6-volt regulators can handle up to 35 V input, the LM-309 up to 25 V in, and the 4195 up to 30 V in.

The manufacturer also recommends heat sinks for the regulators if one ampere is going to be pulled (excluding the 4195). With the transformers I used, no heat sinks were required when close to an ampere was drawn. This is probably because the regulator didn't have a whole lot of input voltage to dump off as heat during high current drain.

The meter in the +5-volt supply shows a resistor (R1) across it. My meter was a 150-mA meter which needed six 0.5-ohm resistors in shunt to give full-scale deflection at slightly more than 1.0 ampere.

The interior-view photograph shows the three supplies in an LMB-685 cabinet (6 × 8 × 5 inches). My home-made pc boards are arranged very

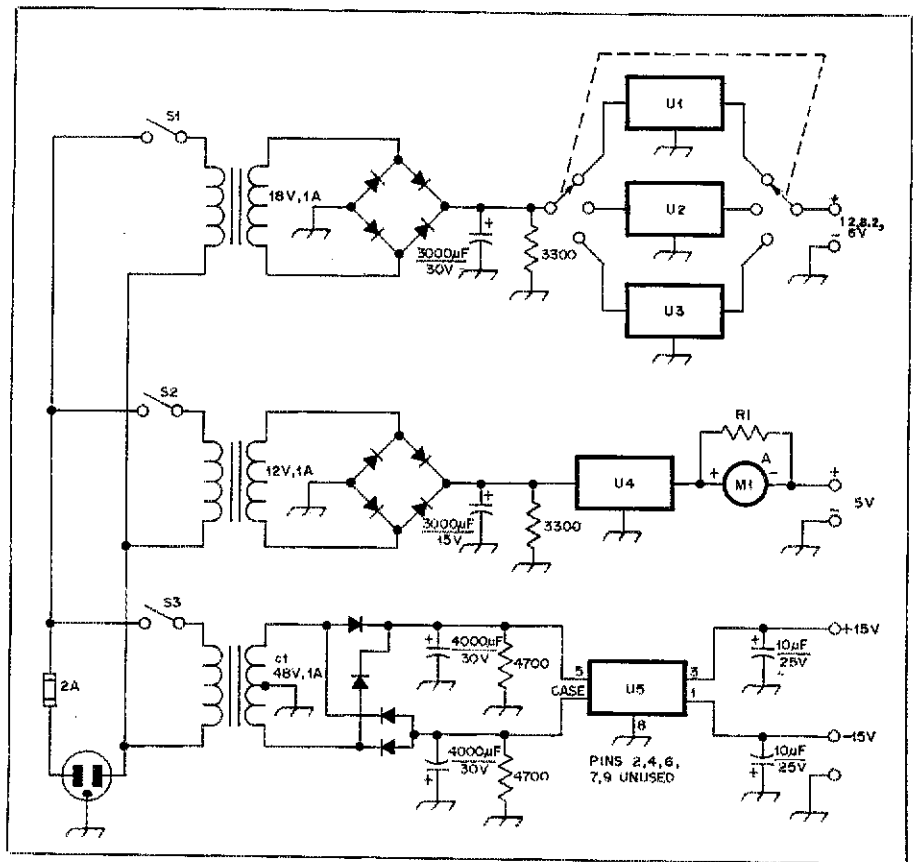


Fig. 1 — Diagram of the fixed-voltage supply. Important: The grounds shown above are not chassis ground; each power supply ground is separate. (The regulators are available from James Electronics, 1021 Howard Ave., San Carlos, CA 94070.)

M1 — 1 A, see text.

R1 — See text.

S1, S2, S3 — Single pole, single throw.

U1 — LM340K-12 regulator IC.

U2 — LM340K-8 regulator IC.

U3 — LM340K-6 regulator IC.

U4 — LM340K-5 regulator IC.

U5 — 4195 regulator IC.

liberally, accounting for the reason things look jammed in. Actually, two of the boards straddle their respective transformers so the interior is not as congested as it might appear.

The power supply suits my purposes fully. In nine months of operation I

have had no reason to require different voltages or more current than the unit provides. If readers of this article need voltages different than the ones I consider "standard," it's no problem to substitute or add another voltage regulator. This supply sure beats batteries.

Strays

POTENTIAL HAM FINDS WILLING FRIENDS

One budding amateur in Long Beach, CA, is learning code and theory from members of a local club. What's so special about that? The student, Brad Williamson, is almost completely paralyzed. He has to learn code with a special machine attached to his chin and send it with his tongue. Injured by a fall that left a blood clot in his brain stem, Brad is 20 years old.

He is being assisted by the Lions

Club, which is contributing a "talking book" tape of the theory and a tape player, the Braille Institute, which is making the tape, and members of the Associated Amateurs of Long Beach (CA). Club members Ray Furlong, N6RF, and Bob Spiegel, WB6ILM, have taken on the responsibility for teaching Brad all he needs to know to pass the FCC exams. With any luck, you may soon be hearing Brad on the Novice bands from Long Beach! — The Oscillator, August, 1977

I would like to get in touch with . . .

pediatricians to form a net. Marvin Gale, M.D., 340 4th Ave., Suite 12, Chula Vista, CA 92101.

fellow amateurs who are members of S.P.E.B.S.Q.S.A. (Society for the Preservation and Encouragement of Barber-shop Quartet Singing in America). M. K. Nunas, VE1NN, 224 Gaspé St., Dieppe, NB, E1A 5C6, Canada.

other hams having a converter that will receive code on a Morse sounder and can send and copy American Morse. (It's legal if you send your call sign in Continental Morse.) W9LQE, R. 2, Box 283, Poland, IN 47868.

The Invisible Rhombic

The rhombic is generally considered to be the king of antennas as far as performance goes. Trouble is, you need four tall supports in a clear area to erect one — unless you make it a Stephenson rhombic.

By J. Gregg Stephenson,* W2OBX/W1DGC

Everyone knows that hf antennas should be erected high and in the clear as much as possible, especially for DX work. There are many situations amateurs encounter, however, where these conditions are not possible or perhaps not even desired for environmental or esthetic reasons. In particular, one may not want to clear out many trees in a wooded area just to provide for an antenna, especially a long-wire rhombic or V type.

Informal outdoor antennas have often proved quite effective during Field Day and similar temporary situations. I was encouraged to proceed with a permanent rhombic installation on three acres of Vermont woodland by an article in the November, 1936, issue of *QST* in which considerable success was reported with less-than-ideal rhombics.¹ The following information may be of interest to amateurs located amidst forested land where a virtually invisible, but effective, long-wire antenna is desired.

Construction

A simple, single-wire rhombic was designed by the compromise method.² It was erected using PVC-insulated No. 12 stranded copper wire, and merely draped in the trees at elevations varying from 30 to 45 feet. Each leg is 250 feet long (3.6 λ at 14 MHz), and the apex angle at the feed and end points is about 50 degrees. The approximate directions of the legs were first laid out with an elementary survey using compass readings corrected to true north and with the main axis pointing in the desired great-circle direction. The antenna

slopes downward from the feed point to the far end about 5 degrees due to the average ground slope. This rhombic has been operated without termination and is fed by 600-ohm open-wire line through a Transmatch device. It exhibits broadband characteristics and is easy to load on any hf band.

Many methods were tried for getting the wire up in the trees, including fly-casting and a crossbow. The most effective method for working in dense

woods and underbrush turned out to be just throwing a 3-oz fish sinker (painted bright red) with about 100 feet of braided nylon leader line (40-lb test), which could later serve to pull up the actual antenna wire. The toughest problem working in dense woodland is to avoid tangles in the throwing line and antenna wire. Our best solution was to flake out the throwing line carefully on a blanket or tarp before throwing the weight, and to proceed over no more than two or three trees at a time. The antenna wire should be premeasured and premarked for the bend locations, and pulled off of a reel near the feed point. Murphy is seldom absent from an operation like this, and considerable patience and the help of someone else (e.g., an understanding XYL) is really necessary. Conditions are most favorable in late winter or spring when there is good snow cover to suppress most of the twigs and leaves.

The rhombic erected in this informal way runs right through tree branches (both deciduous and coniferous), and varies in both elevation and direction somewhat erratically along each leg. But on the average it traverses approximately the presurveyed route. The error of closure at the far end is about 25 feet, but this seems to be of no practical consequence since the antenna is not terminated.

After two years this antenna is still functioning well in all seasons. Because of the resilience of support and the long leg lengths, the rhombic has shown a remarkable ability to withstand blow-downs of branches and dead trees without breaking. However, it is necessary to patrol the wires once in a while and take any necessary steps to remove such problems. Abrasion of the wire against



The Stephenson invisible rhombic at W1DGC/1, south central Vermont. The rhombic is fed with 600-ohm line running up to the gable peak at the near end of the cabin, and the No. 12 antenna wires run off into the woods near the tops of most of these trees.

*22 Arosa Ct Greenlawn, NY 11740

¹ References appear on page 39.

branches has not been noticeable, and there has been absolutely no noise problem from wires touching tree branches, wet or dry.

Performance

This rhombic has been operated mostly on 14 MHz because this was the most useful DX band during available operating opportunities. Limited operation on 7 MHz and 21 MHz shows more-or-less expected results, but more experience is necessary to obtain good confirmation of performance on these and other bands.

Gain results are based on comparison with a well-situated groundplane antenna. Over 30 direct readings of comparative signal strength were obtained from cooperating DX stations, supplemented by observations of received signal strengths on the two antennas. These are crude measurements, to be sure, but the only ones readily available. They do focus on the final practical answer for amateur work — the perceived signal strength at the far end of the DX path, and effectiveness in receiving.

Its effective gain (averaging out fading and polarization effects) in the forward direction over about 30 degrees of azimuth seems to be at least two S units over the groundplane at 14 MHz (10 to 12 dB). In the reciprocal or back direction the gain appears to be less (about 6 dB) due probably to the

antenna slope and attenuated reflected wave in the long wires.

The most surprising result to me was in discovering that, as a general-coverage antenna outside the main beam, this rhombic gives performance at least as good as the groundplane in *most* directions checked so far. Only one or two off-axis readings have shown a slight disadvantage on the rhombic. The apparent absence of deep nulls may result in part from the wandering nature of the legs as they are draped among the tree branches.

On 7 MHz, limited results so far indicate a forward gain over a wider azimuth of about one S unit (about 6 dB), but general coverage in other directions seems to be at least as good as the groundplane. The antenna loads and behaves about like a good general-coverage antenna on 3.5 MHz with no real directional characteristics, but experience here is very limited. Results on 21 MHz are also limited, but performance similar to that on 14 MHz is indicated.

No significant difference between summer and winter operation has been noticed despite the great increase in surrounding foliage during summer. No doubt there is some power absorption from foliage, but the net effect is almost impossible to notice on the hf bands, even when the leaves are wet.

Some confirmation of the general

behavior of informal tree-draped wire antennas has been obtained in another installation. A V beam with 270 feet per leg and an apex angle of 70 degrees showed about 6 dB gain along the main axis at 7 MHz. This antenna uses PVC-insulated No. 16 stranded copper wire, and the average height above ground is about 40 feet.

Lightning hazards are always of concern with antenna installations. We have taken the following precautions: (1) never operate during nearby thunderstorm activity; (2) when not in use, always ground the incoming feeders *outside* the house, and (3) disconnect all equipment from feeders *inside* and ground the inputs.

It seems well worth the trouble to erect long-wire antennas of this type in woodland to obtain significant gain in certain directions, quite good general coverage, with almost no impact on the environment. In fact, there is some whimsical satisfaction in erecting these invisible, but effective antennas. Lack of steerability and nonrejection of some unwanted signals are, of course, disadvantages. But they have not been at all serious for my particular situation.

References

- ¹Hull and Rodimon, "Plain Talk About Rhombic Antennas," *QST*, November, 1936.
- ²Graham, "Long-Wire Directive Antennas," *QST*, May, 1937.

Strays



□ The Hallicrafters Co. has a new service address and is no longer a part of Wilcox Electric Inc. The address is 2501 Arkansas Lane, Grand Prairie, TX 75050. Telephone 214-647-9090.

STOLEN EQUIPMENT

□ Standard SRC 826M 2-meter fm transceiver, serial no. 104207. Has KØKGA inscribed on receiver board; receiver crystal board has been rebuilt. Bill Myers, WBØMCS, 942 E. Mississippi, Denver, CO 80210, 303-777-3353.

□ Anyone desiring to list stolen amateur radio equipment may send the information to Colorado Council of Amateur Radio Clubs, c/o Charles E. Myers, WAØZCS, 1120 Yosemite Drive, Colorado Springs, CO 80910. Please include as much identification information as possible. Free distribution will be made to amateur radio magazines and all Colorado amateur clubs.

Funds for postage and printing will be greatly appreciated.

QST QST QST DE W6QIE . . .

□ At 2000 Pacific time each evening except Monday, Don Johnson, W6QIE, begins code-practice transmissions as he has done for the past 12 years. During the 90-minute sessions, code ranges in seven steps from 5-30 words per minute. Since retiring from the U.S. Navy to his south San Francisco home, reports from as far away as Hawaii, Alaska and Florida along with other regular users attest to the good signal on 3590 kHz provided by 400 to 500 watts input and a dipole about 35 feet up. Earlier this year, Don added tone transmissions on 146.58-MHz fm, using 200 watts to cover the Bay Area nicely.

As if this were not enough, for more than 20 years he has held classes at his station twice weekly, teaching code and theory to would-be hams. His class this past spring was comprised of 50 stu-

dents ranging in age from 12 to over 70. Don is also very active in RTTY traffic work on Navy MARS circuits.



Don Johnson, W6QIE, punches out a QST text on perforated tape, the first step for code-practice material before it is dubbed onto magnetic tapes used to key the transmitters. (K6TP photo)

Product Review

The Motorola MEK6800D2 Evaluation Kit

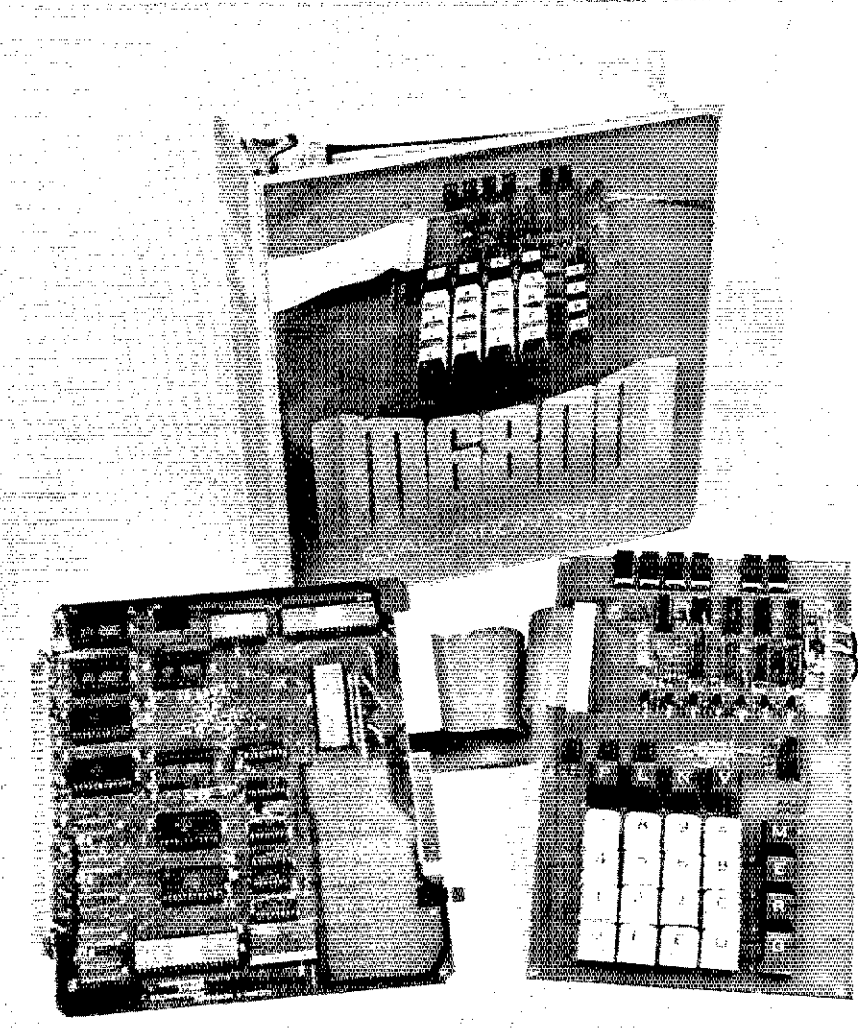
Would you believe that the interest in microprocessors has passed a peak, and that sales have taken a downward turn? Don't you dare believe it, for microprocessors and microcomputers are *still* gaining in popularity, and at a continually faster pace! For thousands of individuals the use of a personally owned computer has become a hobby in itself, and more and more microcomputers are being added daily to those seeing service in amateur radio applications. But where do you start when you think you'd like to get into this microcomputing activity? How do you go about gathering and assembling all of the parts required to end up with your own working system?

A relatively low-cost way is to do a considerable amount of reading and studying, to educate yourself in what it takes to make up a system. Then you do some prudent shopping and accumulate the microprocessor and other necessary ICs, a power supply, a keyboard, a display/readout of some form, and any other desired peripheral or accessory equipment. You can build as you accumulate parts. But for a raw beginner this way is often a slow one, as literature about microcomputer systems sometimes seems to use a coded language all its own; you read and read and read before you finally crack that code. The possibility is great, too, for purchasing some rather costly items which, it may turn out later, are not really what you wanted in your system — there are so many manufacturers' products to choose from, and hindsight is always better than foresight.

Another (more expensive) way is to purchase the major equipment items from a single supplier or manufacturer, either assembled or in kit form, and build up your complete system in this manner. Many such products are advertised in various publications, and several suitable items have been described in the pages of *QST* under the "Product Review" banner.

But the trouble with both of these approaches stems from a fact of life about microprocessors: You need equipment called a *terminal* to get instructions and data into and out of the array of ICs. A terminal can be loosely defined as a keyboard and a display. It may be something as simple as a collection of toggle switches and light-emitting diodes (very time-consuming to enter and read information). Or it may be as sophisticated as an electronic keyboard and a video monitor which displays alphanumeric characters (and for which you can spend a half kilobuck or more). Without a terminal, the rest of that collection of parts will do essentially nothing for you.

What can you do if you want to start with a simple but expandable system right away, without the tedium of an ultrasimple terminal? Motorola's answer to this question is their MEK6800D2 evaluation kit, MEK standing for Motorola Evaluation Kit, and D2



Everything you see in this photograph comes with the Motorola Evaluation Kit except the sockets for the 8-, 14- and 16-pin devices. The terminal (keyboard/display module) is the 6-3/8 X 10-inch circuit board at the right, and the microcomputer module is the 8-1/4 X 9-3/4-inch circuit board at the left. A 50-lead flat cable interconnects the two. The white keys are for data and instruction entry, while the dark keys are for command functions. Each 7-segment LED displays all hexadecimal values from 0 through 9 and from A through F (lower case letters are displayed for b and d). The microcomputer module contains 256 8-bit bytes of random-access memory (RAM) space, with provisions on the circuit board for doubling that amount by adding two 6810 ICs. The instruction manual, a programming manual, and other literature are located in the loose-leaf binder standing behind the two boards.

standing for Design II. The kit uses Motorola's M6800 family of microprocessor ICs. (An earlier evaluation kit offered by Motorola contained only integrated circuits and printed literature.)¹ The '6800D2 kit provides the builder with *everything* he needs (except solder, hookup wire, and a 5-V power supply) to assemble a small working computer system, complete with a unique terminal. With this kit

¹ See "Motorola M6800 Microcomputer Systems Design Evaluation Kit," New Apparatus, *QST*, November, 1975, p. 41.

you can begin gaining practical experience in programming the instant you insert the last IC in its socket and apply power. As microcomputers go, the cost is modest.

Construction and Checkout

The '6800D2 is a kit in the true sense of the word. There are no step-by-step assembly instructions, although at this writing Motorola is contemplating the inclusion of such instructions with future kits. The builder must refer to detailed parts lists, schematic diagrams,

assembly drawings, and engineering change notices to be sure the right part is installed in the correct position. This procedure is no problem for a builder who is experienced in circuits that use ICs, even though he may not have worked with microcomputer systems before, but the D2 kit is definitely *not* recommended as a first-project undertaking!

When I assembled the kit shown in the photograph I went very carefully, double checking every connection before the solder was applied. I also obtained and used sockets for the 8-, 14- and 16-pin ICs and display readouts — just on the chance that I might find it necessary to make a replacement later. (Sockets are provided in the kit for the 24- and 40-pin devices.) My assembly time was approximately six hours for the keyboard/display module and three hours for the microcomputer module, but I've been told that others have completed the kit in less than half that time. Perhaps my reward for the extra time spent in construction was the elation at having everything work exactly as described in the instruction manual under "Start-Up Procedure" when power was first applied.

The instruction manual provided with the kit gives some basic information on programming, and includes a simple program for gaining familiarity with the system. A user learns right away how to examine and change the content of a specific memory location. Most builders find themselves wondering early in the proceedings if they might have any "bad" memory locations, ones incapable of correctly storing all 256 hexadecimal values from 00 through FF. One way to find out is to try each of the many memory locations with each of the 256 hexadecimal values, but, you know, that's an *awful* lot of work. Why not let the microcomputer test itself? The program listing shown in Table 1 will help

you make this check; it takes only about 2-1/2 seconds to check the entire 256-byte memory bank supplied with the D2 kit. If you're interested in following the testing technique used in the program, see the flow diagram in Fig. 1.

Some of the Features

The keyboard/display module contains 24 keys, six 7-segment LED readouts, 13 ICs, 7 transistors, and several resistors and capacitors. Why all those ICs? Partly to include a feature which hasn't even been mentioned yet — built-in audio cassette-tape interface circuitry. Initial programming of the D2 microcomputer is done in hexadecimal machine language, by loading alphanumeric values in a sequence of memory locations. But once you have a program loaded, you can store that information on ordinary cassette tape. When power is removed from the microcomputer all memory information is lost, but it can be restored quickly from the tape the next time you need it. This is a very handy feature for building up a library and exchanging programs, as well as for recording a brand new program for subsequent debugging. (On more than one occasion, I've been debugging a new, lengthy program, only to lose the whole thing through a momentary power outage. You can bet I had most of the information on tape after the first such occurrence.) The cassette-interface circuitry uses the Kansas City standard, which is a format designed to eliminate errors from audio-system speed variations.

The microcomputer module consists of a few resistors and capacitors and 15 integrated circuits, including a 614.4-MHz crystal clock and the M6800 microprocessor IC. Two of the ICs provide for 256 8-bit bytes of random-access memory. Another IC is a read-only memory device (ROM) which contains a "monitor" program designated JBUG. Con-

trol and diagnostic capabilities are handled by this program — such as the presentation of hexadecimal numbers on the 7-segment LED readouts. Some of the other control functions are memory examination and change, examination of the contents of registers in the microprocessor IC itself, and the punching or "printing" of data from memory to cassette tape and the loading of memory from tape. In any microcomputer system, it is the monitor program which permits you to "communicate" with the system immediately after power is applied.

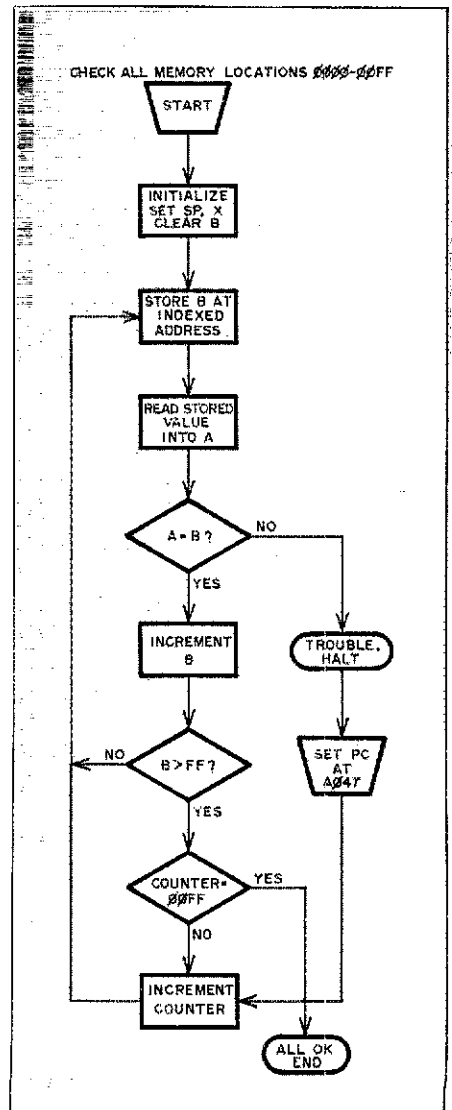
In the photograph you'll see empty spaces on the microcomputer board, some with sockets for additional ICs. These are prewired for ease of expandability by adding RAM, ROM or buffer ICs. In addition, an area measuring nearly 2 x 5 inches is provided for up to twenty 16-pin wire-wrap IC sockets.

Fig. 1 — Flow diagram for the program listing of Table 1. If, after approximately 2-1/2 seconds, the prompt dash is displayed, all memory locations are okay. If A044 3F is displayed, a memory is bad. Depress the G command key to read the address of that memory. To proceed, exit and resume program execution from A047.

Table 1
Program Listing to Check Random-Access Memory Locations

Address	Op Code	Label	Mnemonic/ Operand	Comment
A030	8E A078	START	LDS #A078	DEFINE STACK
A033	CE 0000		LDX #0000	INITIALIZE COUNTER
A036	5F		CLRB	BEGIN WITH 00
A037	E7 00	STORVAL	STAB 0,X	STORE HEX VALUE
A039	A6 00		LDAA 0,X	READ STORED VALUE
A03B	11		CBA	SAME?
A03C	26 0C		BNE	NO, GTO HALT
A03E	5C		INCB	INCREMENT HEX VALUE
A03F	5D		TSTB	ALL HEX-VALUES TRIED?
A040	26 F5		BNE	NO, GTO STORVAL
A042	8C 00FF		CPX #00FF	ALL MEMORY LOCATIONS TRIED?
A045	27 04		BEQ	YES, GTO PROMPT
A047	08	INCCOUNT	INX	INCREMENT COUNTER
A048	20 ED		BRA	GTO STORVAL
A04A	3F	HALT	SWI	STOP, BAD MEMORY
A04B	7E E0A4	PROMPT	JMP \$E0A4	DISPLAY PROMPT

This program is written for use with the MEK6800D2 microcomputer system and Motorola's JBUG monitor. It checks each memory location in the address range from 0000 through 00FF to load and read all 256 hexadecimal values from 00 through FF. The program itself occupies random-access memory space designated as scratch-pad memory for JBUG. The range of memory to be checked can be changed by altering the beginning address (stored at A034 and A035) or the ending address (stored at A043 and A044), where the lower of the two storage addresses is the most significant byte of the memory address and the higher the least significant. NOTE: Because this program occupies memory space designated for the JBUG monitor, some of the program steps may be overwritten during various other operations of the microcomputer.



Further, the JBUG monitor IC can be replaced by either the Motorola MINBUG II or III monitor ROMs. Their diagnostic capabilities are similar to JBUG, but the MINBUG programs are intended for use with RS232 and teleprinter terminals. Of course, additional memory space can be added "out-

board," as can other external devices. The M6800 microprocessor is capable of addressing 65,536 locations.

The Motorola MEK6800D2 Evaluation Kit II is manufactured by Motorola Semiconductor Products, Inc., 3501 Ed Bluestein Blvd., Austin, TX 78721. It is available

through any Motorola semiconductor distributor in the U.S. in a price class of \$215, or \$285 from Canadian distributors. Its power requirement is 5 V dc, regulated, at 1 A. For less than the cost of a 2-meter transceiver you can now have your own personal computer. — *KITD*

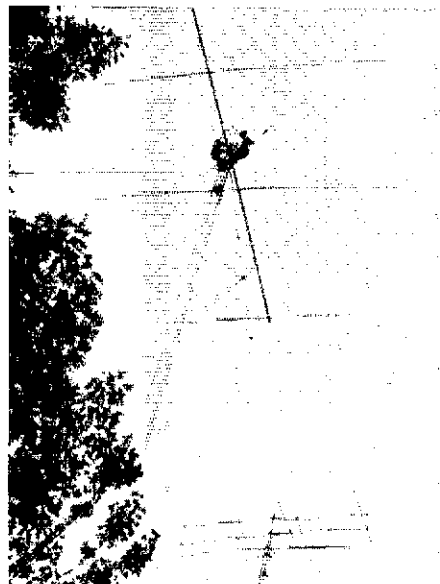
KLM 40-METER BEAM

One of amateur radio's greatest thrills is the first time one hears 20-meter signals on a beam antenna after using a dipole, ground-plane, or other nondirectional antenna. Most of us wait much longer before we are able to hear 40-meter signals on a rotatable, directional array. Fixed antennas such as wire Yagis, quad loops and the like work fine in one or two directions. But there's something about hitting the switch and knowing your beam is turning, toward what you want to work that is unparalleled, in this reviewer's opinion.

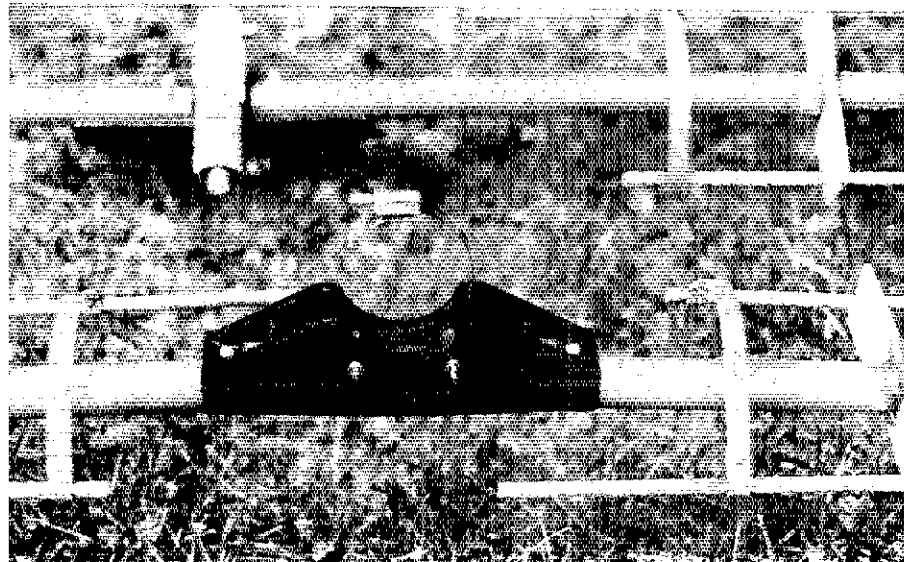
Beams for 40 have been rather a problem lately in terms of market availability. Hy-Gain's 402BA (two linear-loaded elements on a 20-foot boom) works quite well on whichever end of the band it is set for, but not nearly as well on the other end of the band. This is also true of the Mosley S402, which uses loading coils at the element centers and has approximately the same gain-bandwidth factor as the Hy-Gain.² Full-size three-element Yagis for 40 are available from Wilson and Telrex, but their price (especially Telrex) and weight complicate their usage by the average amateur.

The KLM 40 falls into a middle ground between the two classes of Yagis described above. It is not "full size," so it does not present the difficulties of supporting and turning that antennas of that size do. But it

² As the operating frequency departs from the center frequency for which the array was optimized, gain falls off. If the array maintains its gain over a large bandwidth, it is said to have a large gain-bandwidth factor.



K1TN and W1VD install the antenna on 100 feet of Rohn 25 tower.



This shot shows one of the element supports. The manufacturer informs us that considerable experimentation and testing was made with various materials to find a support that would stand extreme cold and heat without damage to the support — this one does.

does approach full size to the extent that it acts like a beam over almost the entire band.

Just what do you get for your bucks? You get 42 feet of three-inch aluminum boom, in four pieces, with appropriate coupling sections; four linear-loaded elements, averaging about 45 feet in length, 1.25-inch diameter at the center and half inch at the ends. The linear-loading tubes are 3/8-inch tubing, all cut to length, formed, ready to build onto the elements themselves, which are attached to the boom with specially molded insulators. You get a one-foot-square boom-to-mast plate with all the proper hardware, including a piece of two-inch mast to use to set up the boom struts (included) ahead of time. You get an ample supply of Penetrox compound for all the aluminum-to-aluminum joints and bags full of hardware to make all the pieces go together.

The KLM 40 is fun to put together, because you begin to get the idea that whoever designed the thing looked at the market, at amateurs' desires and pocketbooks, and at what has been available in 40-meter beams in the recent past. When it's finished, you have one linear-loaded reflector, one director, and one short and one long driven element hooked together with aluminum phasing straps for in-phase feed. A KLM 4 to-1 balun/transformer (optional) finishes the aerial.

Linear loading per se is certainly not a new idea, nor is using two driven elements to achieve greater usable bandwidth. Even shortened elements on a full-length boom have been used before. What the KLM 40 gives you is performance better than a two-element job and not too far behind a full-size

three, for half the weight and about half the bucks. Not a bad deal.

Getting It All Together

Our KLM 40 arrived in early January, dead center in one of New England's worst winters on record. We got off to a bad start when the shipper dropped (literally) the box on our shipping dock, with one end torn open and hardware gushing forth; picking up nuts and bolts from the sidewalk is not recommended as a method of taking inventory but, luckily, nothing was missing. Good thing, too, because it's hard to find stainless steel hardware at the local store, and that's what's used throughout in the KLM 40.

It was too cold to put the thing together on top of the tower (the *only* way, really) so we assembled it with make-shift supports in the snow and tried pulling it up in one piece. Result: one broken element-to-boom insulator. A call to KLM revealed that new insulators were in the works and we decided to wait until they could be obtained before raising the antenna again. (It was never clear if the insulator broke due to some material defect, extreme cold weather, incompetence on our part, or a combination of those factors.)

We finally put the KLM 40 up in May, on a sunny and breezy Saturday morning. Not a hitch, as we assembled the array at the top of the tower. Two riggers handled the 90 or so pounds easily, although it wasn't the first aerial we had ever put up!

The proof was in the pudding, and sweet it was (and is). The aerial definitely is a good performer and better than any two-element beam we've ever used, even full-size, two-element beams. It handles the winds quite

gracefully and it appears that a typical rotor (like the CDE Ham-2) would hold it if proper use of thrust bearings and a long mast were used. This particular one is being turned by a Hy-Gain 400 rotor which provides plenty of margin.

Our particular kit wasn't without a spot or two of difficulty, but nothing which couldn't be solved by a little headscratching and a

quarter-inch drill and file. For some reason the boom didn't go together in the order of pieces that the manual said it should, but we found that it went together in another order. The end caps for the boom didn't fit because the six-inch reinforcing pieces which go in each end of the boom decreased the inside diameter. A few of the tubing-to-tubing junctions wouldn't compress tightly enough and

had to have extra slots sawed in them. But there were no insurmountable problems.

Was it worth the effort? Well, it looks good, works fine and makes a great conversation piece. If I beat you in a 40-meter pileup, you'll know why. Price class is \$500. The manufacturer is KLM Electronics, Inc., 17025 Laurel Road, Morgan Hill, CA 95037. — *KITN*

THE QM70 PRODUCTS FMT-440 TRANSVERTER

There are two basic methods to convert a signal from one frequency to another. The simplest is to inject the signal into a nonlinear device with its output circuit tuned to the desired frequency. The other method is to heterodyne the signal with a second and select the desired sum or difference. Because an fm signal has no necessary amplitude characteristics which would be distorted in a frequency-multiplier stage, it is possible to increase its frequency an integral amount in a nonlinear device. This process is used in the FMT-440 transverter. An fm signal at nominally 146,666 MHz is tripled to 440 MHz,

using a varactor-diode multiplier. This method is quite reasonable when fm-only operation is desired, because the varactor diode is a passive device; it requires no operating voltage. Because all signals applied are tripled, i.e., the carrier and its sidebands, the total deviation of the signal is increased threefold.

For receiving, the standard superheterodyne principle is applied. The output of a crystal oscillator operating at 99,120 MHz is tripled and mixed with the incoming signal. A received signal at 445 MHz yields an output at 147.64 MHz.

Maximum power output is limited by the dissipation of the varactor diode. With the heat sink supplied, a 144-MHz drive level of 30 watts may be applied. At that level, output

on 440 MHz is 12.6 watts.³ When the FMT-440 is used for transmitting on 440 MHz, an rf-sensing circuit is used to activate the tripler automatically. A front-panel switch allows operation on either 2 meters or 70 cm. The FMT-440 may be left in the line when not in use. Current drain is nominally 40 mA in receive, 150 mA in transmit. The unit is designed for use from a nominal 12-volt supply, negative ground. It measures 1.5 × 4 × 7 inches, and weighs about two pounds. QM70 products are distributed in the U.S. by Spectrum International, Inc., P. O. Box 1084, Concord, MA 01742. Price class is \$180. — *WIXZ*

³ Measured in the ARRL lab.

NEW BOOKS

RSGB Radio Communications Handbook

RSGB Radio Communications Handbook, 5th edition, in two volumes. Published by the Radio Society of Great Britain and distributed in the USA and Canada by Ham Radio Books, Greenville, NH 03048. Hardcover volumes, 7-1/2 × 10 inches. Price: Vol. 1, \$18.95; Vol. 2, \$16.50; both volumes for \$31.90.

This publication is rich in theory and practical data. A substantial amount of revision is reflected in the pages of both volumes. There remains considerable emphasis on the theory and application of vacuum tubes, but excellent treatment has been given to semiconductors — particularly in the theory sections of the volumes. The division between tube-type and semiconductor construction projects appears to be on the order of 50-50. Most of the solid-state circuits employ bipolar transistors, but some utilize FETs and ICs in combination with bipolars.

Throughout the publication there is evidence of modern usage of ferromagnetic materials (broadband transformers and interference chokes). There is a lengthy and definitive chapter on keying and break-in techniques. The chapter on modulation relies heavily on amplitude modulation, but there are also some interesting data concerning frequency-modulation methods.

The chapters which deal with hf, vhf and uhf antennas are especially "meaty" for the reader who wishes to build his or her own aerials. Considerable practical data are offered concerning hardware and installation techniques.

A comprehensive chapter has been included to explain the causes and cures for interference. Numerous examples of filtering devices are illustrated in this chapter.

The workshop enthusiast should be

especially pleased with the chapter on measurements. There are many pages which cover testing techniques. Along with this information are myriad practical examples of simple, inexpensive test gadgets that any amateur should be able to duplicate and use.

A goodly number of the construction projects in these volumes rely on artist's sketches or pictorial illustrations rather than photographs. Certainly the pictorial presentation affords greater detail than can sometimes be provided by means of half-tones — especially if the latter are too small or too dark.

The chapters in Volume 1 are entitled Principles, Electronic Tubes and Valves, Semiconductors, HF Receivers, VHF and UHF Receivers, HF Transmitters, VHF and UHF Transmitters, Keying and Break-In, Modulation Systems, and RTTY. In Volume 2 are chapters called Propagation, HF Aerials, VHF and UHF Aerials, Mobile and Portable Equipment, Noise, Power Supplies, Interference, Measurements, Operating and Station Layout, Amateur Satellite Communication, The RSGB and the Radio Amateur and General Data.

This publication is written in the usual precise and technically correct style found in most UK technical literature. These volumes should be well worth the expense to any amateur who is interested in the technical aspects of the pastime. — *WJFB*

Beginners RTTY Handbook

If you already know about 60-mA loops, selector magnets, the Murray code and baud rates, then you've probably dabbled in radioteletype. But for those of you who thought RTTY (ritty) was a new writing game, here's a book that spells it all out. The *Beginners RTTY Handbook* explains the basic theory of radioteletype operation, what hardware is needed to get started in RTTY, and just how to do it!

Actually, RTTY is a kind of writing

"game" using teleprinter equipment to communicate typewritten information over the radio waves. This handbook is published by *RTTY Journal*, which has been publishing RTTY articles for 25 years. The best beginner articles from past issues have been collected, organized and reprinted in this book.

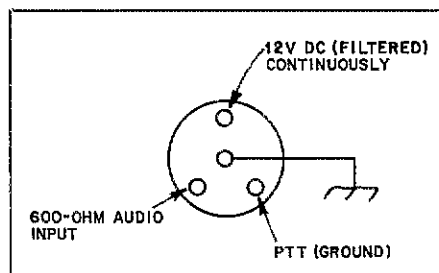
A historical introduction to RTTY is given first, explaining the evolution of the teleprinter from the telegraph. This gives the reader some insight into the design process, and a better understanding of the terms used in RTTY. Also covered are the five-level code, fsk and afsk, demodulators, keyers, loop supplies, gears, selector magnets, and most other aspects of the theory end of RTTY.

After the reader has an understanding of RTTY theory, specific pieces of equipment are discussed. Here, the *Beginners RTTY Handbook* not only describes the functions of each model, but shows pictures and wiring diagrams of some machines that are currently available to the ham. This information can be invaluable to the RTTY buff and beginner alike, especially when picking through old equipment at hamfests! Some of the hardware discussed includes models 15 and 19, the NS-1 and the ST-5. Finally, the RTTY picture-making and sending process is explained by Don Royer, WA6PIR, a well-known RTTY "artist." Samples of teleprinter art are shown to illustrate this unique ham pastime.

This handbook was a great help to me when I was trying to trace the antique wiring in a model 15 teleprinter, and it should be warmly received by all RTTY fans regardless of their experience. RTTY is a fascinating mode of operation which is growing on the hf and vhf bands alike. The *Beginners RTTY Handbook* can make getting on RTTY as easy as pi for any interested ham! The 41-page softbound book measures 8-1/2 × 11 inches. It is available from RTTY Journal, P. O. Box RY, Cardiff by the Sea, CA 92007. Price is \$2.50. — *WB9VAV*

QST

Hints and Kinks



Kenwood TR-7400 Touch-Tone pad modification.

A KENWOOD TOUCH-TONE CHANGE

The manufacturers have replaced the Touch-Tone-pad input jack on the Kenwood TR-7400A PLL Synthesized 2 FM Transceiver. The old miniature jack provided an audio input and ground only. The new jack, a DIN type, is wired for audio input, 9 V dc on transmit only, and ground. While this is an improvement, it has two main drawbacks. The 9 V dc is supplied only on transmit. Touch-Tone pads with built-in PTT-line keying circuits do not work with this arrangement, as they have no power applied. Also, there is no PTT line connection at the jack . . . an apparent oversight.

To correct these two problems, I suggest

these simple modifications. Locate the gray wire that connects the TT pad socket with the tie bar situated near C64. This gray wire is the B+ lead. Remove the wire from the tie bar, feed it through the chassis, and connect it to pin 6 of the relay (RL1). This change provides 12 V dc continuously at the TT pad socket.

Next, install a wire from the unused pin on the TT pad socket to pin 8 of RL1. This is the PTT ground line. Refer to the drawing for the end configuration of the TT pad socket. — Murray Lampert, VE3FXA

FIRST AID FOR THE TA-33 BEAM ANTENNA

When I moved into a house where an antenna could be erected, my TA-33 Jr. was being installed almost before the furniture was in place. Anticipation turned to dismay when Murphy's Law proved itself once again. The antenna would not load the transmitter. Putting my "headbone" to work and with encouragement from the ARRL, I found the trouble was caused by poor connections around the areas connecting the traps to the elements. After a thorough cleaning of all contact points with a metal nail file, the TA-33 Jr. was young and healthy again, carrying a full load. Perhaps some amateurs experiencing a similar difficulty may find this information useful. — Steve Jackson, WA3OHF/6

A TIP FOR A TIP

If you have a soldering iron with a screw-in tip, try sneaking a bit of silicone heat-sink compound on the threads. It will make the iron more efficient and will help prevent the threads from freezing when you want to remove the tip. Do not use too much silicone for it is not meant for these temperatures and will run. — Julian N. Jablin, W9IWI

HEAVY-DUTY GEARS FOR ANTENNA ROTATING

There are hundreds of thousands of garden tillers being used across the nation. These machines are relatively short-lived, and as junk they are very cheap. Each of them encompasses a worm-gear system fully capable of handling a torque of several hundred foot-pounds and the gear ratio is in the range of 20:1 to 28:1. These may be removed and used for homemade antenna-rotating equipment. — H. O. Cantrell, WBSLOT

VOX HINT FOR DRAKE TRANSMITTERS

I have found that VOX problems in Drake transmitters can be helped by replacing the 6EV7 with a 6AQ8. — George Phocas, WA2YPO

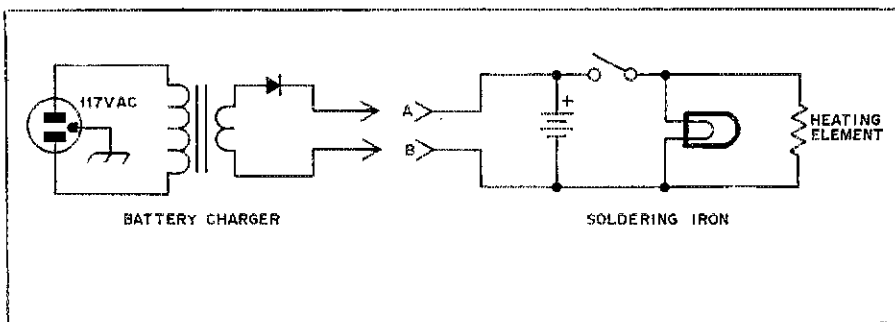
SHORT-CIRCUIT PROTECTION FOR WAHL CORDLESS SOLDERING IRONS

While carrying my Wahl cordless soldering iron in my pocket, the charging contacts in the base shorted against a coin or a key. This put a short circuit across the NiCad batteries and melted an internal wire. A simple modification was devised to prevent a recurrence.

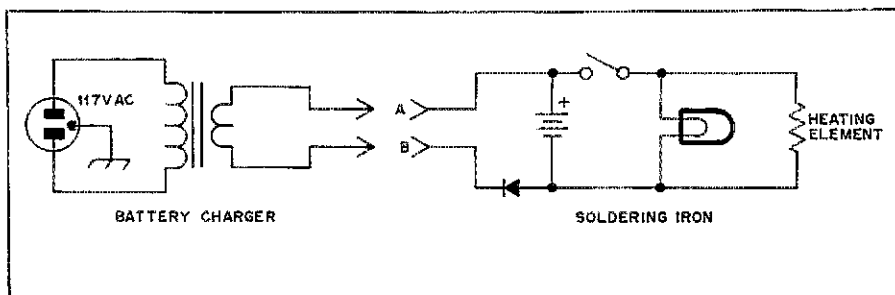
The schematic of the original iron and battery charger circuit is shown. It can be seen that a short across charging contacts A and B will result in heavy current draw from the battery.

The half-wave rectifying diode was removed from the charger and reinstalled in the iron as shown. The charging circuit is electrically identical to the original one. However now the diode prevents the batteries from supplying current to the charging contacts A and B, thus preventing short-circuit damage.

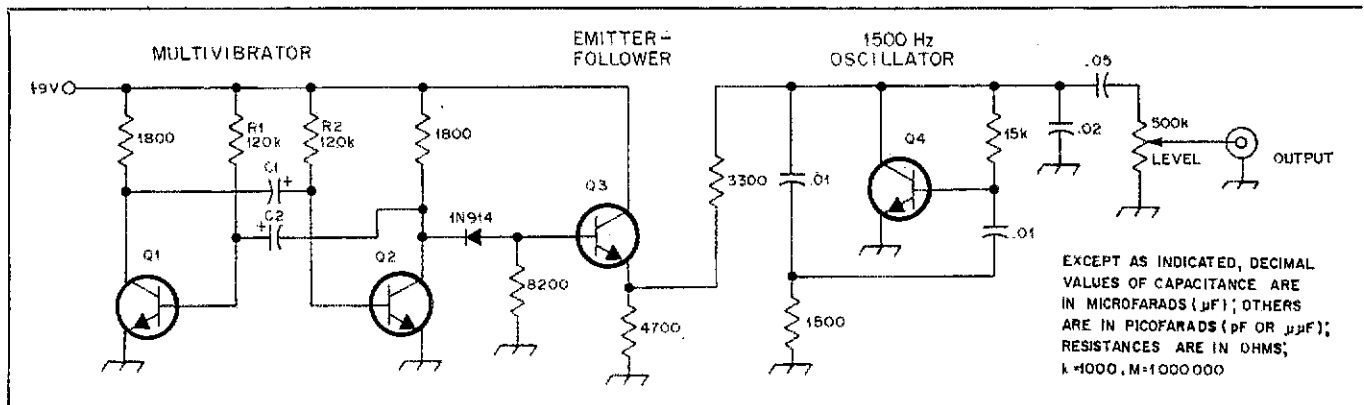
The diode was originally located in the transformer under the outer layer of paper insulation. Care should be taken to reinstall the diode in the correct lead with the correct polarity. A reversal will cause damage to the battery or the charger. Also care must be taken that an unmodified iron is not connected to a modified charger. The ac output of the modified charger will cause damage if used with an unmodified iron. — R. J. Hamel, W9MO/3



The original Wahl cordless-soldering-iron charging circuit.



The modified-cordless-soldering-iron charging circuit with the diode placed in the negative circuit to prevent shorting of the battery.



Schematic diagram of the audio-frequency dot generator.

C1, C2 -- 1 μ F, 16-volt electrolytic capacitor.

Q1-Q4 -- Npn general-purpose transistors, 2N2222 or equivalent.

AUDIO DOT GENERATOR EASES OSCAR SSB SPOTTING

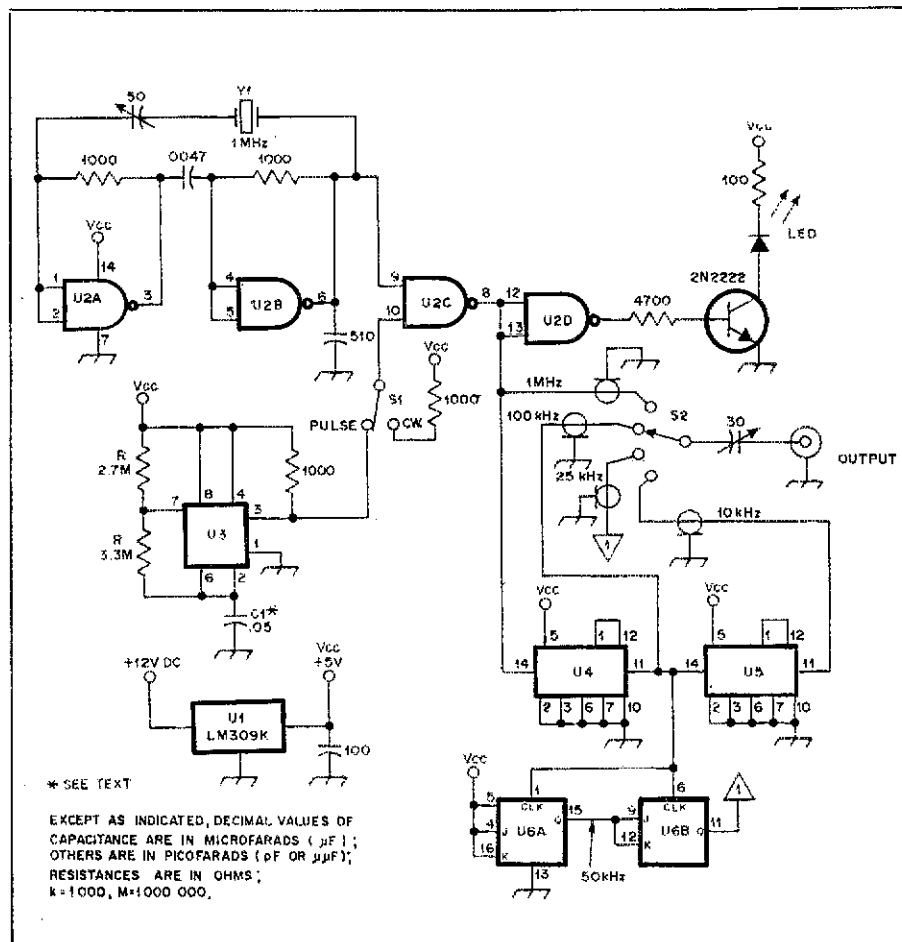
Thanks to the duplex nature of the OSCAR satellites, it is possible for the operator to "talk" himself on frequency while listening on the downlink passband. Using this procedure to zero beat two stations already in contact will cause interference to them. The device shown in the schematic diagram eliminates this problem by generating audio dots at the rate of 12 per second.

Q1 and Q2 comprise a free-running multi-vibrator, with the frequency determined by the values of C1, C2, R1 and R2. Emitter-follower Q3 drives Q4, an audio oscillator operating at 1500 Hz.

The unique tonal quality of this device makes the dot signal readily discernible, and it should only be necessary to use it briefly as the transmitter frequency is varied. If a suitable junction box is constructed, the unit may be permanently connected in parallel with the microphone. — *Marciano Righini, 14MY and Guido Emiliani, 14GU*

A CENTER TAP FOR A FILAMENT TRANSFORMER

Recently I needed a filament transformer for a pair of 811As. The 6.3-V, 10-A transformer I wanted to use had no center tap. I solved this problem by connecting another 6.3-V, 1-A transformer with a center tap in parallel with the 10-A winding of the first transformer. The primary of the added transformer was left unconnected. The arrangement has worked very well ever since. — *Gerald Collins, W8BQE/K4DSE*



This crystal calibrator circuit provides a pulsed output for easy spotting.

AVC ACTION ON THE KWM-2

Many amateur operators have found that the avc action on the KWM-2 is very fast and that overshoot of the S-meter pointer makes readings difficult at times. Slow-action avc may be obtained by connecting a 0.12- μ F capacitor between pin 4 of the noise-blanker socket and the cold end of R74, the 1-megohm resistor connected to pin 6 of V1B. The result is that fast avc is available when the function switch is at the ON position and slow avc action is obtained with the switch on NB. This presupposes that a Collins noise blanker has not been inserted in the set. — *T. A. Dineen, VK3TD*

CRYSTAL CALIBRATOR HAS PULSED OUTPUT

With today's crowded band conditions, a calibration marker can be just another heterodyne. The marker output is difficult to identify unless the oscillator is frequently turned on and off while listening for it. In the calibrator shown in the drawing, supply voltage to the oscillator is turned on and off electronically. Using component values listed on the drawing, the switching rate is approximately 2 hertz. When the calibrator signal is

found, placing S1 in the cw position causes the oscillator to function continuously, allowing the operator to zero beat the calibrator output more accurately. The author's unit was constructed on perforated phenolic board. In this version, a 12-volt power supply was included. Another calibrator was built into a Heath HW-7 transceiver. Reducing the value of C1 will increase the pulse rate, by increasing the switching speed of U3. The LED will light to indicate either PULSED or CW output. — *Richard G. Brunner, WIATO*

QST

Network Hams: A Hobby Becomes a Career

You don't have to look hard to find active amateurs at the three New York networks. Their jobs vary, but their enthusiasm for their hobby doesn't.

By Joel P. Kleinman,* WA1ZUY

When two trucks jackknifed on the George Washington Bridge in midafternoon, they threatened to tie up New York's busy rush hour into the evening. If total chaos was to be avoided, hundreds of thousands of commuters had to be alerted — quickly — to take a different route home.

Minicam operator Jim Fleischmann, WA2BVE, was at the CBS-TV Broadcast Center on the West Side of Manhattan when word of the spectacular accident came. Grabbing his camera, battery pack and some spare batteries, Jim raced to the 30th Street Heliport, where

a helicopter was waiting to ferry him to the scene.

His videotape footage of one truck hanging precariously over the Hudson River was run on the six o'clock local news, and his eyewitness account of traffic tie-ups in New York and nearby New Jersey updated the radio news as well.

After he returned, he spent a few minutes talking about his job, probably one of the more exciting and unpredictable ones in the broadcast industry. "You can be out there from morning to 11 o'clock at night," he told a visitor. "I've covered everything from plane crashes to murders. You never know

where you're going to be." The energetic young man has been a licensed amateur about four years. With only a spattering of electronics in the Air Force, Jim has had very little formal training relating to his career. He has compensated for it with his hobby.

"Oh yeah, ham radio has been very helpful to me," he says. "I relate to it all the time, like when I deal with microwaving from live situations."

Not Really Extraordinary

He laughed as he recalled his first interest in the hobby that led to a career. "My father's a ham, and I used to watch him and say, 'If you can do that, I sure can!' It's been a lot of fun."

As we chatted in the Broadcast Center lobby, word came that wreckers were beginning to move the jackknifed trucks from the bridge, and Jim was on his way back to the scene. His tape for the 11-o'clock news showed traffic backed up for miles from both directions and close-up shots of the trucks being pulled back onto the roadway. The rush hour might have been even worse if motorists hadn't been alerted just before it began. It wasn't a routine day for Jim Fleischmann, but it really wasn't extraordinary, either.

What is extraordinary is the number of hams, like Jim Fleischmann, who attribute their network broadcasting careers to their hobby. From maintenance personnel who repair and inspect complex electronic equipment to network vice presidents and news announcers, licensed amateurs can be found nearly everywhere in network broadcasting.

"We find them in the most surprising places," says Phil Levens, W2EIO. "When we started our club (Broadcast Employees Amateur Radio Club — BEARS), a couple of directors and announcers signed up; they're not necessarily technical people." W2EIO is direc-

*Features Editor, *QST*



The badges of Phil Levens, W2EIO (left) and Merle Worster, W2HTW, read "All Access." There's good reason for it — they're both high-level executives at ABC television. A ham 36 years, Merle feels that his hobby "had a deliberate influence. It was because of ham radio that I got into the broadcast industry."

tor of television operations for ABC television; he is one of several network hams in high-management positions.

At CBS, Dave Minott, WA2EXP, works to insure that the computers which do nearly all the manual labor involved with programming are operating correctly. "Ham radio provided a natural progression into this industry," he says. "In practically every interview I've held with any company, the fact that I had a ham license held a lot of weight. One interviewer wound up talking about ham radio and nothing else!"

Estimates vary, but most agree that close to 200 amateurs populate the various studios, newsrooms, switching centers, transmitters and executive offices at each of the three New York-based networks. Their backgrounds are as different as their present positions in the broadcast industry, but they have one thing in common — an avid interest in radio and electronics. As ABC's Phil Levens says, "If a job applicant has a license, it's a real indication of interest and technical knowledge. You know he isn't someone who was told to go to technical school because it's a good way to make a buck."

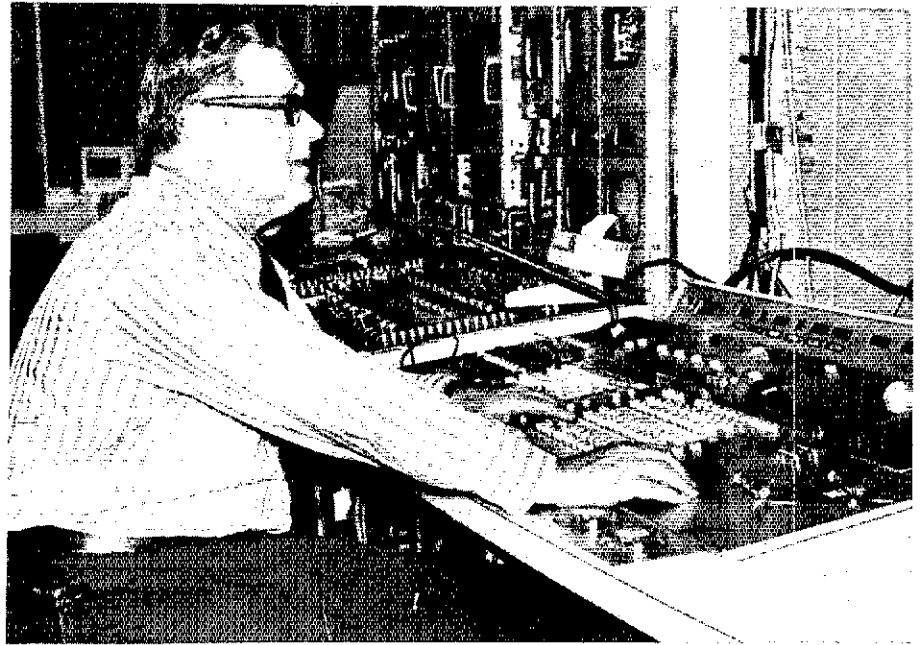
Do Hams Do Better?

Once on the job, do hams do better than their nonlicensed co-workers? If you believe a vast majority of the network amateurs this writer spoke to recently, the answer is an emphatic yes. CBS' Dave Minott answers, "They sure do. You learn to do things the easiest way and the cheapest. You can take a turn off a coil easier than you can buy a new one. Usually things aren't geared this way. Hams I've worked with are very inventive."

Amateurs who work together often find they communicate better — and are more efficient because of it. "It seems to be most evident when time is of the essence," says Dick Moeller, WA2DOS, associate director at CBS radio. "When you're approaching airtime, communications between the director and the technician must be brief. It may not be exactly ESP, but it does help to work with another ham when you're trying to figure out 'What can we do about that?' Or one that really can lead to confusion, 'Can you really do that?'"

Dick speaks from experience, as he and audio engineer Steve Mendelsohn, WA2DHF, form a team with veteran newscaster Douglas Edwards on "The World Tonight," a well-respected wrap-up of the day's events. "In general," Steve agrees, "hams work better together. We often find ourselves using abbreviations to save time. Instead of 'hold on a second' we'll say 'QRX.' We just seem to communicate better."

Another broadcast ham who knows something about the way amateurs



CBS Technical Director Harold Schutzman, W2R11, monitors the stage attached to one of seven control rooms at the giant network. He's been at all presidential national political conventions since 1956.

complement each other on the job is Fred Schutz, K2VNB, CBS' director of technical maintenance. Supervising 70 technicians, many of whom are licensed amateurs, has convinced him that hams bring a special quality to their jobs. "As a ham, you always have an alternate path," he says. "We face critical situations every day where we have to say, 'Suppose this happens; what do I do to get out of it?' If you're a ham, you'll know."

"Hams Are Better"

Although each of the networks has its contingent of amateurs, perhaps nowhere are their special talents more obvious than at the NBC transmitting center on the 85th floor of the Empire State Building. Two of the hams who rotate shifts at the historic facility, where first experiments were run with television beginning in 1931, are convinced that hams do a better job. "I'll tell ya what we find up here — fellas who are hams are better in transmitter work than those without a license," says Mike Pierosak, W2IQH. "They're really interested in the field. In fact, only two of the nine of us who work here aren't hams."

His partner for the evening, Charlie Davidson, K2PDS, agrees. "People who are hams seem to be far more useful to us than those who aren't. They seem to take to it naturally."

A genial man who has spent the last 28 years at the NBC transmitting facility, Mike showed a visitor how micro-

wave signals are tuned in from a live minicam at remote sites up to 30 miles away. At 9:30 P.M., a phone call informed him that a crew would be shooting a scene at the Plaza Hotel for the evening news, an hour-and-a-half away.

One of four horn antennas on the corners of the huge building catches the 7- or 2-GHz signals from the remote van. They are displayed on a monitor and oscilloscope while the transmitter crew adjusts pan and elevation controls to capture an air-quality signal. Another switch chooses between four polarizations for added control. A two-foot dish on the mobile van relays signals via either line of sight or multipath (bouncing signals off intervening buildings).

After trying several angles and antenna configurations, the pre-airtime survey was completed. Few of us who watch the evening news realize that it can take an hour to set up a single live remote shot, or that the people who make it work are likely to be licensed amateurs.

An Uncommonly Strong Interest

Bringing to their jobs varying backgrounds and carrying varied responsibilities, there's no simple way to describe broadcast hams. One teaches judo and amateur radio, another made a game-saving catch in the 1969 World Series and still another has no technical training whatever — only a degree in music and a ham license. Whether trained in electronics or not, their amateur radio hobby more than likely turned them on

to broadcasting in the first place.

First licensed at age 14, Rich Gelber, K2WR, was in the pits at the Indianapolis 500, at ringside for a recent heavy-weight championship fight and with the 1976 Presidential campaign. The ABC-TV audio engineer credits his ham background with getting him his job. "I didn't do that well in college," Rich says, adding with a smile, "Ham radio had a lot to do with that." But what he lacked in academic accomplishment, he more than compensated for in enthusiasm. After working on Yale University's commercial fm station, a friend he met over the amateur bands helped him land his first television job. That experience, in Albany, NY, in turn led him back to his native New York City, where he's been in both radio and television. "It's incredible the number of doors ham radio opens for you," he says. "Just mention you're a ham to some of the people you work with, and you get stuff done."

A maintenance engineer who makes sure the sophisticated videotape equipment at CBS television works properly, George Keller, W2DM, needed no prodding to get involved with amateur radio. "I knew since I was a kid that all I wanted to do was radio," he says. George loves to talk — and his hobby is high on the list of favorite topics. He remembers being fascinated with radio even before he was licensed at age 17. "As a kid, everything was radio, radio, radio. I ignored everything else, like most hams."

Employed at CBS the past 10 years, George has often used his amateur instinct to advantage. On one occasion, while manning the CBS transmitter a few years ago, he solved a sticky problem that others couldn't. "Our signal was down in one part of New Jersey; we were getting a lot of complaints," he recalls. "Maintenance checked it out with a lot of complex equipment, but they couldn't find the problem. One



Flanked by Dick Moeller, WA2DOS (left) and Steven Mendelsohn, WA2DHF, nationally known newscaster Douglas Edwards broadcasts "The World Tonight." An avid CBER, Doug has yet to be smitten by the amateur bug. But Executive News Director Tony Brunton, WA1QHS, who supervises news operations for CBS radio, enjoys hamfests and 10-meter nets.



Pointing to the NBC transmitter atop the Empire State Building, Dave Hubby, W2SNM, says, "I used to work up there." He now inhabits the video control center in the RCA Building, a handy location for keeping an eye on WR2AHU, the repeater of the Broadcast Employees Amateur Radio Club. With members from all three networks, the BEARS repeater is the most active one in New York.

night I borrowed a janitor's fluorescent light and went up there to check each dipole. It turned out that one of them had a busted connecting strap, so I just taped a broom handle to it. "It was just a matter of going back to basic theory — voltage peaks, in this case," he says.

George holds every type of FCC license — but one. "My wife has a CB license," he explains, a wide grin spreading across his face. "Ya know what handle I use when I'm on? 'The Kosher Ham.'"

Traded Glove for Mic

A ballplayer-turned-sportscaster has a singular view of amateur radio's contribution to the broadcast industry. Ron Swoboda, WA2HVM, traded his New York Mets' outfielder's glove for a CBS mic three years ago and took up amateur radio about a year ago.

"I don't claim to understand the type of equipment we use, but I think you should have an appreciation of the skill of the guy working with you," he told a visitor. "If he doesn't throw that switch, you're talking into a dead mic. It's the coordination between technical people that gets a broadcast together. You can't see it, but it happens."

Having had only a year's minor league experience before joining the Mets, the 2-meter enthusiast drew an analogy between his baseball and broadcasting careers. "I burst upon the scene green, scared and unprepared." After a moment's pause, he added, "Hey, I like that!"

As he waited for copy to come in for

the 11-o'clock sports he does for CBS television, Ron talked about how his late-blossoming interest in amateur radio relates to his new career. "I was interested in ham radio from the standpoint of talking into a mic. It was a medium I wanted to know a little more about. As a kid I knew someone who worked for the FCC now; he got me interested."

Does his status as a former ballplayer, whose name is familiar to all baseball fans, interfere with his enjoyment of his hobby? "In a sense, it's nice to talk to nice people without the celeb treatment. But sometimes it opens up other communication if you tell them who you are."

It wasn't difficult to see that Ron Swoboda enjoys his newfound profession and hobby. But baseball isn't far from his mind either. After providing a nonstop 10-minute analysis of his former team and teammates, he talked of the future.

"Two meters sorta suits me right now," he says. "I think eventually I'll get into the code a little more, though."

Began Building at 12

As crew chief at CBS television, Harold Schutzman, W2RII, supervises advance preparations for studio and remote shows. His interest in electronics was stimulated in an unusual manner. "I got a shock when I put my finger in an electrical socket at age seven. Since then, I've always wanted to be in radio."

A ham since 1945, Harold began

building radio equipment five years after his shock and until recently used a 450-watt a-n rig that he put together in 1950. He now uses an SB-104, an anniversary present from his wife, but will always prefer building to operating.

"Ham radio helped me understand the new system of transistors when they first came in," he explains. The first day a new control board was put into operation, his amateur radio-bred talent for coping with emergencies was put to a demanding test.

"We blew 43 power amplifiers before we could figure out through the process of elimination what was happening — we were blowing finals while rewinding the videotape machine. As with most technical problems, no disruption to the two shows, the Evening News and Captain Kangaroo, was noticeable to viewers.

"Although problems are bound to come up when you're working with machines," he notes, "very few shows are actually interrupted."

Ray Sills' Live Sounds

In contrast to the multimillion dollar computer and video equipment the broadcast industry has come to rely on, one facet has remained pretty much the way it was 30 years ago. CBS sound-effects expert Ray Sills, K2ULR, rummaged through dusty boxes of old dishes, metal scraps, bells and bowling pins (used to simulate a person falling to the floor) to show a visitor his stock of "live sounds." He normally does one soap opera a day.

"Each studio is connected electrically to a sound-effects cubicle," he explains. "We also use an awful lot of 78-rpm records, most of which are older than I am. I can play up to three at a time to add, say, crickets to an outdoor sound mixed with rain. The signal-to-noise ratio is very good on the old 78s."

Ray Sills is obviously proud of the job he does. "It's very creative in a way," he says. "One time I had to imitate a mailbox being opened. I rattled it in a certain way to get the exact effect — everyone was thrilled. When they're done well, you're not even aware of sound effects."

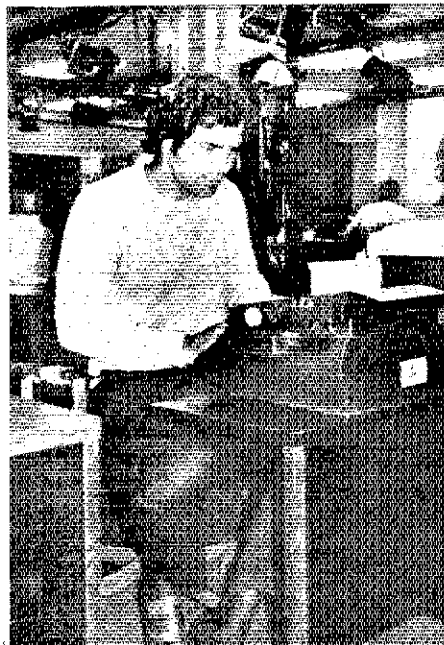
Having studied music in college, Ray's ham license provided the technical background he needed to break into the industry. "Since I have no formal electronics training, it all goes back to amateur radio," he says.

He earned his Novice license in 1956 as a New Jersey teenager, and soon began building rigs that operated on 40

and 80 meters. "I once ran two watts on a 40-meter harmonic with my 80-meter rig and QSO'd a Massachusetts station," he recalls. "I was half thrilled with the DX!"

The hundreds of network amateurs who, like their giant employers send signals over the airwaves, are clearly a credit to their various professions. Many of them will agree with ABC's Bill Nicosia, WB2ZXX, who attributes his career almost solely to his hobby.

"Ham radio was a tremendous influence. It opened a lot of doors. If I hadn't had the background earlier, there's no telling where I might be now." QST



Although Ron Swoboda, WA2HVM, might still look more at home in a New York Mets uniform than he does at the typewriter, his 11-o'clock sports show has won plaudits from viewers all around the town.



First licensed at 17, George Keller, W2DM, is active on 20- and 80-meter cw. He is shown here threading one of the videotape machines he keeps humming for CBS television.

Strays

PROFITIOUS TIMING

□ When Don, WA6HJW, heard that a climber had fallen and become trapped on some cliffs at the end of the Torrey Pines, CA, airport runway, he jumped in his station wagon and sped to the cliffs. From there he contacted the local authorities using 2-meter mobile gear. Amateurs were providing communication for a glider meet, as the airport has no telephone service.

BOOK REVIEW

□ We recommend to you without reservation *Icebound in the Siberian Arctic*, by Robert J. Gleason, W3KW.

This \$4.95 paperback, published by the Alaska Northwest Publishing Co. (Box 4-EEE, Anchorage, AK 99509) is the sort of yarn that you can't put aside once you start it. It's the story of the fur schooner *Nanuk*, frozen in the arctic ice over the winter of 1929-1930, and the search for the famous arctic pilot Carl Ben Eielson, who crashed while trying to reach the frozen-in schooner.

Young Robert Gleason had started out as a radio amateur, later obtaining his commercial license and going to sea. During the struggle for survival in the Arctic, when commercial 500-kHz circuits failed because of distance and propagation, Gleason was able to get through on his ham rig. He was the only link to the outside world. If you get excited about the thought of amateur radio playing a key role in a true,

real-life adventure, then get a copy of *Icebound in the Siberian Arctic* from your bookstore, or from the publisher. It's great! — WIRU

CAP FINDS ELT — QUICKLY

□ What's the best way to find an emergency locator transmitter in a 220-square-mile grid of Illinois countryside? Use two 2-meter repeaters, that's how! The Civil Air Patrol did just that during a recent exercise, simulating recovery of a downed aircraft. Aided by the 22/82 repeater in Joliet and the 34/94 machine in Kankakee, ground search teams found the transmitter in only 45 minutes, a vast improvement over previous attempts. Operators were K9CQ, WB9VEJ and WB9YHD. — WB9VEJ

November Sweepstakes Propagation Predicting

Try some short-haul propagation predictions; then test your findings in the popular November Sweepstakes contest.

By Jim Cain,* K1TN

There's no time like contest time to test your ability to predict radio conditions. Long-time favorite contest, the November Sweepstakes isn't a long-haul activity in terms of number of hops, but skip does play a part and so we present on these pages specially tailored propagation charts for mid-November. K1ZND's article ("Chart Your Way to Better DX," *QST*, January 1977, page 58) outlined use of such charts, but for those not having that article here is a brief rundown.

The vertical axes are frequency in MHz, horizontal are time (UTC, of course) of day. The upper line on the graph is highest possible frequency (hpf), the darker middle line is the muf (maximum usable frequency) and the bottom line is the fof (optimum traffic frequency). Hpf means during about three days out of 30 the frequency indicated by the curve will be propagated at that time of day; muf is 50 percent of the time and fof is 90 percent.

SS participants using modest stations may be most interested in the fof and muf curves, while the "big guns" will probably want to watch the bands indicated by the hpf. Winners have usually done that, anyway, in order to win. There is an old adage about being on the highest band that's open.

Conversely, as the big guns rush to higher bands to find new stations, the lower bands (say, 20 meters) will become less congested for the weaker signals. And smaller stations having reasonable signals may want to get to the higher bands early while they are

less congested. This is getting complicated, but that's what makes contests interesting!

The paths indicated by the charts' titles were chosen on the basis of (1) areas of maximum population/traditionally high SS participation and (2) interesting and usually difficult multipliers for the Clean Sweep (all 75 ARRL sections). New York, NY, can apply for most of the Boston/NY/Washington corridor; Detroit for the Great Lakes region; Plains, GA, for the Southeastern U.S.; Dallas for Texas and vicinity; Sacramento for all of California and somewhat for Washington/Oregon. The Whitehorse, Yukon charts give a good idea of how to snag both VE8 and KL7 multipliers, while the Hawaii and Canal Zone charts should put most everyone on the tracks of those two goodies.

Yes, it does appear that some areas are left out, but there just isn't room for hundreds of charts. Some interpolation can be done, however, with good results. Keeping in mind that the higher bands usually open up from East to West, typical skip zones on those bands, and facts such as it's one hop from New York to Colorado but slightly more to California, you can draw your own curves onto the chart which comes closest to your area. If you are in Wyoming, don't worry about finding the best band, since everyone will be busy finding *you*!

For the longer haul paths used in the SS, the "Sartori Method" described in September *QST* will be of some help. Of course, as some of us have discovered the hard way, a 20-meter beam at 120 feet is great for working Asia, but definitely a handicap in the SS, so

watch out and don't put too much emphasis on such things as the antenna-radiation-angle factor in the Sartori equation. Some listening to WWV a few days before each contest weekend may pay off in finding a VE8 on 15 instead of 20 or 40.

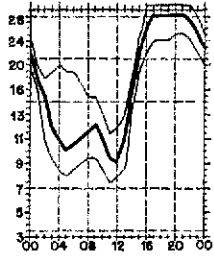
A suggested plan of attack might be as follows: Check bands according to the hpf curve, and do some transmitting, not just listening. If nothing is happening, go back to the next lower band and continue operating. At intervals of your choice keep checking that higher band, until it opens. Keep in mind areas of the country having large populations, watch as your "dupe sheet" fills up in one call area, then check the charts for other areas of the U.S. and Canada which you are slim on. You may not want to be on the highest band propagating to California but rather on the muf band for the Midwest, or for Florida, or whatever.

We sincerely hope that the ultimate outcome of these charts will be that more people will be on the "best bands" at the right times, and activity will be increased as a result — not that there is any lack of stations to work in the November SS. We mean "activity" in terms of two-way contacts, new record scores, more Clean Sweeps, more completed 5-Band WAS awards, and more satisfied participants.

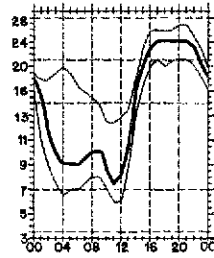
When you submit your SS logs, slip in a note as to whether or not you used the charts and how useful you found them. Your comments will determine whether additional charts are to be done for future contests; can you imagine sporadic-E charts for the 10-Meter Contest and Field Day? Good luck SS!

*Assistant Technical Editor, *QST*

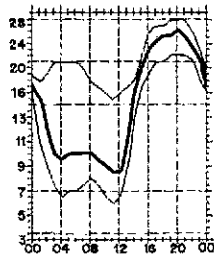
Sacramento to Dallas



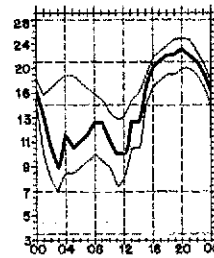
Sacramento to Plains, GA



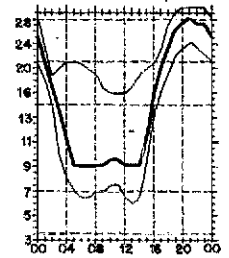
Sacramento to New York City



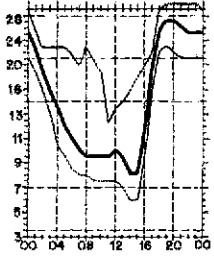
Sacramento to Detroit



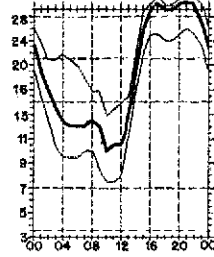
Sacramento to Whitehorse, Yukon



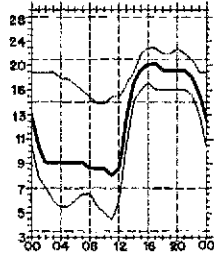
Sacramento to Honolulu



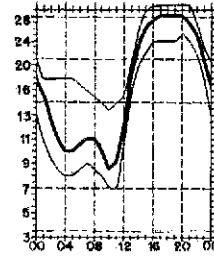
Sacramento to Balboa, Panama



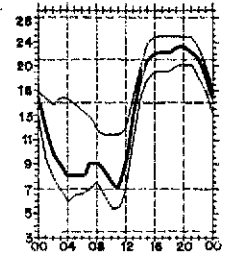
Dallas to Plains, GA



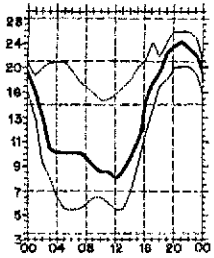
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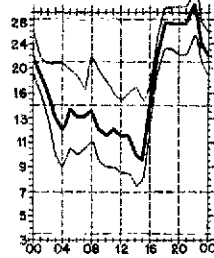
Dallas to Detroit



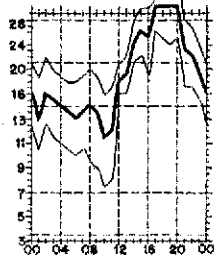
Dallas to Whitehorse, Yukon



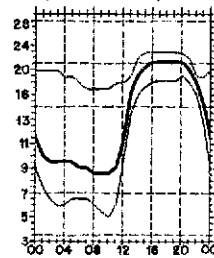
Dallas to Honolulu



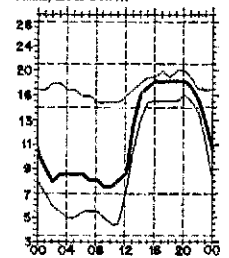
Dallas to Balboa, Panama



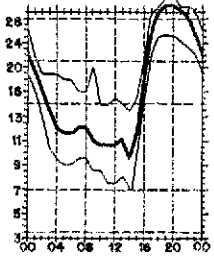
Plains, GA to New York City



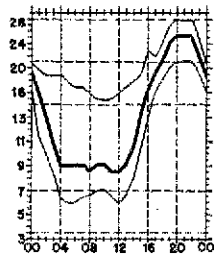
Plains, GA to Detroit



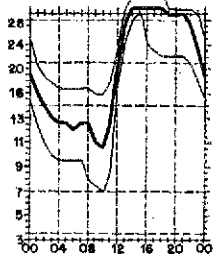
Plains, GA to Honolulu



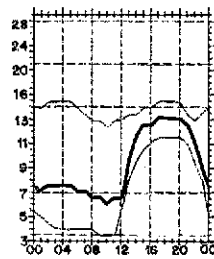
Plains, GA to Whitehorse, Yukon



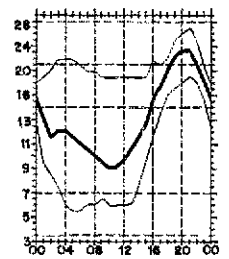
Plains, GA to Balboa, Panama



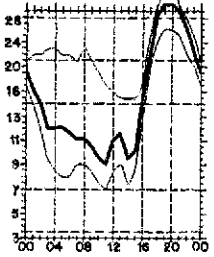
New York City to Detroit



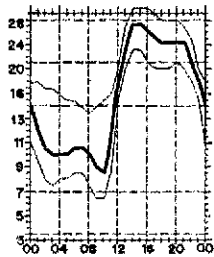
New York City to Whitehorse, Yukon



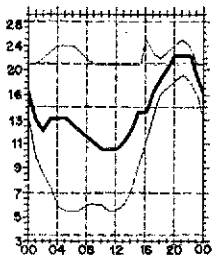
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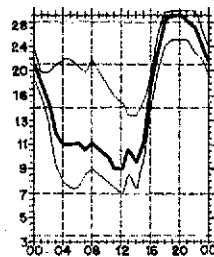
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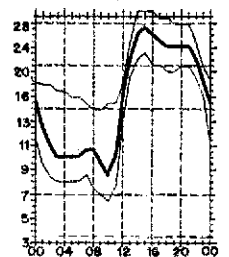
Detroit to Whitehorse, Yukon



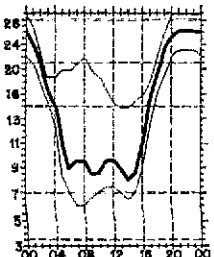
Detroit to Honolulu



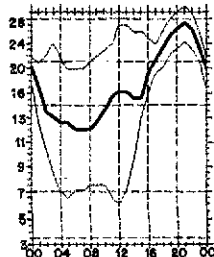
Detroit to Balboa, Panama



Whitehorse, Yukon to Honolulu



Whitehorse, Yukon to Balboa, Panama



These charts predict average propagation conditions for the month of November on high-frequency circuits between various areas of the continental United States and possessions, plus the Canadian Yukon Territory. The highest curve is highest possible frequency (hpf), the middle (darker) curve is the maximum usable frequency (muf) and the lowest curve is the optimum traffic frequency (fof). Horizontal axes are time in UTC; vertical axes are frequency in MHz. These predictions assume a sunspot number of 48, corresponding to a solar flux of 101. For additional information consult articles in January, 1977, *QST* (Sumner) and September, 1977, *QST* (Sartori).

A Baptism by Fire

California's second-worst fire ever brought nearly 500 public-service-minded amateurs out of the woodwork. Thanks in part to their efforts, there were few injuries and no damage to man-made structures.

By Ed. Gribi,* WB6IZF

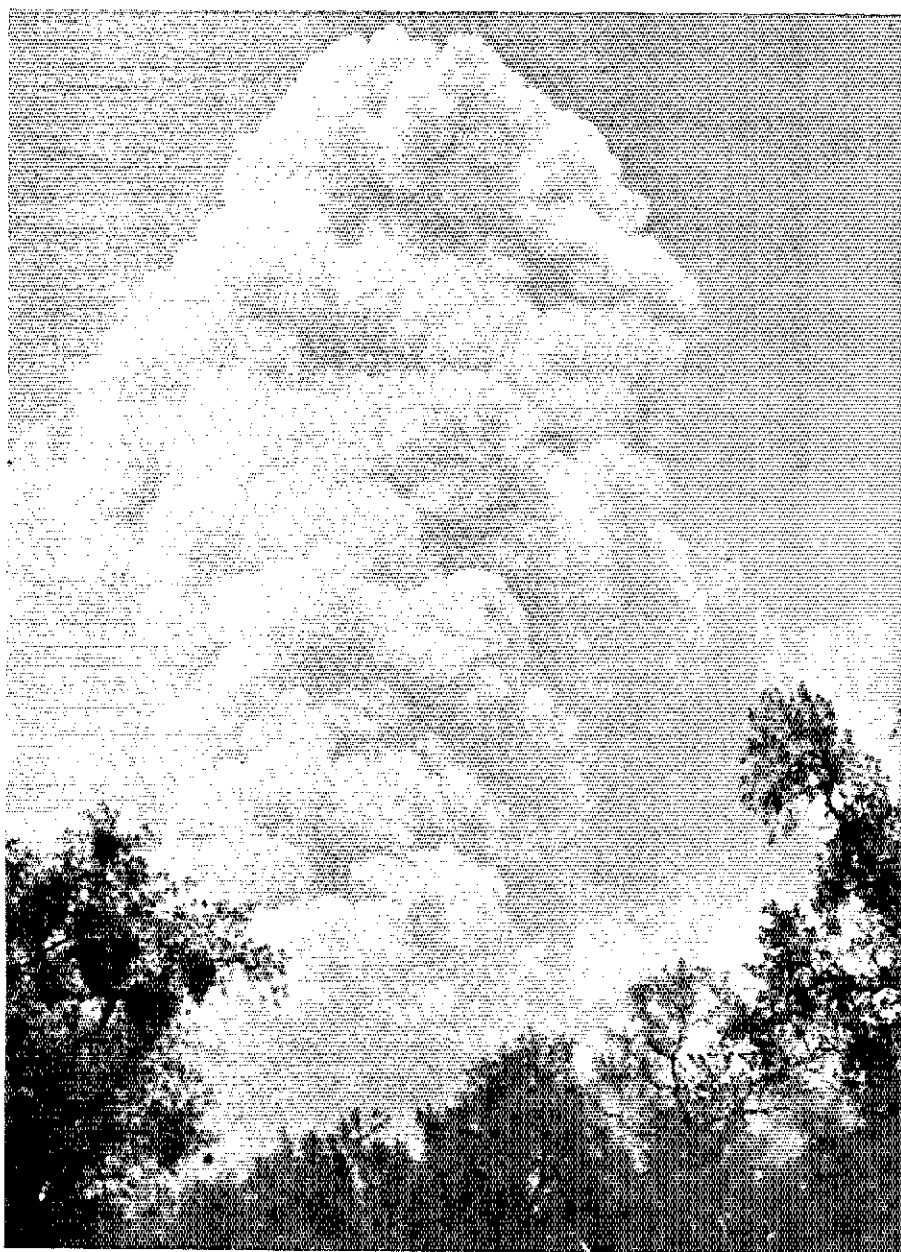
This story really begins in the late afternoon of January 3, 1974, as snow began to fall in King City, southern Monterey County, CA. Snow! No area resident could recall more than a handful of times that snow had fallen in this temperate coastal region. By the morning of January 5, six inches lay on the ground in King City. No big deal — lots of happy kids making snowmen, using improvised sleds, people without power because of fallen lines, and the like.

In the rugged fastness of the nearby Lucia Range, the snow fell in abundance. Arroyo Seco reported two feet on the ground, while Indians Guard Station of the U.S. Forest Service, Los Padres National Forest, had more than four feet. Back in the heart of the forest, the Ventana Wilderness between King City and Big Sur, four to six feet of snow fell during the storm.

The aftermath was as dramatic as the hundred-year snow itself. I remember hiking with one of my kids in the foothills late in the fall of 1974. When I asked, "What's wrong with the hillside?" my son disdainfully answered, "The snow, dad. It loaded up all the trees and dropped the branches." All over the region the snow had pruned trees like a giant scythe.

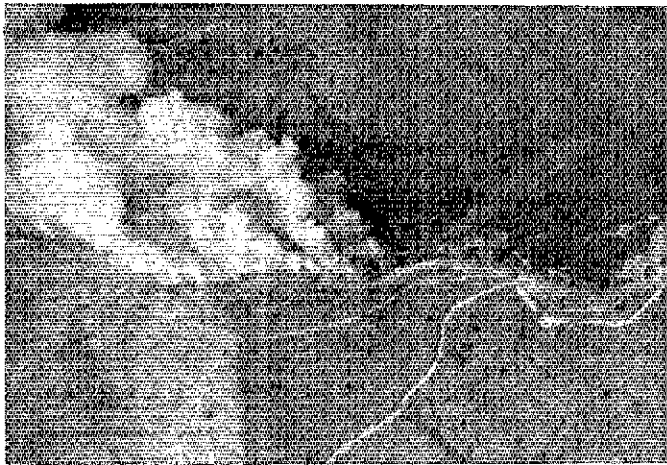
This accumulation of deadwood weathered two relatively dry winters. At the end of July, 1977, there were seven hot days in a row, culminating in thunderstorms on the afternoon of August 1. At about 3:30 P.M. lightning struck repeatedly in the interior of the Lucia Range with elevations ranging from 1500 to 5800 feet. Two fires were started, the Marble Peak fire and the Double Cone fire. By August 4, they had joined.

What was to become known as the Marble Cone fire was not contained until August 19. By that time, 175,000 acres, nearly 275 square miles, of rugged



One of the techniques in the fighting of forest fires is to build a back fire at some appropriate point in order to create a barrier between the existing fire and additional forest land. This spectacular "explosion" took place when a back fire was started along one of the desired barrier points.

*Box 984, King City, CA 93930



Another back fire, as seen from an elevation of about 4000 feet above the ground. (The plane was piloted by WA6BXN.)



At the Indians fire camp, W6MSG was set up in this camper, to handle traffic back to the control station W6UCS in King City.

forest land and prime watershed had been burned. The fire consumed 90,000 of the 98,000-acre Ventana Wilderness. It was the second largest fire in California history.

We Were There

Amateur radio? Oh yes, we were there. Nearly 500 amateurs participated directly, many driving several hundred miles to relieve their comrades. Eleven different field positions were occupied, usually five at a time, for 12 full days. There were stations in every fire camp, often before the camps had any other facilities. The last station didn't pull out of Marble fire camp until it began demobilizing on the 20th day of the fire. A control station at the King City ranger station in Los Padres National Forest coordinated up to three vhf circuits and one hf circuit for the 12-day period.

There were 5,000 fire fighters deployed at the peak of the fire, along with several thousand support personnel with great quantities of equipment. We handled hundreds of the overflow messages — "Where are the 500 lunches? . . . Please locate an overdue convoy.

. . . What's the matter with the hot showers? . . . So-and-so, please call this number." (If he didn't get an answer, he might finally resort to a direct amateur radio link.)

Three new 2-meter repeaters were put up to serve the remote locations; two were temporary repeaters specifically devoted to access difficult locations. As the fire wore on we handled health-and-welfare messages for the fire fighters from all over the U.S.; hundreds of one-ways, two-ways and phone patches were sent out on 80, 40, 20 and even 2 meters. In addition, we ran two intercoms. For eight days we dispatched at least 350 vehicles for the transportation section and for 12 days we provided communications controlling one-way traffic on the narrow road between coastal Highway 1 and the mountaintop Flores and Anderson fire camps.

From Scratch

Several people have asked me how we constructed this rather complex, auxiliary communications facility so quickly. I usually reply that we did it from scratch. Certainly, we had no contingency plan for such a large or sus-

tained public-service operation. However, my pat answer did not do justice to the existing framework, however skeletal, to the existing facilities and resources nor to the fantastic adaptability, flexibility, resourcefulness and common sense of amateur radio operators.

My part of the story began when I received my certificate dated July 12, 1977, as section emergency coordinator (SEC), Santa Clara Valley, ARES, ARRL, from SCM Jim Maxwell, W6CF. In the next couple of weeks I contacted the existing emergency coordinators (ECs), appointed some new ones and made a "social" call on Art McDole, W6WJM, Monterey County communications director.

I received a call through WR6AZO, the new Fremont Peak repeater, on August 2 asking me to get in touch with McDole. At his office, he explained that the Forest Service needed auxiliary communications support, particularly at the south perimeter of the mushrooming fire.

We decided to put WR6AWM into operation at a U.S. Army site on Williams Hill. Emergency permission was granted and a working crew com-

A Day in the Life

0700 — Received first traffic. Reported to the officers in the camp and advised them that we were there to catch their overflow of official traffic, and health-and-welfare traffic. We found that the Air Force Reserve had set up a microwave link, so communications were pretty well covered for official agencies. No personal calls were permitted on their circuits, so health and welfare will be big. One-way messages are increasing as people find out who we are and what we are doing here. Some of the fire fighters have been out here in the boon-docks for as long as three weeks. They come from all over the country: Maine to Louisiana, Idaho and California. They're literally collapsing as they come off the trucks.
0800 — "Are you the guy who sends the messages?" Wow — the word is out! We're busy. Lots of messages coming in. We check in to

WSCARS and offer them a 21-piece traffic list. They flip out! W6VVM and W6RUU come up to 7265 kHz to take all our traffic, splitting it between them. What a help!

W6ONO works continuously on 40 meters while I coordinate traffic on three rigs and get replies back to the senders. All this, while building another antenna. WD6AZQ is on 04/64 with WA6PWT, passing traffic. W6ONO has moved to 31/91. We're really clearing the traffic but more comes in all the time.

1915 — Began patching calls through WR6AEA with WB6FFC. We run 33 patches, initially. The news spreads. People gather around us like a phone booth. Most of them have never talked on a phone patch, so we give them a little speech to explain it. The fire fighters are thrilled to talk to home and I'm touched by the love in their voices. One fire fighter learns he is a new father and everybody cheers him.

We have suddenly become camp heroes. Soon, it's a mob scene outside our truck.

2230 — Last call made on WR6AEA. I'm in shock from being cooped up in the cab of my pickup with all those phone calls and I'm hoarse.

2300 — Ominous red glow in the sky to the south. Much smoke in the air.

0200 — Secured station.

0235 — Camp P.A. system: "GET UP, GET UP! GET READY TO LEAVE!" We are shocked. The camp is moving! The wind has shifted south and the fire has jumped the big cat line. The smell of resin is in the air and strange warm breezes spring up from different directions — an odd feeling. The camp area is now directly threatened. Trucks are hastily loaded, fire fighters gather their things and board trucks, the little town is being packed up . . . an army is in retreat.

A new chapter begins. — W6RKT



At the Marble Cone Control Center in King City (W6UCS), operators included K6SKA at the left and WB6TTE right. (All photos, courtesy W1RU)

posed of W6LIO, WA6TAB, K6LFZ (EC, San Benito County), WB6CAN and WA6PLE (EC, Monterey County) loaded the new machine onto a pickup for the 95-mile trip to the site. With the aid of W6HWW and WA6WZU, it went on the air that afternoon and worked like a champ throughout the fire. It provided immediate, solid coverage for mobiles and base stations at critical locations between King City and most of the area ultimately affected by the fire. Less than six hours earlier I had received first word that Art McDole wanted to see me.

"Tickle My Toes"

The initial call-up of key amateurs was by landline. Within minutes, however, most of our arranging went over to amateur frequencies. WR6AZO, WR6ABD and 146.52-MHz simplex were used almost throughout the period of amateur involvement. Jeff, WA6WZU, now a senior at King City High School, was called at his remote ranch home about 35 miles south of King City. He spent most of that first afternoon on a strategic hill near home with his 2-meter mobile unit acting as a link to alert and call up our colleagues in the communities to the south through WR6AEL, the San Luis Obispo 22/82 repeater. Then he helped put up 'AWM and wound up traveling to the most remote fire camp. He was last heard from for that day at 0350: "If you can't get me on this frequency, just tickle my toes."

Meanwhile a 2-meter handheld unit and then a full-size 2-meter rig were set up at the King City office of the U.S. Forest Service, the Forest District headquarters. The first message was sent

from there by simplex relay 30 minutes before the 'AWM repeater was operational. WA6PLE and WB6CAN were en route to the first projected fire camp. They were told that the fire camp would not be at that locality because of the fire's rapid movement. Similar location changes of fire camps and other facilities took place throughout the period and kept us hopping.

'PLE and 'CAN soon found a useful place to hold several miles south of the fire perimeter. Several messages regarding logistical items were passed in the hours they stayed there. One QSO was quite important. Fort Hunter Liggett is bounded along its entire north and west sides by the national forest. The fire was visible from Fort headquarters most of the time. The commanding officer drove up to take a firsthand look. Then he tried the telephone and two radio circuits to call into the King City ranger station without success. He spotted the two hams and found that they had direct communication via WR6AWM. Within moments he was arranging for mutual support directly with the responsible Forest Service officer.

This type of communication was repeated many times during the fire. Telephones were everywhere and many new lines were quickly run; radio communications were solid and comprehensive for fire fighters, trucks and aircraft. Most auxiliary and support services had some sort of capability. But a typical message on our circuits might be to have a particular person at a field location call a counterpart in King City by telephone. Often the line was busy for so long that the parties wound up talking directly or relaying a message via amateur radio.

Stations in Three Camps

The morning of the third found a fairly glum group of amateurs on the air. Nothing seemed to be happening and few people were using our services. That soon changed and the glum voices brightened considerably. Ernie Mavis, WB6FMB, responsible for communications maintenance throughout the Los Padres National Forest, assigned us the specific functions of supporting the transportation and public information sections and to be prepared to handle outgoing health-and-welfare messages for the burgeoning numbers of fire fighters in the fire camps.

By that afternoon we had stations in three camps, in the ranger station and in the public information center in King City. Also, we were providing the communications for controlling the one-way traffic from Highway 1 to Flores and Anderson camps. Everybody was gearing up for the long pull with dipoles in the trees and Yagis sprouting. The Western Public Service System monitoring frequency, 3952 kHz, became our primary hf link and an essential one as new fire camps developed in canyon bottoms.

That evening another station was activated at Monterey Airport to relay arrival data as chartered jets brought fire-fighting teams from all over the country. W6DOB and WA6TAB alternated manning this position for two days of the buildup. WB6KSD and others maintained the amateur radio position at Monterey County communications in Salinas. Reg, W6FAD, Salinas, acted as our answering service on the north, moving from repeater to repeater, to relay information about amateurs volunteering their services. With this information we were able to direct people, sometimes changing their assignments en route as changing conditions required. To the south the Santa Barbara SEC, Ernie, WB6HJW, started sending us replacement teams as needed.

Drills Paid Off

On August 4 the two fires became one, but we didn't know it until several days later because of the obscuring smoke. Another fire camp was started at Arroyo Seco, so WB6JHM and WA6TLP went in as it was setting up. At about 1930 that evening, the King City station adopted the call sign W6UCS, the club call of the Monterey Bay Radio Club (W6WJM, trustee). This greatly simplified our identification procedures.

At about the same time Walt, W6ASH, EC for Palo Alto and vicinity, arrived at what we now were calling King City Control Center, accompanied by W6BFH and WA6NIL. The years of Field Day, SET and other drills that W6ASH and colleagues had participated

in affected the Center very quickly. With little fanfare we soon had signs and large wall charts showing the working circuits, locations and operators, and a projected schedule of incoming operators and assignments. They were religiously kept up-to-date for the 10 more days the Center was in existence.

By Friday the fifth we were getting down to a routine, even though it was hectic at times. The Santa Maria Radio Club had brought us a trailer which enabled Center operators to snatch some sleep away from the rush there. WA6EUZ and K6AYC brought us a new repeater, WR6ADC. We set it up in the living room of WB6JQA, Greenfield. "Lou's repeater" enabled us to communicate from the Center to Arroyo Seco fire camp on vhf for the first time. That same day we were asked to support the motor pool. The transportation section was located next to our Center but the parking lot for the many contracted trucks and buses was a couple of blocks away. W6DOB parked his Winnebago at the lot and for the next eight days a succession of stations relayed requests for dispatch of vehicles and inventories of vehicles on hand.

Came as Far as 200 Miles

Our wall charts for that first weekend showed 18 to 20 amateurs manning four fire camps and field sites, and three distinct stations operating in King City. At any given time there were five to 10 hams on the highway going home or coming to relieve their comrades, some from as far as 200 miles distant. A number of stations were monitoring vhf and hf in outlying communities and helping us coordinate the supply of operators, equipment and transportation to keep our operation going and to pick up the outgoing health-and-welfare traffic that was increasing in volume.

We were using three repeaters, one simplex channel and hf full time, as well as several other circuits when required. A fair portion of the communication on our own system was simply our own logistic support traffic to keep ourselves going. The remainder of the traffic, however, was fire-related support or H

and W that could not be handled by other facilities. Keeping all this going required delegation of responsibilities, particularly at the King City Control Center. A number of amateurs assumed these responsibilities and carried the load without batting an eye. My list of acting assistant emergency coordinators included WA6PLE, WB6KSD, K6LFZ, WB6CAN, K6TCP, WB6TTE, WB5LMJ/6, N6YR, K6JE, W6ASH, W6MSG, WA6HJW and others overlooked but not forgotten.

Communications were not the only thing we provided. A National Guard unit was in King City with a microwave relay unit to set up on an obscure mountaintop. WB6CAN knew exactly how to get there, so he and WB6KSD, though homeward-bound after days on duty, detoured a couple of hours out of their way to guide the unit to the correct turnoff in the dark.

Marble fire camp ultimately had 8900 people in it — and one pay phone for "public" use. Marble camp was in a hole for vhf. WB6CAN, WB6KSD, K6LFZ (funny, those calls sound very familiar), WB5LMJ and WD6CGH contrived a temporary repeater out of back-to-back transceivers. It went up on the same mountaintop that 'CAN and 'KSD had pointed out earlier and served flawlessly for the remainder of the fire.

Still Only Half Contained

The fire passed the 100,000-acre mark on Friday, August 12 and was still only 50 percent contained. Bulldozer lines and backfires in progress gave good hope of containing the fire within a designated perimeter, however. The need for our motor pool intercom ceased on the 13th. By the 14th we realized that "King City Control" was no longer controlling anything — field stations were relieving themselves or just staying on as required. Therefore, that evening we released the field stations to operate independently and dismantled our jury-rigged, but functional, control center. The Forest Service in King City released our road control intercom on the morning of the 15th. The situation was a little different on the coast side, though. The

USFS man-on-the-spot asked our crew to stay just a few more hours, so W6ASH and WB6DWP remained until replaced that evening. The needs for our services ceased at the Indians fire camp on the 15th and at Arroyo Seco on the 16th. The fire by then had consumed over 150,000 acres.

A dramatic change occurred by the morning of the 17th — containment had jumped from 60 to 90 percent overnight. WB6OIR, WB6RNG and W6QPG were still in place at the Marble fire camp. The last support-type message may have been handled on the 18th. The National Guard in King City had sent a message to Marble regarding a guardsman there who should be notified of an impending blessed event, but the details were incomplete. Between amateur radio and a couple of local phone calls, we got it straight and confirmed delivery at 1140.

W6QPG was still sending out H-and-W messages when the fire was officially contained on the evening of the 19th. On Sunday, the 21st, the 20th day of the fire and the 19th day of amateur radio involvement, Roy took down his antennas, stowed his motorbike on the stern of his fifth-wheel camper and headed for home at Petaluma, some 200 miles to the north.

Field Day plus RET

Thus ended for most of us what had been the longest and largest sustained combination Field Day and Real Emergency Test. At no time did an emergency exist — injuries were miraculously low and no important structures were lost. However, at every point the dangers were there with many aircraft flying hazardous missions, hundreds of vehicles and heavy equipment operating in every kind of terrain from freeway to cross country, and nearly 10,000 people from all over the United States doing their job in an unfamiliar area.

It was an unprecedented and unique opportunity for radio amateurs to respond, and they did — in remarkable numbers and remarkable ways. My wife concluded three things about hams after listening to several hundred minor miracles occur over many days: Hams are (1) crazy, (2) incredible and (3) magnificent!

Fire Veterans Are Lauded

Accolades from grateful local officials began pouring in soon after the Marble Cone fire was contained. In a personal letter to SEC Ed Gribi, WB6IZF, the Monterey County director of communications, Art McDole, W6WJM, praised the "super job" done by the amateurs. "I am pleased that we have such a capability in Monterey County and I assure you that the radio amateurs are and will continue to be a very important part of our emergency planning and operation," he wrote.

Congressman Leon Panetta praised the actions of the amateurs involved as a "key to the successful containment of this blaze,"

while State Senator Robert Nimmo told Gribi he was "particularly impressed with the number of radio amateurs who volunteered their time and services during the fire." He then invited the SEC to testify before the Senate Select Committee on Fire Services that was looking into ways of improving emergency communications.

Finally, Allan West, supervisor of the Los Padres National Forest, expressed "most sincere thanks for all of your efforts and cooperation during the Marble Cone fire." He asked Gribi for a complete list of amateur volunteers so each could be thanked personally.

On September 18, 70 amateurs and their guests gathered for a "Smoked Hamfest" to

talk over their participation in California's second-worst fire in history. They heard USFS official Frank Ealand, WA6IBE, stress the importance of the volunteers' capability to provide phone patches and outgoing health-and-welfare traffic. The calm of the barbecue was in sharp contrast to the blaze which had been roaring out of control only four weeks before.

Lest the public-service-oriented volunteers suffer a letdown, two who attended the hamfest encountered two separate auto accidents and relayed the information through WR6AWM. The repeater has been involved in more public service in its first 50 days of operation than most machines are in a lifetime!

The Cardboard "Clock" — A Simple Universal Time Converter

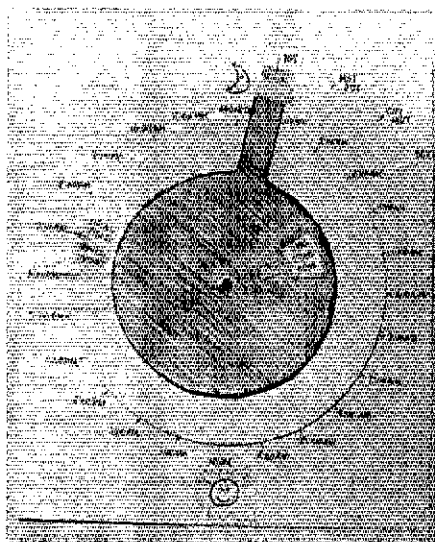
GMT, UTC, Z have you reeling? You're not alone! Build this simple time converter — UTC to local time and vice versa — in a half hour, and your time problems are over.

By Paul F. Hultquist,* WB0SEO

Among the many traumas I suffered as a Novice was keeping proper time in my first logbook. Mountain Standard Time was not altogether satisfactory, especially when the last Sunday in April rolled around and when my first QSL cards began to arrive with Z, GMT and UTC designations, none of which agreed with my log. I finally decided that UTC was the only way to go. If you can't beat 'em, join 'em!

The XYL was not receptive to the

*2615 Van Gordon Drive, Lakewood, CO
80215



With the tab set to Pacific Standard Time, and the rotatable outer circle at 7 P.M., the UTC time (0300) is clearly visible in the window.

idea of spending hard-earned family shekels on a 24-hour clock, particularly when it was to be in the shack (whose contents cost too much to begin with!) and would read "funny" time. The conversion table in the ARRL logbook was neat, but not awfully easy to use. So I put my imagination to work and produced a relatively simple — and cheap — time converter.

The inspiration came one day when I was looking at a cardboard universal calendar that a late colleague had invented some 40 years ago. A circular nomograph would do it!

The first model proved to be unwieldy because I tried to make a converter based on the 12-hour local clock. That required two windows in the top circle of the nomograph to distinguish A.M. from P.M. and led to some confusion as to which window to read.

Easily Switched

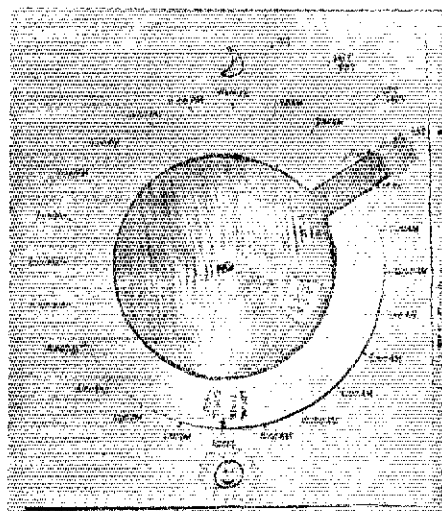
The 24-hour model that I finally developed eliminated that problem, as it is easily switched in April and October from standard to daylight time or vice versa. A little art work on the bottom sheet makes it clear as to whether you should be reading local time on the A.M. or the P.M. side of the dial.

To make one, you'll need only a compass, a protractor, an X-Acto knife, a push pin, a mounting board and three sheets of thin cardboard. Two old file folders will give you plenty of cardboard. It is possible to put the device together as a "circular slide rule" without the mounting board if you have a

tool that can rivet the cardboard discs together in such a way as they can turn freely.

First, choose two circle sizes that are convenient for your circumstances. The one I made used diameters of 4-1/4 inches and 6 inches because those were the diameters of two circular protractors I happened to have. Note that on the inner circle you must leave a narrow tab that extends beyond the larger circle.

Cut a window in the inner circle as shown. It should be at least 20 degrees wide. Mark the outer circle with an arrow; this will be the local time point-



Now set to EST, the time converter shows that 1700 UTC is noon local time.

er. On the backing sheet draw a circle the diameter of the larger circle and mark every 15 degrees corresponding to the hours of the day. Number these to represent local time (usually noon to midnight to noon by the 12-hour clock).

Putting It Together

Now put the push pin through the centers of the circles to assemble the nomograph. Use a small piece of masking tape to stick down the tab so that the window in the smaller circle is in a convenient position. The line from the center of the circle through the center

of the window should be approximately horizontal. Mark the position of the tab with the *local time system* (e.g., MST). Turn the larger circle so that the arrow points at some local time. Using the table in the ARRL logbook, print the corresponding UTC time in the center of the window. Now advance the pointer to the next local hour. Print the corresponding UTC number in the window, and continue until you have covered the entire 24 hours. If you made the circles and the window large enough you can now go around once more on the half hours.

Next, move the tab exactly 15 de-

grees *clockwise*. Mark this tab position with the designation for the time zone *east* of yours. If your original marking was for *standard* time, the new marking also serves for *daylight* time for your zone. It is not difficult to figure out what the markings should be for other zones.

This Cardboard Universal "Clock" has proved to be very convenient in my shack. Because it costs practically nothing it should appeal to hams who do not have a lot of money to spend or who, like most of us, would rather spend what they have on communications gear.

QST

Strays

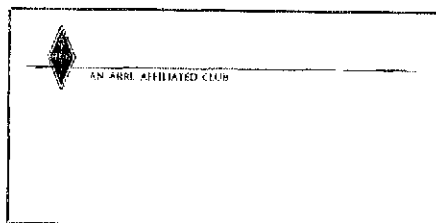


It's not often that certificates of Code Proficiency are hand-delivered by League President Harry Dannals, W2HD, but this was a special occasion: Commander Dannals, USNR, was once the group's commanding officer. At far left is CWO-2 George Keller, the unit's Executive Officer, who received his certificate "a long time ago." Members of Naval Security Group Activity 502 are, left to right: CWO-2 Keller, Lt. Geoff Harrington (Commanding Officer), President Dannals, CTR-1 Francis Hupfer, CTR-1 Mitchell Carness, CTR-2 Vincent Cassara, CTR-2 James Yandoli, CTR-1 Edward Genninger. Not shown: CTR-2 Douglas Janelle, who was on active duty.



At the Western Carolina Amateur Radio Society Hamfest at Asheville, NC, WA4ASQ demonstrated his "good to the last drop" transmitter — a 40-meter cw rig with one 6AG7 and 150 milliwatts. The percolator top lights up when the transmitter is keyed. — *W1YL photo*

Club Notes



The diamond and print are red on white paper.

Club logos are interesting and unique; they attract attention and look official. Many affiliated clubs have their own

stationery with logos and the ARRL diamond on it: Others have official logos but no letter head. After querying the affiliated clubs, it was decided to prepare stationery that could be overprinted or stamped with the club's name, address and logo. It is now available at 100 sheets for \$3 to affiliated clubs.

Another slide show for clubs? That's correct. The Arecibo (Puerto Rico) radio searching system on super-high frequencies. This 12-minute slide/tape set explains the coded radio signals

beamed to the universe. The radio signals contain such information as the molecular structure of common elements on earth. The scientists at Arecibo also use the telescope to listen for intelligent signals being transmitted by who knows whom. Not only does the slide show cover what the telescope does but it also explains the physical characteristics of this amazing radio telescope. Don't forget to tell us at least a month in advance several dates you can use it, as we're sure to be swamped for orders. — *WA1STO*

QSLs - How to Get Them in a Hurry

Part 2: Last month you learned how to send your QSLs overseas. Here's all you need to know to get them back from your valued DX contacts.†

By Dick Tlapa,* K9DNR

If you're a typical new amateur, you probably came into amateur radio via the citizens band or shortwave listening. In any case, what better way to take full advantage of that amateur ticket than by getting into DXing — the art and science of working other amateur radio stations from Argentina to Zambia?

You could only get out 15 miles or so on your 11-meter rig; you could only listen to broadcast stations on your shortwave radio — DXing puts it all

together. In this second and final part, we'll take a look at the psychology of DXing — how to encourage that YL in YU-land (Yugoslavia) to send you a memento of your contact, a QSL card.

With the sunspot cycle once again on the upswing, there are lots of possibilities for new DX contacts using a minimum amount of power. With new contacts, of course, come those bugaboos of DXing, pileups. Hoo-boy! As all experienced DXers know, pileups demand a great deal of listening and key-up operation, and often lead to frustration at not being able to break through the kW's and our rivals' advantages in locale.

If you're an experienced DXer, you know firsthand what goes (and what doesn't) into a successful contact: You're not about to sit on the DX frequency or pound or yell "Break Break"; you realize the folly of tail-

An Envelope Helps

Using stamps as a lure can have its drawbacks too. During one sleepless night, I flipped on the receiver and down at the end of the 20-meter cw band came a faint station talking to a Japanese. Wow — it sounds like New Hebrides, I thought. He came back to me after his QSO had ended, and we had one of our own. The date was February 14, 1958.

Several years passed, and I noticed that Dave had never QSL'd, so I thought I'd try again. His card finally came, 10 years after our QSO. "Yes, Dick, I remember our QSO," he wrote. "I sent you several cards (via direct mail)."

This time, Dave had sent me the card in an envelope! — K9DNR

*Box 183, Cicero, IL 60650

†Part 1 appeared in *QST* for October, 1977.

Incoming QSL Bureaus

Just getting into DX? Then you'll want to know the easiest and cheapest way to collect as many cards as possible from your far-off contacts. A time-honored system of card distribution to U.S. and Canadian amateurs is available to everyone — just as long as you're not in a hurry!

Each call area has its own central QSL Bureau (see Table 1) staffed with volunteers who sort incoming cards and relay them to persons who provide the bureaus with return envelopes and postage. There is no fee involved.

To get yourself on file with your local bureau, simply:

- 1) Send a self-addressed 5 X 7 envelope with first-class postage for at least one ounce to your local bureau. Write your call sign in the upper left corner. Better yet, send several, along with some extra postage — you may get more cards than you expect.

Cards for portable operation will go to the home district. W1CW/6, for example, receives cards from the first district bureau.

- 2) Notify the bureau if you change your call or address. If postage rates increase, send along extra postage with your next batch of cards.

Keep in mind that you won't receive cards quickly with this system, as delays occur at each of several steps between the DX station and yours. Thanks to the 250 volunteers who staff the bureaus, though, you will receive them eventually. — WATZUY

There are lots of possibilities for new DX contacts using a minimum amount of power.

ending to the extent that the chap in the midst of a QSO will lose the closing transmission and that once you get in, brief contacts are best.

Psychology Takes Precedence.

If you're after that YU's QSL card, though, psychology takes precedence over technique. First let's examine our own psychology. What makes us think that a DX operator wants to talk to us? He or she is also looking for DX, but not necessarily a W or a K. If he's an old hand, he has thousands of us in his logs. If he is a tyro, of course, he needs us for WAS.

Ordinarily, however, the DX station

is desirous of latching onto some exotic DX too. He'll need another W or K like another burst of auroral hash.

Why do DX stations come back to us at all? Some are just being nice guys who take delight in giving a new country to an award-hunting American. Many European stations have started a whole new ball game: looking for countries!

If a DX station is trying to make WAS, especially on cw, the op no doubt has all the California, Illinois and New York contacts he needs. He is looking for Arizona, New Mexico and other ham-sparse states in 7-land, and will resort to sending QSLs via direct mail to get one in return. Put yourself in his place, and you'll know why many DX operators are actually doing us a favor by answering our CQ.

How to Do It

Back to psychology. One good trick is to look for DX when no one else is. Friday nights are the worst of all — many stay up late, and the kW's pounding out of 6-land can sound like megawatts. The pileups are deafening and the

chance of breaking through with a mere 100 watts is practically nil.

But that exotic DX station is also looking for DX. Watching his time zones and working hours, the DX station sometimes calls CQ, too. (See related stories.) Pick an offbeat time and you're apt to find rare DX with no one to talk to.

Another good psychological trick is to use the other person's language. On cw especially, not too many words are necessary, and the DX station will enjoy being addressed in his own language. Books which give common expressions in Spanish, Russian, French, Dutch, etc. are available. Learning the new words can be fun, too, for the learning now has a practical objective.

The DX station will enjoy being addressed in his own language.

It's startling to learn how many hams have other hobbies: golf, tennis, bowling, etc. In many instances, the American amateur is reluctant to spend "running expenses" on his hobby that can be compared to green's fees and lane's fees. They often draw the line at the direct-mail method of QSLing and enclosing IRCs (see QSLs, Part I, *QST* for October).

Using a QSL bureau for repetitive DX is fine, especially if you're a bit short of funds. But if you can spare some "running expenses" for your amateur hobby, QSLing via the bureau can be an excruciatingly slow process. You'll get faster and better service from direct mail, particularly air mail, from the really exotic DX station. This writer has very seldom not received a QSL by return mail. There are two gimmicks involved, actually a practice of the psychology we are writing about.

First, DX ops like to know what you and your shack look like. A small, single-weight snapshot enclosed with the QSL card and IRC works wonders. Inscribed on the back can be a description of your shack and your interests. A remark I made about deep-sea fishing to a chap in New Zealand elicited an enthusiastic response, as did the subject of skiing to a Russian and skin diving to a Seychelles op.

Commemoratives Help

Second, many DX operators are stamp collectors. The QSL card we send him should be inserted in an envelope, along with the snapshot and IRC. The face of the envelope should have as many U.S. commemorative stamps as required for the total postage. The author customarily "frames" the front with different stamps and makes a point of asking the clerk to cancel them lightly, on a corner only. This writer's

Table 1

ARRL DX QSL Bureau System

The ARRL DX QSL bureau system distributes cards free of charge from DX stations to amateurs within the League membership area (see page 8 of any *QST*).

First Call Area: all calls* — Hampden County Radio Association, Box 216, Forest Park Station, Springfield, MA 01108.

Second Call Area: all calls* — North Jersey DX Assn., P. O. Box 8160, Haledon, NJ 07508.

Third Call Area: all calls* — Jesse Bieberman, W3KT, RD 1, Box 66, Valley Hill Rd., Malvern, PA 19355.

Fourth Call Area: K4, N4, W4 — National Capitol DX Assn., Box DX, Boyce, VA 22620.

Fifth Call Area: WA4, WB4, WD4, WN4 — Sterling Park Amateur Radio Club, P. O. Box 599, Sterling Park, VA 22170.

Sixth Call Area: all calls* — ARRL W5 QSL Bureau, Box 1690, Sherman, TX 75090.

Seventh Call Area: all calls* — ARRL Sixth (6th) District DX QSL Bureau, 2814 Empire Avenue, Burbank, CA 91504.

Eighth Call Area: all calls — Willamette Valley DX Club, Inc., P. O. Box 555, Portland, OR 97207.

Ninth Call Area: all calls — Columbus Amateur Radio Assn., Radio Room, 280 E. Broad St., Columbus, OH 43215.

Tenth Call Area: all calls* — Northern Illinois DX Assn., Box 519, Elmhurst, IL 60126.

Zero Call Area: all calls* — W0 QSL Bureau, Ak-Sar-Ben Radio Club, P. O. Box 291, Omaha, NE 68101.

Puerto Rico: all calls* — Radio Club de Puerto Rico, P. O. Box 1061, San Juan, PR 00902.

U.S. Virgin Islands: all calls — Graciano Ber-

lardo, P. O. Box 572, Christiansted, St. Croix, VI 00820.

Panama Canal Zone: all calls* — KZ5 QSL Bureau, KZ5OD, Box 407, Balboa, CZ.

Hawaiian Islands: all calls* — John H. Oka, KH6DQ, P. O. Box 101, Aiea, Oahu, HI 96701.

Alaska: all calls — Alaska QSL Bureau, Star Route, Box 2401, Wasilla, AK 99687.

SWL — Leroy Waite, 39 Hannum St., Baliston Spa, NY 12020.

QSL cards for Canada (VE and VO) may be sent to: ARRL Central QSL Bureau, P. O. Box 663, Halifax, NS, Canada, B3J 2T3. Or, QSL cards may be sent to the individual bureaus.

VE1* — L. J. Fader, VE1FQ, P. O. Box 663, Halifax, NS B3J 2T3.

VE2 — A. G. Daemen, VE2IJ, 2960 Douglas Avenue, Montreal, Quebec H3R 2E3.

VE3 — The Ontario Trilliums, P. O. Box 157, Downsview, Ont., M3M 3A3.

VE4 — W. A. Stunden, VE4BJ, 578 Oxford St., Winnipeg, Man., R3M 3J9.

VE5* — A. Lloyd Jones, VE5JL, 2328 Grant Road, Regina, Sask., S4S 5E3.

VE6* — G. D. Holeton, VE6AGV, 4003 1st St., N.W. Calgary, Alta., T2K 0X2.

VE7* — Howard Martin, VE7AFY, No. 45-9960 Wilson Road, Ruskin, BC V0M 1R0.

VE8* — Al Sturko, VE8NS, P. O. Box 72, Fort Smith, NWT X0E 0P0.

VO1, VO2 — William Coffen, VO1KM, P. O. Box 6, St. John's, Nfld., A1C 5H5.

*These bureaus sell envelopes or postage credits. Send an s.a.s.e. to the bureau for further information.

QSL bureaus for other areas can be found in the December, 1975, issue of *QST*, page 64.

Mongolians Can Be Lonely, Too

Waiting for the right time to snare some DX paid off for this writer one weekend. I needed Mongolia for a zone award and tried on successive Friday nights to wade through pileups with my homebrew KW station, to no avail. One Friday night, thoroughly disgusted, I disconnected the driver from the linear, flipped the switch onto 40 meters and enjoyed the vicarious thrill of hearing a group of Novices nervously pound out, "You are my first Illinois. Pse QSL."

The next morning, bright and early, I tuned up on 20. Hmmm, seemed like I heard a faint CQ. I swung the beam to the northwest and heard JT1AA calling CQ: Excitedly,

shack, in fact, is chock-full of many beautiful covers from around the world sent in return for his. Mauritius, North Borneo, Macao, Russia, St. Thomas Island, Malta, French Guiana, etc. are some of the areas represented

"Hey," you may be thinking, "that can get quite expensive!"

Well, it depends on how you look at it. Ordinary DX contacts, multiplied many times to the same countries, can be verified inexpensively by QSL cards through the various bureaus. But exotic DX contacts needed for awards are best serviced by the direct-mail system (check address in the *callbook* maga-

I answered it. Zowie, there he was! "K9DNR de JT1AA. K." He turned out to be a Czech technician working for the Soviet government in Ulan Bator and we had a 30-minute QSO. This writer happens to know Czech fluently, which may have been partly responsible for the much-desired QSL he sent me by direct mail.

But the most amazing part of this story is that nobody else answered further CQs from that station over another 30-minute span. And it was not until we finished our QSO that I realized I had forgotten to reconnect the driver to the linear. I had worked Mongolia with only 75 watts! — *K9DNR*

zine) and the hints outlined in the preceding paragraphs. If the contacts are sufficiently important, so is the method of proving them — garnering those QSLs.

One last note. Use some psychology to avoid getting fooled by the occasional (thank goodness!) common-DX op who passes himself off as "real exotica." Andorra was a bitter example to this writer.

How to do it? Make sure the DX station has been recently covered in the "How's DX" column of *QST* or in recent *callbooks*.

Good hunting and good luck! **QST**

FCC Acts on Repeater Deregulation

In January of this year the FCC released a Notice of Proposed Rulemaking (Docket 21033) which dealt with deregulation of repeaters, remotely controlled stations, auxiliary-link stations, and control stations. To refresh your memory, here is a list of the changes proposed by the Commission at that time:

A) Delete separate station licenses for repeater, control and auxiliary-link stations (i.e., require no prior approval for the operation of such stations).

B) Permit repeater or auxiliary-link operation by portables and mobiles.

C) Discontinue WR calls, except renewals and special requests.

D) Revise station identification requirements to indicate repeater or auxiliary operation.

E) Change identification intervals for repeaters, etc., from five to 10 minutes.

F) Change logging procedures for remotely controlled stations to show control operators instead of control points, and require list of control operators to be posted at transmitter site.

G) Permit repeater and auxiliary operation on all amateur frequencies except 435-438 MHz.

H) Revise rules to emphasize that a station occupying a frequency has first priority, but that all frequencies must be shared.

See March, 1977, *QST*, page 50, for more information.

In April the ARRL filed comments with the FCC urging the retention of separate subbands for repeater and auxiliary station use, and advocating the desirability of continuing to issue separate licenses and distinctive WR call signs for repeaters. The League concurred with the Commission's proposals to eliminate separate licensing for auxiliary-link and control stations, and to permit portable or mobile auxiliary-link operation (thus removing the present restrictions on remote base operation). The League agreed further with the FCC's proposal to increase the identification interval for repeaters from five to 10 minutes. For details on the League's comments see this column for June, 1977.

Although not proposing specific rule changes, the FCC also asked in January for comments concerning the advisability of retaining the present requirement of recording all transmissions of an automatically controlled, open repeater (if they are not monitored in real time), and for comments concerning what limits on effective radiated power should be placed on repeaters. The League's position was that the recording of transmissions from an automatically controlled, open repeater was not necessary for proper repeater operation, and that there was no need for the present restrictions on effective radiated power versus height above average terrain now contained in the FCC rules.

*Manager, Membership Services, ARRL

What action has the FCC taken on its proposals? Let's go through the eight points listed above, one by one:

A) The FCC has deleted separate station licenses for repeaters, control and auxiliary-link stations. These modes of operation now become privileges inherent in each individual primary license and club license. Present repeater, control and auxiliary-link station licenses will remain in effect until expiration, at which time they will not be renewable. No prior FCC approval is required for the operation of such stations.

B) Portable and mobile operation of auxiliary-link stations is now authorized. This means remote base operation is now authorized.

C) The distinctive WR prefix for repeater stations has been discontinued. Those who presently have repeater licenses may retain them, along with the distinctive call, until expiration.

D) Repeater, control and auxiliary-link station identification requirements have been revised as follows:

1) When a station is operating in the repeater mode it shall be identified either by voice by following the primary call with the word "repeater," or by cw by appending "/RPT" to the primary call.

2) When operating as an auxiliary-link station (or control station since the control function has been combined with the auxiliary-link function) it shall be identified either by voice by including the word "auxiliary" after the primary call, or by cw by adding "/AUX" after the primary call.

E) The identification interval is now the same for all types of amateur stations - at least once each 10 minutes.

F) The logging requirements have been changed so that the log of a remotely controlled station must show control operators instead of control points, and although a complete list of control operators need not be posted at the transmitter site of the remotely controlled station, there must be posted the name, address, call and telephone number of the remotely controlled station licensee, and of at least one other control operator.

G) In addition to the present repeater subbands, the following frequencies have been opened up for repeater use: 144.5-145.5 MHz, 220 MHz and above (with the exception of 435-438 MHz).

H) No action was taken on priority of frequency use.

The FCC also dropped the requirement that the transmissions of automatically controlled, open repeaters be recorded. It took no action to modify the present regulations governing effective radiated power versus height above average terrain.

In order that Technician class licensees may take advantage of the newly created repeater subband on 2 meters, Technicians have been granted privileges on 144.5-145 MHz. This is in addition to their present privileges of 145-148 MHz.

Although the effective date of this action is November 4, there was an immediate freeze imposed September 21 on the filing of applications for new repeater, control and auxiliary-link station licenses. Furthermore, the Commission has announced that all applications for such stations presently on file but not acted upon will be dismissed without action.

This column is not the place to editorialize, and we do not intend to. Suffice it to say that there are many who will not agree with all points of the Commission's action, but amateurs now, more than ever, must act in a responsible manner to continue the long tradition of self-regulation of the amateur service. Elimination of prior FCC approval for repeater, control and auxiliary-link stations, and the opening up of additional bands for repeater use, give us a great deal more freedom and flexibility. The purpose of the FCC's action was to decrease its regulatory workload, but at the same stroke of the pen amateur radio's self-regulation workload has increased. We're sure Docket 21033 will be discussed for a long time to come. *K1FHN*

LEAGUE COMMENTS ON AMPLIFIERS AND TYPE ACCEPTANCE

The League has filed comments with the FCC in Dockets 21116 and 21117. These dockets propose to ban the manufacture of commercial amplifiers capable of operation between 24 and 35 MHz, and to place commercially manufactured transmitters and amplifiers under the purview of the FCC's equipment control program known as type acceptance. Type acceptance means that a manufacturer would have to obtain prior approval from the FCC of the operational characteristics of its products before they could be marketed. See page 61 of April, 1977, *QST* for further information on these dockets.

The League's comments were direct and unequivocal: "The proposal . . . is ill-conceived and impractical and, if adopted, not only will not reduce the unlawful use of such devices by the undisciplined Citizens Band Radio Service, but also will have a most severe impact upon and unfairly penalize the innocent, law-abiding and self-regulating Amateur Radio Service. The time has come - indeed, it is long past - for the Commissioners and the Commission's staff to concede that rules without effective enforcement are not worth the paper upon which they are written."

The League pointed out the ease with which circuits designed to prevent operation on 24-35 MHz can be circumvented, and that even if circuits to meet the Commission's objectives were available, an underground market in illegal amplifiers would surely

develop. It suggested that the FCC explore the feasibility of prohibiting the sale of amplifiers to other than licensed amateurs, pointing out that there are now two petitions before the FCC proposing rules to permit the sale of amateur type equipment only to licensed amateurs: RM-2839 filed by the San Antonio Repeater Association and RM-2866, filed by Frank W. Napurano, K2OKA. The R. L. Drake Co. has filed comments supporting SARO's petition, setting forth a comprehensive and detailed plan to provide such controls.

With regard to type acceptance, the League's opposition was equally as fervent. The League stated that

1) The desired result, i.e., control of the design and marketing of transmitters, transceivers, and external radio frequency amplifiers to prevent their use in the 27-MHz CB band, would not be achieved.

2) No significant need for type acceptance of amateur equipment has been shown and none is known to the League.

3) The statutory authority of the Commission to control the design and related characteristics of amateur equipment without specific legislation by Congress is questionable.

Where do these dockets stand now? Twice they have been brought before the FCC for action, and twice they have been deferred until a later date. At its September 21 meeting, the FCC granted the League's request to present oral argument to the FCC in connection with these dockets. Thus no action can be taken until such time as oral argument can be heard. No date for the League's appearance before the FCC has been set as of this writing, but it could be as early as the end of October.

Dockets 21116 and 21117 are two of the most significant dockets facing amateur radio. If passed as proposed, their effects will be far-reaching and with us for a long time. They raise what many consider to be the moral question: "Is it fair to penalize a law-abiding, self-regulating service for the FCC's inability to enforce its rules which apply to a separate, undisciplined service?" Amateurs have answered a resounding "NO." - *K1FHN*

ELECTION UPDATE

In the July issue W1RU, in announcing elections for director and vice director in eight divisions, compared the League with republic-type national governments. The announcement of the elections was repeated in the August issue. Nominations closed September 10. September 17 saw the ARRL Executive Committee meet in Washington, DC, to examine nominating petitions and make decisions on the eligibility of the candidates.

Where only one candidate was lawfully nominated and eligible, the Executive Committee declared that amateur elected. In the Atlantic Division Harry A. McConaghy, W3SW, was reelected director with Jesse Bieberman, W3KT, Layfield L. Lamb, W3BWZ, Alan M. Maslin, W3DZI and Harold C. Smith, WA2KND, in a four-way race for vice director. In the Canadian Division Ronald J. Hesler, VE1SH and William R. Savage, VE6EO, will be competing for the director-

ship while William W. Loucks, VE3AR, was declared the vice director.

Things were rather simple in the Dakota Division with Garfield A. Anderson, K0GA, being declared the director and Tod Olson, K0TO, being declared the vice director. The members in the Delta Division will choose between Max Arnold, W4WHN and Malcolm P. Keown, W5RUB, for director and among Robert H. Dilworth III, W4LQE, William E. Mixon, K5SVD and Robert P. Schmidt, W5GHP, for vice director.

The Great Lakes Division will see Richard A. Egbert, W8ETU, facing Leonard M. Nathanson, W8RC, for the directorship while George H. Goldstone, W8AP, Paul Kluge, W8SOP/KP6BD and Joseph E. Miller, K4DZM, will vie for the vice-director slot. Several members who were found lawfully nominated and eligible for both these positions declined to run. In the Midwest Division, things were comparatively simple with Paul Grauer, W0FIR, being declared director and Claire R. Dyas, W0JCP, being declared vice director. In the Southeastern Division Larry E. Price, W4RA/W4DQD, will face Ted R. Wayne, WB4CBP, for the directorship while Bev B. Cavender, W4ZD, Evelyn Gauzens, W4WYR and David Novoa, KP4AM, will vie for the vice-director slot. Frederic N. Barry, K6RTU, Charles R. Breeding, K6UWR and William J. Stevens, W6ZM, are in a three-way race for the directorship of the Pacific Division, while the vice-director slot will be decided between J. Patrick Corrigan, KH6GQW and Robert C. Smithwick, W6JZU.

Ballots must be returned to Hq. by November 20. The ballots were in the mail by October 1. If you are a full member in one of these divisions having a contest and have not received your ballot by now, please contact Hq. immediately. Winners will be announced by W1AW bulletin on regular schedules following the count on November 20 and in these pages of the January, 1978, *QST*.

PETITIONS GRANTED

On September 1, the FCC granted Max Grossman's petition to amend Part 97 to permit amateurs to operate worldwide in any amateur band between 3.5 and 148 MHz while outside the jurisdiction of a foreign government.

And Dismissed

The FCC dismissed the petition of Wayne Green, W2NSD/1, asking the FCC to issue requested amateur calls where available and to issue "counterpart" call signs. They simultaneously dismissed a similar petition from ARRL asking for "counterpart" call signs. In a similar vein they dismissed the petition of Thomas Vernon Appler II, K3UEJ, which requested that FCC begin issuing the old call of a deceased person to family members.

ARRL GOES TO CAPITOL HILL

The League had its day on Capitol Hill recently. On September 14, the House Subcommittee on Communications -- which is currently considering a rewrite of the Com-

munications Act of 1934 -- held hearings on the personal radio services-- both amateur radio and citizens band radio. The League was there to present amateur radio's side of the case.

A little background is in order. Radio waves by their very nature, since they know no boundaries, fall into the area of interstate commerce; hence are under the purview of federal legislation. Congress passed the Communications Act of 1934 to regulate the radio services. By this act it created the present Federal Communications Commission. There have been a lot of technological advances since 1934: TV, satellites, etc. The writers of the original act in 1934 clearly could not have taken into account the state of wireless communication today; thus many people feel that a rewrite of the act is in order. The House Subcommittee on Communications (which is a subcommittee of the Committee on Interstate and Foreign Commerce) is now studying the feasibility of such a rewrite.

The League feels that there are changes that could be made to the Communications Act that would have a beneficial effect on the Amateur Radio Service. One is to clarify the secrecy provisions of Section 605 to make it clear that the amateur and CB services are exempt. The rule has thus far been interpreted to exempt amateur transmissions, but clarification is needed. Also, exempting CB transmissions from the secrecy requirements would open the door toward CB self-policing, similar to the ARRL Official Observer program.

The League is also recommending that the Communications Act be amended to give the FCC authority to regulate the sale of radio transmitting equipment to assure that such equipment is sold only to persons who hold valid authorizations. This is one proposed solution to the problem of illegal amplifiers finding their way into the hands of CBers or unlicensed people -- a far more acceptable solution than banning the manufacture of all commercial amplifiers that can operate on 24-35 MHz.

The League also recommends that the Commission be given authority to delegate certain of its functions (such as the giving and grading of examinations, and the issuance of temporary permits) to qualified persons. This would help ease the work crunch which caused the FCC to abolish separate licensing of repeater stations, and propose in Docket 21135 the elimination of all amateur station licenses except primary and space station licenses (under consideration in Docket 19852, October 25, 1973).

Finally, the ARRL is asking that the FCC be given authority to prosecute unlicensed operators. Currently the FCC has authority only over licensed operators. It can cite a licensed ham or CBer for improper operation, but if it monitors an unlicensed operation, it must turn the case over to a U.S. Attorney. This limits the effectiveness of the FCC's enforcement team, and it is highly desirable that the FCC be allowed to directly prosecute unlicensed violators.

Legislative processes move slowly, and no quick action can be expected on the rewrite of the Communications Act. Nevertheless, it is important that amateur radio be heard and that it make its needs known. The League will be there, now, and in the future, to assure that amateur radio is equitably represented. -

K1FHN

Moved and Seconded...

MINUTES OF EXECUTIVE
COMMITTEE MEETING
No. 365
September 17, 1977

Pursuant to due notice, the Executive Committee of the American Radio Relay League, Inc., met at 9:30 A.M., on September 17, 1977, at the Ramada Inn, Tyson's Corner, Maryland. Present: President Harry J. Danals, W2HD, in the Chair; Directors Max Arnold, W4WHN, Richard A. Egbert, W8ETU, Ron Hesler, VE1SH, and Robert B. Thurston, W7PGY. Also present were Directors Harry A. McConaghy, W3SW, John C. Sullivan, W1HHR, and L. Phil Wicker, W4ACY; Vice Director Gay E. Milius, W4UG; and Membership Services Manager Perry F. Williams, W1UED. The Chair appointed Mr. Williams as Secretary of the Meeting.

On the motion of Mr. Hesler, the Committee recognized the names of 224 individuals who had recently been elected to Life Membership, and instructed the General Manager to list their names in QST.*

On motion of Mr. Thurston, the Committee approved the affiliation with the League of the following amateur radio societies: Adams-Brown AREC, Fayetteville, OH; Berry's Mountain Amateur Radio Club, Lykens, PA; Bridge City Amateur Radio Club, Bridge City, TX; Cabarrus Amateur Radio Society, Concord, NC; Central Missouri Radio Association, Columbia, MO; Cres Amateur Radio Club, Columbus, OH; East High Amateur Radio Club, Madison, WI; Forest Park Amateur Radio Club, Woodhaven, NY; Fort Scott Community College Ham Radio Club, Fort Scott, KS; Glenhurst Radio Society, Glendale, NY; Heart O'Texas Amateur Radio Club, Inc., Waco, TX; Jackson Amateur Radio Club, Jackson, TN; Jefferson County Amateur Radio Club, Inc., Arnold, MO; Kensington High School Society for the Propagation of Hertzian Waves, Philadelphia, PA; Lake City Amateur Radio Club, Fufaula, AL; Ozarks Amateur Radio Society, Aurora, MO; Point Loma Amateur Radio Club, San Diego, CA; Porter County Amateur Radio Club, Valparaiso, IN; RCA Astro Electronics Amateur Radio Club, Princeton, NJ; Ringgold Amateur Radio Club, Ringgold, GA; Rochester Institute of Technology ARA, Rochester, NY; St. Lucie Repeater Association, Inc., Ft. Pierce, FL; St. Mark's School Amateur Radio Club, Dallas, TX; Sarasota Emergency Radio Club, Inc., Sarasota, FL; Thomaston Area Amateur Radio Club, Thomaston, GA; Tri-County Repeater Association Inc., Livonia, MI; Triple States Radio Amateur Club, Adena, OH; 220 Club of San Diego, San Diego, CA; University of New Brunswick Amateur Radio Club, Fredericton, New Brunswick, Canada.

On motion of Mr. Arnold, the following convention dates were approved: Great Lakes Division, March 25, 1978, Muskegon, MI; New York State, May 19-21, 1978, Rochester, NY; and Tennessee State, May 27-28, 1978, Knoxville, TN.

On motion of Mr. Hesler it was unanimously VOTED that those authorized to sign checks on behalf of the treasurer shall include only John Huntoon, Gerald A. MacArthur, Barbara Camp, and Linda McLaughlin, effective October 1, 1977.

On motion of Mr. Egbert, it was unanimously VOTED that those authorized to sign checks on behalf of the general manager shall include only Richard L. Baldwin, David Sumner, and Robert Myers, effective October 1, 1977.

On motion of Mr. Arnold, it was unanimously VOTED that "Guidelines For Use of Phone Patch and Auto-Patch by Radio Amateurs," recommended in the Legal & Regulatory Committee's report at the July meeting of the Board of Directors, is adopted.

The Committee next proceeded to

examine nominations in the director elections, with careful attention to the application of the eligibility rules concerning membership and freedom from commercial radio connections. The Committee made findings and ordered actions as detailed below, all by unanimous action:

ATLANTIC DIVISION

For Director: Harry A. McConaghy, W3SW, was found lawfully nominated and eligible. Being the only eligible nominee he was thereupon declared, pursuant to the By-Laws, to be duly elected as Director from the Atlantic Division for the 1978-1979 term without membership balloting.

For Vice Director: Jesse Bieberman, W3KT, Layfield L. Lamb, W3BWZ, Alan M. Masin, W3DZI, and Harold C. Smith, WAZKND, were found lawfully nominated and eligible and their names ordered listed on ballots to be sent to Full members of the Division.

CANADIAN DIVISION

For Director: Ronald J. Hesler, VE1SH and William R. Savage, VE6EO, were found lawfully nominated and eligible and their names ordered listed on ballots to be sent to Full members of the Division.

For Vice Director: William W. Loucks, VE3AR, was found lawfully nominated and eligible. Being the only eligible nominee, he was thereupon declared, pursuant to the By-Laws, to be duly elected as Vice Director from the Canadian Division for the 1978-1979 term without membership balloting.

DAKOTA DIVISION

For Director: Garfield A. Anderson, K0GA, was found lawfully nominated and eligible. Being the only eligible nominee, he was thereupon declared, pursuant to the By-Laws, to be duly elected as Director from the Dakota Division for the 1978-1979 term without membership balloting.

For Vice Director: Tod Olson, K0TO, was found lawfully nominated and eligible. Being the only eligible nominee, he was thereupon declared, pursuant to the By-Laws, to be duly elected as Vice Director from the Dakota Division for the 1978-1979 term without membership balloting.

DELTA DIVISION

For Director: Max Arnold, W4WHN and Malcolm P. Keown, W5RUB, were found lawfully nominated and eligible, and their names ordered listed on ballots to be sent to Full members of the Division.

For Vice Director: Robert H. Dilworth III, W4LOE, William F. Mixon, K5SVD, and Robert P. Schmidt, W5GHP, were found lawfully nominated and eligible, and their names ordered listed on ballots to be sent to Full members of the Division.

GREAT LAKES DIVISION

For Director: Allen L. Baker, W8TZZ, was found lawfully nominated and eligible, but the Committee was in receipt of a letter from Mr. Baker withdrawing his name as a candidate. George H. Goldstone, W8AP, was found lawfully nominated and eligible, but the Committee was in receipt of a letter from Mr. Goldstone, withdrawing his name as a candidate for Director. Richard A. Egbert, W8ETU and Leonard M. Nathanson, W8RC, were found lawfully nominated and eligible, and their names ordered listed on ballots to be sent to Full members of the Division.

For Vice Director: William E. Clausen, W8IMI, was found lawfully nominated and eligible, but the Committee was in receipt of a letter from Mr. Clausen withdrawing his name as a candidate. George H. Goldstone, W8AP, Paul P. Kluwe, W8SOP/KP6BD and Joseph E. Miller, K4DZM, were found lawfully nominated and eligible, and their names ordered listed on ballots to be sent to Full members of the Division.

MIDWEST DIVISION

For Director: Paul Grauer, W0FIR, was found lawfully nominated and eligible. Being the only eligible nominee, he was thereupon declared, pursuant to the By-Laws, to be duly elected as Director from the Midwest Division for the 1978-1979 term without membership balloting.

For Vice Director: Claire R. Dyas, W0JCP, was found lawfully nominated and eligible. Being the only eligible nominee, he was thereupon declared, pursuant to the By-Laws, to be duly elected as Vice Director from the Midwest Division for the 1978-1979 term without membership balloting.

PACIFIC DIVISION

For Director: Frederic N. Barry, K6RTU, Charles R. Breeding, K6UWR and William J. Stevens, W6ZM, were found lawfully nominated and eligible and their names ordered listed on ballots to be sent to Full members of the Division.

For Vice Director: J. Patrick Corrigan, KH6GQW and Robert C. Smithwick, W6JZU, were found lawfully nominated and eligible and their names ordered listed on ballots to be sent to Full members of the Division.

SOUTHEASTERN DIVISION

For Director: Larry E. Price, W4RA/W4DQD and Ted R. Wayne, WB4CBP, were found lawfully nominated and eligible and their names ordered listed on ballots to be sent to Full members of the Division.

For Vice Director: Frank M. Butler, W4RH, was found lawfully nominated and eligible but the Committee was in receipt of a letter from Mr. Butler withdrawing his name as a candidate. Bev B. Cavender, W4ZD, Evelyn Gauzens, W4WYR and David Novoa, KP4AM, were found lawfully nominated and eligible, and their names ordered listed on ballots to be sent to Full members of the Division.

On motion of Mr. Egbert, unanimously VOTED to appoint Robert B. Thurston, John Huntoon and John C. Sullivan as a Committee of Tellers, with Stan Zak, F. E. Handy, and Victor C. Clark as alternates, to count the ballots in the current election.

On motion of Mr. Arnold, it was unanimously VOTED that the budgets of the following divisions be increased by the amounts shown: Canadian Division, \$800.00; Northwestern Division, \$300.00.

On motion of Mr. Arnold, it was unanimously VOTED that the General Counsel petition the FCC to allow an applicant for any grade of amateur license to be examined for all elements required for that grade of license and to receive credit for all elements passed. Such credit to be maintained for a period of 120 days.

At this point, Mr. Egbert presented to the President a check for \$1,000.00 to be used in preparation by ARRL for the World Administrative Radio Conference in 1979, a gift from the Toledo Mobile Radio Association, an ARRL affiliated Club. Mr. Egbert noted that a check for \$500.00 from the Toledo Mobile Radio Association would also be presented to the Radio Amateur Satellite Corporation (AMSAT) later in the day, during the course of the Virginia State ARRL Convention.

The Committee then discussed extensively the issuance of nonprofit mailing permits in the name of ARRL to various elected officials of the organization at post offices near their respective residences, and the use of these permits in League elections. It was recommended informally that the President request the Membership Affairs Committee to study the matter and report to the Board of Directors at its next meeting.

The Committee expressed its warm good wishes to John Griggs, W6KW, Director from the Southwestern Division and a long-term member of the Executive Committee, for a prompt and complete recovery from his illness.

The Committee heard reports on hearings by the House Subcommittee on Communications concerning proposed revisions to the Communications Act of 1934, and on the three RFI bills presently pending before Congress.

The Committee also heard a report on the Code of Ethics for manufacturers, distributors and dealers in amateur products which had been brought up responsive to the action by the Board of Directors at its July meeting. The Committee also discussed the information which appears on ballots relative to each candidate, the consensus being that class of license is one such item.

There being no further business, the Committee adjourned at 12:20 P.M. Respectfully submitted, Perry F. Williams, Secretary of the Meeting

*A list of newly elected Life Members will appear in a later issue.

FM Repeater News

Conducted by Lew McCoy,* W1ICP/WR1ABH

Band Plan for the 144.5- to 145.5-MHz Repeater Band

By now, it should be common news among the fm repeater clan that FCC has acted on Docket 21033. Several items in the FCC action are dealt with elsewhere in this issue. What is important to frequency coordinators and repeater councils is that an immediate action is necessary to formulate a band plan for the new band segment, 144,500-145,500 kHz. The changes take place November 4, so it is imperative that coordinators be ready.

The Northern Amateur Relay Council (NARC) of California called a special meeting as soon as details of the FCC action were available. The council hammered out a viable band plan which has been discussed with other councils, the League's VHF Repeater Advisory Committee and the new VHF/UHF (nonrepeater) Advisory Committee and there has been general acceptance. For example, the largest repeater council is the Tri-State Amateur Repeater Council of New York, New Jersey and Connecticut. Their frequency coordinating committee accepted the new plan wholeheartedly. Likewise, the Texas VHF-FM Society board of directors met and accepted the plan. Also, the same is true of T-MARC, the Middle Atlantic FM and Repeater Council.

The question is probably asked: Why all

the haste to put a plan into effect? There are a couple of answers. In the first place, over 2000 amateurs are waiting to put repeaters on the air, so we know there will be a rush for channels. Secondly, this is being written past the regular deadline of this column so that it will be in the amateurs' hands before the effective date of the FCC rules change. *Most important: If you are planning a repeater, check with your local frequency coordinator.* Certain areas may require different treatment and only the local coordinator knows of those problems.

In any event, here is a generally accepted band plan for the new segments to provide guidelines for frequency coordinators.

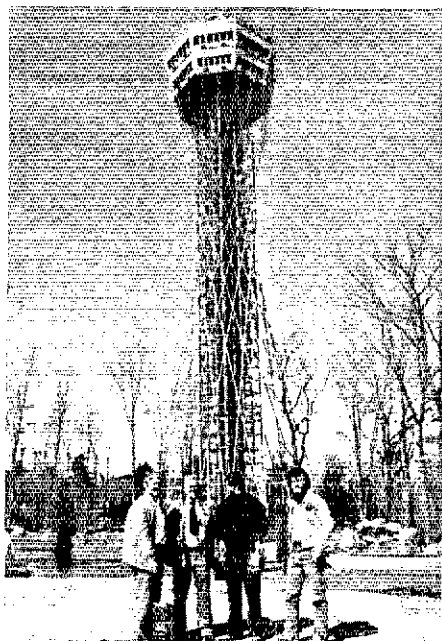
All inputs are low, while outputs are high. A quick check shows that the least harmful intermods occur to weak signal and OSCAR work above the new band segment. The plan provides a total of 20 channels, 20 kHz spacing, no splits. The channels inputs start at 144.51 MHz, while the last is at 144.89 MHz. Input/output spacing is 600 kHz. The section from 144.9 to 145.1 MHz (200 kHz) is reserved for non-channelized communications; weak signal, ssb, etc. See Table 1 for the band plan.

As you'll see from the FCC changes, the

Table 1
144.5- to 145.5-MHz Repeater Band Plan

Input/Output	Input/Output
144.51/145.11	144.71/145.31
144.53/145.13	144.73/145.33
144.55/145.15	144.75/145.35
144.57/145.17	144.77/145.37
144.59/145.19	144.79/145.39
144.61/145.21	144.81/145.41
144.63/145.23	144.83/145.43
144.65/145.25	144.85/145.45
144.67/145.27	144.87/145.47
144.69/145.29	144.89/145.49
144.9-145.1 MHz reserved for weak signal, ssb, etc.	

entire 220-MHz band and most of the 420-MHz band are opened to repeater work. We have a request from the VUAC that any new planning for these bands by repeater councils, coordinators, etc., leave 220-220.5 MHz and 430-435 MHz open for weak-signal work, moonbounce and so forth. Modifications of the ARRL band plans should be forthcoming soon, but at this time the urgency is for the new 2-meter plan. — W1ICP



Anytime there is a tall tower you can bet the local hams are ready to put up a repeater if they can. So what's unusual about this one? It just happens to be the famous National Gettysburg Battlefield Tower and it is now the site of WR3AKN, 147.93/33. From the left, WA3WOH, W3JNT, W3JOH and Dennis Cullison.

WHAT IS YOUR COUNCIL DOING?

The following letter is sent out to all new and proposed repeater operators by the Illinois Repeater Council (IRC) and it may provide your group with some ideas.

"Dear OM,

"Congratulations on receiving your new repeater license from the FCC! Since repeaters are our purpose, we would like to introduce you to our organization, in the event you're not familiar with the IRC.

"The Illinois Repeater Council was formed in 1972 to promote cooperation and the interchange of ideas among repeaters in Illinois. In Docket 18803, the FCC urged local frequency coordination as an alternative to Commission intervention in band occupancy matters. The Council serves as the center for coordination of repeaters in Illinois, and works with coordination groups in neighboring states on the use of frequencies. The frequencies recommended by the Council are in accord with the ARRL band plans as much as possible. Local variances, such as local simplex activity, are taken into consideration. At present, band plans for repeater use exist for 10 meters, 6 meters, 2 meters, 220 MHz and 450 MHz.

"As a new repeater licensee, we suggest that you contact us prior to establishing your repeater. We have the latest information available on operational and proposed repeaters in Illinois and surrounding states, and can assist you in choosing the best frequencies for your system. We ask that all requests for coordination be in writing so that there is a record of all correspondence. Information on control and link frequencies is considered confidential in order to maintain security. Those requesting coordination will be contacted by a member of the IRC's Frequency Coordination and Technical Committee.

"Because of the crowded spectrum in some areas of the state, frequencies cannot be held in reserve. It is expected that recommended frequencies be used in a reasonable time, or they will be reassigned. Since the Illinois Repeater Council is an advisory organization only, no guarantees are given that any frequency is or will remain interference free. Of course, FCC Rules state that no individual or group 'owns' any frequency. The maximum benefit of any repeater system can only be realized through the cooperation of everyone to minimize interference.

"Membership in the IRC is open to all individuals and groups who operate or are planning to operate a repeater in Illinois. Meetings are held every other month at various locations across the state. We publish a newsletter containing the latest news relating to repeater operation, Council activities, FCC Rules, new dockets, etc. that is included as part of the membership. We invite you to join us! A membership application is enclosed for your convenience. Annual Council dues are \$4. Membership is *not* a prerequisite for frequency coordination, as we encourage *all* repeater licensees in Illinois to contact us for coordination.

"Annually, the IRC publishes *Illinois Repeater Directory*, the most complete listing of repeater and fm activity for the state. All individual and group members receive an ample supply of the directories for the members of their repeater. The directory, however, should not be used as a substitute for coordination, as our files are constantly being updated with new information.

"We hope that you will take advantage of frequency coordination for your repeater through the IRC, and that you will seriously consider joining the organization. We feel that the \$4 you pay for dues will be very well spent. We look forward to hearing from you!

73, The IRC Officers"

Correspondence

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

A CASE FOR ETHICS

□ Bravo! You are urged to use the "legal limit" in promotion of the Code of Ethics for advertisers program. ("It Seems to Us," September QST) — *W. L. Langford, K4DT, Dothan, AL*

□ Name names and refuse advertising. Give us a cause to rally around and make members aware. The losses to your 16.4 percent income due to advertising will be more than offset by increases in the 32.8 percent membership dues as new and more amateurs respect the League and QST for adopting a policy more directed to service to its members. — *Harold Johnson, W4ZCB, Statesboro, GA*

□ The companies doing these things will not respond to a Code of Ethics; they abandoned their ethics when they started these operations. The only pressure which they respect is the pressure of the marketplace. — *Carl Eymann, W4STMD, New Orleans, LA*

□ Spectronics, Inc. of Oak Park, IL is a wonderful contrast. Permanently displayed over the Spectronics sales counter is a large, bright-yellow sign stating "Will not sell ham gear to CBers. Don't even ask." — *Morris Hornik, WB9JHW, Milwaukee, WI*

□ I suggest as an alternative that amateurs accept a voluntary limit of 300 watts (key-down output) on all frequencies above 22 MHz. Now before you jump up and down screaming, let me ask this, "Do we really need high power at the higher frequencies?" I know we hams hate to have our power output restricted, but I feel the need to impress fellow hams is far less than having type acceptance shoved down on us. — *Lester Harlow, W6PSD, Spring Valley, CA*

□ I hope your proposals will help the situation but in the long run I feel that only FCC authority to punish with stiff fines and confiscation will make any significant impact. — *I. L. McNally, N6WX, Sun City, CA*

□ You have our promise that there will never be any ham equipment sold from this store to anybody who doesn't have the proper license, nor will any equipment ever be sold, repaired or modified that would allow the equipment to operate out of hand. We realize that this will cost us income, but this is our way of stopping the problem from our end. — *Lyle Taylor, Sales Manager, Star Fire Radio, Las Vegas, NV*

NOVICE NECESSITY

□ The ARRL-managed used-gear sale could be a good one. I suggest that ARRL either simply publish and mail newsletters and limit ads to QST-ARRL members. Require some safeguard on condition of gear as listed and encourage surplus dealers to run listings. — *John Freeman, W7KPB, Rogue River, OR*

□ Yes, please do something. As an authorized instructor I have held many Novice and General license classes and unfortunately, although practically all were licensed, I can only point to four (4) in the last year who became active. Lack of funds and availability of equipment have been the cause given in every case. Of the four who did become active

hams, two had transceivers given to them and the third was a retired gentleman who purchased my HW101. The fourth was the son of the retired man, who shared the same home, equipment, etc. Thank you, and thank David for what we can all do collectively. — *Margaret Williams, WA4FTJ, Virginia Beach, VA*

□ I think a list in QST is a great idea. Where I live you must go about 200 miles to find any used gear. — *Fred Tandy, WA6TUA, Lindsay, CA*

□ There is one suggestion I would like to add; there could be a small chart which could list the type of equipment and the maximum selling price for any piece of gear to be advertised regardless of original manufacturer. — *James Schug, WA2YEI, Middle Village, NY*

□ Here in the northwestern portion of the Minnesota section, we don't have much in the way of cities. My QTH is 60 miles S.E. of Fargo. Can't even get much in the way of parts locally, so for those of us who wish to build our gear, we have to order just about everything and wait up to three months. — *Shelby Haukos, Fergus Falls, MN*

□ I suggest that you not act as a clearing house for Novice equipment. It doesn't fit my concept of the ARRL. Sooner or later, some poor Novice will get taken by a fraudulent or misleading ad, or, some seller will get a bad check or counterfeit or stolen money orders. Some of this unhappiness will tarnish the League's image. You have several advertising pages devoted to sellers of used equipment and most have good word-of-mouth reputations. I personally would much rather deal with one of your advertisers than with some faraway unknown seller whom I know nothing about.

Here are some ideas: Sell Novice kits at cost plus mailing cost. Avoid competition with radio gear manufacturers by getting down to basics only. Maybe you could sell modular "add-ons." Encourage manufacturers to bring out "Novice Starter Kits." Arrange for reduced-cost parts and designs to be sold to ARRL affiliated clubs for them to sell or give away. Electronic parts are not as easy to get as the ads would make it appear: Specific parts for a specific application would work better. People can troubleshoot their own gear better, faster and safer than someone else's. — *Ed Brown, WDSCTP, Dallas, TX*

□ Being a 16-year-old, new ham, I have a limited income and better rigs come hard for me. I am constantly looking to upgrade my station and to sell what I presently use. I feel that everyone should be able to subscribe to these lists. With this special section, I can upgrade by swapping my equipment, so please help us by starting this list. You will make a lot of new hams very happy with the feeling that they have the ARRL on their side. — *Mark Levenite, WB3GOK, Honey Brook, PA*

□ I am only 15 but plan to begin your deferred life-membership plan. Luckily our public library gets QST. I have some suggestions. First, make it available to all hams. Young Novices who can't afford \$500 for ham gear probably don't have League membership at the top of their list, but rather things like gear, antenna wire, etc. Sell the gear at the same price you got it or make the list monthly and sell it. I believe this is

another example of the excellent work the ARRL is doing for the benefit of amateur radio. — *Jim Long, WB7QEZ, Coos Bay, OR*

□ I agree very much with WB2MAE. When I was about that age I was looking for equipment too. I have several items that would be very suitable but if I have to spend much money advertising them I wouldn't be able to sell them reasonably. — *Harold McDonald, W2BQP, Floral Park, L.I., NY*

□ The teenager is not alone. Hi! How about a 37 year old with house, kids, car, etc. Gear is going out of reach for the average guy. How about some good old cheap gear with tubes for the Novice. — *Bob Efrein, WB2EKM, Hastings-on-Hudson, NY*

□ Perhaps QST could accumulate the ads having to do with Novice equipment wanted and for sale under a separate head and more readily accomplish what WB2MAE meant without entailing the compilation or collection of data for a list. The ARRL does enough already. — *Charles Gardiner, Bayside, NY*

IS THIS HAM RADIO?

□ What is happening to ham radio? All of a sudden everything is becoming "channelized." Two-meter gear manufacturers are advertising their gear as having 400 or 800 or 1000 "channels." CIR advertises their 80-m to 10-m ssb transceiver as having over 40,000 frequency synthesized "channels." Chip Margelli in his recent column in QST (August 1977) titled "Contests and Emergencies" states "very few stations are now working split-channel except on 40 meters." What ever happened to the phrase, split frequency?

Is the influx of CBers to amateur radio so great that we have to start turning our frequencies into channels to make them feel comfortable? When I became a ham I was told that hams operate on bands of frequencies, not channels.

I hope that we hams are not becoming so indoctrinated into becoming appliance operators that we have to start channelizing all of our bands. Let true ham operators of the world gently remind our companions or newcomers when they slip and say "let's switch over to another channel, this one's busy." — *Raymond J. Norkus, WB9QZH, Thorntown, IN*

LID LIST

□ W2WQL's "Lid List" ("Correspondence," September QST) left out one well-known character: the "barber." He's the one who never calls CQ; instead he uses the "shave-and-a-haircut" call-up.

I was tuning through the 40-meter cw band when I came across one of these, and about a kHz away someone started sending CQ using full break-in. This irritated the "barber" because he started sending, "Get off." Later, a WB1 called "CQ 0." He needed Iowa. I needed Rhode Island. While he was sending his address, the barber "opened up for business" right on frequency! I remember a QST article which cautioned against this because, "it's confusing, marks you as a juvenile, and is of questionable legality." — *Robert Yanda, WA0DWL, Anamosa, IA*

So What's an IARU?

It was a late winter evening in Paris, more than half a century ago. The secluded dining room of the Hotel Lutetia hummed with conversations in several European tongues. Suddenly, there was a sharp rap on the head table, as a toast was proffered to Mr. Hiram Percy Maxim, W1AW, the honored guest of that evening, 12 March 1924.

It Couldn't Be Helped

It was a seagoing passenger liner which had brought Mr. Maxim to Europe — days en route, rather than hours. He was there on business, but a forward-looking Board of Directors had asked him while there to represent the League in efforts to encourage international amateur relations. Amateurs had been talking around the world for a few years, and it seemed inevitable that some sort of organization would have to be created to protect the interests of a growing number of radio enthusiasts.

Amateurs from nine different nations were represented at that fateful Paris dinner. Mr. Maxim, as president of the ARRL, was hosted by these European gentlemen because at that time amateur radio as we know it today was quite new on the Continent: Militaristic governments had outlawed the free practice of amateur radio, and such free practice as that which American amateurs enjoyed was not to be experienced in Europe until 1927. But the representatives present at that dinner (from France, Great Britain, Belgium, Switzerland, Italy, Spain, Luxembourg, Canada and the United States) foresaw the growth and development of the Amateur Radio Service in the rest of the world, and they were determined to found a body which could effectively promote their interests, while protecting their privileges.

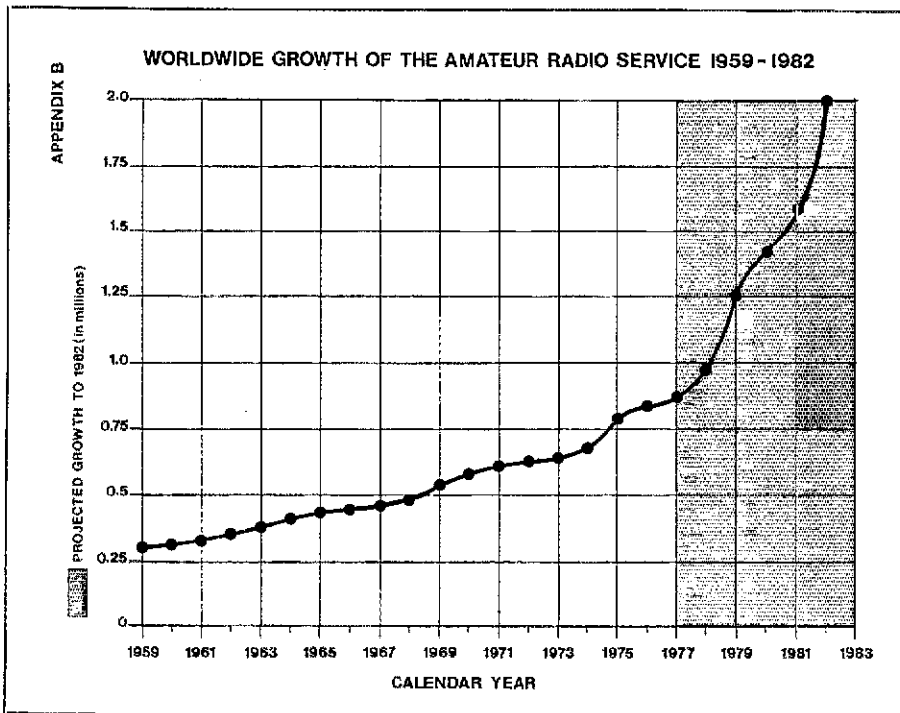
And so, following what must have been a splendid meal in the Parisian fashion, a meeting was called to order. A name for the new body was chosen, and the International Amateur Radio Union was born.

Protect What?

It seemed only right that the formal organization of the IARU be postponed until a general "Amateur Congress" could convene in Paris. On the afternoon of 14 April 1925, the First International Amateur Congress met, and the IARU was inaugurated a few days later.

A lot has happened to the structure of the IARU since those days, of course, but the purposes haven't changed a bit. The Union is dedicated to presenting a unified front for the promotion and development of amateur radio around the globe. And part of this mission involves defending the frequencies allocated to radio amateurs at the World Administrative Radio Conferences of the International Telecommunication Union.

*International Services Officer, ARRL



Interested in some fascinating reading on how amateur radio grew from a handful of enthusiasts in 1914 to nearly 1,000,000 today? Read Clinton B. DeSoto's *Two Hundred Meters and Down: The Story of Amateur Radio*. It's available from ARRL hq., Newington, CT 06111 for \$3 postpaid.

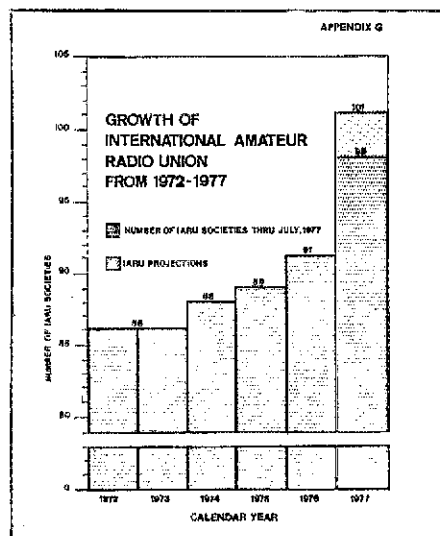
Amateur radio simply can't exist without frequencies. And with the growth rate depicted in these graphs, we need plenty of them! To this end, the IARU helps to analyze and to unify the frequency needs of its member-societies.

For example, did you know that right at this moment all IARU member-societies are presenting amateur frequency requests to their national governments — and that every society, with very minor exceptions, is presenting the same proposals as every other society? That's unity, and that's what the IARU is all about.

The graphs tell the story: growth. This year alone, the IARU has admitted to membership the amateur societies representing amateur radio in seven developing countries: Bahrain, Botswana, Jordan, Oman, Papua New Guinea, Sierra Leone and Turkey. The society representing Indonesia has applied, and more applications are pending.

So Where Do I Fit In?

Some years back, the member-societies of the Union voted that the ARRL serve as the Headquarters society. So, IARU is headquartered today within the ARRL building in Newington, Connecticut. If you are a member of ARRL or CRRL (or any other society overseas which is a member of the IARU),



you're already doing a lot to contribute to the Amateur Radio Service, for your membership dues directly help to support the Union. And the Union is solely dedicated to promoting and protecting our privileges. Thanks for your help!

Coming Conventions

November 19-20
South Florida Section, Clearwater, FL
January 21-22, 1978
Southeastern Division, Miami, FL
February 17-19
Florida State, Orlando, FL

March 18-19
South Carolina State, Greenville, SC
March 25
Great Lakes Division, Muskegon, MI
May 5-7
Delta Division, Baton Rouge, LA
May 19-21
New York State, Rochester, NY
May 20
Wisconsin State, Lake Delton, WI
May 27-28
Tennessee State, Knoxville, TN
July 1-2
West Virginia State, Jackson's Mill, WV
September 1-3
West Gulf Division, El Paso, TX

September 22-24
ARRL National, San Diego, CA
October 13-15
Midwest Division, Kansas City, MO
October 14-15
New England Division, Boxboro, MA
November 11-12
Hudson Division, McAfee, NJ
November 18-19
South Florida Section, Clearwater, FL

NOTE: Sponsors of large ham 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.

Hamfest Calendar

Maryland: The Columbia Amateur Radio Assoc.'s hamfest is November 27 at the Ellicott City Armory. Exhibits, flea market, refreshments. All indoors. No tail gating. Open 8:30 A.M.-3 P.M. Tables \$4, advance \$3. Donation \$2. Talk-in 147.99/39, 16/76 146.52. For info contact CARA, P. O. Box 850, Columbia, MD 21044.

Massachusetts: The annual ham auction sponsored by the Honeywell 1200 Radio Club

is Saturday, November 19, in the cafeteria at Honeywell Information Systems in Billerica. The facility is located at 300 Concord Rd., Billerica (off Rte. 3 at exit 27). The auction easily reached from I-495 or MA Rte. 128. Doors open at 11 A.M.; the auction runs from noon till 5 P.M.

Massachusetts: The Hampden County Radio Assoc.'s "This Is Ham Radio" spaghetti supper is at the Westfield YMCA, 67 Court St., on December 2. Starts at 6 P.M., and the program includes a judo demonstration and 10-minute talks on various aspects of ham radio (OSCAR, DX, ARRL, SSTV, repeaters, licensing, etc.). Bring your family and interested friends. Contact Jeffrey J. Duquette, WA1SNJ, P. O. Box 346, Southwick, MA 01077 for more info.

Michigan: The Oak Park High School Electronics Club's swap n' shop is on Sunday, November 27, at Oak Park High School, Oak Park, from 8 A.M.-4 P.M. Donation \$1 and tables \$1; refreshments.

Michigan: The Hazel Park Amateur Radio Club's annual swap n' shop is December 4 at the Hazel Park High School. Admission is \$1

at the door. Reserve table space from WB8ZPN, Robert Numerick, 23737 Couzens, Hazel Park, MI 48030.

Michigan: 1977 VHF Conference sponsored by the Western Michigan University electrical engineering department is November 19, 3-5 P.M., with dinner at 6:30. Details from Glade Wilcox, W9UHF/8, Department of Electrical Engineering, Western Michigan University, Kalamazoo, MI 49008.

Minnesota: The winter hamfest of PI-CONET and the Handi-Ham System is Saturday, December 3, at the Eagles Club in Fairbault. Registration starts at 9 A.M. Activities include a Handi-Ham equipment sale, dinner at noon, program.

Pennsylvania: The Foothills Radio Club of Greensburg's annual swap n' shop is on Saturday, November 12, from noon to 5 P.M. at St. Bruno's Church at the jct. of U.S. Rte. 119 and state Rte. 819 in South Greensburg, just off turnpike exit 8. Indoor flea market with double the space of last year. Talk-in on 07/67 and .52. Call Harvey Irby, W3IBW, 412-836-3444 or Joe Scarlett, WA3YDP, 412-823-4262 for more info.

Strays

AFFILIATED CLUB HONOR ROLL

Whether specializing in contests, DX, repeaters or moonbounce; whether located at a high school or NASA Center, the 1800 ARRL-affiliated clubs are doing a great deal for amateur radio across the U.S. and Canada. ARRL suggests activities and asks the club for assistance with local projects, such as displays at CB jamborees. On their own, many clubs sponsor Novice and General classes hold conventions and hamfests, distribute club bulletins and help spread word about our hobby.

A number of clubs have shown their support of amateur radio and the League by having all their members join the ARRL. Each of the "100 Percent Clubs" on the following list has been awarded a handsome certificate from the ARRL, a small token of the League's appreciation for encouraging all club members to join.

Ada (OK) ARC; Aeronautical Center ARC (Oklahoma City, OK); Alamo DX Amigos (San Antonio, TX); Albert Lea (MN) ARC; Alma (AR) ARS; Anderson (SC) Radio Club; Arizona DX Club; Bath (ME) Junior-High School ARC; Bolivar County (MS) ARC; Boulder (CO) ARC; Carbon County (PA) Area Vo-Tech School ARA; Carl Sandburg ARC (Orland Park, IL); Cary Quad ARC (W. Lafayette, IN); Central Arizona DX Assn.; Central Florida DX Assn.; Central Kansas ARC; Central Ohio DX Assn.; Charles River Wireless Society (MA); Cincinnati (OH) Chapter O.M.L.K. Electronic Communication Assn.; Clinton (IA) ARC; Columbia (MD) ARA; Columbia University (NY) ARC; Cum-

berland ARC (PA); Delta DX Assn. (LA); Devry Tech ARS (Atlanta, GA); Dorchester, (MA) ARC; Downey (CA) High School ARC; East River RC (WV); Eaton County (MI) ARC; Elmira (NY) ARA; FDR VA ARC, Montrose (NY); Fauquier ARC (VA); 550 ARC & Oakland Repeater (NJ); Forsyth ARC (NC); Fort Pierce (FL) RC; Fort Wayne (IN) DX Assn.; Fountain City (TN) RC; Gaston County (NC) ARS; Goshen (IN) ARC; Greensboro (NC) ARA; HFEA ARC (Fullerton, CA); Hall of Science ARC (Flushing, NY); The Ham Club (Tipton, OK); Holmdel ARC (NJ); Jefferson Barracks ARC (St. Louis, MO); Kanawha ARC (Charleston, WV); Lake Area Radio Klub (SD); Lake Cumberland Area (KY); Lakeland RC (Heinsburg, AB); Limestone ARC (AL); Lockheed ERC ARC (Burbank, CA); Los Alamos (NM) ARC; Loudon County (TN) ARC; Louisville (KY) Gas & Electric Co. ARC; Lumberton (NC) ARC; Marlboro (NJ) High School ARC; McPherson (KS) ARC; Mid-South DX Assn. (TN); Mile-Hi DX Assn. (Denver, CO); Milltown (IN) ARS; Mississippi Valley DX/Contest Club (St. Louis, MO); Monroe County (MI) Community College ARC; Morganton (NC) ARC; Morris RC (NJ); Murphy's Marauders (CT); Nashville (TN) ARC; National Capitol DX Assn. (DC); Newton (IA) ARA; Nitany ARC (PA); Norfolk County (MA) RA; Norfolk (NE) RC; North Alabama DX Club; Northeast Nebraska RC; Northern Illinois DX Assn.; OBP RC, Chap. 1 (MO); Ohio Valley ARA (Cincinnati, OH); Onalaska (WI) Area ARC; Orange (TX) ARC; Owensboro (KY) ARC; Paducah (KY) ARS Club; Rouget School ARS (Brooklyn, NY); Pilgrim ARC (MA); Potomac Area VHF Society (TN); Radio Amateur Transmitting Society (TN); Raleigh (NC) ARS; Randallstown (MD) ARC; Red River Valley ARC (TX); River Rats ARC (KY); Rock Hill (SC)

ARC; Royal Order of Boiled Owls (NY); Scarborough (ON) ARC; Seneca Repeater Assn. (OH); Sharon (PA) High School ARC; Sheboygan County (WI) DX Assn.; Sierra Pacific AR Klub (CA); Skagit ARC (WA); Smoky Mountain ARC (TN); Society of Amateur Radio Operators (San Francisco, CA); South Bay ARS (CA); South Queens Boys Club ARA (NY); Southside ARA (VA); Sweetwater ARC (WY); Tamiami RC (FL); Totah ARC (NM); Twin City DX Assn. (MN); Twin Lakes High School ARC (Monticello, IN); University of Idaho ARC (Moscow, ID); Valley of the Moon ARC (CA); Virginia Century Club; W/K ARC of Greater Milwaukee (WI); W. T. Clarke High School ARC (Westbury, NY); Wellington (KS) ARC; Westchester (NY) ARA; Wichita (KS) ARC; Williamsburg (VA) Area ARC; Wireless Institute of the Northeast (NJ) - WA1STO

ROCK-A-BYE MY BABY . . . WITH A MORSE CODE MELODY

When we brought our baby home from the hospital, she was frequently upset for no discernible reason. We happened to have the *Tune in the World* tape on one day and noticed that it had a calming effect on our daughter. After that, we tried playing the tape during her crying jags. It seemed to help. When we mentioned this to the pediatrician, he said it was quite normal for any rhythmic sound to have a calming effect. Don't throw those tapes away! - WB8NAS and WB8NOK

(Note: WB8NAS missed the chance to upgrade when the FCC visited Hartford in July since he was with his wife and infant. When the examiner called roll and was apprised of the situation, Pete and Sally got a round of applause. It sure helped relieve the tension! - WB9VAV)

Washington Mailbox

Conducted By Harold M. Steinman,* K1FHN

FORMS, FORMS, FORMS . . . OR "DON'T LET FORM 610 TRIP YOU UP"

Q. Tell us something about FCC form 610, the amateur license application form.

A. Form 610 is used for almost every type of amateur license application. Whether you are applying for a Novice license or the Amateur Extra, you must fill out form 610. It is also used for renewals, modifications, and by Amateur Extra licensees to request a 1 x 2 call. Every amateur must encounter the form at least every five years during his career as a radio amateur.

Form 610 is accompanied by three pages of instructions, and is relatively easy to fill out. Still, there are a few common mistakes that seem to trip people up, and lead to delays.

Q. What sort of mistakes?

A. For example, you *must* use a separate form 610 for each station you are renewing, modifying or requesting. You *cannot* apply for more than one station license on the same 610 form.

Another common error is that some applicants are confused by the difference between the mailing address and the station address. There are two separate blocks on the 610 form for these two items, and they must both be completed. The form will be returned to the applicant if either is not completed.

Usually, your mailing address and station location will be the same, but it is not necessary that they be so. The mailing address is where you wish official FCC mail to be sent. It can be different than your station location, even in another state if you desire. The important thing is that you will be responsible for official mail sent to that address. Failure to respond to official FCC mail could lead to revocation of your license.

As mentioned above, the station location can be different than your mailing address. There are several reasons why you might wish to receive mail at a different location than your station. You may find it more convenient to have mail delivered to your place of business rather than your home, in which case you would put down your home address as your station location, and your business address as your mailing address.

We should mention that the address you specify as your mailing address is the address which will appear in the *Radio Amateur Callbook*, and this means that an active amateur will find many QSL cards coming to this address. There are some amateurs who live in apartment buildings who would rather

not have QSL cards mailed to their home address. For one thing, it confuses the mailman when he has to deliver a card addressed to "Hal. K1FHN," with no indication of the last name of the addressee. In any case, it's easy enough under these circumstances to specify a different address for mail to be sent to. If you can't use your place of business to receive personal mail, you can rent a post office box, and put this down on the 610 form as your mailing address.

Q. Can I use a post office box number as my station location?

A. We're glad you asked that, because the answer is no, emphatically no. In fact, many applications have to be returned for this reason. It's perfectly OK to use a P. O. Box number as a mailing address, but your station address must be a definite, unique land location. In addition to P. O. Boxes, Rural Route numbers and general delivery addresses cannot be used as station locations.

Q. What if there is no way I can give a numbered street address as a station location?

A. If a numbered street address cannot be given, you may use whatever language is necessary to pinpoint the exact station location. For example, you could say, "On Route 1, three miles west of Plymouth, Pennsylvania."

Q. What other common mistakes are made when filling out a 610 form?

A. Believe it or not, many people forget to sign and/or date the form. Both these items are essential, and the application will be returned if one or both are missing.

Also, don't forget to include the original or a photocopy of your current license along with the application. (Of course, this doesn't apply to those who are seeking their first amateur radio license.) There is a space on the form where you can attach the license.

Q. Did you say I can send a photocopy instead of the original license?

A. Yes, in fact we strongly recommend that you send a photocopy, and keep the original license in your possession.

Additionally, we advise that wherever possible you should photocopy your entire application so that you will have documentation in your files just in case your original application goes astray.

Q. You mentioned above to include the original or photocopy of any current license when submitting a 610 form. What if I'm unable to do this because my license has been lost, or somehow destroyed?

A. Under these conditions, specify in the block normally used to attach your license the circumstances under which your license was lost, mutilated or destroyed.

Q. Any other items I should watch out for on the 610 form?

A. Do *not* mail the application to Washington, DC. Mail the completed 610 form to FCC, P. O. Box 1020, Gettysburg, PA 17325.

Also, do *not* enclose any fees. There are no fees required now for *any* amateur application. If you enclose money, it will only delay the processing of your application.

Q. Where can I obtain a 610 form?

A. From any FCC office, or send a self-addressed envelope with 13-cents postage to ARRL, 225 Main St., Newington, CT 06111. Indicate clearly that you are requesting a form 610.

Q. Under what circumstances should I not use a 610 form?

A. Do not use form 610 if you are an alien with an amateur radio license issued by a foreign government and you want permission to operate in the U.S. based on a reciprocal operating agreement. Such applicants should use FCC form 610-A.

Do not use form 610 to apply for a club, military recreation, or RACES station license. Form 610-B is used for these purposes.

Do not use form 610 for the sole purpose of obtaining a duplicate license if your original license has been lost, mutilated or destroyed. Simply send a letter requesting a duplicate license to FCC, P. O. Box 1020, Gettysburg, PA 17325. Be sure to give your name, address, station call sign, license-expiration date (if known), and state how the license was lost, mutilated or destroyed.

QSY ID

Q. I know that I'm required to transmit my station's call sign at the beginning and end of each single transmission or exchange of transmissions, and at least each 10 minutes during each transmission or exchange of transmissions. What if I QSY during a QSO? Do I have to identify my station on the new frequency right away?

A. Yes. Part 97.87f of the rules states in part, "The identification required by this section shall be given on each frequency being utilized for transmission . . ." This means that you must transmit your call sign on the new frequency immediately after QSYing.

[Note: Questions appearing in this column are typical of those frequently asked of the FCC and other agencies. Answers, prepared at ARRL, have been approved by FCC staff. Interpretations contained herein concur with those of the Personal Radio Division of the FCC. Numbers in parentheses refer to specific sections of the FCC rules.]

YL News and Views

Conducted By Louise Moreau,* W3WRE



The YLs of Germany

Enthusiastic, active and DX hunters - that's the gals of YL Deutschland. Its nearly 100 members are anxious to meet with women worldwide. But not, in their words, as "just DX contacts. We want to become friends on the same basis as we know our neighbors."

To promote this "YL World Neighborhood," the DL YLs have organized YL Day. The 15th of each month on 20, 15 and 10 meters, the DL women work YLs of other countries on two special frequencies. Their goal is to "grow to know each other not as a W or LU but as Jane, Luisa or Maria, as friends not QSL cards."

The club publication *Informationen* informs the gals from 19 districts of programs, club news and other activities. About 17 YLs representing all sections of West Germany are among the DX members of YLRL. Their support of the club's program of international friendship through amateur radio is noticeable particularly in their high scores in YLRL-sponsored contests this past year.

As part of the DARC convention last May, a special DL YL "Treffen" was scheduled in Limburg/Offenheim. Thirty-nine women from all parts of Germany and from neighboring countries attended this first DL YL mini-convention.



DL YLs attending the DL YL National Convention at Limburg, Germany, in May 1977, represent all the districts of West Germany. (WA8EBS photo)

1978 WAYLARC OFFICERS ELECTED

The Washington DC area YL Club announces elections of the following club officers for the coming year: President Ethel Smith, K4LMB; Vice President Elizabeth Zandonini, W3CDQ; Secretary Irene Akers, W3RXJ; Treasurer Maxine Harris, W4UWK.

*YL Editor, QST. Please send all news notes to W3WRE's home address, 305 N. Llanwellyn Ave., Glenolden, PA 19036.



Dr. Hannes, DK3JP and Margot, DK5TT, (center) with Heintz, DL1RA and Ursula, DL3LS and unidentified YL at the National Convention at Limburg. (WA8EBS photo)

1977-78 YL NET DIRECTORY

Daily: YL SSBers System, 1600 UTC on 14.332 MHz. Monday: Buckeye Belles, 1400 UTC on 3.950 MHz; Honeybee Net, 2130 UTC on 3.915 MHz. Tuesday: YL SSBers, 0030 UTC on 7.280 MHz; Buckeye Belles, 0100 UTC on 3.972 MHz; CLARA, 0130 UTC on 3.775 MHz; CLARA (4th Tuesday only), 0130 UTC on 3.765 MHz; Floridoras, 14100 UTC on 3.933 MHz; Jay Hawker, 1430 UTC on 3.940 MHz; Coffee Cup Net, 1500 UTC on 3.915 MHz; MINOW, 1630 UTC on 3.670 MHz; Ironing Board Net, 1700 UTC on 7.235 MHz. Wednesday: YL SSBers, 0030 UTC on 7.280 MHz; LARK, 0230 UTC on 7.130 MHz; Yankee Lassies, 1230* UTC on 3.910 MHz;

The Harem, 1400* UTC on 3.930 MHz; Gaylark, 1700 UTC on 3.955 MHz; YL Open House, 1800* UTC on 14.288 MHz; New Englanders, 1900 UTC on 50.650 MHz. Thursday: YL SSBers, 0100 UTC on 3.926 MHz; TASYL, 1300 UTC on 3.950 MHz; TYLRUN, 1400 UTC on 3.940 MHz; Georgia Peaches, 1400 UTC on 7.275; YL SSBers, 1500 UTC on 21.373 MHz; Tangle Net, 1800 UTC on 14.288 MHz. Friday: YL SSBers, 0030 UTC on 7.280 MHz; Working Girls Net, 0500 UTC on 3.933 MHz. Saturday: YL SSBers, 0300 UTC on 14.332 MHz (for ZL-VK members); Hawk Roost, 1400 UTC on 3.910 MHz; YL SSBers, 1600 UTC on 14.332 MHz; Ontario Trilliums, 2000* UTC on 3.770 MHz; Sunday: YL SSBers, 0030 UTC 7.280 MHz; LARK, 0300 UTC on 7.240 MHz; Western Pennies, 1430 UTC on 3.990 MHz (1st Sunday); YL SSBers, 1800 UTC on 28.673 MHz. Note: Asterisk indicates meets one hour later during Standard Time.



Three generations of YLs: (l-r) Mary, K4ZMH; daughter-in-law Lora, WDBLPN and Val, WD8KVD, Lora's daughter. (Photo courtesy W4WINH/W8WN)

1978 YLRL OFFICERS

President Eila Russell, WA8EBS; Vice President Phyllis Shanks, W2GLB; Secretary Ione O'Donnell, WA2DMK; Receiving Treasurer Carrie Lynch, WA4BVD; Disbursing Treasurer Rose Ellen Bills, N2RE. District Chairmen: 1st district, Jean Thompson, K1TVT; 2nd district, Virginia Chittenden, WA2BGE; 3rd district, Norma Vanderhoff, W3CG; 4th district, Dot Bedford, K4AOH; 5th district, Ruth Jank, K5OPT; 6th district, Louise Evans, WB6AUK; 7th district, Ramona Barrows, WA7UES; 9th district, Joyce Lauterbach, WB9NUL; 10th district, Irene Mulick, WB0MPC; KH district, Eleanore Kimitsuka, KH6HPK; KL7 district, Rose Rybackek, KL7FQQ and VE district, Ebba Kristjansson, VE5DZ. No 8th district.

The World Above 50 MHz

Conducted By
William A. Tynan,* W3XO



We Can All Live Together

For those of you who are tired of the 2-meter polarization question which has been the subject of this portion of the column over the past few months, this should be a welcome change. This month, another important issue to vhfers, that of frequencies to be used for various types of activity on the 70-cm band, will be addressed.

The fm gang seems to be quite well organized with almost everyone pretty much sticking to the published band plans. The ATVerS are generally around 439.25 MHz with their video carriers while ATV repeaters generally use that frequency for the input and 427.25 as the output. There is some ATV operation in various parts of the country in the 435- to 438-MHz region, however. This could cause problems when the satellites begin to use that range. From now on this is the only part of this band in which amateur satellites will be allowed to operate under international law. Difficulties may arise as early as next February when the next AM-SAT-built OSCAR is expected to be launched carrying a Japanese-constructed 145- to 435-MHz transponder in addition to a 145- to 29-MHz unit. The orbiting of the Phase III spacecraft toward the end of 1979 may further intensify the conflict.

The other major users of the 70-cm band are the weak-signal people such as moonbouncers and long-haul terrestrial operators. There is also a growing group of not-so-long-haul occupants using mainly ssb and some cw. Many of these are employing the new commercial rigs which have recently become available. The increased activity is extremely welcome but it is generating a few problems. Historically, weak-signal work including moonbounce has been concentrated very near 432.0 MHz. This is mainly due to the use of triplers from 144 MHz. In order to know where they were, the early users of the band commonly used crystals which came out as close to 144/432 as possible and employed 1-MHz standards for spotting. As EME developed, it naturally evolved around this frequency. When foreign stations attempted to take part in this exciting international uhf activity, some ran into trouble with their governments. Many countries forbade all amateur operation on 70 cm. Others had, and still have, a power limitation which makes moonbounce all but impossible.

The only way many foreign stations have been able to participate in EME without running afoul of their authorities has been to get special authorization to operate on 70 cm with powers adequate to do the job. Naturally when pressed as to what frequency these would-be DX EMEers wished to use, they specified 432 MHz. Some governments took this very literally and granted authority only for 432.0 plus or minus a few Hz! In one case,

Japan, the situation developed in a different manner altogether. For reasons difficult to understand, 432.0 became the "national fm calling frequency" for the 70-cm band. Obviously, this makes that frequency useless for moonbounce anywhere near Japanese-populated areas. For this reason, the JAs on EME usually operate around 432.05 to 432.06 and that is where stations attempting to work them must transmit.

While activity was light, and many of the same stations made up both the moonbounce and terrestrial contingents, there was little problem. But now, increasingly, EME operations are being hampered by QRM from other users of the band.

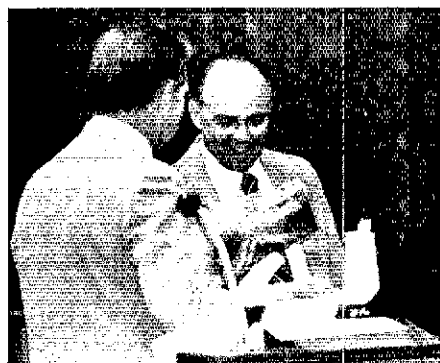
This situation was given a thorough airing at the Central States VHF Conference. Many active 70-cm operators were present including both EMEers and those following more down-to-earth propagation modes. After considerable discussion, a vote was taken which went heavily in favor of following the lead of some of the southern states in conducting non-EME operation around 432.1 MHz. This provides (1) 60 kHz in which to move around without getting too close to the frequencies used to work the JAs on the low side and (2) 432.125 MHz, the bottom of the OSCAR 7 uplink band, on the high side. This should provide sufficient space for some time to come. If one wants to ragchew and be out of everyone's way, there is plenty of space above the OSCAR band which ends at about 432.175. OSCAR 7 will probably be around for some time to come but it won't last forever. When it does cease to function, its uplink band will then be available for general use. All future amateur satellites, which involve the 70-cm band, must employ the 435 to 438 segment for uplinks as well as downlinks.

If all 70-cm operators get behind the CSVHF Conference resolution, we can all "do our thing" without interfering with the other guy's pursuit of what he likes to do. CU on 432.1!

ON THE BANDS

6 Meters — The "super Es season" ended, if anything, a little early being pretty well played out by mid-August. But then, the E clouds had earned a rest! An exception was a good opening which occurred the evening of September 14-15 between fives and the Northeast. WA3WIP, Lanham, MD, near Washington said that signals were quite strong and that the session lasted for over an hour. A phone call from K5ZMS tells of contacts, apparently via the transequatorial mode, between FO8DR and KH6s EQ1, IAA, HI and JJ. The QSOs started about August 26 and as of September 2 were taking place nightly. In addition ZK1AA reports hearing KH6 TV signals up to 65 MHz. It appears that TE is off to a good and early start this fall, at least in the Pacific.

From a much colder place, KL7IFD reports that he and KL7s CQ, BB and IKA are all active on 6-meter ssb from the Anchorage area. KL7IFD runs an ssb beacon on 50.110 in order to attract some attention. During last



W6PO receiving 1977 Chambers Award from W2AZL. (K0LCB photo)

Field Day their club station KL7AA managed 9 contacts with southern CA and NV stations. There is 6-meter activity in our 49th state.

2 Meters — Widespread tropo from the Midwest to the East Coast on several occasions in the first part of September accounted for the principal feature for this and higher bands during late summer. On the evening of September 3-4, the band put on a real show. It was the first 2-meter tropo opening caught by WB9FOL, Alexandria, IN, since getting on ssb last March. Jeff hooked up with W3BDP, DE; K2KGN, NY; W2BLV, NJ; WA3VFJ, PA; WA4HPM, VA; WA3NZL, MD; N0IS, MO; WB0LLI, IA and WA9JFM, WI, as well as many others. That one night brought WB9FOL's state total to 16 which more than doubled the seven that he achieved on fm. Many stations throughout the eastern part of the country reported this same opening. One of these, WB4EYP, Sterling, VA, near Washington, DC, recounts that the band was still open at noon local time the next day, Sunday, September 4, when Bob worked W9OAC, IN and WA81PG, MI. The evenings of September 6-7 and 8-9 also produced notable tropo openings with WB0IUT, Lincoln, NE, reporting working stations in OH, IL, IN and WI, as well as W4SMU, KY and K3JTY, PA. This brings Doyle's state total to 31.

By the night of September 8-9, the good tropo conditions were affecting the Northeast with K1WHS, East Lebanon, ME and WA1QUB Hillsboro, NH, both reporting contacts with Midwestern stations including GW3NJV/W9, W9BOZ, K9MOV, W9YF (new call for W9YYF), K9NBH, WB9UZR, W9NKF, K9ZGT and K9HMB, all IL; WA9KRT and K9JU, IN; WA8MIC and WA8PKB, OH; WA8MOA and W8IDU, MI, as well as VE3EYR. K1WHS characterizes the opening as the best long-haul tropo he has experienced since setting up in ME in 1973. Except for a little aurora, Dave classifies conditions during the contest, only two days later, as poor. This writer echoes that sentiment. Although not accustomed to working from the area, and not able to devote much time to hamming, my portable operation in southern ON during the test produced somewhat disappointing results. I was able, however, to get one section on the aurora with three WI QSOs.

Apparently the week-long tropo was generated by a front which lay in a northeast to southwest line across the country. This system was the cause of the heavy rains which flooded the Kansas City area but it had moved out of the way by contest time.

*Send reports to Bill Tynan, W3XO, P. O. Box 117, Burtonsville, MD 20730 or call 301-384-6736 and record your message.

leaving mediocre tropo conditions in its wake.

What is probably a first was achieved by WASTBE and W5UWB while on their way to Kansas City for the Central States VHF Conference. The two assembled a 2-meter mobile station consisting of a TS520, a Microwave Modules transverter, a KLM 160-watt amplifier, and a seven-element Yagi into WASTBE's pickup truck. Before leaving Corpus Christi they set up a m.s. sked with K0MQS, Delta, IA. During the first attempt at 0600 CDT August 17, they were on a hilly winding road which made it difficult to keep the beam aimed properly but by the second schedule time at 0900 they were traveling through Austin, TX at 55 mph on a straight and level road. Dick received a 15-second burst from W5UWB/M5. By 0943 they had completed the first mobile 2-meter m.s. contact that this conductor has ever heard of. Congratulations to all three. When is someone going to try to make it mobile to klob?

W5JTA, SWOT no. 1, wants it known that the organization's certificate for working 10 SWOT members is now available. Endorsements for 25 to 100 may also be obtained. Contact Len for details.

Need KH6? W5MB (ex-WA5UNL) says he plans to set up a 2-meter EME station in HI sometime during January. Marshall indicates that he may need some assistance with equipment. Those who believe they may be able to help, please contact him.

70 Cm - The same tropo conditions which were felt on 2 meters during the first 10 days of September also had their effect on 70 cm. W3BHG, Newark, DE, notes working W8IDU, MI, at 1525 UTC on Sunday the fourth. This QSO provided new states for both. On the evening of the sixth and seventh, W3TMZ, Mt. Airy, MD, 25 miles north of Washington, hooked up with 1L stations K9ZGT, K9UYK, K9HMB and W9ZIH. During the same evening W0IUT, Lincoln, NE worked W0TG, KS; W0YZS, MO; W0WMP, IA; W9AAG, WA9CGZ, K9UYK and W9YF, all 1L; W9JLY, IN; W8NRM and K8UQA, OH; along with W3RUE near Pittsburgh, PA. On the evening of September 8-9 K1WHS, East Lebanon, ME, reports working K9ZGT, K9HMB and W8IDU for two new states, bringing Dave's total to 17.

It's not often that one can see photo-

graphic evidence of how strong signals can get during a good tropo opening. But, in the case of the September 8-9 session, we do have such a picture. W9ZIH, Hickory Hills, IL, sends along a photo of his TV screen displaying the ATV transmissions from W3POS, Erie, PA 402 miles away. The two worked in a solid 439.25-MHz ATV QSO, taking full advantage of the fine conditions existing that evening.

CSVHF CONFERENCE

The 1977 meeting of the Central States VHF Society, held in Kansas City toward the end of August was another high mark in our world above 50 MHz. The KC gang did a bang-up job of assembling a fine program and lining up a splendid site for the get-together. Some of the top vhfers, representing all 10 U.S. call areas, were in attendance to hear such speakers as Joe Reiser, W1IR, discussing antenna spacing, Marshal Williams, K5MB, on matching large arrays, John Fox, W0LER, presenting the latest information gleaned from OSCAR telemetry, Al Katz, K2UYH, providing an insight into what can be done with digital signal processing techniques and Mel Wilson, W2BOC, bringing the group up to date on his thoughts with respect to the latest rash of Es openings on 6 and 2. Wayne Overbeck, N6NB (K6YNB), gave a "show and tell" on his various vhf DXpeditions through the years, including the now-famous 1976 trek to KL7. That resulted in the first 2-meter WAS in history going to K0MQS. Wayne also told the group why he favors the quagi type array. Following his talk, he held an "open truck" in the parking lot so all could see how he crams all the equipment into a camper. The saga of another renowned vhf DXpedition, the Pack Rats moonbounce operation from HKITL, was presented by Tony Souza, W3HMU.

Two new features at this year's CSVHF Conference were an antenna gain measuring competition and an operations forum. Both

appeared to meet with great enthusiasm. The principal recommendation which grew out of the operations forum was an overwhelming vote to move terrestrial work on 70 cm to the vicinity of 432.1 MHz (see above). Most of the members of the newly created VHF/UHF Advisory Committee (VUAC), including chairman W1JR, were present. Each summarized opinions in their various call areas and discussed the committee's first task of coming up with a band plan for 23 cm. N6NB, chairman of the Contest Advisory Committee (CAC), broke the news of two League-sponsored contests of interest to vhfers. One is a uhf test for 220 MHz and above which features an interesting new system of multipliers, while the other is a moonbounce contest. Watch QST for detailed announcements on both of these interesting, new operating events.

The assemblage was introduced to the world of microwaves with a demonstration of Microwave Associates Gunnplexers operating on 10,250 MHz. It was put on by Tom Clark, WA3LND/W0TUF, and this conductor. Interest in these units was further heightened when W6KJ noted that he and N6CA had a pair of the units running in a stabilized mode, enabling the use of normal communications receiver bandwidth.

Both SMIRK and SWOT were well represented at the conference and considerable interest was shown in these activity-promoting groups serving 6 and 2 meters, respectively. The banquet speaker was Tom Clark, WA3LND/W0TUF, who holds a Ph.D. and is an accomplished radio astronomer by profession. The title of Tom's talk was "Sounds of Space and Sounds of Earth." The space sounds, which he described and played samples of, consisted of the hf signals emanating from the planet Jupiter and the regular ticking of pulsars; while the sounds of earth were made up of the sounds as well as the pictures being carried into space, recorded on a gold disc similar to a phonograph record, housed inside the Voyager spacecrafts. The John Chambers Award, given annually by the society to the individual making a significant contribution to vhf/uhf, went this year to Bob Southerland, W6PO, for his notable efforts toward bringing moonbounce within the reach of more and more amateurs. Once again, the prize committee outdid themselves and came up with a large table piled high with goodies. The ladies made out well in this department too.

New CSVHFS officers for the coming year are W0OHU, president, W0LER, vice president, W0VW, treasurer and once again the reliable W4FI, secretary. It was announced that next year's conference will be held in Rochester, MN. C U there.

Table 1

Antenna-Gain Competition Central States VHF Conference

23 Cm		
Antenna	Entrant	Gain dBi
4-ft dish	W0ZJY	22.0
5-ft cyl paraboloidal (K0TLM feed)	W0HJY	20.0
5-ft cyl paraboloidal	K0TLM	19.0
5-ft cyl paraboloidal	W0ZJY	15.5
29-in. dish	K0NG	14.0
Laport rhombic	K0NG	14.0

70 cm

Antenna	Entrant	Gain dBd
21-el F9FT Yagi	W5UPR	14.8
16-el KLM Yagi	K5UGM	13.7
16-el KLM Yagi	K7OO	13.7
15-el quad	N6NB	13.7
13-el K2RIW Yagi	WA4IPI	12.8
15-el W0EYE yagi	W0NHR	12.7
6-el NBS yagi	W1JR	10.2

2 Meters

Antenna	Entrant	Gain dBd
16-el F9FT Yagi	WA5HNK	15.0
19-el 39-ft HB Yagi	WA0RDX	15.0
14-el KLM Yagi (HB mating section)	W5UWB	14.6
14-el KLM Yagi (KLM balun)	W5UWB	14.1
8-el quagi	N6NB	13.2
9-el F9FT Yagi	W5ASHNK	13.1
2 stacked Yagis	W6NMT	12.9
10-el HB Yagi	W0WYZ	12.9
7-el Yagi	N6NB	11.8
7-el KLM Yagi	K7OO	10.1
6-el HB Yagi	W0NHR	9.6
3-el quad-Yagi	N6NB	9.0

50-MHz WAS

1	W0ZJB	53	W2RGV	106	WB6OKK
2	W0BJV	54	WIDEI	107	K7ZOK
3	W0CJS	55	W1HOY	108	WA6OLE
4	W5AJG	56	W6ANN	109	W6PO
5	W2HL	57	W1SIZ	110	K6JLU
6	W9CA	58	W1AEP	111	K9BDJ
7	W6OB	59	W5LFH	112	WA5FPS
8	W0INI	60	W6NLZ	113	K6IBY
9	W1HDQ	61	W7MAH	114	K6QAX
10	W5MJD	62	W8ESZ	115	WA6OZC
11	W2IDZ	63	W2BYM	116	WA6HKM
12	W1LL	64	W1RCD	117	K7CIN
13	W0DZM	65	K6PVH	118	WB6NKO
14	W0HVW	66	W4HOB	119	WA7GZC
15	W0WKB	67	K0JJA	120	WA7ZBS
16	W0SMJ	68	K6RNG	121	WA7FLB
17	W0QGW	69	W9QWT	122	WB6HQU
18	W7ERA	70	W6EDC	123	WA6AQX
19	W30JU	71	K6VLM	124	WB6BMB
20	W6TMI	72	K6QDX	125	K6QHC
21	K6EDX	73	W0EDM	126	Not issued
22	W55FW	74	W0JCI	127	WA6BOE
23	W0DRE	75	W0LLU	128	WB6UWY
24	W0ALL	76	W7RT	129	WA6KLR
25	W0CME	77	W7RDY	130	K7GWR
26	W0WVG	78	W6KIN	131	WA7JUI
27	W0CNM	79	W6CKR	132	K7TUO
28	W1VNH	80	K6GMX	133	WA6NRY
29	W0OLY	81	W7DYD	134	WB5CNZ
30	W7HEA	82	K6ZEE	135	K5HVC
31	K6QGG	83	K6HCP	136	WA7EYU
32	W7EFA	84	K6YIL	137	WA7ZTA
33	W0PFP	85	K6GMV	138	VE7AFB
34	W6BJI	86	K7BAG	139	W6SMS
35	W2MEU	87	W7ZOW	140	K5WVX
36	W1CLS	88	K7ZPS	141	W7INX
37	W6PIZ	89	K6EPT	142	W6DPD
38	W7ILL	90	K7HKL	143	WA5TYX
39	W0PDX	91	K5SW	144	W6KQG
40	W0DO	92	WA7FO	145	WA6JUD
41	K9DXT	93	WA6HXW	146	WB6VIN
42	W6BAZ	94	W6NIT	147	W7GRH
43	W6BA	95	K7ICW	153	K7QFW
44	VE3AET	96	K6EJO	154	WB6HDB
45	W0IFP	97	W6NLO	155	K7NN
46	W0QIN	98	K7BBO	156	K7PKI
47	W0WVN	99	K6ZXS	157	K7DVK
48	K9ETD	100	K7MUR	158	WA5VHN
49	W0FKY	101	K5EFW	159	K5ZMS
50	W8LPD	102	WA6JRA	160	WA5HNK
51	W0ZTW	103	WB6WAX	161	WA9DOT
52	W6GCG	104	W7FN	162	K7DBR
		105	WB6IMV		

No. 20, 22, 34, 37, 43, 56, 60, 68, 70, 71, 72, 74 and all after 75 are for 50 states.

Table 2

Noise-Figure Competition Central States VHF Conference

70-Cm Preamps (postamp 1.7 dB)		
Device	Entrant	NF in dB
V244	K2UYH	0.85
NE645	WB5LUA	0.95
FMT4576	W1JR	1.20
FJ203E	W1JR	1.35
MS2110	W5HN	1.35
FMT4575	WA4IPI	1.35
MRF904	K5MWH	1.50
FJ203	K3WC	1.60
MRF901	W3TMZ	1.60
MRF904	W1JR	1.60

2-Meter Preamps (postamp 1.35 dB)

MRF904	K5MWH	1.30
special HP	WA7CJO	1.40
3N204	WA0TXV	1.40
3N211	W7DNU	1.40
U310	W1JR	1.55
U310	W3TMZ	1.60
U310	W1JR	1.70
U310	W7FN	1.80
U310	W7DNU	1.80
2N5650-BF90	K5PJR	1.80

How's DX?



Conducted By Rod Newkirk,* W9BRD

Two-Hundred Meters and Down a Little

We beat the DX drum for an improved 10 meters last month. This is the time of year that produces a perennial pickup at the opposite end of our long-haul spectrum, too; venerable 160. Over the past few seasons of lean solar activity, 1.8 MHz has built up quite a substantial following. Many of the gang have gone all-out to equip their stations with gear and skywires particularly effective at such lower frequencies. "One-sixty surely is a different DX world," one top-band newcomer told us in a recent QSO. "Very few Yagis and quads."

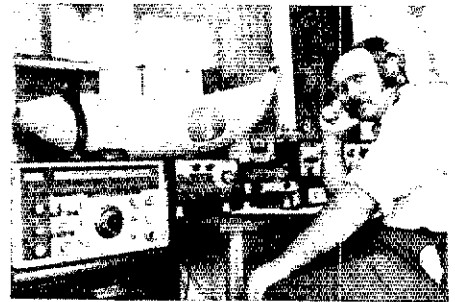
Unlike such main DX freeways as 20 and 15, generally favorable 160-meter long-distance propagation is not directly proportional to sunspot numbers. W1BB, who has probably studied the band more diligently than any other amateur, wonders with others if there's an optimum level, somewhere along the curve, above and below which 1.8-MHz openings taper off. When the smoothed sunspot count was dipping through the 40-50 area, top-band conditions may have been more solid than in seasons since.

One thing's for sure. When — and who knows just when? — the slope zooms substantially upward again, 160 once more will become a mighty tough DX nut to crack. Toward that end we'll need all the tools and techniques now being sharpened by 1.8-MHz specialists for the 1977-78 season ahead. Dedicated 28-MHz diards are squeezing plenty of DX out of 10 meters during the present sunspot minimum. At the next maximum, will 160-meter devotees do as well?

GETTING 'EM ON THE WALL

I've searched the HZ1AB log files here in Dhanran and find them complete for the period 1958 through 1961. Also on hand are QSO records for October 16, 1974, to March 6, 1976, and very limited operation on 15, 40 and 80 meters from September, 1976, to February of this year. Logs for current activity beginning March 7, 1977, are also intact. Missing logs are a mystery; some may be in the hands of QSL managers and others are known to have departed with past operators of HZ1AB. WB9FUV, also on the scene, and I are taking care of some of the backlog of unanswered cards and, in response to self-addressed stamped envelopes, or s.a.e. plus International Reply Coupons, will respond to any HZ1AB QSL request for which we have matching QSO record. All QSLs for HZ1AB now may go via QSL manager K8PYD with whom we maintain close liaison. (K8CSG-HZ1AB) . . . I'm clearing up QSL matters for past DXpeditions by OH2s BH and MM as C5AZ, CT9AT, ZD3s X, Z, etc. (OH2BAD) . . . Trying to replace the 1968 KM6BI QSL I lost in a shack fire is a very tall order. (PY6CN) . . . I noticed mail to Lebanon being returned undelivered earlier this year, but only temporarily. (W1OPJ) . . . There were about a hundred U.S.S.R. stations represented in August QSL receipts here who should be listed among your "QSLers of the Month." (W1BFFK) . . . One of the toughest countries to work from VR3-land is another VR3. QSOed VR3AR from VR3S but still need his QSL. (W7HNL) . . . At the moment I would have to nominate PY0ZAE and

UHRBI as non-QSLers of the Year. (WB0CGJ) . . . We receive numerous recommendations for non-QSLers listing but possible mitigating circumstances really require case-by-case evaluation. It's fairer to accentuate the positive. (W9BRD) . . . I see that some of the gang list VP2KJ and VR3AH as QSLers of the Month but I'm having trouble running down their wallpaper. (K4ZVS) . . . DL9OH disclaims QSL connection with a similar-suffixed TA2. (WA4UVG) . . . W3US, now in Italy, delegated his QSL chores for 9J2s SJ and TJ to me. Self-addressed stamped envelopes from U.S. applicants, please. (N8JW) . . . I'm preparing some 3500 QSLs for my recent QSOs from HH, HI, KP4, VP9, 8P6 and other Caribbean regions. The cards depict a work by my father, sculptor Tom Allen, Jr. (N2BA) . . . HD8CD QSOs with Europe and Africa may be confirmed via 1QWDX, others via K8LJG. (HC5EE) . . . HK0BDG second-op Richard wants QSLs to P. O. Box 842, San Andres. The station's first op speaks no English and isn't keen on card-swapping. (WB5KSU) . . . Couldn't get our CY1UNB cards printed until the fall U. of N.B. term. All requests will be honored. Since hundreds of QSOs with about 60 countries are involved, all QSLs received without s.a.s.e., or s.a.e. plus IRCs when appropriate, will be answered via bureaus. (J. Connor, VE1UNB) . . . Prefix variants afoot, suffixes usually unchanged: (F-CG-CK-CY-VA-VB-VC-VG (VE), SJ (SM), LG (LA), 4T (OA), DT (DM), XO (VO), 4N-4O (YU) and XQ (CE). Fresh International Telecommunication Union block allocations include H4 (VR4), J3 (VP2G) and S9 (CR5) . . . Due to skyrocketing postage costs, applicants for my A9XS cards are urged to include the customary s.a.s.e., or s.a.e. plus IRCs. (WB2QHQ) . . . After years in the game my QSL returns are running 75 percent from Germany, 70 from VK-ZLs, 54 from Yugoslavia, 50 from England and 28 percent from Canada. No complaint about Russia; with 905 U.S.S.R. stations in the log I've received 656 QSLs or 72 percent. (WA9UES, NNRC) . . . Ex-5X5NK has about 18 months of Uganda QSOs to QSL from the home station, DJ6EA. . . While passing through Ceylon W6YO picked up a bundle of 487PB QSLs to disseminate in due time. . . K7LAY, handling cards for WB5LBJ/DU6, also has YB4ACJ logs through February 6, 1977. . . WN-KN now is issued by the Federal Communications Commission as an additional WA-WB-WD type label. Current KN1PFQ, for example, is former WA1IEB, formerly KN1PFQ, who got his old Novice call back for Advanced class use. (WA6AUD) . . . 'Tis understood that AC3PT once more is QSLing direct from his Gangtok palace. (DXNS) . . . K4BEO/CE and N4SN/DU request QSLs via the fourth call area ARRL QSL Bureau branch. K1AGB supplants WA1HAA as QSL tender for VQ9HCS and J06HP. (VE8ON) . . . KG4-bound QSLs may be routed c/o GARC, P. O. Box 73, FPO, New York, NY 09593. (L1DXA) . . . HZ1SH operator John can receive cards through his G8FQM home address. 9L1SL op Chuck (ex-6W8FP) can be reached via WA3NCP. XP1AB's Henry wants QSLs via WA3HUP while op Harvey specifies WA2UUK. (WA6AUD) . . . YV5ANF helped me confirm a 1963 contact with YV0AA. (YS1RRD) . . . For returns rapid and reliable, "How's?" correspondents WA1BFK 4LVP 7HPI, Ks 3UA 4ZVS, Ws 2ZQB 9RFV, Wbs 3ALX 0CGJ, N8ZZ and VE3HHS enthusiastically applaud these QSLers of the Month: A9XCC, C31HD, CN2AQ, CO5QM, CT2BS, CX2AQ, DK5EC/HBQ, DJ1BZ, EAs 6DD 8BF 8JQ 9EO, EI7CV, EJ0A, EL2EK, FO8S EBF FB, Gs 3WQE 8DV, GJ2LU, GM4DGT, HB9HT, HH2MC, HI8EJH, HK0TU, HL9TJ, HM2JW, Is 1YLU 4BCA, IS0QRJ, JAs 11DU 1JQY 1KSO 1SYY 3IG 7AMK 0BNX, KGs 4LH

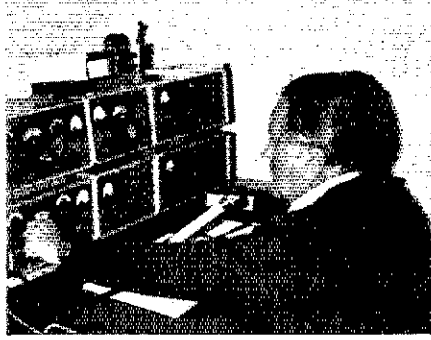
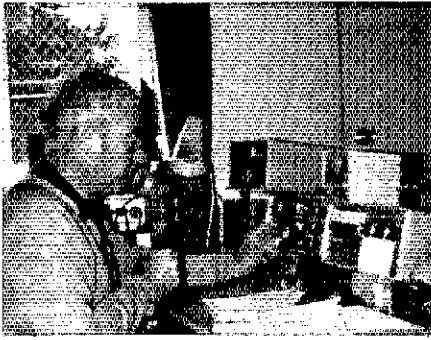


A9XS should be back at WB2QHQ by now, attending to QSL debts incurred as a recently radioactive Bahrain resident. As you can plainly see, W/K pileups almost drove Chris bananas.

4SC 4TT 6JAR, KH6FX, KL7IQQ, KP4s DSD EDA ENV, LUSBF, LX1s ML YZ, OH6NO/SU, OK2RGA, OX3AB, OZ7BW, P29s CD JS PJs 2VD 8CO 9JT, PY1s BOA NEW RO/0, ST2SA, TA1ZB, T12GAP, plenty of U types via bureau, VKs 2WJ 2WN 3FC 3XB 3YD, VPs 1HE 2DH 2MJK 2MYP 2ST 2SZ 2VL, VS5MC, XE1OM, YU1GMN, ZE4JS, ZLs 1HQ 1NG 1WV 2MM, ZM7AT, 4S7DA, 4U1ITU, 5W1AU, 8P6BU, 9G1JW, 9H1ED, 9J2WR, 9L1CD and 9N1MM, along with QSL aides Ws 3HNK 3KVO 5QPX, K3RLY, WA4AKU, WB6DXL, F6BII and JA1HBC. Any other deservables that should be recognized? . . . Was IUWF 4UQM and WB5PIP offer to serve as QSL managers for hard-pressed DX ops overseas, the rarer the better. . . Alp! PY6CN still strives to confirm 1963-65 QSOs with CE0ZI, CRs 4AD 7GF 8BH 9AH, ET3RT, GC2AAO, GD3ENK, HV1CN, HZ3TYQ/HZ4, OH2AH/0, ST2AR, SVs 1AB QIF, TA1RF, UA1s CC/UJ8 1KED, U18AG, VKs 2AGH/1h 9BH, VP8GO, XE5L, XT2HV, YA3TNC, ZCSAJ, ZD6PBD, ZLs 3VB 4JF, ZS6BBB/9, 4S7H, 5A4TW, 5H3JR, 5N2HJA, 7G1L, 9L1RO, all in arrears. Other helpful colleagues are parentified with holdouts indicated: (W1OPJ) ODSAJ; (WA2ZQB) K2JZNF/4X; (WA9BFPV) FM0COO, ZS3BT; (WA9OZC) CR6KV, JW7UH, KS6CK, 2E3USA, 9U5SK, all '69-'70; (WB3ALX) HR3SM; (VE1AI) FWSBO '70; (VE3HHS) CE7BAL, FG7AM, GDSBOY, KC4AAD, KG4DS, T12EA, all '75. Any success? . . . In supplement to the directory to follow, we understand that the following wanderers accept QSLs via their home addresses: DJs 1BP/HBQ 7RU/SN 9NX/HBQ 0YD/HBQ, DK7UF/HBQ, DLs 2RL/YV6 7HU/IC8, F2VO/HBQ, G4DIJ/OY. Is 4LCK/IH9 0KLV/IH9, Ks 1DRN/C6 4ZJF/C6, KH6IMH/DU2, LZ1CY/D2, N5RM/HB, OH8NQ/SU, Ws 2NTJ/CK2 3OGY/VP9 6UOU/KC6, WA6KWQ/KW6, WB6EMA/TG7 and ZS5WV/A2. As for the individual selections to follow, be aware that each suggestion is not necessarily accurate, complete or "official" . . .

A2CSD, P. O. Box 70, Orapa, Botswana
A2CZV, P. O. Box 202, Gaborone, Botswana
A4XGY, A. Fearnley, P. O. Box 8051,
Salalah, Sultanate of Oman
A4XHA, P. O. Box 8656, Salalah, Sultanate
of Oman
A9XCD, P. O. Box 144, Manama, Bahrain
CSAAD, J. Dunglein, Dept. of Civil Avia-
tion, Banjul, Gambia
CN8CW, P. O. Box 85, FPO, New York, NY
09544
COSDM, A. Diaz, P. O. Box 113, Matanzas,
Cuba

*c/o ARRL, 225 Main St., Newington, CT 06111

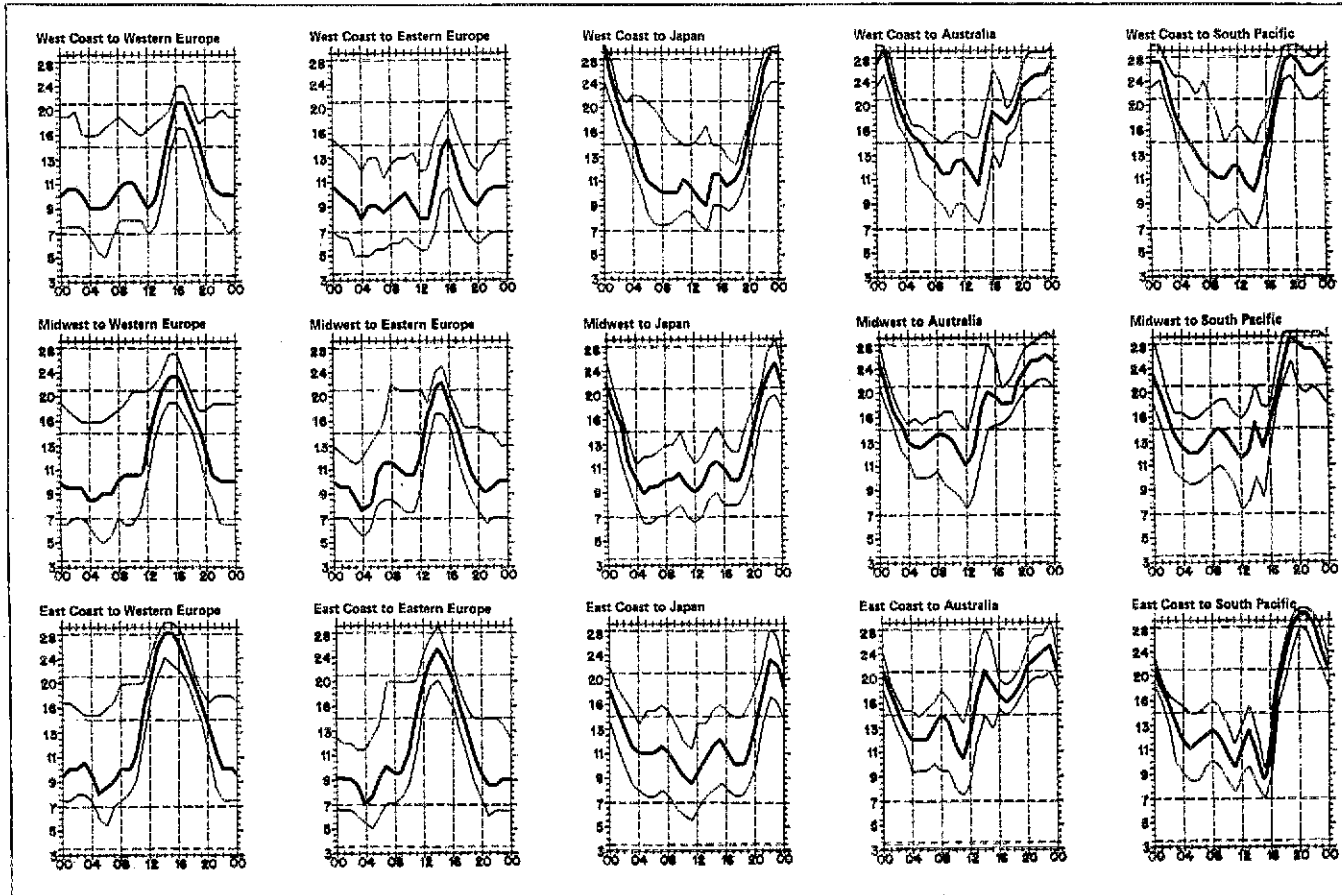


VKs 5WR and 6RU, left and right, are Aussie OTs known to several worldwide DX generations. Bill and Jim welcomed W9DH, contributor of these photos, during Loren's recent business visit to Adelaide and Perth.

IT9SKO/IG9 (via IT1ZGY)
 J28AW, Box 11, Djibouti, Djibouti
 JA4ZHL/JD1 (via JA4FHE)
 JA7ZSQ/JD1 via JH7WKO, Central P. O.
 Box 49, Sendai, Miyagi 980-91, Japan
 JR3WRG, Y. Sugimoto, I-11-12 Nagaremach
 Hiranoku, Osaka 547, Japan
 KC6JJ, J. Jensen, Box 358, Yap, W. Carolines
 96943
 KC6MJ, P. O. Box 900, Ponape, E. Carolines
 96941
 KX6AU, L. Hargis, Box 517, APO, San
 Francisco, CA 96555
 KZ5s FR UH (via WD8CPU)
 OA8CM, P. O. Box 323, Pucallpa, Peru
 OF2s BAD/OF0 BR/OF0 (via OH2BAD)
 OX3OA, O. Andersen, Box 44, DK-3910,
 Sondre Stromfjord, Greenland
 S8AAE, C. Churms, Bethel College, Esda-
 brook, Butterworth, Franskei, S. Afr.
 SV1KW, P. O. Box 39, Coriu, Greece
 TI2RAW, P. O. Box 2310, San Jose, Costa
 Rica
 TI2RW, P. O. Box 2745, San Jose, Costa
 Rica
 TR8ECM, G. Chosse (F6ECM), P. O. Box
 3999, Libreville, Gabon
 VE2AQ5/TG9, J. R. St.-Germain, 2655 Curie
 Pl., San Diego, CA 92122
 VK9JD, P. O. Box 27, Norfolk Island 2899,
 Australia
 VP1GYL, P. O. Box 506, Belize, Belize
 VP2LDJ, P. O. Box 335, Castries, St. Lucia,
 W.I.
 VP2MB, J. McKenna, P. O. Box 88, Plymouth
 Montserrat, W.I.
 VP2MGB, Ruby Bramble, Bethel P. O., Mont-
 serrat, W.I.
 VP8PC, P. O. Box 113, Port Stanley, Falkland
 Islands
 VP8PP, P. O. Box 224, Port Stanley, Falkland
 Islands
 ex-VQ9EA-S79EA, 13 Creighton St.,
 Cambridge, MA 02140
 VR4BT, B. Tiffany, P. O. Box 640, Honiara,

CT2YA, Madalena C. de Andrade, P. O. Box
 602, Ponta Delgada, S. Miguel, Azores
 CT4LI, Rua da Matematica 6, Coimbra,
 Portugal
 DMs 6LZB 60B (via DM3SCG)
 EA7ALM, P. O. Box 3153, Malaga, Spain
 EA9EW, P. O. Box 103, Cueta, Spanish
 North Africa
 EA9FN, P. O. Box 326, Melilla, Spanish
 North Africa
 EL1F, c/o T. Skelton, 143 Folger St., Clem-
 son, SC 29631
 F0s BEF BEG (via DL6PF)
 FC6ETR, Residence Tourraine, 20200
 Bastia, Corsica, France
 FG7AE, P. O. Box 957, Pointe-a-Pitre 97110,
 Guadeloupe, F.W.I.
 FK8CR, P. O. Box 544, Noumea, New
 Caledonia

FM7WO, via V. Thompson, K5VT/3, 625
 E. 35th, Baltimore, MD 21218
 FM9BAH, P. O. Box 619, Fort-de-France,
 Martinique, F.W.I.
 FR7BN, M. Louis, La Possession, 97419, Re-
 union Island (or to FM7WO via K5VT/3)
 FY7s AN AU (via WD8CPU)
 GI-GUSBXG (via DL6PF)
 GUSs CBD CBE (via F6DGT)
 HC6FC, P. O. Box 502, Ambato, Ecuador
 HC8s EE GZ HV JN SL TV VN (to HC8s SEE
 1GZ 1HV 2JN 2SL 2TV 2VN)
 HPIYA, P. O. Box 9668, Panama 4, R.P.
 HR2RAN, P. O. Box 1011, San Pedro Sula,
 Cortes, Honduras
 HR3JJR, P. O. Box 207, La Ceiba, Atlantida,
 Honduras
 HZ1BS, P. O. Box 6177, Jeddah, Saudi Arabia
 HZ1TC, P. O. Box 3366, Jeddah, Saudi Arabia



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 hpt). 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

Guadalcanal, Solomon Islands
 VR4DN, D. Newman, Box 81, Honiara,
 Guadalcanal, Solomon Islands
 VS5AA, W. Maddox, P. O. Box 1711, Bandar
 Seri Begawan, Brunei
 ex-W6BYB/VE1, J. Mayes, W6BYB/7, 3815
 Tanager In. S., Billings, MT 59102
 WA5KKG/YB7, C. Mansfield, Box 92, Queen
 St., P. O., Singapore 7, Singapore
 WA6ICQ/9QS, J. Waite, c/o ZAMISH, APO,
 New York, New York, 09662
 WA6YU/DU2, R. Payne, RRF, PSC-2, Box
 18596, APO, San Francisco, CA 96311
 WA6JRX/KG6, D. Schmidt, Box 445, Agana,
 Guam, 96910
 WB6LJI/VQ9 (via WA4FVT)
 WB6UAG/EM0, W. Baker, 110-F Escondido
 Village, Stanford U., CA 94305
 WD4CQH/C6, R. Briens, Box F-1601, Freeport,
 Bahamas
 XF1KAT, Box 6731, Mexico, D.F., Mexico
 XF1VOZ, P. O. Box 7-1222, Mexico 7, D.F.,
 Mexico
 XF3B, Apto. Postal 7-1222, Mexico 7, D.F.,
 Mexico
 XQ3VA, P. O. Box 16625, Santiago, Chile
 YB1CS, P. O. Box 314, Bandung, Java,
 Indonesia
 ZS6QU/3, R. Larsen, Barclays Bank Insp.
 Dept., P. O. Box 1153, Johannesburg
 2000, R.S.A.
 SW1BG, T. Ijiri, JOCV, P. O. Box 1219,
 Apia, Western Samoa
 6W8s BY CY, J. & P. Bradford, P. O. Box 3013,
 Dakar, Senegal
 6Y5AB, P. O. Box 511, Kingston, Jamaica
 SP6IP, c/o WB4ZQN, 107 Cambridge Pl., Rte.
 5, Franklin, TN 37064
 9L1CA, C. Jones, c/o Dept. of State (Free-
 town), Washington, DC 20520
 9J2s SJ TJ (via N8JW)
 9K2EW, W. Bortree (WA3SWH), c/o Dept. of
 State (Kuwait), Washington, DC 20520
 9M6VW, c/o T/M Workshop, 1st Dvn., Sig.
 Regt., Labuan, Sabah, E. Malaysia

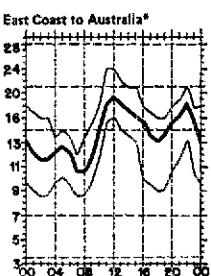
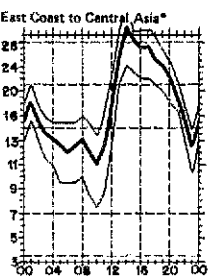
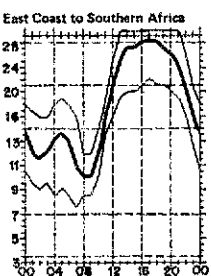
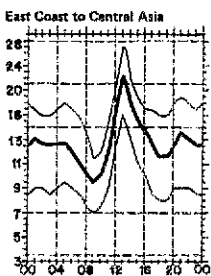
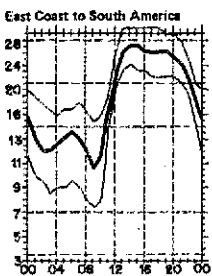
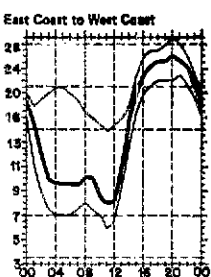
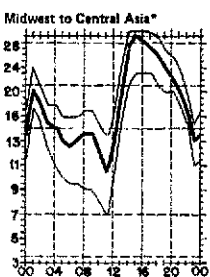
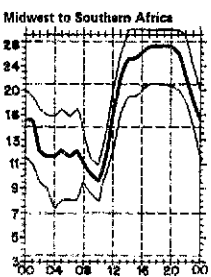
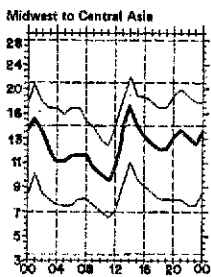
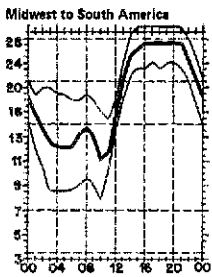
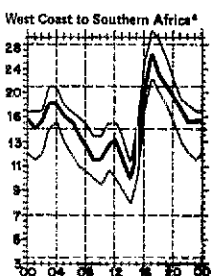
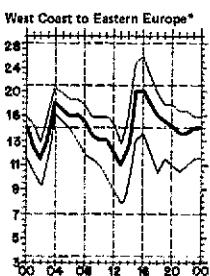
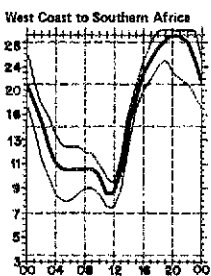
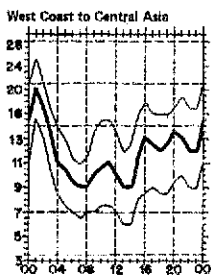
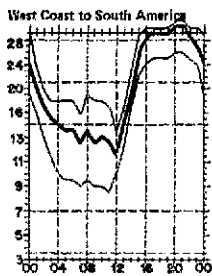
A3SSW (JA1BNW)
 A7XA (DJ9ZB)
 A7XZZ (HB9MTJ)
 A9XCC (K4CG)
 ex-A9XD (K6DQD)
 A9XS (WB2QHJ)
 AP2MQ (JA3CMD)
 AP2TN (W8QFR)
 C31JE (DL6PE)
 C31JU (SM7GXE)
 C31MJ (EA3NE)
 C31MS (EA3MS)
 C31NB (F9AP)
 C31NT (HB0RLC)
 C31OE (F6ECX)
 C31OF (DC4KN)
 C31OH (F6DNW)
 C31ON (F2VX)
 C31OO (D21SX)
 C5AAM (WA6FIT)
 C5AL (G3FGP)
 C6ABC (WB4YHN)
 CG1CR (VE1ABM)
 CJ1EJ (VE1AMN)
 CK1KE (VO1KE)
 CN8CC (F6CVE)
 CT2BZ (WA4FVT)
 CT3BQ (OZ1LO)
 CT5TU (CT1WB)
 CY1UNB (VE1UNB)
 DT7DK (DM2DUK)
 DX1JA (PARA)
 DX1TH (W6UJU)
 EA6EO (DB3XS)
 EP2DC (K1DFC)
 EP2IA (G3SXW)
 EP2TT (JR3WRG)
 EP2TY (JR3WRG)
 EP2YK (JG1OFN)
 F0A0J (HB9SZ)
 F0BAK (PA0TO)
 F0BBM (DK8PG)
 F0BBW (G3BTO)
 F0BTF (PA0TBK)
 F0CA/CT3 (JU2AWA)
 J7B7BK (LA7BK)

F0DFO (ON6WN)
 F0JP (DL8FR)
 FC0AOZ (DK1DY)
 FB8YE (F6BFH)
 FK8CD (W7LLC)
 ex-FL8DV (J28AF)
 FM7WW (WB5SFS)
 FM0DON (HB9MVW)
 FP9GG (F6DPP)
 FP0TD (K8LJG)
 GJ5CAJ (ON5IQ)
 GJ5CCP (ON6NH)
 GJ5CEM (GJ2LU)
 GU5BYY (N5RM)
 GU5CBE (F6DGT)
 HB0BGN (HB9BGN)
 HC8DD (HC1EE)
 HD8CD (GRC)
 HG6RTT (HA6NP)
 HH2MC (WA4AKU)
 HK0BDG (see text)
 HL9WC (K8LJG)
 HM9A (HM5HW)
 HR0DHX (WA4DFE)
 HS0SEA (RAST)
 I1DFS/IA5 (I1FNX)
 I0J1/G9 (IT9ZGY)
 I0LL/IM0 (I0WHY)
 IA5PQW (I2PQW)
 IB0JN (I8N)
 ID90N (I3ON)
 ID9XRU (I2XRU)
 IF9ZRQ (IT9ZRQ)
 IH9HLO (I2YBC)
 IH9IPL (IT9KST)
 IH9JT (I9JT)
 IH9OEF (IT9JLG)
 IH9ONU (IT9KST)
 I17EX (I7VCA)
 IM0DX (I3XAL)
 IM0USU (IS0UAJ)
 IM0RYC (I4USC)
 J28AY (F6ETO)
 JT2AT (JT1KAA)
 JW7BK (LA7BK)



9H1FC does occasional petroleum work in north Africa where he puts such rare regions as Libya on 20 sideband. When home in Mesquite, TX, Scotty signs K5CO.

JY9VK (W1HSS)
 K4BEO/CE (see text)
 K4YT/8R1 (W2GHK)
 KA1S (KA6US)
 KC6PO (JA1LZK)
 KG6RE (JA2KLT)
 KH6EF/HR (WB6DXL)
 KM6FD (K5YMY)
 KM6FF (KM6BI)
 KS6FF/HR (JA2NNF)
 ex-KX6AJ (K4MU)
 KX6DC (W6ENE)
 KZ5DG (WA6EAE)
 LZ0KKK (LZ2KKK)
 LZ0U (LZ1KDP)
 N4SN/DU2 (see text)
 N6WW/4X (WB6NWW)
 N7DC/YV5 (W3HNK)
 OA4JN (K1ALP)
 OE8JSK/5B4 (OVSV)
 OF1AJ/0 (OH1AJ)
 OH0DX (OH3ZH)
 OH9TH/SU (OH9RJ)
 KA1S (SM0BVK)
 OX5AB (WA1DBR)
 P29BB (VK2BAX)
 PA9AAQ (DJ3OE)
 PA9APG (DL6PE)
 PA0GWK/A6 (VERON)
 PJ3AR (WA2DHF)
 PJ9BB (W2VLA)
 S79CM (ON5MC)
 S79H (W6UJU)
 S88TH (W6UJU)
 S8AAD (SARL)
 S9RLB (CR5LB)
 SM6GBM/4U (SSA)
 SP2EPU/JW (PZK)
 ST2QL (G3KOL)
 ST0RK (DL7FT)

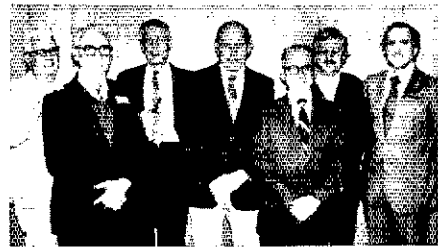


as the lowest curve (optimum traffic frequency, or fof). See January 1977 QST, page 58, and September 1977 QST, page 35, for a complete explanation. The horizontal axis shows Universal Coordinated Time (UTC); the vertical axis, frequency in MHz. Asterisk indicates long-path circuits. Data are provided by the Institute for Telecommunication Sciences, Boulder, CO. These predictions for November, 1977, assume a sunspot number of 48, which corresponds to a 2800-MHz solar flux of 101.

SU1JA (JA0YJK)
 Y75AA (CRAG)
 ex-TA2MM (DJ0RR)
 TF2SS (IRA)
 TF4F (IRA)
 TI2CF (WA4LDM)
 TL8JW (JA2CNT)
 ex-IN8AD (F6AQV)
 VF6BCY/4X (VE1FQ)
 VK9XR/mm (ON6GC)
 VP1DD (W0AWA)
 ex-VP1JJ (GW8MTC)
 VP1SM (W5QPK)
 VP1WCS (K5AFJ)
 VP2MBB (VE3ECP)
 VP2MH (K8MFO)
 VP2MJE (W6FLI)
 VP2MVP (W4DJJ)
 VP5EE (WA4KMO)
 VP5MA (WB4LPM)
 ex-VQ4SS (G3SS)
 VQ9HCS (K1AGB)
 VS5AM (VS5PM)
 VS5DM (K9WFG)
 VS5MM (VS6BY)
 ex-VSSWM (VS5AA)
 VS6FE (G3HCJ)
 VU2BXP (JA1PUT)
 VU7LA (JA1AQ)
 WB3BKR/HK (W1MXI)
 ex-XW8AL (F0DAJ)
 ex-XW8BS (W7KRP)
 ex-XW8FN (WB3IDA)
 YB0ACF/6 (YB6ACV)
 ex-YJ8CG (VK2BCG)
 Y18XX (ZL1A1L)
 YN8ARC (YN8SLR)
 Y09KCA (Y04KCA)
 YT3G (YU3ZV)
 YU0QM (SRJ)
 YV4CB (W3HNK)
 ZD8AB (W8BMS)
 ZD8RW (WB8MBT)
 ZF1CN (W4BJ)

ZF1HE (VE3FT)
 ZF2AU (W4MLA)
 ZF2BB (N4TZ)
 ZL4LR (ZL4NH)
 ZM7AH (WB5VDS)
 ZM7MM (W6FWX)
 ZS2MI (ZS6AGV)
 ZS3LK (DK3GI)
 3A2CX (F6CWA)
 3A2HB (W4LRI)
 3A0FY (F9UW)
 3A0HD (F6DPA)
 3D2RM (WB5MXO)
 ex-3V8DD (N5RM)
 4079WARC (YU1PCF)
 4T4AKC (OA4AKC)
 4X4VB (WA4WTG)
 ex-5A3TX (W3HNK)
 5B4CD (SM5EI)
 5B4FI (SM3GI)
 ex-5N2AAU (VK2WS)
 5N2AA (K9LSB)
 5N2KO (W0PXXO)
 5N2LA (W3AFM)
 5W1BH (W6FWX)
 ex-5X5NK (DJ6EA)
 5Z4QC (SM0HWM)
 5Z4RG (WB9MFC)
 5Z4WL (DL3WL)
 ex-606BW (WA3WRD)
 ex-6W8FP (9L1CA)
 6Y6CSJ (6Y5AB)
 8P6FU (W3HNK)
 8P6GQ (WA4T2M)
 8P6IM (N2BA)
 8P6IQ (W4YOK)
 8P6IR (WA4AJ)
 9H3TIN (MARL)
 9J2US (W3HNK)
 9K2CM (W4UL)
 9M2DW (DJ9ZB)
 9M8TH (W6UOU)
 9N1AR (G3PTO)
 9Q5FL (ON5FL)

For the preceding glossary your thanks are due Ws 1CDC 10PJ 3AZD 4KFC 4YOK 5QPX 7HPI 7LLC 9JJ 9NN, Ks 1ZZ 2BT 2TV 3D1 3UA 4ZVS 5VT, WAs 2ZQB 9BFV, WBS 5KSU 6EMA 8ABN 0CGJ, Ns 5RM 8ZZ, VEs 1AMN 2AQS 3ECP and DX periodicals to be properly credited next month. Neat-oh!



Getting QSL bureau people together in the 8th Call Area is apparently just as difficult as it is anywhere else. This distinguished group of gentlemen represents one third of the 8th Call Area ARRL QSL Bureau. Gathered (left to right) are W8ZCK, WA5SHF/8, W8BKO, W8CFG, W8SUC, W8OEM and WA8EUK. Other people who work in the bureau but are not shown in this photo are K8AIK, K8ANZ, W8DCH, W8DWP, W8EE, W8JEY, W8NPF, K8PYD, W8LTA, W8BOBA, W8BRPU, K8UHB, W8UNP, W8BYUL and W8ZCQ.

The 8th Area ARRL QSL Bureau is under the auspices of the Columbus Amateur Radio Association and is managed by W8CFG.

A "high volume" bureau, in 1976 the 8th Area bureau handled some 250,000 cards, and 1976 was a slow year.

The workers in the QSL bureaus are doing their part to help you. Are you doing your part to help them help you? Your part is simple: Keep envelopes, or postage credit, on file with your QSL Bureau. The bureau addresses are listed every other month in *QST*. (W8THU photo)

DX Century Club Awards

Administered by Don Search, W3AZD

The ARRL DXCC is awarded to amateurs who submit written confirmation for contacts with 100 or more countries on the official ARRL DXCC List. You may also submit cards to endorse your award in 20-country increments through 240, 10-country increments through 300, and in 5-country increments above 300. The totals shown below are exact credits given to DXCC members from August 1 through August 31, 1977. An s.a.s.e. will bring you the full rule for participation in the DXCC, the DXCC list and application forms.

New Members

Mixed

WA0LWG/236
 JA5ANP/224
 SM5BRW/218
 W6KJG/217
 JR1AIB/212
 JA5FDJ/209
 I3OBO/206
 YU2CBK/201
 VE4OSN/188
 WB1MX/170
 JA2AXB/165
 LU8ADK/165
 K4UWH/164

15AFP/160
 GW3CBA/154
 WB4KTR/150
 JA3EOP/145
 JA1XS/143
 W6WEG/142
 KA6SS/133
 LA5NM/133
 JA1QVR/128
 W0TGB/127
 WA1NRG/126
 KZ5FR/120
 17PXV/116

K9EVB/112
 OH2KP/112
 W6RLB/111
 SM5AKT/110
 W6PVE/110
 9J2CB/110
 VE8AM/108
 DK8KD/107
 KP4DGT/107
 OH8TS/106
 TA1MB/106
 DK7XX/105
 DM2BML/105

WB8QXR/105
 LA2HN/104
 WB6DEO/104
 DA1DS/103
 DK3YD/103
 JH3KA1/103
 OZ4EDR/103
 W6PMT/103
 K1YHM/102
 K1ZD/101
 K8KW/101
 K9THZ/101

WA6DVE/101
 I5SMX/100
 K3HWL/100
 K3YGG/100
 K5IQ/100
 K8FO/100
 K91JX/100
 VP2EEC/100
 WA6WMT/100
 WB8GZE/100
 WA4JRJ/100
 W9BZ/100

Radiotelephone

W8CNL/304
 WB8LDH/217
 JA5ANP/203
 JA5FDJ/202
 JR1AIB/201
 WA3KCY/200
 SM5BRW/170

ZP5PX/130
 WA2CIF/129
 OZ9UU/124
 WA4JW/120
 WB4QI/120
 DK4MI/112
 KA6SS/112

LA5NM/111
 WB4QVZ/110
 9J2MG/110
 WB6ICJ/108
 KP4DGT/107
 W6RLB/107
 DK2NZ/106

17PXV/106
 K0UPV/104
 OZ2YV/104
 W4DYV/104
 W4SRH/103
 W8ILC/103
 WB9EOR/101

K9TXJ/100
 WA1AHQ/100
 H8CRS/100
 H18SRH/100
 WB5YV/100
 WA6WMT/100
 XF1RX/100

CW

I3OBO/178
 K5RW/140
 W8BO/121
 CX4LO/120

JA5ANP/112
 SM5BRW/106
 JA1FGB/104
 LU8ADK/104

WB9CGL/104
 W9VJW/103
 DJ2GW/102
 K9CT/102

JA1TNV/101
 K4OAF/101
 OH2BN/101

KP4DJE/100
 N6JV/100
 WA5YTX/100

Endorsements

Mixed

W9JUV/353
 W5TIZ/345
 OE1FF/335
 W9KXK/333
 W1RLQ/332
 JA1GC/330
 K4IEX/328
 VE3DDR/324
 JA2AAQ/323
 K8IFF/322
 W0TDR/320
 K9GM/318
 K0BUR/318
 W9HGR/316
 W1HGA/315
 W9HLY/314
 K6LAE/313
 W4AAV/313
 W9GW/312
 N4KW/311
 OK1MP/310

YV5AK/310
 K5GO/309
 WA6AUD/307
 OE8RT/305
 WA8PYL/305
 JA8KB/293
 WA4NRE/293
 JA7HZ/292
 WING/290
 I3LLD/288
 W2GA/288
 K1CDN/280
 K2UUL/280
 K9CT/280
 W2REH/280
 K9HMB/276
 W2VYX/269
 W2CC/262
 K2LM/260
 N2CW/260
 EA3NA/259

K6SP/259
 JA8CDT/256
 N311/251
 VE3DU/250
 W7DV/250
 W3DPA/249
 W7FR/249
 W3ACE/244
 K2HVN/242
 K4PY/242
 W2QXA/242
 WB4RUA/241
 K4UEE/240
 WB4FJO/240
 EA2IA/236
 JA2ETQ/232
 G31ZJ/221
 GW3SB/220
 W7OK/220
 W8YMB/220
 WB8LDH/220

N8JW/219
 K0UPV/218
 YU3TJA/217
 W8GE/214
 K6YK/210
 WA3KCY/206
 W4NG/206
 WB7DKV/202
 K3IKM/202
 KP4AM/200
 SM6BZE/200
 W2HAE/200
 W4YE/200
 W5CPI/200
 I5XRR/188
 WB4ROY/182
 W2IFK/180
 WA2FIJ/180
 WB4ZHN/175
 K4LRA/173
 OZ2E/173

W4OHZ/170
 JA8KSF/164
 YU1NFT/163
 K4SV/162
 DJ7MX/160
 ZL3BK/160
 WB2HJW/159
 JA5PUL/156
 WA4PYF/156
 W7FY/150
 DL7UX/149
 WA4BTQ/145
 K6OZI/140
 W1YNE/140
 WB7DPM/140
 W9TF/140
 WA4MCH/128
 K1PMJ/123
 Z56OK/120
 K2TV/119
 WA9EBT/119

Radio telephone

W4UG/335
 I5TDJ/333
 W5TIZ/329
 I2AT/322
 JA2AAQ/322
 W8VHY/322
 K8IFF/318
 OE1FF/318
 K0BUR/317
 F511/315
 W1HGA/315
 W6ZC/307
 DJ4PT/306

I2AHG/306
 WA6AUD/306
 I1BGJ/304
 JA1GC/298
 OK1MP/297
 WA4NRE/293
 JA7HZ/292
 WA8PYL/292
 F6BPH/280
 K4IEX/278
 K4ISP/277
 W2GA/277
 K2UUL/273

K9HMB/273
 K5GO/272
 W5SDR/270
 W9KXK/265
 W2CC/261
 N311/241
 W3ACE/241
 WA0LW/233
 JA1HBC/232
 K9CT/230
 G4DYD/219
 W8FAW/215
 K4NJS/210

WING/205
 KP4AM/200
 WB4VNG/200
 K25GH/199
 OZ5EV/194
 JA8KSF/190
 I5XRR/187
 W1JR/187
 I0GFP/184
 K3DH/180
 W6VDY/173
 W7FR/171
 WB8IAY/165

N8JW/163
 W6ORD/160
 JA5PUL/156
 WA4PYF/155
 WB4KTR/150
 DF4FX/141
 ZL3BK/140
 VE3DC/125
 W8KSB/3/123
 K1PKT/120
 WA4UVG/120
 W5CPI/120
 W6IIM/8/113

CW

N4RJ/243
 W9ZM/224
 W1JR/186
 K4IEX/182

W2NC/180
 W9GW/175
 JA2AAQ/174
 W4NBP/160

W6JD/150
 N8JW/144
 DL1PM/142
 VE3IR/140

W8GKM/136
 WING/133
 K4UEE/126

N8BM/120
 WA4MCH/120
 K6YK/118

5BDXCC

OZ5EV
 YU1AG

YU3CM
 VE3EDC

W1SP

YU3TJA

JA8JL

Note: W9EB should have been shown in previous endorsement listing with 329 countries. (Mixed)

The following should have appeared in the September 1977 DXCC Honor Roll listing. Phone: W5PQA 342/310, W7GN 338/314, K6EC 325/310.

50 Years Ago

November, 1927

Technical editor Kruse analyzes signal bandwidths, refuting claims that "my phone isn't much broader than c.w.," but also pointing out that a.c. supplies or chirps remove the halo the telegrapher claims.

"Motorboating" can occur in receiver audio circuits inadequately isolated from each

other, and J. M. Thomson shows how to eliminate this low-frequency pulsing.

Editor Warner reflects on the vast potentialities of amateur radio — yet with geographical restrictions. "Can anybody think of any other group whose individual operations actually take in the whole globe and who can go no further because the world isn't any bigger?"

An anonymous contributor describes his reactions to an evening of broadcasting, ending with switching off the set in complete disgust with the low quality of programs.

Harold Westman says our QSL cards are pretty dull things and suggests a number of ways they can be made more attractive.

Worldwide S-meter enthusiasts are trying a second test this month, and have published

detailed information on each continent's transmitting schedules.

The Honolulu-California air races have been much in the public news recently, and we learn that amateurs (Ralph Heintz and Ronnie Martin, 6AYC, among them) have furnished vital communication for the trans-Pacific flights.

Weather map transmission is not totally new, but Thornton Dewhurst describes a system with a unique method of synchronization pulsing. Tune to 36 kc. if you want to hear the signal.

W9UZ is justly famous for his NRRL expedition work, so a description of his new home station will be of interest to everyone.

A company called "Teleplex" introduces a new automatic sender.

25 Years Ago

November, 1952

Signal strength from a mobile varies considerably depending on the vehicle's heading and W7MRX shows a simple method for checking the antenna pattern.

W1JEQ describes a neat package of 6146s, providing 100 watts on 2 meters.

The Editor notes it was just 20 years ago the first single-signal receiver developments were accomplished by QST's W1AL.

A lot of us still have trouble tuning those dog-gone new "single-sideband" signals, but pioneer W9OHM's illustrations of spectrum distribution should help considerably.

It's a rather bulky cabinet, but W4CA has a very efficient five-band antenna-switching unit for powers up to 500 watts.

The League has requested FCC to expand the phone segments on both 10 and 20 meters.

The clamp tube is coming into general use for carrier control in phone rigs, and WITS

shows us the various modulation patterns resulting from common circuits in use.

A Novice can build a fairly economical dual-output power supply if he knows what parts to buy; W1DF recommends some transformers in the replacement category.

Turret switching of coils provides minimal lead lengths, as W8YPG describes in his elaborate home-built receiver. W1PH has another design, using coffee cans for shields.

"Correspondence" this month is filled with member protests against FCC's proposal for calling and working frequencies in our bands.

Keys and mics are poised for the 19th ARRL Sweepstakes. — W1RW

Silent Keys

It is with deep regret that we record the passing of these amateurs:

W1BP, Robert G. Ballard, Saugus, MA
*W1DYM, Gurdon W. "Bill" Gordon, Suffield, CT

W1HUH, Sister Mary Emiliana, Cranston, RI
W1PFE, Gustaf W. Von Colln, Cummaquid, MA
W1RBD, J. Clifford Bubier, Dryden, ME
W1TX, Roy C. Fosberg, Hartford, CT
W1VM, Andrew C. Zaroni, Saunderstown, RI
W1VR, Thomas R. Pennypacker, Dover, MA
W2BTZ, Henry J. Kelly, Cranford, NJ
W2BW, John W. Wilson, Garden City, NY
W2CLI, Lloyd V. Fleming, Glen Rock, NJ
WB2DIV, Theodore E. Kovacs, Beaver Falls, NY

K2EAF, Chester Drexler, S. Farmingdale, NY
W2GDL, Ernest L. Plant, Flushing, NY
W2GTH, Walter T. Bundy, Kingston, NY
*W2HO, Willibald Vollkommer, Monroe, NY
W2MFK, Martin P. Grob, Hauppauge, NY
WA2MI F, Stephen L. Todd, Woodstock, NY
W2ODO, Joseph P. Gehagan, Sr., San Diego, CA

W2RBE, Glenn C. Jones, Runnemede, NJ
W3CJN, John N. Allender, Baltimore, MD
K3CRZ, Robert W. Ledward, Lemoyne, PA
W3DYU, David M. Wilfong, Springfield, PA
WA3FBN, John S. Shemeld, Philadelphia, PA
W3FHN, John A. Painter, Philadelphia, PA
W3HQW, Raymond C. Woodall, New Kensington, PA

WA3PDV, Clifton W. Kinstler, Roslyn, PA
K3PHF, Robert M. Sims, Baltimore, MD
W3RWA, John P. Sauritch, Jr., Charleroi, PA
K3UWL, Edward J. Cillo, Sr., Montoursville, PA

K3ZEY, Michael F. Yenchick, Mont Clare, PA
WA4BJP, Claude F. Parkel, Trussville, AL
W4BMU, Olen R. Beach, Winston-Salem, NC
W4DPF, Paul C. Gregg, Asheville, NC

W4EH, George E. Cooper, Sebring, FL
W4FVN, Hershel H. Haney, Lumberton, NC
W4FCN, Charles R. Wendler, Port Charlotte, FL
K4FOQ, Harry V. Campbell, New Port Richey, FL
*W4GQV, Dr. James O. Dunlap, Sr., Rick Hill, SC

K4LI, Jesse F. Higgins, Washington, NC
K4RAS, Harold R. Glines, Edenton, NC
WB4RDI, Marlin D. Scribner, Richmond, VA
W4UVJ, Harry E. Robbins, Louisville, KY
WA5GIX, Lamar W. James, Pine Bluff, AR
K5IAN, Tommy L. Wade, Fort Worth, TX
K5KNY, Inez S. Brown, Springtown, TX
WA5SRV, Edward R. Miller, Mesquite, TX
WA5TOZ, Rex R. Doty, Miami, OK
WA6AFX, Thorburn S. Lewis, Roseville, CA
K6CF, E. Louis Lamoureux, Valley Center, CA

K6DSU, Marvin G. Whitney, Santa Barbara, CA
WA6EHC, J. Allen Gould, Woodland, CA
W6EXX, William R. Luebke, Redwood City, CA

WA6IIR, Ira F. "Jack" Knight, Newhall, CA
WB6KMV, Richard K. Ferran, San Gabriel, CA
W6MHH, Charles F. Warner, Garden Grove, CA
W6PJU, Mildred H. Maxson, Vista, CA
WA6PYL, Robert N. Pautz, LaCanada, CA
W6REU, William G. Fairfield, San Francisco, CA

W6RMN, Howard M. Beck, Yucaipa, CA
K6RYH, Robert F. Bryan, San Diego, CA
Ex-W6TED, John E. Scott, San Diego, CA
W7BLE, W.D'Orr Cozzens, Clearfield, UT
W7CCT, Joe T. Myers, Wapato, WA
K7EOM, Arthur G. Fritz, Seattle, WA

W7IMI, Charles M. MacCalli, Sierra Vista, AZ
W7JKJ, Stanley J. Gier, McNeal, AZ
W7LIU, Paul S. Carlock, Phoenix, AZ
K7UAE, Robert W. MacGregor, Idaho Falls, ID
WA7ZAG, Alfred C. Bidstrup, Idaho Falls, ID

WA8BHA, Frank M. Brooks, Middleport, OH
W8EDH, Melvin F. Altenburger, Delphos, OH
WB8EZZ, Daniel L. McAllister, Ubrichville, OH

WA8JAM, Leo C. Edwards, Canton, OH
WA8LAS, Leo B. Hornaday, Cleveland, OH
W8QGQ, Harry V. Frederick, Menomonee, MI
W8RZM, Francis C. Higgins, Toledo, OH
W8WMG, Clayton W. Dew, Saginaw, MI
W8ZMO, Russell V. Anderson, Otsego, MI
K9DUO, Carl A. Nevin, Alton, IL
WB9DZJ, Lloyd A. White, Waukegan, IL
W9ISG, Lloyd E. Spencer, Springfield, IL
WB9RGX, Loys W. Cross, Cedar Lake, IN
W9TIL, Paul Carpenter, Elgin, IL
WB9TTW, Lois C. Felter, Marion, IN
K9UZM, John D. Jankski, Hanover Park, IL
W9ARH, Gerold D. Ozburn, Peyton, CO
W9RH, Earl P. Nelson, Cedar Falls, IA
W9SWD, Cecil L. Cline, Boone, IA
WA9UPV, Clyde E. Miller, Lincoln, NE
WB9YUM, James C. Boustead, Minneapolis, MN

VE3FTB, Harry L. Blacker, Ottawa, ON
JY9CR/W4YEB, Charles M. Raybuck, Amman, Jordan
OH2SF, Lars Ravander, Helsinki, Finland
XE1CE, Carlos Gonzalez Najera, Coyoacan, Mexico

*Life Member, ARRL

Public Service

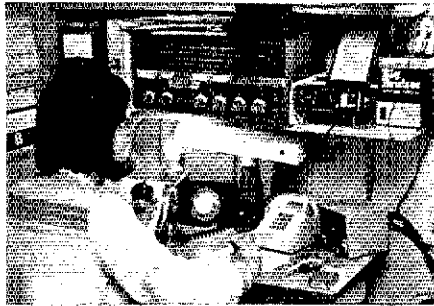
Conducted By Robert J. Halprin,* K1XA

Lights Out

New York City's Police Commissioner Michael J. Codd was so impressed with amateur radio during the blackout of July 13 that he has ordered steps leading toward a permanent auxiliary emergency radio network. Sergeant Staehs of the Community Relations Bureau is working with a committee of amateurs to coordinate their efforts with the Bureau.

A list of hams, their call signs and home addresses will be given to each precinct and, in turn, maps of the precinct area's emergency system locations will be assigned to selected hams. In the event of a city-wide emergency, time and lives may be saved by having an organized, well-informed, well-equipped, backup system of communications.

Almost immediately after the blackout, a communications system was put into action on 2 meters by WA2OHN, WA2EXP,



With a candle and a 12-volt battery, WA2MJK held forth on 2 meter fm during the New York City blackout.

WA2TLI and others, using emergency-powered WR2ADC on top of the Chrysler

Building in Manhattan. With the telephone lines virtually jammed with emergency calls, base stations set up by the hams in each precinct received reports of fires, looting, robberies, cardiac arrests and numerous other emergencies. Other hams operating mobile reported crimes they witnessed and, in some cases, transported police to the crime sites.

Bewildered Mets and Cub fans were being assisted and escorted out of Shea Stadium by hams toting hand-helds, while on 10 meters, health and welfare traffic was being originated to all parts of the country to assure people that loved ones in New York were safe. And CBS technician WB2EUH used the amateur frequencies to get the latest information to news reporters. See October *QST*, page 95, for further details of the amateur response to the massive power failure in New York. -- (WA2OHN, WB1ADL, WB2IBE)

PUBLIC SERVICE DIARY

□ Dundee, MI - May 31. Late afternoon weather conditions produced a tornado watch, with Monroe Co. ARES members responding. They relayed storm conditions and damage reports to the Office of Civil Preparedness. (WB8TKL, assistant EC Monroe Co.)

□ Mt. Rainier, WA - June 17. ARES members set up links for the Aberdeen Explorer Scouts Search and Rescue to communications centers in Tacoma and Seattle during a search for a missing hiker. Within a day the victim was found. (K7CYZ)

□ Cleveland, OH - June 30, July 7. By monitoring a receiver provided by the Lake Erie ARA, the National Weather Service used timely amateur reports to issue several statements and warnings on more than a dozen tornadoes. (LEARA bulletin)

□ Phillips, WI - July 4. High winds hit the area, knocking down trees, buildings, power and all communications. Nearly 200 hams assisted in the emergency response. (K9FHI, SCM WI)

□ Waukesha Co., WI - July 6. Fixed and mobile stations reported storm conditions during a severe-weather net, allowing government officials to take appropriate action. Some trees and power lines went down after a tornado hit. (K9PAK, EC Waukesha Co.)

□ Montgomery Co., MD - July 6. Fire disabled electrical water pumping service for the area. RACES officers WA3UQF and W3BFV called a net to coordinate various agencies in establishing an emergency water supply. (WA3UQF)

□ Hemingford, PQ - July 12. During the Hoot Owl Net, VE2EDB checked in to relay U.S. motorists' reports of a motorcycle accident near the border station where he was working. WB1BZR telephoned the details to New York State Police at Plattsburgh. (WB1BZR)

□ Daviess Co., KY - July 16, 21. During severe flooding and winds, amateurs coordinated official agencies whose dispatching radios had failed. Evacuees included a heart patient and an isolated family which was trapped in a collapsed building. (W4OYI)

□ Grand Rapids, MI - July 17. A call for a special rabies vaccine went out from YN1FBI and was answered by WD8EMB. Through his persistence with medical agencies and airlines, plus help from XE1VW, the medicine was transported in time to save the pregnant patient. (WB8ESK, EC Kent Co.)

□ Granite Pk., MT - July 20-21. While using the 2-meter band for the first time, WA7RHE, a Ski Patrol member and others discovered a lone hiker who had fallen from the state's highest peak. They obtained a doctor and National Park Service helicopter, but had to endure near-freezing temperatures before completing the rescue the next morning. (WA7ZMC)

□ Del Valle Lake, CA - July 20. A missing-person search included 13 members of the Alameda Co. RACES. It was called off after efforts proved futile. (WB6RPK)

□ Liverpool, NS - July 27. During a 90-minute disruption of long-distance telephone service, six amateurs aided in its restoration. (VE1FV)

□ Mt. Diablo, CA - August 1. The Mt. Diablo ARC was in action for more than three days after a lightning strike set a brush fire in the Mt. Diablo area. Club members handled traffic primarily for Red Cross and went on standby for other agencies. Members of the Grizzly Peak VHF ARC also assisted. (WB6FOA)

□ Halifax, NS - August 2. Out for a day hike in woods near the international airport, a couple had not been heard from in three days. The Halifax ARC supplied vhf links for the rescue teams. By evening the pair was found in good condition. (VE1OC, SCM Mar/Nfld)

□ Sterling, IL - August 5. Teams of hams manned all three floors of a hospital after a main bus feeder line shorted. Orders, inquiries

and paging were routinely handled for more than five hours, until the primary mains were restored. (WA9NXE)

□ Cabot Strait, Canada - August 10. On a ferry crossing between Nova Scotia and Newfoundland a 10-year-old passenger took ill. VE5ZE and another nurse recorded vital signs and used on-board station VE6MD to relay to a doctor on land. While evacuation was discussed, an on-board doctor was located and the boy's condition improved. (VO1AW)

□ Pacific Ocean - August 11. Deteriorating mechanical and weather conditions befell a yacht en route from Japan to Hawaii. Before its batteries ran down, KH6JL/R3 took weather reports and gave its position to the Pacific Maritime Mobile Net and Pacific Inter-Island Net. Just as the boat's last jury-rigged sail blew away, a search plane from Okinawa sighted it. A Japanese vessel taking it in tow soon thereafter. (KA6RC)

□ South Texas - September 1-4. As Hurricane Anita approached, hams all along the state's Gulf Coast prepared to exchange reports with Highway Patrol, Weather Service and broadcast stations. When it changed course to Mexico, weather info was relayed to hams there. (W5KR, SCM STex)

□ Mt. Cabot, NH - September 5. WA1ZQE used his IC-22 to call for help on the Mt. Washington repeater when his Cessna crashed on Mt. Cabot. Members of the Northeast FM Repeater Assn. responded and authorities were notified. WA1ZQE and his wife were later rescued. (WA1QQV, PRA NH)

□ Repeater Log. According to reports received to date, repeaters were used to report 76 automobile accidents and related occurrences, five fires, four suspicious persons, two disturbances, one theft, one search, one drowning and 15 other miscellaneous incidents. Repeaters involved were WR1ABM, WR4s AGA ALM, WR5s ABA ABE ADP AJG, and WR6ACJ.

□ SEC reports received in August total 36; at this time last year 32 were submitted. Reported ARES membership totaled 11,578 as

*Asst. Communications Mgr., ARRL

compared to 11,776 in August, 1976. Sections reporting were Alta, Ariz, Ark, Colo, Conn, Del, ENY, EMass, Ga, Ind, Me, MDC, Mich, Minn, Miss, Mo, Mont, NC, NFla, NTex, Okla, Ont, Org, Oreg, SDgo, SF, SJV, Sask, SFla, SNJ, Utah, Va, Wash, WMass, WNY, WPa.

A belated half-year summary of SEC reports is as follows: Including late reports, 214 reports have been sent in from 50 different sections. At the same time last year, 227 reports were submitted from 51 different sections. At press time, these sections show 100 percent reporting: Ariz, Ark, Colo, Conn, Del, EMass, Ga, Ind, Me, Mich, NC, NFla, NTex, Okla, Ont, Org, SDgo, Sask, SFla, SNJ, Utah, Va, Wash, WMass.

NATIONAL TRAFFIC SYSTEM

Combined reports were received from the First, Second and Fourth Regions. (This becomes standard for all regions with the October reports.) TWN-D manager WSPNY and 8RN-D manager K8LGA have both resigned - our thanks for your stewardship. W7DZX is now PAN-E assistant manager. The Colorado-Wyoming Net and the Twelfth Region held a very successful banquet/meeting in Denver. WA1FCM is now W1KX, WB2EMU became N2YL, W9GGW is W9MR and WB0QOT acquired K0DJ. A RN5-D certificate went to WA4RAJ. CAN-D certificates to WB4QBB and WB9FOT. 8RN-E certificates to WB8TDA and WB8YDZ. 2RN certificates: (first annual) N2RD W2WSS WA2LNA WB2DFO WB2EUF WB2IDP WB2JRC; (second annual) K2TTG WA2CJY WA2ECO WA2KOJ WA2YYM WA2ZJP WB2RMK; (third annual) W2J1 K2UYK; (sixth annual) W2ZEP.

August Reports

(evening sessions)
(daytime sessions)

1	2	3	4	5	6	7
EAN	31	1695	54.6	1.400	98.3	
EAN	62	930	15.0	.684	86.3	
CAN	31	1103	35.6	.800	99.5	
CAN	61	417	6.8	.244	94.6	
PAN	31	910	29.4	.796	99.4	
PAN	31	455	14.7	.393	94.6	
1RN	83	691	8.3	.441	96.0	86.3
2RN	117	893	7.6	.574	93.1	89.5
3RN	62	390	6.2	.520	99.4	100.0
3RN	31	155	5.0	.656	100.0	100.0
4RN	124	853	6.9	.291	70.1	100.0
4RN5						100.0
RN5	31	342	11.0	.380	79.4	98.4
RN6	62	575	9.2	.450	100.0	100.0
RN6	31	200	6.4	.254	87.1	100.0
RN7	62	362	5.8	.505	86.2	98.4
RN7	62	187	3.9	.235	59.9	96.7
8RN	55	387	7.0	.343	81.1	96.7
8RN	31	181	5.8	.780	96.7	98.4
9RN	60	544	9.0	.402	89.9	100.0
9RN	30	91	3.0	.320	72.5	87.1
TEN	59	426	7.2	.369	76.9	98.4
TEN						98.4
ECN	58	264	4.5	.343	87.1	100.0
TWN	62	438	7.0	.327	97.7	100.0
IWN	20	72	3.6	.175	41.2	87.1
TCC	117 ¹	608				
Eastern						
TCC	86 ²	459				
Central						
TCC	114 ¹	656				
Pacific						
Sections ²						
	4633	22329	4.8			
Summary	5920	36613	6.2			
Record	5520	31117	16.4			

¹ TCC functions not counted as net sessions.
² Section and local nets reporting (134): BCEN (BC), APN (Mar/NFID), CMN GBN ODN OPN OSN (ON), QSN WQV/UHF (PQ), SATN (SK), AENB AEND AENM AENR AENW (AL), ASN (AK), ATEN HARC (AZ), AMBN APN ARN OZK (AR), NCN NEN SCN (CA), CWN (CO, WY), CN CPN (CT), FAST FMN FPTN GN NFPN QFN SPARC TPTN (FL), CVEN GARE GSN GSSBN (GA), IMN MLCN (ID, MT), ILN (IL), QIN (IN), I75MN TLTN (IA), KPN KSNB KWN QKS QKS-SS (KS), KNTN KRN KSN KTN KYN MKPN (KY), LAN LRN LSN LTN (LA), PTN SGN (ME), MDCTN MDD (MD), EMRI EMRISS EMZMN NENN WNM WMPN (MA, RI), HEN KCMN MACS QMN WSN (MI), MSN MSPN

MSSN PAW (MN), MSBN MSN MTN (MS), MON MOSSBN MSN (MO), NHVTN (NH, VT), NJN NJPN (NJ), SWN (NM), NLI NLIPN NLIV WDN (NY), CNN NCSSBN SCSSBN THEN (NC, SC), BNN BRN ONN OSSBN O6mN OSN (OH), OAN OFON OLZ OPEN OTWN STN (OK), OSN (OR), PTN (Pac), PFN PTTN WPA WPAP&TN (PA), SDN (SD), TNN TPN (TN), TEX TTN (TX), UCN (UT), VFN-E VN VSBN VSN (VA), WVN WVN WVPN (WV), BEN BWN WJN WSN WSSN (WI).

1 - NET	5 - RATE
2 - SESSIONS	6 - % REP.
3 - TRAFFIC	7 - % REP. TO
4 - AVG.	AREA NET

Transcontinental Corps

N2GM (ex-WB2ASD) received a TCC-E certificate, while N4MD received a TCC-C certificate. K5MAT issued TCC-P certificates to the following, with years of service in parentheses: W6EOT (22), W7DZX (17), W6VZT (14), K6HW (13), N6GW (11), W7KZ (10), W6MLF (7), W7GHT (6), W6LQ (5), W7EP (5), K6TER (4), VE7ZK (3), W6FG (3), W6OA (2), W5KH (2), K7IWD (2), WB0QOT (2), W0IW (1) - a total of 129 years of service!

1	2	3	4	5
Eastern	130	90.7	1913	608
Central	93	92.4	907	459
Pacific	124	91.9	1320	656
Summary	347	91.6	4140	1723

1 - AREA	4 - TRAFFIC
2 - FUNCTIONS	5 - OUT-OF-NET
3 - % SUCCESSFUL	TRAFFIC

TCC Roster

The TCC Roster (August): Eastern Area (VE3SB, Dir.) - W1s KX NJM QYY, K1s BA EIR GN XA, W2s CS FR GKZ MTA RQ, K2HI/VEZ, WA2ICB, WB2ASD, W3YQ, K3s KM PA, N3HR, W4UG, K4KNP, W8s LTA PMJ, K8KMG, VE1AAO, VE3s GOL SB. Central Area (W5GHP, Dir.) - N4s DY MD, W5s GHP MI RB, K5s GM MC TTC, N5s TS YL, WA5s IQU HNN, W9s CXY DND FC NXG, N9TN, W0s AM HI, K0s CW EVH, WA0TMM, Pacific Area (K5MAT, Dir.) - W5KH, K5MAT, N6GW, W6s EOT MLF OA VZT YBV ZRJ, K6HW, W7s DZX EP GHT VSE, K7IWD, W0s ETT FG FV HXB IW LQ, K0s BN DJ TER, WB0TAG, VE7ZK.

Independent Nets (August)

1	2	3	4
Amateur Radio Telegraph Society	31	409	467
Central Gulf Coast			
Hurricane Clearing House	32	175	2882
Early Bird	31	228	548
Hit & Bounce	31	190	400
IMRA	62	1356	448
North American SSB	27	373	952
North American Traffic and Awards	24	250	170
Washington Region PON	31	49	711
20 Meter ISSB	18	36	277
75 Meter ISSB	28	688	486
7290 Traffic	31	855	1169
	46	516	2248

1 - NET	3 - TRAFFIC
2 - SESSIONS	4 - CHECK-INS

Public Service Honor Roll August 1977

This listing is available to amateurs whose public service performance during the month indicated qualifies for 40 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. 10; (2) Checking into phone/RTTY nets, 1 point each, max. 10; (3) NCS cw nets, 3 points each, max. 12; (4) NCS phone/RTTY nets, 3 points each, max. 12; (5) Performing assigned liaison, 3 points each, max. 12; (6) Phone patches, 1 point each, max. 20; (7) Making BPL, 3 points regardless of traffic total; (8) Handling emergency traffic directly with a disaster area, 1 point each message; (9) Serving as net manager for entire month, 5 points. This listing is available to

Novices and Technicians who achieve a total of 20 or more points.

69	WA2ERT/1	W0FT	WB8WTS
WA5RKU	W2MLC	W0TF	WB8YVI
67	N2MW	K0PIZ	WB9AUD
VE7DKY	WB4QBB	VE1ACU	W9GGW
	WA4UUX		W0OYH
65	N4WA	48	W0RFF
WA3YJG	W5GHP	W8VPW	WB0VHN
WB0HOX	K0EZ	K0JTW	VE1AAO
64			VE1HJ
WB2IDP	55	WA1TBY	VE1ZH
N2YL	W7VSE	K5OWK	43
WB4DBK	54	WB6FTY	WA1MJE
K4ZN	WA9QCF	K9KSA	W2CS
62		VE3GOL	N6GW
WA0GG	53	46	WA6UAZ
WB5NKC	WA2HTP	WA3NDQ	VE2EOH
N5TC	W8DIL	WA3PRW	42
	WB8TTP	W3YQ	WB3AOB
61	WB8YDZ	WB4TEK	WA5VBM
K1BA	52	45	W6AUC
WA1ZAZ	W1BVR	WA4OEM	WB8DKQ
WA2ECO	K5DG	WB0QOT	WB0EGW
W2MTA	WA7MEL	41	41
K4BKX	WA8ZNC	W1BVR	W2YJR
W5KLV	WB0LFY	K1ES	WA2ZJP
WB5NKC	51	WA1OUZ	WA4FKE
WA5YEA	K1PAD	WA1POJ	K5GM
K6JT	WA4EPJ	K2SE	W5UYH
W6RFF	W4MEE	W2VQ	WB8TEE
WB8JGW	WB5NEZ	W3PQ	W9NXG
59		WA3WPY	40
WA4JDH	50	WA4EKJ	N1RP
N4PQ	WA1UWF	K4EV	WA4CNY
58	WA1YWK	WA4KSO	K4YFC
W8IQ	WB3EDX	WA4LXB	WB8VAZ
WB8VLR	WB6PVH	WA4PSL	27
57	49	WA4RAJ	WB4DHC/N
WA2BMI	W1RWG	N4SS	WB4JMV/N
VE3GT	K3YHR	N5ES	WA5QY/T
	WBANJU	WA5JYH	WA7ZAP/T
56	N5RB	W5LBR	WB8JVN/N
W1KX	N5YL	K5MC	WB9YMF/T
WA1VGP	W7GHT	N5TS	
WA2AYY	K0EVH		

Brass Pounders League August 1977

BPL Medallions (see December 1973 *AST*, p. 59) have been awarded to the following amateurs since last month's listings: WA4TXM WB8DKQ.

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	546	1621	1402	39	3608
W0WYX	54	1036	433	603	2126
W3VR	301	599	419	17	1336
K3NSN	20	529	527	2	1078
K0YFK		428		428	856
W4MEE	1	396	368	18	786
K9CPM		403	27	309	739
K3KW	1	297	329	36	663
N4PQ	6	307	343	5	661
WB6EIG	3	329	329	3	661
WA4JDH	1	324	320	3	648
WB2IDP	6	293	266	15	580
K4ZN	8	298	272	1	579
W5KLV	4	323	238	14	579
WB0HOX	25	229	275	12	545
N4MD	4	265	245	16	530
W8PMJ	9	270	246	2	527
WB5NKC	13	176	321	12	522
N2YL	5	307	171	25	508
WA3WQP	7	225	268	1	501
WB6EIG (July)					
	99	285	283	2	579
W7DZX (July)	19	260	249	4	532
WB6EIG (June)	9	285	281	4	579

Multioperator Stations

K2BSA/3	1205	89	21	1315
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BPL for 100 or more originations-plus-deliveries

WA3ATQ	276	W7SQT	144
W1TR	227	W5GHP	131
W7TZK	214	WA4CRI	112
WA5VBM	173	WB4DBK	102
K5GM	159	K4TH (July)	123
K7VWA	147		

Multioperator Stations W6ZE (July) 201

1 - CALL	4 - SENT
2 - ORIG.	5 - DEL.
3 - RECD.	6 - TOTAL

Rules, ARRL 10-Meter Contest

With sunspot activity on the increase, the fifth annual ARRL 10-Meter Contest should generate a lot of activity worldwide. Add to that the 12,000 new Novices since last year and increased activity from Technicians. The scores should be way up!!

Remember to send an s.a.s.e. to Hq. for a summary sheet, one log sheet for every 100 QSOs and an Op. Aid 6 ("dupe sheet"). Novices and Technicians should sign their call with /N or /T. Don't forget that each Novice or Technician QSO counts four points.

Suggested frequencies are cw, 28,000-28,050; Novice/Tech., 28,100-28,150; ssb, 28,500-28,600; a-m, 28,800-28,900. Be sure to avoid the OSCAR 7 down-link frequencies: 29,400-29,500!

Rules

1) *Eligibility:* This contest is open to all amateurs worldwide.

2) *Object:* To exchange QSO information with as many amateur stations in any and all parts of the world as possible on 10 meters.

3) *Contest Period:* The contest shall run from 1200 UTC December 10, to 2359 UTC December 11, 1977. This is a 36-hour period with no limitation on operating time.

4) *Conditions of Entry:* Each entrant agrees to be bound by the provisions of this announcement, the regulations of his licensing authority and the decisions of the ARRL Awards Committee.

5) *Entry Classification:* Entries will be classified as single- or multiple-operator stations. Single-operator stations are those in which one person performs all transmitting, receiving, spotting and logging functions. Multiple-operator stations are those obtaining any assistance, such as from spotting or relief operators, or keeping the station log or records. Multiple-transmitter stations are prohibited. The use of electronic or mechanical devices and/or any other method of simultaneous operation of two or more transmitters is prohibited.

6) *Exchange:* Amateurs in the 50 United States and Canada will transmit signal report and state or province. Others (including KP4, KZ5, KC6, etc.) will transmit signal report and consecutive serial number starting with 001. Stations not land-based transmit signal report and ITU region. The District of Columbia is considered part of Maryland.

7) *Valid Contacts:* A station may be worked once on cw and once on phone. All contacts must be either cw to cw or phone to phone. Crossmode contacts do not count for contest credit. OSCAR contacts may be counted. All cw QSOs must take place between 28.0-28.5 MHz except those made through OSCAR.

8) *Scoring:* Two points are earned for each completed two-way exchange. Four points are earned for a completed two-way exchange with a W or K Novice or Technician. Incomplete QSOs will not count. Multipliers: The multiplier

will consist of the number of different states, Canadian call areas (VE1-VE9), VO), ITU Regions (as sent by non-land-based stations) and countries as determined by the ARRL Countries List. A state or province cannot be counted again as a country. Final score = QSO points X the multiplier.

9) *Reporting:* Contest work may be reported on the forms available from Hq. or on a reasonable facsimile. All entries must be postmarked no later than January 9, 1978, in order to be eligible for QST listing and award. Check sheets must be submitted if you make more than 200 QSOs (total). If you are a Novice or Technician, make sure you indicate it on your entry.

10) *Awards:* Awards will be issued on a section or country basis. A certificate will be awarded to the highest scoring single-operator station in each section, Canadian call area and foreign country. Multiple-operator, Novice and Technician stations will receive an award if three or more such entries in a section are received or if the entry displays exceptional effort. Regional awards for non-land-based stations will be issued if participation warrants.

11) *Judges:* All entries become the property of ARRL and none can be returned. All entries will be passed upon by the ARRL Awards Committee whose decisions will be final.

12) Standard disqualification criteria apply; see *QST*, January, 1977, page 85.

Strays

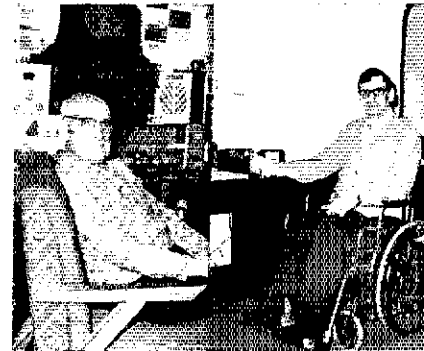
3,000 QSOs

They're a generation apart, but Kelly Heinbuch, K8YDR, and Hugo (Pete) Miller, W8NSR, love to chew the rag — with each other. In fact, the two retired hams have QSO'd well over 3,000 times, having surpassed that milestone early this year.

K8YDR, of Millersburg, is confined to a wheelchair, while his 80-year-old friend, who lives in Sugarcreek, has been

retired since 1963. They met on the air October 24, 1961, soon after Pete ventured onto 6-meter phone with his 7-watt transceiver for the first time. (He'd operated cw on homebrew gear since 1935.)

Though they've met personally many times, they seem to enjoy their QSOs more than anything else. At last count they were well on their way to the 4,000 mark, and going strong.



Pete Miller, W8NSR (left), wouldn't trade his less-than-mint amateur gear for anything else. Kelly Heinbuch, K8YDR, is active on phone and cw, and somehow devotes a great deal of time to his hobby, building and operating. The two Ohio hams sked six days a week, and have done so non-stop since 1965!

Rules, ARRL 160-Meter Contest

The 8th annual ARRL 160-Meter Contest will be held December 2-4, 1977. Please remember to keep the "DX-window" (1825-1830 kHz) clear. This is the spot DX goes to get away from stateside QRM. Don't call there; they usually listen from 1800-1805 and, in any case, will announce exactly where they are listening. This year, listen for Hawaii in the 1995-2000 range and between 1800 and 1810 (03-19 UTC).

Don't forget to use the 1830-1850 portion. It will help spread out the QRM that is so noticeable in the bottom 25 kHz.

Rules

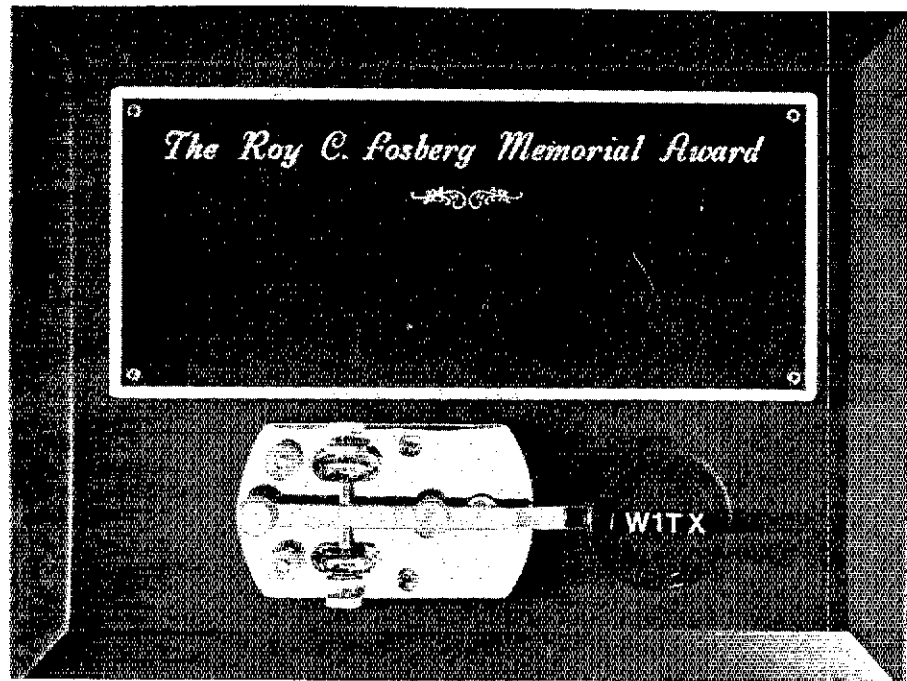
1) This contest will start at 2200 UTC Friday, December 2, and end at 1600 UTC Sunday, December 4, 1977. This is a 42-hour period with no limitation on operating time. Cw only.

2) The contest is open to all amateurs. A QSO with an amateur in an ARRL section (see page 8, *QST*) is worth 2 points. QSOs with amateurs not in an ARRL section are worth 5 points. DX to DX QSOs will not count.

3) Multipliers are the 74 ARRL sections, VE8 and each foreign country worked.

4) The exchange will be the report, plus ARRL section, for those in an ARRL section. Those participants outside of an ARRL section will send a report and the name of their country.

5) Competition is within the section and non-WVE country for certificate awards. Division high scorers will have



The Roy C. Fosberg Memorial Award will be presented to the top New England Division single-operator entrant in the 1977 ARRL 160-Meter Contest. This award is being offered by the Connecticut Wireless Association in memory of W1TX, an ardent 160-meter man and 25-year club member, who became a silent key in July, 1977.

their section award endorsed with an appropriate seal. Multioperator work is permitted with scores to be shown after single-operator listings (no certificates).

6) Contest work may be reported either on the forms available from Hq. or on a reasonable facsimile. An entry consists of the log and summary sheet. Check sheets are not mandatory.

7) Entries become the property of ARRL, none can be returned. Awards Committee decisions are final. Send an addressed stamped no. 10 envelope for appropriate entry forms. All entries must be postmarked no later than January 9, 1978, to be eligible.

8) Standard disqualification criteria apply; see *QST*, January, 1977, page 85.

Strays

I would like to get in touch with . . .

hams who are mothers of infants or small children. Sally O'Dell, WB1BRQ, Box 382, Newington, CT 06111.

TWO BRIGHT FELLAS

Who's the youngest ham of all? Hands down, it's gotta be five-year-old Guy Mitchell, WD0DVX, of Buckingham, IA. In fact, he passed the Morse code Novice exam 15 days before his fifth birthday, which has to be some

kind of a record. He learned code from tapes his parents, Wade (WD0DFW) and Cindy (WD0DFU) brought home to study as part of their Novice class. Guy, considered the youngest ham in the U.S., began kindergarten this fall. His volunteer instructor was Robert B. Hall, WB0DBH.

Who's the youngest Extra class licensee? Probably it's Luke Hopkins, WB0NVT, a 13-year-old from Kansas, who recently passed his FCC exam consisting of 20-wpm code and comprehensive theory.

Congratulations to you both!



Five-year-old Guy Mitchell tunes up. He became a Novice operator several months before starting school.

June Vhf QSO Party Results

Things were looking up — scores, participation and even the muf.

By Bill Jennings,* K1WJ

The arrival of June and the initial thoughts of summertime leisure and recreation are soon replaced by visions of rising muf and E skip.

Six meters, again the "bread and butter" band, came through in fine style for the June VHF QSO Party. Excellent openings between the East and West Coasts, the West Coast and KH6, as well as good north-south propagation, provided the impetus for a June contest that was to see a total of 16 all-time division records set.

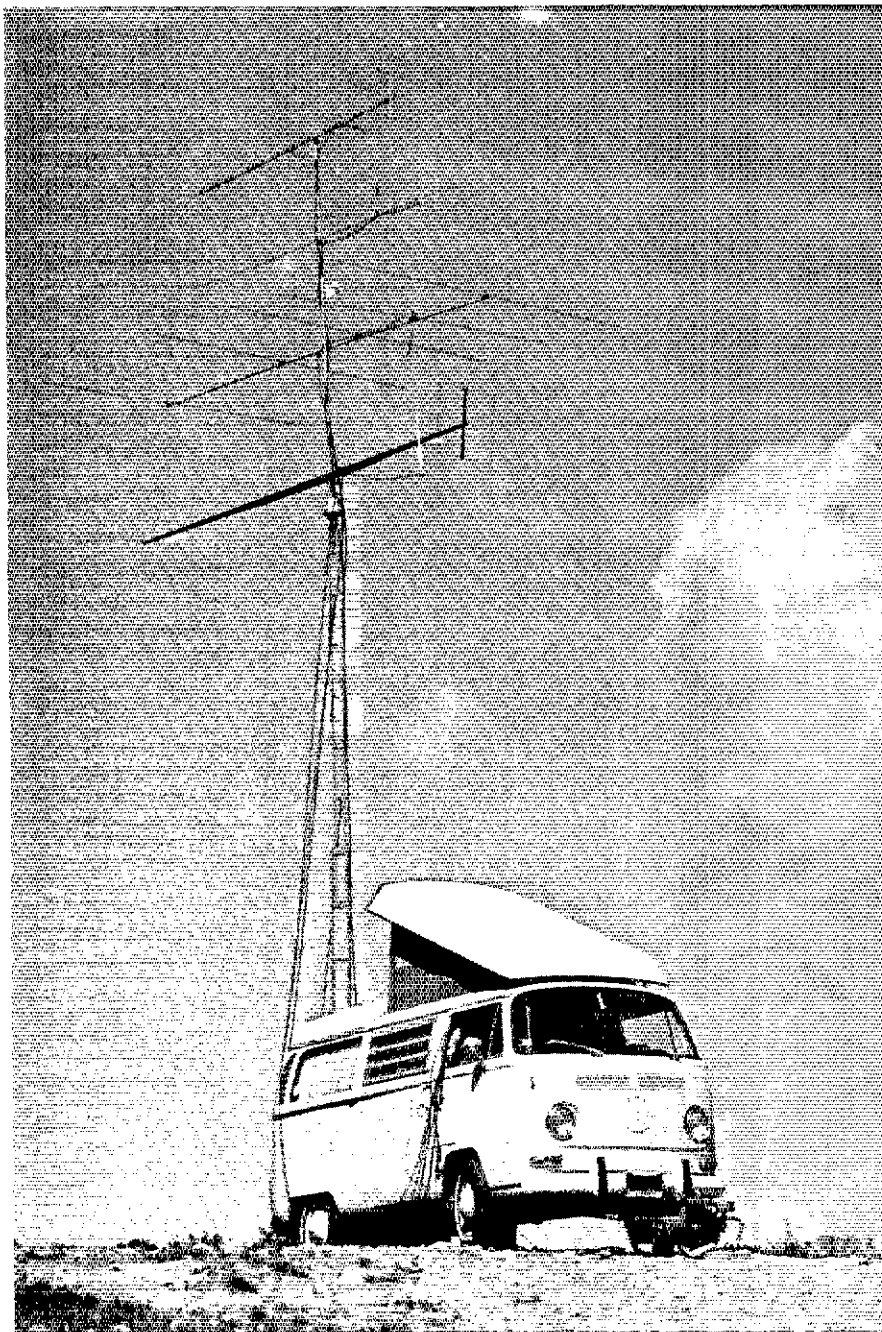
The figures in the multipliers-per-band-listings seem to bear out the importance of decent 6-meter conditions for achieving a competitive score. Of the 244 stations meeting the minimum numbers of multipliers to make the listing, 156 (or 64 percent) made it on 6 meters. This is a greater number than the total number of stations that made the listings in 1976 on any and all bands.

A new single-operator national record score was but one of the highlights of the contest. N6NB (K6YNB) proceeded to improve on his 60k point premier performance of 1976, to the tune of almost 9000 points, and copped the number one single-operator slot for the fifth year in a row. If Wayne is able to repeat in the top spot in 1978, it will be his *Number 6 National Best*. The QSO breakdown by band for N6NB shows 362 QSOs on 6 meters, 188 QSOs (no QSOs on the 146- to 148-MHz portion of the band) on 2 meters, 69 QSOs on 220 and 24 contacts on 432.

The other "repeater" to the Top Ten single-operator list is W2CRS. Doug increased his 1976 score by 7905 points, to move from number five to third place nationally. This score increase of almost 29 percent is indicative of the average score increase needed to make the Top Ten this year. In 1976 the average score for the Top Ten in the single-operator category was 27,017, rising to 33,254 in 1977.

Multioperator stations filling the Top Ten positions had to post an average score increase of almost 1000

*Communications Assistant, ARRL



More points per horsepower? N6NB (ex-K6YNB) set a new national record for single operator from this Volkswagen bus, whose 53 hp somehow got Wayne, his generator, tower, antennas and kilowatt rigs for four vhf bands up 8800 feet on Mt. Pinos. Using the VW was a last-minute decision after the much bigger truck he would normally use broke down late the night before the contest!

points to 94,921, from 93,960 in 1976. W3CCX led the pack with a boost in score of almost 8k points to retain the number one position. The group at W1DC came up with a 21k total point increase over their 1976 effort to move from fifth place up to third. A similar increase in score for the W3BBS operation brought them from an eighth-place finish in 1976 to the magic 100k point level and fourth place this year. The largest overall change in position was made by the gang at WB2FKJ/2. Their 23k increase in score, won them a five-place upward adjustment from number 10 in 1976 to number five this year.

Eight stations (six single operator and two multioperator) repeated as leaders of their respective divisions. K9HDE, WA0SCL, WA5TUD, W2CRS, WA0MRH and WA4GPM, single-operator stations, led their divisions as did multioperator stations W3CCX/3 and W0OHU/0.

Of the 16 new division high scores set, nine were single operator and seven were of the multioperator variety. The Dakota, Roanoke and West Gulf Divisions all sport two, both single and multioperator, new division records.

Those single operators making new division records included K9HDE, who nearly doubled the 1972 score of K9HMB to capture the Central Division record and WA0CSL adding 8k points to the existing Dakota Division record. The oldest standing record broken was the 1968 Midwest Division mark, this done by WA0MRH by over 5000 points. K1MNS is the new single-operator division record holder in the New England Division. N6NB bettered his 1972 record in the Pacific Division by more than three times the total score. Wayne is the only single operator to hold two division records simultaneously. He has the score to beat in the Pacific Division (as N6NB) and holds the record in the Southwestern Division (as K6YNB), both with outstanding 60k plus scores. WA4GPM bettered the old Roanoke Division mark by 2000 points. WA0TVZ took over top spot in the Rocky Mountain Division, while WA5HMK was bettering the old West Gulf record by 10 kilopoints. In a strong effort, VE2YU nearly tripled the single-operator record in the Canadian Division.

On the multioperator side of things; the W3CCX/3 "machine" bettered their one-year-old record in the Atlantic Division. The operators at W0OHU/0 nearly tripled their 1976 division record in the Dakota Division, and are now, as last year, the only group to hold two multioperator division records at the same time. W4BFB/4, the Mecklenburg, NC, group added 30k points to the previous best in the Delta Division.

Top Ten

Single Op		Multi-Op	
N6NB	69,184	W3CCX/3	152,134
K1MNS	36,686	W2SZ/1	112,395
W2CRS	35,280	W1DC	110,580
WA5HMK	34,151	W3BBS	101,584
K9HDE	33,572	WB2FKJ/2	95,364
WB8BKC	33,259	W6XJ/6	93,314
WB6OKK	31,326	K2OWR	81,396
WB8BGY	31,032	WA2SNA	79,288
WB5UQH	30,858	K3LZ	62,205
W1EJ	28,946	W2CNS/3	60,950

W7LYE/7, K3LNZ/8 and K4CKS broke the existing division multioperator records in the Northwestern, Roanoke and Southeastern Divisions respectively. K5CM (that's really Connie, K5WVX) and the gang behind a new call sign, added 23,000 points to their 1976 record to set the standard in the West Gulf Division.

More than one operation in the June contest was the happy recipient of a DX multiplier, thanks to the efforts of W2BN/C6A in the Bahama Islands and WB2RLK/6Y5 in Jamaica. To thank these and others so inclined to give out multipliers, a category has been added

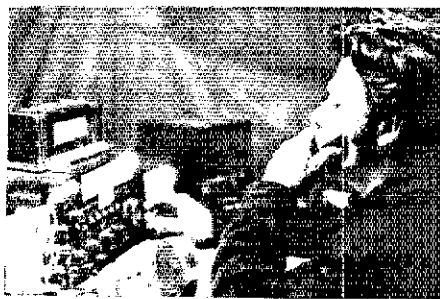
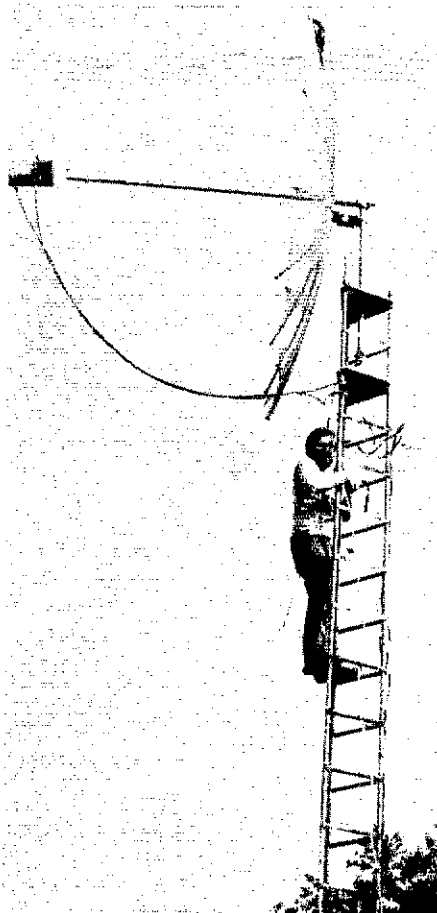
this year, starting with this report to include DX stations in the all-time division leaders and the division leaders boxes.

This, the latest running of the June VHF QSO Party boasts: new single-operator and division records, a substantial average increase in scores of the Top Ten and an increased number of entries, from 406 in 1976 to 487 in 1977, an increase of almost 20 percent. The figures seem to put the damper on those "doom-mongers," who predicted that this contest, the first run under the new "no." 52 (146.52-MHz simplex) rule" would be a bust, in terms of the amount of participation as well as lower overall scores.

The no. 52 rule has since been amended to a "limited 52" rule for the September VHF QSO Party. Any opinions, thoughts or suggestions on this or any matter (rules, etc.) concerning contests are actively solicited by the Contest Advisory Committee. Correspondence directed to the CAC may be sent via ARRL hq. It's your contest, your opinion counts.

Soapbox

The 1000-mile trip down to Delaware and back was as exciting as the



How it's done: Several of the operators of W3CCX/3 in the process of building the number-one multioperator score.

June VHF Contest 1977



contest. Driving 300 miles in the rain with no windshield wipers and two broken brake lines on the bus, added to the excitement. . . . Set-up went smoothly. Erected six towers in 30-mph winds and had all the gear on the air in one day's time. Hoisting the eight-foot dish proved to be tricky in those winds. . . . Highlights included a 175-mile, 1296-MHz ssb QSO (not bad for a sea-level station). Working marine time mobile on 10 GHz (probably first New Jersey to Delaware two-way on 10 GHz) proved to be interesting also (W2CNS/3) Contest was great fun especially when Es began coming in from the west on 2 meters. Just realized how many multipliers are available out there. (WB5LUA) Our vote for "Mr. Nice Guy" goes to K7OFT/7 for giving two tough states almost at once (K6BPC) Here in Alaska, 6 meters was not open except for occasional meteor bursts of about one-minute duration. Worked two stations on ssb, one on a-m and one station on mfw (all local contacts). . . . KL7IFD/KL7 plan another weekend operation o

Multipliers Per Band

Min. Sections MHz	40	15	5	3	2	Min. Sections MHz	40	15	5	3	2	Min. Sections MHz	40	15	5	3	2
K1PXE	18	21	11	16	4	WA2SNA*	46	23	12	17	8	WA4FBH*	56	6			
W1FV	49					W2EIF	14	17	12	10	1	WA4IQS	53	6			
W1XZ		16		9	3	WA2KOK	42	13	2	5		WA4IPI		9			3
WA1FFO				16	3	WB4NXY/2	36	15				WB4V LH*	45				
WB1DNM		16				W2PAU	10	18				WA4MVI	39	8			4
W1AVV		15				W2HXF		12		7		K4PKV	24	6			6
K1MUJ/1*	54	16				K2BWR*	39	15	11	10		K1FJM/4		12			6
W1SP	38	17		11		WA2BPE	46					W4VHH		12			8
W1JR	30	16	7	16	4	K2LZF	35	13	5	4		K4HJE/4*	57	8	2		4
WB2GLQ/1	48	12	7	3		K2MOY	27	15		1		W4PAR*	31	7	2		3
K1DAT	42	4				K2NV	15	17		3		WA4WZQ/4*	24	5	2		3
WA5IOD/1	27	7	3	3		K2GK	20					WB4BSZ	47	2			
K1LOG		6		13		W2WGL	15					WD4DTC	43	4			
W1XM*	50	16	12	11		K2LWR*	42	13		12		W4LJ					4
WA1OAM/1*	50	19	7	5		WA2ZJF*	43	15		4		W4IQQ/4*	51	5			4
WA1MKE*	43	2		4		WA2GBG/2*	42	17				K4SAO/4*	25	4			4
K1MNS	53	16	4	10		WA2WLH*	34	15				WA4DNS	51	5			
W1EJ	54	15	5	7	1	WB2KYQ/2*	10	17				WA4EEZ	48	1	2		
W1JSM		18				K2EVJ	27				2	WB4BND	49				
W1SL		9		4		WA3OPX	29	14	6	11		WA4HNQ	43				
W1FMF*	62	18	3	10		W3BDP	4	16				WB4COM	46	1			
W1DC*	55	22	15	15	6	W2CNS/3*	58	19	10	13	4	W4MNZ	41				
WA1OUB*	61	20				WA3VJU	54	13				WB4JGG	55	8			
K1COW	40	8		5		K3GNC	29	14	2	8		K4EJQ	22	8			5
W1AIM	44	7				K3IWK	30	16		1		W4BFB/4*	59	11	2		5
WA1WK*	70	16	7	1		W3CXE	42					WA4GPM	44	17			12
WA1MAG*	50	6				W3CCX/3*	56	22	15	20	9	K2UOP/4	40	15	3		6
W2SZ/1*	61	22	17	20	7	W3BBS*	47	22	14	19	5	W4UCH	17	5	5		5
WA1RWU*	52	18		11		K3LZ*	48	20	5	14		WA4SBC		7			12
N1HR/1*	39	12	4	5		W3AD/3*	34	17				W4FJ	20				8
K1JX/1*		15		4		K3HZU*	30	18	2	1		W4MHQ		9			4
W2CRS	55	19	8	8		WA3NRU	4	15	2			K4LHB			5		
WA2FUZ	44	12				W3TMZ		21	3	19		K5MWH		11			4
W2CXC	30	9		7		W3XO	40					WA5UMP/5*	63	5			
WB2FKJ/2*	59	22	11	13	3	WA3USC		15				WA5UUD	53				
K2CBA*	47	19	8	9	1	K3IVO/3*	32	12	4	13		K4CHE/5	54	1			1
K2QVS	29	16		10		W3PGA/3*	26	13	6	9		W5TRB	57				
WB2TCC		17		8		W3EAX*	4	13	6	1		K5GMX	59	9			
WA2FZW	44	16	8	8		W3GNR/3*	40	19				WB5LUA		12			5
WB2WIH	37	10		5		W3QZF/3*	41	10				WB5UQH	67	7			
WB2VWW	41	11				WA4NJP	56	7		2		WA5VHN	52	1			
W2OMS				19	6	WA2JVO/4	49	5				K5CM*	70	14			
WB2CUT		16				KH6JZ/4	47					WA5HNC	60	8			3
WA2UDT		18				W4ISS	16	4		7		WA5QCP	54				
WA2ZZF				15	2	W4WDH		7		3		WA5IYX	40				
K2QWR*	56	22	15	18	3	K4CKS*	56	8		4		WB5HRI*	48	10	1		2

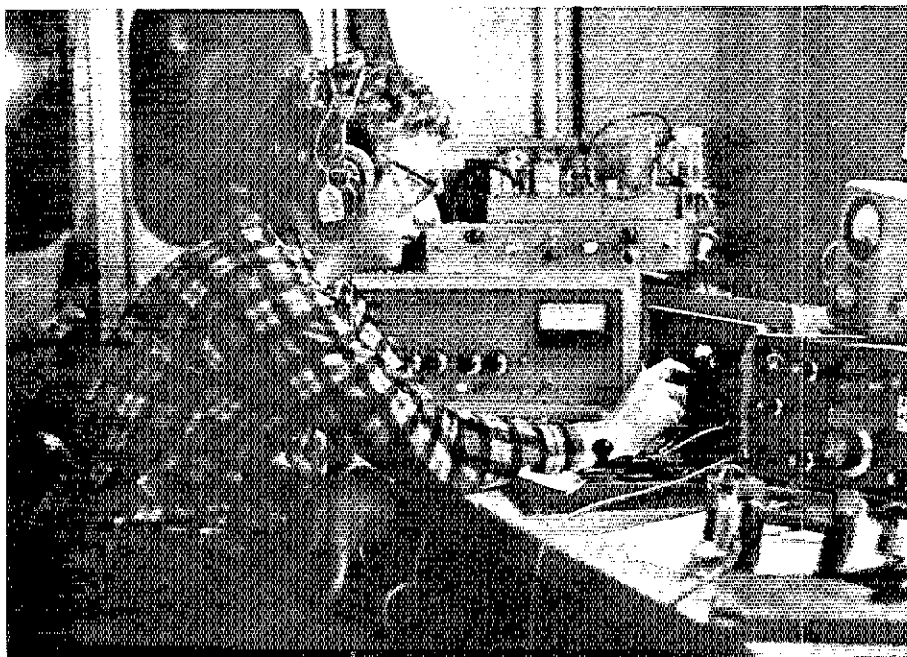
N5AF*	46	8	1			K7CW*	45	9	1	3	1	WA9KVS	60					
W6BXO	42	8	3	6	1	K7ZCB/7*	46	4	2	2		WA9QVK	51	5				
WB6KBZ*	49	8	5	8	3	W7XF	55					WA9KGO	40	8				
WB6OKK	43	13	5	8		WA7KYM	48	2				W9YYF		14		6		
W6ABN	31			5		WB8BKC	63	11		5		WA0TVZ	54	1				
K6IBY			6			WB8BGY	60	9		3		W9MHL/0	53					
W6XT*	9	5	5			W8IDU	49	6	2	1		WA8GUB/0	58					
W6AMT*	55	11	6	7		KH6JDZ/W8	50					WB0VGC	40					
W6OAL/6*	30	8		6		WA8EUU	40	6		1		W0SI	44					
WA6GYD	30	7	4	5	2	W8MRM/8*	47	7		2		WB0NZA	40	10				
K6FV	36	7	2	4		WA8CLN	54	17				W0GL	59	7				
K6QAX	42	7				WA8OGS	54	7				WA0TRO	41					
WA6AWM	61	6				WB8IGY	43	12		4		WA0PDA	40					
N6CW	53					WA8TLZ	24	8		3		W0OHU/0*	65	15	4	5		
W6XJ/6*	69	15	6	6	1	WA8TJL		15		4		W0RGU*	49	7		4		
WB6BDR	58	6		4	2	K8UQA				16		K0TLM	54	6		3		
N6GN		8		5	3	W8VP*	54	15				WB0PKN	50	2				
N6NB	66	11	8	9		W8CCI*	58					W0JRP	47	1				
K6YK	52	4				WA8PLZ*	49	7	1	1		WA0MRH*	67					
WB6LBR	42	4				WA8AEC	22	14		12		W0EKB	66					
K6RNQ	49					K3LNZ/8*	52	19	12	15		K0KKV*	44					
K6JKQ/6	15	4	2	3		WA8FSE	10	17		9		WA0SCL	58					
K7NN	68	1		1		K9HDE	64	7	1	5		K0VXM	41	5				
K700*	67	9	3	5		WA9LEF	65	9				WA0VPY	53	3				
K7OFT/7	45	1				W9KDR	64	7				VE2YU	47	13		4	1	
WA7UHW	40					W9SE	40	9				VE2SH	30	10		5	1	
W7JF	43					W9IVI	47	6				VE3BON	34	11	4	10	1	
K7ICW	54	8				K9BDJ	43					VE3EYR	33	4		3		
K7NV	60					K9KQR		10		4		VE3FHM	26	4		3		
K7ZOK	43	8		3		N9HH*	59	13	2	4		VE3FN		22				
W6YKM/7*	56	6	5	5		K9EKI	43	8				VE3ONT*	44	22	12	1		
WA7RTA	44	4	2	2		WA9MEM	47					VE3FHK*	50	7		3		
WA7TDU	41	3		2		WA9PKL	40	2				W2BN/C6A	50					
K7AUO/7*	40	4	2	2	4	WB8HUC/9*	61	10										
W7HR	37	5	1	3		WB90PD	61											
W7LYE/7*	41	5	3	3		K9OXY	52	7		2								
K7SS*	42	5	2	3		WA9LZM	54				2							

*Multi-Operator Station

September 10-11. Hope 6 meters is in better shape. (KL7IFD) Really a great contest. During the contest, this station provided "semi-emergency" help to a motorist who had become stranded near our station location on top of Black Mountain in San Diego County. It seems that the motorist had messed up his transmission and had gone down the mountain for parts. While he was gone, someone had mixed up his distributor wires for fun. A call on the local 04/64 repeater at 2300 local time brought response from a station in Los Angeles, 120 miles away, who passed along a wiring diagram. This assistance was greatly appreciated and produced some favorable ham radio PR. (WA6PKS) Fantastic band openings both days on 6 meters. I was surprised at how well my old HX-30 performed. . . . Hope to have 2-meter capabilities improved for the next time, as 2 was wide open on Saturday night. (WA4EEZ) Reception was average. Facing the antenna toward the setting sun paid off again. Raised VE3ONT and several WV stations. (WA3NNZ) Vhf contesting without 146.52 MHz is a *real* drag! (WA6VEF) Glad to see the use of 2 fm way down! That channelized stuff isn't what vhf operating is about! (W2FWS/WB2KLD) Excellent conditions on 6 meters. Activity on 2 cw and ssb very poor. All areas except one- and three-land heard on 6 meters. A real pleasure listening to the guys on Puget

Sound working KH6IAA and KH6GRU. I listened for about 30 minutes, then the 7000-foot Olympic mountain range at my doorstep, allowed KH6IAA's signal to roll down my side. 2006 UTC, a 43 report on ssb, gave me number 50 on 6. (K7VNU) It was the meanest contest I ever got into. The signals were up and down like a roller coaster throughout. Many DX stations with signals

building up strong, with a fast drop out. Just enough to tease a guy into thinking that the band (2 meters) would break wide open, but it didn't. (K9SLQ) Just finished my first vhf contest from VE7-land. Amazed at what I could work with only 3 watts and a five-element beam at 25 feet. (G3PPE/VE7) I strongly urge that the rules be revised to allow each foreign country, on the



WB2AXV at the 432 station for W2SZ/1 in Western Massachusetts.

Division Leaders

Single Op	Division	Multi-Op
WA3VJU	Atlantic	W3CCX/3*
K9HDE*	Central	N9HH
WA0CSL*	Dakota	W0OHU/0*
WA5UUD	Delta	W4BFB/4*
WB8BK	Great Lakes	W8VP
W2CRS	Hudson	WB2FKJ/2
WA0MRH*	Midwest	K0KKV
K1MNS*	New England	W2SZ/1
W7HR	Northwestern	W7LYE/7*
N6NB*	Pacific	WB6KBZ
WA4GPM*	Roanoke	K3LNZ/8*
WA0TVZ*	Rocky Mt.	W6LEV/7
WA4NJP	Southeastern	K4CKS*
WB6OKK	Southwestern	W6XJ/6
WA5HNK*	West Gulf	K5CM*
VE2YU*	Canadian	VE3ONT
W2BN/C6A	DX**	WB2RLK/6Y5

*Indicates New Division Record
 **New Category Begun in 1977

All-Time Division Leaders

Single Operator			Multi-Operator			
Call	Score	Year	Call	Score	Year	
K3IPM	37,989	68	Atlantic	W3CCX/3	152,134	77
K9HDE	33,572	77	Central	K9HMB	40,468	75
WA0CSL	21,808	77	Dakota	W0OHU/0	60,164	77
WA5RMS	16,740	70	Delta	W4BFB/4	48,972	77
K8LEE	37,114	74	Great Lakes	WA8BCA	61,656	75
K2RTH	37,875	74	Hudson	WB2WIK/2	106,399	76
WA0MRH	20,435	77	Midwest	W0OHU/0	33,120	74
K1MNS	36,686	77	New England	WA1MUG	172,142	74
K7GWE	20,515	74	Northwestern	W7LYE/7	35,776	77
N6NB	69,184	77	Pacific	WA6JUD/6	81,213	76
WA4GPM	21,316	77	Roanoke	K3LNZ/8	56,742	77
WA0TVZ	22,935	77	Rocky Mt.	WB5AXC/5	23,424	76
W4GJO	32,292	62	Southeastern	K4CKS	19,856	77
K6YNB/6	60,342	76	Southwestern	W6AMT	105,080	76
WA5HNK	34,151	77	West Gulf	K5CM	56,028	77
VE2YU	24,115	77	Canadian	VE3ONT	82,188	74
W2BN/C6A	18,700	77	DX**	WB2RLK/6Y5	10,620	77

**New Category Begun in 1977



Members of the W2CNS/3 Delaware "expeditionary force" are (left to right) WA2ZKD, K2LDU, WA2FOE, W2CNS, WB2BGJ, WA4EVC, WB2KAO, K9LXX, WA2SEY, WA2MZG, WA2ZQN, WA2WVL, WB3HKZ.

ARRL Countries List, to be counted as a separate multiplier. The case in point being the C6A and 6Y5 operations. (WA3VVJ/K3IVO) When is there going to be a low-power multiplier? (W6FAW) The temperature and humidity were super rough here. It took a load of 807s and a few cloths to make it through the contest. Condx were great in that the band (6 M) was open to all different parts of the country. Band didn't stay open too long at a time in any one direction though. Looking forward to greater 432-MHz activity during September, when we will have a different location with over 2000 feet more height. (WB4AEG/K4CKS) Our group had a slight setback. When we arrived at the club house to load up the equipment, we discovered that a burglar had removed all of it the night before. We had to scrounge up some rigs and purchase an antenna. We suggested to the police that they check their files for any burglars with the name *Murphy*. Hi. (WA4YFC/W4GZX/4) This VHF QSO Party was a great introduction, for me, to 6-meter ssh. Have never enjoyed a contest more. Activity was just tremendous, considering that skip was to a limited area. It was a pleasure

putting VO2 into so many logs. (VO2AG) Again attempted microwave contacts over a 40-mile path. An inversion layer made the bands above 3.3 GHz unusable. A closer contact of 20 miles was made on 10 GHz. High-light of the contest was the landing on Round Top Mountain, near our station site, of a survey team helicopter. Our position was given as 45 degrees 40 minutes 38.860 seconds latitude, 123 degrees 21 minutes 40.303 seconds longitude and 910.01 meters in elevation, as determined by an inertial guidance platform. (W7CDM/K7AUO/7) Ran 144-MHz meteors with W7FN,

W5FF, W7JF and W7UBI. Heard lots of other stuff (calls and sections), but not enough for two ways. . . . Also heard K1WHS and W6PO off the moon on 144 MHz. . . . Worked 69 sections in 49 states on 6 meters. Heard KL7FIE (no. 50) in Alaska, but lost him in the QRM. Not too bad for a weekend. (W6XJ/6) This was certainly our greatest vhf contest ever. Everything seemed to go just right; the weather, the band conditions, the lack of bugs, and the local Sunday newspaper ran an article and pictures of our operation on the front page, without us even contacting them. . . . Some guys even found out



Standing: (left to right) W0RY and WB0TXA (and moral support to WB0UIP and WB0SJJ at the 2-meter station of W0RGU, multiop in Minnesota).

about the contest by reading the Sunday newspaper, then got on and worked us. (W0OHU) Probably the best condx on 6 meters for a contest in several years. . . . Spent a lot of time on Saturday watching the muf soar to 110 MHz and more. . . . Band on Sunday open for hours into Rocky Mountain and Dakota areas, where very few ops available for contacts. (WA5IYX) Only a masochist would assail the 2-meter band during a vhf contest with a 10-watt rig and a four-element, 10-meter yagi at 50 feet! . . . Having been off 2-meter cw since 1965, I was pleased

to see so much cw and ssb on the low end. (W1FB) I think that the scoring for the contests would be fairer if 6-meter contacts were worth only one-half point in June. For a September contest, a 2 meter and higher only entry has a chance of winning in a section, but in June it's hopeless. I just don't want to put up with TVI hassles in a TV fringe area if I operate 6 meters. (K1FJM/4) Six meters was not to be believed. . . . Worked 40 states in less than 24 hours! (W2CRS) My rig wasn't working on Saturday and my wife picked Sunday to start "potty training"

our two-year-old son. I had fun anyway and will try again this fall. (WA9FCG/1) Was "detained" (arrested) for "smuggling" Coffee Mate in plastic bag, and fined \$250 U.S., which was given back upon our departure. . . . Worked two Washington, DC stations. The first was using a "Benton Harbor Lunchbox" and an indoor dipole on a-m and the second station was using an IC-502 while walking down Rhode Island Avenue. . . . Cockroaches may be killed by spitting Bourbon on them (86 power or higher). (W2BN/C6A)

Scores are listed in order, single-operator stations first within each section. From left to right: call, score, number of QSOs, number of multipliers, bands operated (A-50 MHz, B-144 MHz, C-220 MHz, D-420 MHz, E-1215 MHz, F-2304 MHz, G-3300 MHz, H-5 GHz, I-10 GHz).

U.S.A.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100																																																																	
WA1CBH	1750-70-25-AB	WA1HNN	418-38-11-B	K1JG	54-9-6-B	W1ECH/1	8-4-2-B	W52Z/1(K1S DR HQF XX ZM)	WA1LUC	K2T B WA2S LK 5L	WB2S AXV BXP QCDJ QZJ/G	WA8USA	112,395-751-127-ABCD E	WA1RWU	(WA1S ECR LPJ RLP UQC)	34,668-403-81-ABD	N1HR/1	(WA2JHR)	17,880-274-60-ABCD	K1JX/1	(WA1QZHW1A1VA)	1330-64-19-BD	13,570-230-59-AB	WA2WLH	(WA2Z EOW VAM)	WB2JWD/1	8281-169-49-AB	WA2AAZ	(K2I WIG WA2S GAI HKR MCD, WB2S PSI TGU, ops.)	WB2KYQ/2	(+WB2HNL)	3643-209-27-AB	W2FWS	(+WA2DWP, WB2S BGI KLD)	48-130-37-AB	WB2ELB	(+WA2S JSD KJE)	K2EVJ	(+WA2LVF)	2392-106-32-AB	2030-56-29-AE	W3GNR/3	(+K3S DCF ZDR, W3JUT, WA3BUX, WA3T DCD, DTVR)	15,871-269-59-AB	W3QZ/3	(K3S OIH LYK, W3S BTK BZN TEF, WA3UXP, WB3AAE, ops.)	15,695-296-51-AB	K3HKK	(K3S CM RBH, WA3S IFC ZPW, WB3S AEI HKU, ops.)	6552-156-42-AB	Tennessee	WB4JGG	15,624-248-63-AB	K4EJQ	(WA4DF, ops.)	4760-124-35-ABD	W4SGI	1408-112-38-AB	W4ALDU	3783-95-39-ABE	W4AAT/1	36-6-6-A	W4BF8/4	(K4S BF GHR LVV SE, WA4S CIA JCM, WB4S VCC VCF, WB4S BQC KOH LTA OYE PCS TLX YFC, WD4ABZ, ops.)	48,972-643-77-ABCD	W4DZG	(WA4S UKI WDN, WA4S IWN JET IWN YFL ZXD, WB4HKC, WD4DES, ops.)	900-45-20-AB	Virginia	W4AGPM	21,316-260-73-ABD	K2UOP/4	14,680-211-65-ABCD E	WB4EYF	12,584-234-53-ABC	W4AZHS	9106-138-37-AB	W4UZH	2720-69-32-ABCD	K4FTO	2480-81-31-AB	W4DSC	924-76-19-BD	W4FJF	1596-43-28-ABD	W4AEP/1	1144-43-26-A1	WB4NTV	1127-49-23-A	K4MSG	924-76-19-BD	W4MHQ	806-54-13-BD	W4QJP	792-66-12-B	WB4NFB	170-34-5-R	K4LHB	50-3-5-C	W4BJY	12-6-2-B	K4FJW	(+WB4GJZ)	5371-131-41-AB	Arkansas	W4ZQUI/5	5360-134-40-AB	W5MYNR	3256-88-37-A	K5MWH	913-23-15-BD	W5UMPS	(+W5A JCM, WB5S W5HSS)	22,576-332-68-AB	Louisiana	W4SUUD	16,536-317-53-A	K4CHF/5	13,496-238-56-ABD	W8SLBT	304-37-8-BD	New Mexico	W5TRB	15,276-268-57-A	W5TRX	4140-115-39-AB	W5BAQO	2-2-1-B	Northern Texas	K5GMX	20,876-307-68-AB	W8SLUA	2106-100-18-BD	W8FGR	1935-45-23-A	W8SRPU	112-16-7-B	Oklahoma	W8SUQU	30,858-417-74-AB	W5VHVN	14,734-278-53-AB	K5CM	(+K5S BXG LUR SW, W5XCD)	56,028-667-84-AB	Southern Texas	W5SHNK	34,151-468-71-ABD	W5GQCP	12,366-229-54-A	W5SHY/1	3960-99-40-A	W5BHR/1	(+W5T QN, W5GQD, W5BS FQJ HNC NXH)	20,435-320-61-ABCD	NSAF	(+WB5L VL, WB5S W5S)	14,282-283-55-ABC	W5EHW	(+W5ASZ)	273-35-7-B1	6	East Bay	W6HXO	16,500-237-60-ABCD E

K6ITZ 1647- 61-27-A
WA6VEF 348- 56-6-BD
WB6KBZ/7(+WA6HCL,WB6BY1)
 33,288-404-73-ABCDE

Los Angeles

WB6OKK 31,326-419-69-ABCD
K6KH 32- 8- 2-C
K6BPC(+WA6HXD,WB6YVP,oprs.)
 9196-242-38-AB

Orange

W6ABN 3528- 83-36-AJ
WB6NFW 490- 70- 7-B
K6IBY 96- 8- 6-C
W5XT(+N6MNN,WB6PKY,WB6TYI)
 6422-214-19-ABC

Santa Barbara

WB6IDK 2987-102-29-ABC
W7KRYE 1173- 51-23-AB
W6AMT(WB66 ASR FER GQR
 RAL RIV,oprs.)
 55,063-596-79-ABCD
W6DAL/6(+WA6EJQ,WB6IMM)
 6566-138-44-ABD

Santa Clara Valley

WA6GYD 11,808-191-48-ABCDE
K6FV 11,466-204-49-ABCD
K6QAX 7497-153-44-AB
K6DTR 7426-154-47-ABC
WB6ZGY/6(+WLARR,W66 BMV
 HJV VEF,WB6SHD)
 15,562-292-49-ABCD

San Diego

WA6AWM 20,770-310-67-AB
N6CW 11,607-219-53-A
WB6FTW/6 88- 22- 4-B
WA6MFR/8 45- 9- 5-AB
W6XJ/6(+K66 HAA JYO,NKKA,
 W6GGV,W6BVLV,WB6CXF)
 93,314-917-97-ABCDI

WA6AJK(WA66 MFM PKS,WB6GUL,
 oprs.) 2120-106-20-AB

San Francisco

WB6BDR 17,920-240-70-ABCDE
N6GN 1664- 79-16-BDE
W6FAW 1378- 93-26-AB

San Joaquin Valley

N6NB 69,184-643-94-ABCD
K6YK 8803-175-56-AB
WB6HR 8322-142-46-AB
WB6IPU 4212-107-39-ABC

Sacramento Valley

K6RNO 6174-126-49-A
K6JKU/6 1968- 64-24-ABCD
WBKID 1824- 21- 7-BC
WA6JUR/6(+WB6BIUY)
 110- 22- 5-B

7

Arizona

K7NN 26,180-372-70-ABD
WA7JLM 3268- 86-38-AB
K7OOD(WB66PXP,WA7ZWO)
 47,460-597-84-ABCD

Idaho

K7OFT/7 10,718-233-46-AB
WA7UHW 6120-153-40-A
WA7VAX 1600- 64-29-AB
WB7NXQ 99- 11- 9-A

Montana

K7OFT/7 10,718-233-46-AB
W7JF 10,578-246-43-A

Nevada

K7ICW 17,236-278-62-AB
K7NV 14,040-234-60-A
K7ZOK 5292- 95-64-ABD
W6YKM/7(+K66 KLY LXD,WA6JUD)
 28,152-371-72-ABCD

Oregon

WA7RTA 14,872-265-52-ABCD
WA7TUD 6624-143-46-ABD
W7JKU 5247-159-33-A
W7TYR 4794-136-34-ABCD
W7NFC 2106- 78-27-A
K7HJS 1104- 48-23-A
WA7OBY 819- 39-21-A
K7AUO/7(K7ULH,W75 ADV BKN
 KMB UDM,WA7BIP,WB75 CRK
 FHF,oprs.) 22,568-398-52-ABCDE

Utah

W6LEV/7(+WA6MMUJ)
 168- 19- 8-BD

Washington

W7HR 16,430-316-46-ABCD
W7JUK 4644-161-27-ABC
K7VNU 4560-152-30-AB
W7FIV 3276-126-26-AB
W7POE/7 1624- 86-19-AB
WA7UFW 1468- 77-19-AB
W7MCL 518- 48-17-ABD
W7ID7 610- 25-18-A
W7LYE/7(K75 KOT W16,W75
 DNU GLS,WA7NAN,oprs.)
K7SS(+K75 HBN JA RA,W7EY)
 28,392-510-59-ABCD
K7CWF(+WA75 JBS KY2 OTI)
 28,379-496-99-ABCDE
K7ZCB/7(+WA7GFM,WA7EY,
 WB7PMP)
 25,704-488-54-ABCD
WA7EHE(+K7IEY)
 1995- 95-21-A

Wyoming

W7XF 20,845-379-55-A
WA7KYM 11,200-224-50-AB
W7LFL 5421-139-39-AB

Alaska

KL7IED/KL7 42- 21- 2-AB

8

Michigan

WB8BKC 33,259-399-79-ABD
WB8BGY 31,032-425-72-ABD
W8IDU 4454-158-58-ABCD

KH6JUZ/W8 9,300-186-50-A
WA8EJU 7661-159-47-ABD
WA8EPU 7380- 68-35-A
WA8ZCY 585- 38-15-ABD
WB8FZC 584- 73- 8-B
WB8AA 560- 70- 8-B
K8RZC 496- 62- 8-B
W8TQZ/8 721- 17- 3-AB
W8RMY/8(+WA8HX,WB8RY,
 oprs.) 18,424-323-56-ABD
W8YDK/8(WA85 WQJ,YUZ,oprs.)
 4107-111-37-AB

Ohio

WA8LNL 28,684-404-71-AB
WA8OGS 13,662-253-54-A
WB8IGY 13,570-222-59-ABD
WA8ITLZ 4305-114-35-ABO
W8IGU/8 3200-100-37-A
N8TM 2880- 96-30-AB
WA8TJL 1919- 95-19-BD
K8LQCA 1696- 53-16-D
K8LQIC 512- 59-15-ABD
WB8GX 852- 71-12-AB
WB8OH 603- 67- 9-B
WB8IE 441- 63- 7-B
WB8PN 338- 38-3-ARC
K8ZAP/8 180- 46- 4-B
WB8M 68- 17- 4-B
WB8VPIK8AL(+WA8AHD,WB85
 ERG ONY SXT T51 UX5,W8DS
 AHV AKI KTK LVJ,oprs.)
 29,808-435-69-AB
WB8CC(+W8LJ,W8AS WQC WV1,
 oprs.) 19,952-144-91-AB
WB8PLZ(+W83 JX,WB8YTH,W8AS
 DZU LTA SVV,W885 NPM TZD,
 W8BMSF,oprs.) 17,980-298-58-ABCD
WA8WCW/8(+WA8BPF)
 3392-106-32-AB

West Virginia

WB8EC 5568- 96-48-ABD
K8NLZ/8(K85 AA5 LFG,WA35
 EOG NZL OYV,K4LFB,W4F5J,
 WA4LJU,oprs.)
 36,272-511-98-ABCD
WA8FSE(+WB8H68,K6 HCK NQB
 QPU VAZ YDF,W88G,W,oprs.)
 7524-191-36-ABD

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Illinois

K9HDE 33,572-424-77-ABCD
W9H EF 28,860-390-74-AB
W9KLU 23,927-337-71-AB
W9SE 17,593-251-49-AB
W9IV 10,609-209-53-AB
K9BDJ 4386-102-43-A
WA9AHZ 4320-144-30-AB
W9FA 3864- 83-46-ABD
WA9IDS 3131-101-31-AB
WB9QBU 2229- 85-27-AB
WB9YVP 2086-149-14-AB
K9KJL 1624-14-14-BD
K9DIB/M 1224- 51-24-A
WB9NEY 476- 34-14-AB
WB9VYA 385- 59- 7-B
W9ABA 36- 9- 4-B
W9TAL 7- 7- 2-AB
WA9DLT 3- 3- 1-B
N9HH(+WB9CLN,WB9DY,
 WA9IYY TXV)
 36,036-436-78-ABCD

Indiana

WB9LEP 11,880-264-45-AB
WA9MEM 11,781-231-51-AB
W9CGI 10,810-230-47-A
 6556-149-44-AB

WB9NTL 5776-162-38-AB
WA9PKL 5754-137-42-AB
WB9OLE 3424-107-37-AB
K9SLG 1704-142-12-B
WB9BA 44- 11- 4-B
WB8HUC/9(WB85 GEU GEW GEX
 GEY GFA,oprs.)
 26,218-370-71-AB
W9JQU(K9JFK,W9YDF,Z,W895
 BGM HVJ SLD,oprs.)
 506- 46-11-AB

Wisconsin

WB90PH 16,531-271-51-A
K9OXY 13,908-223-61-ABD
WA9LZM 12,768-224-56-AEF
WA9KVS 11,400-190-60-A
WA9RVK 10,248-183-56-AB
WA9KGG 9360-195-48-AB
WB90DD 3040- 98-32-A
W9YFV 2060- 91-20-BD
WB9JUD 1357- 59-23-A
WA9JFM 1259-125-10-B
WA9CUH 317- 31- 7-B

10

Colorado

WA9TVZ 22,935-417-55-AB
W9MHL/8 13,356-282-53-A
WA9GUB/8 5802-169-58-A
WB9VGC 6840-171-40-A
W9UVR 4641-119-39-A
WB9YSI/M 14- 14- 1-B

Iowa

W8SI 9064-206-44-A
W8NZA 6900-138-80-AB
K8MSI 5480-137-40-AB
WB9JFH 3290- 94-35-A
K8DAS 470- 46-10-BD
W8GAP 256- 41- 6-B
WA9DXZ 155- 31- 5-B

Kansas

W8QL 20,262-307-66-AB
WA8TRO 6396-186-41-A
WB9WAO 4644-108-43-AB
W8QCA (XO- 36- 5-B
WB9RETI(+WB9WAO)
 2511- 81-31-AB

Minnesota

WA9POA 5680-142-40-A
W8RLI 5617-137-41-AB
K8OK 558- 82- 9-B
W8OHU/8(+K95 AKS CHZ UYK,
 WA9CWY,WB95 QPI RRM)
 80,164-659-89-ABD
WB9RHL(+WB9Y,W890V,W895
 R8J RNW HVQ SJJ 1XAUI,
 W8RAMA)
 18,540-303-60-ABD

Missouri

K8ILM 46,217-255-63-ABJ
WB9PKN 7436-143-52-AB
W8IRP 6144-128-48-AB
WB9GK 518- 35-14-ABD
WA9CFO 54- 8- 6-ABC

Nebraska

WA9MRH 20,435-305-67-A
W8EKB 19,272-292-66-A

WB9WSX 162- 21- 8-B
K9KVK(+K9GND,WA9WRI,WB95
 GOM VEN YFR,oprs.)
 6248-142-44-A

North Dakota

WA9CSL 21,808-376-58-A
WB9NST 88- 17- 4-B

South Dakota

K8VXM 2096-176-46-AB
WB9LX 2294- 62-37-AB
WB9VPI(+K8GAL,WA9NHL,WB9J
 29,848-533-56-AB

Canada

Maritime-Newfoundland

VE1ASJ 9152-708-44-AB
VO2AG 5125-205-25-A

Quebec

VE2YH 24,115-377-65-ABDE
VE2SH 12,650-261-46-ABDE
VE2AB 1860- 75-23-ABDE
VE2KW 120- 70- 6-B
VE2AQI (X- 6- 4-B
VE2RMV(+K8K BMQ BGF DR
 oprs.) 564- 80- 6-BD

Ontario

VE3BQNV(+JABG,oprs.)
 18,000-224-50-ABCDL
VE3EYR 4880- 80-58-A
VE3CPA 2600- 80-58-A
VE3FHM 2970- 86-33-ABD
VE3CKU 2754- 81-34-AB
VE3PN 1716- 78-22-B
VE4YV 1700- 48-75-AB
VE3GJU 1108- 85-13-B
VE3AUJ 627- 57-11-B
VE3AIR 480- 48- 9-BCD
VE3EL 24- 18- 5-B
VE3ONT(+VE35 APH ASO DSS I
 FIB,oprs.) 28,467-353-79-ABCD
VE3FHK(+VE3FHL)
 23,780-383-60-ABD

Saskatchewan

VE5DX 6228-242-34-A
VE5LY 4768-149-32-A

British Columbia

VE3PE/VC7 1044- 58-18-A
VE7CGY/7 189- 63- 3-B
VE7ASM/7(VE75 ASI AFR AVW
 CCB BN BBS BSM BI GCKW DLO
 oprs.) 3452-166-31-ABCDI
VE7SID(+VE75E1)
 3950-154-26-AB
VE7CGG(+VE7CGR)
 1079- 83-13-AB

DX

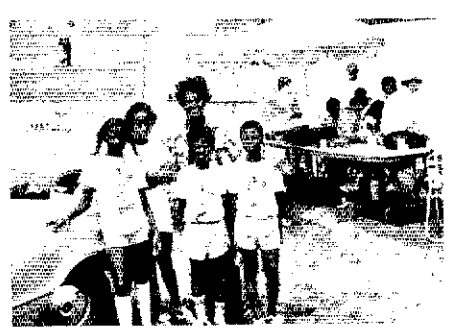
Bahama Islands

WZBN/C6A 18,700-374-50-A

Jamaica

WB2RLK/8Y5(+W44KMO,WB4PK
 oprs.) 10,620-295-16-A

Strays



say who had more fun — the kids or the amateurs who had a ball providing communication for the event, as well as making phone patches for the children to their friends in the area. Shown (l to r) are gold medalists Sylvia Kizer, Kerron Young, Pinkie McCraw and Lafayette Simmons, and coach Jessie Rhoden. — **WA4GLS**

ANTENNA AUTHORITY DIES

One of the world's foremost authorities on antennas, Henry Jasik, W2HE, died in Roslyn, NY, in July following surgery. He was 58. Best known as editor of *The Antenna Engineering*

Handbook, Jasik had served as a consultant to government organization radio astronomy observatories and industrial organizations. He was employed as vice president of Cutler Hammer ALL Division and director of the antenna systems division there.

I would like to get in touch with . . .

amateurs in the western districts of Baltimore County who would be interested in spending 1-1/2 hours on the second Tuesday of each month to operate at RACES locations. Edwina Murray, Deputy Director, Baltimore County Civil Defense, 301-825-1013.

Operating News

Observer Topics

This is the second of a series of topics on this subject. The first one appeared in *QST* for February, 1977. That one was entitled *Official Observer Topics*. Note that we have left the word "official" off, this time. There is reason for this: This time we are relying not only on OO appointees for our source, but also on a number of observations that have come to us from independent (i.e., nonappointee) sources.

The imperious telephone is the medium used by most of these reporters. Usually, they want to report foul and obscene language and find out what can be done to put a stop to it. Some of them tell us that they have called FCC but get little satisfaction. Most of them want to know what the League (meaning Hq., of course) is doing or intends doing about it, with the strong implication that we *should* be doing something.

The impact of obscene conversation or language on the listener concentrates on one single reaction — that it's outrageous and ought to be stopped. The perpetrator should immediately be run off the air, fined, his license taken away. He is a disgrace to the good name of amateur radio that so many of us have tried for so long and worked so hard to establish. The listener can't do anything about this except perhaps to remonstrate with the perpetrator (which usually has a negative effect), so he appeals to the one agency that can — the FCC. But FCC has its problems also; it can write letters, send warnings, even make veiled threats, but it has neither the staff nor facilities, generally speaking, adequately to take action to build up a case for violation of 97.119.

So the appeal goes to ARRL headquarters. Alas, we have staff (our OO volunteers) and some facilities (volunteer facilities), but absolutely no authority, and FCC is reluctant to give us any for very good reasons. All ARRL (not headquarters alone) can do is let the perpetrators know that their inimical operation is being observed, that it is being deplored and that it should stop for the overall benefit of the service.

There are several other considerations involved in the invocation of 97.119. One is the definition of "obscene, indecent or profane," in the modern concept. In today's society one can hear all kinds of utterances in public places and via mass media that in bygone years would have been considered one of the above but now seem to be accepted parlor talk. Who is to decide what is obscene, indecent or profane? Any competent defense lawyer could very convincingly demonstrate that if a person is to be convicted of uttering an obscenity on the air, then all mass media should be doubly convicted because they all, on occasions, use the same words, the same

language, the same meanings and implications of the worst of what we can ever hear on the amateur bands. So okay, it outrages some of the more conservative among us to hear such things on our beloved amateur bands, but it is, after all, only a reflection of society's nouveaux mores. If we can rise above it, much more credit to our service, but it should surprise or shock no one that some of us don't.

But let's assume that we stir our enforcing agencies to action and start achieving convictions of the more blatant of these offenders. The right of fair trial or hearing still obtains in our society, and so each such case prosecuted will call to the attention of the general public that there are miscreants among us and perhaps give the false impression that such activities are the rule rather than the exception. The better success we achieve the more chance we have of conveying this impression, the more black marks of conviction will stand on amateur radio's escutcheon. Can this negative quality be overbalanced by the fact that we amateurs ourselves were instrumental in bringing the miscreants to justice? Maybe. Maybe not. Public opinion is a funny thing. Is it just possible the media that make money by dispensing obscenity and pornography would bend opinion against us?

The solution? The closest we can come to one stems from within, not from without. Amateur radio is a service as old as most, older than many. It has many proud traditions, one of which is that it "behaves itself," something that FCC's enforcement branches themselves not only admit but tend to boast about. If we lose that, we have lost much. If FCC can no longer say that it need devote comparatively little attention to monitoring the amateur bands because violations are scarce, we have suffered a grievous setback in our image. So the obvious solution to the dilemma is that we must retain that reputation. But, how?

Well, there are going to be some bad apples in the barrel, nothing we can do about that. Perhaps we can prevent the proverbial spread of badness, however, by catching first-offenders before they get into such habits through being exposed to evil influences. If those of us interested in maintaining our image as a "self-behaving" communications service would just protrude a little more among the newcomers, we might influence them in a positive direction. We might offset the loud, pushy conveyers of filth and obscenity. It's worth a try, isn't it?

SCM ELECTION NOTICE

To all ARRL members in the Eastern New York, Eastern Pennsylvania, San Diego, South Dakota, Louisiana, North Carolina, Virginia, Pacific, and Maritime/Newfoundland sections:

You are hereby solicited for nominating petitions pursuant to an election for Section Communications Manager. A petition, to be valid, must contain the signatures of five or more full ARRL members residing in the section concerned. Photocopied signatures are not acceptable. No petition is valid without at least five signatures on that petition. No member may sign more than one petition. It is advisable to have a few more than five signatures on each petition.

Petition forms (CD-129) are available on request from ARRL headquarters but are not required. The following form is suggested:

(Place and date)

Communications Manager, ARRL

225 Main Street, Newington, CT 06111

We, the undersigned full members of the . . . ARRL Section of the . . . Division, hereby nominate . . . as candidate for Section Communications Manager for this Section for the next two-year term of office. (Signature . . . Call . . . City . . . Zip . . .)

SCM candidates must have been a member of the League for a continuous term of at least two years and a licensed amateur of General class or higher (Canadian Advanced Amateur Certificate) immediately prior to receipt of petition at Headquarters.

Petitions must be received at Headquarters on or before 5:30 P.M. Eastern Local Time, December 9, 1977.

Wherever more than one member is nominated in a single section, ballots will be mailed from Headquarters on January 3, 1978, returns counted February 28, 1978 and SCMs elected as a result of the above procedures will take office April 1, 1978.

If only one valid petition is received for a section, that nominee shall be declared elected without opposition, for a two-year term beginning April 1, 1978.

If no petitions are received for a section by the specified closing date, such section will be resolicited in April *QST*, and an SCM elected through the resolicitation process will serve a term of 18 months.

Vacancies in any SCM office between elections are filled by appointment by the communications manager.

You are urged to take the initiative and file a nominating petition immediately.

George Hart, W1NJM
Communications Manager

REPEAT SCM NOMINATING SOLICITATION

Since no petitions were received for the Sacramento Valley section as a result of notices in April and May *QST*, nominating petitions for this section are herewith resolicited. See the above notice for details on how to nominate.

SCM ELECTION RESULTS

The following were elected for two-year terms of office beginning January 1, 1978.

Uncontested

Ala.	F. S. Brown, W4LNN
Alaska	R. Davie, KL7CUK
East Bay	R. B. Vallio, W6RGG/N6KB
Neu.	L. M. Norman, W7PBV
N. Mex.	J. T. Knight, W5PDY
Santa Barb.	D. P. Gagnon, N6MA
W. Mass.	W. T. Lowe, W1TM

W1AW Operating Schedule (October 30, 1977-April 30, 1978)

PST	CST	EST	UTC	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
6 A.M.	8 A.M.	9 A.M.	1400	Slow ¹	Fast ²	Slow ¹	Fast ²	Slow ¹		
7	9	10	1500	←		Cw Bulletins ³	→			
8	10	11	1600	←		RTTY Bulletins ⁴	→			
1 P.M.	3 P.M.	4 P.M.	2100	Fast ²	Slow ¹	Fast ²	Slow ¹	Fast ²	Slow ¹	Slow ¹
2	4	5	2200	←		Cw Bulletins ³	→			
3	5	6	2300	←		RTTY Bulletins ⁴	→			
4	6	7	2400	Slow ¹	Fast ²	Slow ¹	Fast ²	Slow ¹	Fast ²	Fast ²
5	7	8	0100	←		Cw Bulletins ³	→			
6	8	9	0200	←		RTTY Bulletins ⁴	→			
6:30	8:30	9:30	0230	←		Phone Bulletins ⁵	→			
7	9	10	0300	Fast ²	Slow ¹	Fast ²	Slow ¹	Fast ²	Slow ¹	Slow ¹
8	10	11	0400	←		Cw Bulletins ³	→			
9	11	12	0500	←		RTTY Bulletins ⁴	→			
9:30 P.M.	11:30 P.M.	12:30 A.M.	0530	←		Phone Bulletins ⁵	→			

¹ Slow code practice on cw bulletin frequencies, 8 minutes each session; 5, 5, 7-1/2, 7-1/2, 10, 13, 15 wpm.
² Fast code practice on cw bulletin frequencies, 8 minutes each session; 35, 30, 25, 20, 15, 13, 10 wpm.
³ Cw bulletins, 18 wpm, on: 1.835, 3.58, 7.08, 14.08, 21.08, 28.08, 50.08, 147.555 MHz
⁴ RTTY bulletins 60 wpm/170-Hz shift on 3.625, 7.095, 14.095, 21.095, 28.095, 147.555 MHz.
⁵ Phone bulletins on 1.835, 3.99, 7.29, 14.29, 21.39, 28.59, 50.19, 147.555 MHz.

Operating-visiting hours are Monday through Friday 7:30 A.M. to 1 A.M. and Saturday and Sunday 3:30 P.M. to 1 A.M. (all local Eastern Time). The station address is 225 Main St., Newington, CT 06111 (about 7 miles south of Hartford). Maps with local street detail are available upon request. Please note that all footnoted frequencies are approximate. If you wish to operate when visiting, you must have your original operator license with you. (Schedules can also be arranged to work W1AW.) The station will be closed Nov. 24, Dec. 25-26, 1977; Jan. 1-2, Feb. 20, Mar. 24, 1978. **Staff:** Chief operator/Asst. Communications Mgr. C. R. Bender, W1WPR; Chris Schenck, W1EH; Stan Gibilisco, W1GV.

In a communications emergency monitor W1AW for special bulletins as follows (times in UTC): *phone* on the hour, *RTTY* at 15 minutes past the hour, *cw* on the half hour.

To improve your fist by sending in step with W1AW (but not over the air!) and to allow checking the accuracy on certain tapes, note the UTC dates and *QST* text to be sent in the 0300 practice from the issue of *QST* two calendar months past: Nov. 4, It Seems to Us; Nov. 8, World Aboard; Nov. 9, League Lines; Nov. 22, Public Service; Nov. 23, Happenings; Nov. 28, Operating News.

AMSAT-OSCAR 7

Ref. Orbit	Date	Time (UTC)	Long. W				
13547A	1 Nov.	0100	70.0	13735X	16 Nov.	0110	72.6
13560X	2 Nov.	0155	83.6	13747A	17 Nov.	0009	57.5
13572A	3 Nov.	0054	68.5	13760B	18 Nov.	0104	71.1
13585B	4 Nov.	0148	82.1	13772A	19 Nov.	0003	55.9
13597A	5 Nov.	0048	66.9	13785B	20 Nov.	0057	69.5
13610B	6 Nov.	0142	80.5	13798A	21 Nov.	0152	83.1
13622A	7 Nov.	0041	65.3	13810B	22 Nov.	0051	67.9
13635B	8 Nov.	0136	78.9	13823X	23 Nov.	0145	81.5
13647X	9 Nov.	0035	63.8	13835B	24 Nov.	0045	66.4
13660B	10 Nov.	0129	77.3	13848A	25 Nov.	0139	79.9
13672A	11 Nov.	0028	62.2	13860B	26 Nov.	0038	64.8
13685B	12 Nov.	0123	75.8	13873A	27 Nov.	0132	78.4
13697A	13 Nov.	0022	60.6	13885B	28 Nov.	0032	63.2
13710B	14 Nov.	0116	74.2	13898A	29 Nov.	0126	76.8
13722A	15 Nov.	0016	59.1	13910X	30 Nov.	0025	61.7

NOTES

- 1) All time and date references are in UTC.
- 2) The times and longitudes are for OSCAR's first equator crossing each day, which is called the reference orbit.
- 3) A-O 7 is operational on Mode A on odd days of the year and on Mode B on even days of the year. (February 1 is day 32, for example.). Wednesdays are reserved for special experiments: authorized users only. This includes *Tuesday evening* for the Western Hemisphere.
- 4) All orbits scheduled for Mondays are reserved for QRP use only. Use a *maximum* of 10 watts erp.
- 5) The Mode B transponder inverts signals. Upper sideband on 432 MHz becomes lower sideband on 145 MHz.

AMSAT-OSCAR 6 has been permanently removed from active service.

Haven't listened to OSCAR yet? Try this. If you live in the eastern half of Canada or the U.S., listen to the reference orbit given in the chart (don't forget times are UTC). If you live in western North America, listen about an hour and 55 minutes later. Give OSCAR plenty of time to cross your QTH's horizon — a pass lasts a maximum of 25 minutes.

There are many other passes that you will be able to hear or talk through, both in the morning and evening. The OSCAR LOCATOR (now available as part of *Getting to Know OSCAR from the Ground Up*) is a tracking device that will let you know which passes you can access and where the satellite is at any given moment in the Northern Hemisphere.

SPACECRAFT FREQUENCIES

Spacecraft	Uplink	Downlink	Beacon
A-O 7			
Mode A	145.850-145.950 MHz	29.400-29.500 MHz	29.502 MHz
Mode B	432.125-432.175 MHz	145.975-145.925 MHz	145.972 MHz

The schedule of orbits for AMSAT-OSCAR 7 will be a regular feature of *QST*. Further information on the amateur satellite program can be obtained free of charge from ARRL hq. Also, the popular and informative series of *QST* articles for the beginner has been reprinted in book form. *Getting to Know OSCAR from the Ground Up* covers OSCAR 6, OSCAR 7, the newest satellite, A-O D, to be launched early next year, and the exciting Phase III program scheduled for late 1979. The book is now available for \$3 ppd. from the ARRL.

Strays 

POLAR DXPEDITION

☐ If you draw a great circle dividing the globe into the area of maximum water and the area of maximum land, that line passes directly through Dumet Island, off the coast of France. The line is called the Continental Divide of the Emerged Lands, bringing to mind the possibility for a Polar DXpedition QSO from the tiny island, inhabited by a couple of elderly persons who apparently don't mind visitors. Its position: latitude 47° 24' 22" North, longitude 2° 37' 13" West. — F6CCI

STRANGE BUT TRUE

☐ OH4RF worked W7QQD on June 30. The *very next* contact was WA7QQD. Neither the 7s had ever worked the other. The first contact that WB3HBN made was after upgrading to General was with WD4DDQ, who had just passed his General exam 23 minutes earlier. To further coincidence, both hams were using vertical antennas which were cut for cw and were trying them out to check on phone performance.

A DX LOVE AFFAIR

☐ On the first day of June, after 20 years of marriage, Delmar and Janette Sellers renewed their wedding vows. Only he was in Santiago, Chile, and she was in California! And minister, WA7SHJ/CE3, performed the ceremony over the Inter-American Traffic net through the phone patch of K4GOS in Clearwater, FL. After the solemn event, there were parties in both hemispheres. — WB4VWO and K4JCL

BROMSGROVE SILVER JUBILEE AWARD

☐ If you worked GE3VVG and other stations between June 4 and 12th you may qualify for the Bromsgrove Silver Jubilee Award. A special silver-print certificate will be issued upon confirmation of a log showing QSO points. Bromsgrove and District A members count two points each while other GE stations are one point apiece. All inquiries or submissions should be directed to J. K. Harvey, G8KLO, 22 Elm Grove, Bromsgrove, B61 0EH, England.

Operating Events

NOVEMBER

- 2: West Coast Qualifying Run**
- 3-4: YL/AP phone,* Trilliums Weekend Contest**
- 5: Frequency Measuring Test*
- 5-6: Sweepstakes cw,* RSGB 7 MHz phone*
- 12-13: Missouri QSO Party, WAE RTTY, IPA Contest, Delaware QSO Party**
- 13: OK DX Contest**
- 17: WIAW Qualifying Run*
- 19-20: Sweepstakes phone,* WWDXA cw**
- 21: WIAW Qualifying Run**
- 26: 10-Meter Ground-Wave Contest**
- 26-27: CQWW cw*

DECEMBER

- 3-4: 160-Meter Contest, North Carolina QSO Party, EA Contest phone, Connecticut QSO Party, TOPS cw**
- 8: West Coast Qualifying Run***
- 10-11: HA-DX Contest, EA Contest cw**
- 16: WIAW Qualifying Run***
- 17-18: SOWP Christmas QSO Party**
- 25: HA5-WW Contest**
- 28: WIAW Qualifying Run***

JANUARY

- 1: Straight-Key Night***
- 4: West Coast Qualifying Run
- 7-8: CD Party phone
- 17: WIAW Qualifying Run
- 21-22: VHF Sweepstakes, CD Party cw
- 27: WIAW Qualifying Run
- 28-29: Simulated Emergency Test

*Detailed last month
**Details this issue
***Details next issue

NOVEMBER

2: West Coast Qualifying Run (W6OWP prime, W6ZRJ alternate), 10-35 wpm at 0500Z (Universal Coordinated Time, abbreviated UTC, with Z shown as a time designator). The run will take place at 9 P.M. PST the night of November 1. 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 include your name, call (if any) and complete mailing address. A large stamped addressed envelope will help to expedite your award/endorsements.

5-6: Trilliums Weekend Contest, sponsored by the Ontario Trilliums Ladies Amateur Radio Club, from 0030Z Nov. 5 through 0030Z Nov. 6, open to all. The Trilliums will call CQ TW, all others CQ TOT. Each Trillium station may be contacted twice (one phone and one cw, same band; two phone different bands, two cw different bands, one phone and one cw, different bands). Exchange RS(T), name, QTH. The Trilliums will also transmit their club numbers. Log date, time (Z), RS(T), band, mode, TOT number, as well as

name, address and claimed score. All logs must be signed by the operator. Cw and phone contacts will each earn 5 points, with a low-power multiplier of 1.25 for all transmitters running 150 watts cw, 150 watts a-m, 300 watts PEP or under. A bonus of 100 points will be added for working 10 members of the Ontario Trilliums, and an additional 100 points for working 20 members, etc. Logs must be postmarked no later than Dec. 31, 1977 and received not later than Jan. 15. Send to Eva Colleck, VE3EVA, 155 Midland Ave., Scarborough, ON M1N 3Z8 Canada. Awards. Suggested frequencies: The TOTs will operate cw and phone on 80, 40 and 20 during the period. Check 3770 3855 7103 7240 14035 14140 14280 kHz.

12-13: Missouri QSO Party, sponsored by the St. Louis Amateur Radio Club - 14th annual, starts 1800Z Nov. 12, ends 2300Z Nov. 13. Valid QSOs take place between MO stations and all others. The same station may be worked only once in each different MO county, regardless of band or mode. MO mobiles will count separate from each different county. Exchange QSO no, RS(T) and QTH (county for MO stations, state/province/country for others). MO mobiles will start with number 1 from each county activated. Frequencies: 3540 3910 7040 7240 14040 14270 21110 21360 28110 28600 50-50.5. Score 1 point per QSO. MO stations use states, provinces and countries for multiplier; others use MO counties (maximum of 115). MO mobiles total separate score from each county activated. Awards. Mailing deadline Dec. 15. Send to the St. Louis ARC, K0LIR, 842 Tuxedo Blvd., Webster Groves, MO 63119. Enclose an s.a.s.e. for a copy of the results. WAE RTTY (European RTTY DX Contest), sponsored by the Deutscher Amateur Radio Club (DARC), the full 48-hour period, UTC. Additional rules, page 98, July QST (under the Aug. 13-14 heading). IPA Contest, sponsored by the German section of the International Police Association Radio Club, to enable participants to earn the Sherlock Holmes Award. Contest periods are Nov. 12 0800-1000Z, 1400-1700Z; Nov. 13, 0800-1000Z, 1400-1700Z. Call CQ IPA, open for members to members and members to non-members, cw and ssb. (Crossband and crossmode not allowed.) Exchange RST and serial starting with 001. IPA members will preface the exchange with IPA. Each complete QSO on 80/40 counts 2 points; 4 points on 20/15/10. Stations may be worked once per band. Multipliers per DXCC list per band. Suggested frequencies plus/minus 25 kHz: cw, 3575 7025 14075 21075 28075; ssb, 3650 7075 14295 21295 28650. W/VEs can obtain rules, membership list, entry forms from WB4QJO. Entries must be postmarked by Dec. 31 and sent to Adolf Vogel, DL3SZ, Ritter-von-Eyb-Strasse 2, D-8800, Ansbach, Germany. Delaware QSO Party, sponsored by the Delaware Amateur Radio Club will be held in the following four periods: 0001-0600Z and 1600-2200Z on both Nov. 12 and Nov. 13. Stations may be worked once per band per mode for QSO points. Exchange QSO no., RS(T) and QTH (county for DE, ARRL section or country for others). DE stations score 1 point per QSO, multiply total by the sum of ARRL sections and DX countries worked. Others score 5 points per DE contact. Multiply by 1 if one DE county is worked, by 3 if two counties, and by 5 if all three counties are worked (New Castle, Kent and Sussex). Suggested frequencies: cw, 3560 7060 14060 21060 28160; phone, 3975 7275 14325 21425 28650; Novice, 3710 7120 21120 28160. Awards plus a certificate to all stations working all three DE counties. Mailing deadline is Dec. 31. Send to John R. Low,

K3YHR, 11 Scottfield Dr., Newark, DE 19713. Include an s.a.s.e. for results and/or the W-DEL certificate.

13: OK DX Contest, the full 24-hour period UTC; 160-10 meters, cw and phone. Note that OK stations on 160 are allowed just cw. Crossband and crossmode not valid. Exchange RS(T) plus ITU zone no. (See map with zones, page 85, May QST.) Each complete QSO counts 1 point, each QSO with an OK station 3 points. A station may be worked once on each band. Contact between stations of the same country (use DXCC list) count only as a multiplier but do not earn points. The final multiplier is the sum of ITU zones worked on all bands. Classes: single op, all band; single op, single band; multiop, all band. A separate log must be kept for each band and must contain date/time(Z), stations, exchanges, points, ITU zone. The summary must contain, call, name and address of op, sum of contacts, sum of QSO points and multipliers, and total score. Include usual declaration. Mail by Dec. 31 to the Central Radio Club, Box 69, 113 27 Praha 1, Czechoslovakia.

17: WIAW Qualifying Run at 0300Z, 10-35 wpm, transmitted simultaneously on 1.835 3.58 7.08 14.08 21.08 28.08 50.08 and 147.555 MHz. This is 2200 EST (10 P.M. local Eastern Time) the night of Nov. 16. Underline one minute of the highest speed copied. Certify that the copy was made without aid and send it to ARRL per the instructions under the Nov. 2 listing.

19-20: WWDXA International CW Contest, the full 48-hour period UTC. The object is to work as many amateurs in as many ITU zones and on the DXCC list using all available frequencies. Satellite repeaters OK. Multi-multi encouraged. Single op, single transmitter and single-band entrants must state single category for special recognition. Purpose is to encourage group contesting to enhance teamwork and interaction. SWLs are a separate category. Exchange RS(T) and ITU zone (page 85, May QST). Mobiles changing zones during the contest period will make changes in their report to indicate new zone. A multiplier of 1 for each new ITU zone per band and one for each new DXCC listing per band. Score 3 points for contacts on different continents, 1 point for different country but same continent, 10 points for contact by satellite transponders or repeaters, zero points for your own country (but the multiplier counts). Total score is total points multiplied by the sum of zones and countries. DO NOT SUBMIT LOG, only the summary to the committee, c/o Frank Jerome, W5AT, 908 Holoway, Midwest City, OK, USA 73110. Note that land and sea mobiles count as a different continent (3 points). Include name/calls of all operators and listeners. The committee reserves the right to request your log to verify your entry in the event of close or tie scores (committee W4BPD, W4YCC and W5AT). Summary must be postmarked before Jan. 1. (Synopsis will be mailed to each entrant before Feb. 15.) Awards. Committee decisions final. All stations/entrants are considered to be multi-multi unless plainly stated otherwise on summary.

21: WIAW Qualifying Run at 2100Z, this represents 4 P.M. EST on Nov. 21. Other details under Nov. 17 listing.

26: Annual 10-Meter Ground Wave Contest (25th one!), sponsored by the Breeze Shooters, Inc. of Pittsburgh, PA. Separate category for Novice/Technician. Revised rules. Send an s.a.s.e. to Richard Ewanuk,

WA3LUM, 311 Evergreen Ave., Pittsburgh, PA 15209 for logs/new rules.

DECEMBER

3-4: North Carolina QSO Party, sponsored by the Alamance Amateur Radio Club from 1900Z Dec. 2 through 0100Z Dec. 4. Suggested frequencies plus/minus 20 kHz: cw, 3560 7060 14060 21060 28606; Novice, 3720 7120 21120 28120; ssb, 3900 7270 14290 21390 28590. Out-of-state stations transmit RS(T) and state, province or country. NC stations send RS(T) and NC county. Out-of-state stations count 1 point for each NC contact (the same station worked on a different band, mode or in a different NC county, counts as a new contact); multiply by the total number of NC counties worked for the final score. NC stations count 1 point for each contact, multiply by the total of states, provinces, foreign countries for final score. NC mobiles use the number of counties operated FROM for additional multiplier. Your log must be signed, none can be returned. Logs must show RS(T), bands/modes, time(Z), state, province, country or NC county. On a separate sheet please show your name, call and mailing address plus your total score and where you operated from. In the case of multioperator stations this sheet must also list all calls. Awards. Logs must be postmarked no later than Jan. 10 and sent to Alamance ARC, Inc., 2822 Westchester Dr., Burlington, NC 27215. EA Contest phone from 2000Z Saturday through 2000Z Sunday (cw Dec. 10-11). Non-EA stations will try to contact the most EA stations in every zone and with as many EA districts as possible. Only single-operator category; 80-10 meters. Transmit RS(T) plus QSO number, starting with 001. N.A. to EA QSOs are worth 2 points. Only one QSO with each station per band valid. A minimum of 100 points for score consideration. Multipliers are each EA district, per band. Call CQ EA. Log QSOs, date/time(Z), bands/stations, control numbers, QSO points and note new multipliers. Usual summary with call, name, address and declaration. Postmark no later than Feb. 15 and send to the URE International Contest, Box 220, Madrid, Spain. Connecticut QSO

Party, sponsored by the Candlewood Amateur Radio Club. C.A.R.A., in an effort to find a time when band conditions are favorable and when other events are minimal, is moving its 15th CT QSO Party from the usual first of May to the first weekend in Dec. and invites all amateurs to participate. The time will be from 2000Z Dec. 3 to 0200Z Dec. 5 with a rest period from 0500Z to 1200Z Dec. 4. Phone and cw are considered to be the same contest. Send QSO number, RS(T), ARRL section for out-of-state stations or CT county for CT stations. Stations may be worked once on each band and on each mode. To score, out-of-state stations multiply total QSOs by the number of CT counties worked (maximum of eight), CT stations multiply total QSOs by the sum of ARRL sections and provinces. Additional DX contacts count for QSO points but only one DX multiplier overall is allowed. W1QI, the club station, will be operating cw on the odd hours and ssb on the even hours and counts as 5 QSOs (each band, each mode). Suggested frequencies are cw, 40 kHz up from the bottom of each band; ssb, 3925 7250 14300 21375 28540. Out-of-state portables and mobiles operating in CT are requested to identify themselves as such, as are CT mobiles operating in other counties. Awards (minimum of 5 QSO points). A Worked All Connecticut Counties Certificate will be awarded to each station working all CT counties. Logs must show category, date/time(Z), stations, numbers, bands, QSO points and claimed scores. Enclose a large s.a.s.e. for results. Logs must be postmarked by Jan. 15 and sent to C.A.R.A., c/o Fred Porter, W1VH, 169 Carmen Hill Rd., No. 2, New Milford, CT 06776. TOPS CW Club Contest, from 1800Z Dec. 3 to 1800Z Dec. 4, cw only, single or multioperator. Call CQ QMF; 3.5-3.6 MHz (use the low end of the band for DX). Contacts with one's own country count 1 point (each call area in W/K, VE/VO, VK/UA, etc. count as a separate country). Contacts with stations in the same continent 2 points, with stations in other continents 5 points, with the Hq. stations (GW8WJ or GW6AW) 25 points. Final score equals total points times number of prefixes worked. Exchange RST001 (and up). Logs must be sent no later than Jan. 31 to Peter Lumb, G3IRM, 14 Linton Gardens, Bury

Saint Edmunds, Suffolk IP33 2DZ, United Kingdom. Enclose an IRC for a copy of the results.

10-11: HA-DX Contest, sponsored by the Hungarian Radioamateur Society, from 1600Z Saturday to 1600Z Sunday. Classifications: single op, single band; single op, multi band; multioperator, multiband (club stations classify for this category). All bands 80 through 10 meters, cw only. Call TEST HA (HAs will call TEST WW). Exchange RST and serial starting with 001. After their signal report HA stations will transmit a two-letter code corresponding to their location (country) as follows: BA BP BE BN BO CS FE GY HA HE HO NO PE SA SO SZ TO VA VE ZA. Each HA contact counts a point. The same station may be worked just once on the same band. Each different HA county worked counts as a multiplier on each band. Usual logs/summary plus declaration. Awards. Report promptly to the Radio Amateur League of Budapest, H-1553 Budapest, Box 2 Hungary. EA Contest cw, see Dec. 3-4 listing.

17-18: SOWP Christmas CW QSO Party sponsored by the Society of Wireless Pioneer (SOWP), from 0000Z Dec. 17 to 2359Z Dec. 18. There are no formal requirements for exchange and logs are not required. The purpose of the affair is to give members a chance to meet on the air and to exchange seasonal greetings. The call will be CQ SOWP. Suggested frequencies are 55 kHz up from the low end of each amateur band. Additional information may be obtained from the Party Coordinator, Bill Willmot, K4TF, 1630 Venu Street, Merritt Island, FL 32952.

25: HA5-WW Contest, full 24-hour period UTC, single operator, multioperator, SW sections, all bands/modes. Call WW Test d... exchange report plus ITU zone number (see page 85, May QST). Contacts with one's own continent count 1 point, between continents 3 points, with HA/HG5 stations 5 points, with HA5 stations 5 points. Final score equals the sum of QSO points times the sum of different ITU zones. Usual log/declaration, mailed by Jan. 15 to BKA Contest Committee, Box 2, Budapest 134 Hungary. **QST**

Strays



SURE BEATS WEAVING POTHOLDERS

When the president of an Ivy League college looks for relaxation, where does he go? To its student-run amateur radio club, naturally!

William McGill, president of Columbia University in New York, became interested in amateur radio last summer when he began monitoring the school's club station, W2AEE, on his homemade shortwave receiver. He quickly received offers of assistance from Joshua Mermelstein, WA2OHP and other club members.

The ham-to-be turned down a chance for an early FCC exam and kept reviewing because he "insisted he had to get it perfect," Mermelstein says. A builder of electronic circuitry for more than 20 years, Dr. McGill regards amateur radio as a form of occupational therapy: "When I am soldering I forget all about Columbia's problems," he says.

When he "had it perfect," he passed the exam with flying colors. Dr. McGill's call sign? WB2ORF.

Can one man make a difference? H. F. Jewson, WA3ATE, who was recently awarded the Golden Eagle award of the Philadelphia Electric Co. ARC, did just that. When the company began renovating its building in 1969, the radio shack was dismantled and put into storage for the six years of construction. During that time, Jewson lobbied for a new



Dr. McGill pounds the brass in anticipation of his license exam.

shack and for space on the roof for antennas, while maintaining club records and correspondence. When construction was completed, he was instrumental in the club's efforts to obtain new equipment. Elected president in 1975, he has seen club membership jump 38 percent in the last year.

TEXAS WEATHER WATCH

When storm clouds gather, 44 amateurs in the Temple, TX, and surrounding areas band together to provide up-to-the-minute weather reports on 146.88 MHz through a repeater atop a hospital. Anyone with a high-band scanner or the newer multiband fm radio can monitor the machine. The Temple Amateur Radio Club began the "Local Weather Watch" over a year ago. Several "spotters" put in the storm to survey conditions which are relayed to the National Weather Service Waco. — W5PTC

"RIG HERE'S IN A JOHN DEERE . . ."

Most of us have worked mobile stations some time or another, right? WB6DPO reports having worked a real topper — W0VZL tractor mobile in Anthony, KS. The farmer has a 20-meter rig mounted in the air-conditioned cab. It even sports a tape deck and 2-meter gear for contact with the house in case his XYL needs him. He claims he has more time than ever to ragchew and still does as straight a furrow as anyone around. — El Cajon (CA) Counterpoise News

QST Congratulates . . .

Tom Cordich, WB6LPN, whose hobby led him to a new field of work. Abandoning his career as a professional musician at age 46, he enrolled in Long Beach (CA) City College and within three months had earned his First Class Commercial license. He soon found a job as broadcast engineer with the Trinity Broadcasting Network, and will shortly be sporting an A.S. degree in electronics. — WB6PAF

Station Activities

SCM \times AREC \times ORS \times OVS \times SEC \times TOWER \times TCC \times OO \times NTS \times WAC \times
 CP \times A-1 OPR \times EC \times DXCC \times CLUBS \times RM \times OPS \times RCC \times PAM \times WAS

CANADIAN DIVISION

ALBERTA: SCM, Sydney T. Jones, VE6MJ — VE6AAI has now left the lonely lookout station and is back in civilization. VE6AGT was lost to VE6IJJ and KYL and took time off a busy schedule of house construction to engage in some fishing. Several members of the Lakeland Radio Club have now qualified for their tickets. If you are interested in taking a turn as net control please contact VE6AFO, our Phone Activities Manager. We hear VE6ALU has now moved a little closer to civilization. VE6WV has been working on home brew beam and reports some results. VE6GN was a recent visitor to Edmonton. Traffic: VE6HD 16, VE6AAI 12, VE6AFO 4, VE6BCC 4, VE6CE 4.

BRITISH COLUMBIA: SCM, H. E. Savage, VE7FB — We try not to miss this monthly corner of QST our letters from amateurs away from home look forward too. But the ARRL Convention in Seattle and all the activity there we failed last month. VE7ZK our big traffic man is QRT whilst he moves. VE7GY Net Manager for BCEN is now settled in Victoria, and wishes to thank all who looked after the net during this time. We visited many amateurs during this summer and had some grand ham shacks. VE7DDO Suoke, his shack resembling a tower and looks out onto the Pacific Ocean. Nanaimo ARC officers for 1977/78 — VE7BKN, pres.; VE7DJA, vice-pres.; VE7NP, secy. The STATIC is their monthly paper he around for years and real good effort. Traffic: (Aug.) VE7K 112, (July) VE7DKY 259, VE7ZK 114, VE7BLS 12, VE7K 132, VE7K 122, VE7DFY 25, (May) VE7ZK 133, VE7DKY 94, VE7COA 4.

MANITOBA: SCM, Steve Fink, VE4FQ — Asst. SCM: VE4RG, RM: VE4UL, PAM: VE4JP. We welcome VE4HU as our new SEC. Bill will be heading ARS in Manitoba and your cooperation is urged. New ECs are VE4LH in Steinbach and VE4AAU Birtle. VE1BKK will be stationed in Winnipeg for the next year with the Air Force. VE4ZE is a new White Crane operator at Elm Hill. Ted's sponsor is VE4QN. VE4DS now active on 75 from Selkirk. MEPN: 31 sessions, 847 QNI, 47 QTC. Let's have some VE4 activity in Sweepstakes! Asst. SCM VE4PG will write next month's column while I am away. Traffic: VE4PG 85, VE4JP 19, VE4YE 17, VE4UL 14, VE4IX 13, VE4JA 10, VE4PA 10, VE4AAD 8, VE4CR 8, VE4GJ 7, VE4MO 7, VE4LB 6, VE4LN 4, VE4XN 4, VE4NE 3, VE4NM 3, VE4AAU 1, VE4OD 1, VE4GU 1.

MARITIME & Nfld.: SCM, Aaron D. Solomon, VE1QC — Asst. SCM: VO1FG, SEC: VE1DI, PAM: VO1JN, RM and APRM Mgr: VE1ACU, NTN Mgr: VO1GW. Silent Keys: Chas. Williams, ref. leg. sup. EUC. Also ex-VE1GB, Sydney ARC and Girl Guide Station CG1CR received much publicity for traffic handled. VE1S EQ AM BBO BFV BPL under the direction of VE1ZS rescued older couple stranded in woods for 77 hours near Hbx. Int. airport. VE1S IB IR KKI L Z and GJ returned. VE1AW/VE1MD helped by VE2E/L VO1H VE1AYK secured medical aid for sick child on M/V A. Shea. VE1CR Char. ARC operated at Old Home Week Fair. 4571A pres. Ceylon RC. guest of HARC. HARC received time writeup for Field Day ops. in Mar. Tel. & Tel. Bulletin. VE1S BIK HI sporting new reg. XOLIGS handled much traffic during Caribou. GALT BC. did special news story on operation of XOLIGS. XOLIGS got new 80M antenna, is working DX. VO1AAJ winner of Smallwood and Stirling trophies. APN: sess. 31, QNI 119/20, QTC 133/18. Traffic: (Aug.) VE1ACU 164, VE1CR 128, VE1ZH 88, VE1HJ 68, VE1AAO 54, VE1BFW 48, VE1AB 44, VE1EJ 10, VE1BK 2, (July) VE1MB 6, VO1GW 4.

ONTARIO: SCM, Larry Thivierge, VE3GT — Asst. SCM, Noreen Nimmans, VE3GL. RMs: VE3S AWE, DPO GFN, PAMS: VE3S AGN EWD FGT GJG. OOS: VE3S AC TA AFA DJR GEQ OVSS; VE3S DSS FN VE3S AVT and CE who have both won Keys. VE3LJC active from Lake Joseph Centre camp near Parry Sound with VE3IRK at the controls. VHFers enjoyed excellent band conditions Aug. 11th and 12th. Congrats to VE3SB who has been elected Eastern Area TCC Director. Bromsgrove Silver Jubilee Award is awarded for stations that obtained 25 points during 000 GMT 4th July 1977. 1977/78 12th June 1977. Details from J. K. Harvey, G8KLO. This award is in honour of the Queens Silver Jubilee. The 1976 Annual League Report is available from Hqs. for the sum of \$3.00 and is worthwhile reading. Belleville area amateurs will be using the prefix CZ commencing Jan. 1, 1978 until Dec. 31, 1978 in honour of that city's 100th anniversary. VE3S FST WKZ CDR and M4Q sporting new 1S-820s. New call from the Windsor area is VE3HD. Windsor club's annual presidents banquet scheduled for Nov. 12th, tickets available from VE3EIM. VE3WJ new CARTG member. Good luck to all participating in the annual Sweepstakes, cw Nov. 5th and 6th, phone Nov. 13th and 20th. Retiree County amateurs held a successful corn roast at Cobden. Ottawa ARC had a good turn out for their annual picnic. ECs VE3APK and K6GMU/VE3 bus organizing ARES activities in Oakville and Port Colborne respectively. VE3DHB has resigned his PRA appointment due to work commitments. The film "Moving up to Amateur Radio" has been well received and is very popular at club meetings where prospective amateurs are attending. "Talk to the World . . . about Amateur Radio" is available from HSO Hqs. \$1.00 for batches of 30 booklets. This brochure promotes a better understanding of amateur radio in Canada and is ideal as a handout at amateur demonstrations, fairs, shopping plazas and exhibitions. Traffic: (Aug.) VE3SB 483, VE3GL/3 382, VE3DPO 156, VE3GT 128, VE3ISW 119, VE3CDK 82,

VE3EWD 77, VE3GFN 75, VE3CJG 73, VE3HGJ 72, VE3EBC 59, VE3DV 55, VE3DVE 54, VE3BDM 53, VE3AWE 37, VE3HTT 35, VE3ATR 31, VE3FGV 30, VE3JAK 14, VE3EHL 11, VE3DH 4, (July) VE3DVE 16.

QUEBEC: Asst. SCM: Edward Sieb, VE2BAQ — VE2EC reports that he is overhauling his station, and is presently only active on 2-meters. The St. Maurice Valley Group very active here and more people are appearing with "Brown Radios" giving 220 MHz band added push it needs. About 15 people active on 223.5. VE2FCX very active since getting ticket in spring; his crop of antennas is doing very well. He is presently working on an 80-meter dipole, 120 feet in the air; that should harvest some real DX! Traffic: VE2EC 14, VE2BAQ 2, VE2YU 2.

SASKATCHEWAN: SCM, P. A. Crosthwaite, VE9RP — I am extremely sorry to announce that VE5RN will no longer hold the position as Asst. SCM. Ron did an excellent job and will be missed as the assistant. I was invited to attend the DQC sponsored G.R.S. symposium in Winnipeg Sept. 9-17. I was there as your representative and participated in the workshops giving the Amateurs point of view. Will be passing on the information to other clubs this fall. Traffic: VE5AAE 32, VE5RP 10, VE5WM 10, VE5HE 6, VE5UV 5, VE5QY 4, VE5NJ 3, VE5QI 3, VE5QO 3, VE5GF 2, VE5PB 2, VE5PD 2, VE5UX 2, VE5ABA 1.

ATLANTIC DIVISION:

DELAWARE: SCM, Roger E. Cole, W3DKX — SEC: W3PQ, PAM: W3WD, RM: W3QQ, P5HR: K3YHR 49, W3PQ 44, WA3WPY 44. New appointment: W3WD as PAM. Thanks to WA3DUM for excellent service in the past. Congratulations to the 1977 Hamfest Committee and especially to K3YHR for a job well done. Prizes 1st WA3WCJ, 2nd K3KMM, 3rd WA3HFN, 4th W3JAE. There appears to be two candidates for the coming SCM election for the Delaware Section. WA3JQL and W3DKX. Please VOTE for the candidate of your choice upon receipt of your ballot. DARC CIPs WA3GLS WB3EAF WB3FQF WB3GXD WB3FLP and WB3EQU set up an All-Band plus RTTY station for the Newark Sidewalk Days Aug. 19 & 20. DTN: QNI 377, QTC 62, DEPN: QNI 73, Tfc. 11. Traffic: W3PQ 107, W3QQ 100, WA3WPY 73, WA3WY 36, W3DKX 34, K3YHR 22, W3WD 20.

EASTERN PENNSYLVANIA: SCM, George Van Dyke, Jr., W3HK — SEC: W3RF, RMs: K3NGN, K3KW, PAMS: WA3PZ, W3AVJ. Net reports: PFN QNI 399, QTC 590; CM6 QNI 34, QTC 9; PT IN QNI 287, QTC 168; AREC(2) QNI 8, OO reports: W3KEK W3CL K3HD 1, OVS reports: WA3LWR W3AVJ W3CL W3ID, OVS reports: W3CL W3GOA W3DQ WA3NDQ, WB3ZEE, BPL: W3CUL W3VJ K3NSN K3JK W3WQP WA3ATQ, P5HR: WA3YJG WA3NDQ N3KZ. Big guns W3CUL & W3VR still in there with the traffic! Op at N3KZ is now WB7TPY. WA3ATQ says she will be QRT for Sept. hard to believe! W3YDC says Scout Jamboree in VPA went well. W3WKE reports two more rare keys! W3ID reports VHF nets just aren't drawing members. A reminder all appointments are good for two years. WB3A7E upgraded to General! Several stations on vacation this month, but if your report is not here it may be my fault, a mix up on what was to be discarded. 2nd incoming mail may have gotten yours. Let me know and I will report you next month. W3GMK reports 21bs per watt too heavy for a KW, going to lighter construction. WB3EVL now General. WB3XF Advanced. K3UCJ & WB3XV big ES. WB3DTC will be operating from school in NH. K3VT and W3GM, I would like to thank WA3YJG N3HT and WA3XK for not holding the MEPN also on EPA and PT IN until I could get someone to take the job full time. With the nets falling behind we need experienced RMs with no outside conflicts such as school or girls! Hope everyone had a safe and pleasant summer and all antennas repaired. Traffic: W3CUL 3008, W3VR 1336, K3NSN 1078, K3KW 663, WA3WQP 501, WA3ATQ 293, W3DQ 215, W3PQ 201, K3YL 201, N3KZ 163, W3ATU 156, WA3YDC 57, WA3YD 53, W3AVJ 51, K3RC 44, WA3NDQ 42, W3WRE 20, W3KEK 19, W3ADE 15, W3CL 15, W3ID 15, K3FD 13, WA3CKA 12, WA3LWR 11, WB3AZE 6, K3HXS 4, W3HK 3, WA3TMP 3, WA3DQ 3, WB3BGA 1, WA3BJG 1, W3EU 1, W3GMK 1, W3GOA 1, WA3VQE 1.

MARYLAND — DISTRICT OF COLUMBIA: SCM, Karl R. Medrow, W3FA — SEC: N3II, FR: W3ECN and others the net times are: W3QRQ-MDQ, 3643 kHz, 7 and 10 PM local daily, WA3PRW/K3ORW-MEPN/MDCTH, 3920 kHz, 6 PM local with the MEPN also meeting at 1 PM local Sat. and Sun. W3DFW/W3OYV WR PGN/MDC PGN, 3905 kHz at 5:15 PM local except Sun. The Aug. dog days are over. Six P5HR men with 3 over 40 points. Congrats to those listed. N3RC was W4LGM and is now in the WDC area. OO reports from W3ARC W3IC, WA3JUS, WA3SKH W3BIV and WA3SK. The PVRC hierarchy W3Z2, pres.: K3NA, vice-pres.: W3UO, secy.: N8II, treas.: N4IN W4KFC W4BVV and W3FA, dir. The PVRC Rpt. Assn. has W3ZZ N8II K3WX WA3ZAS W3IMZ W3XE and K4AW. FR awarded scholarships to WB4HBK WB9NIQ WB9QUC and WB85ZLN. Congrats. How about you locals? WB3AUK/2 is now permanent in Rochester. Ham Arundel News from the AARC, the Modulator from BARC, and the Repeater Journal from CVRA are good and appreciated. The NRL AARC was complimented for its excellent Johnstown Flood operations. 1977 is the year of change! New calls



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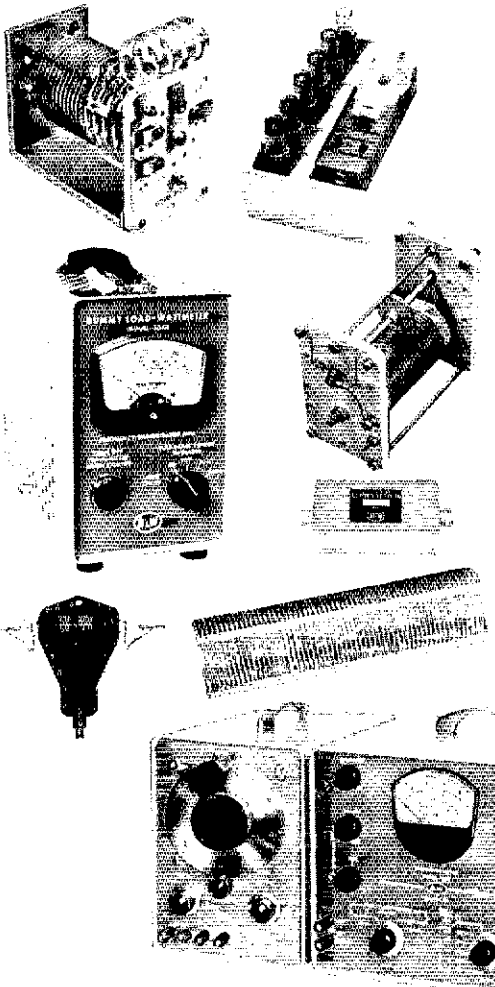
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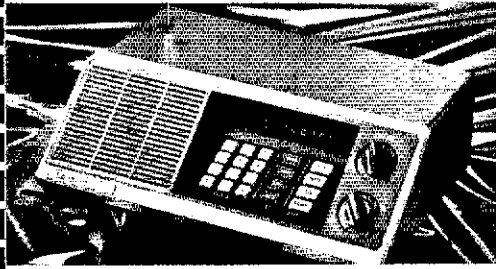
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N3RL, ex-W3FCI, W3UG, ex-W3INF, K3KU, ex-K3OAL, K3QB, ex-W3JIB, K3NA, ex-W3JAI, N3IT, ex-W3ZAK, Comrats, WB3EDX passed the Advanced and barely missed the Extra. WB3AOB back to the school grind. These two extremely active on the Four nets thank you. W3CDQ a wonderful visit to YU and I, WA3FYZ experimenting with invisible antennas as an aid to faster code! N3ZIN so glad to be back in circulation after the winter with a summer virus. W3FZY had a busy month. WA3UYF has solved his weak signal problem. WA3XKH is buying instead of building. W3WBV handled emergency tlc with XE2ABC a good job. K3ORW sounded like the constant NCS this month filling in for all the vacationers. W8BZY with new rig getting reorganized for the season. As W3DFW portables w8st his signal gets louder! At the MDD-MEPPN-MDCNT picnic there were 51 who earned Net Certificates. With the Nets. Sessions/Tlc/GNI avg. MEPPN 22/77/20. MDCNT 17/51/36. WR PON 18/26/14 and the MDCN PON 4/22/23. Traffic: W3BFDX 167, WB3AOB 123, W3FZY 14, W3KBE 89, WA3UYF 73, K3KU 41, N3IT 36, WA3PRW 28, W3FZY 26, WB2Y 321, W3EOV 14, K3ORW 4, W3JNW 2.

SOUTHERN NEW JERSEY: SCM, Raymond F. Clancy, WR2GTE, SEC, W2H0B, Southern Counties ARC was ready for the summer with contest at the Atlantic City convention hall. Let's have traffic reports W2QB WA2BAB K2BR, Gloucester County ARC now meets in National Park Municipal Bldg. sez K2HPV. SJRA had a super Hamfest Picnic at Malaga, the 29th. SJRA's W2ORS introduces new members by writeup in Harmonics. W2LPJ age 73 wkld vibrnplex 2 hrs on FT. W2B2B age 26, W2B2A age 26, W2B2Y age 20, W2XQ, W2JXX now N2SL, W2TUI, now K2UL, K2BG sez Burlington County RC will hold Christmas dinner Dec. 15 at Vincentown Grange. W2GEX new General. W2GLZ new Tech. West Jersey RA holds a "CB Fair" at Willingboro Plaza to introduce Ham Radio. Shore Points ARC enjoyed slides of DXpedition by W2ORA. W2JGL sez 2000 3PM NY and after 4 hrs of FT. W2B0M, WA2BPK volunteers at ORS. W2ORA new general works in nuclear Pwr. WA2DUE moved from Tech to Advanced. WA2ISS, age 14, Novice nw is Extra. N2SL is son of N2GL. W2JAV gave demo of Video-RTTY on 23 inch screen vs hard copy printout at Cumberland RC's W2BX. W2JJ revealed K2H's hams. W2JAV sez 4000 3PM with W2SDO, Del Valley GCWA met at Mallard Inn in stead of Penna. on Sept. 24. Traffic: W2LCC 123, W2ZQ 105, W2JI 28, W2LPJ 24, K2UL 15, K2BG 11, WA2WSV 0, W2IU 2.

WESTERN NEW YORK: SCM, Joseph M. Hood, K2FA, Asst. SCM: W2MTA, SEC: W2JIC, NYS had their annual picnic on Aug. 13 at W2MTA with the following stations receiving certificates for NYS participation: K2UYK, N2EF, N2SY, W2BIW, W2CSC, W2RUF, WA2LNA, WA2YJL, WA2YJM, WA2ZJW, W2ZEMU, W2ZFOU, W2ZTGL and W2ZYM. Regret to report that W2RUF was in an automobile accident in July. Hope she fully recovers. This gets to press. RA6S provided Public Service Communications for the Fireman's Convention Parade on Aug. 21. W2RO-FM 89.9 MHz has a program on amateur radio at 7:35 AM Fri. and 10:10 AM on Sat. The show is hosted by WA2HWW. WA2AIV reports that K2GIC is a new Assn. for Wyoming County. RARA had an amateur radio booth at the Monroe County Fair and signed up a sizeable number of potential hams for their fall classes. K2RL coordinated the RARA booth effort. WA2JWD, who recently passed his Extra, has received a small federal grant to set up an amateur station in an Endicott NY High school to assist in teaching Physics, Languages and Social Studies. He is interested in talking with other high schools interested in similar activities. W2YWK has been running a class at IBM which produced W2PMD, WA2RFI and WA2RDL. Regret to report that RAWNY lost W2RG and W2ZHS as Silent Keys. The WR2AEI repeater was moved to Cobbs Hill which improved coverage to the east and south. WA2ELB heard a beacon on 50.190 MHz from the south and wonders if anyone knows what it is. Traffic: W2OE 176, WA2ELD 170, W2MTA 153, W2FR 87, WA2ZJP 79, WA2HSB 49, W2PZL 47, WA2AIV 39, W2TZ 27, K2GIC 14, W2VND 12, K2VR 10, WA2UAR 3, WA2ECA 1.

WESTERN PENNSYLVANIA: SCM, Donald J. Myslewski, K3CHD - SEC: WA3VUP, Asst. SECs: K3SMB, WA4LW, PAM: K3SMB, RMS: K3A1, W3NEM, W3KUN.
Net
WPA CW Traffic 3545.0 7:00 PM Dy
WPA Phone Traffic 1983.0 6:30 PM Dy
Pa. Traffic & Training 3610.0 6:30 PM Dy
WPA RACES 3990.5 9:00 AM Su
K3HWL has been appointed asst. Director for the Atlantic Division. Local Pgh. traffic to and from NT3 is being handled entirely on WR3AJN 146.287.81 repeater. The Breze Shooter's 10-meter ground wave contest will be held Sat., Nov. 26 at 9 PM. The Crawford Amateur Radio Society provided communications for the Northwest Pa. Shriner Parade. Welcome to the Skyview Amateur Radio Society who recently affiliated with the ARRL. The Nittany ARC turned out to assist Alpha Fire Co. of State College during their parade. N3LE recently acquired an Alfa 350X L. The Horseshoe ARC operated special events call KC3F at the Keystone Country Festival, the last such call to be issued by the FCC. WA3YK recently was a guest of radio station WRTA in Latrobe, PA and presented an interesting insight of amateur radio for the general public. Recent upgrades to Novice, WR4JGR, WB4JG, W3JL, W3JEN, W3JEN, to General, W3GKR, to Advanced, W3CEW, W3EKQ, to Extra, WB3CDK, K3MS. A newly formed club, Irwin Area Radio Association is planning a repeater on 146.925/.325 MHz. The WPA CW Traffic Net had 31 sessions in Aug. with 433 check-ins and handled 250 messages. The WPA Phone & Traffic Net had 31 sessions in Aug. with 329 check-ins and handled 181 messages. PSIH credits W3YG. Traffic: K2BSA/3 1315, W3YQ 467, WB3CDA 259, K3AT 250, N3FM 122, W3EGJ 103, WA3YEQ 100, W3TEF 43, W3KUN 40, K3SMB 35, K3HI 34, K3CHD 33, W3LOS 28, K3UA 28, WB3DKT 21, N3LE 20, W3AS 19, WA3YK 10, W3KQD 6, K3CR 4, W3SN 4, W3YD 4.

CENTRAL DIVISION

ILLINOIS: SCM, Edmond A. Metzger, W9PRN - Asst. SCM: Harry Studer, W9RYU, SEC: PAM: WA9KFK, RM: W9NJP, Cook County EC: W9HPG.

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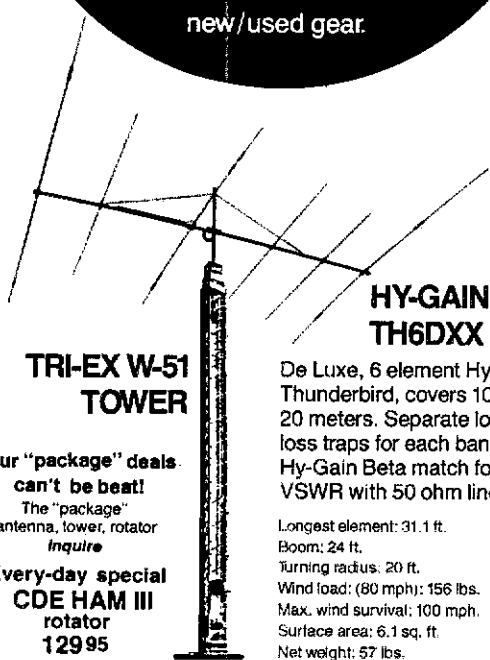
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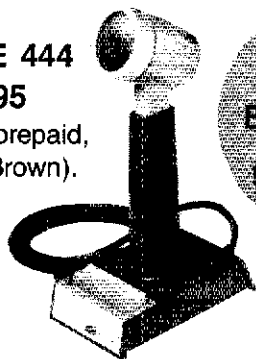
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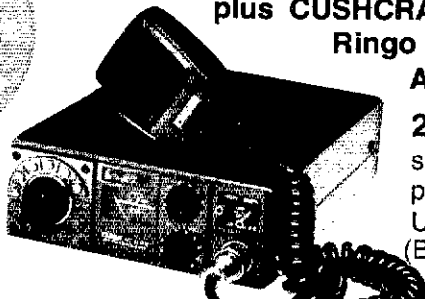
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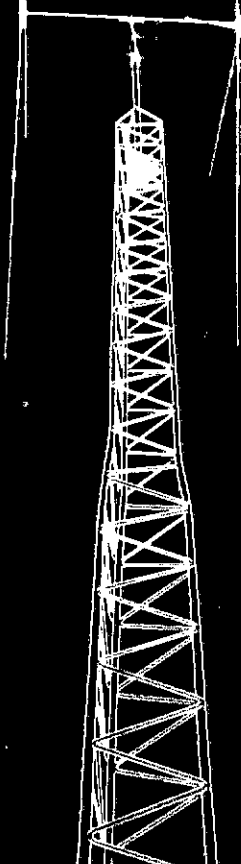
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IFN	3940	1700 M-S		
		1400 Su		no report

WA9GBW has a new HW 2036 on the two meter band. The Knox County Amateur Radio Club resumes monthly meetings at the Galesburg High School at 7:30 P.M., the second Mon. of each month. WA9OTD is operating in KY after four years in CA with a CA. A new Novice is WD9SE, a brother of K9WA. WB9FT has upgraded to General Class. Recent Silent Key is W9FX. Our sympathy to his family and many friends. Richard Koscielski has been appointed EC for the Starved Rock Area. Other appointments include K9TXI as OBS and WB9LZA WB9BS and K9TKJ as OBS. K9LGR is now K9IL. WB9ARI has received his old call K9DAC after a lapse of 13 years. W9GKE presented a color slide program at the Aug. 19th York Radio Club meeting. The Joliet Amateur Radio Society, Inc. presented the Annual Old Timers Night with a combined dinner and meeting. A visual history of the club's 50 years was presented at their program. Members of the Sangamon Valley Radio Club (Springfield) assisted the American Red Cross with communications during the dates of the IL State Fair. WA9ACP and his XYL are the proud parents of a baby girl named Amy Andrea. K9DUG joined the ranks of Silent Keys on July 25. WB9ODF has moved up to 2 meters. The Annual Antenna Jamfest was the most successful event in the club's history and about 100 eyeball QSOs were in evidence. The 1979 Central Division ARRL Convention will be held in the Milwaukee area. Dates will be announced later; make plans now to hold a week end for this big event. "Home Computers" was the topic of the program presented by Chuck Stakel at the Hamsters latest meeting. New Novices heard in the Springfield area are: WD9EDV WD9EJD WD9GGR WD9GGS WD9LGC and WD9DSD. Reports received by this column indicate that a great many of the IL Section radio clubs are presenting code and theory classes. Please notify headquarters of your club and your schedules so that prospective hams can be advised of a class in their vicinity. W9OK is vacationing in Horse Shoe Bend ARK. Traffic: W9HOT 324, W9NXG 185, WB9LZA 163, N9TN 176, WA9SRW 145, W9DK 144, WA9VGV 131, W9KR 102, W9UJ 76, WB9JR 75, W9HCG 64, W9FE 52, W9LNG 42, W9OYL 30, N9MX 18, WB9NEH 8, W9PRN 8, K9DAC 8, WB9RFC 4, K9WA 2.

INDIANA: SCM, M. P. Hunter, W9LE. — N9MM is down on the "speaking" with Kingman and Palmyra slide show. License upgrades seem to be coming at a fantastic rate. W9LX is reported to own a large aluminum forest in his backyard. The Lafayette Hamfest came off without a hitch even though most of the state had its share of rain. Main prizes went to K9RPZ and a CBI W9LF received the Outstanding Amateur of the Year award and W9LHM received a Hamster Council Award. W9ZAT recently returned to IN for a visit to celebrate 25 years as a priest and 22 years in the Brazilian jungles. K9OIB was repairing the upper tower bearing when the gin pole let go. He now has a new 90 ft. tower (now why didn't I think of that approach?). Speaking of towers, W9LF was contemplating taking his tower down for repair, but he returned home from work and found that the tower fairy had done the job for him. W9GX began his 6th year as a ham in July. Net Tlc: QIN 295, ITN 400, INTN 76, IPON 1, HOOS. VHF 22, ICN 12. Traffic: W9FC 254, K9DC 195, W9GLW 166, W9GGW 150, W9LTU 146, W9HUE 131, WA9OCT 120, W9L 112, WA9LJ 110, W9VX 78, K9TKL 85, WB9SKA 61, W9IOH 56, W9W 27, W9POT 67, WB9GK 69, W9UEM 69, WB9VXN 64, WB9PIR 56, K9VBM 42, W9DLF 25, W9PMT 22, K9ZLU 20, WB9DIX 18, WB9IHR 18, K9RPZ 18, K9EJT 17, K9DCX 16, W9RTH 15, WA9ITB 14, K9KIB 14, K9RWQ 14, WB9VKO 12, WB9CZV 11, WA9OHX 11, W9EGV 9, K9ILK 8, W9DKP 8, WB9SLV 8, W9BDP 5.

WISCONSIN: SCM, Roy A. Pedersen, K9FHI — SEC: K9ZZ. PAMS: W9AYK W9IEM K9UTQ. RMS: WB9ICH W9SFL K9KSA K9LGU K9EN. Nets, Freq., Time, QNI, QTC, Mgr.: 5845, 3985, 11:52 M-S, 585, 547, W9AYK. BEN: 3985, 1700Z, Dy, 870, 150, W9IEM. W9EN, 3985, 2330Z, Dy, 163, 340, K9UTQ. WNN, 3725, 2215Z, Dy, 20, 0, WB9ICH. WIN-E, 3662, 0000Z, Dy, 268, 133, W9SFL. WIN-L, 3662, 0300Z, Dy, 216, 90, K9LGU. W9SN, 3662, 2330Z, M-W-F 62, K9KSA. W9RN, 3662, Sat., 0430Z. K9EN, W9LD, 3925, 1:00, M-F, 1:13, 344, WA9NIX. New Generals in Steve's Point area WD9ESX WB9WWS. WA9NDV has Extra (after Watts Snod). Rock River Radio Club of Dodge County has their old call WB9TCH. WB9YXY has TH6DX received 13 colonies award. WB9KAX now K9RTB. Wisconsin Rapids ARC WB9DQA gave demo on Aug. 13 during W9LH's Wisconsin Rapids W9D certificate to all stations contacted sending same. WB9GKH has Extra. Regret to hear W8QGG from MI passed away. BWN certificate to WB9YPY K9AKG W9SJJ W9NME. Ben certificate to W9ZZZ W9NZQ. W9SN certificate to WB9ROD. WD9AXX passed General. WNA picnic at Oshkosh July (2nd Sun.), support your net. K9CFL made BPL Dots your county have an EC? We need more. WB9LK checked out 23 time messages running 1 watt CW from northern MN. K9UTQ getting into QRP act. Wausau area has been kept busy with tornado watches and warnings, their repeater serves them well. W9NOT visiting pop in Mount Washington. Traffic: (100) K9CPM 739, W9KKA 29, W9D 29, W9L 27, W9L 27, W9GXY 162, K9MZQ 142, W9IEM 99, K9FHI 93, K9L 73, W9LAUD 61, W9AYK 47, K9KSA 45, K9AKG 43, WB9JSW 43, K9UTQ 40, WB9YPY 33, WB9ICH 30, W9YFW 30, WB9BRE 27, K9JPS 27, WB9YXV 25, N9CP 24, W9LW 23, W9SJJ 21, W9DCQC 18, W9VQ 17, WB9RE 15, W9VCL 15, K9ANV 12, WA9I WJ 14, WB9SXX 13, W9LKK 12, WB9FTC 11, WB9ROD 5, WD9AUD 127, WB9FTC 1.

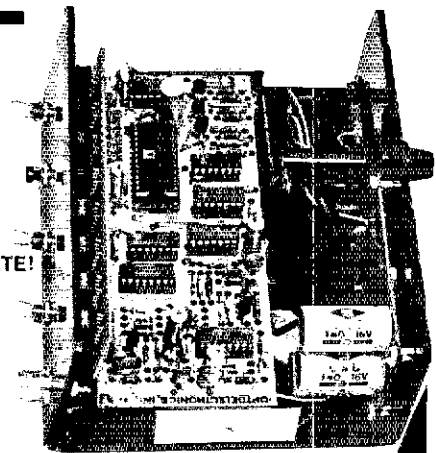
DAKOTA DIVISION

MINNESOTA:	SCM, Gordon Olson, K9EC — SEC:	W9SA,			
Net	Freq.	Time/Dav	QNI	QTC	Manager
MSN 1	3645	6:30 PM	179	124	WB9OFQ
MSN 2	3685	10:15 PM	45	94	N9HY
MSPN N	3945	12:05 PM	853	127	WB9JYT
MSPN E	3925	5:45 PM	840	189	WB9HOX
PAW	3925	9:12-1:5	5900	317	WB9QWV
MSSN	3710	5:30	172	31	WB9QWH

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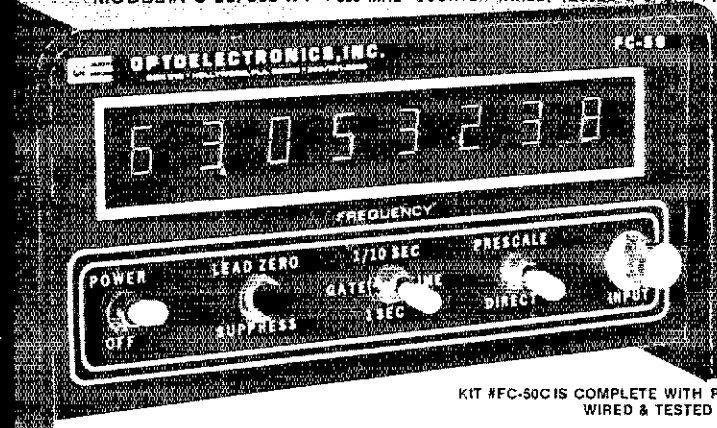


SIZE:
3" High
6" Wide
5 1/2" Deep

FEATURES AND SPECIFICATIONS:

DISPLAY: 8 RED LED DIGITS .4" CHARACTER HEIGHT
GATE TIMES: 1 SECOND AND 1/10 SECOND
PRESCALER WILL FIT INSIDE COUNTER CABINET
RESOLUTION: 1 HZ AT 1 SECOND, 10 HZ AT 1/10 SECOND.
FREQUENCY RANGE: 10 HZ TO 60 MHZ. (65 MHZ TYPICAL).
SENSITIVITY: 10 MV RMS TO 50 MHZ, 20 MV RMS TO 60 MHZ TYP.
INPUT IMPEDANCE: 1 MEGOHM AND 20 PF.
[DIODE PROTECTED INPUT FOR OVER VOLTAGE PROTECTION.]
ACCURACY: ± 1 PPM ($\pm .0001\%$); AFTER CALIBRATION TYPICAL.
STABILITY: WITHIN 1 PPM PER HOUR AFTER WARM UP (.001% XTAL)
IC PACKAGE COUNT: 8 (ALL SOCKETED)
INTERNAL POWER SUPPLY: 5 V DC REGULATED.
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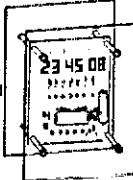
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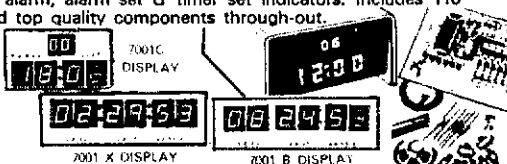
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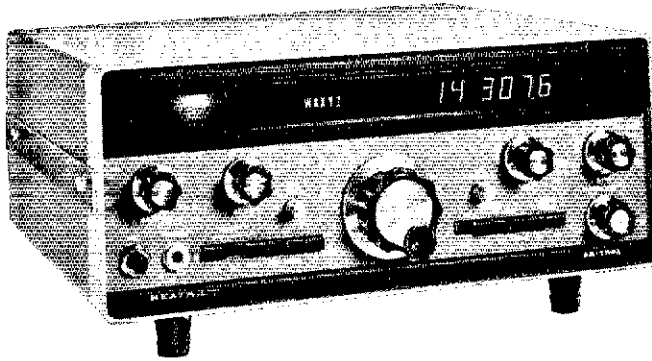
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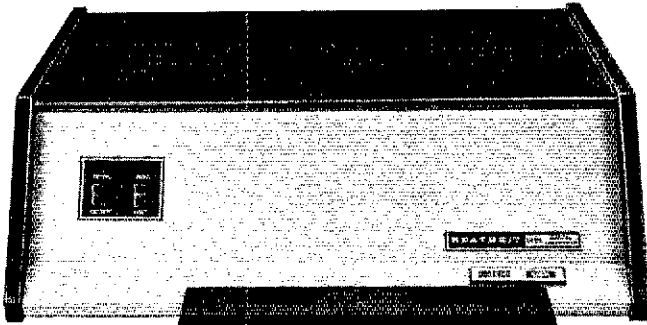
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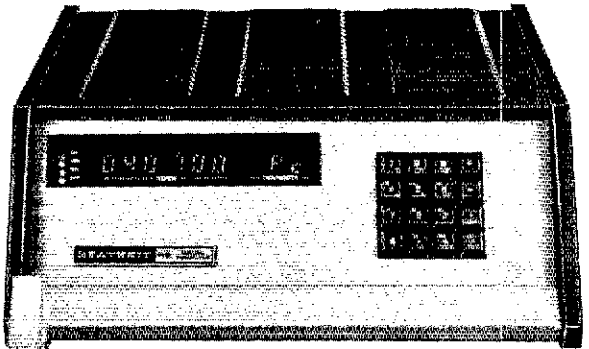
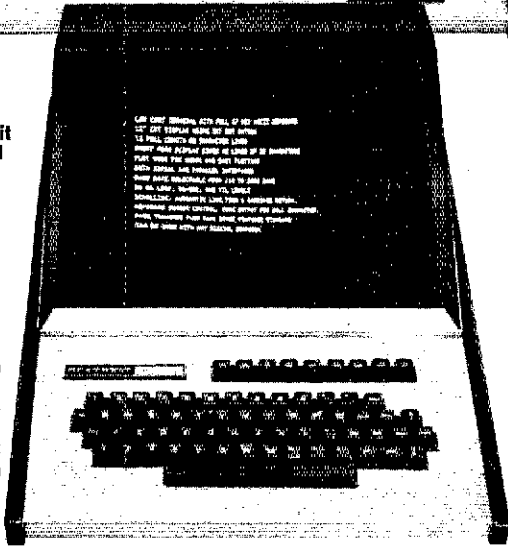
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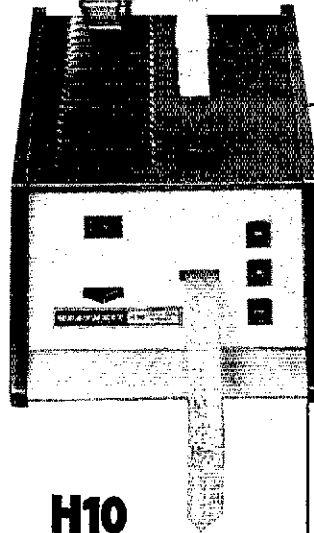


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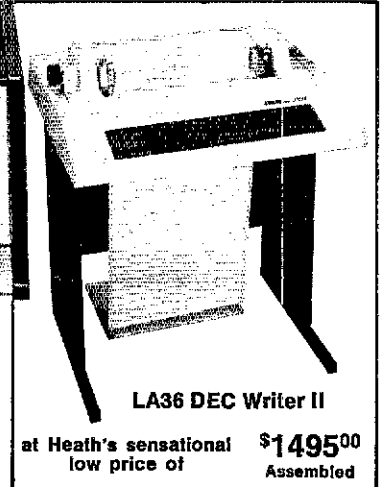
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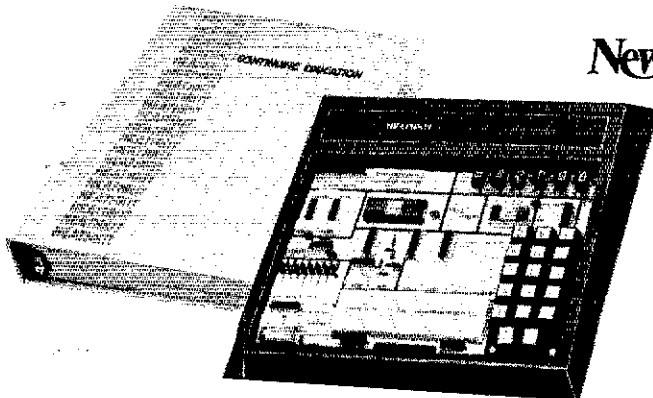
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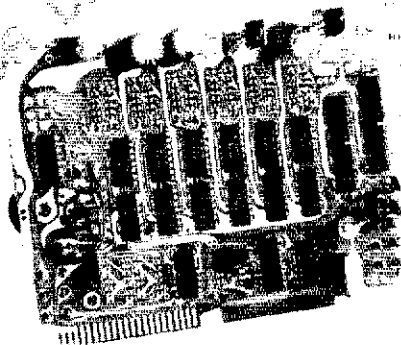
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THE RECEIVER. Double-Direct-Conversion. Easy tuning. Just select the frequency and set the audio level. Excellent cross-modulation characteristics. Offset tuning so you can tune either side of zero beat to reduce QRM. Front panel control selects one of 3 selectivity curves: 2.5 kHz for SSB reception, 1 kHz for normal CW, and 500 Hz for when the QRM gets rough. Plus separate AF and RF controls, headphone jack, and built-in speaker.

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THE VFO. Common to receiver and transmitter. Permeability tuned. Linear scale. 5-5.5 MHz basic frequency is crystal-mixed to the desired frequency so bandwidth and stability are the same on all bands (crystals included for 3.5, 7, and 14 MHz bands).

THE POWER SUPPLY. Built-in. AC operated, and regulated. Monitors current demand, shuts down automatically when necessary for protection. Lighted input current meter shows proper Drive setting.

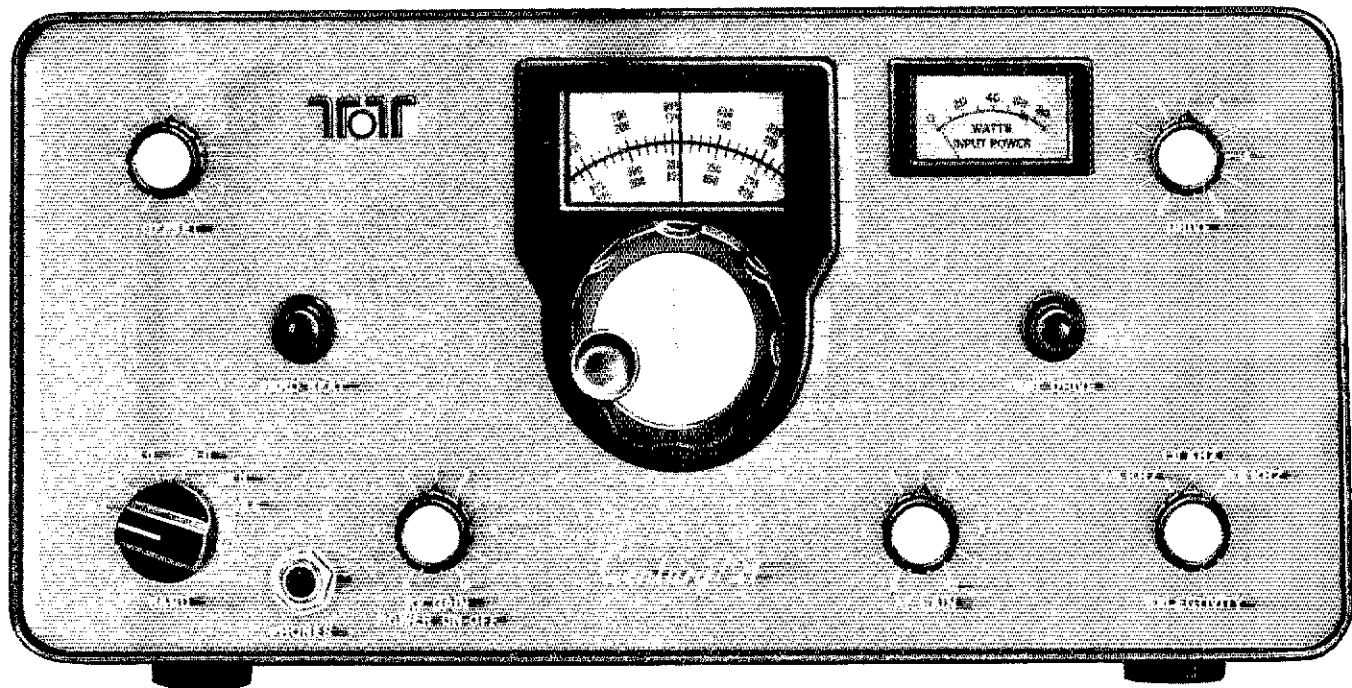
MATCHING ACCESSORIES. Model 670 Electronic Keyer, 6-50 wpm, self-completing characters, powered by the Century. Model 276 Calibrator for markers at every 100 and 25 kHz. Model 271 Crystal for 21-21.5 MHz; 272 Crystal for 28-28.5 MHz; 273 Crystal for 28.5-29 MHz.

570 Century 21 Transceiver	\$289
670 Century 21 Keyer	\$ 29
276 Century 21 Calibrator	\$ 29
271, 272, 273 Crystals ea.	\$ 5

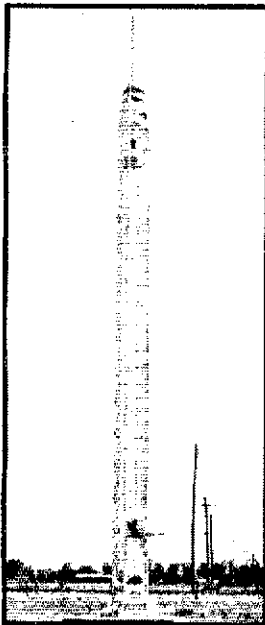
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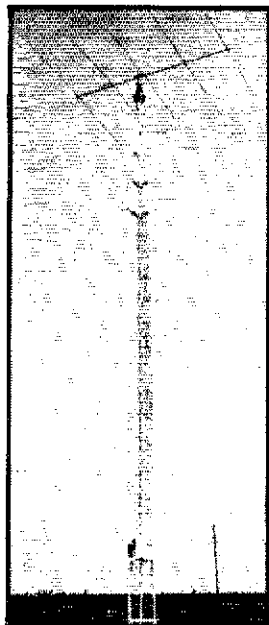
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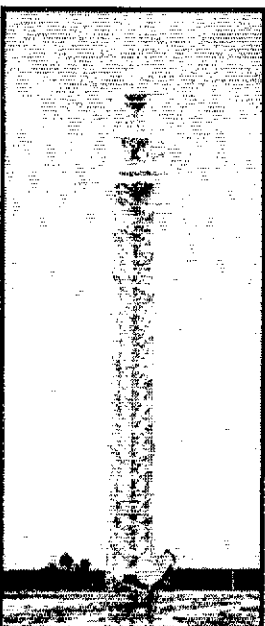
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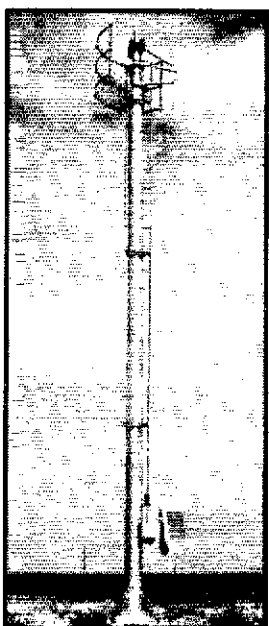
W-51



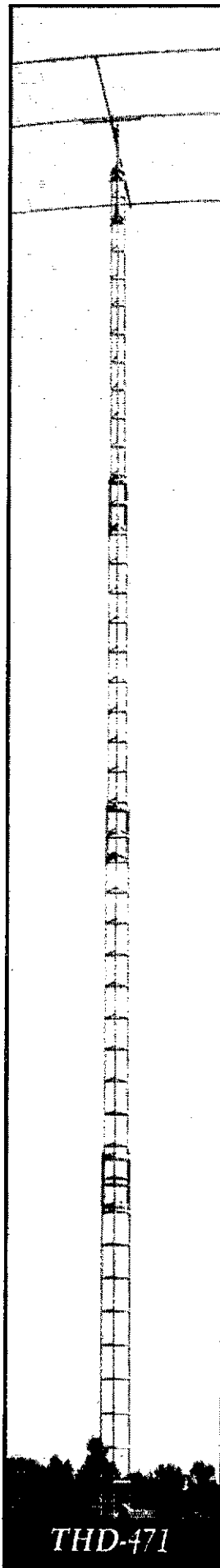
MW-65



LM-470D



TM-370



THD-471

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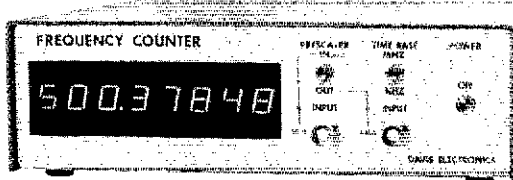


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MISSISSIPPI: SCM, E. Ed Robinson, W5YTN - SEC: WB5FXA. Everyone enjoyed a fine time at the Mid Delta Hamfest. The Cleveland ARC and the Delta AR Assn. had fine prizes. Congrats. New Extra Class: K5RRG now K5MK, WB5MTQ now N5WE, WA5MPQ now K5VJ. Heard on MTN W55RVY K5DMC WB5VFS K5OAF. Welcome new MS amateurs: WD58 CVB CYJ ECF F2B FXN LYP EYK DSV DWD ENK EMP EKK EMQ EMO END DSW DSX EGU EHZ FBB FAZ FBH FBC FDQ FBO FDM FBA FDP FHL FHG FBF EUR ETA ETX FEY EQL FQY EUP ERN ETV FEZ ETY EQJ EUQ EUD ETW EIZ EFX EOP FMR FNK FOD FHO FQB FPF FQR FNM FNV FNY FQG FHP FIC FGS FPK FQJ FLY I MW FCG FHN FOA ENZ FGT FPM FLX FKI FIM FSI FT FTA FXS FXV FWW FTS FTE FYP FTC. DRN5, W5KLV, sess. 31, QTC 342, M5 represented by W5EDT WB5LXX K5VXV W5VKR W5QDC WB55KK, CGCHN, K5OWK, QNI 28R2, QTC 175, M5BN, WB55NB, QNI 1381, QTC 84, MTN, WB5FHA, QNI 194, QTC 81, MSN, N5E, QNI 32, QTC 10, M5-Lou Weather Net, K5VXV, QNI 97, QTC 2, Shannon ARN, W55TZ, QNI 15, Traffic: WB5FHA 116, K5MK 88, W5LSG 46, W55BVY 38, WB55NB 38, W5YTN 37, K5OAF 36, W5WZ 31, N5WE 30, W5RUB 25, W5NRU 18, W5RW 10, K5VXV 10, W5ASK1 9, W5NCB 8, WB5VFS 6, W5LL 2, W44GN1/9 1.

TENNESSEE: SCM, G. D. Keaton, WA4GLS - SEC: WB4DYJ, PAM: WB4PRF, RM: WB4DJU, Net Mgrs: W46RW W46FP WB4YQ K4YF WA4NY WB4ZG WA4WZJ WA4VWJ W4TZG WA4BOC WA4FQA.

Net - Freq.	Time/Days	Sess.	QNI	QTC
TPN - 3.980	1140 M-F	7/9	1467	223
	1245 M-F			
	0130 M-Su			
	1400 SuH			
	0200 M			
TN - 3.635	0000 Dy	no report		
INN - 3.710	2300 M&Th	8	56	35
ETVHFN - 50.4	0200 MWF	13	117	5
ETVHFN - 145.2	0200 TH	8	32	0
MTMN - 28.8	0200 TH	8	44	0
WTVHFN	2330 Dy	32	951	440
149.37 - 146.97				
LWRGN -	0030 W	no report		
147.63 - 147.03				
WMARCN -	0100 MWF	12	89	0
146.07 - 146.67				
TDARCN	0200 W	4	217	0
146.16 - 146.76				

WA4KGR moving to Okinawa, will be operating from there. Net Mgr. cert's sent to WA4CNY K4YFC W4PFP WB4YPO WA4EWW WA4WJ WB4DZG WA4VXW WA4RDC. Certificate of Merit awarded to WA4EJX WA45BU WB4MMU WB41PI WA4HAA WA4D5O WB40IS WA4JD W41VT W44KY5 WA46GR WB4D7Y WA4H W4PFD W4MCC K41QT K41MA for their participation in the South West V. Flood. To WA40GQ WB4APL WA4DKL WB4RRK for their help in the Special Olympics and to K4LTA K4PLN K4TKO W4TYV WB4UUG W4WGW WA4YKN WB4YPO WA4ZBC W44FI W44APL W44CTW W4ERT WB4EOD WB4HDC W44K5O W48XG W49HK W4KID for their assistance in the bromine spill at Rockwood, Glad to welcome WD4KWB and WD4KWC to the ham world. WB48XG reports good activity on six meters. Traffic: K4CNY 251, WA4CNY 224, WB4PRF 135, WA4K5O 141, W40GG 90, WB4752 74, WA4G1 577, WB4BK 67, WA4VX 62, W44K5O 55, WA4KQ 52, WA4YPO 50, W44Y 37, W41ZG 44, W4WGW 35, WB4RRK 33, K4J5F 30, WB4HOI 28, K4XE 26, W4RUW 24, WB4AYM 23, WA4Y5J 21, W44VW 20, W44WHQ 13, K4XU 12, W4CYL 10, K4FK 7, W4WHE 5, W4PSN 5, W48GH 4, W44WX 4, W4SGI 4, W4VJW 3, N4RG 2.

GREAT LAKES DIVISION

KENTUCKY: SCM, Ted Huddle, W4CID - SEC: WB4ZML.

Net	QNI	QTC	Net	QNI	QTC
KRN	348	28	KYN	174	77
MKPN	657	70	KSN	369	31
KTN	965	115	KNTN	59	133
KPON	924	6	GADEC	83	13

W4YOK and XYL operated from 8P6L-Land while on vacation, 300 contacts made as 8P6LQ & 8P6LR. WB45IJ now has his Extra Class while WB4ZKC has his Advanced. An early announcement for the SFT7 section meeting to be held in Louisville the third weekend in Jan. Traffic: W4BAZ 76, N4GD 79, W4AVV 67, W4CID 77, W4BWSM 42, W4RHZ 35, W4ANPD 35, W44IGS 32, W44CQH 31, K4HRF 30, W44AGH 26, K4UMN 20, W4AUN 17, W44FA 13, WB4EAK 12, W4CDA 12, W43YPQ 3, W4YOK 2.

MICHIGAN: SCM, A. L. Harker, WRTZZ - Asst. SCM: W8MPD, SEC: W8EFK, RM: W8JYA W88NCB.

PAMS: K8LNE W8SOP, VHF PAM: W8WVV.
Net - Freq. Time/Days QNI QTC Sess.
MACS - 3953 1600 Dy 1040 485 35
QMN - 3663 2300/0200 Dy 548 222 59
W5BN - 3935 0001 Dy 432 20 31
33-1N - 3930 0130 Dy 458 97 31
UPEN - 3922 2230 Dy 628 88 34
VHF PAM Rpt. 437 4 21

As I am writing this in Sept. I have tried to outguess the various net managers concerning time schedules. Please check your net in the above tabulation and notify the net mgr. (not me) if any of the winter line Net's have not been awarded for W88MPD W88YDZ and W88UJ. Received report from LND of Lakes ARC for the first time. Tnx. W8VRF now filing GLEIN reports as new secy. Election results Chippewa Hills ARC: W88LZM, pres.; W881UJ, vice-pres.; W881UJ, secy.; W881UJ, treas. K8ZJU & W88YI will transfer but at 1000 hrs. Winter line licenses. Notices: W888 MFJ MOH LNW LUU LUV LUX LUW. Techs: W881AD W881AE. Extra W88CJU. Congratulations, Who's Who Dept.: W82ROT now W88NLN, W88UJ now W88UR. K8JHA or maybe it was W88YV is now W88X, (which is it Les?), W88H5, will be back on 160 this season with his old 100 and at 190-ft. long wire "old?" Regretfully I report W88CEW K8YWO W88AB W81HZ W88AWL W88UJ are Silent Keys. Traffic: W88DKQ 899, W88VPW 189, W88YDZ 148, K8LNE 145, W88OP 119, K8DD 99, W7KQU/8 87, W88DH 86, W88NH 81, W88RN 68, K8DYI 47, W88JX 45, W880JE 42, W88TZ 32, W88PD 35, W8YIG 32, W88VDS 29, W88DS 29, W88ETB 27, K8ZJU 22, K8CN 25, W88JN 24, W885YA 22, W88HX 21, K8DTG 19, W88LU 17, W88UC 16, W885W 16, W88FXR 14, W88ZL 15, W88HL 14.

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State _____ Zip _____ Please send information on _____

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- **ACCESSORY SOCKET:** Fully wired for touch tone, phone patch, and other accessories. Internal switch connects receiver output speaker when connector is not in use.
- **MULTI-PURPOSE METER:** Discriminator Meter, Provides "S" reading on receive and power out on transmit.
- **RECEIVE:** Better than .25uv sensitivity, 15 pole filter as well as monolithic crystal filter and automatic tuned LC circuits provide superior skirt selectivity.
- **HIGH LOW POWER OUTPUT:** 15 watts and 1 watt-switch selected-low power may be adjusted anywhere between 1 and 15 watts-fully protected-short or open SWR.
- **OTHER FEATURES:** Dynamic microphone-mobile mount-external 5 pin accessory jack-speaker jack- and much, much more-size 2½ x 7 x 7½. All cords, plugs, fuses, microphone hanger, etc. included. Weight 5 lbs.

Manufactured by one of the world's most distinguished Avionics manufacturers, Kyokuto Denshi Kaisha, Ltd.
First in the world with an all solid state 2 meter FM transceiver.

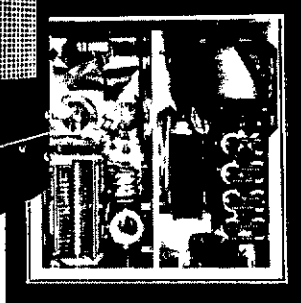
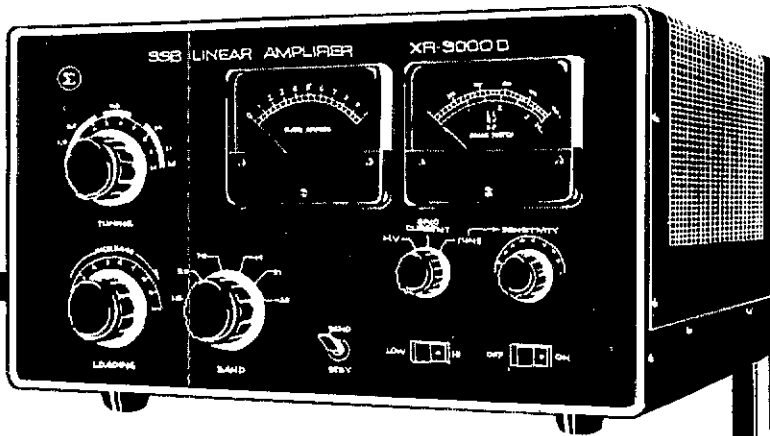


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8817 S.W. 129th Terrace, Miami, Florida 33176
Telephone (305) 233-3631 • Telex: 51-5628
U.S. DISTRIBUTOR

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The New Sigma XR3000D Linear Amplifier Compare!



Introductory price

\$789

2 Day Air Shipment
Anywhere in U.S. \$35
Alaska and Hawaii Slightly Higher

Features:

Custom computer grade commercial components, capacitors, and tube sockets manufactured especially for high power use—heavy duty 10Kw silver plated ceramic band switches • Silver plated copper tubing tank coil • Huge 4" easy to read meters—measure plate current, high voltage, grid current, and relative RF output • Continuous duty power supply built in • State of the art zener diode standby and operating bias provides reduced idling current and greater output efficiency • Built in hum free DC heavy duty antenna change-over relays • AC input 110V or 220V AC, 50-60Hz • Tuned input circuits • ALC-rear panel connections for ALC output to exciter and for relay control • Double internal shielding of all RF enclosures • Heavy duty chassis and cabinet construction and much, much more.

- Full band coverage 160-10 meters including mars.
- 2000 watts P.E.P. SSB input. 1000 watts input continuous duty, CW, RTTY & SSTV.
- Two Eimac 3-500Z conservatively rated finals.
- All major HV and other circuit components mounted on single G-10 glass plug in board. Have a service problem? (Very unlikely) Just unplug board and send to us.
- Heavy duty commercial grade quality and construction second to no other unit at any price!
- Weight: 90 lbs. Size: 9½" (h) x 16" (w) x 15¾" (d).

HOLIDAY INTRODUCTORY SPECIAL!

New! Sigma Model AF250L Deviation/Modulation Meter



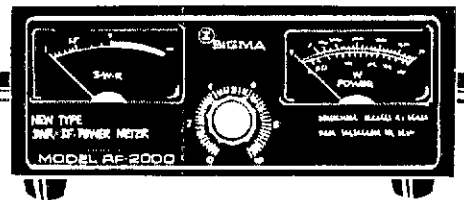
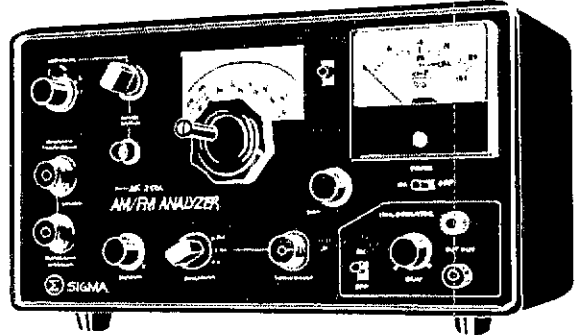
Introductory Price
\$169

Features:

Extremely stable local oscillator for easy measurement of HF, VHF, and UHF bands employing negative feedback, to insure extremely high stability • Easy to read, accurate linear scale • Direct off the air signal measurement capability.

Specifications:

Frequency: 1.8MHz-520MHz/3 range select (A, B, C, EXT), A range: 26.5 MHz-40MHz, B range: 48MHz-60MHz, C range: 140MHz-156MHz, EXT. range: 1.8MHz-520MHz (Need Signal Generator) • Generous overranges • Input level: (1) Through type input level: 1W-200W (RF Input Terminal), (2) Direct input level: More than 80db/50ohm impedance • Amplitude modulation degree: 0-100% • Frequency deviation: 0-20KHz • Accuracy: +/-3% of full scale • Intermediate frequency: 10.7MHz • Local input frequency (EXT Range) • Measuring frequency +/-10.7MHz • RF Attenuator: 0-60db variable • Audio signal oscillator: (1) Audio Frequency—1,000Hz (1 KHz), (2) Output level—More than 1V RMS • Power Source: AC117V • Dimensions: H-5½" (140mm), W-10¼" (260mm), D-7¼" (184mm) • Weight: 7 lbs.



\$29

Introductory Price

Sigma RF-2000 SWR & Power Meter

NEW CDE HAM III ROTATORS—
Reg. \$159.95—\$125

Cal PWR Scales 200W-2000W Freq Range 3.5-150 MHz Please do not confuse the RF2000 with similar appearing lower priced units. RF2000 is an individually calibrated professional quality instrument. Unequaled at many times the price. Size 7" (w) x 2½" (h) x 2¼" (d).

KDK	SPECIAL SALE	MARS	Option Kit—Any Frequency,	
	FM 144 Accessories	CAP*	Any Split	\$12
	FMPS-4R Regulated AC/PS	\$49	FMOF-1	Offset Option Kit—?
	FMTP-1 Touch Tone Pad	\$59		Extra Positions. Crystals Required \$10
	FMTP-2 Touch Tone Pad with 10 Number		FMOF-2	± 1 MHz Offset Option Kit
	Programmable Memory	\$99		(No Crystals To Buy)
	FMMS-1 Microphone with Built-in		FMTE-1	Sub Audible Tone (100 Hz-
	Touch Tone Pad	\$58		Adjustable 67 203 Hz)
	FMTD-1 Private Call Decoder for use with		FMAT-1	½ Wave Portable Antenna for
	and Programmed by Any Touch			Hotel, Motel or Apartment
Tone Pad	\$75		Extra DC Cord & Plug	
SI-12A Audible Tone Encoder/Decoder	\$65		AC/DC Socket 5 Pin Bin Plug	
FMSC-1 Scanner—Random Any Range	\$99		Owners Manual (extra)	
FMSC-2 Scanner—Programmable 14			Service Manual	
Channels	\$65		Mounting Bracket (extra)	
				\$6 00

**Standard New 2 Meter
FM Transceivers
Model SRC 146A Special Sale**

SRC 146A	\$314
4 Xtrals 34/94 and 94/94	NC
USA 2 Deluxe Base Charger	\$47
PT3644 Leather Case	\$12
A1 19 Ribbon Ant and Whip	\$10
N1-cards	\$30
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NEW!!! Touch Tone pad completely wired and ready to plug in—\$69.00

Our Price **\$289**

**New! Nye Viking
Model MB-11 3,000 Watts**

\$285

Antenna Impedance Matching Network Copper ribbon-wound, silver plated variable inductor. Heavy duty 7000 volt variable output capacitor. 10,000 volt fixed capacitors. Silver plated RF conductors. Large precision, easy-to-read dials 360° readout. Overload protection for SWR meter.

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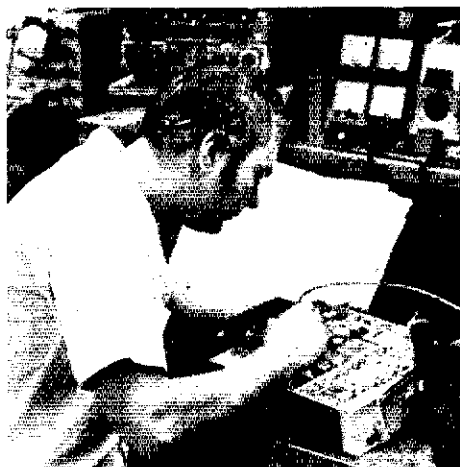
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Career opportunities are opening up fast for the man trained in communications.

The field of communications is bursting out all over. In Citizens Band alone, class "D" licenses grew from 1 to over 2.6 million in 1975, and the FCC projects about 15 million U.S. CB'ers by 1979. That means countless careers in design, installation and



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NRI now offers a special course in CB Servicing. You get 37 lessons, 8 reference texts, your own CB Transceiver, AC power supply and multimeter . . . for hands-on training. Also included are 14 coaching units to make it easy to get your commercial radio telephone FCC license—enabling you to test, install and service communications equipment.



maintenance. Start training now, the NRI way, to get your FCC license and qualify for one of these openings.

Learn on your own 400-channel, digitally-synthesized VHF Transceiver.

The NRI Complete Communications Course teaches you to service and adjust all types of two-way radio equipment (including CB), using the one unit that is best equipped to train you for CB,

Commercial, and Amateur communications: a digitally-synthesized 400-channel VHF transceiver and AC power supply. This 2-meter transceiver gives you "Power-On" training. Then we help you get your FCC Amateur License with special instructions so you can go on the air.

The complete program includes 48 lessons, 9 special reference texts, and 10 training kits. Also included are: your own electronics Discovery Lab, a new Antenna Applications Lab, an Optical Transmission System, CMOS Digital Frequency Counter, and TVOM. The course covers AM and FM Transmission Systems; Radar Principles; Marine, Aircraft, and Digital Electronics; and Mobile Communications. You must earn your first class radio telephone FCC license or you get your money back.



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COUNT 'EM!

Count 'em — now Spectronics offers five digital frequency displays for use on most popular amateur rigs. It's the end of embarrassing off-frequency situations, and the beginning of direct digital readout of actual transmit and receive frequencies. Spectronics readouts are economically priced for every amateur's budget.

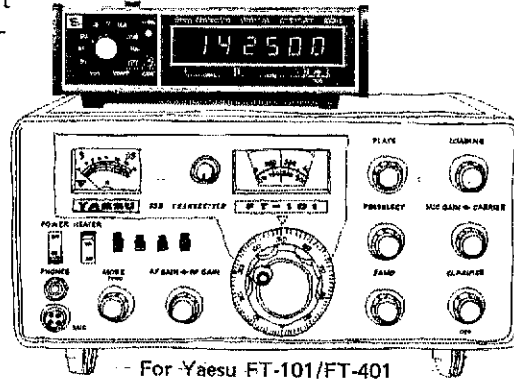
From turn-on, Spectronics crystal controlled readouts give you better than 100 Hz accuracy. From a cold start, they let you check a rig's VFO warm-up irregularity, as well as drift and linearity. The bright

easily read display can be seen even from across a room. Just plug the unit into 117 VAC and connect the cable (supplied) to the VFO receptacle on

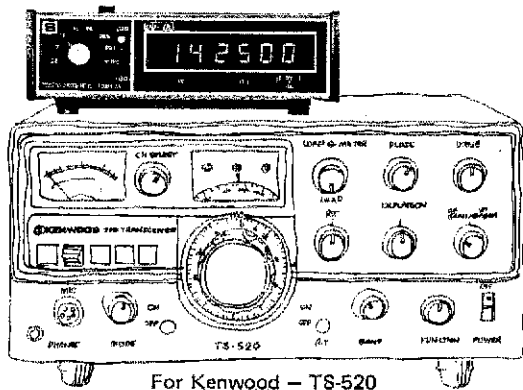
your transceiver or receiver. It's a totally hassle-free hook-up.

In addition to these great displays, Spectronics offers a high-quality frequency counter for your test bench. Model SC-30 covers 5 Hz to 30 MHz; the SC-250 from 5 Hz to 250 MHz.

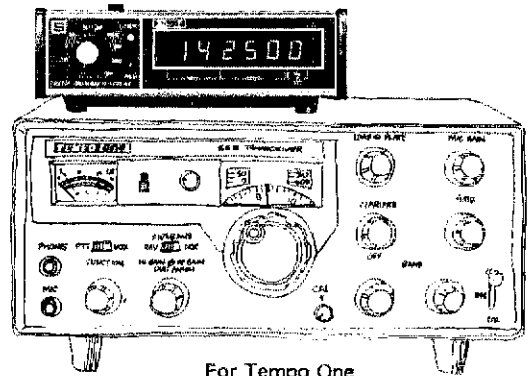
Until now, direct digital frequency read-out was incredibly expensive. But no more. So order the Spectronics unit that's right for your rig now. The Prices? Incredibly right. No matter how you count 'em.



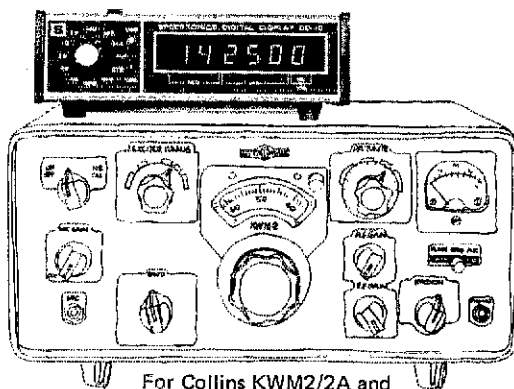
— For Yaesu FT-101/FT-401
— Order Model DD-1—\$169.95



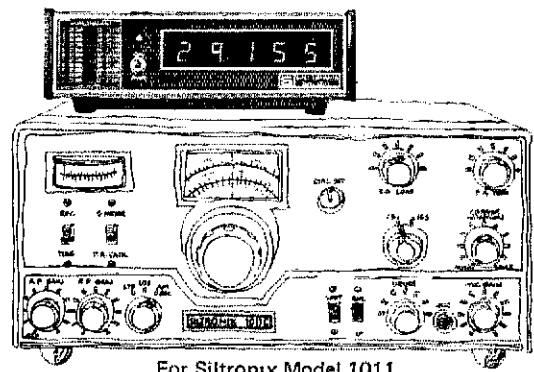
For Kenwood — TS-520
— Order Model DD-1-K—\$169.95



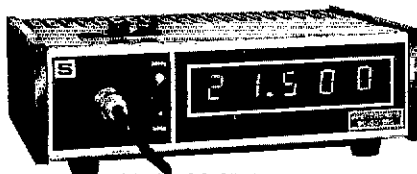
For Tempo One
— Order Model DD-1T—\$169.95



For Collins KWM2/2A and
75S series—Order Model DD-1C—\$169.95



For Siltronix Model 1011
— Order Model DD-10/11—\$149.95



Model SC-30 Counter
5 Hz—30 MHz—\$169.95
Model SC-250, 5 Hz—250 MHz—\$219.95

SPECTRONICS INC. 1491 East 28th Street, Signal Hill, CA 90806

ENCLOSED IS \$ _____ PLEASE SEND:

- Model DD-1 Model DD-1-K Model DD-1T Model DD-1C
 Model DD 10/11 Model SC-30 Model SC-250
 Detailed data sheet on Model _____

Name _____

Address _____

City _____ State _____ Zip _____

BankAmericard and Master Charge accepted.

California residents add 6% sales tax. Add \$2.00 for shipping and handling within Cont. U.S.

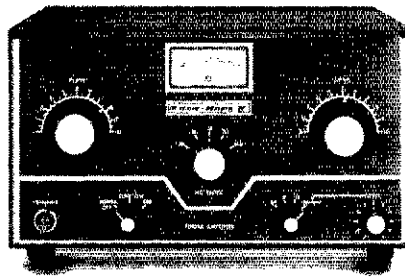
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Everybody likes power and nowhere can you get more of it for \$349.95 than with our Cygnet 1200X linear amplifier.

With 100 watts of driving power you're on the air with a solid 1200 watts PEP input and most people won't be able to tell you from somebody operating full bore.

Linearity on the 1200X is excellent, efficiency is outstanding, 117/230 A.C. power supply is built in, and features like provision for external ALC give you the flexibility you need to get the most out of your rig.



Mark II for power and glory, too. But if you've got your heart set on block-buster power we've also got the right linear amp for you.

It's the Mark II, the proven unit everybody thinks of when you talk about workhorse linear amplifiers.

The Mark II dominates the bands with all the power that's allowed—2000 watts PEP—and a clean, linear signal that's music to your ears.

The Mark II features a separate, matching power supply, big, quiet

blowers for both the RF deck and the power supply, all bands from 10 to 80 meters and all you need to enjoy it is 100 watts driving power.

Get a Swan 1200X or Mark II linear amplifier today and stop letting people shout you down. Use your Swan credit card. Applications at your dealer or write to us.

Cygnet 1200X 1200-watt linear amplifier complete with built in 110/220V power supply \$349.95

Mark II 2000-watt linear amplifier complete with separate 117/230 VAC power supply and two 3-500Z tubes \$849.95
(Prices FOB Oceanside, CA)

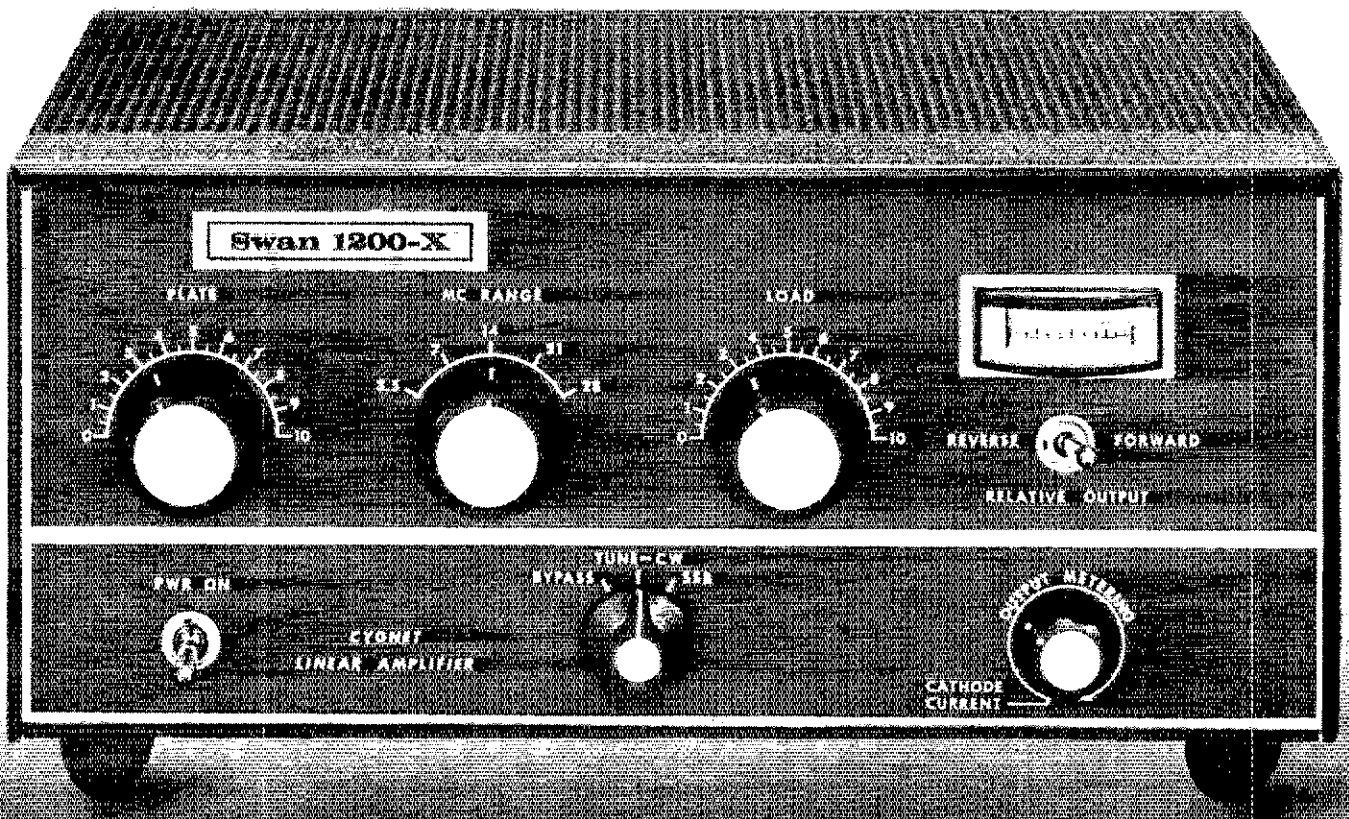
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SWAN 1200X LINEAR AMPLIFIER. TALK LOUD FOR A SONG. \$349.95



This MFJ Super CW Filter . . .

gives you 80 Hz bandwidth, and extremely steep skirts with no ringing for razor sharp selectivity that lets you pull signals out of heavy QRM.



\$29⁹⁵

Can you imagine hearing ONE CW signal on the crowded Novice bands on a Sunday afternoon? That's what 80 Hz bandwidth, extremely steep skirts, and no ringing will do for you.

Simply plug it into your receiver or transmitter to drive phones or connect it between audio stages for full speaker operation.

Bandwidth is selectable: 80, 110, 180 Hz. Response is at least 60 dB down one octave from center frequency for 80 Hz bandwidth. Center frequency is 750 Hz. No impedance matching. No insertion loss.

Drastically reduces noise. Up to 15 dB improvement in S/N ratio.

8 pole active IC filter. Low Q cascaded stages eliminates ringing. Months of operation from 9-volt battery. 2 3/16x3 1/4 inches.

Try it—no obligation. If not delighted, return it within 30 days for a refund (less shipping). This filter is unconditionally guaranteed for one year.

To order, simply call us TOLL-FREE 800-647-8660 and charge the CWF-2BX filter on your BankAmericard or Master Charge or mail us an order with check or money order for \$29.95 plus \$2.00 for shipping and handling or \$19.95 plus \$2.00 for CWF-2PC, wired PC board.

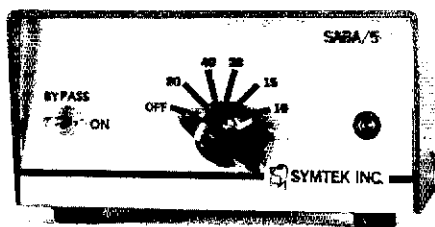
Don't wait any longer to eliminate QRM on all bands. Order today.

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SABA-5 THE SIGNAL INTENSIFIER THAT REALLY WORKS!

- NEW—Lower Prices
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- PLUS—5 Band Models Covering 80, 40, 20, 15 and 10 Meters without Tuning



Virtually any Amateur receiving station can be enhanced by the SABA/5 Pre-Amplifier which will provide a minimum of 20 DB of ultra-low noise, useful gain over an entire amateur band. Models are available with R-F activated or externally gated TR relays for direct application to transceivers. Other features include:

- Solid State MOS-FET Circuitry
- Broadband with adequate MARS Overlap (May be tuned for 6 and 12MHz)
- Allows reduced RF Gain on receiver for improved modulation
- Battery or External Power Operation
- High Quality Communications Designed Circuit Board
- Attractive Black textured and brushed aluminum case
- Minutes to install on Receivers or Transceivers

For More Information and Prices, Contact:

SYMTEK INC.

4805 N. HESPERIDES, TAMPA, FLA. 33614, U.S.A.
813 - 879-8467

everybody changing calls and new blocks being issued and since my old ship was scrapped, I wonder if I can get NBFE if I ever get my Extra Class? Traffic: (Aug. WB2IDP 580, WA2GCO 272, WA2BHI 222, WA2HTT 13, WB2HIG 35, WB2LZN 28, N2LI 17, K2UB 13, K2CRT 9, K2JFE 9, W2NN 8, WA2YEI 7. (July) N2LI 164, K2XJ 93, WB2JY 14, WA2YEI 9. (June) K2XJ 40, WB2JY 27.

NORTHERN NEW JERSEY: SCM, Robert Neukomm

Net - Freq.	Time(PM)/Days	Ses4	QNI	QSI
Manager				
NJN - 3695	7:00 Dy		31 349	128
W2ZEP				
NJN - 3695	10:00 Dy		31 177	43
W2ZEP				
NJSN - 3730	8:15 Dy			
N2MW				
NJPN - 3950	6:00 Dy		31 518	217
W2QC				
NJPN - 3950	9:00 A Su		31 51	
W2QC				
NNJ RTTY - 147.51	7:00 Dy			
W2PSU				
PVTN - 145.7	3:00 Dy			
WA2OPY				

SEC: WB2VUF, PAMS: W2QC & WA2OPY (VHF)
RMS: W2ZEL, N2MW & W2PJJ New Novices
WA2LEP WB2MWL WB2KGC WA2OZE WA2PZJ &
WA2GEZ, New Advanced tickets: WB2KGV
WB2KGU WA2KGU WB2QLG WA2JUT WA2JUM
WA2JUN WB2JUN WA2JZN WB2JZN WA2KGY
WA2LWB WB2GLB WA2LNL WA2MW, New
Generals: WA2FL WA2SYR, New Techs: WA2JUN
WA2OZF WA2OZK WB2TKX & WB2PPL
New amateur Extras K2YJ WA2ENI WB2ARS and
WB2LVZ. The 550 ARC is sponsoring Novice and
General/Tech theory classes this fall at Pequannock N.J.
High School. WA2MWT received a "CD" certificate
from the Mayor of Ramsey, NJ. WA2BSI now W2JNG
WB2YKS now N2MW, WB2ASD now N2GM
WB2VTT now N2GI, WB2DFO now N2MW
WB2RHK now W2VQ, WB2HJJ now N2OO and
W2LUH now W2UH, N2MW passed the 2nd class
commercial ticket. WB2MAE erroneously reported a
WA2MAE. WA2NLP on 2 mtrs with IC-225, Union
County ETN held 16 sessions in Aug. WA2GEZ
worked Kingman Reef for his 201 DXCC. N2GM and
WB2VUF vacated jobs. WB2VUF and N2MW
WB2FWY obtained WAJS. NJ RACES and NJ Army
MARS will conduct a joint exercise called "operation
spill" on Sun., Oct. 23. N2SU made 10K in the N
QSO Party. Ex-WA2EJZ now K2PF advises receiving
DXCC. WA2EPK advises he passed the Advanced and
also that WA2DMC is now an "Extra" and regret to
report W2NCA an old "RTTYer" and ham for 43
years is now a Silent Key. WA2MVQ visited the 10/77
Repeater Club and The 550 Club giving talks about
traffic handling and the League's award programs.
W2Z7 has been very helpful in making the transition
of the SCM's job and he is to be congratulated for a
job well done. Thanks to WA2VQ and N2MW
visited the League thanks for a nice trip by K1KA
W2PA attending graduate school at the University of
Michigan. WA2PCF advises that Ocean County Emer-
gency Phone Net started Wed. Aug. 24 and meet
every Wed. 3 PM at 28.650 as a training net.
WA2WXM will be at NJU as of Sept. 15. W2SC
attending Cornell. Traffic (Aug.) N2GM 238
WA2AYY 161, WB2CST 140, N2MW 125, W25WV
105, W2ZEP 78, W2PA 75, N2GI 65, K2SE 54
W2VQ 50, WA2MVL 42, N2GJ 38, W2RQ 35, W2SC
21, WA2EPK 20, WA2WXM 19, WA2KFE 17, N2NS
11, W2GC 13, WB2HSB 11, W2CC 9, W2CJ 9
WA2PTF 5, WB2ZNI 4, WB2JUN 3, N2SU 3. (July)
WB2DFO 103, WA2NLP 14, K2AM 18, W2ODV 1
W2KB 1.

MIDWEST DIVISION

IOWA: SCM, Max R. Otto, W2LEF -- Congrats to
Marshalltown Club for hosting another successful IA
75M Picnic, 210 licensed hams in attendance. W0IZK
and W0YLS received the Certificate of Appreciation and
W0VMN was given the Balfony Award. W0DSH
W0LEL K0GIE K0S,GUF K0KAI W0LGG WA0LZC
W0MIY and W0WOL staged a mini Iowa Hamfest at
2nd Mike's. Congrats to W0GQW and W0GQF for
Advanced tickets, and to W0GQW WB0YRN and
WB0TJU for new Generals. W0SR wrapped up 5BWAS
with a KL7 on 10. Lightning knocked out WB0YH
and WB0YRN. K0JGH moved to Ottumwa as a
teacher. N5YX/9 is new QRS/DPS appointee. 7
Tennis tournament on 12 courts around Cedar Rapids
was linked up on 2M via W0ERS W0GON W0TU
W0GGO W0EXN W0PFR W0JJKI W0S1Z WB0SVL
and W0MMT. W0GCFW and W0GDFU of Bucking-
ham are the proud parents of 5 year old W0G0VX
the youngest known amateur. Law officers at Sioux
City given 20 assist with large parade by K0AAF
K0AMS WB0NMI W0GQE WB0QR WB0QNL
WB0SFZ K0TFT WB0TLD WB0VZU WB0WQ
WB0YOW and W0Y0Y. Muscatine welcomes
W0GQC W0DBY W0DBZ and W0GQW who has
new TS-520, K0LXM W0DBZ and W0QYL sporting
new TS-520s. Nets IA 75M, 3970 kHz 000Z, K0RN
Mtr., QNI 129, QTC 143, Ses. 27, K0YD
Mtr., QNI 1529, QTC 143, Ses. 37, Tall Corn, 3560
kHz, 0030/0400Z W0YLS, Mtr.; QNI 396, GTC 130
Ses. 63, Traffic: (Aug.) WA0AUX 456, K0EVH 326
W0SS 190, W0UPX 64, WA0SSU 61, W0LFF 37
WB0NS 19, WB0WXI 19, N5YX/9 13, W0KI 12
WB0AVV 10, W0LW 9. (July) W0IKT 48, W0PYD 7.

KANSAS: SCM, Robert M. Summers, K0BXF -- SEC
W0KL, RM: W0FT, PAMS: W0YH W0BCL, W0AM
says all equip and antenna are now working and he is
again active. W0PB reporting 5 married couples ham
operator to the Hiawatha club. W0QD
still working them all on 2. His QVS report is full of
activity including the SWOT Net operating on 145.150
MHz each Fri. at 20:00 to create more 2-meter
activity as well as handle traffic. Coverage is from 3 to
5 states each night. At this year's hamfest in Con-
cordia the Raymond E. Baker Memorial trophy for
the most outstanding KS Amateur of the Year was
Wilbur Naylor, W0WXY. Clubs should now begin to
select your entry for the event next Aug. Net report:
Aug. GKS: QNI 440, QTC 171, KWN: QNI 649, QTC
294, GKS-SS: QNI 76, QTC 24, KSBN: QNI 171
QTC 1020, KPN: QNI 47, QTC 47 and C5TIN: QNI
984. USOC may have a party for the
very fine job he had with the KS phone nets during his
tenure as PAM: We will sure miss his fine support of
the APRL LO staff here in KS. Ken will continue to
publish the Kansas Nets Bulletin though. Traffic:

Where will your radio be
tomorrow morning?



It happens in the best
of neighborhoods!

MEMBERSHIP IN THE LEAGUE IS...

Our newest service - an insurance program available to members only. Get theft, fire, lightning protection for all your equipment (except antennas) now. This program plus annual dues costs about half as much as a typical rider covering one synthesized mobile unit. Details in your mailbox soon!

Outgoing DX QSL Bureau - the inexpensive way to QSL.

FREE:

- ARRL awards to members only
- Technical Assistance...tell us your amateur problem

- *New Ham News* subscriptions for newcomers
- Licensing help

Representation before national and international governmental bodies - The League is defending present frequencies and fighting for new ones, fighting for Technician phone privileges on ten, and fighting for new laws that will attack RFI at its source.

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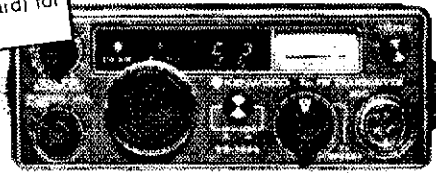
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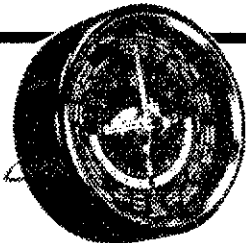
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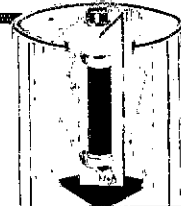
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MISSOURI: SCM, L. G. Wilson, K0RWL — Asst. SCM, Joe Flowers, W0GTF, SEC, W0BFKY. The Ozark ARC will set up an Amateur Radio Display booth at the CB Coffee Break in Aurora on Oct. 1st. The Zero Beaters Hamfest held Aug. 7th in Washington was as usual a success. W0PBA and W0BMA have retired from TWA with numerous years of service. The PHD club reports the passing of W0GHCQ to the ranks of Silent Keys. Our deepest sympathy to family and friends.

Net	QNI	QTC	Net	QNI	QTC
MSN	84	33	HBN	284	37
MOSSHN	917	351	SCEN	86	56
MON	165	106	NEMOE	36	
MON2	120	38	PHD	29	8

PHD 23 6 (July)
Congrats to the following Novices: KNGVMZ, W0qs DIE DKY DK2 DLL thru DLU through DLW, DMR DDA DOV thru DOX, DPJ thru DPL, DQR DRI DRP DRU DSH DSI DSS DTE DTJ DTL DTR DUM DJN DVD DVG thru DVI, DWD DXG DXK DYZ DZY DZC DZU DEG, DZI thru DZK, DZP DZV DZD EAD EAE EAG thru EAJ, EADQ, EAS thru EAU, EAW EAZ EBC EBL EBU ERV EGA ECC EGD EGG ECL EDR EDX, EET thru EEV, EFG EFH EFJ EFP EFU EFY EGA EGB EGH EGM LGP. Congratulations to W0YBM W0YBW and W0GEEV on Tech. Congrats to W0YQG W0ZNY and W0G0CZ. W0G0QD is now sporting a new call, K0SI. A special congratulations to W0SVXW, an ex-CB'er who has gone from no license to extra class in ten months! In closing, this reminder. Interested members are urged to apply for ARRL membership appointments. Traffic: (Aug.) W0N0B 459, K0ONK 191, W0GTF 166, W0G0VHN 137, W0BSSE 116, W0B33 70, W0BLY 30, K0SSN 64, K0C0UD 38, W0G0D 38, W0B0L 38, W0G0UD 34, N0GW 30, W0EPI 27, K0BBM 26, W0WUD 23, W0LVCV 22, W0PFK 19, W0QAU 15, W0BVI 11, W0BGI 11, W0MFO 8, K0RWL 2, (July) N0GW 10, K0AHL 4.

NEBRASKA: SCM, Claire R. Dyas, W0JCP — Jerry Hall of League Hqtrs. spoke at the monthly meeting of the Lincoln ARC and the AK-SAR-BEN ARC. The Lincoln ARC provided communications for the recent Nat'l Junior Olympia meet. Blue Valley ARC had display at the West Side State Fair. Lincoln ARC preparing display for the State fair. Annual NEC. QCWA meet will be held in Kearney on Dec. 10. W0H0NW home on leave from Saipan Island. Net reports: QCWA QNI 44; Nebr Morn Phone Net, QNI 1167, QTC 50; Nebr Cornhusker Net, QNI 1283, QTC 18; Nebr. Inform Net, QNI 1072, QTC 72; Western Neb. Net, QNI 44; QTC 30; ARRL Net, QNI 149; Traffic: W0FQB 159, W0VEA 81, W0B0VR 76, W0SGA 49, W0GKK 44, W0EUT 39, W0HTA 38, W0ACBJ 31, W0JCP 25, W0HOP 23, W0J0J 20, K0SFA 20, W0B0NF 18, K0BRS 15, K0FJT 14, W0G0CC 13, W0VYX 11, W0ADJH 9, W0B0YV 9, W0ALU 8, W0B0L 8, W0F0EX 8, W0G0EX 8, K0HNT 6, W0G0MQ 4, W0WKP 4, W0J0J 3, W0BLY 3, K0FRU 2, K0RRL 2, W0NHS 1, W0NJK 1, W0RJA 1.

NEW ENGLAND DIVISION

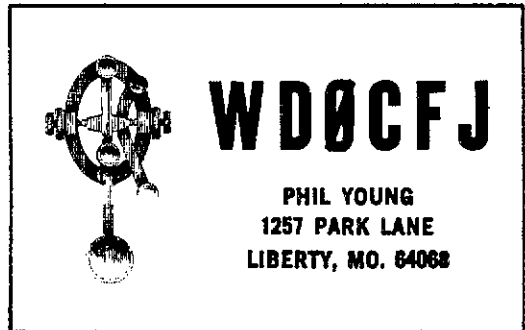
CONNECTICUT: SCM, John McNassar, W1GVT — SEC, W1XX, RM, K1EIR, PAM, K1EIC, VHF PAM: WA1ELA

Net	Freq.	Time/Days	Sess.	QNI	QTC
CN	3640	1900/2200 Dy	62	284	349
CPN	3965	1000 Su	31	124	191
		1800 M-5			

VHF-2 — 28/88 2130 Dy
High QNI: CPN — W1NGO and W1HMJ. CN — W1KY and K1GF. SEC, W1XX reminds EC the new ARRL "Amateur Radio Emergency Service" Shoulder Patches are available at nominal cost — they will provide recognition during Public Service operations — hope you get one. Director W1HR is most interested in your Club Events during the coming year, please keep him informed. The ARRL's QSO Log, which will be available at ARRL, includes latest Public Service Information, circulate at club meetings! Candlewood ARA (Danbury) hopes to hold the Conn. QSO Party Dec. 3 & 4 this year. Their participation in a new film "CQ Ham Radio" will be shown on TV and used in teaching Novice Classes. Manchester RC will propose it revised in accordance to the Zoning Code, which will correct a situation that is unfair to amateurs. Meriden ARC and Wallingford ARS held Joint Picnic which was a huge success. Southington ARA continued meetings during summer months. Shoreline ARC had WA1STO from ARRL as speaker at meeting. Tri-City ARC is continuing amateur radio classes. W1E0I returned from hospital and keeping tight traffic schedule. W1WEE building 160-meter rig. K1DFS building transmatch. W1FD solved his rotor problem. Congratulations to: WA1ZNT WA1TRY WA1VHR and WA1VTV for Advanced Class; WA1ZBS WB1A1H and WB1AOE for General Class; and W1TR for Aug. BP1.1. Happy Thanksgiving to all Traffic: W1AURA 393, W1EFW 314, K1GF 286, W1TR 249, WA1VGP 192, K1XA 98, K1DFS 63, W1EH 42, W1BDN 33, W1AW 32, W1GVT 31, W1KV 20, W1QV 8, W1CUH 6, K1OQG 4, W1BDI 3, WA1PRJ 3, (July) W1EFW 366, K1GF 195. (June) W1EFW 242, W1QV 10.

EASTERN MASSACHUSETTS: SCM, Frank Baker, WA1LP — Asst. SCM: WA1QW. SEC: WA1AG received reports from: W1S BK BAR RHD; K1NFV WA1RTR WA1ZLO WB1AMG. New calls: K1MC ex-WA1PWX, K1FHP, ex-WA1LTV, K1LUN, ex-WA1HBR, WA1QKD now K1KG, K1ES ex-WA1VQR, N1AS ex-WA1CRI, W1ZG ex-W1ZGC, W1JH ex-WA1USZ. W1QHP has his old call back and on 2 FM. W1EXF new YL in Whitman. W1IG a Silent Key. K1QOQ now W6THG. W8PEY in Santa Barbara, CA. W1SM/AKY retired. EMRI had 327 QTC. 424 QNI. NECP had 69 QNI, 19 QTC. W1BK has a Rohn 25G up 80-ft., four-element Monoband on top for 20. K1ES an ORS and Asst. Mgr. of EMRI. WA1UWF worked AK for WAS. W1DMS helped out in Marshfield parade, had a visit by XE3LK. W1EMG in camp in NH. W1HL busy selling house, building new one. New officers of Sharon ARA: W1SWH pres.; W1S2Y vice-pres.; WA1PG, Treas.; WA1ZHJ, sec. Chelmsford ARA & Billerica ARC holding Novice classes. Sharon ARA had an auction. New officers of SSRA: WA1PNG, pres.; WA1YMD, vice-pres.; K1WGU,

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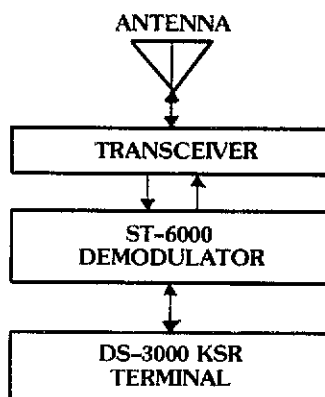


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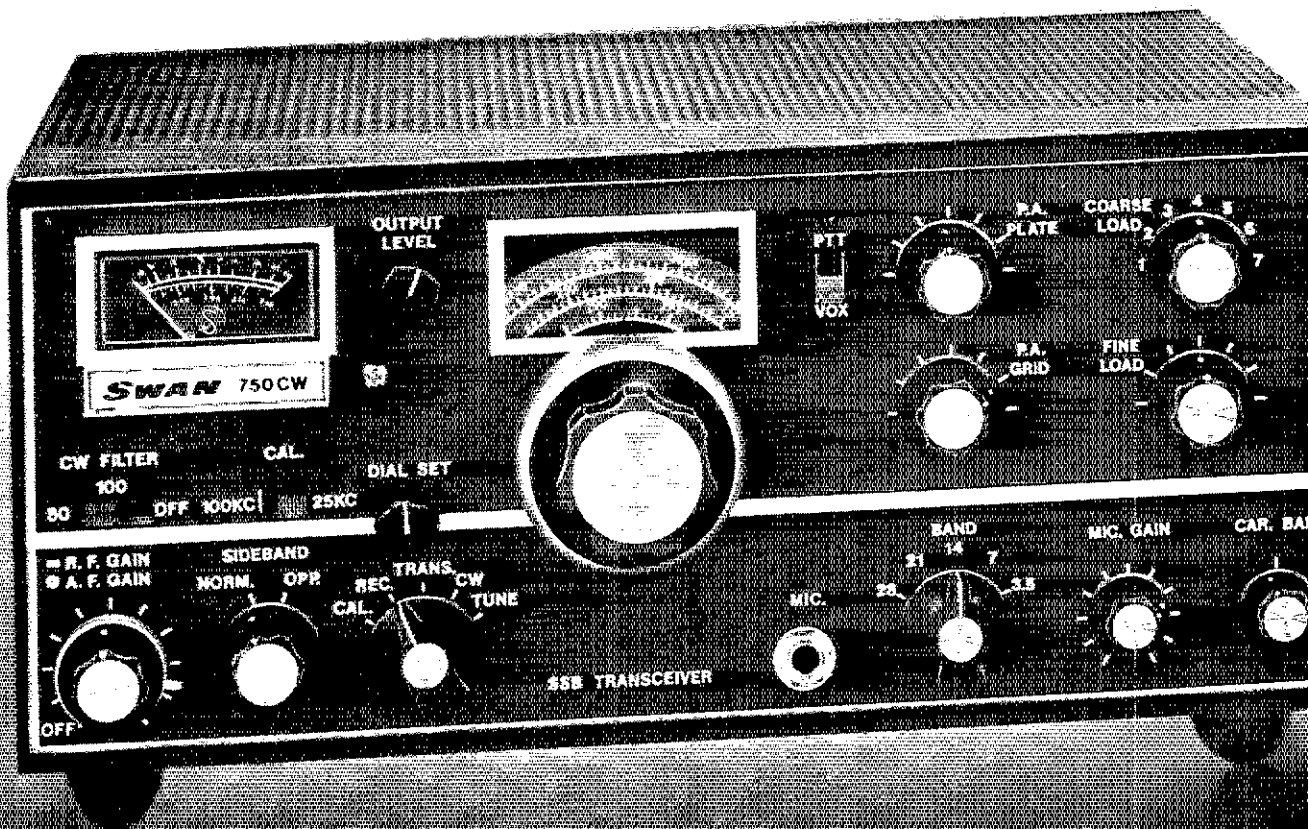
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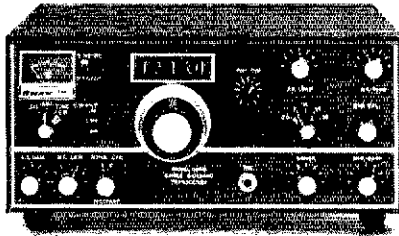
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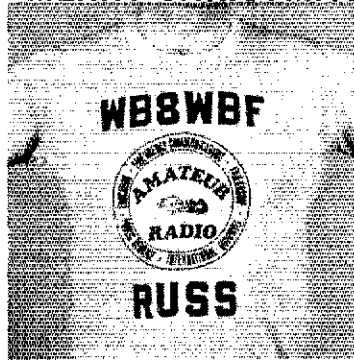
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secy.; K1LOE, treas. K1B50 is ex-WB1AKL. WA1VMG has model 19 on R11Y, now net mgr of HHTN. K1FJ going to college Ohio. W1NF copied Hurricane Anita warning from W3CVE and sent it out on 20 Nov. W3C for Nodham. K1ES going to So. Eastern Mass Univ. W1LID now out in Nogales AZ, and on 20. W1IIM has retired. W1NF helping W1MZ's wife to get her Novice, says that W3OY is in a convalescent home. W1PL is busy again as a consultant. W1K1J helped W1NQM get his call back after 23 years. WA1QAA & WA1QAB have a new contact. W1JY is ex-WA1KJ. K1JTF has his Advance. New Generals: WA1S YGY WFR YNO, WB1AIR. K1DOU has a new baby girl. Algonquin ARA meets on the 4th Wed. at the Marlboro Public Library at 8 PM. Massasoit ARA had a "Mini Auction," many of the gang are out in their boats, and have rigs on board. K1TR is ex-WA1OAM. Officers of Midsex ARC: WA1JY, Pres.; WA1JY, vice-pres.; WA1RVZ, secy.; W1LLO, treas. K1TR going to Univ. of Mich., will be active at W8UM. WA1ZXS in Danvers. WB1DGG has new six-element KLM beam for 10 and working meteors scatter. WA1FNM has been laid up, on air soon. OPS endorsed. NENN had 167 QNTs, 83 QTC. WA1YMD, Asst. mgr. for EMRIPN. WA1UM in Dallas. W1WBAOH in NC. WA1S: WER EDF ANM. WB1BUR have their Generals. WA1SCS home from the Naval Academy and on 2. EM2MN had 162 QNTs, 53 QTC. WB1FEL has his Advance a month after he got his license. K1BA is Asst. Mgr. 1RN. WA1VEI Asst. Mgr. 1RND. 1R11C: Aug. 1. WA1Z 2 396. WA1Z 3 396. 238. K1B50 187. WA1UWF 149. K1PAD 48. WA1YNO 133. WA1YWK 126. W1F1J 112. WA1EY 104. W1DMS 78. W1EMG 67. W1DMH 40. K1B50 32. WA9NEW 23. WA1PGY 16. WA1YMD 16. WA1IFE 12. K1BZD 10. K1TR 6. W1PEX 4. K1LWI 4. W1NF 2. (July) W1HL 54. WA1PGY 37. WA1VMG 3.

MAINE: SCM, Bill Mann, W1KX - SEC: K1EF. Androscoggin ARC and others communicated for Brunswick NAS Blue Angels show Sept; 2-3. Maine Speed Net began with a Mon.-Wed.-Fri. schedule at 1830 local on 3996 kHz. Mgr. WA2ERT/1. Join us. 1830 local on 3996 kHz. Mgr. WA2ERT/1. Join us. 11 at 1300 local. Thanks to WA1GRA for Abbot Ham Gathering. Annual Ham Band gathering at W1OLQ (Aug. 28) featuring K1GUP K1CXW W1HDC and others. ME Emerg. Comm. Plan nears completion by K1EF. In annual ARRL statistics Maine jumped from 67th to 37th compared to other sections for traffic handled and freq reports to SCM. K1ECC coming. SEC/EC reporting record was Number One out of 74! Oxford Co. RACES/ARES Net Sun. 0915 local on 3996 kHz.

Net - Freq.	Time/Days	Sess. Tfc.	Ck-In.
FTN - 3596	7 PM Dy	31 154	211
SCN - 3940	5 PM M-S	11 7	1049
BYN - 3960	8 AM M-S	27 34	985

Traffic: WA1FCM 169, W1KX 148, W1ERW 108, WA2ERT/1 91, N1RP 78, W1RWG 65, K1MZB 50, K1EF 42, W1HDC 35, K1TZH 21, WA1RXD 13, W1CEV 12, W1CTR 9, WA1NKE 7, WA1JCN 1.

NEW HAMPSHIRE: SCM, Robert C. Mitchell, W1NH/W1SWX - SEC: K1RSC, RM: N1NH. Welcome new hams WB1EUJ WB1EUB WB1ESY WB1EUW WB1EUU WB1ESQ & WB1EXY. The Keene ARS new officers: WA1SOY, pres.; WB2QLL, vice-pres.; WB1BX secy.; WA1Y5M, treas. WB5 W1TN reads bulletins daily. K2UBE made annual visit to Nashua. WA1PEL has his Advance & new 5WAS No. 295. W1BY5 back from FL. W1MRW now WB2CY eyeball with K1BCS at York Beach. Another OO has moved to Hoxford, MA. Good luck W1MK. We're installing all new antenna systems. WA1FSZ continues to be the outstanding club around at the friendly Amateur Radio Tech. Soc. meetings. W1JGR moved to Milwaukie. K1ACL needs only KH6 on 10 for 5WAS. N1JH has a new FT101. W1UN is on 220 with Midland 13-509. K1MFG vacationed in the White Mountains. K1VBL's repeater WR1A1L back on the air. The new antenna is K1L60 feet. C1Ppy. Thanks giving to all. Traffic: K1BES 434, K1AGC 160, W1TN 124, N1NH 112, K1PGV 41, K1NH 34, WA1HOB 6, WA1PEL 2, W1BY5 2.

RHODE ISLAND: SCM, J. Titterington, W1E0F - RM: WA1WCP. PAM: WA1RFT of having very limited time, K1YDA has graciously consented to stay on as SEC until I can find another who has more time. For all those who want to build their code speed and upgrade their license, the East Mass-R1 Slow Speed Net is back on 3715 kHz Mon., Wed., & Fri. at 1815 local time. Check in and have fun. We will all miss W1BTY who became a Silent Key. His was many times RM in RI. would appreciate having a contact person from each organized club to update me on club news. All new Novices are invited to contact your SCM with your questions, that's why I am here. RI-EM 2 Mtr. Tfc. Net sessions 27, QNT 171, Tfc 44, WA1CSO, Mgr. RI Slow Speed Net sessions 1, QNT 31, Tfc 15, WA1POJ, Mgr. Traffic: WA1POJ 146, WA1RFT 27, W1E0F 17.

VERMONT: SCM, Bob Scott, W1RNA - SEC: W1VSA. Repeater ECS: K1LEK WA1UQY and WA1SVC. New manager GMM WA2CF. WA1ZVC and WA1UQY with ARRL League Hqtrs. WA1ONT WA1UQY WA1USM and WA1ZVC put on ham radio display at the Rutland Mall promoting the hobby and creating interest for the amateur instructional classes starting Sept. in Rutland. WB1ABC, Lyndonville, active in NHV CW net. WB2ZCO recently moved to Fairlee. BARRC Hqtrs in Charlotte had over 100 attending. GMM 27:457/59; V1 55B 30/519/85; V1 Fone 4/56/10; VT RFD 4/60/11; Carrier 27/560/25. Some have mentioned shortage of news in this. Why? Lack of input. How about some help from you all? Traffic: K1RQB 131, WB1ABQ 17, W1RNA 9, WB1BZR 7.

WESTERN MASSACHUSETTS: SCM, Percy C. Noble, W1BVR - W1Z1 (ex-WA1TF) returned after 14 months in Germany (as DJ0NH), is on with a Trjton IV. WB1CWH Novice in Apr. and Advanced Class in Aug. PA1E WA1BZ and WB1DGG were operators at the Scout jamboree in Park Hamsburg. W1ZPB moved from Mt. Hermon to Northfield. Received interesting notes from four of our WM members. Pretty good percentage out of total membership of about 7001 WA1DNB for WMEN: 4 sessions, QNT 200 (81 on sbp & 119 from 2-meter training). Hampden Co. EC K1GAC has initiated NCS evening experience on his Co. Net. W1Y 81. W1DMW for W1BZ 31 sessions, traffic 172, 21 different stations. Top 5 in attendance:

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Buy a tube of toothpaste on the basis of outrageous exaggerations as to what it'll do for your social life and it still may clean your teeth.

BUT if you buy a linear amplifier on the basis of toothpaste claims — or ambiguous specifications — you may end up with a real turkey!

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EXAMPLE — Power Output & Efficiency:

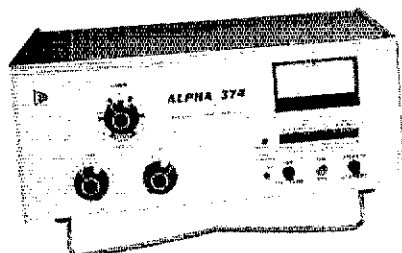
An ALPHA 76 running key-down at one kilowatt DC input delivers well over 600 watts rf output, averaged over the 160 thru 10 meter amateur bands. Another current model "deluxe" linear managed less than 400 watts average output in identical tests using the same instrumentation. You'd never suspect it from reading the manufacturer's claims

and specs — and the deficiency was largely concealed by gross errors in the internal metering circuits!

EXAMPLE — Duty Cycle:

Ratings are sometimes ambiguous and can be misleading. One prominent amplifier manufacturer rates his desk model for full power in "intermittent amateur service." (Just how intermittent he doesn't say.) Another manufacturer hedges his "continuous" rating with time limits for one model, but not for a second model.

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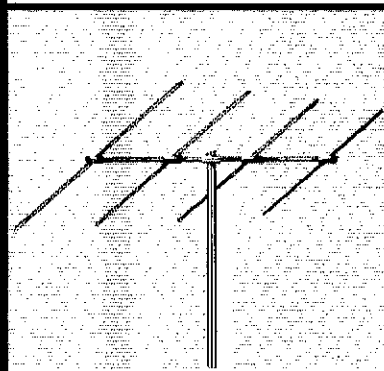
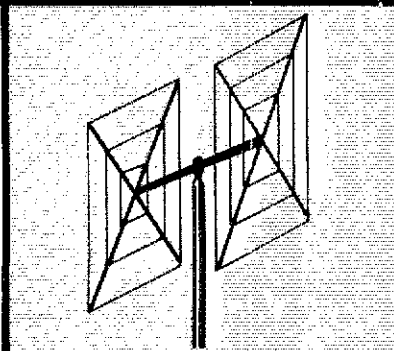
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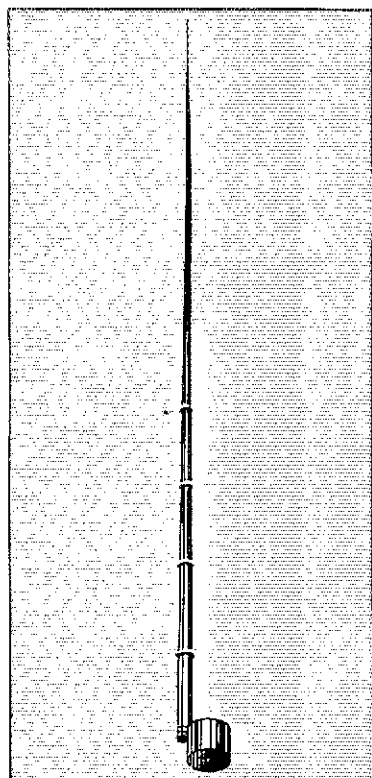
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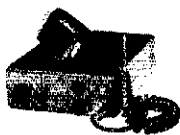
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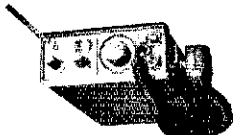
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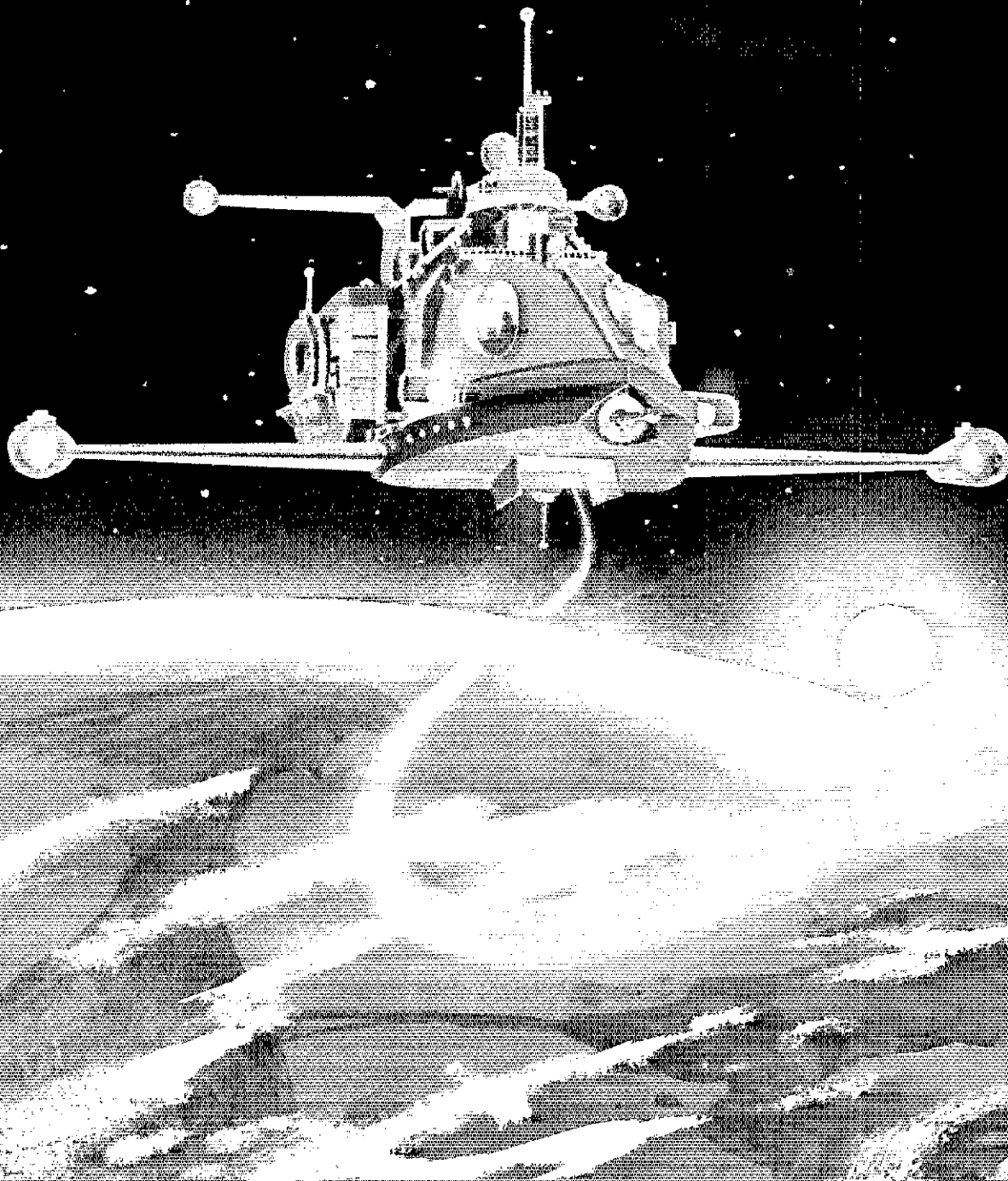
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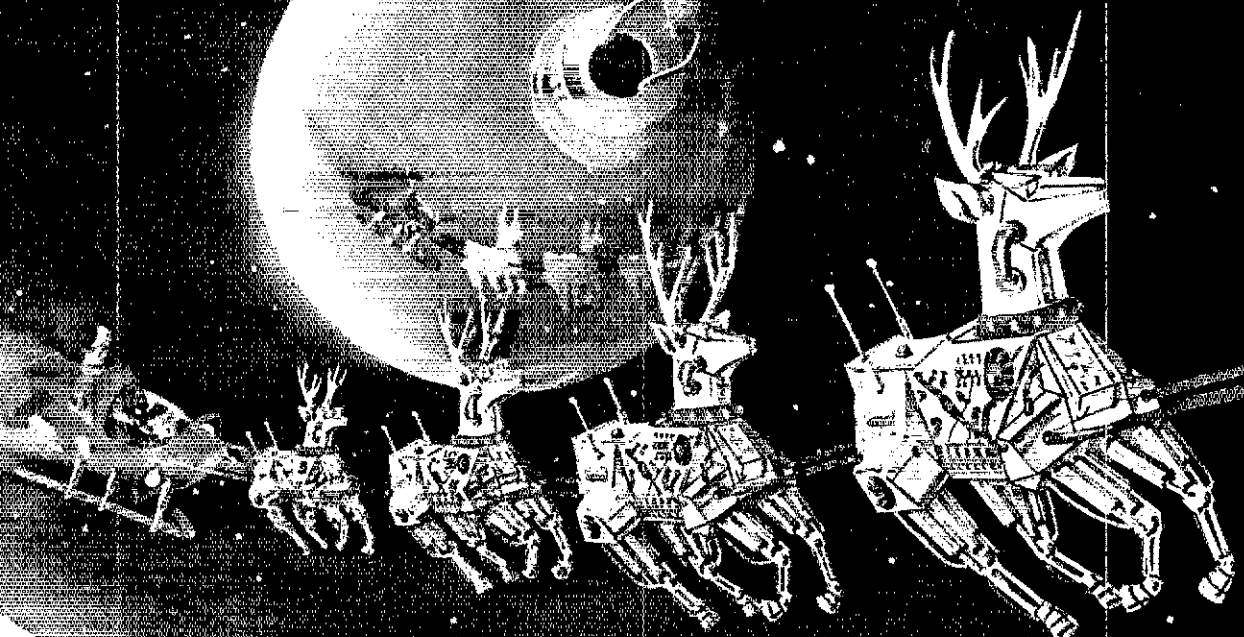
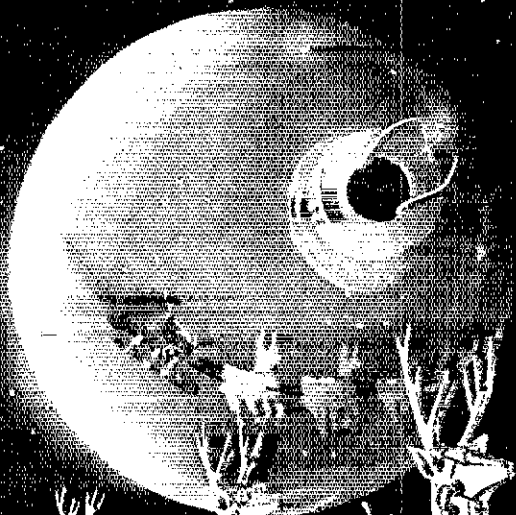
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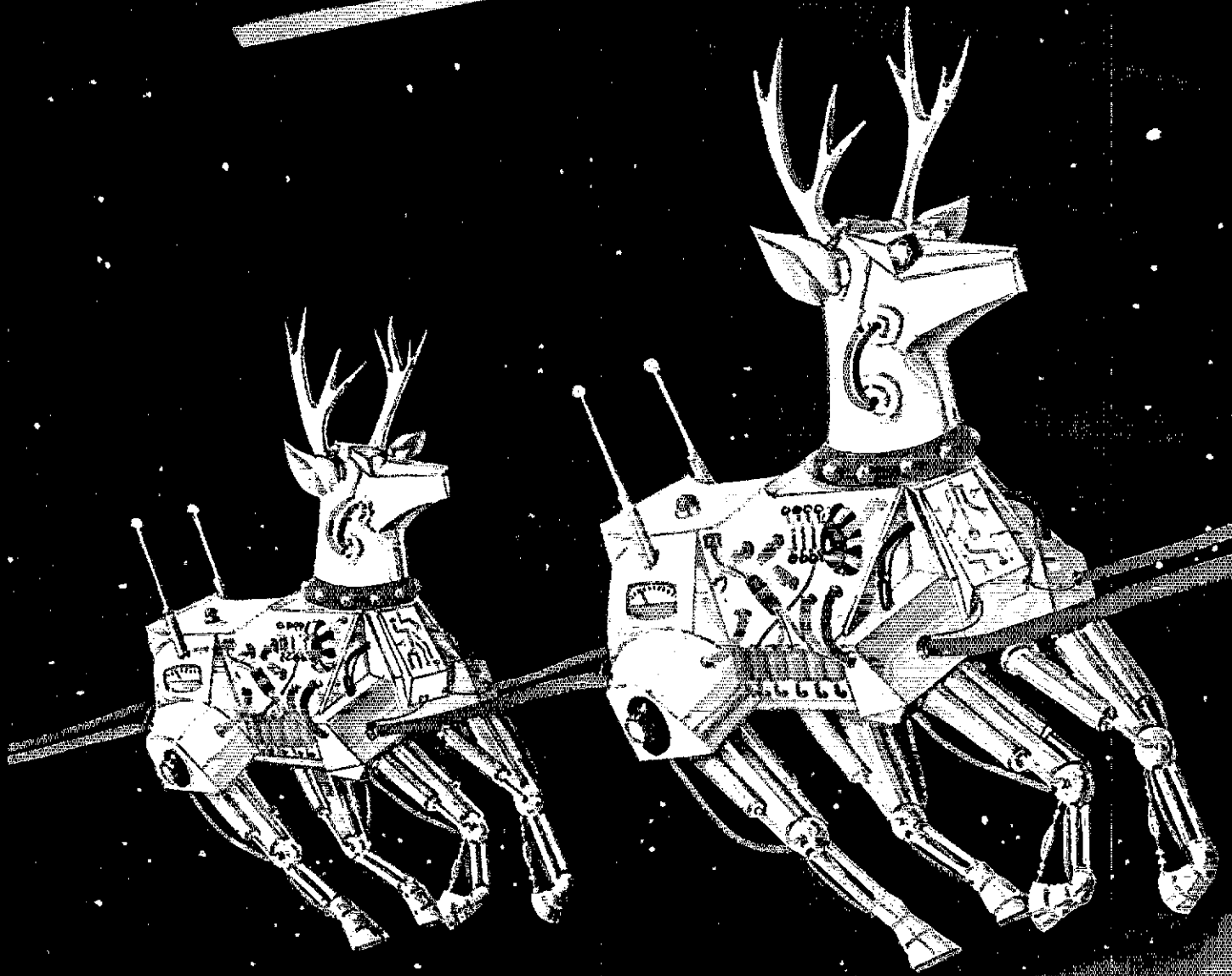
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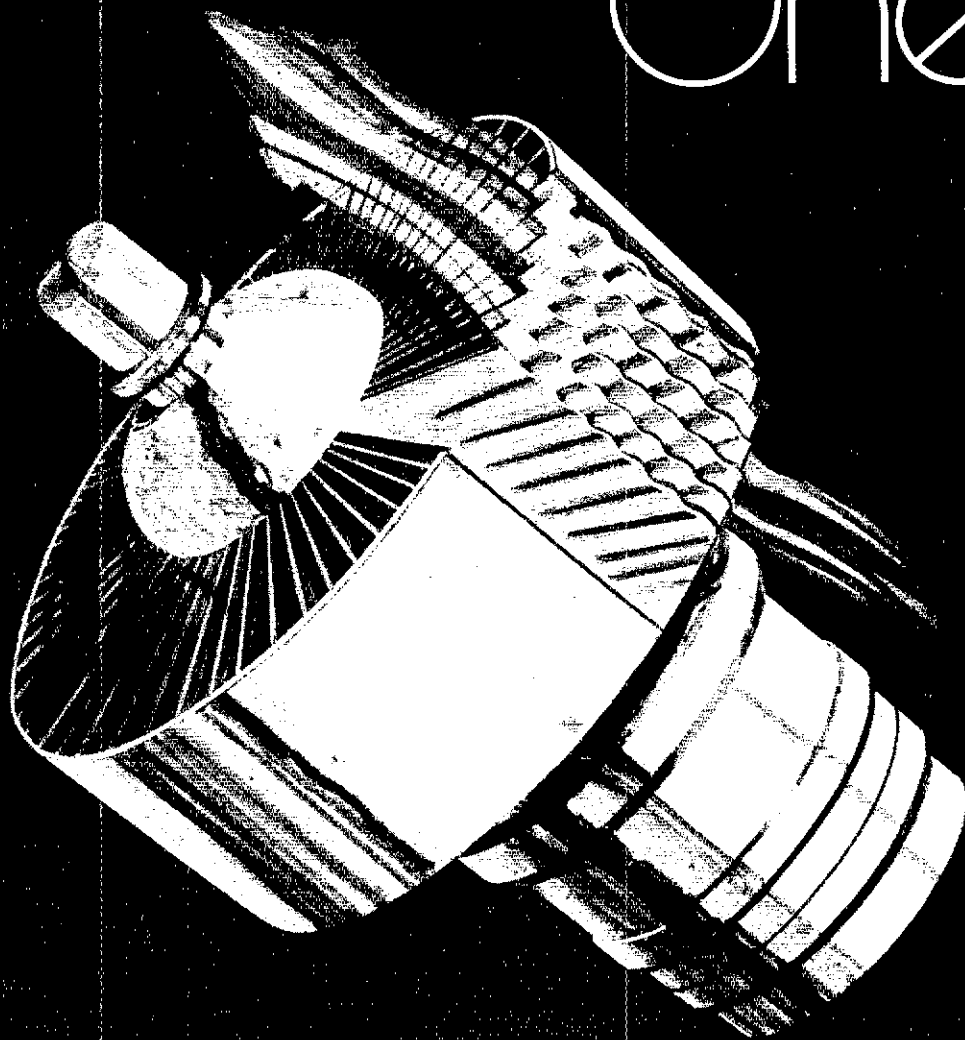


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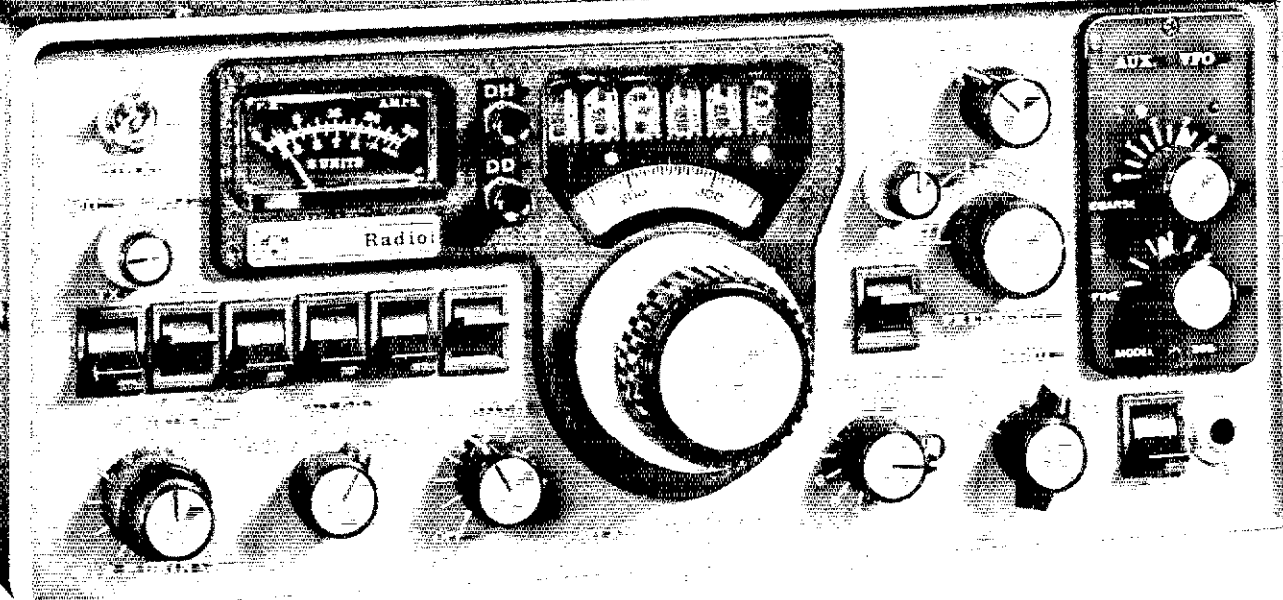
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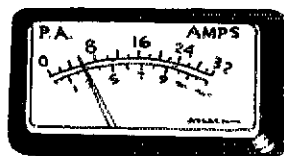


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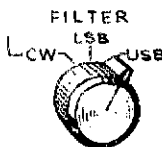
P.E.P. and CW input.

SSB/CW TRANSCEIVER

SSB with PTT or VOX operation and full break-in CW operation.



TUNE/CW

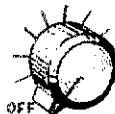


CW-LSB-USB FILTER

Selection of upper or lower side-band with 2700 Hz bandwidth,

1.6 to 1 shape factor, or 500 Hz CW bandwidth with 2.5 to 1 shape factor.

A.F. NOTCH



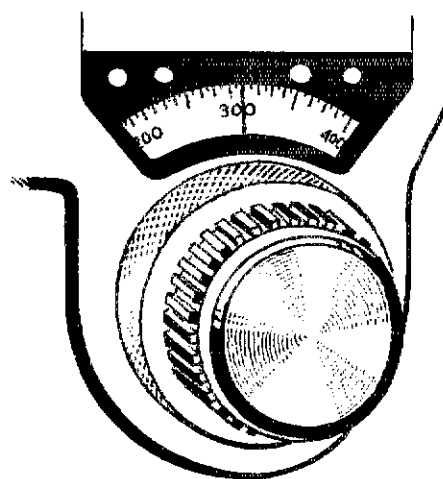
AF NOTCH FILTER

Provides better than 40 dB rejection of an audio frequency, adjustable from 300 to 3000 Hz.



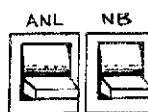
DIGITAL DIAL READOUT (Optional)

Provides precise frequency readout within 50 Hz. All



ANALOG DIAL SCALE

0 to 500 kHz dial scale in 5 kHz increments. Velvet smooth dual speed tuning, with 18 kHz per revolution of fine tuning control.



ANL AND NOISE BLANKER

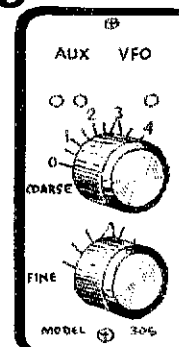
Automatic Noise Limiter reduces hash type noise interference which is not intermittent pulse type.

Blanker effectively reduces or eliminates pulse type noises.



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Permits receiving up to 5 kHz above or below your transmitting frequency. Especially useful for CW operation or in a net of SSB stations that are on dif-

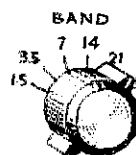


PLUG-IN AUXILIARY VFO (Optional)

Can be either a tunable VFO with the same 500 kHz tuning range as primary VFO or a crystal controlled fixed channel oscillator with choice of up to 12 crystal controlled channels.

10-160 METERS COVERAGE

Provides a full coverage of all amateur bands in 500 kHz segments.



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Up to 10 additional 500 kHz ranges between 2 and 23 MHz can be added by plugging in

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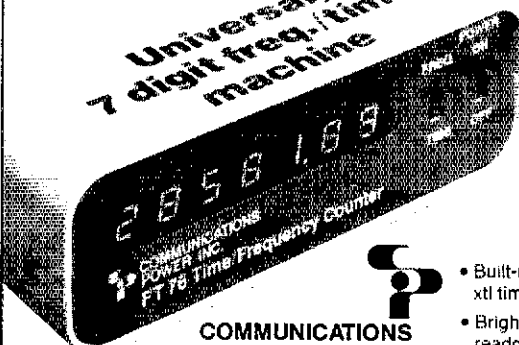
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W1BVR WA1OUZ W1TM W1DVW W1UD. WA1MJE for WMPN. (July) 21 sessions, QNI 229, traffic 42, 51 different stations. (Aug.) 23 sessions, QNI 257, traffic 42, 74 different stations. K1RD, ex-WA1DNG moved to NH. Traffic: (Aug.) W1TM 214, WA1MJE 186, W1UD 174, W1DVW 97, W1KK 97, W1BVR 82, W1ZPB 50, WA1OUZ 44, WA1OPN 20, WA1TYY 18, W1DDY 16, K1RGG 10, W1CWH 5. (July) WA1MJE 302.

NORTHWESTERN DIVISION

ALASKA: SCM, Roy Davie, KL7CUK — The ARES group of the Kenai this month was watching the possible flooding of the Kenai River due to a glacier run off being high. The Alaska Snipers Net on 3920 kHz reported by KL7HOV had a record attendance of 996 ck-ins. KL7IFD and KL7HMH joined ranks and were married, congratulations. The Fairbanks Club provided communications for the annual Equinox in Sept. KL7FKO had a heart attack but is improving, get well soon Al. KL7CAH is also back in the hospital again, we are also looking forward to seeing you out and around soon Sandy. The Anchorage Club has over 100 students signed up for the tall classes. I would like to hear from stations that would like to participate in the Intruder Watch program. It is very important that we back up those in the upcoming up coming WARC. The Matanuska-Susitna Club had a station operable at the State Fair. Considerable material was passed out relative to classes and amateur radio operations. Traffic: KL7CUK 9, KL7HMH 4.

IDAHO: SCM, Dale A. Brock, WA7EWV — SEC: W7JMM, PAM: WA7HOS. RM: N7DH. Net — Freq. Time QNI GTC Manage FARM — 3.935 0200 Dy 922 40 W7CJC RACES — 3.99 1415 M-F 461 36 WA7WX IMN — 3.635 0300 M-F 182 96 W7GHT Pocatello's repeater, W7JAMN, 147.66/147.06 new operating. Pocatello ARC reports 450 people attended the W1MU Hamfest. W7JY in the hospital; here's hoping a speedy recovery. W7JY has received his old call W7ENQ; some DTs may now remember him. WA7UBC reports the Idaho Society of Radio Amateurs, Boise Chapter, realized 31 Novices, 6 Techs, 3 Generals, and 2 Advanced from their classes. Payette reactivated their club, Treasure Valley RA with 30 members. Elected were W7TYG, pres.; W7MHO, vice-pres.; WA7HOS, secy-treas. W7MHO graduated 18 Novices from his spring classes. Traffic: W7GHT 262, W7LLM 64, W7GBO 25.

MONTANA: SCM, Robert Leo, W7LR — The Helena Capital City ARC held their annual picnic Aug. 21st, a good turn out, good weather, and good eats. Also held a VHF meeting there. K7NM moves from Bozeman to Havre. K7MB, ex-WA7BS2, W7GP, ex-K7EVS. More! WA7RHE and others saved a life in a Granite Peak accident via 2 meter. W7LR had a report about yacht in Indonesian tidal waves via Pacific Maritime Mobile Net. The Eaglehead repeater was tested briefly. WB7SWH & WB7TEG new Hardin Novices. WB7STG new Bozeman Novice. WA7ZPG new Miles City ham. W7DB reports lots of travel. IMN in Aug. had QNI 182, GTC 96. WA7PDC reports 6-meter SSB activity near Kalispell. WR7AAB back on. Big Arm picnic big success. Traffic: W7XD 28, W7NEG 20, K7SIK 18, W7LR 8, W7HAH 4.

OREGON: SCM, Dwight J. Albright, W7HLE — Asst. SCM: WA7JUU. SEC: W7LBI. Chief PAM: WA7SSO. PAM: WA7GFE. RM: K7OUP. 85N, 3908, QNI 578. GTC 52, QST 16, WA7GFE; OSN, 3585, QNI 197. QIC 105, 31 sess. WA7AVB; ARES, 3993.5, QNI 396, GTC 20, WA7RWM; ARES Jackson Co., QNI 107, GTC 69, WA7JUZ; WGN, 3702, K7JUY; PDX ARES, QNI 10, K7ZAV. Now that we are into the full swing of teaching for Novice and upgrade let's stress the fact that we need to abide by the Rules. Many old timers are berating the fact that we are letting our frequencies be in jeopardy by not keeping them clean of chirps, foul language especially. We also don't need to have had a report of adverse conditions predicted about the time you are reading this. WX Bureau much high water? 224.90/50. WR7AEY is now on the air in Hillsboro. New OBS WB7DIP makes schedule on repeaters. Look for him Mon. 6 PM 1/76 Wed., Fri., also 146.22/82. Grande Ronde Radio Amateurs had a booth at the Union County fair. W7KVV gets fall code/theory classes started Sept. 30th. RN7 Net Mgr. W7VSL rec'd an F keyer from FAA tower group when he retired. WB7FBZ helping in relay work during CA fires. WB7BZ rec'd first contact certificate. Traffic: (Aug.) W7VSE 268, K7VM 146, K7OUP 91, WA7GFE 41, WA7KX 40, K7GEG 28, K7WV 27, WB7AAK 23, W7ZAP 17, WB7DIP 13, W7LT 10, WA7HRG/7 9, WB7DIP 7. (July) K7OUP 135.

PACIFIC DIVISION

NEVADA: SCM, Leonard M. Norman, W7PBV — SEC: K7ZAU. WA7RPZ, pres. of Nevada Airstream Rally Club home from a three months tour of northwest, Airforce, Army and Navy MARS are recruiting for members, several VHF repeaters are proposed. W7UJZ reports that TARA and SNAR members enjoyed an outing, many with a first time ride in a Model T Ford, thanks to WA6CBA and WB6VLK. K7ZUK now an OBS on NV Races net, reports that the RACES test drill turned out to be the real emergency communications put into action by local thunderstorms causing considerable rain fall with flooding in several areas. K6MQX/7 remodeling his shack. KH6BZF/7 visited many friends in the Las Vegas area. W7PBV and W7BIF attended the Reno Hamfest, which was a success; next Aug. Reno Hamfest is planned at one of the new hotels downtown Reno. WB7PWL was a visitor in W8-Land. Traffic: W7LX 207, K6MQX/7 4.

PACIFIC: SCM, Pat Corrigan, KH6GGW — We sadly bid Aloha to KH6GGW who left the islands after many years. He was the mainstay of repeater operations in the state for many years among other things. Look for him from W4. WB7DUJ and wife stopped on their way to world trip. KH6BZF still pluggin away at tropicals, CA/Hawaii on VHF/UHF. Lee gonna try big moonbounce effort with K5 visitor in Jan. He now has eleven elements on 6m. Worked N4DT (S. Carl) of OSCAR B. Senior citizens might be a good source for additional traffic for traffic-minded hams. Pacific

LOOK OUT The FINCO Stingers are here!



FINCO Is introducing its new Stinger Series Amateur Antennas.

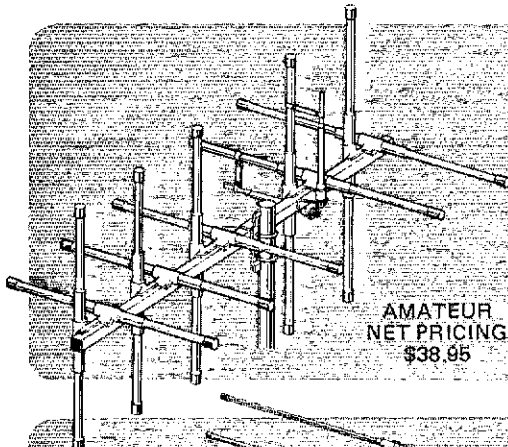
FINCO STINGER A 2+2

2 Meter

The model Stinger A 2+2 is a ten-element, dual polarization 2-meter antenna designed for OSCAR communications or where switching from horizontal to vertical polarization is required. The A 2+2 can even be phased to operate on both horizontal and vertical polarization at the same time (circular polarization). This is not only ideal for OSCAR work but gives your station versatility for ground communications.

Wide, non-linear element spacing gives the A 2+2 superior gain. However, since it is a five element beam in one given plane, the half power beam width does not make satellite tracking difficult because of sharp directivity. The dual gamma match assemblies provide for a very low V.S.W.R. and will withstand 2,000 watts P.E.P.

The Stinger construction features make the A 2+2 extremely heavy duty. Provisions are made for mounting the antenna at the end of the boom — for azimuth control — or at the middle of the boom for normal applications.



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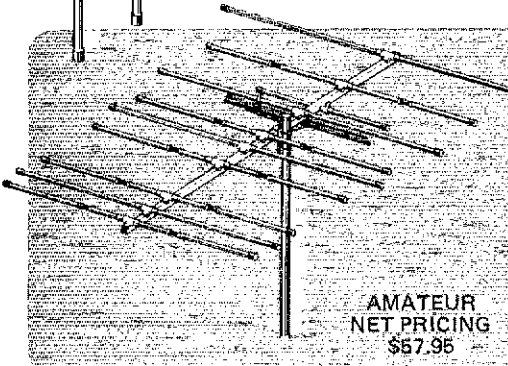
FINCO STINGER A62

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The model Stinger A 62 is a truly remarkable combination 6 and 2-meter beam designed for optimum performance on both bands yet only requiring ONE transmission line. This is accomplished through the use of exclusive phasing elements to accomplish dual band operation with no sacrifice to either band — NO SWITCHING REQUIRED!

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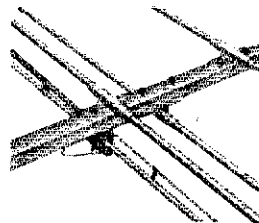
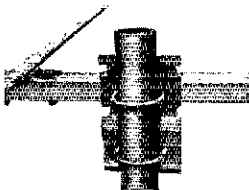
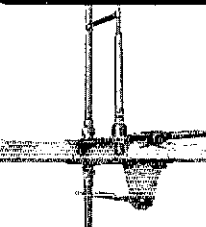
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A 4" x 6" x full 1/8" thick heavy duty plated steel mast to boom mounting assembly is used on all Stinger Series of Amateur antennas. The bracket assembly locks permanently on the square boom and thus withstands high wind loads and torque without twisting or becoming misaligned. The assembly accepts mast diameters of up to 2" O.D. Provisions for mounting either in a vertical or horizontal plane is incorporated in several models.

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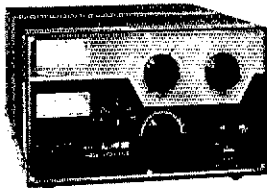
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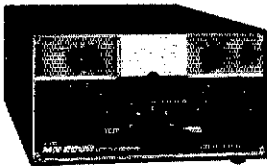
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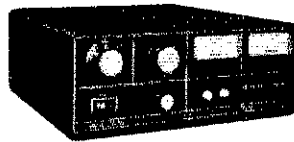
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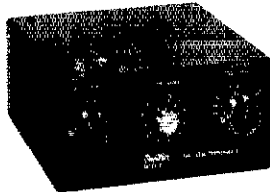
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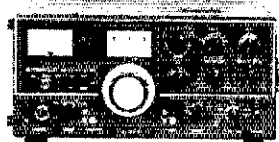


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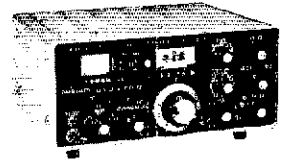


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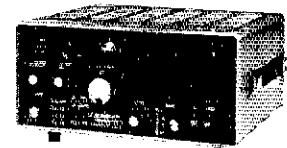
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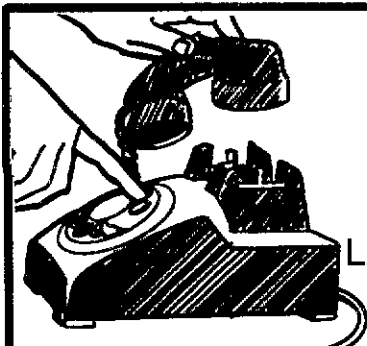
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Traffic Net (PTN) meets 0330 UTC daily 14110 except Sat./Sun. (0001Z). We have the only husband-wife ham in the entire U.S. with OM & YL suffixes (Rick & Eleanor ex-KH6DY & HPK) SA RC-Hawaii Nov. 5/6, Kullima. Had nice note from K56CC. Former K56s DH DU DY now all in Saudi Arabia KH6s HIJ ION EKQ & others had nice month-long trips to W. Traffic: KH6JG 70, KH6HJ 32, KH6JUE 30, KH6BZF 28.

SACRAMENTO VALLEY: 5CM, Norman Wilson N6JV - SEC: W6SMU. The El Dorado ARC manned a booth at the El Dorado County Fair. Their Aug. meeting featured W6TEC and WA6ESA and a program on the annual SEI. The RAMS supplied communication links for the Sacto. Society for the Blind and their Bike for Sight in the N. Sacto. area. The RAMS also held a garage sale on Aug. 27 and 28 at the QTH of WB6SBR. The Golden Empire ARS will have their 7778 meetings on the third Fri. of the month at Melody Hall in Chico. WA6JX now N6WR and WB6SRA is K6GV. WB6CFY in Marysville now active on OSCAR mode A with 10-meter vert. and seven-element beam on 2. WB6FAA has built a synthesizer for his 2-meter rig. The speaker at the North Hills RC Aug. meeting was William Jenkins who gave a presentation on the Bell Systems' International communications operations. N6JV tacked a Phone DXCC and WA7 on the wall. Traffic: W6RSP 198, W6DEF 20, K6RPN 17.

SAN FRANCISCO: 5CM, Mark L. Nelson, WB6NH - SRRRC provided March of Dimes Bikethon communications, and FWRA is doing same. Ukiah WR6AUG and Eugene's WR6AA have been moved to better coverage locations. W6JMO is now N6VA. W6OAI made superb DXpedition presentation to HARC's Aug. meeting, then took off for V56-HS and CR9-Lands. WB6NH operated 2M from the Good year Blimp! WA6EDX now a Silent Key. VOMAR radio class reports 6 new Novices; WD6S BMJ CC ASP CBR BMK and CCH Congrats to all! SFR members are sporting new name badges - tancy! New "Redwood County Contest Club" made 1650 QSO during IARU Radiosport. Sept. VHF QSO Party activity high in Bay Area. 2M traffic handling in S area is via WR6ADC, 84/24, with WR6 ADZ and AEA, 25/85 as alternates. WB6AGR, Mendocino reports possibility of an emergency radio van! Please note new address for your activity reports. Traffic: W6RNL 234, K6TP 176, W6IPL 156, W6NL to W6GGR 4.

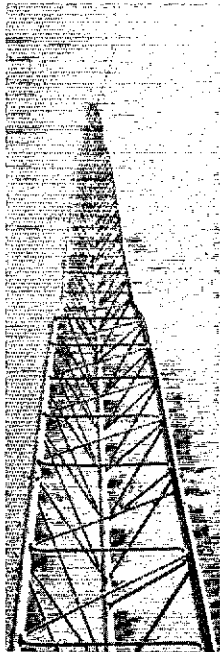
SAN JOAQUIN VALLEY: 5CM, Charles McConnel W6DDP - Asst. 5CMs: WA6YAK W6TRP. I am pleased to announce W6TRP as having moved to south part of the Section. WA6MKH EC for Merced Co., W6KK OBS, WB6VJW OPS. Renewals: WA6JD ORS, WA6EXV OPS. WB6MQP is N6OW.. WB6AP is N6HF. WB6KGF is N6DI, WA6EPP is N6DP and WB6CCZ is N6JL. WD6CPO WD6CRH WB6YAR are new techs. W6JPU W6QKP K6JKQ W6SFB WA6YA W6DDP attended the Slater Hamfest. K6GOK has wattmeter. WA6YAK an SB220. WB6QYM an IC21. W6WPV a TS820. WA6AK1 a TR7500. WA6OEF led the Pacific Division in the 1977 Novice Roundup. Congrats on a job well done. WB6WYA WB6GU WB6TA WB6FL WB6ZLA WB6WFQ WB6IR WB6WM WB6AN WA6CYR WB6LBR W6YER and W6CHI were active amateurs in the Marble Cone Fire. Amateur Radio showed how well it can do a job. Wish everyone a Happy Thanksgiving. Be sure to vote for the candidate of your choice in the Pacific Division Director election. Traffic: (Aug.) WB6VJW 66, WB6WFQ 11, WA6GJV 6, WA6JDB 6, WA6KMW 4, W6DDP 3. (June) WA6YAB 2.

SANTA CLARA VALLEY: 5CM, Jim Maxwell, W6C - SEC: WB6IZF. The 175,000 acre Marble Cone fire in Monterey Co. brought hundreds of hams out to provide emergency communications reports. WB6IZF, logistics and welfare traffic were handled, together with some traffic control work along the narrow fire trails. A mix of hf, 2m simplex and 2m repeaters were used. A list of calls of those who participated is much too long to include in this column. A forthcoming issue of QST will contain complete rundown. Hats off to all those who unselfishly gave of themselves during the 18 day fire. Welcome home to W6IZU and WA6TUF after the OSCAR sojourn to EU. TUF put five countries on the air via the orbiter, using calls WA6TUF/DL, HB6AUI, LX and 3A9JE. With the exception of the U operation, all QSOs were made using a portable OSCAR terminal, opening up in a parking lot (4U) perched on the side of a hill (HB6) and so on. Congrats to NCN members on the NCN honor roll for July: N6AU WB6HBT W6JQU WB6JGS W6N W6RFF W6YBV and KeyKG. NCN meets daily 1900 and 2030 local on 3630 kHz, and at 1930 local on WR6ADC, 84/24. N calls abound, with WA6JJA WB6HBT switching recently to N6TX, N6VB, respectively, and linking it. WA6YPT has worked in Social on 432 ssb from Monterey county, reports WB6JNN. A new repeater is in the planning stages at Mt. San Bruno, reports N6IH, trustee. The call will WR6BBX, on 235/835. The West Valley gang is toyed with the idea of putting up a 10m baseband, sponsored by WA6OHT and N6TY. Traffic: W6YBV 13, W6RFF 108, W6NW 51, N6IH 48, W6AUC 3, WB6JGS 21, N6VB 12, WA6HAD 8, W6CF 3.

ROANOKE DIVISION

NORTH CAROLINA: 5CM, Bill Parris, K4GHR - SEC: W4EHC. PAM: W4DFO. VHF PAM: W64VI. RM: K4MFC. Stanley Co. ARC has been reactivated with W4EAT, pres. K4DC. Vice-pres. K4JJA, sec. pres. in Winston-Salem. WB4KCS has been holding breakfast meetings with ARS members with good attendance. K4JO has Novice class underway at W4DBT is running a General Class. Morganton ARS now conducting the Western Piedmont VHF Net on club repeater on 75/15 each Wed. at 2100. Two new 10-K Chapters have been started in the State. Raleigh Chapter. Raleigh area with WB4YBF coordinator, and the Rocky River chapter in the Charlotte area with W4ACGM doing the organization. Raleigh ARS operated station at a CB Jamboree with excellent results. ARS also contributed \$50 AMSAT program. Cary ARC now has Novice class underway with N4UE teaching. Cabarrus ARS is active with a kmtr hunt being held and operating station at the County Fair. New ARRL appointments include WB4VIM VHF PAM, WB4ULP EC Surry C.

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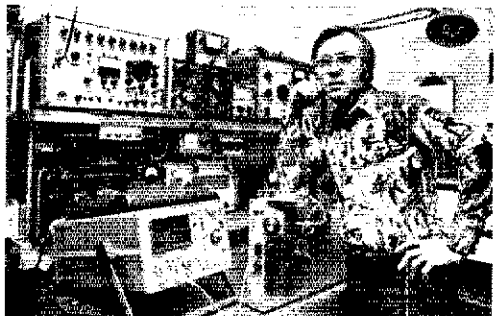
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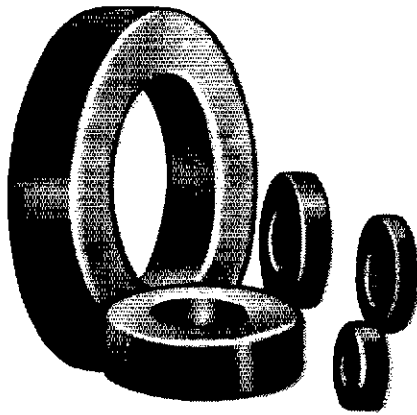
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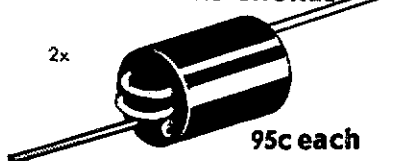
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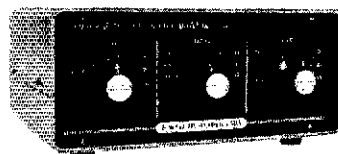
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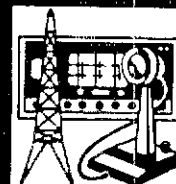
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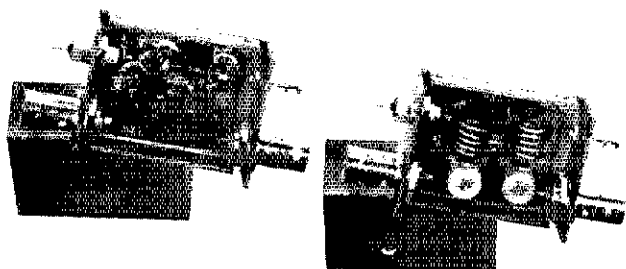
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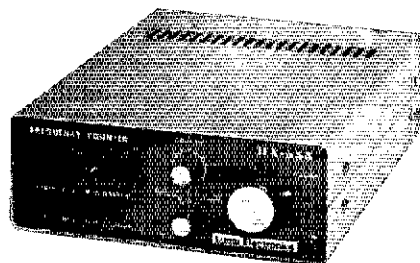
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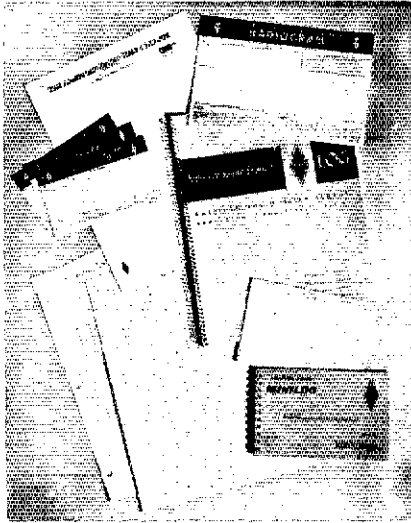


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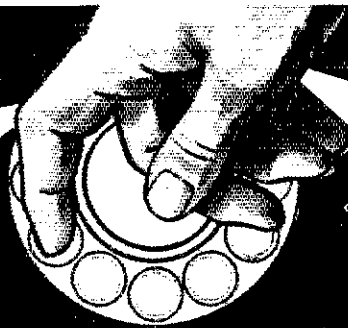
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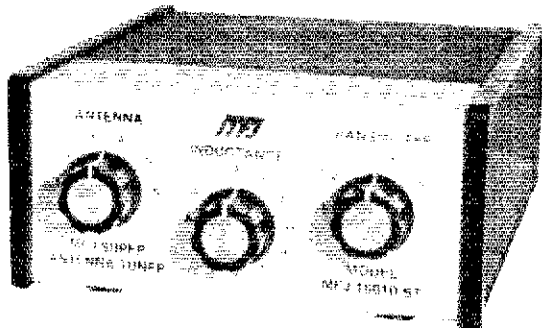


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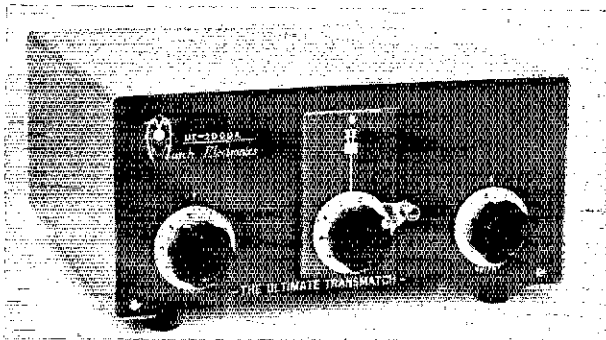
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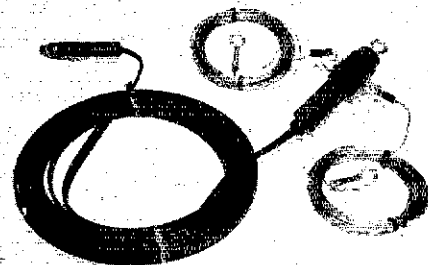
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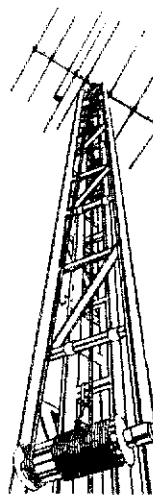
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the near future. WABYED is going to teach a Novice class at Colorado Mtn. College, beginning in Sept. It is with deep regret that we add the call of W05KL to the list of Silent Keys from the Colorado Section. Net 11c. for Aug. Hi-Noon QNI 1169, QTC 33, Informals 128, QNF 1201, sessions 11c. Late Net 11c. July 7c. Columbia QNI 144, QTC 159, Informals 26, QNF 156a, Traffic: (Aug.) W0VYX 2126, K0YFK 856, W0CQD 317, W0EJO 238, W0HBS 208, K0J5Q 152, W0BYNP 127, W0BQPP 115, W0WV 95, W0MCI 93, W0HE 75, W0LQ 67, W0HFX 64, W0MDT 34, W0LAE 29, K0TER 24, K0OHU 10, K0SPR 9, W0BYED 4, W0GW 4, July W0LAD 241, W0WV 75, W0LQ 57, June) K0TER 49.

NEW MEXICO: SCM, Joe J. Knight, W5PDY — SEC: W5ALR, PP: W5GNR, PAM: K5IKL, RM: K5KPS. South West Net (SWN) meets daily on 3885 kHz at 19-15 local time, handled 166 msgs. with 186 check-ins. New Mexico Broadnet Net (NMRRN) meets daily on 3940 kHz at 18-00 local time, handled 73 msgs. with 774 check-ins. NM Breakfast Club meets daily on 3940 kHz at 07-00 local time, handled 90 msgs. with 623 check-ins. SWN activity down during Aug. Expect fall to bring improvement. Amateur Radio Telegraph Society (ARTS) handled 409 msgs. with 427 check-ins. K50BB improving. A short time in the hospital. W5GWW doing well after open heart surgery. We will all miss W6LUX and K5UGO who joined Silent Keys. Traffic: N5NG 218, W5JVO 201, W5DAD 198, W5ENI 170, W5KH 156, K5KPS 104, W5UHQ 86, W5BROP 59, W5TWW 49, W5MIV 29, W5SOHI 14, W5SCAG 4, W5QNR 2.

UTAH: SCM, Carl R. Ruthstrom, W5GPN — A Weather Watch net is planned in the UT Section. Contact WA77BO for info. He has new Drake C line. WA75VN was married in Aug. W7DHO won new IC225 at UT Hamfest. The following won prizes at the W7KLU hamfest: W7JLR, first place for the biggest antenna on the street; automobile and K7SUJ, the W7MU plaque in the Chinese auction. WA7ARK spent time on Lake Powell houseboat with a group of artificial kidney patients. He used 75 meters to keep in touch. WA7UJJ coordinating communications for Boy Scout camp on old Norman Trail. Salt Lake group continue Fri. night transmitter hunts on 147.05 MHz. W7MUG home at recovering from operation in Salt Lake City hospital. WA7HQB reports new Novice licensees W87TMJ and W87TMK. W7RZ, KXBAU home from Kwajalein due to illness of his mother. We wish her complete and speedy recovery. New repeaters in UT are Bear Lake, 147.775 and 74.18774-75, Salt Lake City, W7BEI, reports UCN had 39 sessions, 151 check-ins and 42 messages. Traffic: K7HLR 86, WA7JRC 61, WA7MLL 57, K7KJY 59, W87DMI 30, W7BE 24.

WYOMING: SCM, Chester L. Stanwalley, W5ADA — Asst. SCM: Tom Graham, W7KHH, PAM: W4WFC, RM: K7KSA. The Wyoming Council of Amateur Radio Clubs held their first organizational meeting in Casper Aug. 27. Drawing up constitution and by-laws consumed most of the meeting time. Next meeting planned for Nov. 19th in Casper. New Novices W87THK, W87RWX and W87GSA, XYL of W87NMR of Sheridan. W87SSV, XYL of K7KSA of Story. W87SGV and W87SQW of Casper. W871BH of Ranchester. New Technician W87SYW of Saratoga. The XYL of W87UEU passed General Class exam and waiting for license. K7SLM reports Wyoming cowboy net held 29 sessions, 590 QNR, 8 QTC. Traffic: W7TK 468, W75GT 377, K7VVA 349.

SOUTHEASTERN DIVISION

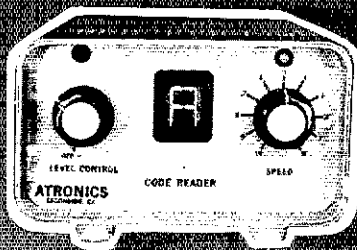
ALABAMA: SCM, Jim Brashear, W84EKJ — WAARAJ back in Birmingham after spending some time in Pensacola. Sorry K4UMD was in hospital and missed the No. Ala Hamfest. The Decatur ARC put on a good hamfest with larger parking area, flea market and building than in past. The G'tha are planning to start taking classes for new licensees. W84DEJ visiting in Manchester, N.H. recently. K4JK has new TS-820 to go with new MLA 2500 — say he don't notice much improvement over TS-520 and SB-200, but can tell a difference in bank account! I enjoyed attending a meeting of the Valley ARC in Marietta and meeting some of the members and seeing W5HCH again. W84AWX, XYL of W4NDE passed General. W84FBU upgraded to Adv. DeKaib Co. Radio Club has code practice Tue. and Thur. at 7:30 PM on 277.27, Ft. Payne repeater. K4HJM XYL had surgery recently. W84AGA was used for communications recently to assist St. Clair Co. Sheriff's dept. in search for homicide suspect. K4BFT had a booth at the Northeast Ala. State Fair to demonstrate ham radio and originate traffic. Thanks to Huntsville Jaycees. Endorsed W4MHO as OE and OES. Appointed WA4RND as ORS-II. Traffic: W44JDH 648, W44MD 57, W84EKJ 111, W44RAJA 97, W44RND 79, K4OZ 45, W4BU 28, K4UMD 26, W84KSL 25, N4OE 20, W4ANNA 13, W4AVKD 12, W44RKH 9, W84TVY 4, W4ATMG 2, W4MHO 1.

CANAL ZONE: SCM, Paul F. Ebdon, K25TJ — We will be like that GUYV. SCM. Must file in advance for testing for amateur licenses. Exams will be the second Sat. of the month at the License section in Balboa. K25VY started his annual Novice class in Sept., turned out great as usual. K25FTN, pres. of the CZ Novice Assn. also started a Novice class along with a class to upgrade to General. K25K, K25X are instructors for these classes. If you would like to help please contact FTN. Remainder from K25A's, you have to sign a release form before the license section will allow your name and call to be used in the next call book. Contact the License Section for the form. Sorry to say K25A AA ARN DE HP 11 KN MR STN V5 L-5 & 2K have returned state side, you will be missed by anyone having turning to Zone after summer vacation. Welcome back.

GEORGIA: SCM, A. H. Stakely, K4WC — SLO: K4YRL, RM: W4SHL, PAM: K4JNL, Contrals to W4LEK, K4E, W44HG making PSHR. W4DHC also made PSHR in July. Contrals to W44ACZ, W44HE, W44HF, W44YB making Extra; to K4DDM W44DSB and K4ZMT making Advanced; and to W4KVG making General. Welcome new hams W44JBV, W44KHM, W44KHN and W44KHQ who trained via Adversity Club's summer Novice class. The old Crackpot Net is being discontinued according to K4DNI. All amateurs they meet at 1106Z every day except Sun. at 1200Z on 3.995. Net QNI 212, QTC

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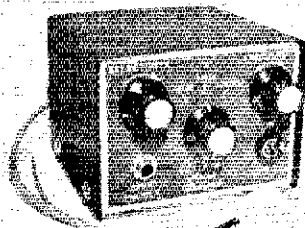
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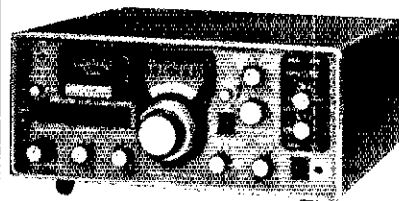
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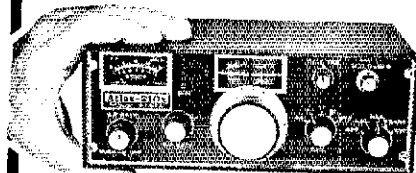
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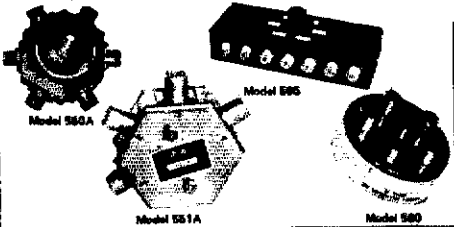
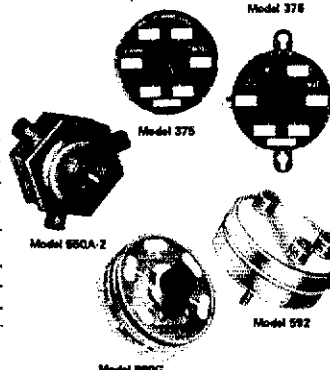


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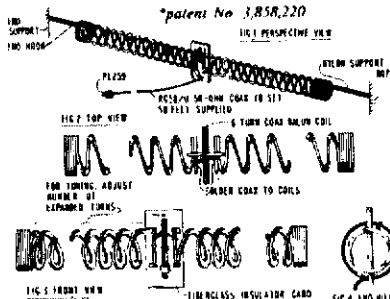
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6. for Aug. GSN QNI 338, QIC 132 reported by W4SHL. CVEN No. 1, QNI 67, QIC 1 reported by K4GNK. CVEN No. 2 QNI 1077, QIC 100 reported by WA4CCY. GAREC QNI 74, QIC 1 reported by WA4NBZ. Ctrd GA VHF Net QNI 119, QIC 13 reported by W4HON. K4GYV now back from FL. WA4DHC reports K4RJA. K4JSH now has a title to go with the training he has been doing for All Radio Club as he is Training Director. JUD GSN net QNI 1776, QIC 165. K4YRL is doing a terrific job as SEC for GA. He deserves your support as he has brought us from 17th to 5th in our category and 52nd to 19th for ARRL as a whole. Contact him or your EC to join our emergency preparedness capability. WB4DHC going off to school. HITS 43N whose Aug. report is QNI 26, QIC 10. Traffic: (Aug.) W4FDE 32, W4SHL 65, W4C/N 52, K4NM 44, K4YRL 26, K4LV 22, WB4TEK 22, WB4DHC 19, WANWB 16, W3HON 15, K4Wc 15, WA4PZD 5, W4IM 4. (July) W4SHL 39, WB4DHC 27, K4PIK 5.

NORTHERN FLORIDA: SCM, Frank M. Butler, Jr., W4RH - SEC; WA4WBM, RM; WB4GHU, PAM; WA4INC/75, WA4TXM/40, WB4BS/VHH - Manager Net - Freq. Time(2)/Days QNI QIC - Manager NE PN - 3950 2330 DV 1288 145 WA4TNC (2) N - 3651 0000/0300 Dy 1032 657 WB4GHU New appointments: WB4GBB as QRS; N4PL as OPS. SINC is carried by WB4WVP on (GNS) by WB4KC & WB4DHO on F2N; by WA4KE & WA4NDC on FMTN; and by K4RCR on LA Traffic Net. WA4CRI earned 3rd BPL. Sorry to report W4CCA and K4ELH Silent Keys. New calls: WB4IPR now N4OV; K4KRC now N4PI; W4UX/74 now N4PL. N. Fla. well-represented on F2N by WA4S OEM RAJ & TXM; and WB4GBB, WA4KST, WB4GIZ, WB4GR with homebrew contest; and WB4GBB with CW contest at Pensacola Hamfest. WB4NIP reports a new Gulf Coast Ham Club. Meetings at 0800 CST on 50.110 MHz. N4XS has a new homebrew CW keyboard. Okaloosa Co. hams furnishing shelter comm. for Red Cross using converted CB rigs on 10m. K4KIP active on 2m from Carabelle. For those buying FL ham license tags, fee is up from \$1 to \$5. W4DHC is in Class 3. W4HYT & W44BYU upgraded to General. N4FA is July meeting featured CW "burnout" contest - winners WB4ITK and K4M2K. W4EAL and WB4LUX were winners in message contest for high traffic totals reported to SCRL. New Jax slow-speed QSO freq. is 21.12540 MHz. Conducting code classes at Ormond Beach CAP Station. CW contests for all bands/modes with 15-520/1R-7400. Orange & Citrus Counties held simulated hurricane drills - not too soon, with Anita & Babe in the Gulf! Traffic: (July) WB4GBB 346, WA4CRI 244, WA4FKE 211, WB4E 203, WB4GHU 193, N4WA 163, WA4JFM 152, W4LDM 149, W4DHO 101, WB4IRM 88, WB4DHS 85, W4JJ 77, N4SS 68, WA4BZY 67, WB4V 66, WB4HO 64, WB4EXA 45, WB4LZK 44, W4RH 43, WB4JY 37, WA4INC 36, N4DY 32, W4KIX 30, W4MGO 28, W4DIV 27, W4ETA 25, WA4IWW 25, K4ANH 20, WB4RIP 24, WB4YKV 19, W4MVG 18, K4LX 17, WB4RIP 16, W4EAL 16, K4RNS 10, W44YQ 10, WB4VMP 9, WB4VQ 8. (July) N4DY 41, W44ST 28.

SOUTHERN FLORIDA: SCM, Woodrow Huddleston, K4SCL. SEC: WB4ALH. Asst. SEC: W4WYR. RM: W4MER. PAM: WB4AD. WA4NBE. New appointments: WA4SB E.C. Sarasota County, WA4JWX G.O.V.; WB4SSP G.O.V. WA4SB reports 18 stations in ARS. April Aug. 15, 12 mobilizing to assigned stations. WB4NE building solid state ATV station to operate on 439.25 MHz. W4BK finds it hard to get back into harness after several weeks vacationing in western USA and Canada. Congrats to two new hams WD4LKK and W4EAL on their 1st days on air. Congrats also to WB4ALH for helping them get started. WB4ALH also upgraded to Extra. Congrats to WB4AD and Florida Mid-Day Traffic Net as net celebrates 20th year of operation. N4KB, ex-W4RE, Bonita Springs, is now Station Brave on 1CC. WA4ZHU is sporting a new call K4ZD as he heads for college U. of Texas. The Hurricane season is in full swing with two hurricanes spawned in the Gulf of Mexico which a number of Radio Amateurs have completed basic annual emergency preparation while still hoping it will not be needed. Traffic: (Aug.) W4MEI 786, K4IH 382, K4SCL 238, W4NFK 216, WA4NBE 205, K4SJH 151, WB4WYR 151, WB4NH 132, WA4PFK 123, WB4ALH 106, K4NAN 100, WB4LH 89, W4IRA 86, W4QM 86, W4DVG 85, W4KMN 84, W4APL 77, W4SPL 72, WA4GYR 72, W4WYR 66, W4NTE 65, W4H4PB 50, W4LYT 48, K4BLM 44, WA4IC 42, N4KB 38, W4QGV 34, WA4ZHU 30, WB4AOC 29, W4LTK 29, WA4HDH 27, K4SJA 24, N4TW 20, K4LCK 19, W4KST 16, W4ATJG 16, W4AKPG 11, K4LX 11, W4BNE 8, WA4SB 8, W4SMK 3. (July) K4IH 481, W4BNE 19, N4KB 9.

WEST INDIES: SCM, David Novoa, KP4AM - Summer was Extra Class time. KP4S DJE AST and DRM are now KP4M and DM respectively. KP4EMN is now KP4MD and your SCM got KP4AM (no cw in fm no esp here from now on). KP4S (WV) and DDD passed their Extra Class exams. The first CW DXCC in Puerto Rico was received by KP4CW (who else could he?) KP4CM is back in the Island. KP4AAM is in Virginia, USA, and is heard frequently with KP4XX on high speed cw. Not all two-letter call signs are assigned to Extra Class hams - K4S WS and DJ are Novices. KP4CL is working very hard and doing a very FB job with the Puerto Rico YL Club. KP4BJM is building a new QTH. KP4AHQ has a big signal from his QTH atop Colozal Mountains. Traffic: KP4AZA 4, KP4EBQ 3, KP4RHF 3, KP4HG 3.

SOUTHWESTERN DIVISION

ARIZONA: SCM, Marshall Lincoln, W7DQS - PAMs: W47KQE, W7UGQ. RM: W7EP. New call sign for the Superstation ARC is WB7TD. WB7HXH and WA7LMJ members of the Explorer Post 599 RC, presented a program on amateur radio on Phoenix Radio station KUPD. WB7XZ wants to hear from anyone interested in forming a 10-meter group in the Phoenix area. AZ ARC will have a program on microprocessors on Nov. 3 at the regular meeting at the Phoenix Red Cross. The Pinal Mountain YL Net recently has been started on the 1373 repeater at 2000 Mts. each Thur. WB7PW is mgr. A message originated in California in California in two hours and 20 minutes after origination. WB7TD wants to hear from other AZU hams interested in forming a club. Call him at 991-3150. cactus Net 264, ATEN

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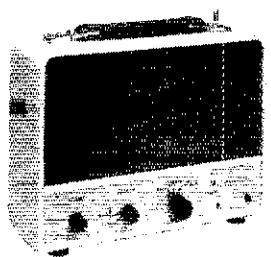
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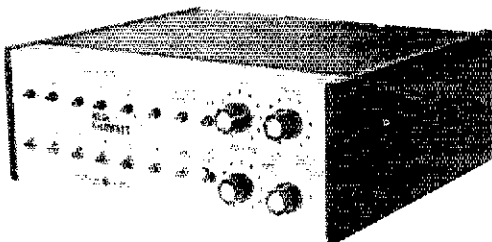
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104, SWN 166, Traffic: (Aug.) W/EP 249, WHJAG 109, W7HER 71, K7JKB 71, K7RGE 40, W7RQ 20, W7JG 19, K7RL 15, WA7WB 15, K7GH 12, W7TPY 12, K7GLA 10, K7NMQ 10, W67CL 8, W7DQS 4, K7JKV 1, WA7NHQ 1, (July) W67CZL 6.

LOS ANGELES: SCM, Eugene H. Polino, WHNH - RM: W66PKA. Attention, attention: I do not send anymore reports to me, as this is my next to last report to you members. A new SCM has been born and he will want the reports to come to him with the end of Oct. I want to thank those who have been loyal and helpful for the last six and a half years. The SCM spot has been interesting as well as informative about people. I have found that we have workers and lazies in everywhere. Those with the biggest voice are the ones that do the least and vice versa. Your SCM has an important job with all the glory going to others who do very little but go to club meetings and talk bull. Remember no more reports to this station! The Pasadena City College started its new Amateur Radio Licensing class in Sept. Contact instructor WB6WF1, tel. 578-7250 for more information. I am sorry to report the moving to W1-land of W65S7. Jerry has been transferred by the company and we will miss him in the L.A. Section very much as he has always been a real traffic man/workhorse on SCN. Good luck, Jerry, hope to see you back soon, K7Hbz2 reports being a visitor to the West Coast recently, reports meeting many old friends and eyeballing ole W6AUA, also mulling 2 mtrs. Congrats to W6GAW on passing his Advanced ticket. The Hawaiian tic, net on 14110 kHz still going, fair amount of traffic during the summer, should be real good this fall and during the Holiday. N6Z7 is enjoying a Tempu 4000 linear after fixing his TH beam. Traffic: W65-2 160, W6GLI 135, N6PZ 97, WHNH 88, K6GL 50, W6BRO 49, W6HLL 45, W6USY 36, W6QAE 34, W6BWI 34, W6NKE 17, K6LA 14, W6BNI 3.

ORANGE: SCM, Wm. Heitritter, WB6ARK - Asst. SCM: K6KNC. SCM: RM: K6J1, PAM: W66HE. SCM: WB6ARK K6GGS W6LKN K6KNC W6WPP W6YWS. K6LL reports Thex LM-470. W66NEX has new 50 foot tower with three-element on 20 and Drake L-4B amp. WHH11 on 2 with Icom IC-225. W6YWS reports new Canadian VEX-1 and wants to contact hams who are American Legion members. W6RAM new CBS schedule: Thu., 10a, Thur. 3585 kHz, 21.50 and Mon., Wed., Fri. 7075 kHz, 20.30. WA6LVA is now K6J1. New officers Citrus Hill ARC (San Bernardino): WB6LEW, pres.; K6GGS, vice-pres.; WA6L V, secy.; W66KMS, treas. W6AUS has appointed W6WHP as 1st. portion of Riverside County. W6BYXK has appointed W66JSG Asst. EC in Bishop. WA6FLX is now K6GA. New officers Victor Valley ARC (Victorville) K6LPS, pres.; W66KDF, vice-pres.; W66QL U, secy./treas. Victor Valley ARC reports W66ZDW W66ZCI W66ZLF W66ZUH upgraded to Tech; W66ZL to General and W66ZV to Advanced. Fullerton ARC reports W66YK and W66WI upgraded to General. Saint Jude Hospital ARC has obtained club call W66BPI. W6110 reports the following new calls were students of his Fall 76/Spring 77 ham radio classes: W66SM, W66MD, WA6LDC, W66LDC, W66SXW, W66LLE, W66ZLN, W66ZET, W66ZLJ, W66YK, W66YJ, W66ZSN, W66ZFT, W66ZTS, W66JUT, W66AK, W66AF, W66AEL, W66ALM, W66AFT, W66AF, K6IAM, W66AQL, W66AKL, W66ACQ, W66AEL, W66ZX, W66AZ, W66ZX, W66ALU, W66AK, W66AK, W66AL, W66AZ, W66ZY, W66AI, W66AJ, W66YKH. Congratulations to Chairmen W66ZL, W66RE and all who assisted in the process of change of call from W6ZE received GPL for traffic handled during the fair. Traffic: (Aug.) W66IG 661, K6J1 84, W66ARK 51, W66E 46, W66PB 27, W66WD76 21, W66ULU 18, W66RH 14, W66YR 13, (July) W66TIG 579, W66Z 406, W66H 244, W66ARK 144, K6J1 73, W66ULU 68, W66WDZ 40, K6LL 28, W66YK 74, W66YWS 6, June W66YK 579, WA6TVA 70, W66WDZ 42, W66RE 36, W66PB 8, W66NEX 6, W66YWS 5, W66SKL 2.

SAN DIEGO: SCM, Arthur R. Smith, W66NI - Ten more months until the ARRL National Convention San Diego, Sept. 22-24, 1978. San Diego was well represented at the Southwestern Division Convention in Santa Maria. New appointments: W66COL, CYS; W66HKK ORS OBS, W66JGF CO, N66KD OPS, W66NIK OPS. W66LEJ keeps tabs on repeaters with Heath scanner. A new MICOR repeater has given Palomar ARC an improved signal from Palomar Mountain. Upgraded: K66UT W66JL to Advanced; W66PL W66YK to General. Novices and Technicians are invited to take part in ARE's net each Sun. at 0830 or 0725 kHz. K6PZE has collected 798 Ten-Ten numbers. San Diego DX Club's new officers are W66M pres.; K6J1, vice-pres.; W66AT, secy./treas. New ARE members by District: (Central) W66AY, W66AV, W66UJ, W66JH, K66CT, W66PDO, W66PH, W66PYD, W66YK, W66YLL. (Eastern) K66GH, W66POW, W66JKL. (Northern) W66AJ, W66JZ, W66NWE. (Central) W66ANL, W66BKC, W66CZ, W66FFA, K7JDR. Call sign changes: W66LGT to N66L, W66HI to N66L, W66ZNP to N66N, 1st meter ARE's members call for more air time. Hams with many phone catches for their fm rigs. Traffic: W66PVH 425, W66I 198, N66W 164, W66BK 158, W66UAZ 122, N66AI 84, W66JUF 31, W66E 29, N66D 13, W66IF 4.

SANTA BARBARA: SCM, L. Paul Cannon, N6MA - SCM: W66HW. RM: K6XO, VHF: W66K, H: PAM: Vacant. Amateur rallied to the cause again in the northern part of the section to assist with combat the big fire in Big Sur. W66HJW reports nearly 50 hams who went up to assist. W66AWM 128/80, King City was a big help. Another air operation with many phone catches for their fm rigs. Traffic: W66PVH 425, W66I 198, N66W 164, W66BK 158, W66UAZ 122, N66AI 84, W66JUF 31, W66E 29, N66D 13, W66IF 4.

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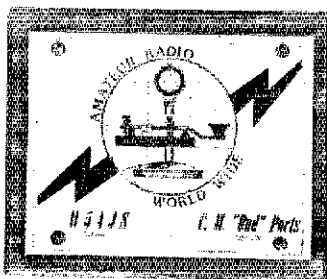


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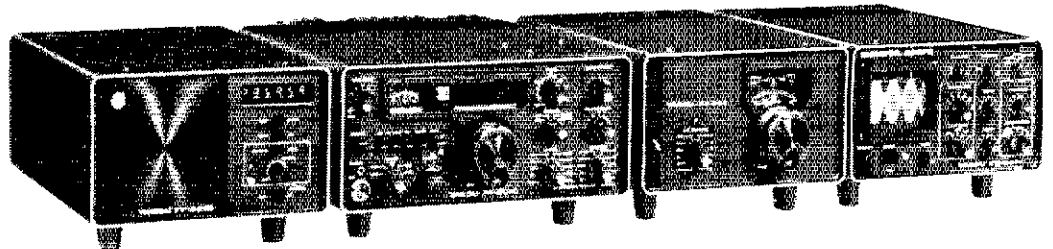
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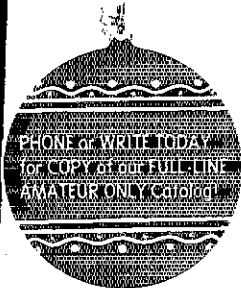


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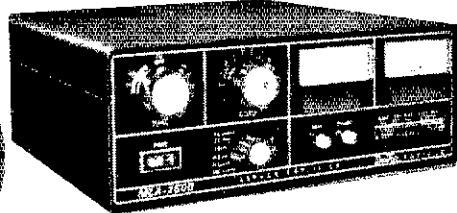
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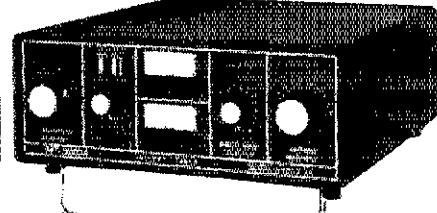
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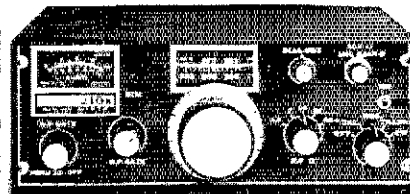
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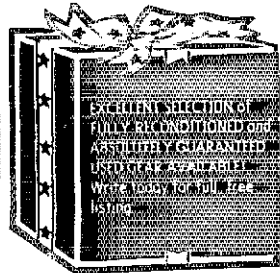
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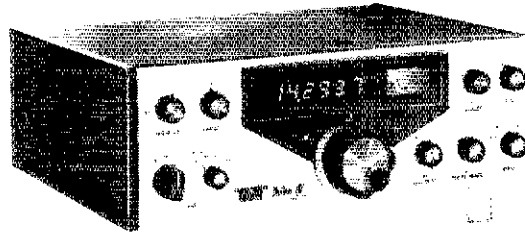
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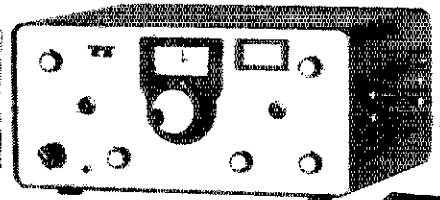
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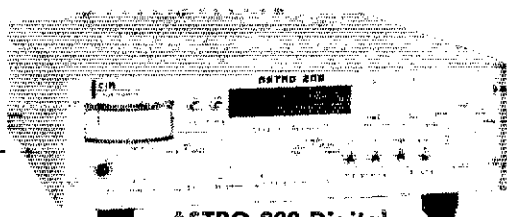
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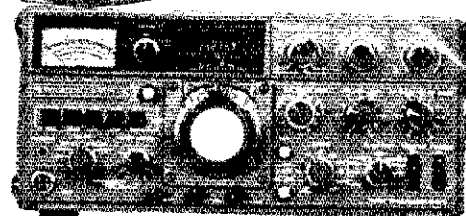
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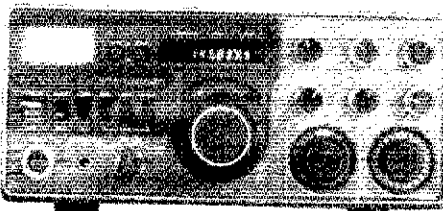
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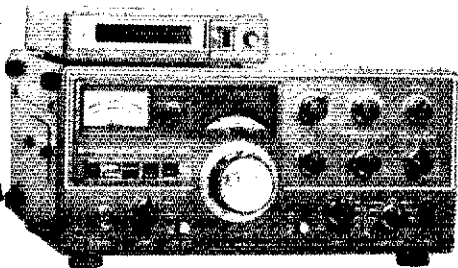
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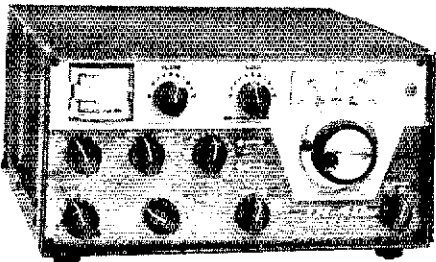
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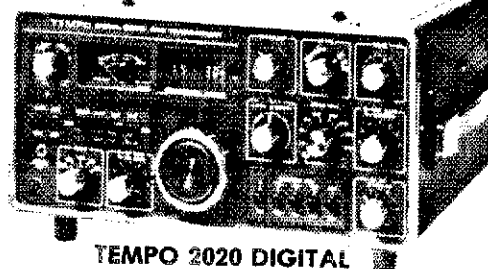
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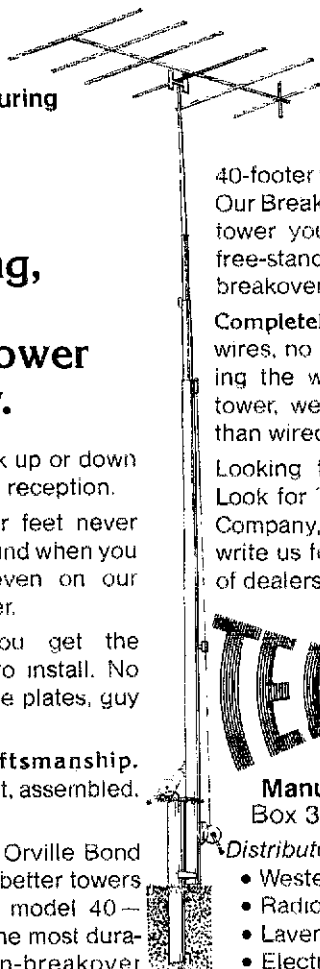
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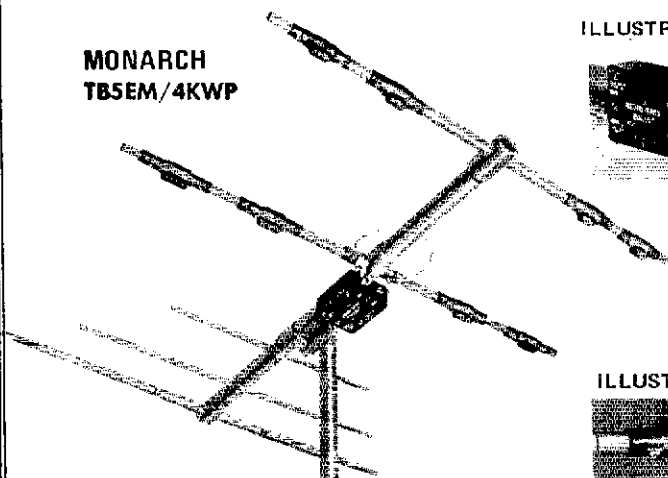


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WEST GULF DIVISION

NORTHERN TEXAS: SCM, 1ed Heithecker, W5EJ —
EC: K5PC, RM: W5JA. Tropical storm Anita had
everyone alerted, but proved to be no problem. DARC
Education Director, W5RT TE expects 250 or more for
fall license classes which started Sept. 15. Gidewalk
sale still the place to find those you haven't seen for
a month of Sundays. W5UOB was appointed Technical
Director for Texas VHF-FM Society with W5GZ as
chmn. for frequency coordination. Summer meeting
(Aug. 5-7) was held in San Antonio with good
attendance. Panhandle ARC reports successful Golden
Spread Hamfest with club treasury a bit better than
Spring. Novice training class training in code and
theory began Sept. 20, conducted by W5BRC. Nov.
classes at General level by W5AL will begin in Nov.
Transmitter hunt activities again becoming popular, as
they were in the '40s. SWOT activities growing as is
membership now in excess of 1000. W5ZNY, co-
ordinator for CRW (Citizens Radio Watch) continues
to provide monthly reports of amateur activities
assisting Dallas Police by early warning of possible
trouble spots in the area. W5RRC ram-rodding big
amateur demonstration and get-together in Sherman-
Dennison area, with many from the Metroplex ex-
pected to attend. K5WK, in Richardson reports a FD
score in excess of 10146 points. Novice classes began
Aug. 15 handled by K5ZJP & K5BA. HRVARC was
active in field day with good score reported. W5CTM
Novice class graduated 9 new amateurs. PH representa-
tive gets plenty publicity in City and County papers —
good work. Levelland saw 22th annual NW Texas
Emergency Net picnic, sponsored by Hockley City ARC
and NW Texas Emergency Net. North Worth KC Club
with W5FLQ and W5BOMC handling Novice classes.
Club received good publicity in "The Observer." Hurst
ARC reported much fun and low score in FD. W5CAX
received Advanced Class and W5UOB his Extra Class.
Much activity in Oct. planned, with AARL West TX
convention at Austin followed by Texoma Hamarama
at Kingston with both meetings scheduling events you
won't want to miss. See you there. W5GPX reports in
after trip to LA & VN with Amigos de Las Americas
group, we've been missing his good reports. Traffic:
W5T 27, W5TMM 60, W5G5N 53, W5PC 47,
W5TAL 26, W5HNL 11, W5VK 2, W5LA 6.

OKLAHOMA: Leonard Hollar, W5FTN — Asst.
SCM: Ray Miller, W5REC. SEC: W5MMU, Eastern
State College, Wuburton, is the latest to offer College
Credit for Novice Course passed. Needed 43 messages
to beat 2000 reported in Aug. W5CAX new PAM for
CFON. She will need a lot of help. WX reports on
that could be reporting. Have been hearing many new
calls since the Washington logjam was broken. We have
seen quite a few mobile caravans, but I believe that
Tulsa takes the cake with their FRAMPS group taking
to the road monthly in their RVs. Travel trailers etc.
on week end and W5SPLX, I gladly give you
the details. W5MUI has been working hard getting
his Emergency Organization going, has recruited some
new EOs and has openings for more. He has begun
work on a new State Emergency Plan. Again more
help wanted. I feel that in the days to come, we will
be called upon more and more to provide that we are
capable of doing Public Service Operations. How many
of you really know what it means and how to do it?
Traffic: W5BNKC 522, W5REC 444, W5RB 215,
W5BNKD 198, K6OWK 90, W5VOR 65, W5SFSN 64,
W5DOCZ 55, W5UYH 51, W5W 43, W5GUYU 38,
W5BYC 30, W5LELG 23, W5SOSN 23, W5MUI 17,
W5BLWD 13, W5BNMZ 12, W5NLF/N5LW 10,
W5GUY 11, W5RHXZ 10, W5BUCM 9, W5JJ 8,
K5CAY 4.

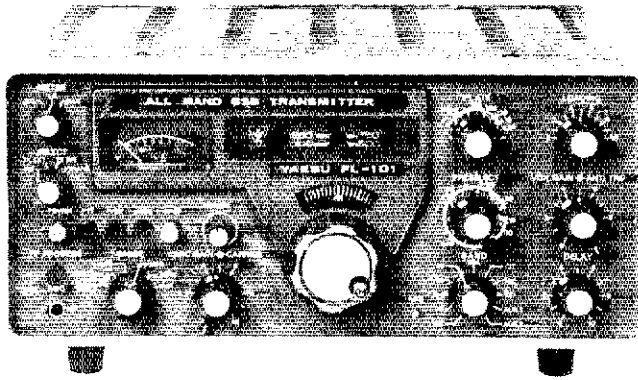
SOUTHERN TEXAS: SCM, Arthur R. Ross, W5KR —
SEC: W5LQP, RM: W5RKU, PAM: N5TC. OUS rpts
this month: W5FFD N5ZZ W5SCT K5DL QV5
rpts this month: W5CCT W5RQP, W5ARNV is new
I.C. for Bear Co. W5GLN is new E.C. for Cameron Co.
W5PDD upgraded to Advanced. K5WA W5ZUGG
bought a new home. New hams in Corpus Christi:
W5GOG W5FKA, Ex-K5VCL, now W5VQL, is also
new to Corpus C. San Antonio ARC provided com-
munications over entire distance of rally held by the
San Antonio Sports Car Assn. OHSUS N511 teach-
ing Amateur Radio course at Temple Junior College.
Reasport ARC conducting Novice classes. OHS
K5GM made BPL first time in more than 20 yrs. of
trafficking! Many-hatted W5KLV and OPS W5VBM
made BPL this month, also. OHS W5JYH rpts fall
Novice class began in mid-Sept. W5YJX upgraded
from Tech. to General; put up new Rohn tower with
lots of help from W5HNS W5KCA W5EJG; home-
brew two-element quad is resting atop it all; YF
W5GUY has been most patient through it all. New
calls in El Paso: W5DQB W5DIXI W5DQJ
W5LQJ W5EBV W5EBU W5EBT W5DGB
W5DGG W5DQJ W5LQJ. Hurricane Anita gave
Southern Texas Amateurs a real good fire drill. More
of that will probably appear elsewhere in QST.
Traffic: W5KLV 579, K5HZR 395, W5YLEA 333,
W5VBM 257, K5GM 411, W5RKU 218, N5TC
199, W5JYH 61, K5DG 49, W5K5V5 34,
W5TNN 28, N5TT 24, W5KR 13, W5RVT 13,
W5ZRH 4.

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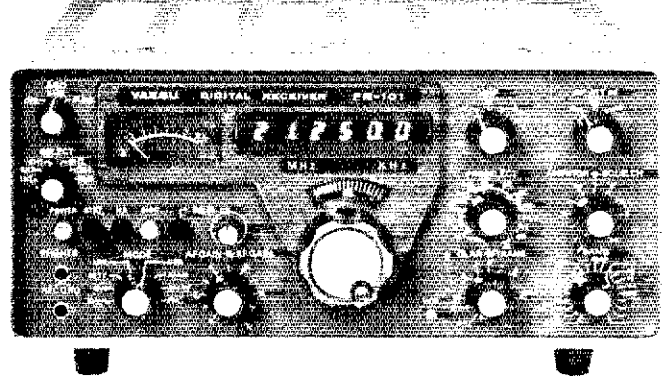
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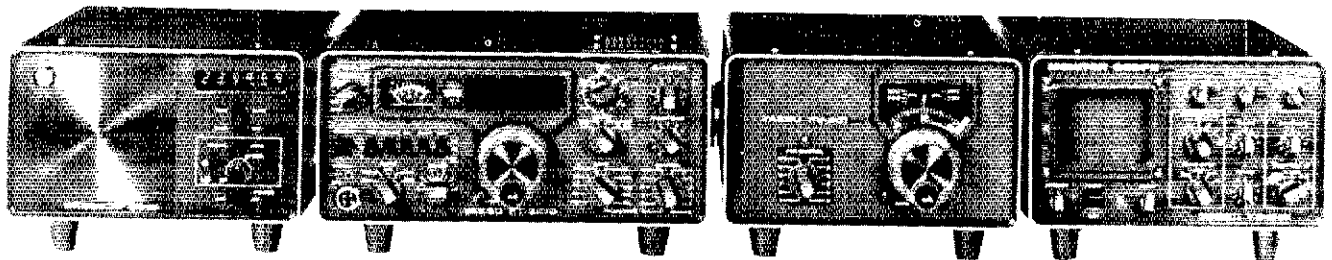
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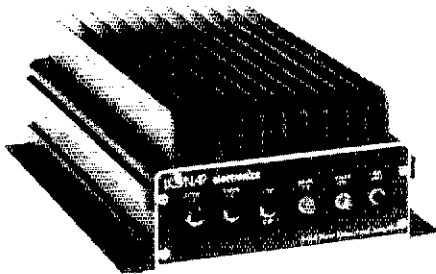
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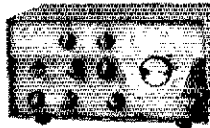
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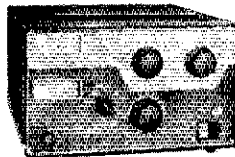
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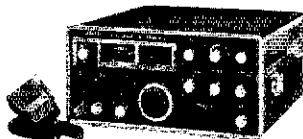
R-4C



T-4XC



L-4B



TEMPO



FP-301



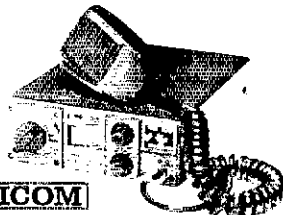
FT-301D
YAESU



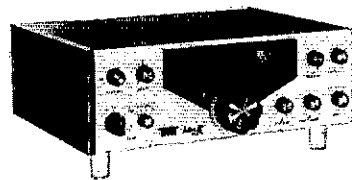
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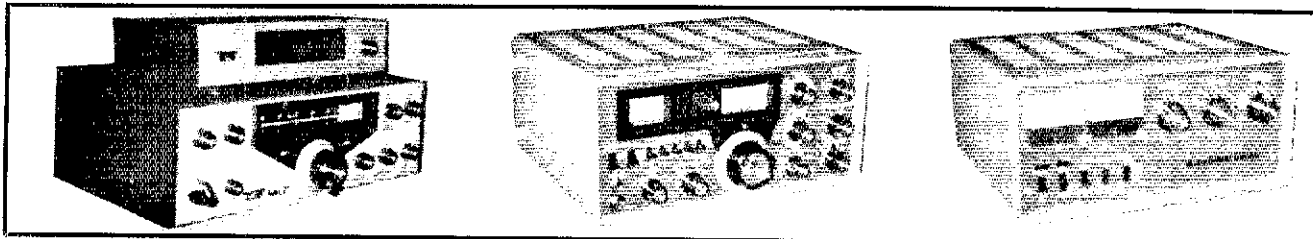
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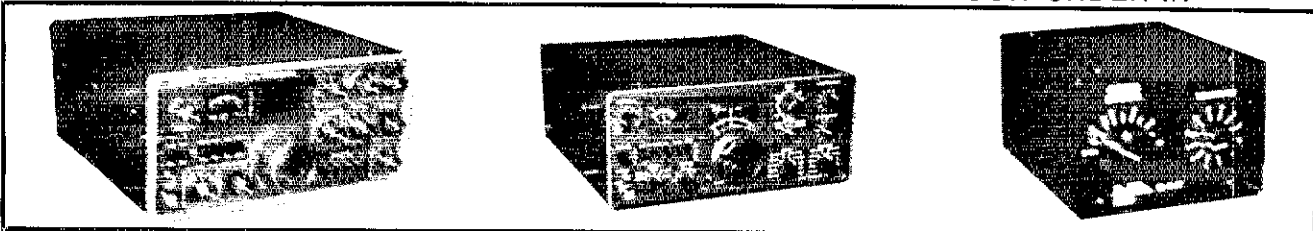
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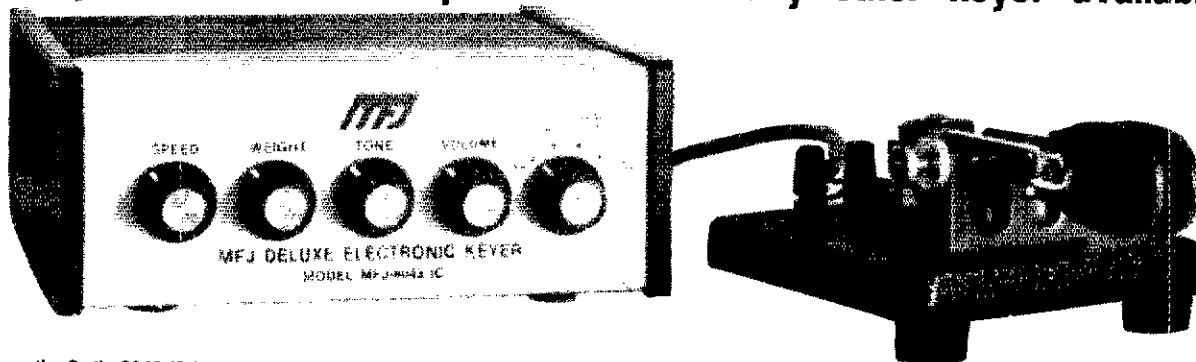


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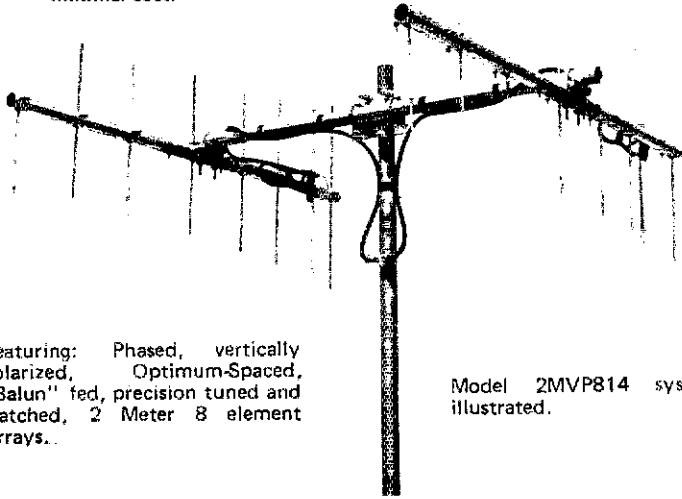
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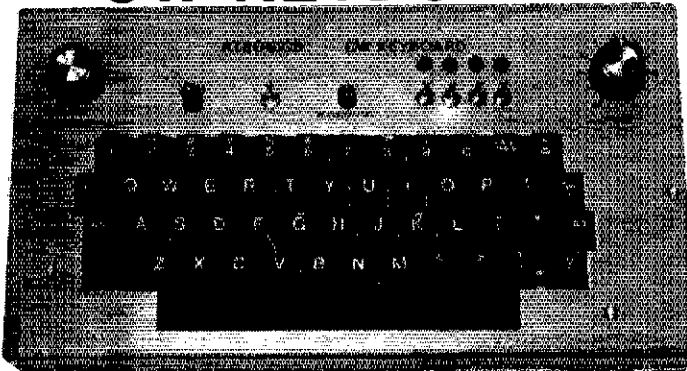
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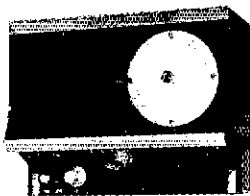
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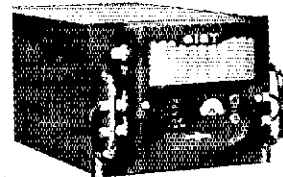
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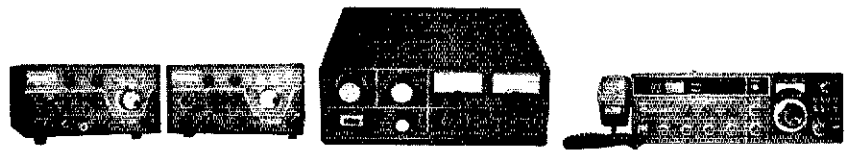
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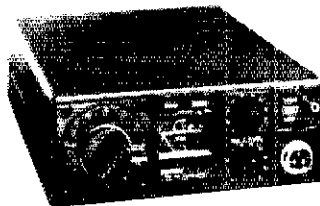
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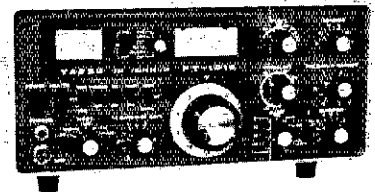
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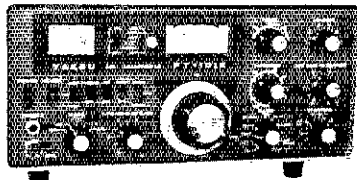
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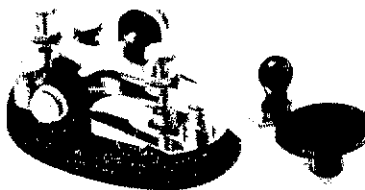
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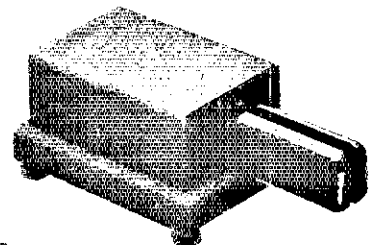
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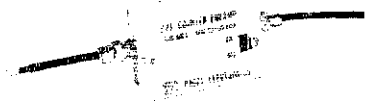
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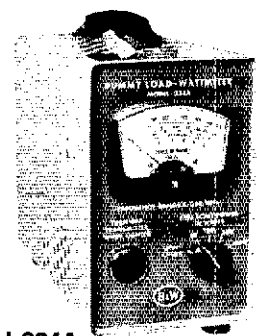
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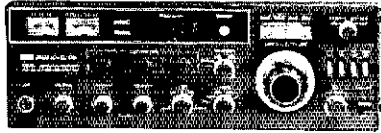
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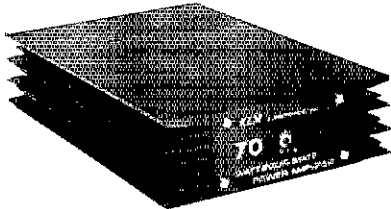
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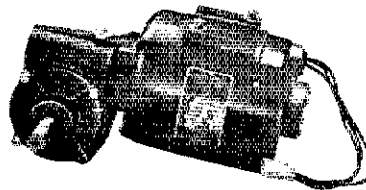
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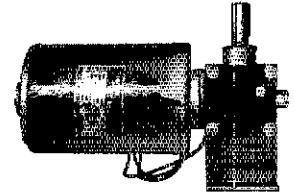
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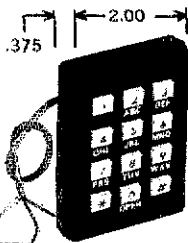
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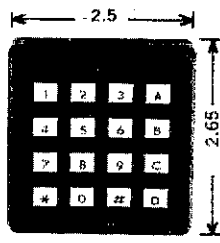
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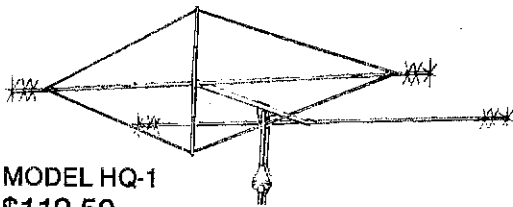
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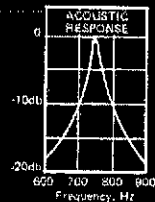
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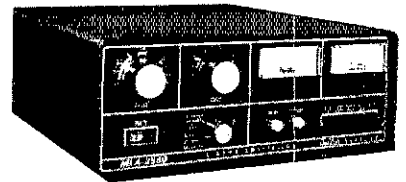
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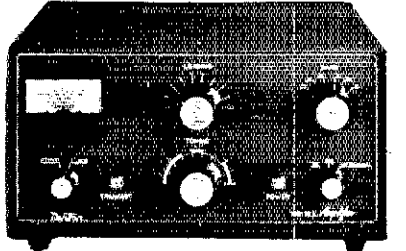
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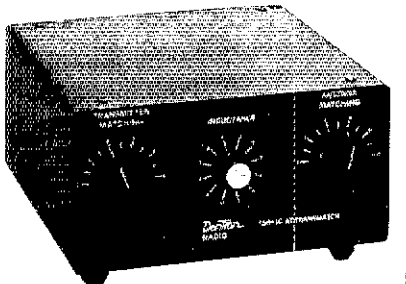
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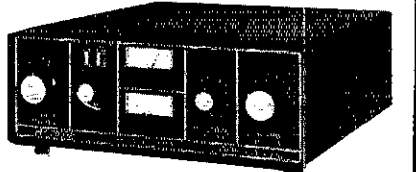
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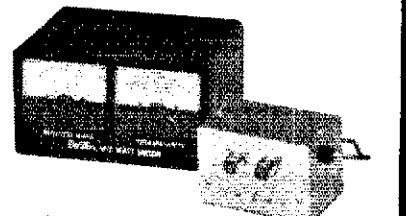
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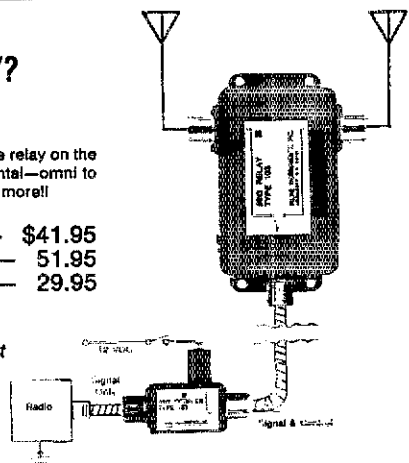
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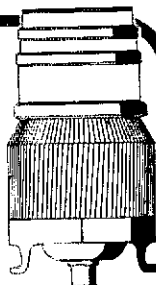
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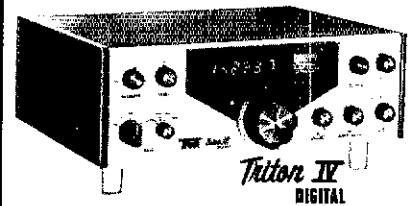
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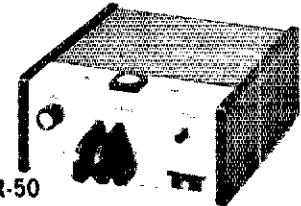
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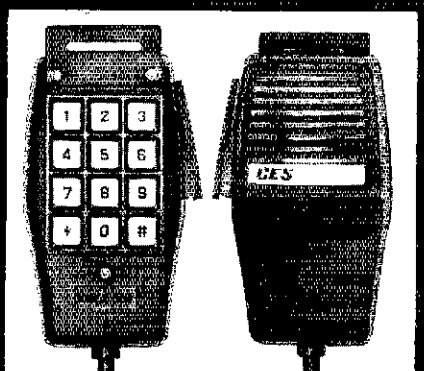


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WANTED: Hamcrafter receivers and parts, any condition, for private collection. Also want HT-33-B with manual — must be mint — write C. Dachs, WD5EOG, 4500 Russell, Austin TX 78745.

WANTED!!! Johnson SSB adapter (any condition) for Johnson Viking Valiant Transmitter and Technical Materials Corporation SSB adapter — model GSB-1, call 201-477-4096 or 201-363-2853.

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TEN-TEC Argonaut transceiver with calibrator, microphone, power supply — \$320. Mint condition. W9CQH, 815-732-2501.

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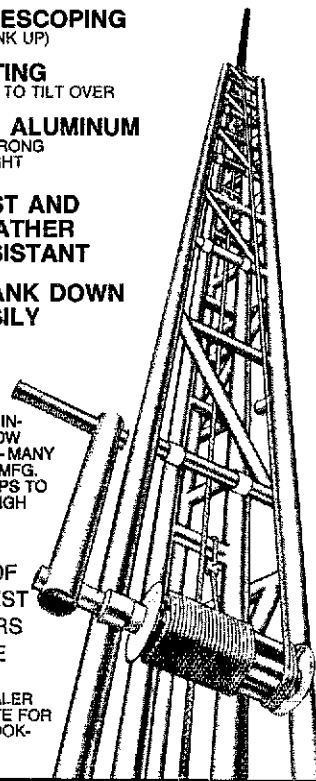
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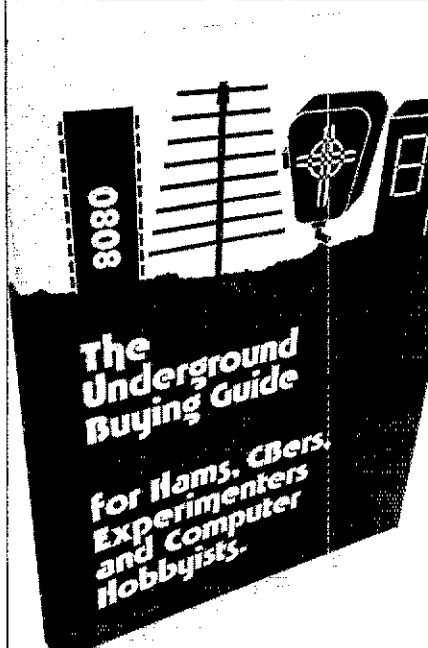


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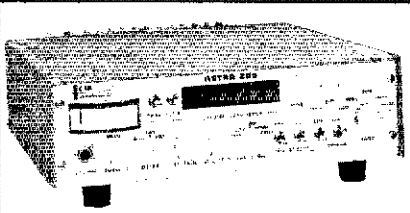
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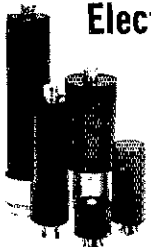
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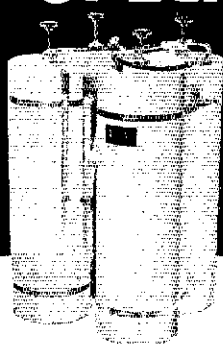
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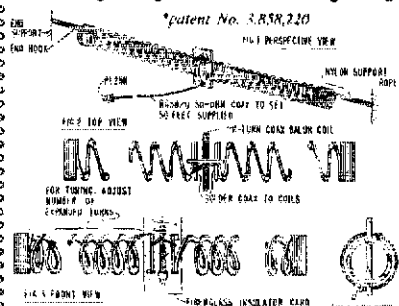
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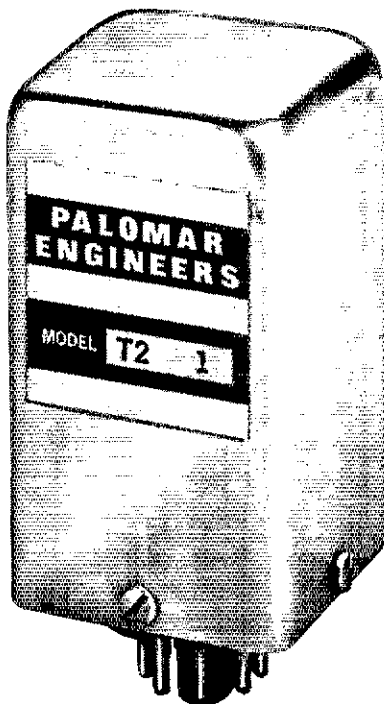
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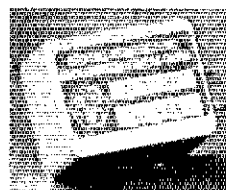
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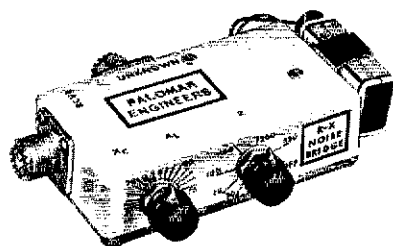
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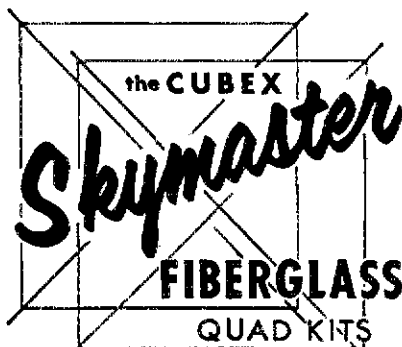
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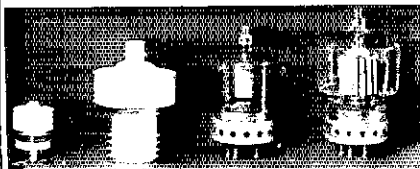
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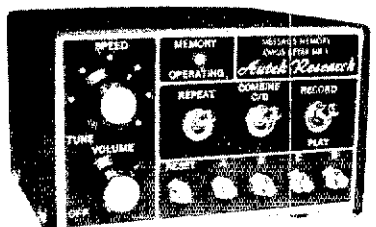
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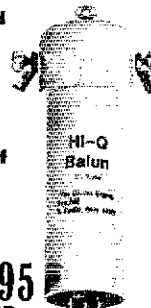
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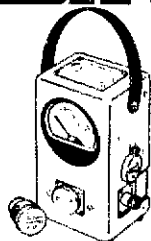
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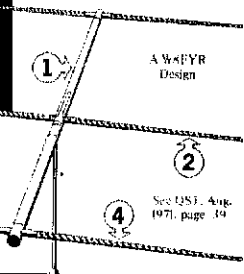
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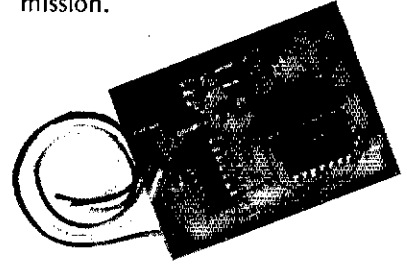
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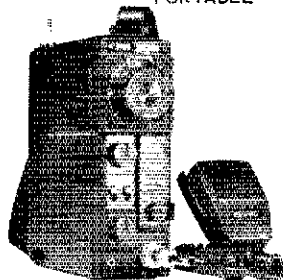
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PORTABLE



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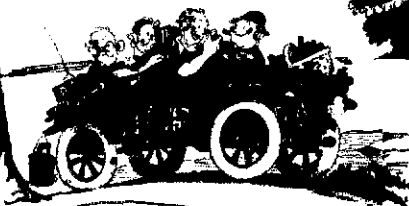
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DRAKE R4C receiver with ssb and cw filters. \$450. Ken Bishop, 5 Sunnyslope Drive, Middletown, CT 06457.

DRAKE TR-4CW and AC-4 for sale. R. Myers, 221 Long Swamp Road, Wolcott, CT 06716. 203-879-0561.

SELL Hammerlund HQ-170 with matching speaker, excellent condition, also 5 band transmitter, \$125. WB4AVV 615-344-5670.

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WANTED 160 meter AM low power transmitter W2HRT POB 216 Hackensack NJ 07602.

CAPACITORS, 40uf, 5kv, oil-filled, unused, shipping included, \$33. Other sizes also. 100' steel tower, with guys and all hardware, unused, best reasonable offer, will ship. Chris Wartes K7UWT/K7II, 706 Harvest Rd., Bothell, WA 98011, 206-486-5344.

COLLINS: 755-2, \$375; 312B-4, \$175; MP-1, \$90; CC-2, \$35. Drake: MN-4, \$75. Gunset: Communicator IV/6m, \$80. Clegg, FM-27B, \$225. Hallcrafters: VFO/24.6, \$30. Raytrac: DX20000L linear, \$500. Waters/BAW 361 Keyer, \$40. W1YJI, Dr. Lloyd Teran, Box 252 Sherborn, MA 01770.

SELL: Heath HW-16 and HG-10, \$150. W. Begun, WB4WME, 5117 Foxwood Road, Knoxville, TN 37921. 615-588-3987.

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\$550 DRAKE TR4C, AC-4, MS-4 excel. condition manuals original owner Hal WA1TKD, 617-533-8904

HEATH SB-101 transceiver \$8640 - LMO SB600 speaker HD 23 A.C. supply - Package only \$500. Will deliver within 100 miles 201-835-8490.

SSTV: Venus S52 monitor, C-I camera, tripod with manuals and factory cartons, \$450. Bill Kaufman WB4VHV, 810 W. Virginia Ave., Tampa, FL 33603. 813-229-1762.

SELL or trade - HW-202 transceiver with HWA-202-2 tone encoder, HW-2036-3 power supply - \$175. New 200m lens television camera with power supply warranty - \$175. Need Atlas 180/210/215, 2M synthesized or HT transceiver. WEDOM, 60M Majorca CT, San Jose, CA 95120. 408-997-0132.

SPARE equipment all operational excellent Halcrafters 5X101A receiver \$110; Swan 500C transceiver with 117x/ac \$300; FL-2100 linear \$275 Heath VF-1 VFO with p/s \$18. Ship collect W4KON/6 1395 Via Alta, Santa Maria, CA 93454 805-937-8014.

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2.5 Watt MARK II and

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SPECIFICATIONS:

- Range: 144-148 MHz
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Include LC-4 Leather Case, WC12 AC Wall Battery Charger, BC4 Desk Type Battery Charger, SM4 Speaker Mic, Touch Tone Pad, Tone Options.

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The new arrivals to the Wilson family of quality high performing hand-held radios are the small American-made small sized MARK II and MARK IV. The ultimate hand-held for the amateur who demands quality, performance and value.

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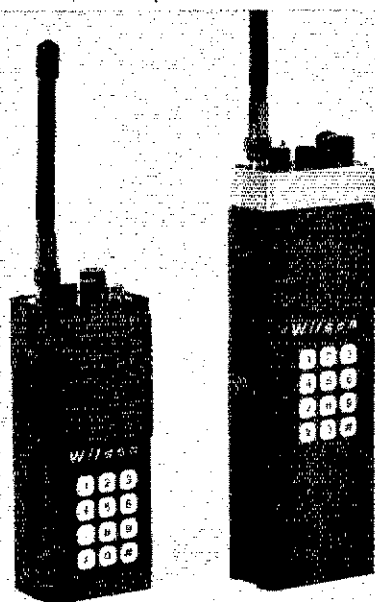
- Lightweight and compact size - fits comfortably in the palm of your hand.
- Rugged Lexan® case.
- Same dependable performance as all Wilson Hand-Helds.
- Microswitch Speaker-Mic built in.

- Priced at

\$199⁹⁵ MARK II
(2.5 watt)

\$239⁹⁵ MARK IV
(4 watt)

Other Wilson units available are the VHF Models 1402SM, 2.5 watt, Model 1405SM Switchable 1 and 5 watt and 4502SM, 450 MHz, 2202SM, 220 MHz UHF units



FOR SIZE COMPARISON, THE NEW MARK IV IS ILLUSTRATED NEXT TO WILSON'S 1405SM SWITCHABLE 1 & 5 WATT RADIO.

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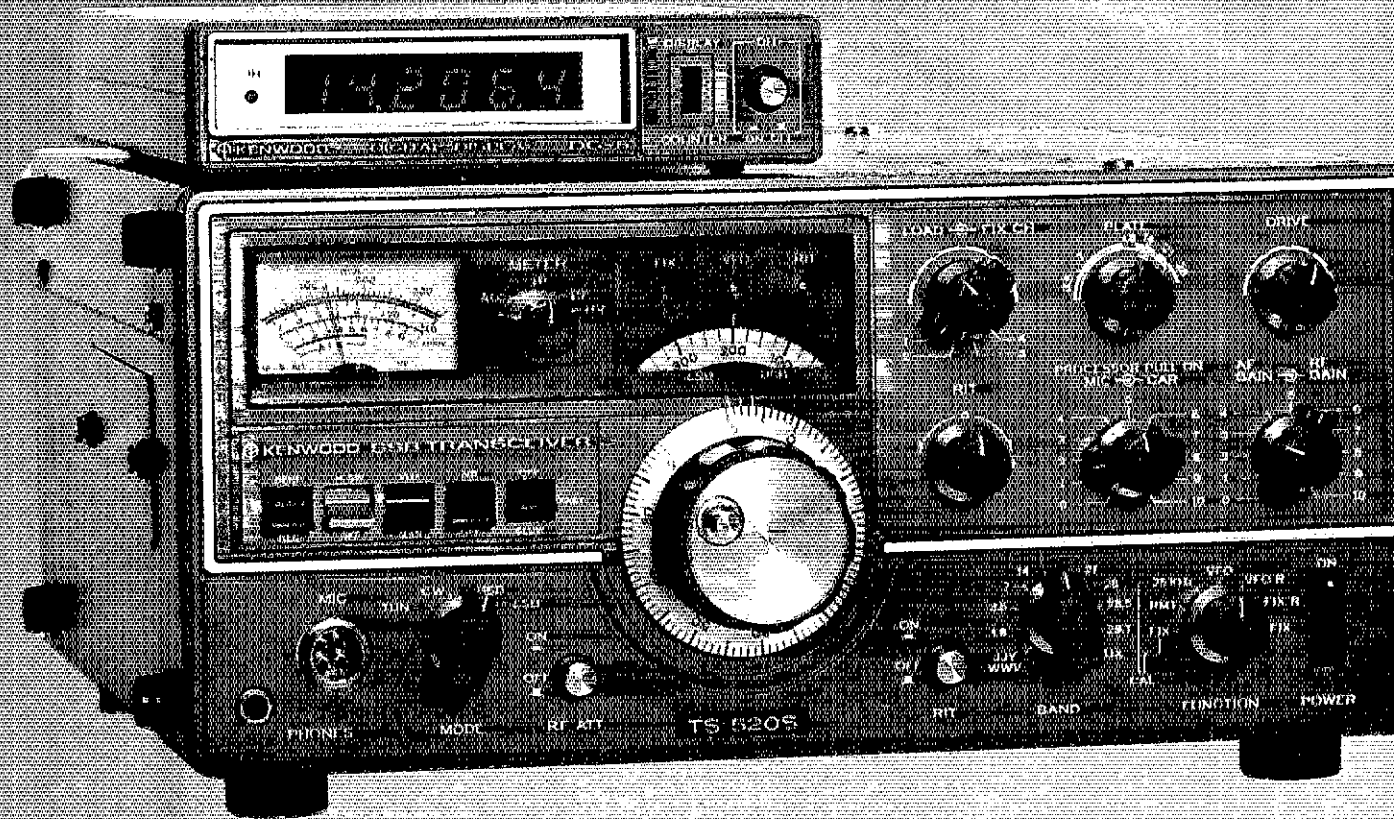
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KENWOOD

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TS-520S

AND DG-5 DIGITAL FREQUENCY DISPLAY



The TS-520S continues all of the fine features and characteristics of the original TS-520 together with many of the ideas and suggestions for improvement from amateurs worldwide.

FULL COVERAGE TRANSCEIVER

The TS-520S provides full coverage on all amateur bands from 1.8 to 29.7 MHz. Kenwood gives you 160 meter capability, WWV on 15,000 MHz, and an auxiliary band position for maximum flexibility. And with the addition of the TV-506 transverter, your TS-520S can cover 160 meters to 6 meters on SSB and CW.

DIGITAL DISPLAY DG-5 (option)

The Kenwood DG-5 provides easy, accurate readout of your operating frequency while transmitting and receiving.

OUTSTANDING RECEIVER SENSITIVITY AND MINIMUM CROSS MODULATION

The TS-520S incorporates a 3SK35 dual gate MOSFET for outstanding cross modulation and spurious response characteristics. The 3SK35 has a low noise figure (3.5 dB typ.) and high gain (18 dB typ.) for excellent sensitivity.

NEW IMPROVED SPEECH PROCESSOR

An audio compression amplifier gives you extra punch in the pile

ups and when the going gets rough.

VERNIER TUNING FOR FINAL PLATE CONTROL

A vernier tuning mechanism allows easy and accurate adjustment of the plate control during tune-up.

FINAL AMPLIFIER

The TS-520S is completely solid state except for the driver (12BY7A) and the final tubes. Rather than substitute TV sweep tubes as final amplifier tubes in a state of the art amateur transceiver,

Kenwood has employed two mucky 6-200TA (equivalent to 6146B) tubes. These rugged, time-proven tubes are known for their long life and superb linearity.

IGNITION NOISE REDUCTION

An effective noise-blanking circuit developed by Kenwood that virtually eliminates ignition noise is built into the TS-520S.

ATTENUATOR

The TS-520S has a built-in 20 dB attenuator that can be activated by a push button switch conveniently located on the front panel.

RECEIVER VERSATILITY

A special jack on the rear panel of the TS-520S provides receiver signals to an external receiver for increased station versatility. A switch on the rear panel determines the signal path... the receiver in the TS-520 or any external receiver.

VFO-520 - NEW REMOTE VFO

The VFO-520 remote VFO matches the styling of the TS-520S and provides maximum operating flexibility on the band selected on your TS-520S.

AC POWER SUPPLY

The TS-520S is completely self-contained with a rugged AC power supply built-in. The addition of the DS-1A DC-DC converter (optional) allows for mobile operation of the TS-520S.

EASY PHONE PATCH CONNECTION

The TS-520S has 2 convenient RCA phono jacks on the rear panel for PHONE PATCH IN and PHONE PATCH OUT.

CW FILTER - CW FILTER (OPTION)

The CW-520-500 Hz filter can be easily installed and will provide improved operation on CW.

AMPLIFIED TUNE AND CIRCUIT

The AGC circuit has 3 positions (OFF, FAST, SLOW) to enable the TS-520S to be operated in the optimum condition at all times whether operating CW or SSB.

The TS-520S retains all of the features of the original TS-520 that made it tops in its class: RIT control • 8-pole crystal filter • Built-in 25 KHz calibrator • Front panel carrier level control • Semi-break-in CW with sidetone • VOX/PTT/MOX • TUNE position for low power tune up • Built-in speaker • Built-in Cooling Fan • Provisions for 4 fixed frequency channels • Heater switch.

TS-520 Specifications

Amateur Bands: 160-10 meters, plus WWV (1.8 MHz and V)
 Modes: USB, LSB, CW
 Antenna Impedance: 50 Ohms
 Frequency Stability: Within 1.5 kHz during one hour after one minute of warmup, and within 100 Hz during any 30 minute period thereafter
 Tubes & Semiconductors:
 Tubes: 2
 (6200A x 2, 12BY7A)
 Transistors: 52
 FETs: 19
 Diodes: 101

Power Requirements: 120/220 V AC, 50/60 Hz, 13.8 V DC (with optional DS-1A)

Power Consumption: Transmit: 280 Watts - Receive: 26 Watts (with heater off)

Dimension: 333(13 1/4) W x 153 (6-0) H x 335(13 3/16) D mm(inch)
 Weight: 16.0 kg(35.2 lbs.)

TRANSMITTER

RF Input Power: SSB: 200 Watts
 PEP CW: 160 Watts DC

Carrier Suppression: Better than -40 dB

Sideband Suppression: Better than -50 dB

Spurious Radiation: Better than -40 dB

Microphone Impedance: 50k Ohms
 AF Response: 400 to 2,600 Hz

RECEIVER

Sensitivity: 0.25 μ V for 1Q dB (S+N)/N

Selectivity: SSB: 2.4 kHz/-6 dB, 4.4 kHz/-60 dB

Selectivity: CW: 0.5 kHz/-6 dB, 1.5 kHz/-60 dB (with optional CW-520 filter)

Image Ratio: Better than 50 dB

IF Rejection: Better than 50 dB

AF Output Power: 1.0 Watt (8 Ohm load, with less than 10% distortion)

AF Output Impedance: 4 to 16 Ohms

DG-5

SPECIFICATIONS

Measuring Range: 100 Hz to 40 MHz

Input Impedance: 5 k Ohms

Gate Time: 0.1 Sec.

Input Sensitivity: 100 Hz to 40 MHz: 200 mV rms or over; 10 kHz to 10 MHz: 50 mV or over

Measuring Accuracy: Internal time base accuracy ± 0.1 count

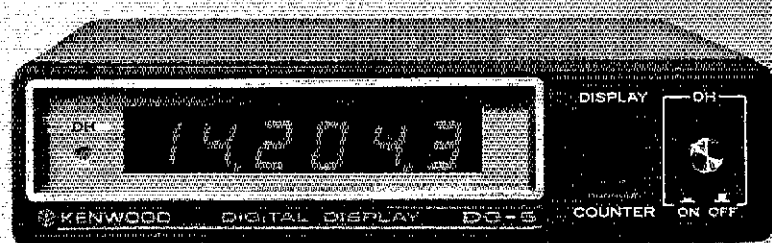
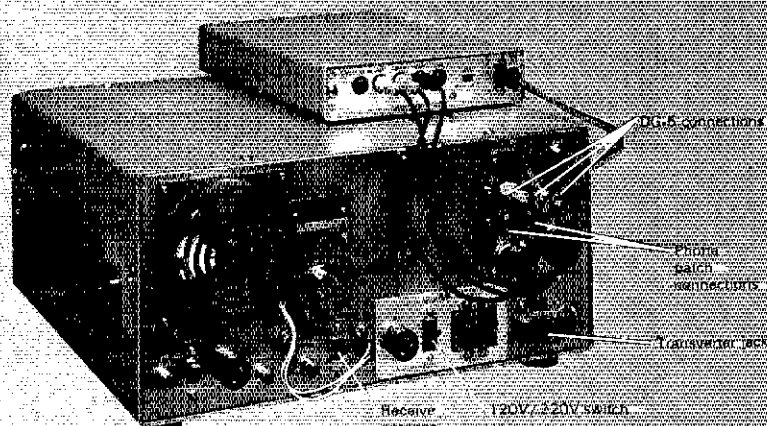
Time Base: 10 MHz

Operating Temperature: -10 to 50° C/14 to 122° F

Power Requirement: Supplied from TS-520S or 12 to 16 VDC (nominal 13.8 VDC)

Dimensions: 167(6-9/16) W x 43(1-11/16) H x 268(10-9/16) D mm(inch)

Weight: 1.3 kg(2.9 lbs.)



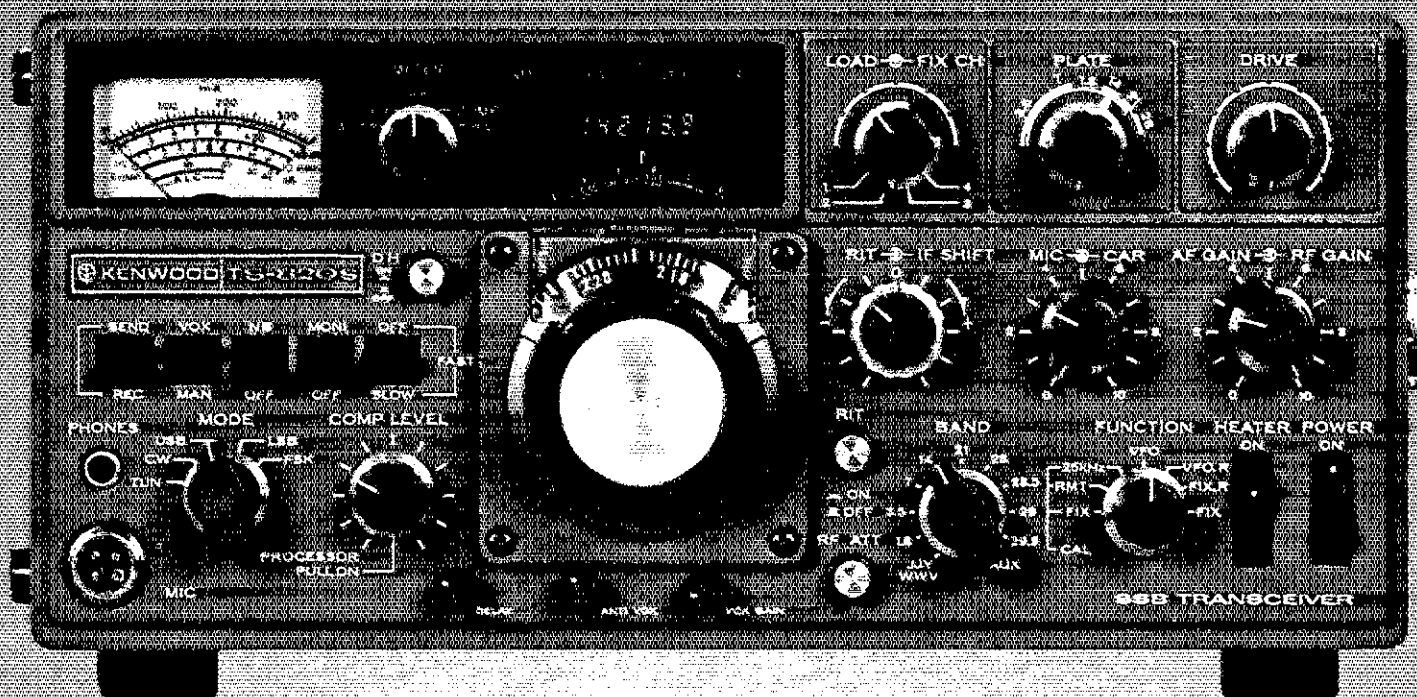
DG-5

The luxury of digital readout is available on the TS-520S by connecting the DG-5 receiver (option). More than just the average readout, this counter tracks the carrier, VFO, and heterodyne frequencies to give you one single frequency. This handsomely styled frequency can be set almost anywhere in your shack for easy to read operation. For set it on the dash-board during mobile operation for safety and convenience. The bold digital display your operating frequency while you transmit and receive. Available with OH (display hold) switch for frequency memory and a position memory selector. The DG-5 can also be used as a digital frequency counter up to 40 MHz at the touch of a switch. (Input cable provided.)

NOTE: TS-520 owners can use the DG-5 with a DK-520 speaker for.

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TS-820S

WITH DIGITAL FREQUENCY DISPLAY

We told you that the TS-820 would be best. In little more than a year our promise has become a fact. Now, in response to hundreds of requests from amateurs, Kenwood offers the TS-820S*... the same superb transceiver, but with the digital readout factory installed. As an owner of this beautiful rig, you will have at your fingertips the combination of controls and features that even under the toughest operating conditions make the TS-820S the Pacesetter that it is.

Following are a few of the TS-820S' many exciting features.

PLL • The TS-820S employs the latest phase lock loop circuitry. The single conversion receiver section performance offers superb protection against unwanted cross-modulation. And now PLL allows the frequency to remain the same when switching sidebands (USB, LSB, CW) and eliminates having to recalibrate each time.

DIGITAL READOUT • The digital counter display is employed as an integral part of the VFO readout system. Counter mixes the carrier VFO, and first heterodyne frequencies to give *exact* frequency. Figures the frequency down to 10 Hz and digital display

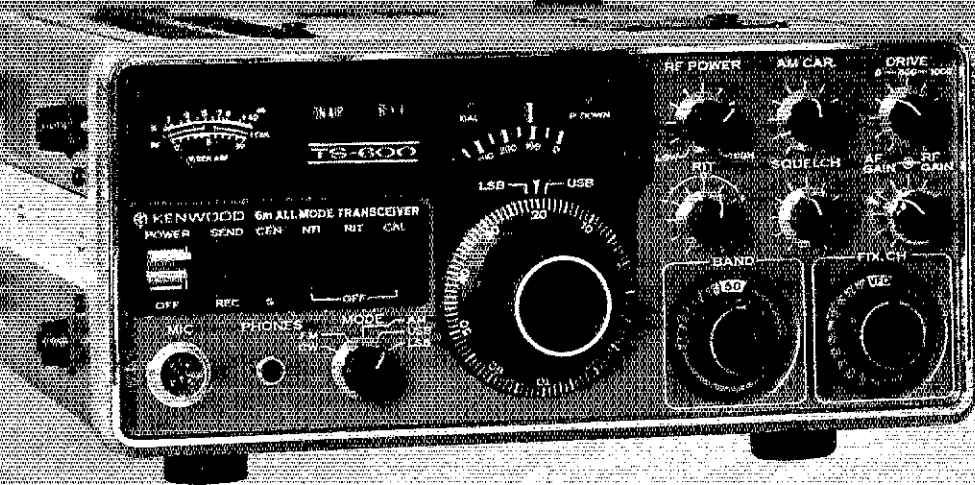
reads out to 100 Hz. Both receive and transmit frequencies are displayed in easy to read, Kenwood Blue digits.

SPEECH PROCESSOR • An RF circuit provides quick time constant compression using a true RF compressor as opposed to an AF clipper. Amount of compression is adjustable to the desired level by a convenient front panel control.

IF SHIFT • The IF SHIFT control varies the IF passband without changing the receive frequency. Enables the operator to eliminate unwanted signals by moving them out of the passband of the receiver. This feature alone makes the TS-820S a pacesetter.

*The TS-820 and DG-1 are still available separately.

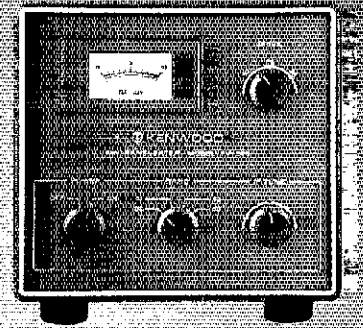
TS-600



Experience the excitement of 6 meters. The TS-600 all mode transceiver lets you experience the fun of 6 meter band openings.

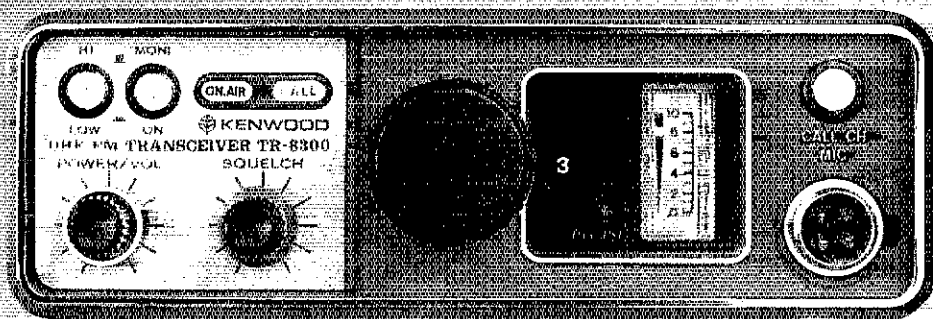
This 10 watt, solid state rig covers 50.0-54.0 MHz. The VFO tunes the band in 1 MHz segments. It also

has provisions for fixed frequency operation on NETS or to listen for beacons. State of the art features such as an effective noise blanker and the RIT (Receiver Incremental Tuning) circuit make the TS-600 another Kenwood "Pacesetter".



TV-506

An easy way to get on the 6 meter band with your TS-520/520S, TS-820/820S and most other transceivers. Simply plug it in and you're on... full band coverage with 10 watts output on SSB and CW.



TR-8300

Experience the luxury of 450 MHz at an economical price.

The TR-8300 offers high quality and superb performance as a result of many years of improving VHF/UHF design techniques. The trans-

ceiver is capable of F₃ emission on 23 crystal-controlled channels (3 supplied). The transmitter output is 10 watts.

The TR-8300 incorporates a 5 section helical resonator and a

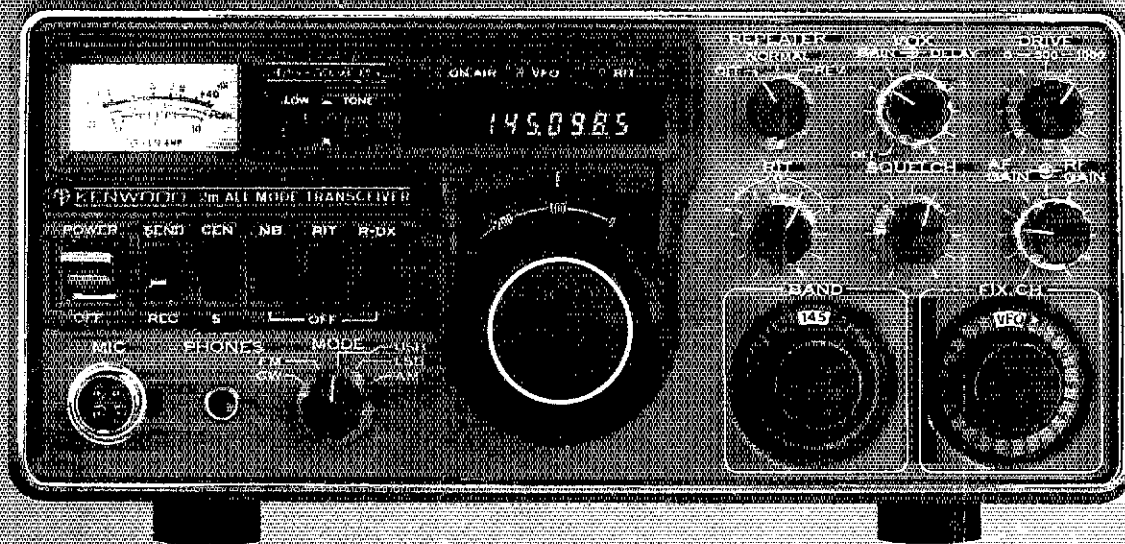
two-pole crystal filter in the IF section of the receiver for improved intermodulation characteristics. Receiver sensitivity, spurious response, and temperature characteristics are excellent.

KENWOOD

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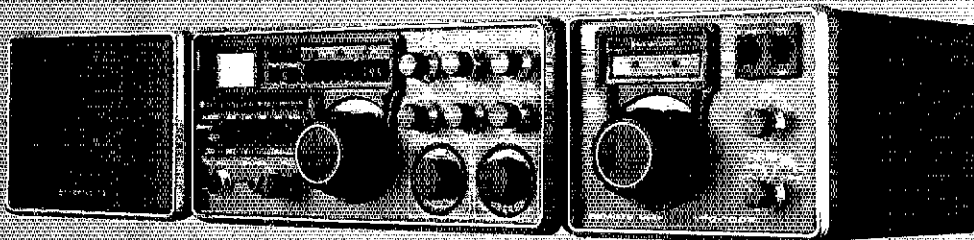
TS-700S

WITH DIGITAL FREQUENCY DISPLAY



Check out the new "built-ins":
digital readout, receiver pre-amp,
VOX, semi-break in, and CW sidetone!
Of course, it's still all mode, 144-148
MHz and VFO controlled.

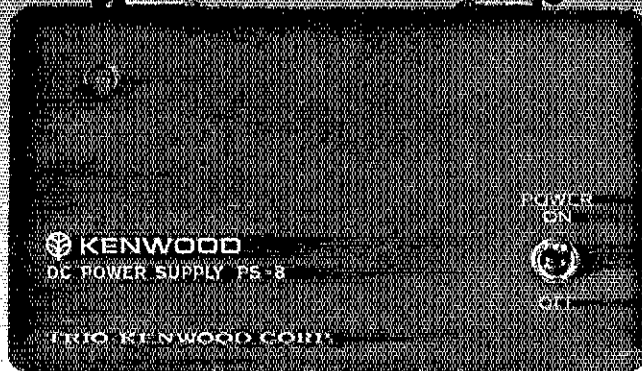
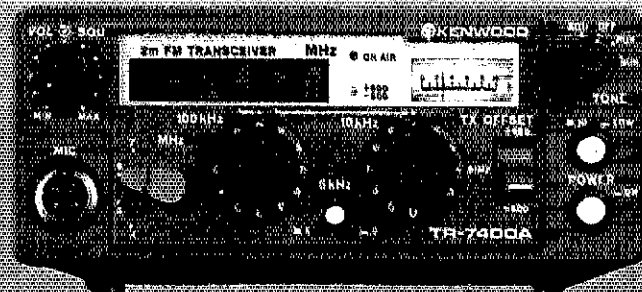
Features: Digital readout with "Kenwood Blue" digits • High gain receiver pre-amp • 1 watt lower power switch • Built in VOX • Semi-break in on CW • CW sidetone • Operates all modes: SSB (upper & lower), FM, AM and CW • Completely solid state circuitry provides stable, long lasting, trouble-free operation • AC and DC capability (operate from your car, boat, or as a base station through its built-in power supply) • 4 MHz band coverage (144 to 148 MHz) • Automatically switches transmit frequency 800 KHz for repeater operation. Simply dial in your receive frequency and the radio does the rest... simplex, repeater, reverse • Or accomplish the same by plugging a single crystal into one of the 11 crystal positions for your favorite channel • Transmit/Receive capability on 44 channels with 11 crystals.



VFO-700S

Handsomely styled and a perfect companion to the TS-700S. This unit provides you with the extra versatility and the luxury of having a second VFO in your shack. Great for split frequency operation and for tuning off frequency to check the band. The function switch

on the VFO-700S selects the VFO in use and the appropriate frequency is displayed on the digital readout in the TS-700S. In addition a momentary contact "frequency check" switch allows you to spot check the frequency of the VFO not in use.



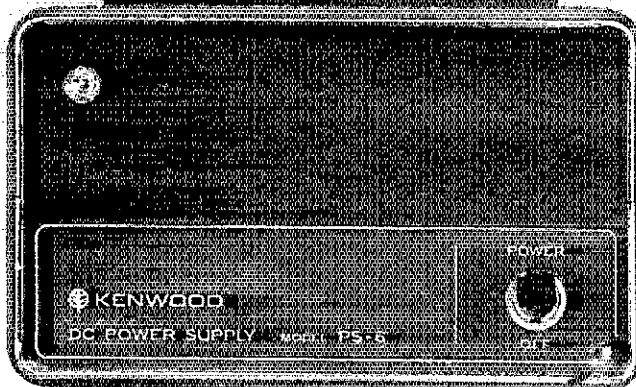
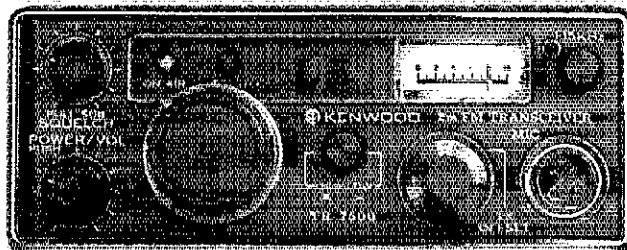
TR-7400A

Features Kenwood's unique Continuous Tone Coded Squelch system, 4 MHz band coverage, 25-watt output and fully synthesized 800 channel operation. This compact package gives you the kind of performance specifications you've always wanted in a 2-meter amateur rig.

Outstanding sensitivity, large-sized helical resonators with High Q to minimize undesirable out-of-band interference, and give a 2-pole 10.7 MHz monolithic crystal filter combine to give your TR-7400A outstanding receiver performance. Intermodulation characteristics (Better than 66dB), spurious (Better than -60dB), image rejection (Better than -70dB), and a versatile squelch system make the TR-7400A tops in its class.

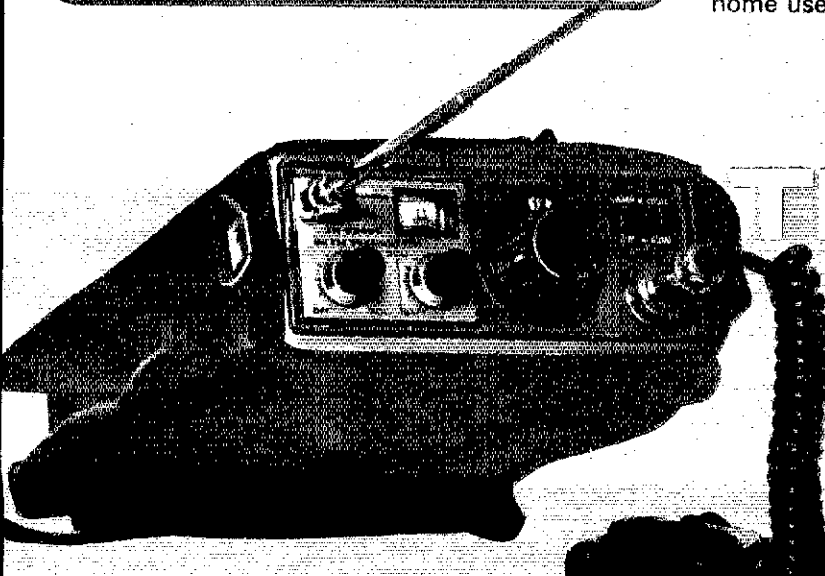
Shown with the PS-8 power supply

(Active filters and Tone Burst Modules optional)



TR-7500

This 100 channel PLL synthesized 146-148 MHz transceiver comes with 88 pre-programmed channels for use on all standard repeater frequencies (as per ARRL Band Plan) and most simplex channels. For added flexibility, there are 6 diode-programmable switch positions. The 15 KHz shift function makes these 6 positions into 12 channels. 10 watt output, ± 600 KHz offset and LED digital frequency display are just a few of the many fine features of the TR-7500. The PS-6 is the handsomely styled, matching power supply for the TR-7500. Its 3.5 amp current capacity and built-in speaker make it the perfect companion for home use of the TR-7500.



TR-2200A

The high performance portable 2-meter FM transceiver. 146-148 MHz, 12 channels (6 supplied), 2 watts or 400 mW RF output. Everything you need is included: Ni-Cad battery pack, charger, carrying case and microphone.

KENWOOD

pacesetter in amateur radio

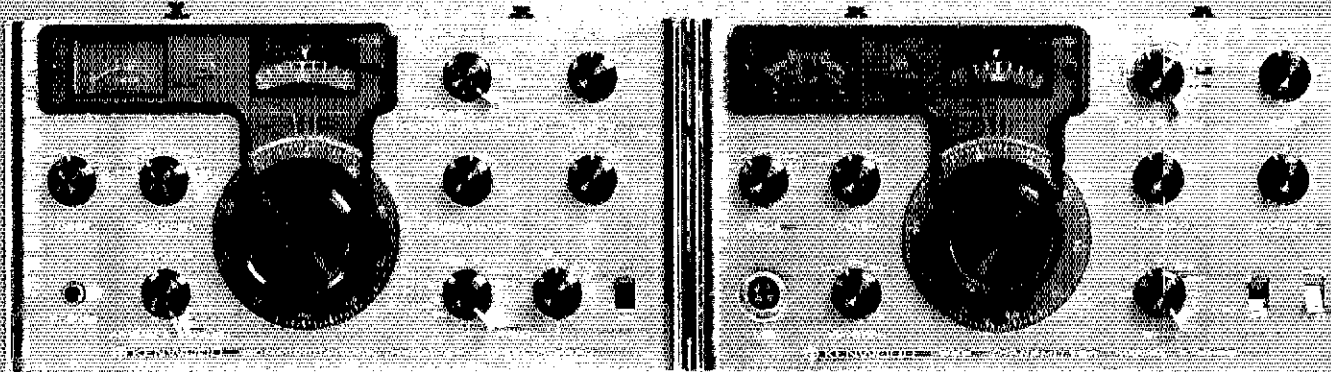
Kenwood developed the T-599D transmitter and R-599D receiver for the most discriminating amateur.

The R-599D is the most complete receiver ever offered. It is entirely solid-state, superbly reliable and compact. It covers the full amateur band, 10 through 160 meters. CW, LSB, USB, AM and FM.

The T-599D is solid-state with the exception of only three tubes, has built-in power supply and full metering. It operates CW, LSB, USB and AM and, of course, is a perfect match to the R-599D receiver.

If you have never considered the advantages of operating a receiver/transmitter combination... maybe you should. Because of the larger number of controls and dual VFOs the combination offers flexibility impossible to duplicate with a transceiver.

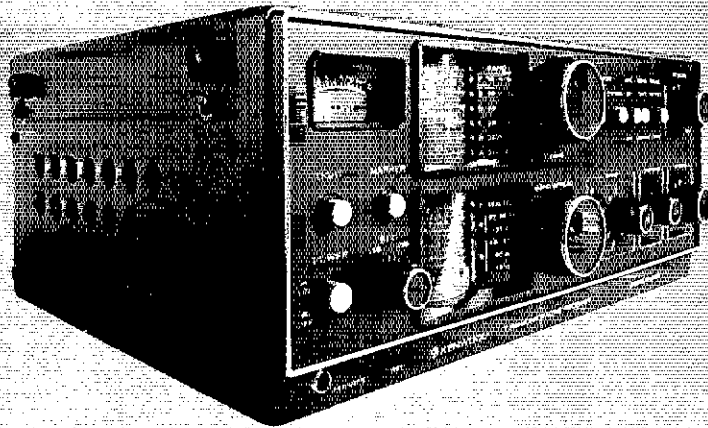
Compare the specs of the R-599D and the T-599D with any other brand. Remember, the R-599D is all solid state (and includes four filters). Your choice will obviously be the Kenwood.

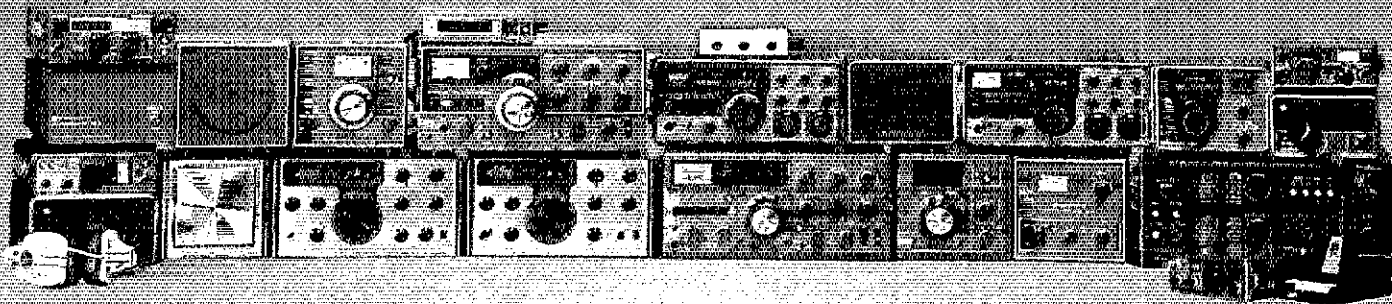


R-599D T-599D

R-300

Dependable operation, superior specifications and excellent features make the R-300 an unexcelled value for the shortwave listener. It offers full band coverage with a frequency range of 1.70 MHz to 30.0 MHz • Receives AM, SSB and CW • Features large, easy to read drum dials with fast smooth dial action • Band spread is calibrated for the 10 foreign broadcast bands, easily tuned with the use of a built-in 500 KHz calibrator • Automatic noise limiter • 3-way power supply system (AC/Batteries/External DC) take it anyplace • Automatically switches to battery power in the event of AC power failure.





*Fine equipment that belongs in every
well equipped station*

820 SERIES

- 820 Series**
- TS-820S... TS-820 with Digital Installed
- TS-820... 10-160 M Deluxe Transceiver
- DG-1... Digital Frequency Display for TS-820
- VFO-820... Deluxe Remote VFO for TS-820/820S
- CW-820... 500 Hz CW Filter for TS-820/820S
- DS-1A... DC-DC Converter for 520/820 Series

520 Series

- TS-520S... 160-10 M Transceiver
- DG-5... Digital Frequency Display for TS-520 Series
- VFO-520... Remote VFO for TS-520 and TS-520S
- SP-520... External Speaker for 520/820 Series
- CW-520... 500 Hz CW Filter for TS-520/520S
- DK-520... Digital Adaptor Kit for TS-520

599D Series

- R-599D... 160-10 M Solid State Receiver
- T-599D... 80-10 M Matching Transmitter
- S-599... External Speaker for 599D Series

- CC-29A... 2 Meter Converter for R-599D
- CC-69... 6 Meter Converter for R-599D
- FM-599A... FM Filter for R-599D

SHORT WAVE LISTENING

- R-300 General Coverage SWL Receiver

VHF LINE

- TS-600... 6 M All Mode Transceiver
- TS-700S... 2 M All Mode Digital Transceiver
- VFO-700S... Remote VFO for TS-700S
- SP-70... Matching Speaker for TS-600/700 Series
- TR-2200A... 2 M Portable FM Transceiver
- TR-7400A... 2 M Synthesized Deluxe FM Transceiver

- TR-7500... 100 Channel Synthesized 2 M FM Transceiver
- TR-8300... 70 CM FM Transceiver (450 MHz)
- TV-506... 6 M Transverter for 520/820/599 Series

POPULAR STATION ACCESSORIES

- HS-4... Headphone Set
- MB-1A... Mounting Bracket for TR-2200A
- MC-50... Desk Microphone
- PS-5... Power Supply for TR-8300
- PS-6... Power Supply for TR-7500
- PS-8... Power Supply for TR-7400A
- VOX-3... VOX for TS-600/700A

Trio-Kenwood stocks a complete line of replacement parts, accessories, and manuals for all Kenwood models.

MORE ACCESSORIES:

Description	Model #	For use with
Rubber Helical Antenna	RA-1	TR-2200A
Telescoping Whip Antenna	T90-0082-05	TR-2200A
Ni-Cad Battery Pack (set)	PB-15	TR-2200A
4 Pin Mic. Connector	E07-0403-05	All Models
Active Filter Elements	See Service Manual	TR-7400A
Tone Burst Modules	See Service Manual	TS-700A; TR-7400A
AC Cables	Specify Model	All Models
DC Cables	Specify Model	All Models



The Kenwood HS-4 headphone set adds versatility to any Kenwood station. For extended periods of wear, the HS-4 is comfortably padded and is completely adjustable. The frequency response of the HS-4 is tailored specifically for amateur communication use. (300 to 3000 Hz, 8 ohms).



The MC-50 dynamic microphone has been designed expressly for amateur radio operation as a splendid addition to any Kenwood shack. Complete with PTT and LOCK switches, and a microphone plug for instant hook-up to any Kenwood rig. Easily converted to high or low impedance. (600 or 50k ohm).

TRIO-KENWOOD COMMUNICATIONS INC.
1111 WEST WALNUT/COMPTON, CA 90220



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\$69⁹⁵

MFJ-16010 ST Super Antenna Tuner

This NEW MFJ Super Antenna Tuner matches everything from 160 thru 10 Meters: dipoles, inverted vees, long wires, verticals, mobile whips, beams, balance lines, coax lines. Up to 200 watts RF OUTPUT. Built-in balun, too!

- Operate all bands with one antenna • Works with all solid state and tube rigs • Ultra compact: 5 x 2 x 6 inches • Uses toroid cores



\$39⁹⁵

MFJ-16010 Antenna Tuner

Now you can operate all bands — 160 thru 10 Meters — with a single random wire and run your full transmitter power output — up to 200 watts RF power OUTPUT.

- Small enough to carry in your hip pocket, 2-3/16 x 3-1/4 x 4 inches • Matches low and high impedance by interchanging input and output • SO-239 coaxial connectors • 12 position tapped inductor • Stacked toroid cores • At 1.8 MHz tuner matches 25 to 200 ohms.



\$29⁹⁵

CWF-2BX Super CW Filter

This MFJ Super CW Filter gives you 80 Hz bandwidth, and extremely steep skirts with no ringing for razor sharp selectivity that lets you pull signals out of heavy QRM. Plugs between receiver and phones or connect between audio stage for speaker operation.

- Selectable BW: 80, 110, 180 Hz • 60 dB down one octave from center frequency of 750 Hz for 80 Hz BW • Reduces noises 15 dB • 9 V battery • 2-3/16 x 3-1/4 x 4 inches • CWF-2PC, wired PC board, \$19.95.



\$69⁹⁵

MFJ-8043 IC Deluxe Electronic Keyer

This NEW MFJ Deluxe Keyer gives you more features per dollar than any other keyer available.

- Uses Curtis-8043 keyer chip • Sends iambic, automatic, semi-automatic, manual • Use squeeze, single lever, or straight key • Dot memory, self-completing dots and dashes, jam proof spacing, instant start • RF proof • Solid state keying ±300 V max • Weight, tone, volume, speed controls • Uses 4 C-cells; external power jack • 8 x 6 x 2 inches • Sidetone and speaker • Optional squeeze key: \$29.95



\$54⁹⁵

CMOS-8043 Electronic Keyer

State of the art design uses CURTIS-8043 Keyer-on-a-chip.

- Built-in Key • Dot memory • Iambic operation with external squeeze key • 6 to 50 WPM • Sidetone and speaker • Speed, volume, tone, weight controls • Ultra reliable solid state keying ±300 volts max. • 4 position switch for TUNE, OFF, ON, SIDETONE OFF • Uses 4 penlight cells • 2-3/16 x 3-1/4 x 4 inches

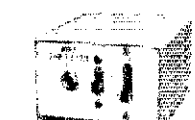


\$59⁹⁵

LSP-520BX II Log Speech Processor

Up to 400% more RF power. Plugs between your microphone and transmitter.

- Gives your audio punch power to slice through QRM • 30 dB IC log amp and 3 active filters • RF protected • 9 V battery • Two Mic jacks, 3/8" phone jacks, uncommitted 4 pin jack • Output cable • 2-1/8 x 3-5/8 x 5-9/16 inches • LSP-520BX, in standard MFJ enclosure, electronically identical, \$49.95.



\$29⁹⁵

SBF-2BX SSB Filter

Dramatically improves readability.

- Optimizes your audio to reduce sideband splatter, remove low and high pitched QRM, hiss, static crashes, background noise, 60 and 120 Hz hum • Reduces fatigue during contest, DX, and ragchewing • Plugs between phones and receiver or connect between audio stage for speaker operation • Selectable bandwidth IC active audio filter • Uses 9 volt battery • 2-3/16 x 3-1/4 x 4 inches



\$29⁹⁵

MFJ-200BX Frequency Standard

Provides strong, precise markers every 100, 50, or 25 KHz well into VHF region.

- Exclusive circuitry suppresses all unwanted markers • Markers are gated for positive identification CMOS IC's with transistor output • No direct connection necessary • Uses 9 volt battery • Adjustable trimmer for zero beating to WWV • Switch selects 100, 50, 25 KHz or OFF • 2-3/16 x 3-1/4 x 4 inches



\$49⁹⁵

MFJ-1030BX Receiver Preselector

Clearly copy weak unreadable signals (increases signal 3 to 5 "S" units).

- More than 20 dB low noise gain • Separate input and output tuning controls give maximum gain and RF selectivity to significantly reject out-of-band signals and reduce image responses • Dual gate MOS FET for low noise, strong signal handling abilities • Completely stable • Optimized for 10 thru 30 MHz • 9 V battery • 2-1/8 x 3-5/8 x 5-9/16 inches



\$29⁹⁵

MFJ-40T QRP Transmitter

Work the world with 5 watts on 40 Meter CW.

- No tuning • Matches 50 ohm load • Clean output with low harmonic content • Power amplifier transistor protected against burnout • Switch selects 3 crystals or VFO input • 12 VDC • 2-3/16 x 3-1/4 x 4 inches

MFJ-40V, Companion VFO \$29.95

MFJ-12DC, IC Regulated Power Supply,
1 amp, 12 VDC \$29.95



\$17⁹⁵

CPO-555 Code Oscillator

For the Newcomer to learn the Morse code.

For the Old Timer to polish his fist.

For the Code Instructor to teach his classes.

- Send crisp clear code with plenty of volume for classroom use • Self contained speaker, volume, tone controls, aluminum cabinet • 9 V battery • Top quality U.S. construction • Uses 555 IC timer • 2-3/16 x 3-1/4 x 4 inches

TK-555, Optional Telegraph Key \$1.95



\$19⁹⁵

C-500 Digital Alarm Clock

This digital alarm clock is also an ID Timer. Assembled, too!

- Gives ID buzz every 9 minutes automatically, or after tapping ID/doze button • Pressing ID/doze button displays seconds • Large 6.3 inch digits • Easily zeros to WWV • AM and PM LED indicators • Power out indicator • Fast set, slow set buttons • 110 VAC, 60 Hz • 3-1/8 x 3-3/4 x 3-3/8 inches • One year warranty by Fairchild

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**UNDER
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- fully synthesized frequency control, using PLL techniques in 5 KHz steps
- built-in tone burst, plus optional tone squelch encoder/decoder
- spurious well below minus 60dB requirement—superior cross modulation, overload and image rejection
- standard 600 KHz offsets plus any split within the band using the memory circuit
- automatic final protection, PLL "unlock" protection and busy channel indicator
- selectable 10 watt/1 watt output

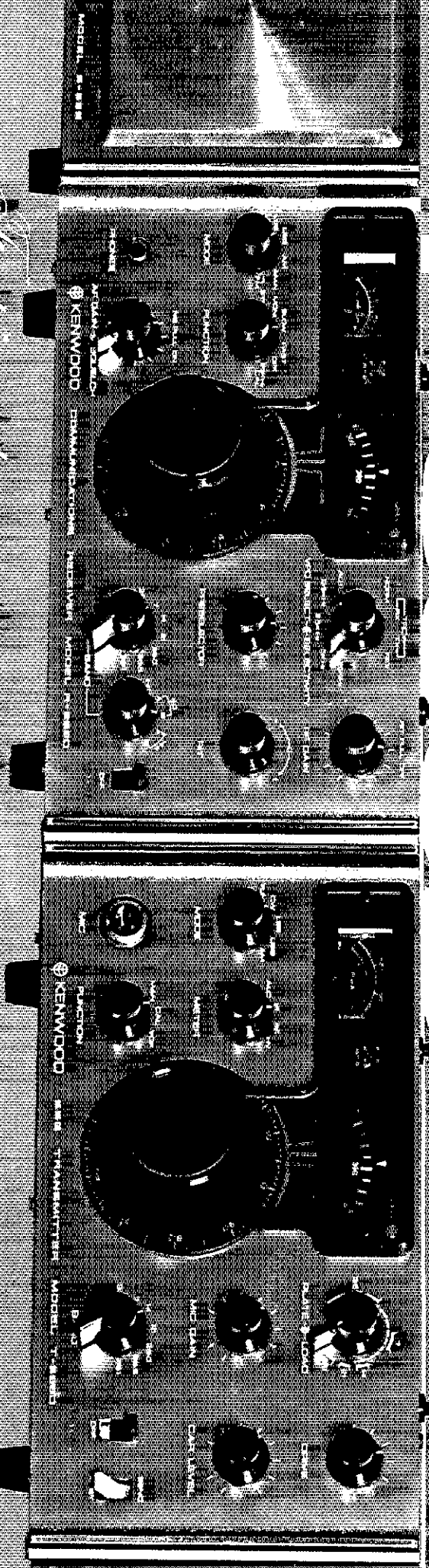
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Eastern Service Ctr., 613 Redna Terrace

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RR-599D



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communication, maybe you should.

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