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December 1975
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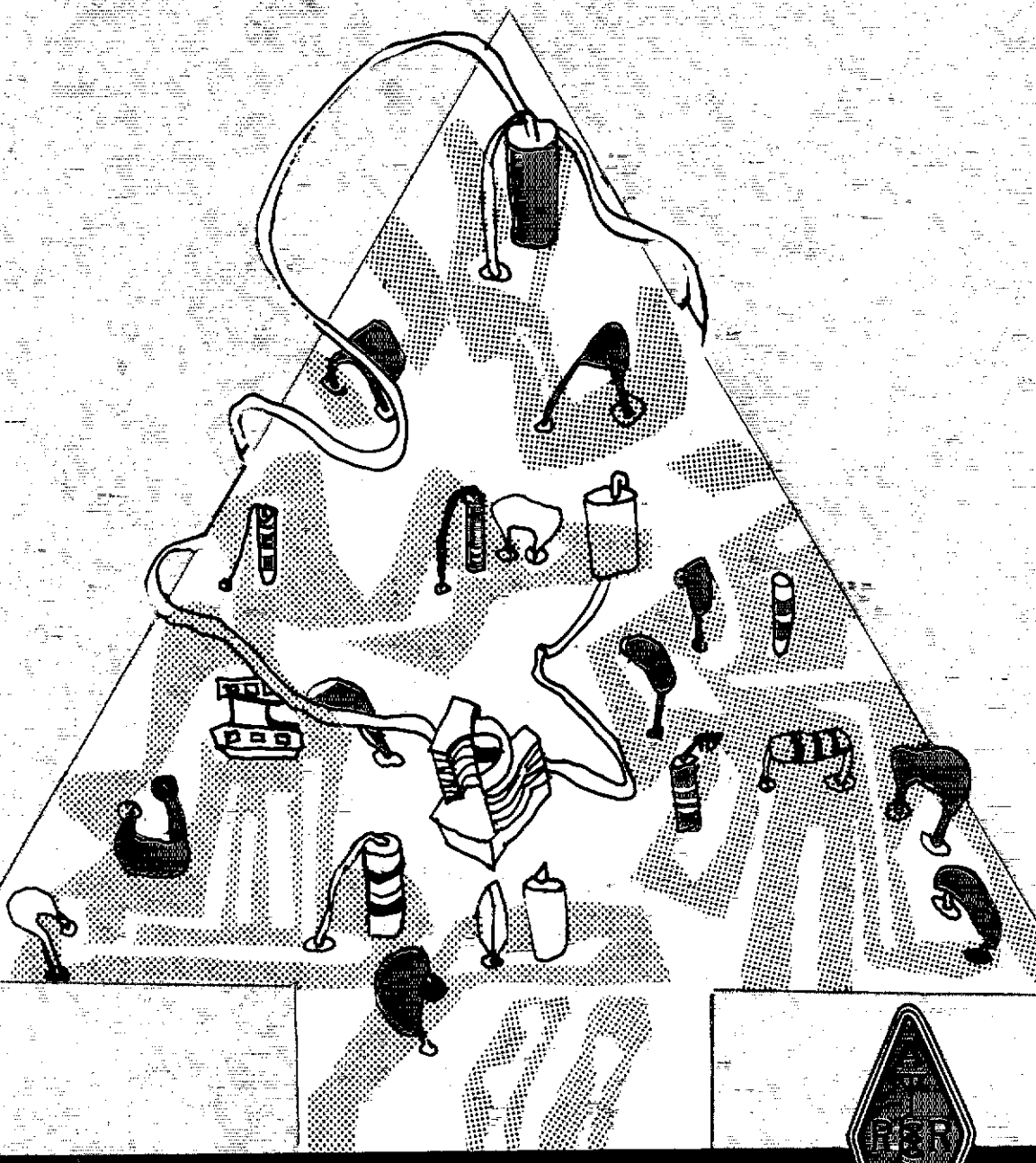

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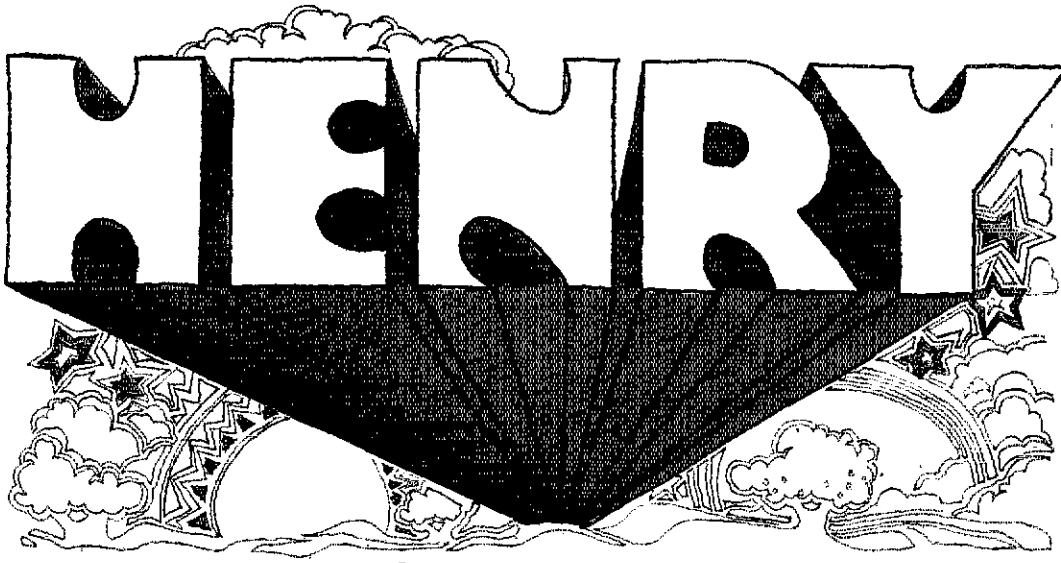

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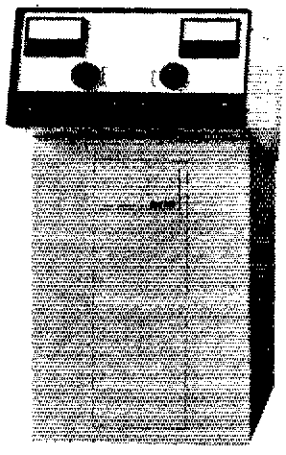

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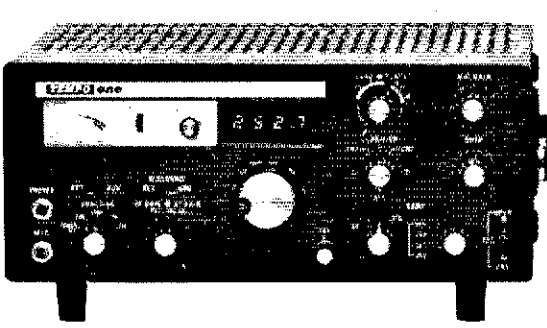

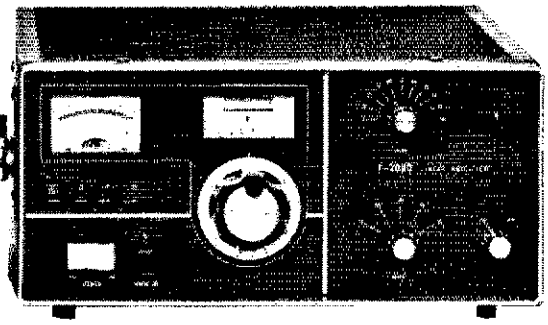

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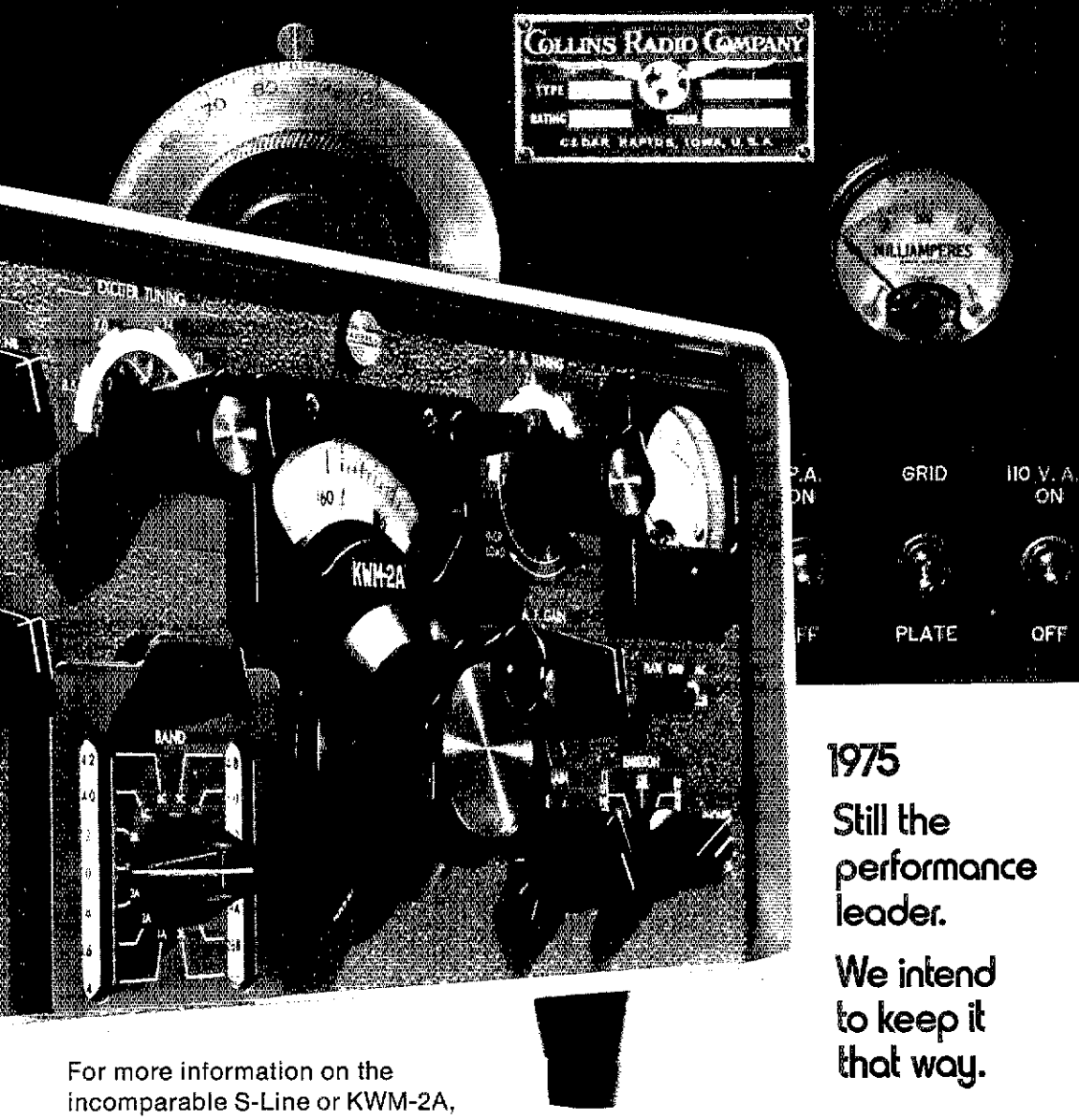

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QST

December 1975

Volume LIX Number 12

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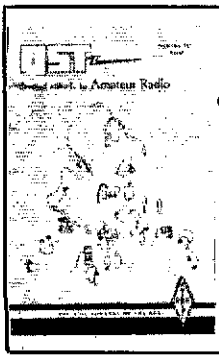

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Reports Invited. All amateurs, especially League members, are invited to report station activities on the first of each month (for preceding month) direct to the SCM, the administrative ARRL official elected by members in each Section. Radio club reports are also desired by SCMs for inclusion in *QST*. ARRL Field Organization station appointments are available in areas shown to qualified League members. General or Conditional Class licensees or higher may be appointed ORS, OVS, OPS, OO and OBS. Technicians may be appointed OVS, OBS, or VHF PAM. SCMs desire application leadership posts of SEC, EC, RM and PAM where vacancies exist.

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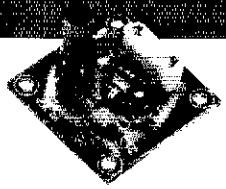

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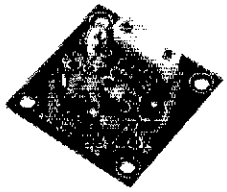

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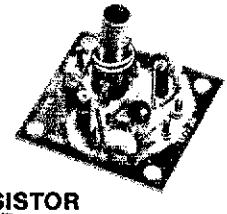

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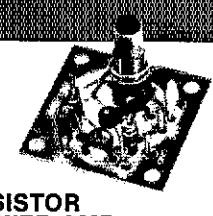

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is a noncommercial association of radio amateurs, bonded for the promotion of interest in amateur radio communication and experimentation, for the relaying of messages by radio, for the advancement of the radio art and of the public welfare, for the 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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7700 31st Ave., N.E., Seattle, WA 98115
Vice-Director: Dale T. Justice K7WWR
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Vice-Director: Albert F. Gaetano W6VZT
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Vice-Director: Donald B. Morris W8JM
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Vice-Director: Maurice O. Carpenter . . . KØHBZ
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Statesboro, GA 30458
Vice-Director: Ted R. Wayne WB4CBP
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CA 93402
Vice-Director: Jay A. Holladay W6EJJ
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Vice-Director: Jack D. Gant W5GM
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* Member Executive Committee

"It Seems to Us..."

APPLIANCE OPERATORS?

WE'VE all heard the charge that radio amateurs, as a group, have degenerated to the status of mere appliance operators. "Amateurs," some say, "simply purchase their equipment and no longer know or care about the technical aspects of electronics." This is nonsense, and we would do well to take deliberate steps to rid ourselves of this largely self-imposed image. That it is a dangerous one is evident from the fact that it has been used against amateur radio by unfriendly delegates at international frequency conferences.

It *is* true, of course, that in the earlier days of amateur radio we were all required by circumstances to make the most of our equipment; we did this simply because what we needed did not exist on the market or was inordinately expensive. We begged or borrowed everything that we could lay our hands on; but if it wasn't available, we made it ourselves. Even back then, if we cadged a transformer from an old broadcast radio, some "old timer" was likely to remonstrate with us for not winding our own!

As electronics technology progressed (we called it "radio"), a wider variety of components and equipment became available from industry, and *these* became our basic building blocks. World War II produced a wealth of surplus military gear which amateurs throughout the world eagerly cannibalized, modified, adapted and improved to perform a host of functions. Even then, there were those who deplored the transition from home-constructed to surplus equipment, and spoke darkly of our "technical decline."

Subsequently, a whole new industry grew up to cater to the needs of the amateur radio service, and we quite appropriately used its products.

There never has been a time in amateur radio when *all* radio amateurs were talented experimenters. The law of averages operated in the earlier days as it does now, and many of us old timers wound our coils and wired our circuits simply by dutiful adherence to plans developed by more clever amateurs. We learned, of course, but we weren't all pioneers and inventors, and what we put together was pretty primitive stuff by comparison with what we're now using.

Today, we amateurs employ all of the gadgets and devices which a vastly expanded electronics industry provides (many of *them* being the direct products of radio amateur knowledge) and then proceed to innovate and to assemble our communications facilities and systems. To be sure, not all of us are skilled technicians or engineers. But few of us are content with whatever we have, and we are continually seeking new horizons of technical and operational effectiveness in the best amateur tradition. We devise, construct, modify, reconfigure, test, stretch, diversify, substitute (and repair) as necessary to satisfy our equipment needs and operating interests, as amateurs have always done. And in the process we *learn* and make our contribution to society and the state of the art.

There are other dimensions to this game, too, and amateurs who are less technically prone often prove to be important contributors indeed, working diligently to improve the amateur radio service in a variety of other ways, functioning as effective members of traffic and emergency preparedness networks and performing as prime movers in our many amateur radio organizations.

The fact is, however, that there is vastly more technical interest and experimentation in amateur radio today than has been the case at any time in our history. An amateur press which has reached a circulation of nearly a quarter million copies a month is testimony to the level of that interest. There now exists one amateur radio magazine with more than 40,000 subscribers which caters *exclusively* to our technical concerns. There is a steadily growing number of periodicals devoted to special branches of amateur radio technology, and the *ARRL Handbook* continues to be one of the best selling technical books in all the world.

Was it really more virtuous to cannibalize an old broadcast radio and assemble a Hartley oscillator, as we did yesteryear, than it is today, for example, to adapt a piece of commercial vhf fm unit for use as an amateur repeater? Not at all. We now function in a totally different world. Amateurs are now talking to one another through orbiting satellites, built and financed by

(Continued on page 13)

League Lines . . .

The League now has available taped Public Service Announcements suitable for airing over radio broadcast stations. If you make your living at a broadcast station, or are in a position to assure the use of these Public Service spots, write Hq.; we'll be glad to send you a set. If you've previously requested these spots, they will be sent automatically.

Governor Ella Grasso inaugurated Amateur Radio Week in Connecticut by working through Oscar 6 from W1AW on October 28. The Governor delivered a short message of appreciation for the amateur service and wound up with about a half dozen QSOs in two countries. Thanks to Director Sullivan for making the arrangements!

Membership in the League continues to grow -- up to 120,485 as of the end of October. But, leave us not rest on any laurels. With a WARC coming up in 1979, the League and amateur radio need all the support they can get, both moral and financial. If you have a friend who is not a League member, give him the word!

WESTCARS continues to fight the battle of malicious interference, and is ready to prosecute the offenders in civil court, if need be. They've established a War Chest, and if you want to help play a part in ridding the bands of this sort of thing, contribute! Make checks payable to West Coast Amateur Radio Service, and mail to Bank of America, Att: Mrs. Helga Lind, 555 Broadway, Milbrae, CA 94030.

The FCC Philadelphia Office has moved to 11425 James A. Byrne Federal Courthouse, 601 Market St., Philadelphia, Pa. 19106, telephone 215-597-4410. The Commission also reported a change in the telephone number of its New York Office, to 212-620-3435. Those interested in operator examination information from the New York Office should call 212-620-3436.

Want to boost your club membership? Sponsor a licensing class for prospective Generals. WB2FVO of the Thomas A. Edison Amateur Radio Association, Edison, NJ, reports that three classes leading to Novice licenses resulted in several dozen new Novices, but only three new club members, while a class for new Generals advertised just by word of mouth brought in 25 new dues-paying members! Some clubs seem to feel the job is done when their students pass the Novice exam, when in fact it's just beginning; don't neglect the follow-through to General if you want your students to be productive, contributing members of your club.

ARRL's Instructor Corps has really grown in the past several months. More than 230 amateurs have volunteered (through Rosalie Cain, WA1STO at headquarters) to help newcomers by answering questions, advising on equipment and serving as volunteer examiners. Leading the lists are the states of New York, 23 volunteers; California, 19; Ohio, 16 and Massachusetts, 15. On the other hand, no amateurs from Delaware, Hawaii, South Carolina, Utah or Vermont have signed up yet. More Corpsmen are needed, even in the top four states. How about it, OMs and YLs -- won't you be someone's "Elmer"?

Hamfests as well as conventions can now qualify for official ARRL status, via the division director whose address is on page 8 of QST. "ARRL Section Conventions" also can be approved, a matter of interest especially to amateurs in Massachusetts, New York, New Jersey, Pennsylvania, Florida, Texas, California, the Atlantic Provinces, the Commonwealth of Puerto Rico, the Canal Zone and the American territories in the Pacific, where section boundaries do not coincide with state or provincial boundaries.

A Calorimeter for VHF and UHF Power Measurements

BY JAMES H. BOWEN,* WA4ZRP

A QUART of water in a styrofoam ice bucket, a roll of small coaxial cable, and a thermometer are all the necessary ingredients for an accurate rf wattmeter, whose calibration is independent of frequency. The wattmeter works on the calorimeter principle: a given amount of rf energy is equivalent to an amount of heat which can be determined by measuring the temperature rise of a known quantity of thermally insulated material. This principle is used in many of the more accurate high-power wattmeters.

Theory and Method of Calibration

The roll of coaxial cable serves as a dummy load to convert the rf power into heat. *The Radio Amateur's VHF Manual* in its section on dummy loads, discusses the merits of a length of lossy coaxial line as a vhf dummy load. RG-174U cable was chosen for use as the dummy load in this calorimeter because of its high loss factor, small size, and low cost. It is a standard 50-ohm cable approximately 0.11 inch in diameter. A prepackaged roll marked as 60 feet long, but measured to be 68 feet, was purchased at a local electronics store for under three dollars. A plot of measured RG-174/U loss factor as a function of frequency is shown in Fig. 1.

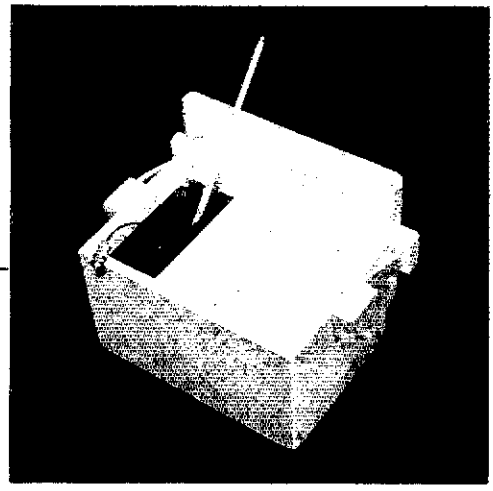
The actual loss factor for this piece of RG-174/U was determined by measuring the loss of the roll at 50-MHz intervals, from 100 to 1000 MHz, using a Hewlett-Packard Automatic Network Analyzer system. The results were then divided by 0.68 and the points were plotted to give the loss factor for 100 feet of cable.

In use, the end of the cable not connected to the transmitter is left open circuited. Thus at 50 MHz, the reflected wave returning to the transmitter (after making a round trip of 136 feet through the cable) is 6.7 dB × 1.36 = 9.11 dB below the forward wave. A reflected wave 9.11 dB down represents an SWR to the transmitter of 2.08:1. While this value seems larger than would be desired, keep in mind that most 50-MHz transmitters can be tuned to match into an SWR of this magnitude efficiently. To assure accurate results, merely tune the transmitter for maximum power into the load before making the measurement. At higher frequencies the cable loss increases so the SWR goes down. Table I presents the calculated input SWR values at several frequencies for 68 feet of RG-174/U. At 1000 MHz and above, the SWR due to the cable connector will undoubtedly exceed the very low cable SWR listed for these frequencies.

In operation, the cable is submerged in a quart of water and dissipated heat energy flows from the cable into the water, raising the water temperature. The calibration of the wattmeter is based on the physical fact that one calorie of heat energy will raise one gram of liquid water one degree Celsius. Since one quart of water contains 946.3 grams, the transmitter must deliver 946.3 calories of heat energy to the water to raise its temperature one degree Celsius. One calorie of energy is equivalent to 4.186 joules, and a joule is equal to one watt for one second. Thus the heat capacitance of one quart of water expressed in joules is 946.3 × 4.186 = 3961 joules/°C.

The heat capacitance of the cable is small with respect to that of the water, but nevertheless its effect should be included for best accuracy. The heat capacitance of the cable was determined in the manner described below.

The 68-foot roll of RG-174/U cable was raised to a uniform temperature of 100°C by immersing it in a pan of boiling water for several minutes. A quart of tap water was poured into the styrofoam



The calorimeter ready for use. The roll of cable is immersed in one quart of water in the left-hand compartment of the styrofoam container. Also shown is the thermometer which doubles as a stirring rod.

* RD 4, Willow Run, Flemington, NJ 08822

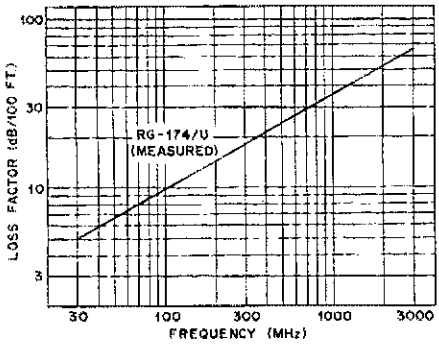


Fig. 1 — Loss Factor of RG-174/U used in the calorimeter.

ice bucket and its temperature was measured at 28.7°C. The cable was then transferred quickly from the boiling water to the water in the ice bucket. After the water temperature in the ice bucket had ceased to rise, it measured 33.0°C. Since the total heat gained by the quart of water was equal to the total heat lost from the cable, we can write the following equation:

$(\Delta T_{WATER})\ (C_{WATER}) = -(\Delta T_{CABLE})\ (C_{CABLE})$

Where:

ΔT_{WATER} = the change in water temperature
C_{WATER} = the water heat capacitance
ΔT_{CABLE} = the change in cable temperature
C_{CABLE} = the cable heat capacitance

Substituting and solving:

$(33.0\text{-}28.7)\ (3961) = -(33.0\text{-}100)\ (C_{CABLE})$

$\frac{(4.3)\ (3961)}{67} = C_{CABLE}$

254 joules/° C = C_{CABLE}

Thus the total heat capacitance of the water and cable in the calorimeter is 3961 + 254 = 4215 joules/°C. Since 1°F = 5/9°C, the total heat capacitance can also be expressed as 4215 × 5/9 = 2342 joules/°F.

Materials and Construction

The quart of water and cable must be thermally insulated to assure that no heat is gained from or lost to the surroundings. A styrofoam container is ideal for this purpose since styrofoam has a very low thermal conductivity and a very low thermal capacitance. A local "5 and 10c" store was the source of a small styrofoam cold chest with compartments for carrying sandwiches and drink cans. The rectangular compartment for sandwiches was found to be just the right size for holding the quart of water and coax.

The thermometer can be either a Centigrade or Fahrenheit type but try to choose one which has divisions for each degree spaced wide enough so that the temperature can be estimated readily to one-tenth degree. Photographic supply stores carry darkroom thermometers ideal for this purpose. In general, glass bulb thermometers are more accurate than mechanical dial-pointer types.

The rf connector on the end of the cable should be a constant-impedance type. A BNC type connector especially designed for use on 0.11-inch diameter cable was located through surplus channels. If you cannot locate one of these, wrap plastic electrical tape around the cable near its end until the diameter of the tape wrap is the same as that of RG-58/U. Then connect a standard BNC connector for RG-58/U in the normal fashion.

Carefully seal the opposite open end of the cable with plastic tape or silicon caulking compound so that no water can leak into the cable at this point.

Procedure for Use

Pour one quart of water (4 measuring cups) into the styrofoam container. As long as the water temperature is not very hot or very cold, it is unnecessary to cover the top of the styrofoam container during measurements. Since the transmitter will eventually heat the water several degrees, water initially a few degrees cooler than air temperature is ideal because the average water temperature will very nearly equal the air temperature and heat transfer to the air will be minimized.

Connect the RG-174/U dummy load to the transmitter through the shortest possible length of lower-loss cable such as RG-8/U. Tape the connectors and adapter at the RG-8/U to RG-174/U joint carefully with plastic tape to prevent water from leaking into the connectors and cable at this point. Roll the RG-174/U into a loose coil and submerge it in the water. Do not bind the turns of the coil together in any way, as the water must be able to freely circulate among the coaxial cable turns. All the RG-174/U cable must be submerged in the water to ensure sufficient cooling. Also submerge part of the taped connector attached to the RG-174/U as an added precaution.

Upon completing the above steps, quickly tune up the transmitter for maximum power output into the load. Cease transmitting and stir the water slowly for a minute or so until its temperature has stabilized. Then measure the water temperature as precisely as possible. After the initial temperature

TABLE I

Calculated Input SWR for 68 Feet of Unterminated RG-174/U Cable

Freq. (MHz)	*SWR*
50	2.08
144	1.35
220	1.20
432	1.06
1296	1.003
2304	1.0003

has been determined, begin the test "transmission," measuring the total number of seconds of key-down time accurately. Stir the water slowly with the thermometer and continue transmitting until there is a significant rise in the water temperature, say 5 to 10 degrees. The test may be broken up into a series of short periods, as long as you keep track of the total key-down time. When the test is completed, continue to stir the water slowly and monitor its temperature. When the temperature ceases to rise, note the final indication as precisely as possible.

To compute the transmitter power output, multiply the calorimeter heat capacitance (4215 for C or 2342 for F) by the difference in initial and final water temperature. Then divide by the total number of seconds of key-down time. The resultant is the transmitter power in watts. A nomogram which can also be used to find transmitter power output is given in Fig. 2. With a straight line, connect the total number of key-down seconds in the time column to the number of degrees change (F or C) in the temperature rise column, and read off the transmitter power output at the point where the straight line crosses the power-output column.

Power Limitations

The maximum power handling capability of the calorimeter is limited by either of two destructive mechanisms. At very high powers the dielectric material in the coaxial line will melt due to excessive heating or the cable will arc over due to excessive voltage. As the transmitter frequency gets higher, the excessive-heating problem is accentuated, as more of the power is dissipated in the first several feet of cable. For instance, at 1296 MHz, approximately 10 percent of the transmitter power is dissipated in the first foot of cable. Overheating can be prevented when working with high power

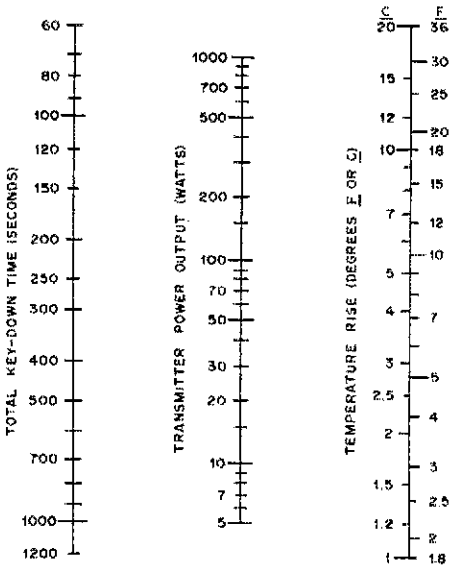


Fig. 2 — Nomogram for finding transmitter power output for the calorimeter described.

by using a low duty cycle to reduce the average dissipated power. Use a series of short transmissions, such as two seconds on, ten seconds off. Keep count of the total key-down time for power calculation purposes. If the cable arcs over, use a larger-diameter cable, such as RG-58/U, in place of the RG-174/U. The cable should be long enough to assure that the reflected wave will be down 10 dB or more at the input. It may be necessary to use more than one quart of water in order to submerge all the cable conveniently. If so, be sure to calculate the new value of heat capacitance for the larger quantity of water. Also you should measure the new coaxial cable heat capacitance using the method previously described.

The wattmeter using RG-174/U as described has been used to measure a 432-MHz transmitter belonging to WA4PGI, running an output power of 200 watts at approximately 50-percent duty cycle, without ill effect. QST

It Seems To Us . . . *(Continued from page 9)*

other amateurs, looking at each other via ATV, bouncing our signals off the moon and meteor trails, enjoying the benefits of single-sideband and slow-scan television around the world, and a magnificent VHF repeater system which is now close to covering the entire nation (and we did *that* in just a few short years with nothing more than volunteer expertise and inprovised equipment). Now we're into computer technology in a big way, and even more exotic horizons are beckoning. We just don't have time to reinvent the wheel.

I suspect that some of those who bemoan our presumed technological deterioration would have difficulty in even comprehending the new technology. But thousands of amateurs *do*, and they're pressing ahead, as radio amateurs have always done, seeking new horizons, testing new concepts, devising innovative techniques and circuits.

"Sure, amateurs discovered and demonstrated to the world the usefulness of the short waves . . . but what have they done for us lately?"

The answer is *plenty*! Those of us who are privileged to be radio amateurs can be proud of the continuing technical achievement which takes place within the amateur radio fraternity, the spinoff from amateur knowledge and experimentation that makes its way into the technology and the market-place for the benefit of society at large, and the uncounted man-years of self-training in electronics that result at no cost to the public. This is all reflected, too, in the variety of electronic devices and systems enjoyed by our society at a most modest cost.

I suggest that we begin pointing with pride to our strengths, rather than engaging in self-condemnation and apologizing for imagined deficiencies . . . and we might stress, too, the fact that what we are doing is within the framework of an orderly, progressive and self-disciplined radio service, one which places a minimum burden on the public coffers.

Amateur radio has more to be proud of today than has ever been the case, and we should proclaim it from the housetops. — *W4KFC*

A Morse Code to Alphanumeric Converter and Display

Part III

BY THOMAS P. RILEY,* WA1BYM

This part covers the operating principles and construction of an ASCII to TV display converter which may be used in conjunction with the Morse to ASCII converter described in Parts I and II of this article.

About the Circuit

As mentioned previously, any display which accepts ASCII code could be used in lieu of the one presented here. However, I found this to be an economical approach, as a major portion of the display system (the TV set) was already available. The heart of the converter is a Signetics 2513 read-only-memory character generator. Unlike the ROM used in the Morse/ASCII converter, this unit is already programmed by the manufacturer. It is often used to operate what is known as a 5 X 7 matrix display. A 5 X 7 matrix is a device in which 35 indicators (usually LEDs) are arranged in a grid of 5 columns by 7 rows. By selectively lighting the proper indicators, any of the 64 ASCII characters can be displayed.

The purpose of the ROM is to provide properly encoded outputs to drive the appropriate indicators which correspond to the ASCII input applied to it. To do this the ROM is organized with 5 outputs and 9 inputs. The inputs consist of 6 ASCII and 3 binary-coded "row select" inputs.

Assume that the proper ASCII code for the letter T were connected to the ASCII inputs and that the binary code 001 (one) were applied to the row select inputs. Under these conditions the five outputs would be 11111 corresponding to the horizontal line on the letter T. Now if the "row select" code were changed to 010 (two), the outputs would change to 00100.

Since only one row of the outputs is available at a time, the entire character is displayed by scanning the row select inputs of the ROM while simultaneously energizing the corresponding row on the display. By scanning at a sufficient rate, the eye integrates the light output and no flicker is visible, just as is done with the scan lines in a TV screen.

*12 Tickle Road, Westport, MA 02790

In this application, a standard television receiver is used as the display device instead of the 5 × 7 matrix of indicators. Characters are, however, displayed in the 5 × 7 format. This is done by assigning each of the TV horizontal scan lines to one of the 7 rows and then subdividing each scan line into a finite number of points. Five of these points are assigned to the five character columns.

The TV horizontal scan frequency is normally 15,750 Hz. This, along with a vertical frequency of 60 Hz, results in 15,750 ÷ 60 = 262-1/2 horizontal scan lines per vertical scan (frame). In normal broadcasting each frame constitutes half of the entire transmitted picture. The scan lines of alternate frames are interlaced (interleaved), 30 pictures per second of 525 lines each. Interlacing is employed to reduce flicker. Since in this application the display of characters will be essentially stationary, interlacing is not needed, nor will it be used.

All the various frequencies required for the converter are derived from a single crystal oscillator and a frequency-divider chain. Since the frequencies in a divider chain are harmonically related, it will be impossible to provide the normal horizontal to vertical frequency ratio of 262-1/2. The ratio used is 264 which is fairly easy to implement (8 × 3 × 11 = 264). In the block diagram of Fig. 5, the crystal oscillator is first divided by 6 in order to obtain six possible columns per character. Five form the character and one is blanked to provide a space between characters. The next stage provides 60 possible character positions across the entire horizontal scan. Since portions of the horizontal sweep are not visible due to overscan, only 40 of the 60 possible character positions are used. The output of the divide-by-60 stage is used to generate the horizontal sync pulses.

The next divided-by-8 section provides eight rows per character. Only seven are used and one is blanked. The final stage in the divider chain provides 33 possible rows of characters across the

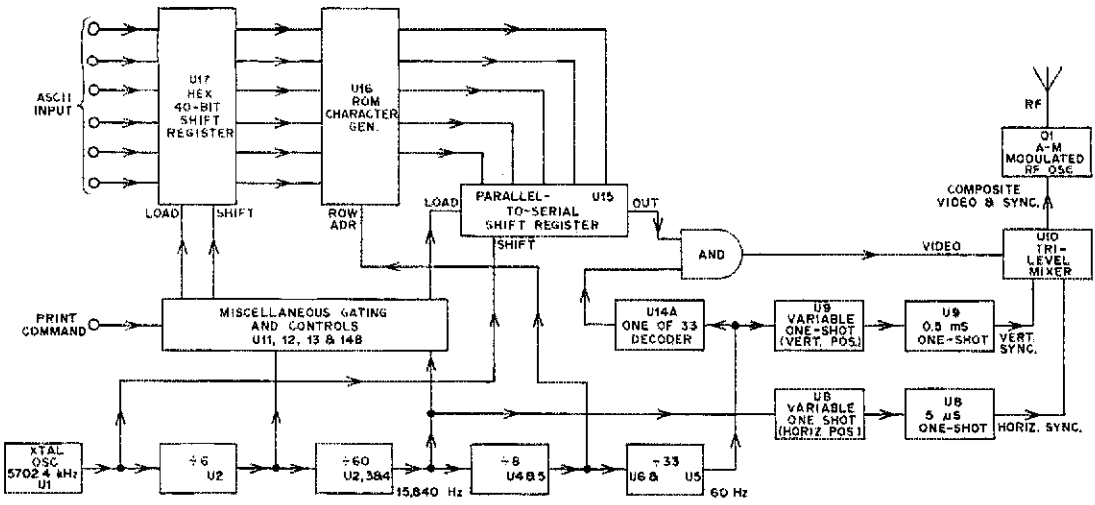


Fig. 5 — Block diagram of the ASCII to television display converter which may be used with the Morse to ASCII converter described in Parts I and II of this article.

entire vertical scan. Only one of the 33 is enabled, resulting in a single row of 40 characters in the middle of the screen.

The output of the divide-by-33 section generates the vertical sync pulses which must be exactly 60 Hz to avoid hum bars (large shaded bars which appear to roll through the screen). The clock frequency is selected in order to meet this 60 Hz requirement.

$$f_{clock} = 60\ Hz\ (33 \times 8 \times 60 \times 6) = 5{,}702{,}400\ Hz$$

In addition, note that the horizontal frequency is $60 \times 8 \times 33 = 60 \times 264 = 15{,}840$ Hz. This is so close to the normal horizontal frequency of 15,750 Hz that most TV sets won't even require adjustment of the horizontal hold control in order to obtain sync.

The ASCII codes for all forty of the displayed characters must be made available to the ROM once during each horizontal sweep. Thus each character must be stored in a memory device once it is entered. This function is performed by U17 which contains 6 identical 40 bit shift registers. All registers have a common shift and load control. When no load signal is present, the registers recirculate. In this mode, the output of the 40th stage is internally connected to the input of the first stage. Thus, the registers never empty but continue to circulate the same data. With the load signal applied, the internal connection from output to input is broken and the inputs to the registers are now connected to the device input pins. When a shift pulse is applied, the ASCII code present on the input is loaded into the first stage and the code contained in the 40th stage is shifted out and lost.

Forty shift pulses are applied to the registers during each horizontal sweep, thereby cycling through each of the ASCII characters. A print command sets a flip-flop which stores the fact that a new character is to be entered. It remains set until the visible portion of the horizontal sweep is complete. Then, during retrace, the flip-flop causes a load command and 41st shift pulse to be generated which enters the new character.

The ROM character generator has all 5 column outputs available at one time (in parallel). However, for this application they are needed serially, one at a time. Parallel to serial conversion is performed by a 5-bit shift register, U15. The AND gate (actually part of U15) is enabled by the "one-of-33 decoder," thus disabling the video output for all but one of the 33 available rows of characters.

Dual one-shots U8 and U9 develop the horizontal and vertical sync pulses respectively. In both cases the first one shot is variable, and the second is fixed at approximately "standard" broadcast sync-pulse widths. The adjustable delay provides control of where the sync pulses are entered during the scan and thus is used to center the row of characters on the screen.

The trilevel mixer combines the video and sync signals into a composite signal having three finite voltage levels corresponding to white, black and sync. This signal in turn amplitude modulates an rf oscillator producing a final output which closely resembles that of a commercial broadcast station.

The frequency of the rf oscillator is adjustable from 54 to 88 MHz (TV channels 2 thru 6). A closed circuit type of system should be used in order to avoid interference from commercial stations and to your neighbors. To do this the rf oscillator is cabled to the TV set antenna terminals. The oscillator output, however, is too strong to drive the TV set directly and must be attenuated. This may be done by connecting about 8" of Twin-Lead to the oscillator output and overlapping it for about 2" with the transmission line Twin-

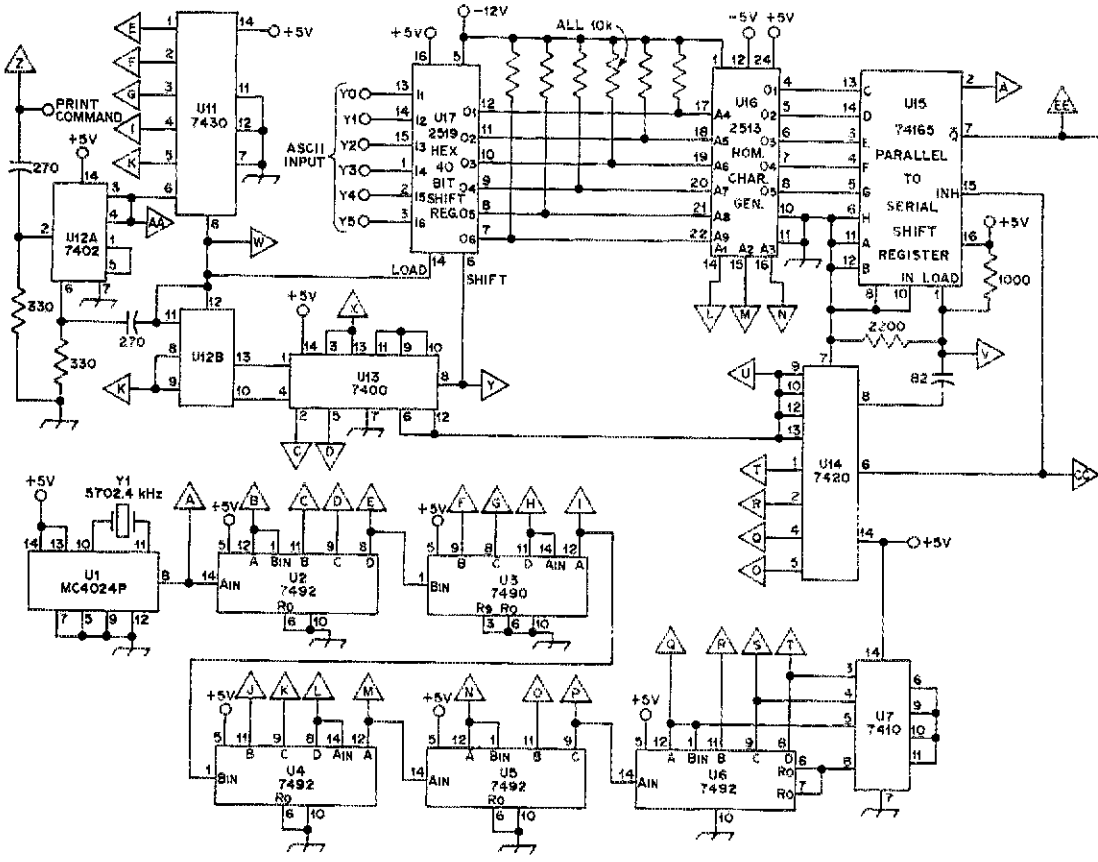


Fig. 6 — Schematic diagram of the ASCII to TV display converter. Integrated circuits U1 through U15 are all TTL devices. Several manufacturers make these devices and assign different prefixes and suffixes to their part numbers. Where a 7402 is called out, Texas Instruments SN7402, Motorola MC7402P or a Signetics N7402A could be used.

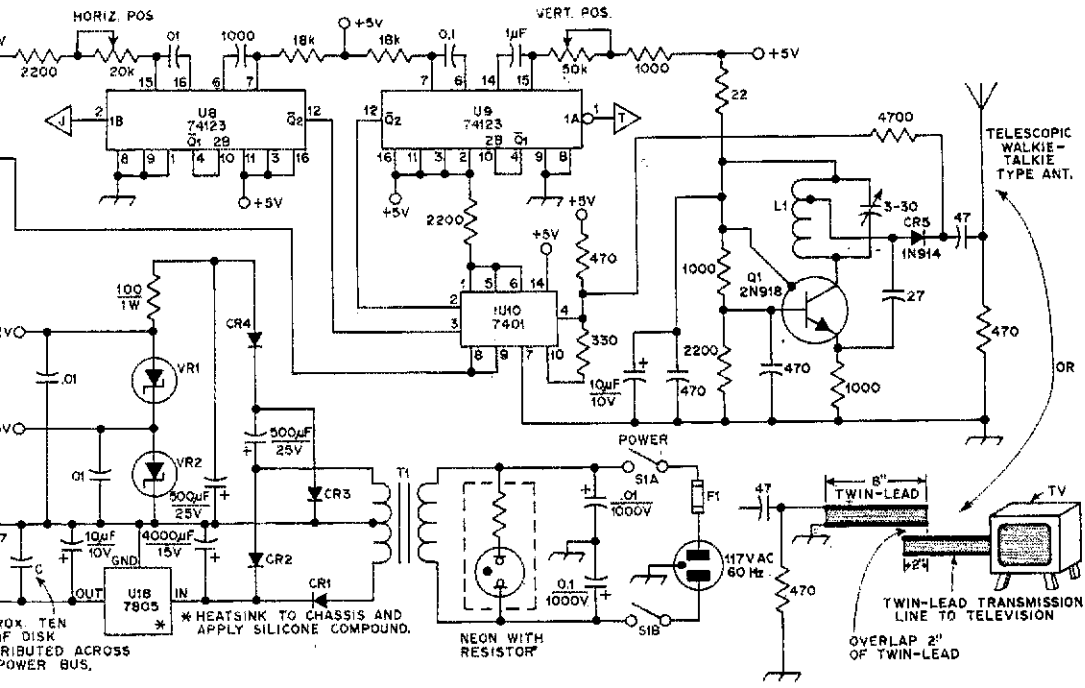
Lead. They can be held together with tape. No antenna should be connected to the TV set antenna terminals with this set-up, as it would be an effective radiator. It should be noted that this coupling technique and the designs of the rf oscillator and trilevel mixer are not original ideas.[1]

Functional Description

The schematic diagram is shown in Fig. 6. The print command is capacitively coupled to a flip-flop made up of U12A and B. Capacitive coupling causes the flip-flop to be set by, and only responsive to the leading edge (i.e., the 0-to-1 transition) of the print command signal. This, in turn, enables one of the inputs of multi-input NAND gate U11. When the other inputs of the NAND gate are also high (which occurs once during each horizontal retrace), an output pulse is generated which is used as the load pulse for the hex 40-bit shift registers. The trailing edge of this load pulse also resets the flip-flop. NAND gate U13A generates a single shift pulse whenever a load pulse occurs, while NAND gate U13B generates 40 shift pulses during each horizontal scan. Both sources of shift pulses are summed in NAND gates U13C and D, resulting in a single output having either 40 or 41 shift pulses, depending on whether a new character has or has not been entered. Note that these and other waveforms are depicted in Fig. 7.

NAND gate U14A provides the gating necessary to inhibit all but one of the 33 available rows of characters. U1 is a voltage-controlled multivibrator which functions well as a crystal-controlled source of clock pulses. Divider chain U2 through U5 is straight forward. U6 normally divides by 12 but

[1] Lancaster, "TV Typewriter," *Radio-Electronics*, September, 1973, page 43.



the gating produced by U7 terminates the count prematurely, resulting in the desired divide-by-11 function. U14B operates as an inverter and provides 40 load pulses to the parallel-to-serial shift register.

The trilevel mixer function is provided by U10 which is an open-collector device. (Open-collector devices produce no output voltage but rather behave as either an open circuit or short circuit to ground, depending on their state.) If U10B is conducting, then the output would be zero potential (sync level). If B is not conducting but C is, then the two resistors act as a voltage divider and the output is about +2 volts (black level). When neither B nor C are conducting, the resulting output is +5 volts (white level).

The rf oscillator is a Hartley type in the common-base configuration. The rf voltage available at the tap of L1 is essentially constant in average amplitude and connected through a 1N914 diode and series 4700-ohm current-limiting resistor to the video output. Variations in the video level change the diode current, resulting in a change in the diode dynamic resistance. The diode forms a voltage divider with a 470-ohm load resistor, resulting in an rf output amplitude that is in proportion to the video input (a-m).

Power supply requirements are +5 V at 360 mA, -5 V at 1 mA, and -12 V at 25 mA. The +5 V is obtained from a full-wave center-tap rectifier, capacitor filter, and IC voltage regulator. The negative voltages are derived from a half-wave voltage doubler and simple Zener diode regulators. Both rectifier circuits are powered from a single 12.6 V C T filament transformer.

Construction

All circuitry with the exception of the power supply was assembled on a 3 × 7 inch perforated board. Layout should not be critical but it is suggested that the layout shown in the photographs be followed (these are known to work!). An all-metal shielded enclosure such as an aluminum Minibox is a must in order to prevent stray radiation from the rf circuits. Three small holes are drilled in the Minibox in order to gain access to the controls. The same wiring practices and techniques as used with the Morse/ASCII converter were employed. A 14-pin IC socket was mounted on the cabinet for ASCII, print command and ground inputs.

Operation

When power is applied the unit usually displays forty identical characters. No erase function was provided as these characters disappear when new ones are entered. The display can be "fine-tuned" by using the TV fine-tuning control or by adjusting the rf oscillator trimmer capacitor. Other than that there is nothing else to do but center the display with the position controls then sit back and "read the mail."

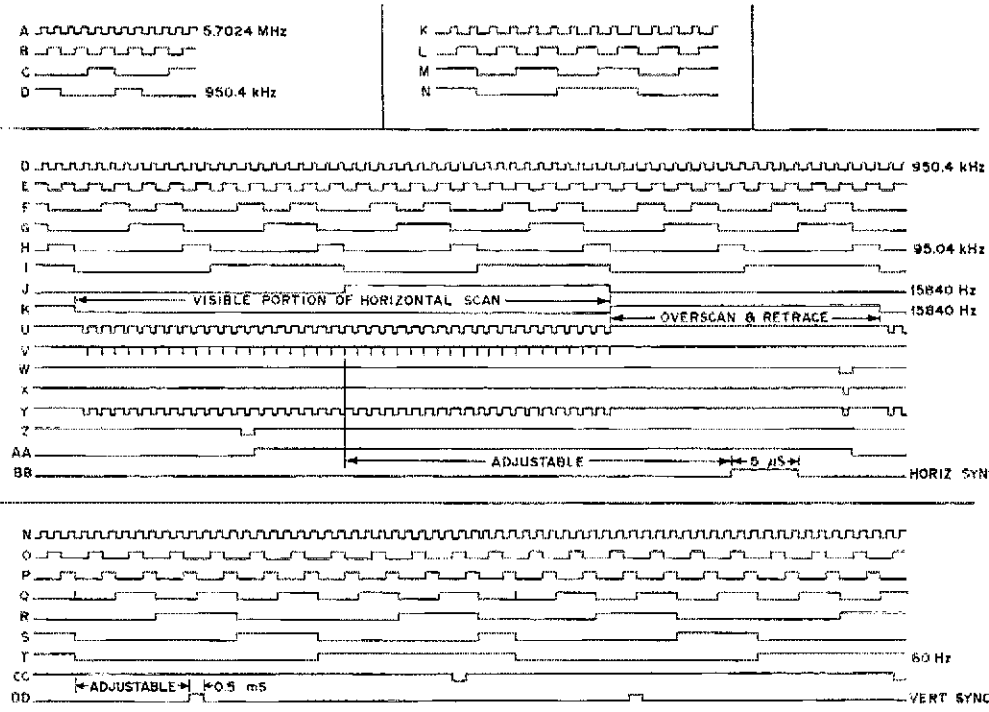
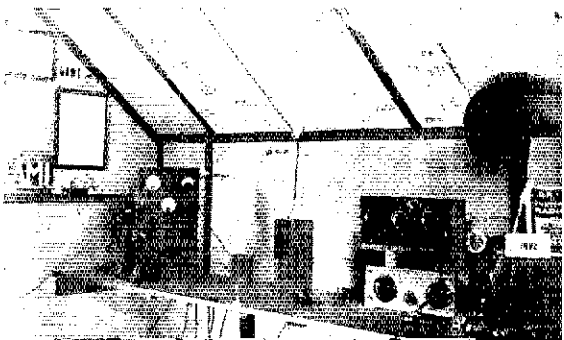


Fig. 7 — Timing diagram of ASCII to TV display circuit.

CR1, CR2, CR3, CR4 — 1N4001 or equiv. silicon rectifier diode.
CR5 — 1N914 silicon switching diode or equiv.
L1 — 6 turns of No. 14 copper wire, 3/8-inch ID, 3/4-inch long, tap at one turn from +5-V end of coil.
Q1 — 2N918 transistor. DO NOT SUBSTITUTE.
T1 — 12.6 V center-tapped, 2 A, Stancor P8130, Triad F-44X or equiv.
U1 — Motorola MC4024P or HEP-C3805P programmable modulo-N decade counter.
U2, U4, U5, U6 — 7492 divide-by-twelve counter.
U3 - 7490 decade counter.
U7 — 7410 triple 3-input positive NAND gate.
U8, U9 — 74123 dual retriggerable monostable multivibrator.
U10 — 7401 quadruple 2-input positive NOR gate.
U11 — 7430 8-input positive NAND gate.
U12 — 7402 quadruple 2-input positive NOR gate.
U13 — 7400 quadruple 2-input positive NAND gate.
U14 — 7420 dual 4-input positive NAND gate.
U15 — 74165 parallel-load 8-bit shift register.
U16 — Signetics 2513N MOS character generator.
U17 — Signetics 2519B MOS hex 40-bit static shift register.
U18 — Voltage-regulator IC, MC7805 or equiv.
VR1 — 6.8-V Zener diode, 1N4736 or equivalent.
VR2 — 5.1-V Zener diode, 1N4733 or equivalent.
Y1 — 5,702.400 kHz; International Crystal type "EX" or equivalent.

Since the original design of the converter has been completed and the system has been in use, experience has shown that the input processor is highly susceptible to noise. Some circuit changes, not too extensive, overcome this problem. Information on these changes will be appearing in a future issue of *QST*.

Strays



Long time radio amateurs may recall QSLs with W9AMI on 80 meters. Pictured here is his original homemade station. The transmitter is a Hartly circuit using a UV202 tube about 5 watts with a chemical rectifier made from 36 jelly jars. Still active on 15 and 20 meter cw, W9AMI works in police communications as an engineer and dispatcher.

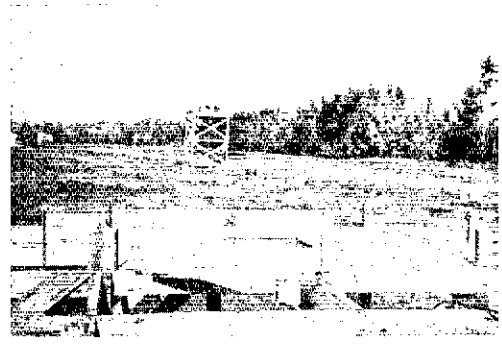
Transmission-Line Low-Profile Antennas

BY JOHN S. BELROSE,* VE2CV/VE3DRC

Limited-space antennas are of ever increasing interest to the amateur. Dr. Belrose is no newcomer to the subject, as material contained in his QST *article*[1] *on mobile antennas has been included in* The ARRL Antenna Book *for a number of years. The topic of this article is one form of a class of low-profile, transmission-line antennas popularly called the DDRR antenna. Both theoretical considerations and experimental data are included, but the practical design aspects are not omitted. The material contained here should be of use in constructing this interesting antenna both for hf and vhf purposes.*

ONE FORM of electrically short antenna is a transmission line fed against a ground plane, as shown in Fig. 1. This type of antenna has been used in a variety of configurations but in the most common one, l is approximately a quarter wavelength long. Z_T is an open circuit or a very small capacitance which can be used to tune the antenna to obtain a resonant input over a narrow band of frequencies. The transmission line, rather than being straight as shown in Fig. 1, is formed into a circle, a hexagonal, or a spiral configuration. (See Fig. 2.) Boyer[2], the inventor of this ring transmission-line type of antenna, described the radiation from it in terms of the directional discontinuity of the curved transmission line. He believed this was an important parameter in determining the radiation properties of the antenna. Hence the name directional discontinuity ring radiator (DDRR). This is perhaps not a satisfactory name, since the radiation efficiency is almost independent of the shape of the horizontal part of the antenna. Burton and King[3] analyzed the antenna as an open center-driven loop over a ground screen, which is also not a satisfactory equivalent for the antenna. While an accurate solution for a *circular* loop driven by a generator in series with it is available for a loop over a perfectly conducting ground plane, there is no accurate solution when the loop is driven in the manner of the hula hoop. Furthermore, the formulas developed in the original article by Burton and King were for two conductors in space, and the radiation resistance given in that article was too high by a factor of two.

Dome[4] and the author of this article feel they have correctly analyzed the antenna. It should be treated as a short grounded vertical radiator having a horizontal or flat top (an L-type antenna) to provide quarterwave resonance. *Most of the radiation is from the vertical stub part of the antenna. Only a small part of the radiated field is caused by the current flowing in the horizontal part.* When $h << \lambda$, the out-of-phase current in the bottom wire (or in the image of the antenna when it is mounted above a ground plane, as is generally the case) almost exactly cancels the radiation from the top wire.



From the above discussion, it is suggested that the name directional discontinuity ring radiator (DDRR) should be abandoned. The Northrupt Corporation later redefined DDRR to stand for directly driven resonant radiator, which is also a rather inappropriate name since a vast class of antennas are resonant and directly driven. Directly driven ring radiator is also not a suitable name, since only a small part of the radiated field is caused by the current flowing in the ring. While it might be possible to find a name that would retain the DDRR designation, the author of the present article is of the opinion that the antenna should be renamed the hula-hoop transmission-line (HHTL) radiator, since this name better identifies the form of the antenna and the class to which it belongs.

Calculation of Radiation Resistance

As mentioned in this foregoing, the HHTL

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[1] For this and subsequent references, see bibliography at the end of this article.

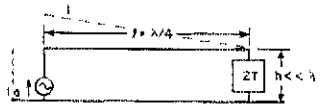

Fig. 1 — Basic quarter-wave electrically short transmission-line antenna.

antenna may best be described as being a short grounded vertical radiator having a horizontal or flat-top extension to provide quarter-wave resonance. Various authors have their preferred formulas for analyzing such antennas. The one used by this writer, given by Laport[5] is:

$$R_r = 0.01215\,A^2 \text{ ohms}$$

where A is the degree-ampere plot of the current distribution on the vertical part of the antenna. The current will maximize at the grounded base of the antenna (I_a) and will fall off as the cosine of the angular distance along the antenna to zero at the open end of the radiator. Since the current will be almost uniform over the vertical part of the radiator, $A = G_V$ degree-amperes (for $I_a = 1$), where G_V is the electrical height of the antenna in degrees of the vertical portion of the antenna of height h. For the antenna dimensions given by Blocker[6] in Fig. 3, at $f = 3.9$ MHz ($\lambda = 252.3$ feet), $h = 2.2$ feet:

$$G_V = \frac{h}{\lambda}(360^\circ) = \frac{2.2}{252.3}(360^\circ) = 3.14^\circ$$

$$\text{and } R_r = .01215\,(3.14)^2 = 0.12 \text{ ohms}$$

This formula ignores the radiation from the horizontal part of the antenna, but this is small as we shall see. The corrected formula for radiation resistance of the hula-hoop antenna which emerged after extensive discussion between Messrs. Trulio and Kriz of the Northrupt Ventura Company and Drs. Burton and King (King, private communication, 1969) is:

$$R_r = 10\,(\beta c)^2 + 0.45\,(\beta c)^2 \text{ ohms}$$

where $\beta = 2\pi/\lambda$, λ = wavelength in meters and $c/2$ is the height of the radiator (meters) above the ground plane. The term $10\,(\beta c)^2$ is the contribution from the vertical stub over the ground plane and $0.45\,(\beta c)^4$ is the radiation from the open-ended horizontal part of the antenna. In our terminology, the height of the antenna is h and $c = 2h$. Substituting into the foregoing equation gives:

$$R_r = 1650\,(h/\lambda)^2$$

This equation is almost exactly that given by Dome[4].

Radiation Efficiency

It is clear that the radiation resistance of the HHTL antenna is very low, and unless the loss resistances (ground-loss and conductor-loss resistances) are also very low, the radiation efficiency will be rather poor. The radiation efficiency of the antenna is the radiation resistance R_r divided by the total antenna resistance R_a or:

$$r = \frac{R_r}{R_a}(100)\%$$

where R_a equals the sum of the radiation resistance (R_r), the conductor-loss resistance (R_c) and the ground-loss resistance (R_g).

Matching the HHTL Transmission-Line Antenna

The tapped resonant quarter-wavelength line and its equivalent circuit are shown in Fig. 4. Transmission lines have been analyzed by many authors; the reference this writer prefers is that of Jordan[7]. As the tap point is moved from the shorted end toward the open end of the line, the impedance seen at the tap point is a pure resistance that varies from a very low value to quite a high value:

$$R_s = \frac{2Z_o^2}{Rl}$$

where Z_o = surge impedance of the transmission line in ohms, R is the total resistance per loop meter in ohms, and l is the length of the transmission line in meters.

The input impedance at a distance x measured along the line from the shorted end is:

$$R_x = \frac{2Z_o^2}{Rl}\sin^2\beta x$$

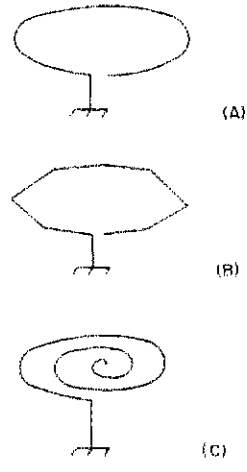

Fig. 2 — Electrically small antenna with top loading curved into a circle, a hexagon, or a flat spiral (length $l \sim d/4$).

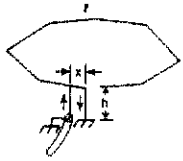

Fig. 3 – A variation of the HHTL antenna, hexagonal in shape which is easier to construct than the circular loop figuration, showing how the feed is tapped onto the transmission line at a distance x for the required impedance match (nominally R_x = 51 ohms).

where βx is the electrical distance in degrees of the tap point at distance x. The Q factor is given by:

$$Q = \frac{2\pi f_o Z_o}{Rv}$$

where f_o is the resonant frequency of the $\lambda/4$ line in Hz and v is the velocity of propagation down the line ($\sim 3 \times 10^8$ m/s). The Q factor of a transmission line is equal to the inductive reactance per unit length to the resistance per unit length:

$$Q = \frac{2\pi f_o L}{R}$$

The surge impedance of the transmission line can be calculated from standard formulas. For a single conductor over a ground plane:

$$Z_o = 138 \log_{10} \frac{2h}{\rho}$$

where h is the height of the conductor above the ground plane and ρ is the radius of the conductor. Alternatively, Z_o can be determined by measuring the total capacitance of the line (with short disconnected) and the inductance with the short in place. Measurements would have to be made from the open end of the line. The impedance would then be given by the formula:

$$Z_o = \sqrt{L/C}$$

These formulas are developed from a theoretical analysis of low-loss (but not lossless) transmission lines and can be used in approximate calculations for the parameters of the HHTL antenna. The formulas differ from those given by Dome who assumed a lossless transmission line. In this case, the resistance that would be measured at the base of the antenna (including radiation and ohmic-loss resistances) is merely transformed up to the tap point.

Neither the formulas mentioned previously nor those of Dome's article can be used to depict conditions at the tap point very accurately, as we shall see. Both are based on a transmission-line theory which does not consider progressive radiation from the line, and coupling between the shorted stub and feed-point stub is neglected. In many systems, the distance x will be small (Fig. 3) and the latter coupling will have significant effect which will be described later. Experimentally, it has been found that as the feed point is moved the impedance is not a pure resistance and the resonant frequency of the antenna is changed slightly. In order to obtain a pure resistance at the feed point, the length of the antenna must be adjusted.

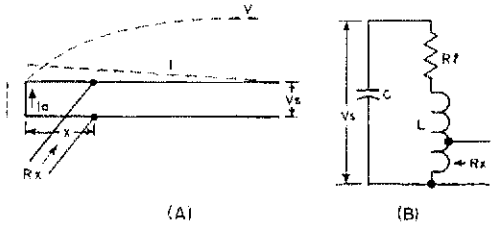

Fig. 4 – (A) Tapped quarter-wave transmission line (voltage and current distributions on the line are sketched) and (B) its equivalent resonant circuit.

Experimental Measurements

A ground plane was constructed (see title photograph) and the HHTL antenna was erected over it. The entire system was elevated about 5 feet so that impedance-measuring and transmitting equipment could be installed beneath the ground screen. This was done so that the measuring instruments would not disturb the impedance or the pattern of the antenna. The ground screen, which consisted of 2-inch welded wire mesh, was hexagonal in shape and approximately 20 feet in diameter. While the ground plane was constructed for model-antenna studies, a full-size 40-meter HHTL antenna was readily mounted on it. The HHTL antenna was constructed of four horizontal No. 18 wires spaced 1/4 inch apart and was mounted 10,8 inches above the ground plane. Frequency of operation was 7785 kHz, which was

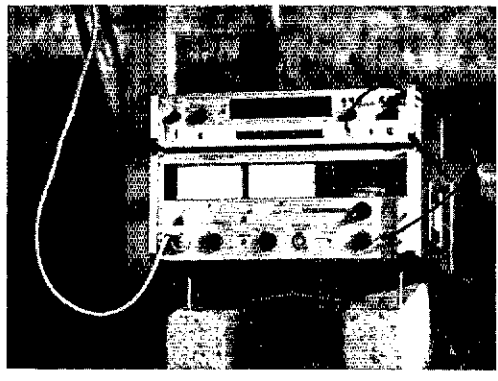

Fig. 5 – Hewlett Packard Vector Impedance Meter and Frequency Counter (for accurate bandwidth measurement) located beneath the HHTL antenna.

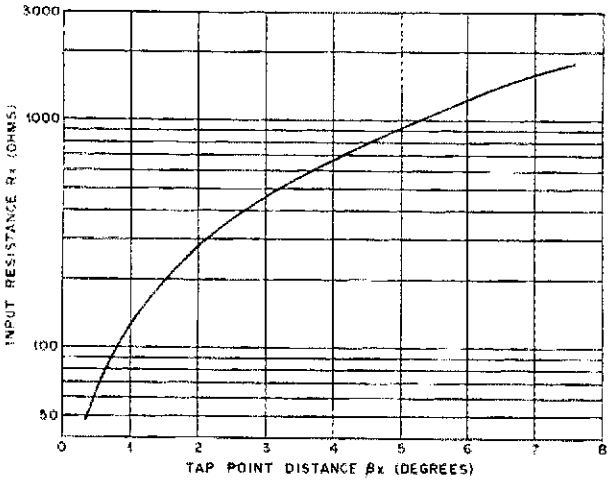

Fig. 6 — Graph based on experimentally measured data showing how the input resistance R_x varies with the tap-point distance βx in electrical degrees for a 40-m HHTL antenna described in the text.

a scale frequency for a model study of an intended low-frequency antenna system.

A Hewlett Packard Vector Impedance Meter Model 4815A and a Hewlett Packard Frequency Counter Model 5325B (for accurate bandwidth measurement) were used for antenna impedance measurements. See Fig. 5. A Drake T4XB transmitter, a calibrated directional wattmeter, a Drake Antenna Match Network MN-2000 and a Stoddart Field Intensity Meter model NM25T were used for field-strength measurements. The radiated field strength for a given transmitter power was measured at several sites (about 1000 meters from the center of the antenna), and this field was referenced to that for a true λ/4 vertical antenna mounted at the center of the ground screen, to determine the radiation effeciency of the antenna.

The HHTL antenna was found to be rather critical to tune. To obtain an input impedance of 51 ohms resistive, it was necessary to adjust both the feed point distance, x and the length, l. There was definitely some interaction. In practice, an exact match is not necessary if a matching unit is used (such as the Drake MN-2000). The distance x for exact resonance was found to be 1-3/4 inches and the length l was 372-1/4 inches. The Q factor was ~180 (bandwidth at 7785 kHz for a phase shift of ±45° was 43 kHz). The surge impedance was measured with a Tetronic model 1302C L-C meter in the following way. The grounded stub section was ungrounded and the total capacitance of the antenna was measured between the open end of the antenna and the ground plane. It was found to be 113 pF. The stub section of the antenna was grounded and the inductance of the shorted quarter wave section was measured to be 9.7 μH. The surge impedance is given by:

$$Z_o = \sqrt{\frac{L}{C}} = \sqrt{\frac{9.7 \times 10^{-6}}{113 \times 10^{-12}}} = 293 \text{ ohms}$$

The measured radiation efficiency was determined by dividing the square of the field strength for the HHTL radiator by the square of the field strength for the quarter-wave vertical radiator. Assuming an efficiency of 90 percent for the quarter-wave ground plane, the measurements indicated the HHTL efficiency was approximately 11 percent.

Theoretical Analysis of Experimental Data

A theoretical analysis of this antenna follows:

f = 7785 kHz
λ = 126.3 feet (38.53m)
h = 10.8 inches (2.56°)
l = 372.25 inches (0.245λ)
x = 1.75 inches (0.415°)
Q ~ 180 (BW = 43 kHz)

$$G_v = \frac{(10.8)\ (360^\circ)}{(126.4)\ (12)} = 2.56^\circ$$

$$R_r = .01215\ G_v^2 = (.01215)\ (2.56)^2 = .08 \text{ ohms}$$

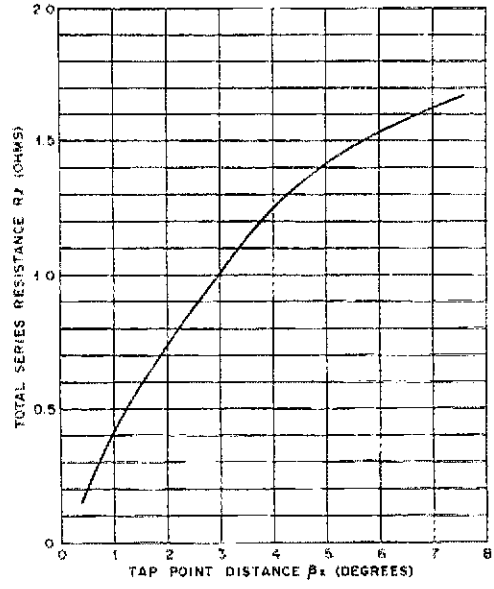

Fig. 7 — Graph showing how the apparent value of the total series resistance of the quarter-wave transmission line Rl (ohms) varies with tap-point distance (βx) in electrical degrees for a 40-m HHTL antenna.

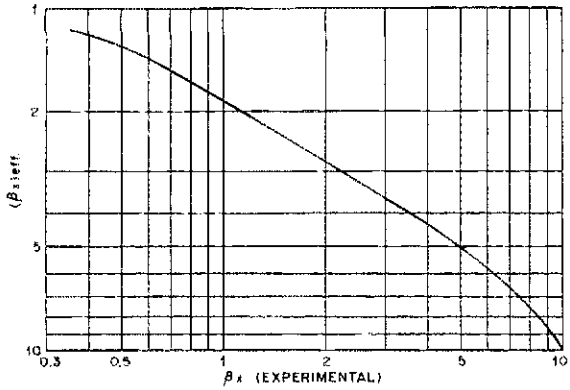

Fig. 8 — β_{eff} as a function of βx.

The calculated radiation resistance was:

$$R_r = 1650 \left[\frac{10.8}{(126.4)(12)}\right]^2 = .083 \text{ ohms}$$

Using the measured radiation efficiency and:

$$\eta = \frac{R_r}{R_a}(100)\%$$

gives the total resistance referred to the base of the ground stub of the antenna (R_a – radiation and loss resistances) as 0.73 ohm.

The graph in Fig. 6 shows how the input resistance (R_x) varied with the tap distance βx (in degrees). With some rearrangement, the equation for R_x can be employed to calculate the tap-point distance x for a given input resistance if the line-loss resistance (Rl) is known. Also, if the distance is measured experimentally the loss resistance can be deduced. In Fig. 7 is shown the manner in which this calculated value for loss resistance (Rl) varies with the tap-point distance (βx in degrees). When βx is small, Rl is a function of βx, whereas it should be independent. Consequently, the theoretical formula for R_x does not very accurately predict the impedance at the tap point.

The equation for the Q factor for a $\lambda/4$ transmission line can be rearranged and employed to estimate the loss resistance R if Q is measured.

$$R = 2\pi f_o Z_o = \frac{2\pi(7.785 \times 10^6)(293)}{(180)(3 \times 10^8)} = 0.26 \text{ ohms/m}$$

Since the length of the transmission line l is 9.44 m, Rl is 2.45 ohms. This same value of Rl is deduced from:

$$Q = \frac{2\pi f_o Ll}{Rl}$$

$$\text{or } Rl = \frac{2\pi f_o Ll}{Q} = \frac{(2\pi)(7.785 \times 10^6)(9.7 \times 10^{-6})}{180}$$

$$= 2.63 \text{ ohms}$$

The Q factor was found to be independent of the tap position, and using this value of Rl and the equation for R_s, the impedance at the open end of the transmission line can be found from:

$$R_s = \frac{2(293)^2}{2.5} = 68.68 \times 10^3 \text{ ohms}$$

The voltage at the open end of the transmission line, for a transmitter power of 1000 watts, is given by

$$V_s = \sqrt{PR} = \sqrt{(1000)(68.68 \times 10^3)} =$$

8.29 kV (rms)

The peak voltage is $\sqrt{2}$ times the rms voltage or:

$$V_s \text{ (peak)} = 11.72 \text{ kV (peak)}$$

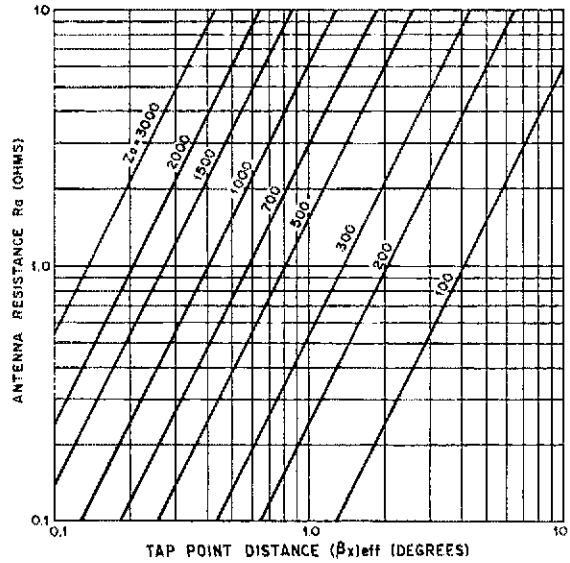

Fig. 9 — Calculation relation for a feed-line input impedance Rx equal to 50 ohms between tap-point distance $(\beta x)_{eff}$ in degrees and antenna resistance Ra in ohms for various values of line surge impedance (Z_o) ohms.

In the case of the normal quarter-wave impedance-matching application employing transmission lines (Fig. 4), currents flowing in the input transmission line do not couple directly with currents flowing in the stub. However, in the HHTL application (Fig. 3), currents flowing in these elements couple when βx is small because the feed-point stub is parallel to the shorted stub and separated by only a small distance. A more rigorous analysis for a lossy line, including radiation from it and coupling between the driven-stub element and the shorted-stub element, should be made to obtain a more accurate expression for impedance matching. However, in practical applications the distance x can be easily obtained experimentally (adjustments are made for minimum SWR). Therefore, a rigorous analysis is not attempted here but instead an empirical approach is taken to provide data suitable for design applications.

Empirical Approach to Interpretation of Experimental Measurements

The effect of coupling between the driven and shorted stub elements will depend on spacing βx and on currents (hence the impedances) in the shorted and driven elements. The experimental measurements show that the effect of coupling is to reduce the actual value of βx (when βx is small), required for impedance step up to a value less than that calculated theoretically. If we consider, as did Mr. Dome,[4] that the antenna resistance R_a is impedance transferred to R_x by tapping the line at distance βx degrees, the equation

$$R_x = Z_o^2/R_a \sin^2 \beta_x$$

can be written as

$$R_x = Z_o^2/R_a \sin^2 (\beta x)_{eff}$$

where $(\beta x)_{eff}$ is the effective value of βx such that equality holds for a given impedance step up. The graph in Fig. 8 shows the experimentally deduced dependence of $(\beta x)_{eff}$ on βx. This graph shows a result anticipated. As βx increases (for $\beta x > 5°$) $(\beta x)_{eff} \sim \beta x$ indicating coupling effects are becoming small.

To use this empirically derived graph in actual antenna design and development we can proceed as follows: (1) estimate the value of antenna resistance R_a based on experience, previous measurements or guess; (2) use the foregoing equation and the desired value of R_x (usually 50 ohms) and solve this equation for $(\beta x)_{eff}$. This is facilitated by use of the graph in Fig. 9, which gives the antenna resistance as a function of $(\beta x)_{eff}$ for various values of Z_o for an input impedance of 50 ohms. The transmission-line impedance Z_o is calculated from:

$$Z_o = 138 \log_{10} \frac{2h}{\rho}$$

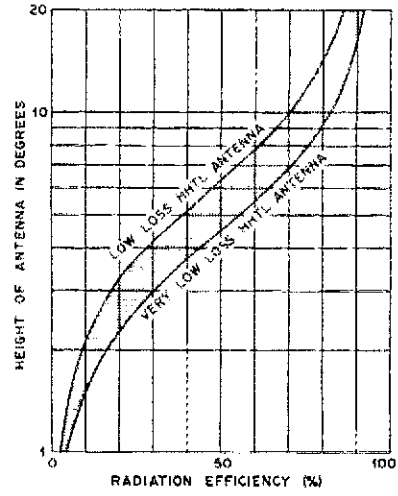

Fig. 10 — Graph showing how the radiation resistance of a HHTL antenna would be expected to vary with the electrical height of the antenna above the ground plane. The upper curve is for a low-loss antenna which would be expected to apply at hf; the lower curve is for a very low-loss antenna as might be the situation at vhf where the hula hoop is a silver plated tube and the ground screen a copper sheet.

(3) for this value of $(\beta x)_{eff}$ determine from the graph in Fig. 8 the value of βx; (4) with the feed line connected to the antenna at this distance, apply low power and adjust the antenna (x and l) for minimum SWR; (5) the experimentally determined value for βx can now be used to determine (using Fig. 8) the value of $(\beta x)_{eff}$ that applies to the particular antenna under development; (6) with this value for $(\beta x)_{eff}$, the graph in Fig. 9 can be used to calculate the actual value of antenna resistance R_a; (7) using this value of R_a and the calculated value for the radiation resistance R_r from:

$$R_r = 0.01215 A^2 \text{ ohms}$$

or

$$R_r = 1650 (h/\lambda)^2$$

the antenna efficiency can be determined from:

$$r = \frac{R_r}{R_a} (100)\%$$

and compared in Fig. 10 with the efficiency expected for the particular antenna configuration used.

Conclusions

Transmission-line radiators are low-profile antennas, which have a radiation efficiency, although rather low, that is comparable with a mobile whip antenna. A 110-inch center-loeaded whip whould have a radiation efficiency of ~ 15% at 7785 kHz.

The radiation efficiency is therefore rather high for the physical height of the antenna. Since the radiation resistance for short antennas varies approximately with the height of the antenna above the ground plane squared, only a small increase in the height of the antenna will make a very great difference in the radiation efficiency. The shaded lines in Fig. 11 show how the estimated radiation efficiences, based on antenna parameters measured and modeled by the author and his colleagues, would be expected to change with the height of the antenna above the ground plane. A radiation efficiency of about 75% can be achieved for an antenna which is 10 electrical degrees above the ground plane (about 7 feet at 3500 kHz or 3-3/4 feet at 7250 kHz).

In summary, the principal advantages of the HHTL antenna are: (1) its small physical height makes it adaptable for mobile operation at least at the higher frequencies or it could be mounted o the roof of an apartment building or a ranch-style house and not be visible from the street; (2) the matching to transmitter, although critical, is adjusted easily; (3) the antenna is at dc ground (low noise pickup due to static build up); (4) if the top wire is wound in a spiral as shown in Fig. 2C, the physical dimensions of the antenna can be made very small (a 20-meter antenna might have a flat top 3 × 3 feet and the height of the radiator about 12 to 24 inches). The disadvantages are: (1) very high Q for low loss when $h < 10°$ and hence narrow bandwidth and large voltages between the open end of the antenna and ground; (2) the loss must be kept very small for acceptable efficiency; (3) the effects of snow and ice covering the antenna have not been investigated but are expected to cause detuning. Because of the high Q factor, it is essential that the HHTL antenna be operated at resonance. If the open-circuit end of the antenna is terminated at a capacitor to obtain resonance over a narrow band of frequencies, the capacitance must be very small since the current flowing in it will in part cancel the field from the shorted stub. A full-wave transmission line radiator (see Fig. 11) has certain advantages in the upper hf range and at vhf where the size is practical, since both ends of the antenna are grounded. If the antenna is made of tubing it can be self supporting, with no support (and associated insulator problems) at the midpoint of the horizontal part of the radiator where the voltage is highest. The half-wave transmission-line radiator, like the quarter-wave one, can be bent into a circle or a spiral and tapped to give an impedance match to 51-ohm coaxial line.

QST

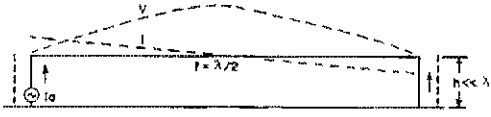

Fig. 11 — Basic half-wave, electrically short, transmission-line antenna.

Acknowledgement

The author would like to thank Mr. John A. Orosz, of the Communications Research Centre, who carried out the experimental measurements reported in this article.

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1) Belrose, "Short Antennas for Mobile Operation," *QST*, p. 30, September, 1953.

2) Boyer, "Hula-Hoop Antennas: A Coming Trend?," *Electronics*, Vol. 11, p. 44, January, 1963.

3) Burton and King, "Theoretical Considerations and Experimental Results for Hula-Hoop Antenna," *Microwave Journal*, p. 89, November, 1963.

4) Dome, "A Study of the DDRR Antenna," *QST*, p. 27, July, 1972.

5) Laport, *Radio Antenna Engineering*, p. 23, McGraw-Hill, 1952.

6) Blocker, "Direct Driven Resonant Radiator," *QST*, Tech. Correspondence, p. 44, November, 1969.

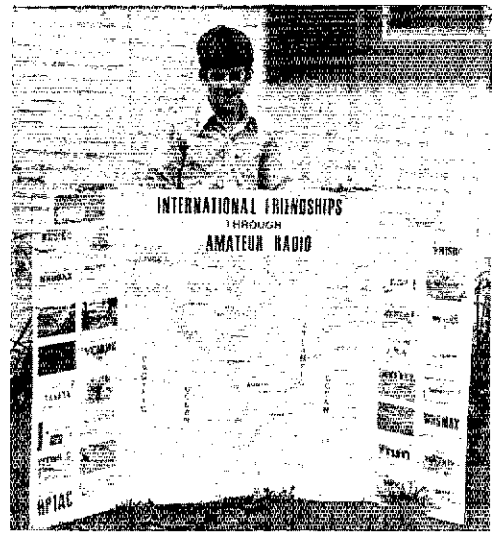
7) Jordan, *Electromagnetic Waves and Radiating Systems*, p. 233, Prentice Hall.

Also See

English, "A 40-Meter DDRR Antenna," *QST*, p. 28, December, 1971.

Fenwick, "A New Class of Electrically Short Antennas," *IEEE Transactions on Antennas and Propagation*, p. 379, May, 1965.

Strays



WB5KNF, Michael Garon, presents the display which won him first prize in his school's social science contest. Michael is active around 7,260 kHz almost every night.

A Universal Transistor Tester.....

BY WILSON E. ANDERSON,* WB6RIV

Here is a simple inexpensive unit that will test all kinds of transistors, including conventional (bipolar) transistors, JFETs, MOSFETs, Darlingtons, and unijunction transistors. An audible note indicates whether the device under test is functioning as an amplifier and gives a relative indication of gain and noise figure. Most devices can be tested in-circuit.

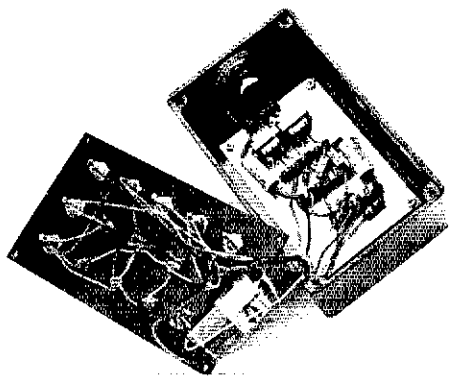
MOST HAMS who do solid-state construction quickly learn one thing about transistors – the devices are easy to destroy and may give no warning when they fail. The result: they must be tested for quality often, in and out of a circuit. However, many transistor testers on the market are expensive and somewhat cumbersome to use.

This article describes a simple low-cost transistor tester that was designed to solve these problems. It will test all kinds of devices in or out of their circuits, and it will give a good relative indication of noise figure and/or gain (beta). A ham accustomed to fishing cw signals out of QRM can probably tell more about the relative gain or noise figure of several random production units of the same type device with this gadget than he could using a tester with an expensive meter movement or curve tracer.

For someone building anything from uhf preamplifiers to a regulated dc power supply, these test functions are extremely useful. Most hams should be able to duplicate this tester in one evening with a low-cost collection of parts, even if everything is purchased new.

This tester produces an audible tone when connected to any conventional transistor, JFET, MOSFET, Darlington-pair IC and so on, if the transistor is capable of amplifying a signal. Among similar JFETs or MOSFETs, those producing the lowest pitch of audible tone have the lowest noise figure. And among similar devices of any type, those producing the loudest audio tone have the highest gain. For a ham who has ten 2N5245 JFETs in his junk box and wants to install the best one in his 144-MHz preamp, this is valuable information.

* 4354 Camerino St., Lakewood, CA 90712.



The wiring of the top panel and circuit board are shown here. A variety of sockets are wired to conform to various pin configurations in common use. To simplify the circuit wiring, all components are attached to a series of terminal strips soldered to a one-sided, copper-clad board. All of the sockets could be eliminated and clip leads could be used for all testing, if the builder wishes.

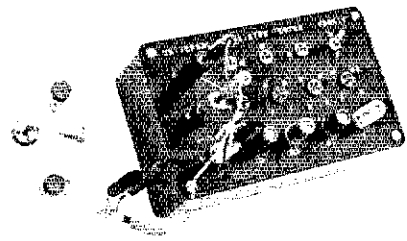
Circuit Description

The transistor tester inductively feeds back an audio signal through two transformers to create sustained oscillation when any device capable of amplifying is attached to the proper terminals. S1 is used to apply either positive or negative voltage through an audio-output transformer, T2, to the device under test. T2 feeds a signal to the 8-ohm speaker and to T1, another similar audio transformer. Positive feedback from T1 is applied to the device under test through C1 or C2, sustaining oscillation only if the device has gain. C3 and C4 must be nonpolarized electrolytics because the current-limiting resistors R1 and R2 may produce either a positive or negative voltage in relation to ground, depending on the type device under test.

Construction Details

Mount T1 and T2 on a 3 × 4-1/2 inch (7.5 × 11.5 cm) copper-clad circuit board. Then install three terminal strips for component wiring. All components are placed on the upper side and interconnected with flexible insulated wire. Since there is so little circuitry, etching a circuit board is not necessary.

Here an rf power transistor capable of delivering 10 watts of output at 1296 MHz is being tested. The tester will reveal the sad news quickly to a uhf enthusiast if he has just blown up his prized device.



The pc board, speaker, and battery are mounted in the 6-1/4 × 3-3/4 × 2-inch (15.9 × 9.5 × 5 cm) plastic case, as shown in the photograph. The simplest way to proceed from here is to mount the seven post terminals shown in Fig. 1 (collector, base, emitter, drain, gate two, gate one, and source/substrate) on the top plate and wire them to the circuit board as shown in Fig. 1.

If the builder wishes to include a series of transistor sockets to match the more popular lead configurations as the author did, Fig. 2 shows how this can be done. Simply wire all socket terminals to their corresponding post terminals. Alternatively, clip leads can be used eliminating the need for socket wiring.

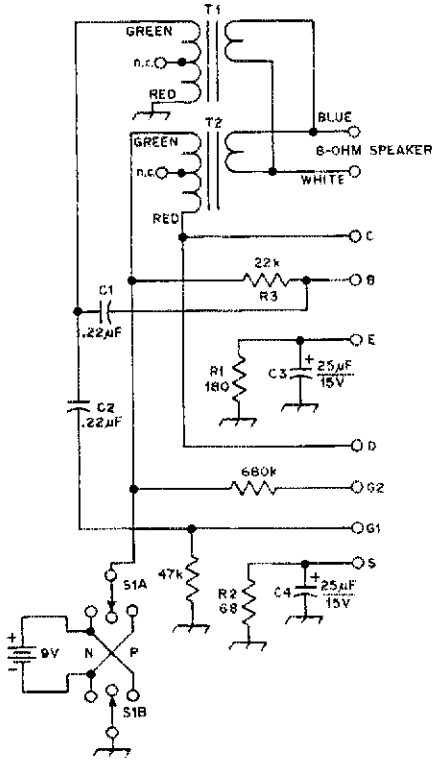


Fig. 1 — Circuit diagram and parts information for the Transistor Tester. Not shown is the wiring of the various transistor sockets, which is described in the text.

T1, T2 — Audio-output transformer, pri. imp: 1200 Ω red and green, sec. imp: 8 Ω white and blue (Calectro transformer No. DI-724).
S1 — Two-pole switch, on-off-on, (Radio Shack No. 757-0247 or 757-0301).
C3, C4 — Non polarized electrolytic.

Testing the Tester

Once all wiring is completed and carefully checked, attach a bipolar transistor of known quality to the collector, base, and emitter terminals. Switch the polarity selector to the proper position (an incorrect setting will *not* damage the device.) A tone should be heard in the speaker, indicating sustained feedback. If there is no tone, double check the polarity switch and circuit wiring. If there is still no oscillation, T1 may be feeding back out of phase. To change its phase relationship to T2, reverse the primary or secondary leads of either transformer (but not both).

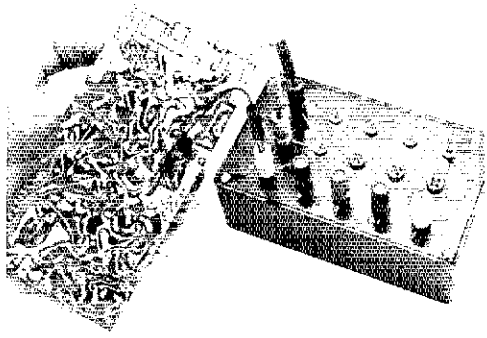
How to use the Tester

When testing various devices, an audio note between 1000 and 5000 Hz should be heard. A note above 10,000 Hz indicates that the device has some gain but will not meet its specifications or may have been connected to the tester incorrectly. If there is no audible tone, the device is defective and should be discarded.

JFETs are tested in the same manner as bipolar transistors with the exception that the drain and source are interchangeable in the tester, and may be connected either way as long as the gate is attached to its designated terminal (gate one).When testing MOSFETs, the source and substrate are both connected to the source terminal post. However, gate one and gate two on dual-gate MOSFETs must be attached properly (note the manufacturer's lead configuration).

As pointed out earlier, the relative noise figure of similar JFETs or MOSFETs can be compared, with those producing the lowest pitch being best. Among production units of most types, there are significant variations in both gain and noise figure, so this type of test is essential for anyone seeking high performance in a uhf preamplifier, for instance.

Of course, the tester will also identify whether an unknown device is of the pnp or npn type. It will only oscillate with the polarity switch in the proper position, and an incorrect setting of this switch will not damage any device except possibly a nondiode-protected MOSFET. Thus, MOSFETs



Almost all devices can be tested without removing them from their circuits, as shown here. A set of small clip leads is needed to test a device installed in a pc board.

should not be tested unless their polarity and lead configuration is known.

Certain "programmable" transistors (unijunctions, for example) will produce an audio note of varying frequency. This is normal and does not indicate a defect in the device.

Devices with a current-carrying capability above 10 amperes usually will not oscillate in this circuit and therefore cannot be tested. A builder who wishes to test such devices should add a double-pole double-throw switch so R3 (the forward-bias resistor in the base lead) can be varied from the designated value of 22,000 ohms to about 5000 ohms. However, low-current devices may be damaged if tested with this switch in the 5000-ohm position.

Almost every amateur owns something that uses some of the solid-state devices this unit is designed to test. The tester's ability to indicate quickly and simply whether a transistor is working usually without removing it from its circuit – makes it one of the most basic pieces of test equipment needed in any ham shack.

[EDITOR'S NOTE: We queried the author about the term *noise* figure as used in this article. Here is his reply: "As used in this article, the term does indeed refer to that characteristic of FETs that is commonly known as *noise figure* or *noise factor*, i.e. the amount of internally generated noise in the device.

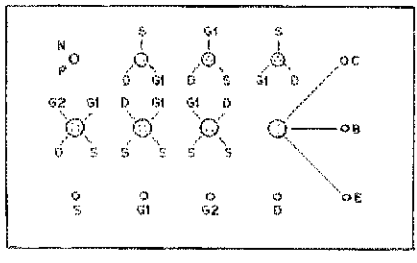


Fig. 2 — Bottom view of the socket panel. All sockets are wired to the terminals corresponding to their pin configurations (collector, base and emitter for bipolar transistors, source, substrate, gate one, gate two, and drain).

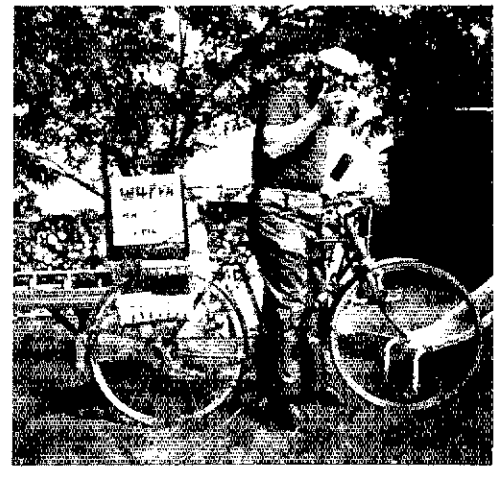
You wondered whether the tester will discern the relative noise figure of 10 FETs of the same type and make, when all 10 are between 1.5 and 2.0 dB noise factor at 450 MHz. In our experience, the answer is yes. . . .

Obviously, this tester provides only an indirect indication of noise figure. But because a number of devices can be tested quickly and easily with this unit, its audible indication of noise figure is an excellent preliminary test. . . ."] QST

Strays

FLASH! FCC OKAYS REPEATER CROSSBANDING

In response to a request by ARRL, the FCC has deleted the restrictions on crossband operation of repeaters effective December 15. This change permits a repeater to have its output frequency in a different band than its input. The Commission also clarified its rules as to when and how various types of amateur stations may retransmit the signals of other amateur stations. Further details will appear next month. Operators in need of details more quickly may send a stamped addressed envelope to ARRL Hq. Ask for a copy of the Report and Order in Docket 20113.



This is W4PVA/bikemobile. Traveling on bike to the Ole Virginia Hams hamfest, Harry worked several stations through the 146.37/146.97 repeater. A motorist hunting for an address stopped Harry who was able through the repeater to give directions.

A Modular Transceiver for 1296 MHz

BY DICK BINGHAM,* WB6BDR/W7KWR

ABOUT half-way through the construction phase of the 1296-MHz converter described in the ARRL *Handbook*, the simplicity of construction of a direct-conversion receiver used in 1969 came to mind. Accordingly, the present project was scrapped and instead separate boxes were built containing a local oscillator, multiplier, rat-race mixer, and a band-pass filter. Modular construction makes fabrication and tune-up procedures quite simple.

Success with the basic configuration was nearly immediate when a two-way contact with WA6STS, over a ten-mile path, was made with only 1/4-milliwatt output! Fig. 1 is a block diagram of the system used in these tests. Keep in mind that this configuration is only an "enthusiasm generator" and is quite removed from a high-performance station. The later addition of a low-noise preamplifier and several stages of power amplification to increase the rf output will result in a station capable of better performance.

The description that follows covers first, the basic package assembly and testing, and second, the "add-on" stages that will increase the value and performance of the station. While there have been many articles written in the past few years concerning 1296-MHz equipment, there has been little attention given to a complete communications package.[1,2,3] It is hoped that the following will aid many amateurs in experimenting in this part of the spectrum with a minimum of problems.

* 4880 Burnside Road, Sebastopol, CA 95472.

[1] Katz, "A 1296-Mc. Preamplifier — That Works!" *QST*, November, 1967.
[2] Meyer, "A Crystal-Controlled 1296-Mc. Converter," *QST*, September, 1962.
[3] Bingham and Hayward, "Direct Conversion — A Neglected Technique," *QST*, November, 1968.

The construction work is broken into six steps:

1) CRYSTAL OSCILLATOR — a 158.4375-MHz overtone crystal and two inexpensive transistors are used to generate about sixty milliwatts of power to drive the X8 multiplier.

2) STEP RECOVERY DIODE (SRD) MULTIPLIER — the multiplier uses two coupled half-wave lines and an SRD to generate the 1267.5-MHz local oscillator signal.

3) BAND-PASS FILTER (BPF) — this unit is identical in construction to the multiplier except that the diode is replaced by a piece of wire.

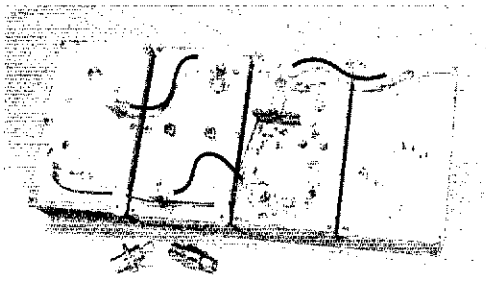
4) RAT-RACE MIXER — The mixer is built on Teflon-fiberglass pc board and uses two inexpensive hot-carrier diodes.

5) RECEIVER PREAMP — the preamp uses two low-noise microwave transistors to provide about 22 dB of gain, a noise figure near 4 dB. It is built on Teflon-fiberglass pc board.

6) RF POWER AMPLIFIERS — each module uses one microwave power transistor to provide about 11 dB of gain and has variable matching elements to simplify matching the device to 50 ohms.

Oscillator Stage

An overtone oscillator can be constructed according to the schematic diagram in Fig. 2. There is ample space inside the box to allow some leeway in parts placement. Good vhf construction practices should be followed — short leads, good-quality bypass capacitors, and the like. Be sure that



Individual stages of the 1296 transceiver are assembled in cast-aluminum boxes for ease of construction and excellent shielding. The popular Bud Econobox is an acceptable substitute for those shown here. Stages represented in this view are, from left to right, local oscillator, step-recovery-diode multiplier, an amplifier to boost the injection (similar to the power-amplifier stages), and the rat-race mixer. Letters seen adjacent to terminals are guides used by the author to aid in making interconnections. The two objects in the foreground are adapters between the BNC series and the miniature connectors used on each module.

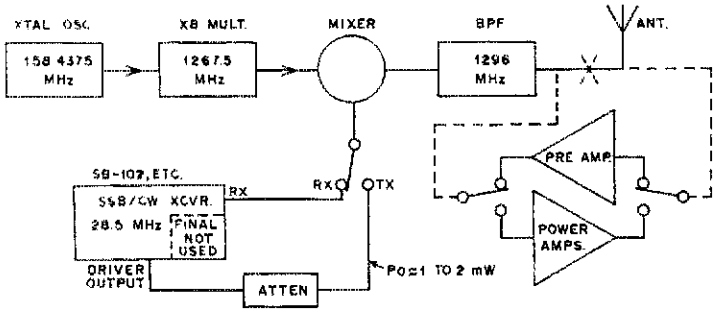


Fig. 1 — A functional block diagram of the transmitting/receiving package for 1296 MHz. The preamplifier and power amplifier modules shown at the right are units that can be added for improved performance.

there is no mutual coupling between L1 and L2. Note that the transistors are not alike; Q1 is pnp (2N4260), and Q2 is npn (MM8001). A crystal frequency of 158.4375 is used by the author, but of course this may be changed to suit the i-f needs of the constructor. The oscillator frequency is multiplied eight times before injection into the mixer, where the difference between that product and the received signal will indicate the i-f.

Band-pass Filter

Although the photograph of the assembled station shows the band-pass filter assembled in one style of cast aluminum box, it has been rebuilt into the more available Bud Econoboxes. The size is nearly the same, but the top cover geometry is slightly different.

Double sided pc board is used to assemble the BPF, and this board must be shaped to fit inside the small ridge that is found inside the top cover of the boxes (see Fig 3). To aid in alignment of screw holes, a small (3/64-inch) pilot drill should be used with the pc board in place in the covers; drill through both the board and cover. Holes at location A should be enlarged to clear No. 4 screws, and holes at B should clear No. 6 screws. Holes labeled C should provide a snug fit for the body of the rf connectors.

Steel No. 4 screws are used (through holes marked A) to hold the board in place. Brass nuts are soldered to the pc board on the circuit side. This can be done by threading a screw into the nut in place and applying enough heat to allow the solder to flow around the nut. Care must be used to prevent soldering the threads of the nut and screw together. No. 6 screws at B should get the same treatment. The rf connectors are inserted from the circuit side of the board, the nut tightened down on the ground-plane side, and both the nut and the shoulder of the connector soldered in place.

Brass shim stock (.01-inch thick) is used for the resonator lines, bent and drilled as shown in Fig. 3. Two small pieces of wire are soldered near the center of the strips to act as small-capacitance coupling probes between the input and output lines. Thin brass (.003 inch) shim stock is soldered to the circuit side of the board, with enough excess to allow it to be clamped between the top cover and the box upon assembly. Any extra material can be trimmed off after the cover is in place. This system provides additional ground continuity between the pc board and the enclosure.

In final assembly, the No. 4 screws should have

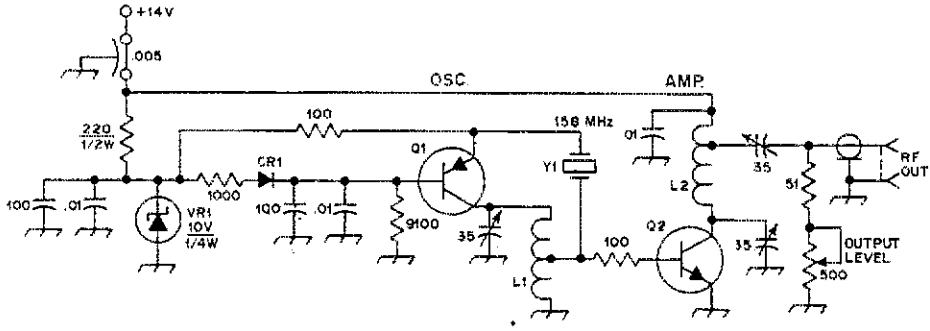
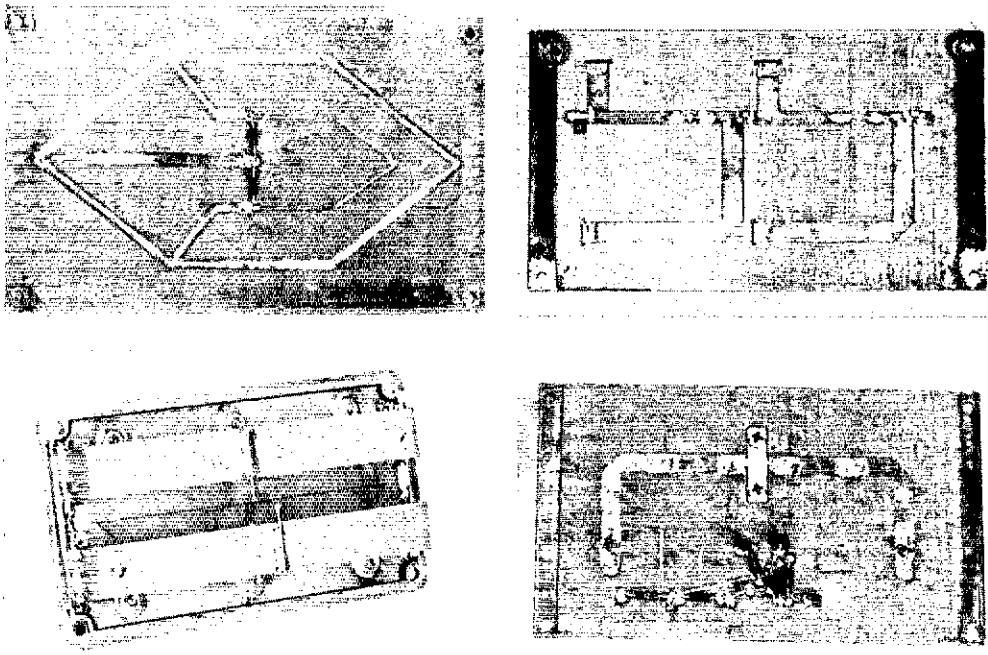


Fig. 2 — Schematic diagram for the oscillator. All resistors are 1/4 watt unless marked.
C1,C2,C3 — 9- to 35-pF ceramic trimmer, Erie 538-006D-9-35 or equiv.
CR1 — Silicon switching diode, 1N914 or equiv.
L1,L2 — 5 turns No. 16 tinned, 7/16-inch long, 1/4-inch I.D. Tap at 1-1/2 turns form cold end.
Q1 — Pnp rf transistor, 2N4260 or equiv.
Q2 — Npn rf transistor, Motorola MM8001 or equiv.
VR1 — 10-V, 1/4-watt Zener diode.
Y1 — International Crystal type CS-1, 158.4375 MHz, or may be of different frequency to suit i-f required. See text.



A view of what is inside some of the modules. Shown clockwise from the upper left are the rat-race mixer, a power amplifier, the receiving preamplifier, and the band-pass filter which is representative of the step-recovery diode multiplier as well.

two washers on each to provide clearance between the ground plane and the box cover. The No. 6 screws that act as tuning capacitors in the center of each line should have locknuts on them before assembling through the hole and into the nut on the circuit side. The tips of the tuning screws should be filed flat, and clearance between tips and the lines should be set at 1/16 inch.

Step-Recovery-Diode Multiplier

The physical configuration of the SRD multiplier stage is identical to that used for the BPF, with the exception that one of the input-connection wires is replaced with a diode and a small trimmer capacitor is added. The diode is connected directly from the rf-connector tip to the resonator line. A small 9- to 35-pF capacitor is located between the two resonators, adjacent to the diode. A short piece of wire makes the connection between the capacitor and the junction of the diode and the rf fitting. The other end of the capacitor is grounded. A 1/4-inch hole in the box cover allows access for adjustment of the capacitor.

The Rat-Race Mixer

One of the easier parts of the project is the construction of the mixer. However, the instructions and dimensions should be followed closely to assure success. If etching techniques are not used in fabricating the pc board, then the builder should invest in a good six-inch steel scale with divisions of 0.01 inch. An X-acto-knife handle and several spare blades should be on hand to aid in layout and cutting away the unwanted foil.

Dimensions for the 1296-MHz mixer are shown on Fig. 4. However, the following process can be used to construct useful rat-race mixers for other frequencies.

1) Calculate the dielectric wavelength for the LO frequency.

$$(\lambda \text{ die} = \lambda \text{ air} \times 1/\sqrt{\text{dielectric constant}})$$

The dielectric constant for Teflon-fiberglass board is 2.55.

2) Draw a circle with a radius of λ die/4.

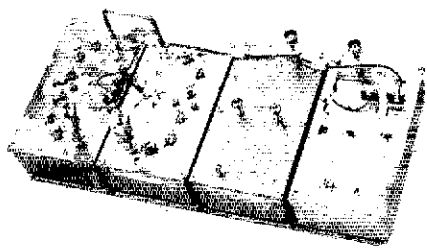
3) Draw a line across the circle through the center (Fig. 4).

4) Use the two intersections on the circle that the line in step 3 makes as centers for two more circles.

5) On the first circle draw straight lines through adjacent pairs of intersections to form the center lines for the six 70-ohm lines that form the perimeter of the mixer. Make these lines 0.09-inch wide.

6) The interior of the mixer has two 70-ohm lines that start at A and terminate at B and C. There is also a 0.2-inch square pad at the center of the mixer board. Use a 0.05-inch drill to make holes at A, D, G, and H.

7) Ground point A by means of a wire soldered



In the "other half" of the transceiver, the stages are, from left to right, two power-amplifier modules, a band-pass filter, and a receiving preamplifier. Each four-module assembly is fastened to an aluminum sheet to provide some rigidity and keep things more or less in order. The cast-aluminum boxes measure 4-3/8 X 2-3/8 X 1-1/4 inches.

to the ground plane. On the ground-plane side, using a 1/16-inch drill, remove sufficient copper to prevent shorts between the rf-connector centers and ground. Solder the rf connectors to the ground plane.

8) Solder the hot-carrier diodes to the circuit as shown in Fig. 4. This should complete the mixer assembly. Now the entire system may be adjusted.

Tuning Procedure

Connect a power meter or diode detector through a 10-dB attenuator to the output of the oscillator-buffer module and apply +14 volts. Adjust C1, C2, and C3 for maximum output (about sixty milliwatts) at 158 MHz. Connect the multiplier to the oscillator/buffer module and the power meter to the output of the multiplier. Adjust the tuning screws on the multiplier to peak the output and then adjust C2, C3, and R7 in the oscillator assembly and C1 on top of the multiplier for maximum output (approx. 10 mW) at 1267.5 MHz.

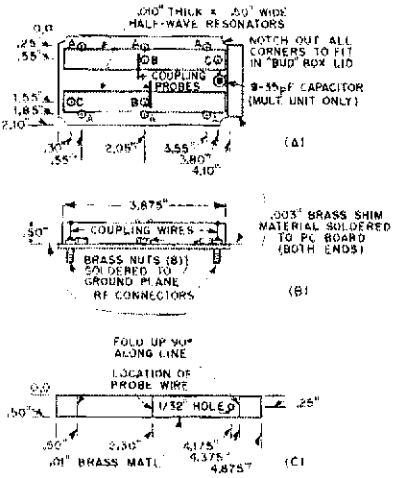


Fig. 3 — Construction details for the step-recovery-diode multiplier or the band-pass filter. The assembly is made on a piece of double-sided pc board which is then fastened in the cover of a Bud Econobox. In the SRD multiplier one of the input coupling wires is replaced with a diode and a 9- to 35-pF ceramic trimmer is connected from that same rf connector to ground. Position the trimmer so that it can be adjusted through a hole in the top cover. The diode is a Hewlett Packard 5082-0180.

Connect the LO port on the mixer to the multiplier output and apply 1 mW of 28.5-MHz signal to the i-f port. Connect the power meter to the input/output port of the mixer and measure the output power. It should be possible to get about 1/2-mW total output (1/4 mW at 1239 and 1/4 mW at 1296 MHz). Connect the BPF to the output port of the mixer and the power meter to the BPF output. Without changing the power settings on the 28.5-MHz generator, adjust the tuning screws on the BPF to maximize the rf output. With everything peaked it should be possible to obtain an apparent insertion loss of three to four dB (3 dB of this loss is the rejection of the 1239-MHz signal). An insertion loss in excess of four dB is not satisfactory and can be remedied by increasing the coupling between the two resonators (move one of the resonators toward the other or solder two small tabs opposite each other and vary their proximity to each other).

Connect an antenna to the BPF output and the basic 1296-MHz transverter is ready for operation! After a few contacts you will probably want to build the preamplifier to increase your receiving capabilities and transmitting range too. If the preamp is switched to follow the mixer, it will increase the transmitted power output to about 20 mW – the rf drive at 28.5 MHz will have to be reduced; otherwise, the signal will distort. Then you can build the power amplifiers to obtain 1/2 watt of output power.

Preamplifier Construction

The two-stage preamplifier is designed to cover 1.2 to 1.3 GHz and uses strip-line techniques on Teflon-fiberglass pc board. The strip-line circuitry is quite simple and requires 0.93- and 0.125-inch tapes to obtain the different impedance lines etched on the pc board (the tapes are not required if the boards are hand carved).

Lay out the circuit according to the dimensions shown in Fig. 5. After the etching or hand carving is finished, cut out 0.3 × 0.15-inch holes at the end of stubs E, F, G, and H for the rf bypass capacitors and bias-lead wires. Carefully drill and deburr 1/8-inch holes at C and D for the transistors. Likewise, drill 1/32-inch holes at A and B for the input and output rf connectors (use a 1/8-inch drill and "finger power" to remove sufficient copper on the ground-plane side to prevent any shorts at the rf connectors).

In the gaps at E, F, G, and H carefully solder the 10-pF, 100-pF capacitors and a 3-inch piece of

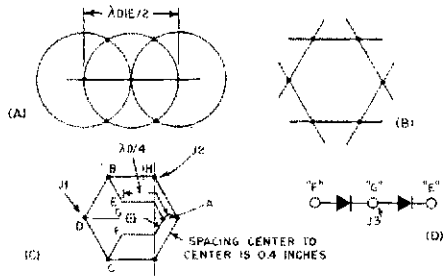


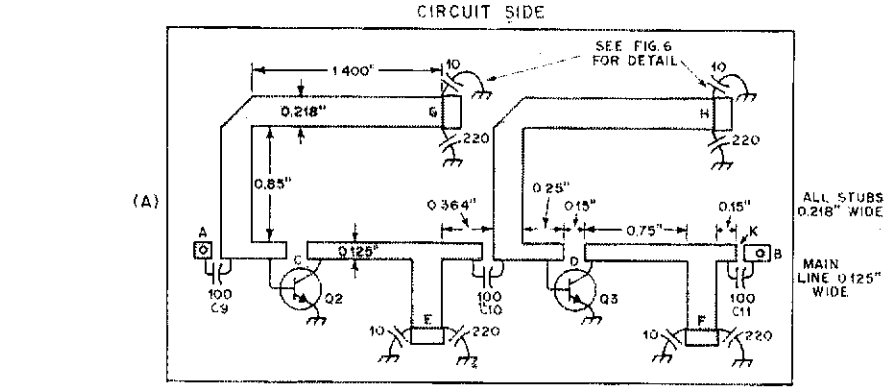
Fig. 4 — A method of deriving the transmission-line dimensions for the rat-race mixer. See text under mixer heading for discussion. The diodes at D are HP 5082-2817.

wire (No. 30) as shown in Fig. 6. Tin the rf connectors and the area around holes A and B and then solder them in place. Solder the dc blocking capacitors (100 pF at the input, output and interstage locations.

The preamplifier transistor emitter leads must be bent before the transistor is placed in the holes C and D provided for them in the board. With the transistor placed gold-side down on a flat surface, the emitter leads must be bent upward to a position that is perpendicular to the surface. CAUTION: do not bend the leads immediately adjacent to the transistor body – damage will most likely occur. Grip the leads next to the body with a pair of tweezers or fine needle-nose pliers; then bend the portion of the lead beyond the tweezers up to the correct position. This should allow a "strain buffer" area to prevent damage to the transistor seals.

The strip-line circuit traces adjacent to holes C and D should be lightly tinned, the transistor placed in position with the emitter leads through the holes toward the ground plane side, and the collector and base leads soldered in place. Bend the emitter leads over on the ground-plane side and solder them to the foil.

Active bias-regulating circuits are used to adjust the current through the preamplifier transistors. See Fig. 7. These circuits are assembled on the ground-plane side of the board in the shaded areas shown in Fig. 5. Before the bias connection wires are hooked up from the amplifier stages, the bias regulators should be tested by substituting an inexpensive npn transistor in place of the rf amplifiers. The base should be connected to X, the collector to Y through 1000 ohms, and the emitter to ground. Adjust the bias control and monitor the voltage drop across the collector resistor. The drop should be 3 to 11 volts (3 to 11 mA). Remove the test transistors and connect the bias wire from G (base) to point X, the wire from E (collector) to Y. The three-inch pieces of wire can be cut to shorter lengths if desired. By adjusting the bias control in each stage, set the current drawn by the first stage to 5 mA and the second to 10 mA. This current



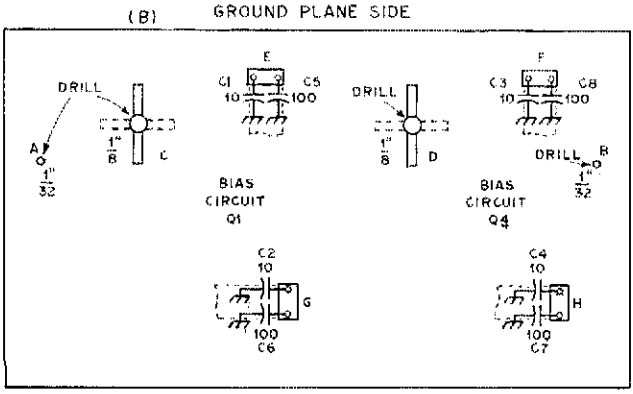


Fig. 5 — Board layout and parts placement guide for the two-transistor preamplifier. The decoupling networks at locations E, F, G, and H are shown in greater detail in Fig. 6. Transistors at locations C and D are HP 35821E. The capacitors used are all Centralab Monocaps; C1 through C4 are 10 pF, type CN10A 100k. C5 through C11 are 100 pF, type CN10A 101k.

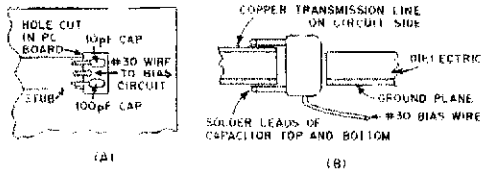


Fig. 6 — Detailed view of the decoupling-network assembly used at the end of stubs in the preamplifier base and collector circuits. Note that the capacitors are in the holes, with leads connected to the circuit trace on one side and to the ground plane on the other.

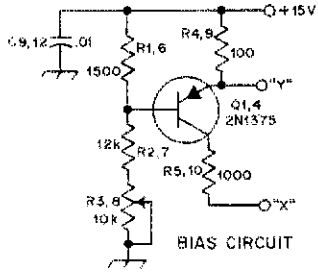


Fig. 7 — Schematic diagram of the bias driver circuit for the preamplifier stages. These components are assembled in the shaded areas shown in Fig. 5B. The photograph of the preamplifier was taken before this modification was developed; hence, they do not appear on that module. The transistors, Q1 and Q4, are MPS6518. Resistors are 1/4 watt.

can be monitored across the 100-ohm resistor in the bias driver — 0.5 volt equals 5 mA.

With the preamplifier connected between the antenna and the BPF, the background noise in the receiver should increase when +14 V is applied. If it does not, the 28-MHz receiver may be a bit tired. A significant improvement in received signals should be noticed with the preamplifier in use. By using transfer relays that reverse the input and output of the preamplifier, you can operate the transceiver with an output of up to 10 or 20 mW.

Power Amplifiers

The power amplifiers are constructed on identical pc boards with the only difference between the amplifiers being the type of transistor used. A 35821E (Hewlett Packard) transistor is used in the first stage, followed by a 35853E in the second. Each stage should provide approximately 10 dB of gain, resulting in an output of 1/2 to 3/4 watt.

Teflon-fiberglass board is used as the base for the amplifiers, etched to the pattern shown in Fig. 8. Note that the square pads are ground connection points, each with a wire soldered through to the ground-plane side of the board. Where component leads pass through the board into the ground-plane side, but without connecting to the plane, the holes should be "deburred" sufficiently to prevent short circuits from occurring. Assembly should follow the procedure given for the SRD and filter boards in that No. 4 screws hold the boards in place on the top covers of the Econoboxes. Don't forget the washers between the board and covers, to provide clearance for component leads that

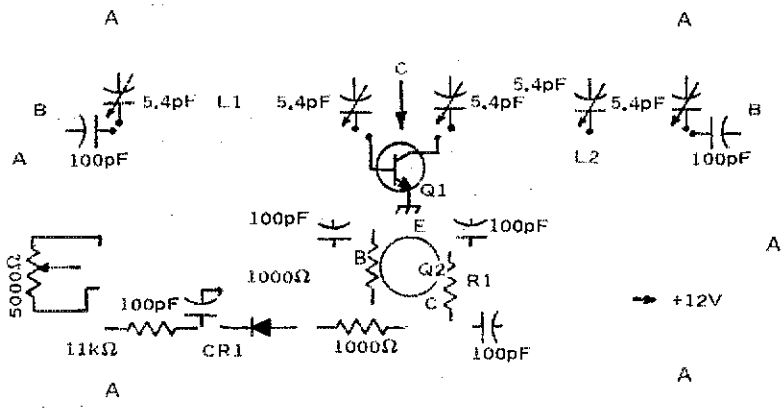


Fig. 8 — Printed circuit layout for the power amplifier module. This pattern will fit inside the cover of a Bud Econobox CU-124. See Fig. 9 for details of mounting the transistors. The square pads are grounded by connecting a wire through to the ground-plane side.

C1 — 1.3 to 5.4 pF variable, E.F. Johnson 187-0103-005.
C2 — 100 pF, Centralab Monocap CN10A-101k.
C3 — .001 disk ceramic.
CR1 — Silicon diode, 1N914 or equiv.
Q1 — HP 35821E or 35853E uhf transistor.
Q2 — Pnp bias driver, 2N3064 or equiv.
R1 — Derive from formula: 1000 millivolts/collector current (mA). Value should be near 30 ohms for the 35821E stage, and near 10 ohms for the 35853E.

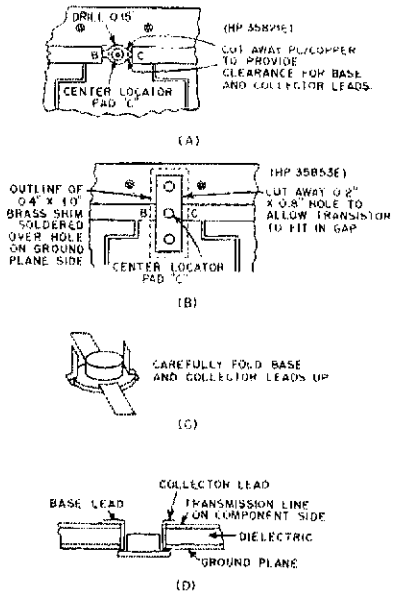


Fig. 9 — Mounting details for the transistors used in the amplifier stages. Care should be used in bending the base and collector leads so as to prevent damage to the seals. Two holes are drilled in the brass shim insert at B to allow fastening the transistor by means of small screws and nuts.

protrude beyond the ground plane. The rf connectors are soldered to the ground-plane side of the boards. Enough copper should be removed around the holes for the connector center pins that there is no danger of short circuits at this point.

The transistor base and collector leads must be bent up as shown in Fig. 9; this must be done carefully, using tweezers to prevent applying pressure at the junction of lead and body. After the emitter leads are in place, contacting the ground plane, the base and collector leads can be bent down flat and soldered to the strip-line circuitry etched on the board.

In testing the amplifiers, the voltage should be increased slowly, to the 12-V level, while monitoring the current through each stage. The first amplifier should pass 30 to 35 mA, and the second 100 to 120 mA. After drive is applied, the variable capacitors can be adjusted to provide maximum rf outputs.

Acknowledgements

I would like to thank WA6STS for providing the "other end" of all the tests we ran and for keeping my 1296-MHz interest alive. Special mention should be made of W7CVI, who gave me a start with the whole thing. Also thanks to W6KQG for BPF design and Phil Froess for help with the rf devices. All comminications regarding this system should be accompanied by s.a.s.e. please – except for two-way contacts on 1296 MHz! QST

December, 1925

. . . Low-power operation seems to be the theme of this issue. 2BBX's station is featured, having been highly successful with only 7.5 watts output: the spiral inductances of hard-drawn ribbon ("where the action is") take up more room than all the rest of the rig. Col. Foster's summer vacation setup at Canadian 9CK runs only 11 watts but has worked all around the Pacific. Rufus Turner tops it all off with an inexpensive transmitter made from receiving parts – an invitation to SWLs to come in and join the fun.

. . . All this means closer attention to the fine points, and 3CAB obliges with information on how best to calibrate and read a dial, while 2CG suggests greater dial bandspread by tapping down on the tuning coil, and Dale Buffington explains how to eliminate body capacity effects.

. . . The increasing use of tuned r.f. stages brings feedback problems caused by magnetic coupling; Fred Marco of 9ZA suggests a remedy – toroidal inductances.

. . . The Carborundum Company is trying a comeback for its product as a rectifier, with a "stabilizing detector unit" which selects the least-disadvantageous resistance range.

. . . More and more a good c.w. note becomes important, and Dr. Dellenbaugh of MIT presents extensive data on design of iron-core filter inductances.

December, 1950

. . . Editor Budlong discusses at length the place of amateurs in civil defense communication; we have military agreement to retain some frequencies for that purpose in the event of war, though they'll need to be below ten meters for security reasons.

. . . "Copyability" is more important than fidelity in ham communication, and this is the theme of W1DX's 50-kc. i.f. amplifier; he warns that signals will "tune sharp," achieved by cascading several tuned circuits in each tube stage. The brothers W3NJE and W8KML tackle the transmitting side, with a speech amplifier and driver design using clipping and a low-pass filter.

. . . Technical Editor Grammer treats two subjects of major current interest – S.W.R. measurements with a coax bridge, and a "harmonic separator" to help locate the cause of any TVI.

. . . Recent issues of *Radio News* have touted "supermodulation" as the ideal means of ham voice communication; Prof. Villard, W6QYT, presents the results of his extensive evaluation, showing many of the claims are mutually conflicting, and concluding there is no magic or revolutionary technique in this system.

. . . Keeping on frequency will be easier with the 100-kc. oscillator with 10-kc. multivibrator described by ZL3LR.

M–*WIRW*

Read Capacitance With Your VOM

BY KENNTH H. CAVCEY,* WØYOR

GOT A lot of mica and ceramic capacitors in your junkbox that you don't know what to do with? Wish you could read them so that you could complete that project that has been sitting on the shelf for the past year? Well this is your lucky day — here is a simple circuit that will allow you to convert your VOM so that it reads capacitance, for only around $22 (probably less with a healthy junkbox!).

Circuit Theory

Everyone knows (even the novice — right?) the relationship that says: Capacitance times Voltage = Charge. If we keep this relationship in mind and use the circuit shown in Fig. 1, we see that our unknown capacitor C_X is charged through R1 and CR1 when the switch is open. When the switch is closed, the unknown capacitor is discharged through the switch, CR2, and the meter.

Now replace the switch, static power supply, and R1 with a TTL-derived, square-wave generator. When the waveform is high, the capacitor C_X is charged to a value of approximately 3.5 volts and when low it discharges as before.

The frequency at which the generator runs determines the discharge current through the meter.

since: $Q = C_X V$

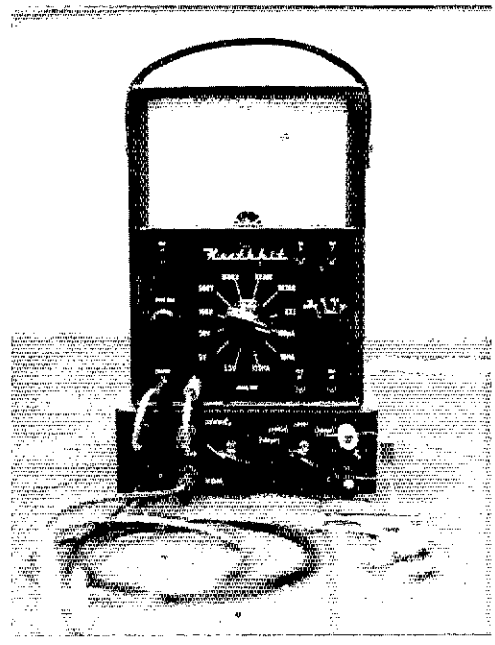
$$nQ = nC_X V$$

but nQ = charge stored per sec.
$nQ = dQ/dt = i$ (average current)
$\therefore \quad i = nC_X V$

where: Q = charge supplied to C_X per pulse.
C_X = unknown capacitance
n = number of pulses per second (frequency of generator)

The most sensitive scale of my VOM is 150 μA (Heath MM-1) so the following calculation was made to determine the free-running frequency of the generator for 150 pF at full scale.

$$n = i/C_X V = 150 \times 10^{-6}/(150 \times 10^{-12})(3.5) = 285 \text{ kHz}$$



Larger values of capacitance can be read by decreasing the frequency which is obtained digitally through decade division (7490s). The power supply is straightforward and many different types may be employed (batteries, LM335, μA723). The simple Zener circuit shown was used by the author with a total current drain of 90 mA.

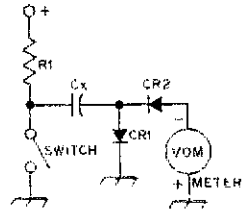


Fig. 1 — Basic capacitance-measuring circuit.

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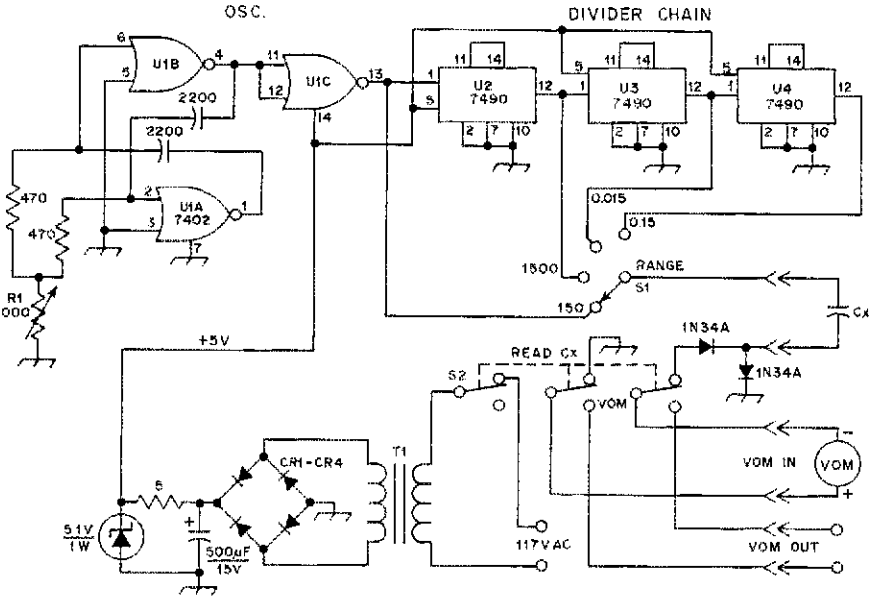


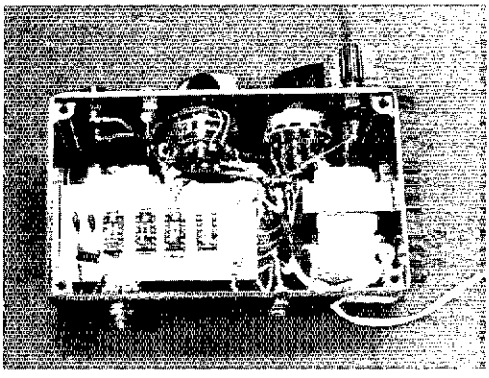
Fig. 2 – Schematic diagram of capacitance checker. Unless otherwise specified, resistors are 1/4-watt composition and capacitors are disk ceramic.

CR1-CR4, incl. – Mallory PTC 401 silicon-diode bridge rectifier.
R1 – Control, Mallory MLC13L.
T1 – Filament transformer, 6.3 V ac (Stancor P-6465 or equiv.).

Construction and Calibration

The instrument was built on a 1-3/4 × 3-1/2-inch single-sided, printed-circuit board and mounted into a 6 × 3-1/2 × 1-7/8-inch black plastic case. The physical layout is left to the builder since nothing is critical to actual circuit operation. The unit could use a higher frequency oscillator to extend its range down to lower capacitances and employ a self-contained meter. Example: A 50 μA meter and a 571-kHz oscillator should give a 25-pF full-scale reading. Dream up your own variation!

The author calibrated his instrument by setting S1 to the 150-pF full-scale position and placing a 100-pF 1-percent silver-mica capacitor across the C_x terminals. The calibrate control was then adjusted for the capacitance value indicated. If no forward reading is obtainable, then check the 7402 oscillator for output either at pin 4, 11 or 13. The other scales are checked with corresponding larger capacitors. The function of S2 is to disable the power supply when using the VOM in normal operations. QST



Bottom view of the tester.

Strays

If you've traveled through central Arizona lately, you've probably noticed one of these billboards promoting a local greyhound racing track. As far as we can tell, the call K9FUN is not in use now; shouldn't he be portable seven?

A TUNING AID FOR SSTV

BY JERRY HALL,* K1PLP

HAVE you ever used slow-scan television, or SSTV, in the operation of your amateur station? If not, perhaps you've visited the shack of a friend who has an SSTV setup. Or maybe you've merely tuned across those "chirping-bird" signals on the high-frequency bands, such as around 14,230 MHz on 20 meters. Did you ever wonder how any actual picture information could be extracted from amongst that collection of weird, sometimes raucous sounds?

If you've listened to an SSTV signal for a while, you know that the received signal comes out of the speaker as a band of varying audio frequencies. The picture (and sync) information is obtained from the pitch or frequency of the tone at a given instant. Frequencies that have been adopted and standardized by amateurs are 1200 Hz for sync-pulse information, 1500 Hz for the blackest end of the picture scale and 2300 Hz for the whitest end. Audio frequencies between 1500 and 2300 Hz are used for intermediate gray tones on the scale. The SSTV receiving monitor is designed and constructed to work with these particular tones, through the use of tuned circuits and detectors.

Unfortunately there's a catch here, at least for the amateur bands below 30 MHz. On these bands the SSTV transmitter emits no carrier. Most such transmitters are nothing more elaborate than an ordinary ssb transmitter or transceiver, with 1200- to 2300-Hz tones being fed into the speech-input circuits. These tones come from the SSTV camera or perhaps from an audio tape recording of preprogrammed information. It is important to note, however, that *at a given instant only one frequency in the audio range is present.* Never, ever, in a properly operating SSTV transmitting system, are two or more tones fed simultaneously to the speech input.

What does this mean? Well, we all know that if we feed a single, pure, sine-wave tone into the audio input jack of a "perfect" ssb transmitter, it will emit a pure rf signal with no sidebands. At some later instant, after the frequency of the audio tone has changed, that pure signal will have moved its position in the frequency spectrum by the amount of the change in audio tones. A bit later yet, that signal may have been shifted even more, depending on the content of the picture information being transmitted. What this means, then, is that the SSTV emission is nothing more than a single rf signal which is frequency agile.

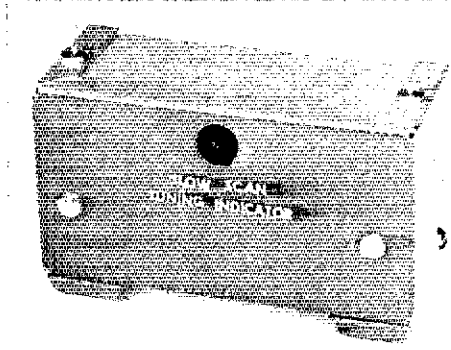
Now here's where the catch comes in. Since there is no transmitted carrier, we must inject the carrier at the receiving end. Of course we do this all the time when we receive ssb voice transmissions. The problem is that the carrier must be injected *at the proper frequency.* During ssb voice reception we find this "proper frequency" rather easily by tuning the receiver dial until the voice pitch we hear coming out of the speaker sounds natural. However, it isn't quite that simple when we're tuning an SSTV signal. Unless we possess a gift known to musicians as perfect pitch, we have no way of knowing just by listening that the audio tones are correct for the tuned circuits of the receiving monitor. Observing the picture being received is usually of little help because of the slow movement of the trace. We must therefore rely on some form of tuning aid. Most homemade monitors and some that are manufactured commercially have no such aid.

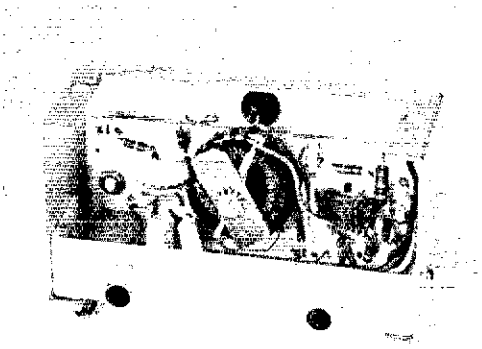
The Circuit and Its Operation

Tuning aids can take any of several forms – an oscilloscope, a meter, an illuminated indicator, or aural comparison of pitches, to name a few. Fig. 1 shows the diagram of a relatively simple and inexpensive aid. It uses an LED as an illuminated indicator. When the signal is properly tuned, the LED flashes on and off as the 1200-Hz sync pulses are received, fifteen 5-millisecond pulses per second. (Every eight seconds, one of the pulses is of 30-ms duration.) The eye tends to integrate these flashes, and the LED appears to be pulsating while illuminated continuously. This is not the case if the signal is improperly tuned.

Oh yes, there are conditions of mistuning which will at times cause the LED to glow almost continually. Such conditions occur when the received picture is of predominantly one tonal range. For example, it is possible to mistune a predomi-

* Associate Technical Editor, *QST*.





An inside view of the tuning aid. The circuit as constructed here is housed inside a 2 x 4 x 1-5/8-inch Minibox. The LED is supported by its leads and protrudes through a grommeted hole in the front of the enclosure. Phono type jacks are fastened to a bracket for audio and 12-volt inputs, with clearance holes for these jacks drilled in the back cover.

nantly black picture signal so the "black" frequency (normally 1500 Hz) passes through the 1200-Hz filter section of the tuning aid and keeps the LED glowing most of the time. With such tuning, the sync pulses would then be received at 900 Hz. However, a little experience with the tuning aid allows one to recognize without difficulty that, under such conditions, the rhythmic pulsations of the LED are missing. Herein lies the reason that pulse-stretching or integration circuitry is not used to keep the LED glowing continuously. Such circuitry hinders more than it helps to find the correct tuning point for the signal.

U1 of Fig. 1 is a dual op amp. Although the power supply connection is shown as 12 volts, potentials up to 28 volts may be used. U1A functions as a limiter, and will limit an input signal of only 25 mV pk-pk. The two 1N914 diodes in the input section provide protective limiting for the op amp.

Following the limiter, L1 and C1 form a single-section filter tuned to 1200 Hz. The 1N270 diodes and .01-μF capacitor rectify and smooth the 1200-Hz audio into dc. This dc is fed to U1B, which has an adjustable threshold to switch the LED on and off. The 1200-Hz filter itself could be made in the form of an active filter. This would require additional op-amp circuitry, and those who favor this approach over the use of the 88-mH toroidal inductor are encouraged to pursue it.

Construction and Adjustments

The circuit may be constructed inside the enclosure of an existing monitor, or it may be housed separately in a small metal box like that shown in the photographs. Component layout is far from being critical.

An unmodified 88-mH toroid should be used for L1, and C1 may be a stock-value capacitor or appropriate combination. Some builders may wish to precision tune the filter to 1200 Hz with the aid of a frequency counter. This is best done after the remainder of the circuit is completed, so the filter is tuned under operational conditions. Before doing this, however, it would be wise to check the

(Continued on page 95)

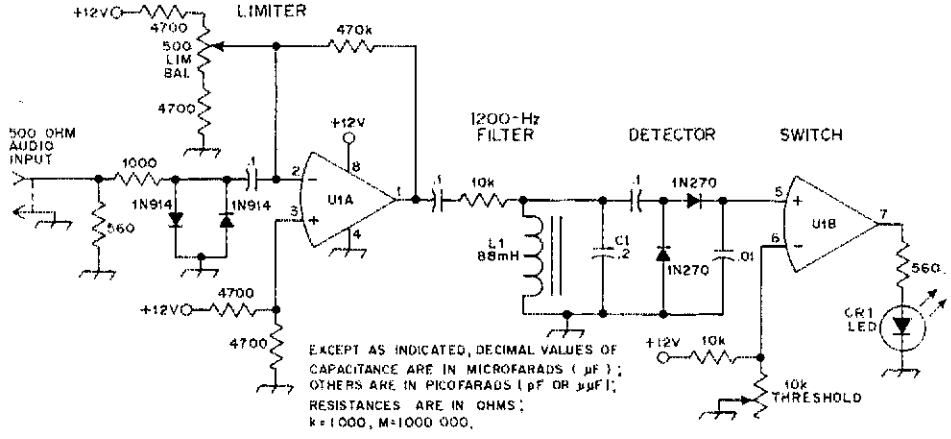


Fig. 1 – Circuit diagram of the SSTV tuning aid. Both controls are of linear taper. All fixed resistors may be 1/4 watt. All capacitors except C1 may be disk ceramic.

C1 – 0.2 μF Mylar or polystyrene. In the unit photographed this value was obtained by connecting two 0.1-μF capacitors in parallel.

CR1 – LED, Radio Shack 276-041 or equiv.

L1 – Surplus 88-mH toroidal inductor.

U1 – Dual operational amplifier, type 5558, 8-pin dual in-line package.

Recent Equipment

To acquaint you with the technical features of current amateur gear.

Janel Laboratories Model 432CA Converter

THERE has been a number of commercially made vhf and uhf converters on the scene since this writer has been involved in activities on those bands -- a time span of several years. A recent addition to the list is the line of converters produced and sold by Janel Laboratories of Corvallis, Oregon, (formerly in Succasunna, New Jersey). Although these converters are available for bands from 50 through 432 MHz, the one for the latter frequency is the subject of this report.

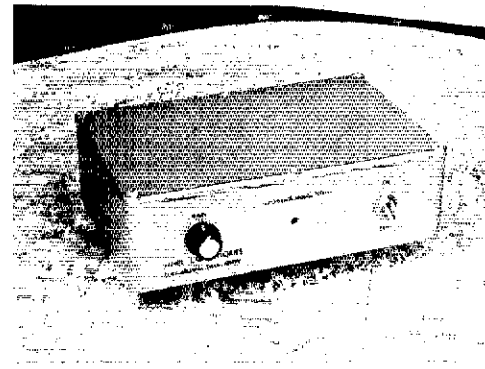
There is a lot of planning and circuitry packed into the 5 × 7 × 2-inch cast aluminum box. A power supply is included for operation from ac mains, but there is also a terminal on the rear of the unit that provides a means of connecting the converter to a +12-V dc source if that scheme fits your operating position.

Standard i-f output is 28 MHz, with a nominal 4-MHz range to allow coverage of 432 to 436 MHz. Either the i-f or the input range can be modified upon special order.

Circuitry

One of the bugaboos of uhf converters in the past has been the oscillator/multiplier chain. Oscillator stability is of prime importance, and freedom from spurious products of the multiplication process is of increasing concern to the discriminating uhf enthusiast. The oscillator in the 432CA starts at 101 MHz and is of quite good stability. Two doubler stages provide an injection frequency of 404 MHz, with spurious products low enough in level that they have minimal effect on converter noise figure and image response. Tuned lines, used as multiplier output and rf amplifier/mixer interstage coupling circuits, are another aid to obtaining good image rejection in the converter.

In the model we tested, the rf stage used a K2073 bipolar transistor in the grounded-emitter configuration. Conversations with the manufacturer revealed that other transistors have been used in later models, always with the goal of improved noise figure in mind. The mixer is an active one, using an MPS H10 in a grounded-emitter, forward-biased circuit. Injection is by means of mutual coupling between the tuned lines of the rf-stage output, multiplier output, and mixer input circuits.



A dual-gate MOSFET is put to work as an i-f amplifier, with straightforward circuitry. A variable resistor to change the bias on the source provides a front-panel means of adjusting gain.

How Does It Perform

As the reader might guess by looking at the title photograph, the 432CA converter has been used at the home station of the reviewer in several contacts via EME (Moonbounce). Stability, while not measured, was always good enough that stations could be found readily by noting the dial setting on the R-388 receiver used as a tunable i-f. This was true even though periods as long as a month passed between last use and turning the converter on again. Only a 5- or a 10-minute, warm-up period was allowed in most instances.

Noise-figure measurement in uhf converters is still somewhat a matter of conjecture, Kentucky windage, and how well you trust your noise-figure meter. Although the converter had been in use for some time, the first application of an instrument to measure the noise figure brought forth a rude awakening -- it showed a horrifying 10.5 to 11 dB! That EME contacts were made through this converter is a tribute to the preamplifiers that were used in conjunction with it. In order to delve into the problem more thoroughly, the writer acquired a noise-figure meter of his own, and subsequent tweaking in the converter brought the NF down to a more reasonable 5.5 dB, which is in the ball park with what the manufacturer says it should be. Needless to say, the next EME period produced

some outstanding signals, and some tape recordings of U.S. and foreign stations that are very impressive to hear (like ZE5JJ and PAØSSB calling CQ on 432MHz!) – all of which reinforces what has been said before. You cannot tune a converter for maximum signal and achieve best noise figure at the same time.

Talks with amateurs in the field and with people at Janel reveal that the converters are now coming through in good condition; all are optimized with the use of a noise-figure meter before shipment.

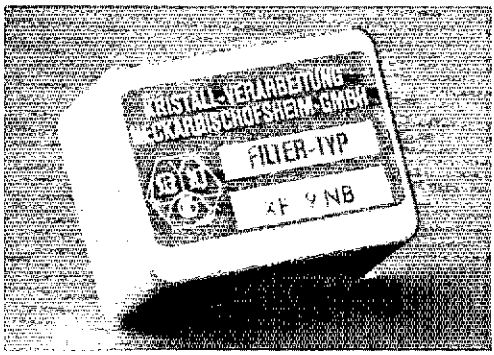
Image response has never been a problem in the installation at W1SL, but there has been trouble with products of a TV station mixing with an fm station output. This, of course, is *not* the fault of the converter, nor of the preamplifier ahead of it. It is reported here only to make the reader aware that there are causes of "birdies" other than image response. – *W1SL*

The Janel Laboratories
Model 432CA
Converter

Dimensions (HWB) and Weight: 2-1/4 X 6-3/4 X 5-1/2 inches, 1-1/2 lbs.
Power requirements: 117 V ac or 12 V dc (at 40 mA).
Input and Output: Nominal 50-ohm impedance, BNC connectors are standard.
Gain, overall: Up to 35 dB, adjustable from front panel.
Noise figure: 5.5 to 5.7 dB.*
Image rejection: 46 dB.*
Price class: $85.
Manufacturer: Janel Laboratories, 260 N.W. Polk Ave., Corvallis, OR 97330.
* Measured in the ARRL lab.

QST —— QST —— QST

• New Apparatus



THE KVG XF-9NB CRYSTAL FILTER

In recent years there has been an increase in the number of amateurs who are building their own receivers. While most of the projects are aimed at fairly simple designs, a few amateurs are now attempting to build receivers which surpass the performance of commercially available units. The design of such equipment is critically dependent upon the availability of high quality components, with crystal filters probably being the single most crucial component.

In a 1974 issue of *QST*, the writer described a high-performance receiver which was based upon a 10-pole, 500-Hz wide crystal filter manufactured by KVG of West Germany.[1] Unfortunately, by the time the article was published the filter was no longer available. However, KVG has recently introduced a replacement unit with similar specifications, the XF-9NB. A sample of this filter was recently evaluated and found to be nearly identical in performance with the earlier unit.

The specified terminating impedance for this filter is 500 ohms, consistent with the other wide-ssb-bandwidth 9-MHz filters manufactured by KVG. The sample filter was mounted in a test fixture constructed from scrap pc board. Tuned transformers were used at each end of the filter in order to match into the 50-ohm instrumentation available, in this case a Tektronix 7L13 spectrum analyzer with a matching TR-502 tracking generator. The insertion loss of the filter including the matching transformers was measured as 8.2 dB, and the peak response occurred at 8.99993 MHz, just 70 Hz below the specified 9-MHz center frequency.

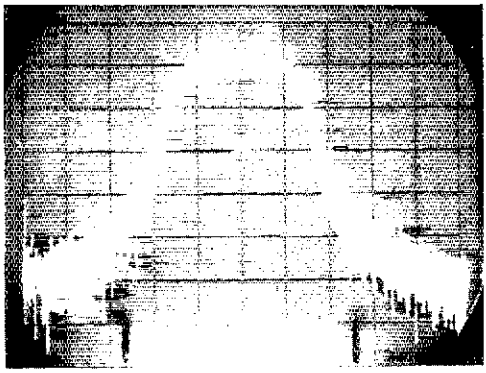
Shown in the accompanying table are the bandwidths measured for various levels of attenuation. As shown, the 6- to 60-dB shape factor of the filter is just a bit over two, representing superb characteristics for a cw filter. The nominal 500-Hz bandwidth is ideal for general-purpose cw applications, being significantly more selective than the typical ssb type of filter, and yet wide enough to be comfortable for long periods of contest operating. The one parameter of major significance which was not evaluated carefully was the ultimate attenuation. In this case, the latter appeared to be approximately 90 dB; however, this was clearly limited by the test fixture, (there was a minimal change when the filter was removed). Time was not available to build a suitable test

TABLE 1

Attenuation	*Bandwidth XF-9NB*	*Bandwidth XF-9M*
3 dB	400 Hz	
6 dB	520 Hz	550 Hz
10 dB	610 Hz	
20 dB	730 Hz	960 Hz
30 dB	810 Hz	
40 dB	900 Hz	
50 dB	1.02 kHz	
60 dB	1.11 kHz	2.1 kHz
80 dB	3.7 kHz	

Ultimate attenuation over 90 dB for each filter. Measurements performed with a drive level of -30 dBm.

[1] Hayward, "A Competition Grade CW Receiver," *QST*, for March and April, 1974.



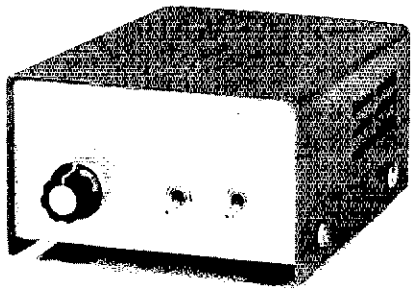
Amplitude response of the XF9-NB i-f filter. Vertical: 10dB per centimeter. Horizontal: Approximately 200 Hz per centimeter. Noise components seen in this display are caused by incidental fm from the frequency source used in this test.

enclosure which also contained the necessary impedance-matching transformers.

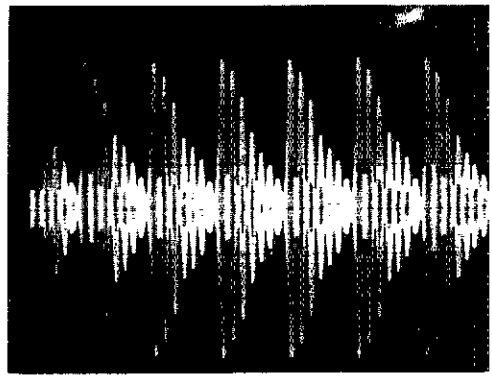
The price class of this filter is $63.95. It is available from Spectrum International, Box 1084C, Concord, MA 01742. This filter should be ideal for the amateur building a high-performance cw receiver. The one item missing from the KVG line which would be ideal as an accessory for the XF-9NB is a matching 2-pole filter for use between the i-f amplifier and the product detector in order to decrease the overall noise bandwidth of the i-f system. The aggressive builder might be able to build such a unit from the line of BFO crystals also available from KVG. Alternatively, the 4-pole, XF-9M available from KVG could be used for this purpose. Measured data for this filter are also included in the table. – *Wes Hayward, W7ZOI,*

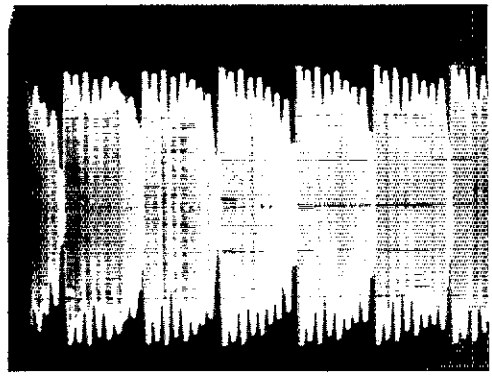
THE NEW ENGLAND ELECTRONICS ENGINEERING QUASI–LOGARITHMIC SPEECH PROCESSOR

With the lack of sunspots we've had lately, the crowded and competitive high-frequency phone bands are even more tightly packed than usual. This has many of us looking for ways to increase our single-sideband signal effectiveness without resorting to larger amplifiers or antennas. The Quasi-Logarithmic Speech Processor offered for about $70 by New England Electronics Engineering will increase ssb effective power by 3 to 6 dB, according to the ads. In general, that's a worthwhile gain.



The accompanying photos tell part of the story. There's no doubt that the processor greatly increases the average power output of the transmitter. The question is, is it an *effective* increase? Receiver checks show that the signal does, in fact, *sound* louder, and is more readable, especially if the signal is near the noise level. The exact amount of the benefit depends on the voice characteristics of the operator and upon the ability of the transmitter power supply to deliver the required amount of average current without overheating. To test its effectiveness, the processor was used on Field Day on 15-meter phone, in conjunction with the same T-4XB that was used for the photos. This was hardly a controlled experiment, but the 817 QSOs made on a less-than-optimum 21-MHz band certainly didn't result from an *in*effective transmitter. There is no increase in the bandwidth of the transmitted signal if the transmitter is tuned properly; in fact, if the processor is properly adjusted, it will be literally impossible to drive the transmitter into distortion.





The oscilloscope display given at the left shows the normal ssb waveform transmitted when the word "hello" is spoken into the microphone. The display shown at the right is characterized by a large increase in average power when the processor is switched on and the limiting is adjusted for the maximum usable gain. This represents approximately 15 dB of amplitude limiting.

The NEEE unit is a simplified version of the logarithmic amplitude-limiting processor described by W1FBY in *QST* for August, 1974.[1] The toroids were eliminated through the use of an active filter, which reduces the circuit complexity without a corresponding increase in battery drain. (A set of two nine-volt transistor radio batteries will power the unit for several months of normal operation or for several contest weekends, but remember to turn it off when it's not in use. The current drain is about the same whether audio is passing through it or not.) The tape-recorder input shown in the earlier *QST* article is not a feature of the NEEE unit.

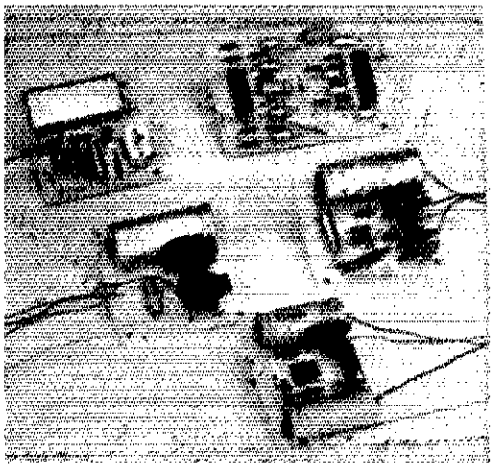
The pros and cons of audio and rf processing were discussed at some length in the W1FBY article. This writer has encountered audio processors which did nothing good for an ssb signal, and as a result he has been skeptical of their merits as compared with rf clipping. Using the NEEE unit has eliminated a lot of this skepticism.

The Quasi-Logarithmic Speech Processor is housed in a 2-1/4 × 4 × 6-inch case and is supplied with a standard three-circuit 1/4-inch diameter phone plug and jack for connecting between the microphone and the transmitter. The manufacturer is New England Electronics Engineering, Box 145, Wethersfield, CT 06109. – *K1ZND*

MFJ Enterprises Subassemblies

MFJ Enterprises is offering a partial solution to the parts procurement problem for radio amateurs by selling module kits of some basic circuits. The kit price of some of these pieces is approximately the same as one would pay if gathering the parts independently. Because the pc board is a part of the kit, etched and drilled, it is probably more convenient to purchase the kit than to start from scratch in garnering the components and etching a circuit board at home.

The photograph shows just a few of the MFJ kits in assembled form. A frequency standard is shown at the upper left in the picture. It has output markers at 100, 50, and 25 kHz. An audio band-pass filter is visible at the upper right. The three assemblies that remain are audio amplifiers of various power classes – 0.5 to 2.5 W. These amplifiers are designed to drive a loudspeaker. Therefore, they may be of special interest to owners of QRP gear (Ten Tec PM series, or Heath HW-7), since some QRP transceivers have only enough audio-output to drive a headset.



Those wishing to obtain additional information on these products can write for a catalog. Some additional products are not shown here, but are described in the MFJ literature. Send all inquiries to MFJ Enterprises, P. O. Box 494, Mississippi State, MS 39762. – *W1CER*

[1] Myers, "A Quasi-Logarithmic Analog Amplitude Limiter with Frequency-Domain Processing," *QST* August, 1974.

FEEDBACK

Errors have been found and some changes made to the circuit of the Micro-TO II keyer. (*QST* September 1975, p. 28).

On the schematic, the grounded end of R2 should go to V*1*. Also, for reasons discussed below, C8 in the monitor should be deleted.

On the overlay drawing, C6 and R9 are reversed. Delete C8. The following are typos: BAH V = Batt V*1*, RDK = 10 K, ING16 = IN916.

In the text, the definition of NAND gate, the output becomes a *1* if any of the inputs goes to *0*. Some references to the Q output of U4A connected to the D input should refer to the *Q* output. There is a reference to R5 being connected to pin 13 of U2B; this obviously refers to R3.

C8 was intended to filter out some of the higher harmonics from the monitor oscillator, a function which is performed adequately by C9 across the output transformer primary. In testing a series of 100 sets of ICs in the keyer, I found that with certain ICs C8 can filter out too much of the oscillator signal, making the output of U3C a *1*. This puts V*1* on the gate of Q2, which, since it has only a few ohms dc impedance in the emitter, draws a tremendous current. This fries Q2 and runs down the battery post haste. Rube Goldberg couldn't have designed a better crowbar. If you do want to fool around with C8 to get a slightly better tone, start with a lower value (e.g., 500 pF) and gradually build it up. At the first sign of clickiness, stop and go back to a smaller value.

I have found suppliers for printed circuit boards and some of the other parts. Send a self-addressed stamped envelope for the latest prices for these components or for the latest hints and kinks on the keyer.

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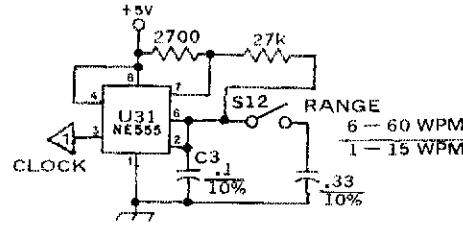


Here is the missing NE-555 timer circuit of the schematic diagram in part II of Riley's, "A Morse Code to Alphanumeric Converter and Display", *QST* for November 1975, page 13.

Silent Keys

IT IS with deep regret that we record the passing of these amateurs:

Ex-K1AKT, William P. Dewey, Quincy, MA
W1AZV, Valentine C. Morehouse, Brattleboro, VT
W1EHD, Ronald H. Bedell, Great Barrington, MA
K1ESY, Mirville M. Burns, Montpelier, VT
W1GV, Malcolm H. Smith, Providence, RI,
WA1JDL, Charles A. Nocher, Washington, MA
EX-K1KIY, Charles P. Mitten, Amherst, MA
K1PCC, George L. Kayhoe, Newtown, CT
W1QUI, Herbert M. Harris, Falmouth, ME
W1YDM, Charles J. Eastman, Mansfield Ctr, CT
W2ACR, Archie W. Currey, Short Hills, NJ
K2DXM/K2ACD, Charles L. Bedman, Colonia, NJ
WB2MBK, William D. Garner, Woodbridge, NJ
K2OO, John H. duBois, Pennsauken, NJ
W2TUP, David Bockman, Hurleyville, NY
WN3ACB, Magdalene E. Coghill, Washington, DC
W3CH, Kenneth R. Cooke, Scranton, PA
K3CRP, Bert Bonfil, Carnegie, PA
W3HVD, G. Carroll Utermahlen, Baltimore, MD
W3LQV, Frederick G. Probst, Upper Darby, PA
W3ZNN, Chalmers M. Shaffer, Dallastown, PA
K4BZZ, Harold P. Chandler, Lake Placid, FL
W4CKR, Chaple F. Keppler, Riviera Beach, FL
WB4DOM, Eugene F. Preston, Largo, FL
W4DR, Charles J. Sheblak, Clearwater, FL
K4EQ, William Kargoll Jr., Jupiter, FL
W4FEF, Wallace Lyons, Jr., Jasper, AL
W4HIU, Royal E. Davy, Miami, FL
W4JJT, Dwight O. Corey, Memphis, TN
W4KCH, Uriah C. Morris, Paducah, KY
W4KKX, James A. Dale, Norris, TN
W4OIR, Clyde M. Hunt, Arlington, VA
WA4PDY, Anthony J. Gehring, Dunedin, FL
W4SNI, Russell S. Hope, Darlington, SC
K4UW, Charles A. Koppe, Clearwater, FL
W4VNM, Edwin M. Pollard, Hartford, AL
W4ZJO, Phares W. Callaham, Memphis, TN
K5JCF, Francis O. Becker, Stillwater, OK
WA5LIV, Ralph M. Hassett, Lufkin, TX
W5NDV, Archie L. Sandifer, Oak Grove, LA
W5SYX, Donald E. Illian, Springdale, AR
W6BUD, Ray C. Halkney, Van Nuys, CA
W6FOW, Charles B. Freeman, San Pedro, CA
W6HYM, Angus "Ed" McPhee, Topaz, CA
W6JJH, Floyd E. Dillard, Hesperia, CA
W6JJY, Richard D. Carter, Santa Monica, CA
W6JSQ, Daniel B. Ford, Bakersfield, CA
WA6KFC, Robert E. Kincaid, San Jacinto, CA
W6KJN, Orlo R. Bonner, San Jose, CA
W6NTR Jack D. Clement Jr., Van Nuys, CA
W6OI, J. Weldon Paine, Inglewood, CA
WB6QIX, Charles D. McCracken, San Bernardino, CA
W6ZYU, Edward J. Hillin, Buena Park, CA
W7LIT, Harry Cornwell, Jr., Forsyth, MT
K7SPB, Conrad D. Hammarstedt, Phoenix, AZ
W8BUR, Evron L. McNeel, Lyndhurst, OH
W8BV, Orlo P. Palmer, Muskegon, MI
WA8EPG, Francis J. Erman, Waterville, OH
W8GOS, George S. Friedlander, Beachwood, OH
K8IGO, William D. Forbey, Cadillac, MI
W8JYO, Wallace C. White, Marion, OH
W8KAR/W5UCL, Herbert E. Clark, San Benito, TX
WBKBW, Thomas G. Campbell Jr., Lakewood, OH
W8KVT, Ted H. Grabarczyk, Dearborn, MI
W8YEQ, Emil A. Habalewsky, Detroit, MI
W9CSM, Edward J. Bromley, Wauwatosa, WI
WA9GYB, Dean R. Bradshaw, Frederick, IL
WB9IMH, Ann E. Carnett, Harrisburg, IL
WA9LRB, Louis L. Lamb, Petersburg, IN
WB9MFF, Nick Jagatic, Mount Prospect, IL
WB9MNS, John E. Bottkol, West Allis, WI
W9NJK, Robert W. Pollock, Good Hope, IL
W9NTE, Donald A. Stange, Racine, WI
K9SQY, Frederick H. Smith, Tampa, FL
WBØDBD Agnes L. Weeks, Ellendale, MN
WØFEA, Paul G. "Red" Hatlestad, Minnetonka, MN
WØGDF, Harold E. Clyma, Webb City, MO
WBØHCI, Daniel R. Boyle, Kansas City, MO
KØVKD, Emil Cernik, Colon, NE
WAØWGX, Kenneth C. Goehnauer, Dodge Center, MN
WØZHR, Harry W. Paden, Jefferson City, MO
VE2BDE, Paul Bruneau, Quebec, Canada
ZL3CA, Clarrie A. Hughes, Domett, New Zealand
G3YHW, J.H. Onions, Warwickshire, England
PAØAPX, G. Werkema, Leewarden, Netherlands
Ex-MP4BHH, T.J. Jordan, Jr., New Orleans, LA

ARRL QSL Bureau

The function of the ARRL QSL Bureau is to facilitate delivery to amateurs in the United States, its possessions and Canada, of those QSL cards which arrive from amateur stations in other parts of the world. All you have to do is send your QSL manager (see list below) a stamped, self-addressed envelope, about 6 by 8 inches in size, with your name and address in the usual place on the front of the envelope, and your call printed in capital letters in the upper left-hand corner.

Cards for stations in the United States and Canada should be sent to the proper call area bureau listed below. Recent changes are in bold face.

W1, K1, WA1, WN1 – Hampden County Radio Association, Box 216, Forest Park Station, Springfield MA 01108.
W2, K2, WA2, WB2, WN2[1] – North Jersey DX Assn., PO Box 8160, Haledon, NJ 07508.
W3, K3, WA3, WN3[1] – Jesse Bieberman, W3KT, RD 1, Box 66, Valley Hill Rd., Malvern, PA 19355.
W4, K4 – National Capitol DX Assn., Box DX, Boyce, VA 22620.
WA4, WB4, WN4 – Sterling Park Amateur Radio Club, P.O. Box 599, Sterling Park, VA 22170.
W5, K5, WA5, WB5, WN5 – ARRL W5 QSL Bureau, Box 1690, Sherman, TX 75090.
W6, K6, WA6, WB6, WN6 – ARRL W6 QSL Bureau, 2814 Empire Avenue, Burbank, CA 91504.
W7, K7, WA7, WN7 – Willamette Valley DX Club, Inc. PO Box 848, Portland, OR 97207.
W8, K8, WA8, WB8, WN8 – Columbus Amateur Radio Assn., Radio Room, 280 E. Broad St., Columbus, OH 43215.
W9, K9, WA9, WN9 – Northern Illinois DX Assn., Box 519, Elmhurst, IL 60126.
WØ, KØ, WAØ, WBØ, WNØ – Dr. Phillip D. Rowley, KØZFL 5209 Loma Linda Road, Alamosa, CO 81101
KP4, WP4[1] – Radio Club de Puerto Rico, P.O. Box 1061, San Juan, PR 00902.
KV4 – Graciano Belardo, PO Box 572, Christiansted, St. Croix, VI 00820.
KZ5 – KZ5 QSL Bureau, KZ5OD, Box 407, Balboa, C.Z.
KH6, WH6[1] – John H. Oka, KH6IQ, PO Box 101, Aiea, Oahu, HI 96701.
KT7, WL7 – Alaska QSL Bureau, Star Route, Box 2401, Wasilla, AK 99687.
VE1 – C. J. Fader, VE1EQ, PO Box 663, Halifax, NS.
VE2 – A. G. Daemen, VE2IJ, 2960 Douglas Avenue, Montreal, Quebec H3R 2E3.
VE3 – The Ontario Trilliums, P.O. Box 157, Downsview, Ont., Canada M3M 3A3.
VE4 – D. E. McVittie, VE4DX, 647 Academy Road, Winnipeg MB R3N 0E8.
VE5 – A. Lloyd Jones, VE5JI, 2328 Grant Road, Regina, SK S4S 5E4.
VE6 – D. C. Davidson, VE6FK, 1108 Trafford Dr., N.W., Calgary 47, AB.
VE7 – H. R. Hough, VE7HR, 1291 McKenzie Rd., Victoria, BC V8P 2L8.
VE8 – Al Sturko, VE8NS P.O. Box 72, Fort Smith, NWT X0E 0P0.
VO1 – William Coffen, VO1KM, PO Box 6, St. John's NF.
VO2[1] – Stan L. Parsons, VO2AS, PO Box 232, Goose Bay, LB.
SWL – Leroy Waite, 39 Hanumn St., Ballston Spa, NY 12020.

[1] These bureaus prefer 4-1/4 by 9-1/2 inch or No. 10 business envelopes.

QSL Bureaus for other U.S. Possessions and for other countries appear in the "IARU News" section of the June and December issues of *QST*.

SLIPPERS FOR THE HW-7 TRANSCEIVER

BY DOUG DeMAW,* W1CER

So you can't "chop it" with your QRP rig when band conditions are poor! Maybe you've tried watering the ground rod with a saline solution, or may even have attempted to enhance that 2-watt signal by rubbing DX grease on the old antenna, all to no avail. Well if a few more dB were added by conventional means, it's possible that communications could be maintained when propagation conditions ruled out QRPing. The Big Boys speak of running the rig "barefoot," and when more power is needed they add a "pair of shoes." The latter would not be an apt description of a QRP man's amplifier, but perhaps the term "slippers" might be!

The circuit of Fig. 1 shows a 15-watt output plug-in amplifier suitable for use with the HW-7 transceiver, or with any 2-watt class rig designed for hf-band work. The nucleus of the circuit is Motorola's new MRF-line transistor, the 449A. Unit cost is $13 for the part, and it will deliver up to 30 watts of output to 30 MHz as a Class C amplifier. Operating voltage is 13.0 dc. Rf drive requirements for full output are under 1 watt. Another member of this transistor family is the MRF450A, which will provide 50 watts of output with 2 watts of drive. It costs $16.50 according to a quote from an East Coast supplier.

Rationale

Someone may wonder why a 30-watt device is specified in a 15-watt output amplifier (Fig. 1). That power level was chosen to restrict the current taken from the power supply during a QRP junket to Barbados in October 1975 (8P6EU), as the only small power unit available was a 2.5-ampere one. Therefore, the T network used in the collector circuit is designed for the characteristic impedance of the collector at that power level – 5.6 ohms ($V_{cc}^2 \div 2\,P_o$).

Table I lists L and C values for 15 watts of output. The network is based on a loaded Q of 4. The X_L and X_C values given in Fig. 1 can be used to obtain inductance and capacitance values for frequencies other than 7, 14, and 21 MHz.

A 50-ohm, 3-dB attenuator pad is used at the amplifier input to assure less than 1 watt of drive without the need to modify the output stage or driver of the HW-7. The base shunting resistors of Q1 consume additional drive power while aiding amplifier stability. Another advantage of the attenuator is that it provides a resistive termination for the HW-7 across its operating range – 7 to 21 MHz. Without the attenuator the complex input impedance of Q1 would be reflected through T1, and the reactance seen by the HW-7 could be troublesome. A complex X_L and X_C condition exists at the input of a power transistor, and reactance amounts vary with operating frequency.

Circuit Notes

A *conventional* broadband toroidal transformer is used at T1. Equal performance was noted when comparing this transformer to *transmission-line* transformers. The latter consisted of two 4:1 transformers in cascade, effecting the desired 16:1 transformation ratio. A conventional transformer requires but one toroid core, and it is easy to build. For that reason it is specified here.

RFC1 serves as a low-Q collector choke. RFC2 is used as a decoupling choke to prevent rf energy from entering the HW-7 via the 13-volt line.

Performance

Motorola rates the MRF449A at 50-percent efficiency. Our lab findings bring that figure closer to 60 percent at 15 watts output. The output waveform from the circuit of Fig. 1 is exceptionally "sanitary." No distortion could be seen on the

*QST, Technical Editor

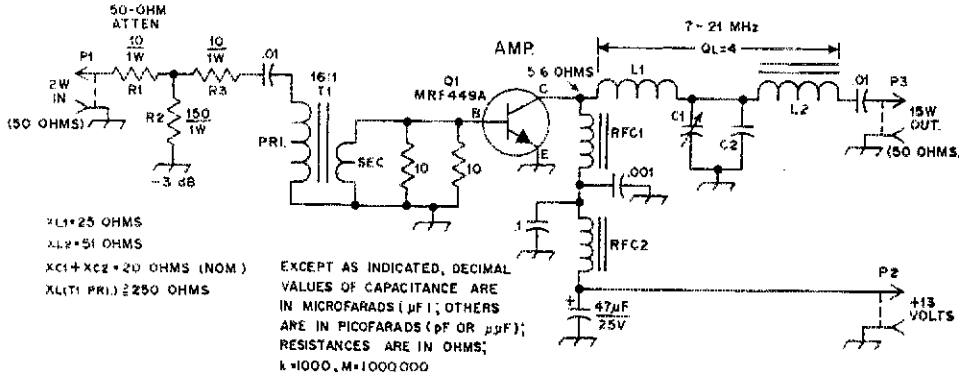


Fig. 1 — Schematic diagram of the 15-watt amplifier. Fixed-value capacitors are disk ceramic unless otherwise noted. Resistors are 1/2-watt composition unless specified differently. The 47-μF capacitor can be electrolytic or tantalum.

C1 — 450-pF Mica compression trimmer (Arco-ElMenco 466 or equivalent).

C2 — See Table I.

L1, L2 — See Table I.

P1-P3, incl. — Phono plugs soldered to edge of pc board.

Q1 — Motorola MRF449A strip-line stud transistor.

RFC1, RFC2 — 7 turns No. 20 enam. wire on 0.5-inch OD toroid ferrite core with 125 permeability (Amidon Assoc. FT-50-61 core or equiv.), 3μH.

T1 — Primary, 32 turns No. 24 enam. on Amidon T-68-2 core (7μH). Secondary, 8 turns No. 24 over primary winding.

TABLE I

Band	*L1*	*L2*	*C1*	*C2*
7 MHz	0.6 μH, 13 T No. 22 enam., 5/16" ID, no core	1.1 μH, 14 T No. 22 enam. on T-68-2 toroid core	450-pF mica trimmer	820-pF silver mica
14 MHz	0.3 μH, 8 T No. 22 enam., 5/16" ID, no core.	0.55 μH, 9 T No. 22 enam. on T-68-6 toroid core	450-pF mica trimmer	220-pF silver mica
21 MHz	0.19 μH, 5 T No. 20 enam., 5/16" ID, no core	0.39 μH, 6 T No. 22 enam. on T-68-6 toroid core	450-pF mica trimmer	None

L1 coils are airwound. L2 coils are on Amidon toroid cores.

sine wave, as viewed on a 50-MHz scope, while delivering 15 watts into a 50-ohm dummy load. Harmonic energy was at least 40 dB below carrier level.

Short test periods were established with the amplifier output port shorted and open (30 seconds maximum), and no damage to Q1 resulted. It is stressed, however, that the amplifier should *always* have a 50-ohm termination during operation to assure proper performance and transistor longevity. Gain will be 8.7 dB at 15-watts output (HW-7 2-watt reference). It can be seen that a significant improvement in signal readability will result from using the amplifier when band conditions are poor.

Final Comments

Three phono plugs are soldered to the amplifier pc board. Mating phono jacks (J1, J2, and J3) are located on the rear panel of the HW-7. The coaxial cable between the HW-7 PA and the antenna relay is opened to permit insertion of the amplifier. The HW-7 PA output is routed to P1 of Fig. 1, and the amplifier output is fed into the HW-7, then to the antenna relay, through P3. To reinstate the HW-7, simply jumper J1 and J3 with a short length of 50-ohm coaxial cable. P2 and J2 permit the operator to obtain 13.0 operating volts for the amplifier from inside the HW-7, if desired. A 3-A regulated supply is recommended for the *overall* system when running 15 watts of output.

Details of the pc-board layout and heat sink are given in Fig. 2. The transistor body must make firm contact with the heat sink. Silicone heat-sink compound should be used between Q1 and the heat sink. Tighten the transistor stud nut *with care* lest the stud be broken off.

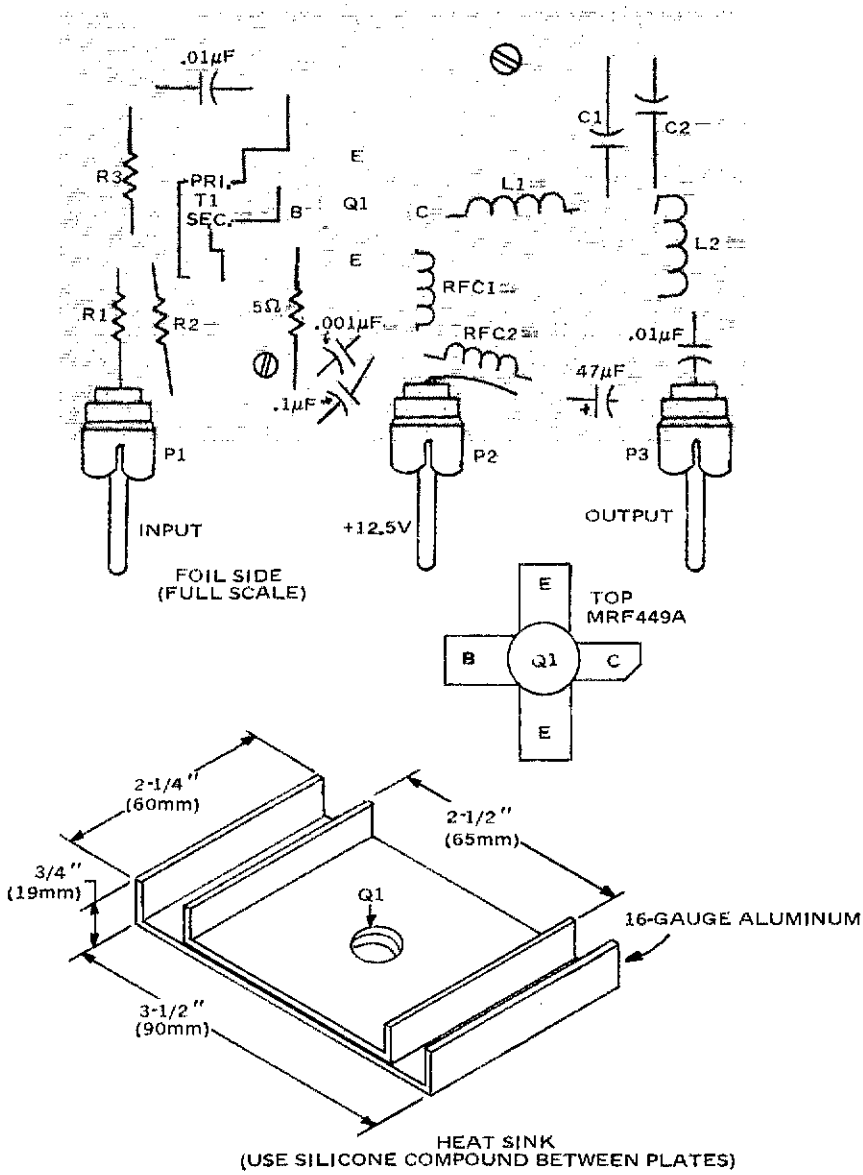


Fig. 2 — Scale layout of the pc board. Heat-sink dimensions are given in English and metric. The heat sink is held to the double-clad pc board by means of the transistor stud and two 4-40 screws and nuts. A substantially larger heat sink should be used if the amplifier is revised for 30 watts of output.

Tune up in the center of the cw band by adjusting C1 to provide maximum rf output into a 50-ohm load. Amplifier bandwidth will be sufficient for all of each cw band.

If a band-switched version of the circuit is desired, build the amplifier in a separate box and use a two-pole, three-position, ceramic-insulated wafer switch to select the T networks. The leads from the switch to the networks and Q1 must be kept *short* to preserve the network characteristics. Switch-lead inductances will become part of the network, so they must be kept to minimum lengths.

Detailed network design information can be obtained from the *QST* beginner's series, "Learning to Work With Semiconductors," April-October, inclusive, 1975. Those wishing to operate the amplifier at 30-watts output can redesign the T network to match a 2.8-ohm collector impedance, using the equations in the beginner's series. QST

Hints and Kinks For the Experimenter

VHF TEST BENCH

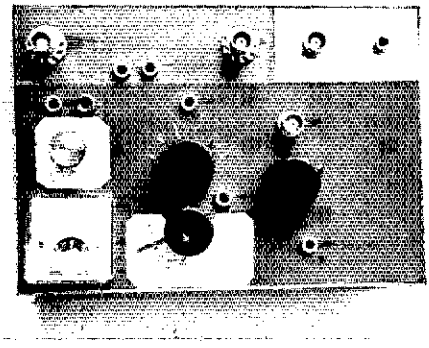
Organizing all of the most often used test equipment into one housing can save a lot of time when working on a project. Less time is spent digging equipment and circuits out from under cables and more time can be devoted to working on the project. Here is one example of how one might set up a "test bench" arrangement for use in the work area.

The housing shown in the title photograph contains a multi-range voltage and current meter. The meter will indicate currents from 50 μA to 500 mA and potential from less than 1 volt to 500 volts, in five ranges. This meter can be connected to the other test gear by a short length of shielded cable.

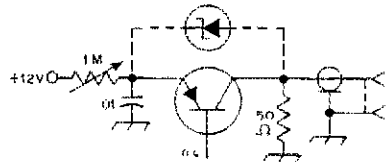
The upper part of the front panel houses an SWR bridge and a 50-ohm dummy load. The SWR bridge uses ¼-inch (6 mm) OD brass tubing as an inner conductor and an outer conductor of ½-inch (13 mm) square cross-section made from single-sided pc board. The sensing wire is terminated at its center with a 100-ohm resistor; each end of the sensing wire connects to a 1N34 diode. A reading of the rectified voltage can be taken from the two (rf bypassed) terminals. Although this instrument was "nailed together," it was usable up to 450 MHz.

The dummy load was made by soldering eleven carbon-composition resistors (560 ohms) in parallel. The dummy load can be used up to 1300 MHz. The rf voltage across the resistors is rectified by a low-capacitance silicon diode, permitting meter indication of the rf energy.

To the right of the voltmeter is an absorption frequency meter which tunes from 2 to 300 MHz in six ranges. The signal is fed into the terminal located next to the tuning knob, and coupled, via a 2-pF capacitor, to the hot end of the resonant circuit. A germanium diode rectifies the rf voltage, which can be measured from the terminal located above the range switch.



The test bench is completed by the addition of a noise generator. Of course exact noise figure can't be measured with this primitive "rush box"



without additional calibration, but you can use it successfully to compare two receivers operating on the same frequency and to tune up a converter.

The housing of the test bench was formed by soldering large pieces of pc board together, forming the main frame of the test bench. — *Joachim Koeppen, DF3GJ*

TRANSMISSION-LINE LOSSES

The subject of transmission-line losses in the presence of standing waves has always held an aura of mystery for some amateurs, even though much information has been published on the subject. The chart of Fig. 1 may help dispel all mysteries, for it provides a convenient means of determining total losses if the SWR at either the input or the load is known and if the loss in the line without standing waves is known. (This latter factor may be obtained from manufacturers' data or from transmission-line data such as appears in *The Radio Amateur's Handbook*, *The ARRL Antenna Book*, or *The Radio Amateur's VHF Manual*.) Conversely, if the SWR values at the input to the line and at the load are measured with a reliable instrument, the total line loss and the loss of the line without standing waves (matched loss) may be determined from the graph.

The horizontal axis of the graph is calibrated in values representing the SWR at the load, while the vertical axis represents total loss in the line in decibels. The curves which are predominantly vertical (dotted lines) in the body of the graph represent the SWR value at the line input, and the curves which are predominantly horizontal in the lower portion of the graph (solid lines) represent the matched-line loss. Interpolation of values may be made between the curves, and the curves are interrelated so that each set or family may be considered as another "axis" of the overall graph.

A couple of examples best illustrate use of the graph. If we had, say, 100 feet of RG-8/U feed line

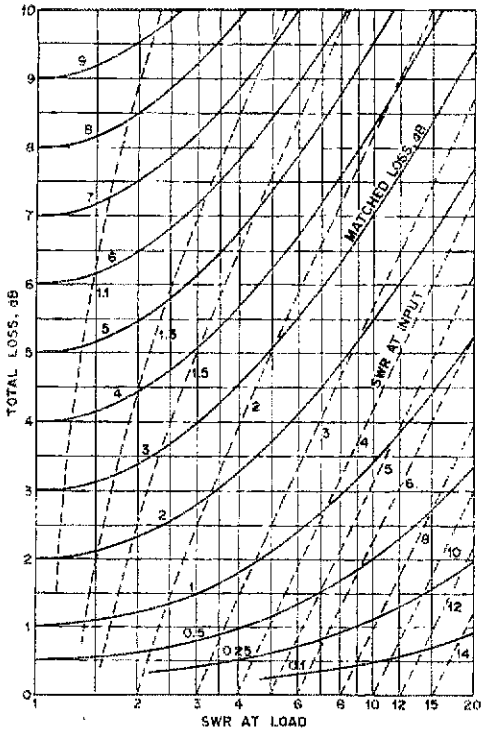


Fig. 1 — This graph relates the matched-line attenuation loss in dB to the total line loss and to SWR values at the line input and load.

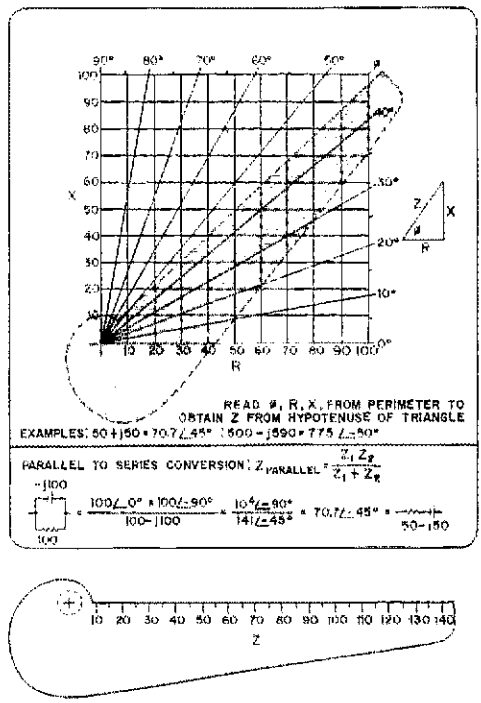
connected between a 10-meter transmitter and its load, and if the SWR as measured *at the load* is 3:1, what is the total line loss and what is the SWR at the line input? First we must determine the matched loss of the length of coaxial line. Date tables tell us that RG-8/U has 1.0 decibel of loss per hundred feet at 30 MHz, a value close enough for our needs. Now we proceed by running a finger along the scale at the bottom of the graph and locate the value of 3, representing the 3:1 SWR at the load. We follow the vertical "3" line up until we meet its intersection with the "1" solid-line curve which represents 1 dB of matched- line loss. At this intersection we may read from the calibration scale at the left that the total line loss under these SWR conditions is 1.5 dB. At this same intersection, by interpolating between the dotted-line curves, we may also see that the SWR at the line input is approximately 2.3:1.

As another example, assume that we are using a length of line with a matched loss of 3 dB and that we measure the SWR *at the line input* to be 2:1. What is the total line loss and the SWR at the load? In this case we begin as before, by running a finger along the scale at the bottom of the graph until we locate the value of 2 for SWR at the load (it'll be the same at the line input if the line is lossless, or has 0 dB of matched loss). This time, however, we proceed by following the "2" *dotted* line up and slightly to the right, as this dotted line represents a 2:1 SWR at the line input. We follow this line until we reach its intersection with the 3 solid curve, representing the matched loss of our feeder. From this intersection we may read (scale at left) that the total line loss here is just a tad more than 5 dB, and (scale at bottom) that the SWR at the load is 5:1. If we had not known any attenuation values in this example but were able to measure the SWR at the load as 5:1 and at the line input as 2:1, we would be able to determine the matched loss and the total loss from the intersection of the 5 SWR-at-load vertical line and the 2 SWR-at-input curve. There's no mystery here, is there? — *KIPLP*

WB2NAG POLAR TO RECTANGULAR CONVERTER

When calculating ac circuit behavior, the use of polar and rectangular form representation of the vector relationships is almost indispensable. The "impedance-triangle" relationship between X, R, Z, and the phase angle Φ can be worked out from the trigonometric relationships in a number of ways. A picture is worth a thousand words, so the Chinese say, and often mathematical relations are clearer when expressed graphically as in the simple vector calculator in Fig. 1.

The calculator can be fashioned from poster board. Measure off the 10 × 10-cm grid into 1-cm squares using a ruler. Set up the phase angles with a protractor. Pin the rotating Z member to the bottom left corner of the calculator with a thumb tack. Flatten the protruding tip against the back and put a piece of masking tape over it to fix it into place. Mark off the Z scale in 1-cm divisions. — *John Carlini, WB2NAG*



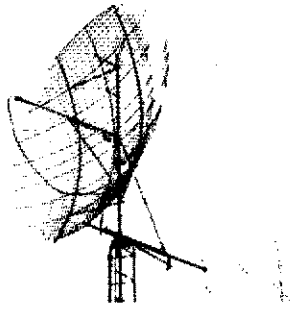
Technical Correspondence

ROTATABLE PARABOLIC DISH INSTALLATION

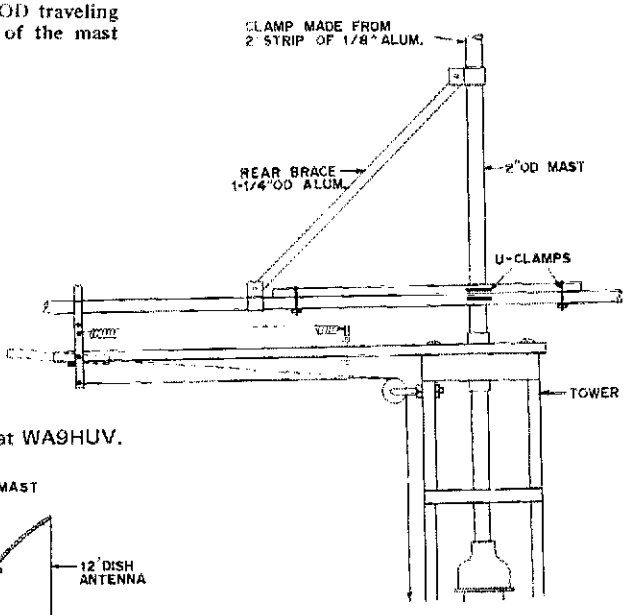
Technical Editor, *QST*:

I am frequently asked how I manage to keep that big 12-foot dish up on the tower. The adage that says, "If the antenna stays up for over a year, it isn't big enough," doesn't seem to apply at my location. Believe me, it's big enough! The installation seems to have defied Parkinson's law for over five years.

Reference to the drawings shows how it is done. The parabola (or any other antenna system) is mounted to a 2-inch OD cold-drawn seamless steel mast 14 feet long. A 1-1/4-inch OD traveling boom is fastened to the lower part of the mast with U clamps. To assure a good grip, a short piece of the same kind of tubing is bolted to the traveling boom and it, too, is clamped to the mast. U clamps are made of 3/8-inch threaded steel rod which grip the mast effectively. A second 1-1/4-inch OD steel boom is bolted to the top of the tower with two U clamps in a fixed position.



The 12-foot rotatable dish installed at WA9HUV.



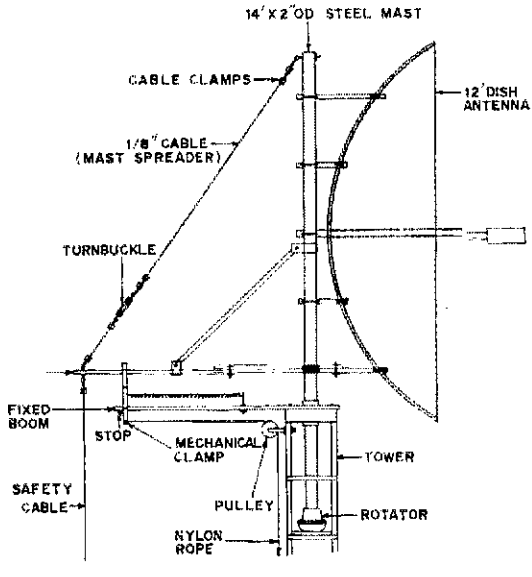


Fig. 1 — Details of WA9HUV antenna installation.

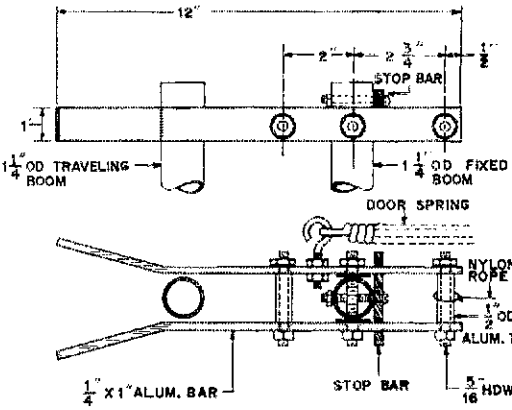


Fig. 2 — Anti-sail mechanical clamp. Above is shown the details of the clamping mechanism, with the general installation below.

The installation details are shown in Fig. 1. A mechanical clamp is mounted at the outer end of the fixed boom. It is equipped with a door spring which holds the clamp in a vertical position when the antenna is stowed. The ground end of the nylon rope is fitted with a turnbuckle which can be hooked to a horizontal member of the tower four or five feet above the ground, out of reach of children. This releases the mechanical clamp so the antenna can be rotated. Fig. 2 shows in close-up the details of the clamp and method of attachment to the fixed boom. The clamp location is not critical, but at WA9HUV it is located about 3-1/2 feet from the mast. The vertical separation be-

tween the fixed and moving booms should be 2-1/2 inches to provide adequate clearance.

The safety cable is an optional item. It is attached to the rear of the traveling boom so that when the antenna is stowed, it is attached to a ground anchor. The combination of the mast-spreader and the safety cable provides the equivalent of top-of-the-mast guying. This, together with the mechanical clamp, assures that as long as the tower stays up, so will the antenna. – *Norman Foot, WA9HUV, 293 E. Madison Ave., Elmhurst, IL 60126.*

CALCULATOR LOGIC

Technical Editor, *QST*:

While the "New Apparatus" section of *QST* is not really the proper place to discuss calculator systems per se, I was a bit disappointed that W1CER did not touch upon the difference between "algebraic" and "reverse Polish notation" types in his write-up of the National Semiconductor Novus 4510 (*QST* for August, 1975).

To anyone considering the purchase of a calculator for mixed expressions commonly (and not so commonly) used in electronics, I'd suggest considering an RPN type with register stacking.

Some rather misleading advertising has come forth by calculator manufacturers of late. In the case of some "algebraic" types, one cannot obtain the "sum of products" and the "product of sums" with equal facility. Nor can one really perform the functions as he would "write the formula."

The algebraic type literally solves by programming "two *plus* two *equals* four." The RPN type more nearly follows "the *sum* of two and two *is* four." Risking oversimplification, I believe herein lies the basic difference between the two types. In my opinion the latter (RPN) is much more versatile.

In RPN, the summing, multiplying or dividing functions are performed after the quantities are entered. This, along with the register stack capability as mentioned by W1CER, permits solution of most mixed-expression equations without resorting to memory storage and recall or writing down of intermediate answers. – *W. H. Fishback, W1JE, Old Comers Rd., Chatham, MA 02633.*

A TALE OF QRN – ELECTRIC FENCE STYLE

Technical Editor, *QST*:

Identifying and locating the interference from a pest-control fence charger was only the beginning of the problem. The arcing-ac roar that blanketed the 80-, 40-, and 20-meter bands sure was a puzzle. At first, the rhythmic 32-times-a-minute roar suggested something like a cross roads flasher or a neon sign, so I would cruise the business district looking for something with that beat. Although the interference was loudest along the power lines, I never chanced across a hot spot that would help to localize the source. Also, just about the time I was ready to sell the gear the interference would stop and maybe not show up for a week or two. And just when I would start to think it was only a passing nightmare it would come back.

Not having much luck with the business area, I thought I would drive in the opposite direction toward a pumping station at the edge of a ravine. I did notice the sound seemed to get a little louder as I passed a house on the next street from mine, so I decided to get a portable radio and explore that area on foot. I had been using the car radio up to then. Sure enough the sound increased as I got closer to the house. When I put the radio near the service feeder and the electric meter, the set nearly ripped itself apart. But after getting permission from the owners, I found nothing in the house, so I decided to follow the power line across the street.

Again, the portable radio roared in anguish as I passed a guy wire bracing the light pole. I asked the people in that house if the rhythmic roar had any familiarity, and the owner said he would check something in the basement. Lo and behold, he snapped a switch and the roar went completely away. He then went back down and turned the switch on. The roar started again. Then he escorted me to his greenhouse in the backyard and pointed to a monster with one red eye and one white eye balefully blinking 32 times a minute – his fence charger.

I had no trouble in convincing him to let me take the thing to the shop. There I wasted no time in wiring a line filter bypassed with a couple of .05-μF capacitors from a junk TV set. Then I hurried back to check the results. Well, the QRM was still there, but the line filter had knocked it down from a roar to about an S2, which was something I could work through. But I decided to probe further.

The fence consisted of a rectangle of aluminum wire about 100 feet on a side and about six inches off the ground. The wire was mounted on plastic "bobbins" nailed to a stump or fence post. Disconnecting the fence would stop the interference, so a cracked or leaky insulator came to mind. Following that idea, I opened the line at the first corner and left only the first 100 feet connected. No interference. When the second hundred feet was connected, the noise started up again.

Attempting to localize the trouble, I opened the second 100 feet in the middle, and again the noise disappeared. To further pinpoint the problem, the remaining 50 feet was opened in the middle and testing was done on the 175 feet. Connecting the additional twenty five feet brought back the noise.

I quickly nailed two new insulators to the fence posts and restrung that offending 25 feet of line on them and reconnected it to the main feed line. Guess what – the noise came back! This sure was a puzzler – with 150 feet of fence line not a trace of QRM but connecting the additional newly insulated line of 25 feet would bring on the noise. I repeated the test a dozen times, seeing and hearing the results but not believing it. By this time I was in such utter confusion I decided to retreat and regroup.

In an attempt to eliminate one variable, I got a power transformer from an old TV set, connected the ac line cord to the primary and wired a couple of terminal strips, so I could feed that fence line from the secondary either with 400 or 800 volts ac in series with a 25-kΩ resistor. I figured I could get some idea of the leakage current by reading the voltage drop across the resistor. I noticed that with 400 volts on the fence line there was no noise, but with 800 volts the noise came back. I also noticed that the leakage, if any, was too slight to give any indication. This was the total 400 feet of fence line.

(Continued on page 65)

The ARRL Foundation

. . . . . On the Move

BY LARRY J. SHIMA,* WØPAN

The ARRL Foundation, Inc. was established in late 1973 to raise funds for the development of amateur satellite programs and other innovative programs related to the purposes of the ARRL. Contributions to the Foundation are tax-deductible under section 170 (c) (2) of the Internal Revenue Code. This article tells what the Foundation is, what it has accomplished in its first two years, what its goals are, and how individual League members and others can leave their mark on amateur radio's future through contributions to the Foundation.

"ON MOTION of Mr. Price, seconded by Mr. Thurston . . . the Management and Finance Committee is directed to proceed with further preparations leading to the establishment of an ARRL Foundation. . . ." With this action in January, 1973, the League's Board of Directors launched what was to become, before the end of that year, The ARRL Foundation, Inc. The new organization was to concern itself with identifying and tapping sources of funding for programs deemed worthwhile by the Board, with initial emphasis on the amateur satellite (Oscar) program. Though related to the League, the Foundation was to be a separate entity with its own Board of Directors.

Why a Foundation?

From the outset, some questioned the need for a separate fund-raising organization. "The League itself is tax-exempt," they argued. "Why do we need a Foundation?" Two reasons are predominant. First, amateurs who are commercially engaged in some segments of the communications industry are ineligible to serve as directors of the League, yet many of them are anxious to further the League's mission. They also possess the contacts within industry which are so necessary to the success of an ambitious fund-raising effort. Second, the League's directors and officers are unpaid volunteers who already devote a tremendous amount of their personal time and energy to matters vitally affecting amateur radio. The League's Board wisely concluded that many of its members would find the additional burden of a major fund-raising program too taxing. Thus, the Foundation provides a means for some of our most dedicated amateurs to get involved in League affairs in a new and productive way, without diverting efforts from other necessary tasks.

The Foundation has its own governing body composed of nine directors. A majority of the directors are also directors of the League. Along with the fact that the directors of the Foundation are elected by the League's Board, this ensures that the goals of the League and the Foundation will not drift apart.

What has the Foundation accomplished?

The first task assigned to the Foundation was to provide for the funding of the amateur satellite program, a responsibility which the League had assumed to a large degree but which it was unable to finance from its own reserves on a prolonged, continuing basis. The Foundation's initial fund-raising efforts were aided immeasurably by the matching fund offer of two prominent amateurs, Bill Eitel, W6UF/WA7LRU, and Pete Hoover,

* Treasurer, The ARRL Foundation, Inc., 2263 Overlook Drive, Bloomington, MN 55431.

Foundation presidents, past and present. The author (right) admires the plaque given to founding President Bob Chapman, W1QV, (left) on his retirement from the Foundation Board in April. Looking on is the new President, Peter Schenk, WA4GFY.

W6APW. They agreed to match contributions received for the amateur satellite program from other sources up to a total of $25,000. The Foundation soon raised most of this goal; today it is 91% realized, with only $2300 remaining to be matched. To date the Foundation has collected more than $62,000 for the amateur satellite program, with about $34,000 already turned over to the Radio Amateur Satellite Corporation (Amsat) for operational support of Oscar 6 and Oscar 7.

While the emphasis has been on satellites, other needed programs have not been neglected. For example, a scholarship fund has been established for the purpose of assisting qualified League members who seek higher education. Additional contributions will be required before applications for assistance can be solicited, however.

What are the Foundation's goals?

At its 1975 Annual Meeting, the Foundation's Board of Directors adopted the following statement of objectives:

> It is the objective of the Foundation to provide financial assistance through a system of grants for extraordinary projects that are beneficial to and advance the Amateur Radio Service. It is not the intention of the Foundation to support activities that would normally be funded by other amateur organizations such as the ARRL. Projects that warrant Foundation support should have specific end products and a recognizable and advantageous cost/benefit ratio.

A list of proposed projects was also adopted to supplement the satellite and scholarship programs previously established. The new projects include:

1) A program to investigate ways of orienting new amateurs to amateur radio, such as through an educational television series.

2) The installation of amateur radio exhibits featuring the Oscar satellites at high-traffic locations, such as the exhibit established by the League at the Kennedy Space Center.

3) An expansion of the successful Oscar education program which is the first use of actual satellites in the teaching of space science in the classroom.

4) Replacement of the popular film *The Ham's Wide World* with a new, updated version.

5) Other innovative programs to keep amateur radio at the frontier of technology and to enhance its usefulness to the world community.

How can individual amateurs help?

Each of us has a special reason to be appreciative of what amateur radio has added to our lives. To some, it was the start of a career in electronics; to others, an avocation that they will always be able to enjoy in spare moments of the day. Some of us repay our debt to amateur radio by contributing our time to club activities, licensing classes, public service nets, League organizational affairs, and so on. Others may not have this time available, but *can* contribute to amateur radio's future in another way – through a donation to the Foundation.

The greatest need continues to be in the area of amateur satellites. While Amsat is an efficient user of funds entrusted to it, continued support of this program is an expensive venture: about $50,000 per year is needed in order to maintain operational support for existing satellites and to develop the satellite hardware of tomorrow. Projects such as the educational program and the Space Center exhibits previously mentioned are also deserving of funding.

A good start would be to have the amateur radio community match the remaining $2300 of the Eitel-Hoover matching fund offer. This would be a firm statement by amateurs that theirs is, indeed, a space-age activity.

But the effort cannot end there. Funding of the Foundation's present and future programs *will take money*. With your help, it can happen.

If you are personally able to donate cash or securities to the Foundation for any of our programs, *please don't hesitate*. Donations can be designated for specific programs or not, as you so choose. Or, if your company has a policy of donating to charitable organizations, contact the responsible officials and see if they will consider the Foundation as a recipient.

There are many different methods of donating to a tax-exempt organization such as The ARRL Foundation, Inc. The following are the most common means of contributing:

Cash Gifts – Stocks – Bonds – Bequests in Wills – Trust Income/Assets – Life Insurance Proceeds – Income from Properties.

Donations are deductible on your Federal tax return to the extent permitted by IRS regulations. While each individual should consult with his tax advisor, it is safe to say that significant tax advantages may be achieved through donation of securities which have appreciated in value. A double benefit occurs when you donate appreciated value securities to the Foundation: you get a tax deduction for the contribution at the market value of the securities on the date they are donated (regardless of your cost) and the Foundation receives the benefit of the appreciated value without having to pay the tax on the gain. Now is the time to review your personal tax situation and decide, before the end of the year, how much to contribute to the Foundation.

Here, we've tried to give you an idea of what The ARRL Foundation, Inc. has accomplished in its first two years, and where it can go *with your active financial support*. We need your contribution now. All contributions, large or small, will be receipted and acknowledged with thanks. Please mail to:

The ARRL Foundation, Inc.
225 Main St.
Newington, CT 06111 USA

Be sure to indicate if your contribution is designated for the Eitel-Hoover matching fund, or for some other purpose. Thank You. QST

SECTION EMERGENCY COORDINATORS OF THE AMATEUR RADIO EMERGENCY CORPS

The Section Emergency Coordinator is appointed by the SCM to take charge of the promotion of the Amateur Radio Emergency Corps organization throughout the Section. He acts as the SCM's executive in the furthering of provisions for emergency amateur radio communications in every community likely to suffer in case of a communications emergency. One of the duties of the SEC is to recommend the appointment of Emergency Coordinators for the various communities in his Section. Does your locality have an EC? If not, recommend the name of a likely prospect to the SEC. The SEC invites your questions concerning the status of the AREC in your Section.

ATLANTIC DIVISION				
Delaware	K3KAJ	David R. Lizey	RFD 2, Box 90	Laurel 19956
Eastern Pennsylvania	W3FBF	Paul D. Mercado	55 Lindberg Ave.	Broomall 19008
Maryland-D.C.	K3LED	John Munholland	306 Holland Rd.	Severna Park 21146
Southern New Jersey	W2JI	Walter Grove	23 Morningside Court	Pennington 08534
Western New York	W2CFP	David Flinn	866 Ridge Road	Lansing 14882
Western Pennsylvania	W3ZUH	Richard J. Karl	1645 Cherry Hill Road	State College 16801
CENTRAL DIVISION				
Illinois	W9AES	R. G. Martin, Jr.	2134 Ridgeview Dr.	Decatur 62521
Indiana	W9UMH	Bruce B. Woodward	6208 Bramshaw Road	Indianapolis 46220
Wisconsin	K9PKQ	James L. Romettanger	1175 4th Street	Baraboo 53913
DAKOTA DIVISION				
Minnesota	WAØOEZ	Joe Fritz	208 8th Street	Waseca 56093
North Dakota				
South Dakota	WAØRIQ	Loren L. Dobson	2001 S. Spring Ave.	Sioux Falls 57105
DELTA DIVISION				
Arkansas	W5RXU	Dale E. Temple	1620 Tarrytown Road	Little Rock 72207
Louisiana	W5TRI	L. E. Shaw	4112 Leon Drive	Alexandria 71301
Mississippi	WB5FXA	Charles E. Bardsley	2425 Pascagoula Street	Pascagoula 39567
Tennessee	WB4DYJ	Milo Ward	Rt. 3, Laurel Rd.	Clinton 37716
GREAT LAKES DIVISION				
Kentucky	WA4GHQ	James E. Odom	401 Carlisle	Lexington 40505
Michigan	W8MPD	Stanley J. Briggs	1885 Pinetree Rd.	Trenton 48183
Ohio	WA8CQA	James F. Weaver	11652 Hollingsworth Way	Forest Park 45240
HUDSON DIVISION				
Eastern New York	W2KGC	William Stahl	93 Shirley Drive	Fishkill 12524
N.Y.C. & Long Island	K2HTX	Charles Haubeil	205-8th Ave.	E. Northport 11731
Northern New Jersey	WB2PBO	Paul R. Krugh	208 S. Union Avenue	Cranford 07016
MIDWEST DIVISION				
Iowa	KØOOD	Alan Harris	4205 Park Ave.	Des Moines 50321
Kansas	KØJMF	Merton Uhlig	1182 Gage Blvd.	Topeka 66604
Missouri	KØHIX	Clifford E. Chumney	Box 86, Debby Lane	Warrensburg 64093
Nebraska	WAØASM	Stephen O. May	2830 So. 42nd Street	Lincoln 68506
NEW ENGLAND DIVISION				
Connecticut	W1DGL	John F. Lindholm	Box 1695	Bristol 06010
Eastern Massachusetts	W1AOG	Donald E. Guptill	17 Park St. Ct.	Medford 02155
Maine	K1CLI	Allen E. Schark	42 Maple St.	Presque Isle 04769
New Hampshire	K1RSC	John Johnston	P.O. Box 116	Rye 03870
Rhode Island	W1YNE	Gordon L. Fox	13 York Drive	Coventry 02816
Vermont	W1VSA	H. A. Preston, Jr.	RFD 1	Charlotte 05445
Western Massachusetts	WA1DNB	Robert H. Phoenix	Box 431, N. Washington St.	Belchertown 01007
NORTHWESTERN DIVISION				
Alaska	KL7IDO	Tony P. Smaker, Jr.	Box 1614	Kotlik 99615
Idaho	W7JMH	Lemuel Allen	1800 So. Atlantic	Boise 83705
Montana	WA7IZR	Owen Wood	407 North Main	Livingston 59047
Oregon	W7HLF	Dwight J. Albright	1678 Orchard Home Dr.	Medford 97501
Washington	W7IEU	Robert L. Klepper	7027 51st NE	Marysville 98270
PACIFIC DIVISION				
East Bay	WB6RPK	Charles Weber	1087 Via Honda	San Lorenzo 94580
Pacific	KH6IKB	Sam Yates	91-975 Mailani	Ewa Beach 96706
Nevada	WA7BLU	L. L. Blain	863 Armada Place	Boulder City 89005
Sacramento Valley	W6SMU	Theodore W. Rast	7812 Winding Way	Fair Oaks 95628
San Francisco	*W6UAI	Charles K. Fipps	35 Belcher St.	San Francisco 94114
San Joaquin Valley	WB6FPV	Michael Waldrop	721 State Road	Earlimart 93219
Santa Clara Valley	WA6RXB	Ralph W. Michelson	19150 Portos Dr	Saratoga 95070
ROANOKE DIVISION				
North Carolina	W4EHF	William C. Finch	818 Emeline Ave.	Fayetteville 28303
South Carolina	W4ZMZ	Donald R. Royster	Box 248-E Church St.	Lynchburg 29080
Virginia	WA4YIU	R. V. Southworth	Rt. 1, Box 258A	Crewe 23930
West Virginia	WA8NDY	Delf A. Norona	P.O. Box 823	Buckhannon 26201
ROCKY MOUNTAIN DIVISION				
Colorado	KØELQ	Richard E. Schmidt	13640 E. Center Ave.	Aurora 80010
New Mexico	W5ALR	R. B. Goodman	2532 La Charles NE	Albuquerque 87112
Utah	WA7ZBO	Larry Jacobs	5655 S. 4060 W.	Salt Lake City 84118
Wyoming	K7NQX	Glen Blackburn	P.O.B. 164, 1739 E. 22nd St.	Cheyenne 82001
SOUTHEASTERN DIVISION				
Alabama	W4DGH	Raymond E. Ringer	Box 1	Valley Head 35989
Canal Zone	KZ5OD	Oscar Leigh DuPre	P. O. Box 284	Balboa Heights
Georgia	K4KZP	William T. Barr	305 Alpine Drive	Roswell 30075
Northern Florida	WA4WBM	Fred K. Marchman	901 E. Missouri Ave.	New Port Richey 33552
Southern Florida	W4IYT	Andrew C. Clark	41 Lenape Drive	Miami Springs 33166
West Indies (P.R.-V.I.)	KP4CB	Paul Girard	1675 Verbena	Rio Piedras, Puerto Rico 00927
SOUTHWESTERN DIVISION				
Arizona	*W7DQS	Marshall Lincoln	Box 1490	Wickenburg 85358
Los Angeles				
Orange	WA6TVA	Steven R. Phillips	272 Villanova Rd.	Costa Mesa 92626
San Diego	W6GBF	Cy Huvar	105 Jamul Ave.	Chula Vista 92011
Santa Barbara	WB6HUW	Ernie Kapphahn	Rt. 1, Box 55-A Suey Creek Rd	Santa Maria 93454
WEST GULF DIVISION				
Northern Texas	W5SHN	Duane U. Farris	908 Henderson Street	Jacksonville 75766
Oklahoma	WA5FSN	Leonard Hollar	710 So. 10th St.	Kingfisher 73750
Southern Texas	WB5CUR	Suzanne R. Rich	P.O. Box 392	Los Fresnos 78566
CANADIAN DIVISION				
Alberta	VE6XC	E. Roy Ellis	Box 2, R.R. 1	Ft. Saskatchewan T0B-1P0
British Columbia	VE7FB	H. E. Savage	4553 West 12th Ave	Vancouver 8
Manitoba				
Maritime				
Ontario	VE3DV	Holland H. Shepherd	3016 Cowan Crescent	Ottawa K1V 8L1
Quebec	VE2DEA	Adelien Michaud	1630 St. Croix Boulevard	Montreal H4L 3Z8
Saskatchewan	VE5CU	W. H. Parker	214 McMaster Crescent	Saskatoon S7H 4F3

* ACTING SEC

Simulated Emergency Test

THIS MONTH

1976	JANUARY					1976
S	M	T	W	T	F	S
				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

Announcement....

Amateur radio played a vital role when portions of the U.S. were hit by hurricane Eloise recently. Consider yourself lucky if your area was spared this disaster. However, if Eloise has "bestowed her charms" on your community, would you be prepared to supply emergency communications?

The Simulated Emergency Test is designed so that all of us can answer yes to the above question. As its name implies, the SET simulates realistic emergency conditions in order to enable amateurs to gain experience in handling emergency communications. Hams from all phases of the hobby are urged to participate in the SET, and steps have been taken this year to maximize participation.

How? Well, we're glad you asked. This year, as in past years, the official SET weekend is the fourth weekend in January – January 24-25, 1976. However, groups may, if they wish, hold their SET on any weekend within one month before or after the official weekend (if it's more convenient), in other words, between January 1 and February 29. This will permit the SET (hopefully) to coincide with the time when amateur activity and public-service value can be the greatest, perhaps in conjunction with a *bicentennial event*. All SETs held during the SET period will be included in the SET results article in *QST*.

Contact your local emergency coordinator to find out the exact date of the SET in your area. These emergency coordinators (ECs) will be coordinating plans for the local Amateur Radio Emergency Corps (AREC) and other interested amateurs. The National Traffic System (NTS) nets will hold extended and extra sessions as needed to facilitate the handling of formal message traffic from coast to coast.

How do *you* participate? We thought you'd never ask. If the identity of your local EC is unknown to you, ask your section emergency coordinator (see opposite page) who your EC is. Then advise the EC of your availability. He will tell you how you can help. He may ask if you are interested in joining the local AREC group. This only requires that you complete a short registration form denoting your band capabilities and your willingness to participate in AREC activities.

If there is no EC assigned for your area, perhaps you or another amateur could volunteer to organize some emergency-preparedness activities. Contact your SEC or SCM (see page 6) for details.

Another way to get in on the SET action is to participate in your local, section, or higher-level NTS net. Most every ARRL section has at least one net operating at the section level. Also, many repeaters have active local nets. Familiarize yourself with traffic-handling procedures. In an emergency, it's imperative that all stations go about handling communications and messages according to a standard form and using maximum efficiency. If possible, report into net sessions before the SET

(Continued on page 99)

THE AMERICAN RADIO RELAY LEAGUE

RADIOGRAM

VIA AMATEUR RADIO

13	R	8	WB9CJS	8	CHICAGO ILL	2200Z	JAN 24

TO
R G MARTIN W9ARS
2134 WEST RIDGEVIEW DRIVE
DECATUR ILL

THIS STATION ACTIVE IN 1976 SET X 73

WB9CJS

REC'D

SENT

Here's an example of a routine SET message to the SEC. Emergency, priority and inquiry test messages should carry "TEST" as part of the precedence, have handling instructions HXB and have "TEST MESSAGE" as the first two words in the text.

September VHF QSO Party Results

Vermont, always a handy multiplier, was supplied by W1GGM, operated by a group on Mount Equinox.

REPORTED BY JIM CAIN,* WA1STN

GOOD grief! When we mentioned that conditions for the June VHF QSO Party weren't the best on record we weren't asking if the propagation gods could provide more bad news in September. September 6 and 7 were on the downhill slide from at least average conditions which had prevailed in most parts of the country the previous week.

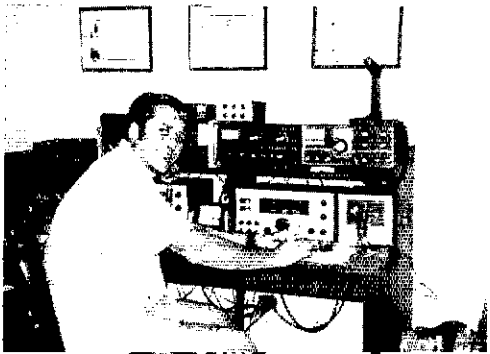
From our editorial standpoint, the best part of this activity was the terrific input from participants, in the form of snapshots, soapbox comments, short stories, and just lots of logs. Entries totaled 282, up nicely from last year's 231. We'd prefer to let some of you tell the story:

"Just a quick comment on conditions. I read with interest the write-up on the June contest; I couldn't help but notice all the hand-wringing about poor conditions. Well, just because we (WA1MUG) submitted the second-highest all-time score, and W1DC and W3CCX submitted scores that were higher than they've ever submitted before (not to mention that they were the third and fourth highest all-time scores), that must mean conditions were poor. Well, the propagation gods must have read that write-up and decided to show what poor conditions are really like." (WB2DRW/WA1MUG). [OK, John, we get the message. – Ed.]

"Six meter conditions were terrible for this part of the country during the contest; managed to work only one out-of-state contact (WB6KBZ), on a probable meteor scatter." (W7KMV).

Finally, here are some comments and an interesting band/mode breakdown from K1PXE. Note Pete had the third-highest single-op score, while not operating *any* six meters nor any fm on two. "The contest was the most fun in years. Band conditions were average except for a slight tropo coastal opening. The trend on two meters over the

* Asst. Communications Manager, ARRL



Here's some explanation of WA4MMP's always-potent signal from Virginia on various bands.

Min. Sections	30	15	4	3	1
MHz	*50*	*144*	*220*	*432*	*1215*
VE2DFO	17	16			
VE3BQN	3	19		7	
K1PXE		20	12	16	5
WA1FFO/1*	27	19	12	14	3
W1JAA		11		12	
W1JOT		3		4	1
W1MX*	8	13	10		
K1WHS	24	21	10	12	
W1YTW	9	15	12	7	
WA1QUB	22	14		5	
K1MNS*	15	12		12	
W1FMF*	24	14	6	6	
W1BIM/1*	16	16			
WA2JHR/1*	18	12	4	3	
W1GGM/1*	18	20	13	13	6
WA1HON/1*	6	3	2	1	1
WA1HWU	22	15			
WA1MUG/1*	32	21	15	18	7
W2CXC	15	16			
K2ARO		2		8	
W2HF		8		4	
K2CBA*	18	18	7	14	2
WA2BLM*	21	17	10	5	
K2RTH		25	13		
K2OVS	11	18		11	
WA2PMW		17			
WA2EUS		8		3	
K2BF				9	
WA2GEZ	16	16			

Min. Sections	30	15	4	3	1
MHz	*50*	*144*	*220*	*432*	*1215*
WA2VWW	13	19			
WB2CVT		17			
W2OMS				16	4
WB2GKE*	24	21	13	15	3
WA2SNA/2*	22	18	4		
WA2FZW*	17	13	10	9	
WA2UDT*	16	19		8	
W2EIF	15	19	9	9	
K2BWR	22	18	14	6	
W2CNS	22	20	5		
WA2WVL		17			
K2JIO		17			
K2EVJ	8	3			2
WA3OPX	16	14	6	7	
W3CGV	4			1	1
W3HOT		23	12	20	3
WA3VJU	20	14		6	
WA3AXV	16	14	2	10	
WA3NVO	15	12	8	7	
WA3KPS	6	17			
WA3UFU		19		4	
W2QW/3*	19	14	6		
W3AKW/3*	4	17	9	10	
W3TMZ		22		19	
K3LFO		19			
WA3LND		18			
W3PGA/3*	18	12	3	7	
K3IVO*	16	16			
W3GNR/3*		18			
W4ISS	3	5		3	
W4BFB/4*	24	16		6	

Min. Sections	30	15	4	3	1
MHz	*50*	*144*	*220*	*432*	*1215*
K4GL	4	5		4	
K4DEK		23			
W5WAX	16	13		3	
WA6JUP/6	9	10	4	6	
W6BXO	6	7	6		
WB6OKK	11	11	6	6	
K6IBY			6		
K6YNB/6	12	12	8	7	2
K6QAX	10	8	6		
WA6JYD	9	7	4		
WB6KBZ/6	13	10	7	4	
W6KQG	13	10			
WB6NMT		7	4	4	
WA6BNF/6*	8	6		3	
K6JKO	7	9	7	6	
WA6NRV	8	9		9	2
K6ZMW	8				3
WB6YIK/6*	9	8		3	
WB6NKO	7	7		5	
K6KLY/7	6	6	3	4	
K7AUO/7*	3	3	2	2	3
K7WKT/7*	1	1		1	3
W7FHZ/7*	3	3	2	2	1
WB8BGY	26	12		3	
K8LZF		6	2	3	
K8LEE	35	5		2	
K8UQA				11	
WA8PLZ*	27	21	1	4	
W4GKM/8		9		3	
K9HDE	5	5		4	
K9UVJ	10	9	3	5	

*Multioperator Station

DIVISION LEADERS

Single Op.	Division	Multiop
W3HQT	Atlantic	K2BWR
K9UVJ	Central	WB8HUC/9
K1WVE/Ø	Dakota	. . . .
WB4JGG	Delta	. . . .
K8LEE	Gr. Lakes	WA8PLZ
K2RTH	Hudson	WB2GKE*
WØKC	Midwest	KØTLM/Ø
K1WHS	New England	WA1MUG
WA7RTA	Northwestern	WA7NAN/7*
WA6JUD/6*	Pacific	WB6KBZ/6*
WA4GPM/4	Roanoke	W4BFB/4
WA8GUB/Ø	Rocky Mt.	. . . .
WØDYB		
WA2JVO/4	Southeastern	W4VO/4*
K6YNB/*	Southwestern	. . . .
W6GTJ/5	West Gulf	W5WAX
VE3BQN	Canadian	VE3FHK

*New Record

TOP TEN

Single		Multi	
K6YNB/6	16,564	WA1MUG	108,252
K1WHS	15,276	WB2GKE	60,268
K1PXE	15,052	WA1FFO/1	44,550
W3HQT	14,442	W1GGM/1	30,981
WA6JUD/6	13,079	WA8PLZ	28,408
W2EIF	12,792	WA2SNA/2	27,456
WA3VJU	11,160	K2CBA	25,665
K8LEE	11,046	WA2BLM	21,359
WA3AXV	10,038	W4BFB/4	19,260
WA3NVO	9828	K1MNS	17,823

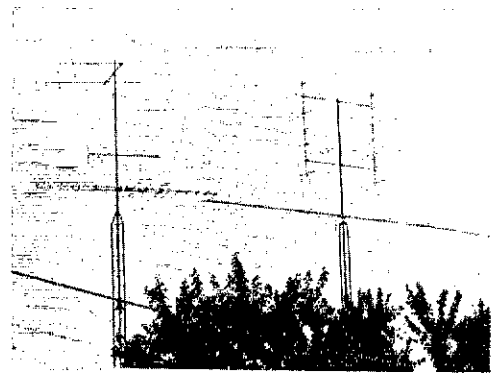
past few years has been interesting to watch. A-m contest activity above 145 MHz has greatly decreased but has been compensated for by an increase in ssb activity. Most of the contest activity is now in the 144.080-144.120 MHz segment. Here's my breakdown:"

144 cw – 67	432 – 35
144 sb – 19	432 – 6
145 am – 26	1296 – 6
145 sb – 20	all bands phone – 80
220 am – 9	all bands cw – 125
220 cw – 17	

Thanks Pete, for the interesting comments. By the way, for those of you who don't know K1PXE, he's sightless.

K2OVS sent us an 8-chapter scenario about the September Party. We chose chapter 5 for everlasting fame and glory (?) :

Non-contester: "CQ, CQ, this is WA2XXX calling CQ two meters."



Some antennas at WB4JGG (Tenn.).

Contester: WA2XXX from K2OVS, how about a contest point?

N.C.: "K2OVS, WA2XXX. Good evening, old man, name here is . . .. QTH is . . .. Your signal is . . . My dog just had puppies . . . etc . . . etc. . . .

(By this time I've QSYed and worked two other stations and come back just in time to answer him.)

Contester: "OK, Jack, what's your section?"

N.C. "What's a section? I live in Podunk Hollow."

Contester: "Your ARRL section."

N.C.: "What's ARRL?"

End of story.

QST for February, 1975, page 61, documents the all-time records for September QSO Parties. Several individuals and groups sallied forth this time around to break a few of those records: WB2GKE broke their own multi-op record of 1973 by 10,000 points; WA7NAN/7, WB6KBZ/6, and W4VO/4 all broke multi-op records in their respective divisions. In the single-op section, hilltoppers WA6JUD/6 and K6YNB/6 set new marks in the Pacific and Southwestern divisions. If there are a couple more records broken next September, we'll run the complete all-time record box again, suitably updated.

Thanks, everybody, for the pictures and comments. We're only sorry we couldn't print more. Get your requests for January Sweepstakes forms in now, and keep us busy afterward with more photos and comments. GL!

Soapbox

I nominate K1PXE for "best fist" award and W4DFK for "best ears." Too many candidates for "worst chirp" to decide on a winner. – (WB2CUT). [We bet K1PXE has a machine to send his code. - Ed.] Our portable site is on Pine Log Mt., elevation 2400'. We thought activity was above average. – (W4VO/4). Got three new states on 432, but not looking forward to January due to possibility of poor band conditions. – (W3TMZ). [Now, what kind of an attitude is that? - Ed.] Our portable operation is from Buck Mt., WA, elevation 4000' . Six meters was especially poor, limited to line-of-sight. Be back in June. – (W7FHZ/7). We object to the multiplier box in the write-up not giving totals for every band, even if the contestant only made the minimum on certain bands. – (W1MX). [OK, we get the message. - Ed.] Pleased to get all California sections from my spot in the south. – (WB60KK). Worked seven on two-meter EME, and expect this to be a very exciting mode in future contests. – (VE2DFO). Wow! 106 out of 176 two-meter QSOs were on cw. Got four on EME, also. – (K2RTH). Tropo was zilch, the E-layer was made of cement, scatter was the worst seen in recent years, and to top it all off, we had lingering thunderstorms in the area both nights. This relatively low score from me has not put a damper on future contest participation, and station improvements will continue. – (WA4MMP). Almost sounded like a band opening on six until I realized it was just a lot of guys operating. – (WA4LDU). I'd like to see calling periods on various bands, to help concentrate activity. – (K9HDE). Nice to hear W1AW on 2 meters. – (W1WEE). First vhf contest getting all W1 and W2 sections, on two bands, at that! – (WA2GEZ). Never did hear any of the usual East Coast mountaintoppers on 432. – (K8UQA). [But he got Sweden and Japan on moonbounce. – Ed.] Lots of cw on 2 meters, otherwise activity down. Think the lack of a "real" announcement of the contest in QST hurt, too. – (W2EIF). [See item in "lead" story. - Ed.] I'm taking down my hf antennas to put up more for vhf, including a double rhombic for six. – (WB9ETQ). Six was so bad it was hard to hear Denver, only 70 miles away. – (WA8GUB/9). Conditions picked up Sunday night, unfortunately after most had ceased operation. W7CNK is worked here so consistently on EME it's getting to be "old hat." By the way, the secret of making a good amplifier is to put 150 screws in the lid so even Murphy can't get into it! – (K1WHS). Cw on 2 meters sounded like 40 meters. – (WA3KPS). My equipment has never been better, but the poor conditions resulted in my just barely bettering last year's score. – (K4MSG). Think activity in the Midwest would increase if the competition were separated by bands. – (K9DAS). Since six died, my score would have been really sad if it hadn't been for good old 2-meter amplitude modulation. – (WA8EUU). Only three years ago I was turning in division-leading scores without using any fm at all; now fm produces half my total contacts and even some multipliers not available on ssb. Unfortunately, it also produces some ill-will from non-contesters. – (K6YNB/6). Good activity at the low end of 2 meters. I suggest mountaintop beacons, probably from New England, one beaming north and one beaming south, to act as band-opening tip-offs. – (WA3NNZ). Thanks to WA1MUG for helping us work East MA, our final section. – (W2OW/2). Sounded like ssb and cw activity on 220 and 432 is going to rival two meters before long; I'll be ready next time. – (WA3AXV). Sure is a big difference being out in "the sticks" where there are no locals to work. – (W3HDH). Seems like the September Party is turning out to be an annual anti-climax to the June one. – (WB4VLH). I'm going to enter my log from now on, regardless of score, just to let you know I was in there. – (WA9LZM). [That's the spirit! - Ed.] It's hard to set big records from 4-land, but I'll keep trying! – (WB4JGG) Three separate electrical storms took place during the contest, making operating risky but exciting. Luckily, no power supply diodes lost. – (WA4GPM). Had some scatter and an inversion but ran out of stations to work. We're trying to get a permanent contest call. – (WA7NAN/7). Hope to have towers up and an amplifier going in January, if I don't operate at VE3ONT. – (VE3FVN). The only way to kill this group's enthusiasm is with a wooden stake. W3DQF was sending "CQ Test" while we were tearing down the equipment. – (W3GNR/3).

Stan, WA1LOU, is probably hard at work building a vertical by now. He operated 2 fm only after rig failure on 6.

VE

Quebec

VE2DEO 2310- 70-33-AB

Ontario

VE3BON (VE3ABG op.)
5133-267-29-ABD
VE3FGU 270- 30- 9-B
VE3EVN 15- 5- 3-B
VE3EHK(+VE3EHD)
2392- 86-26-ABCD

British Columbia

XJ7CGY/7 140- 70- 2-B

U.S.A.

1

Connecticut

K1PXE 15,052-194-53-BCDE
WA1GTP 2158- 83-26-AB
WA1LOU 1060- 99-10-ABD
W1AW(WA3ISU op)*
828- 46-18-AB
W1EEZ 528- 48-11-B
WA1INL 450- 50- 9-B
WA1PRJ 272- 29-16-AB
WA3ISU/1* 250- 25-10-ABC
W1ENZ 198- 33- 6-B
W1GNC* 180- 17-10-ABC
W1WFF 144- 24- 4-B
K1ZZE 138- 23- 6-B
WA1UNE(W1DGL op)
22- 11- 2-B
W1DGL 18- 9- 2-B
WB2NOM/1* 9- 3- 3-A
WA1EEO/1(+K1HTV, WA1s NGR, TZK, WA3QHK, Mike)
44,550-525-75-ABCDE
K1MUD/1 (+K1DNW WA1s HYN LMZ)
3900-156-25-AB

Eastern Massachusetts

WA1MKE 2712-113-24-AB
W1JAA 1426- 41-23-BD
K1DAL 910- 70-13-A
WA1HVS 280- 40- 7-AB
W1IOT 160- 12- 8-BDE
W1EJI 144- 24- 6-B
W1MX(+W1DXG, WA1RLL, W2OHQ WB2MZE, WAØBCU)
3100- 85-31-ABC
WA1LXP(+WA1CDO)
686- 49-14-AB

Maine

K1WHS 15,276-198-67-ABCD
W1YTW 5977-139-43-ABCD
WA1IRE 216- 24- 9-AB

New Hampshire

WA1OUB 8077-190-41-ABD
W1BDC 936- 72-13-A
WA1MGC 600- 50-12-A
W1JSM 585- 45-13-B
K1MNS(+K1PLX, WA1OQV, W8GIM)
17,823-432-39-ABD
W1EMF(+K1MFQ, W1BXM, WA1s ABV ESZ, WN1s VKN VKO)
14,500-274-50-ABCD

Rhode Island

W1BIM(+K1s COW, DKX, WA1s KAX, OLK, TAD)
6,496-203-32-AB

WA2JHR/1 (+WA2UXW)
6699-119-37-ABCD

Vermont

W1HDQ/1 312- 39- 8-B
K1GYT 130- 13-10-AB
W1GGM/1 (+K1KEC, W1GUU, WA1s Hon, EXU, MSD, MZC, WB2GLQ, WA5IOD, K9AQP)
30,981-381-69-ABCDE
WA1HON/1(+K9AQP)
348- 22-12-ABCDE

Western Massachusetts

WA1RWO/1 7067-191-37-AB
WA1RKS 1760- 88-20-AB
WA1MUG (+K1ROE, WA1s GOE, HCO, IOJ, NES, NLD, SKP, WA2s PJL, SCA, SCL, SPL, USX, VKO, WNI, WB2s BXP, DRW, EMU, GIU, OFU, TSK, WOI
108,252-1030-93-ABCDE
WA1UOL/1 (+WA1s UWX, UZP, WB6ACA, Joe Deyette)
78- 13- 6-AB

2

Eastern New York

WB2OLK 7072-208-34-AB
W2CXC 5394-174-31-AB
K2ARO 500- 29-10-BD
W2HE 324- 21-12-BCD
W2IP 189- 21- 9-B
K2CBA(+K2AEP,W2KHQ, WA2s BAH, PVV, WB2s BYP, DNF, OFS, UYE, YGI, WB4BMZ)
25,665-386-60-ABCDE
WA2BLM(+WA2s IDS, LOA, SRI, YPO, WB2s EUH, EZE, OZA, SGN, STZ)
21,359-368-53-ABCD
WB2EBP/2(+K2RKW, WA2ROC, WB2s BGI, FRK)
3850-154-25-AB

N.Y.C. - L.I.

K2RTH 7600-200-38-BC
K2OVS 6520-145-40-ABD
WA2PMW 2125-125-17-B
K2LLG 539- 49-11-B
W2HI 507- 39-13-B
WA2LOS 506- 38-11-BD
K2BI 342- 19- 9-D
W2GFF 209- 19-11-B
W2SEU 84- 10- 7-ABCD

Northern New Jersey

WA2GEZ 5792-181-32-AB
WB2VWW 3936-123-32-AB
WB2CUT 2261-133-17-B
W2OMS 1920- 46-20-DE
WB2LPX 1584- 88-18-AB
WA2CWA 1536- 96-16-A
WB2WZX 490- 49-10-B
WA2YGR 473- 43-11-AB
W2HUG 310- 31-10-B
WA2SLI 114- 38- 3-B
WB2GKE(+K2OWR, WA2s DBD, WUX, ZTG, WB2WIK)
60,268-708-76-ABCDE
WA2SNA/2(+K2s BJG, KJI, RVH, WA2s QEA, QOQ, RIU, UPK)
27,456-597-44-ABC
WA2EZW(+W2HVA, WA8ZLP)
14,651-256-49-ABCD
WA2UDT(+WA2WSK, WB2s LDF, LYP)
11,868-250-43-ABD

Southern New Jersey

W2EIF 12,792-205-52-ABCD

WA2QVI 1800-100-18-AB
WB2SPJ 162- 18- 9-A
K2BWR (+K2ZRJ)
12,400-173-60-ABCD

Western New York

W2CNS 8789-181-47-ABD
WA2IKO 2109-111-19-AB
WB2KLD 1200- 60-20-AB
WA2WVL 850- 50-17-B
K2JIQ 816- 48-17-B
WA2BPL 800- 50-16-A
W2WGI 420- 30-14-B
K2EVJ 416- 28-13-ABE
WA2HYK 231- 21-11-B
WA2WLH 228- 38- 6-AB
W2OW(+WA2s RBI, WYO, WB2s RBA, SGS, YIE)
6086-179-34-AB
W2HBC(+WB2DSE)
4810-122-37-ABCD
W2AF/2(+WA1QAF, WA2AJQ, WB2s UBW, VUO)
2160-120-18-AB

3

Delaware

WA3QPX 6846-142-42-ABCD
K3YHR 517- 47-11-B
W3BDP 333- 37- 9-B
WA3EHL 189- 27- 7-AB
W3CGV 66- 8- 6-ADE

Eastern Pennsylvania

W3HQT 14,442-184-58-BCDE
WA3VJU 11,160-266-40-ABD
WA3AXV 10,038-200-42-ABCD
WA3NVO 9828-203-42-ABCD
WA3NGK 6210-196-30-ABCD
WA3KPS 5014-218-23-AB
W3IMY/3 4816-172-28-A
K3IWK 3976-142-28-AB
WA3YUL 3213-153-21-AB
WA3IEM/3 2898-126-23-A
WA3UEU 2392- 99-23-BD
WA3RIM 1326- 78-17-AB
W3AJI 1113- 50-21-ABC
WA3BRW 1008- 72-14-B
W3FEB 910- 65-14-AB
WA3CSP/3 864- 54-16-A
K3GAS 528- 31-12-ABC
WA3HEI 483- 69- 7-AB
K3LGF 342- 38- 9-B
WA3KEI 287- 41- 7-AB
WA3RCA(+WA3s DAN, FOL, NHO, OVH, OXM, YKA)
11,808-328-36-AB
W2OW/3(+K2OLJ, WA2s LWL, QOL, UCR, WB2s UIN, UTO)
6688-168-38-ABC
W3ARW/3(+K3SOQ,W3GEI
4200- 81-40-ABCD
K3YED(WA3sWAK, WTM)
3870-215-18-AB
W3EP(+W3s GEW, JUZ)
396- 44- 9-AB
WB2ENJ/3(+WA2AUII Rob Haney)
38- 19- 2-A

Maryland – D.C.

W3IMZ 7175-138-41-BD
K3LFO 2964-156-19-B
WA3LNO 1962-109-18-B
W3KMV 1224- 72-17-AB
K3MWQ 1024- 64-16-AB
WA3NNZ 637- 49-13-AB
WA3EOQ 390- 39-10-B
W3JPT 360- 45- 8-AB
W3PGA/3(+K3s ERX, PHH, ROJ, YZY, W3s JEH, VRD, WA3s LAW, TUN)
9000-212-40-ABCD
K3IVO(+W3DPU, WA3ZNM,

WB4ACJ, WB5IBA, WB8CXB)
5792-181-32-AB
W3AUN(+W3WI, WA3TKP)
517- 47-11-B

Western Pennsylvania

W3ANX 1444- 76-19-AB
W3BWU 992- 62-16-AB
W3HDH 500- 50-10-AB
W3IOH 455- 35-13-AB
WA3ANO 208- 26- 8-AB
W3DJM 154- 22- 7-AB
WA3ILT 27- 9- 3-AB
W3LEZ 4- 2- 2-B
W3GNR/3(+K3s TEL, ZDR, W3DQE, WA3s BUX,HSE)
936- 52-18-B

4

Alabama

WB4NCN 494- 38-13-A
WB4OQT 279- 31- 9-A
K4BPY 210- 30- 7-AB
WA4CQG 168- 21- 8-B
K4IQC 65- 13- 5-A

Georgia

WA2JVO/4 2967-125-23-ABCD
WA4NJP 2208- 92-24-ABCD
WB4WMT 1003- 59-17-AB
WB4RUA 450- 45-10-AB
W4ISS 253- 20-11-ABD
W4VO/4(+K4s AEK, CKS, WA4s BRQ, EPJ, WB4s AEG, EGM)
4335-255-17-AB

Kentucky

WB4YAB 2139- 93-23-A
WA4JOS 986- 58-17-AB
WB4VLH(+WB4AJD)
200- 25- 8-A

North Carolina

WB4MXC 150- 25- 6-A
W4BLB/4(+K4s BWS, GHR, LVY, MQG, SAN, SLC, WA4s APD, GVZ, ICM, IPQ, UPG, VCC WB4s BZS, CCW, IZP, PCS, YGC, Kathy)
19,260-420-45-ABD

Northern Florida

WB4BSZ 147- 21- 7-AB
W4CSS 40- 10- 4-A

South Carolina

K4GI 286- 18-13-ABD
W4IQO/4(+W4s BUW, LZW, K4s IME, GMJ, LNH, LOO, WA4JWV, WB4s HKZ, NBK, VMR)
2448-144-17-AB
K4SAO/4 (+WB4BIA)
1064-152- 7-AB

Southern Florida

K2VRZ/4 385- 55- 7-AB

Tennessee

WB4JGG 4182-123-34-AB
WA4IAX 423- 47- 9-AB
WA4LDU 126- 18- 7-AB

Virginia

WA4GPM/4 5332-172-31-AB
WA4LJO 2016-111-18-ABC
W4DFK 1932- 84-23-B
WA4MMP 1368-114-12-AB
WA4TTG 1003- 58-17-ABC
K4FTO 845- 65-13-B

WA4SIQ 741- 57-13-AB
W4WSF 693- 63-11-B
K4MSG 429- 39-11-AB
WB4NTV 140- 28- 5-AB
WA4JIY 81- 27- 3-AB
WA4EPI 20- 10- 2-A
K4IGB/4(+k4s CJZ, MOB, WA4HIA, WB4s LXW, UTJ) 6600-300-22-AB
W4OCW/4(+WA4s EMS, KNP, QDC) 4510-205-22-AB

5

Oklahoma

W5WAX(+K5s BXG, WVX) 3648-111-32-ABD

South Texas

W6GTJ/5 4- 4- 1-B

6

East Bay

WA6JUD/6 13,079-392-29-ABCD
W6BXO 2034-101-18-ABC
WA6VEJ/6(+WA6BMV, WB6s NOM, TYA) 4550-315-14-ABD

Hawaii

KH6BZE 1- 1- 1-B

Los Angeles

WB6OKK 3894-102-33-ABCD
WB6APP/6 1800-129-12-ABC
WA6RAY 100- 20- 5-AB

Orange

K6IBY 110- 11- 5-C

Santa Barbara

K6YNB/6 16,564-363-41-ABCDI

Santa Clara Valley

K6QAX 3048-103-24-ABC
WA6GYD 1960- 80-20-ABC
WB6KBZ/6(+K6GSS) 16,456-446-34-ABCD

K6YA/6(+W6OCP, WB6s LSN, QVW, W8RPA) 3894-154-22-ABC

San Diego

WB6NMT 1827- 68-21-BCD
K6QWZ 455- 65- 7-B
WA6LDN 54- 9- 6-B

San Francisco

W6KQG 2832-116-24-ABE
WA6RNE/6(+WA6s KWN, QCR) 1972-110-17-ABC

San Joaquin Valley

K6JKQ 4031-106-29-ABCD
WA6NRV 1993- 70-24-ABDE
W6YKS 868- 62-14-AB
K6ZMW 429- 34-11-AI
W6DPD 130- 13-10-AB
W6OAT/6 112- 14- 8-B
WB6YIK/6(+WB6HQU) 1660- 80-20-ABD

Sacramento Valley

WB6NKO 1311- 63-19-ABD

7

Arizona

K7UKW/7 1365- 63-21-ABC
WA7HDV 119- 29-11-AB
WA7ZWO 121- 19- 9-A
W7KMV 120- 40- 3-AB

Nevada

K6KLY/7 2812-134-19-ABCD

Oregon

WA7RTA 1485- 95-15-ABC
W7 YR 737- 54-11-ABCD
K7HSJ 175- 32- 5-ABCD
K7AUO/7(+W7s ADV, BKN, RPT, UDM, VRM, K7s IDN, UUH, WKD) 1417- 93-13-ABCDI
K7WKT/7(+K7UURD) 78- 6- 6-ABCDI
WA7LZY(+WB7BST) 20- 5- 2-D

Washington

WA7PVI 200- 50- 4-AB

WA7UQV 140- 28- 5-AB
K7ZCB/7 14- 7- 2-AB
WA7NAN/7(+K7KOT, W7s DNU, GLS, WA7WMD) 8759-437-19-ABCD
W7UHZ/7(+K7s IPQ, PHZ, WA7s IVO,MHM,WMC) 5797-514-11-ABCDE

8

Michigan

WB8BGY 7913-187-41-ABD
K8HWW 561- 46-14-B
K8LZF 308- 23-11-BCD
WA8EUD 301- 43- 7-AB
K8AIC 75- 15- 5-AB

Ohio

K8LEE 11,046-261-42-ABD
WB8IGY 3045-105-29-AB
WA8RCN 254- 58-13-AB
WB8RDY 507- 39-13-A
K8UQA 418- 19-11-D
K8BWZ/8 60- 15- 4-AB
WA8PLZ(+G3PAC, K4GGY, W8s KPY, NKW, WA8s DZU, EHL, LEA, MCH, MSI, PAR, WB8s FLF, ILW, OLR, OOE, OQC, QVC, RKM) 28,408-523-51-ABCD
W8BAP(+K8SUR, WB8s BBP, GZL) 3696-176-21-AB

West Virginia

WB8IAX 1740- 87-20-AB
W3GKM/8* 613- 46-12-BCD
WA8UOY/8 22- 11- 2-B

9

Illinois

W9KDR 1035- 69-15-AB
K9HDI 798- 49-14-ABD
W9ABA 630- 45-14-AB
WA9UFT 594- 66- 9-B
K9KQR 396- 44- 9-B
W9IVT 304- 38- 8-B
K9DTB 70- 14- 5-AB

Indiana

K9OVJ 3456-110-27-ABCD
WB9LTQ 1170- 90-13-AB
WB9CLP 632- 79- 8-AB
K9OZS 612- 51-12-AB

WB9GMC 192- 32- 6-A
WB8HUC/9(+WB8s GEU, GFV GLX, GFY, GEA) 3712-116-32-A
K9IRK/9(+WA9s DLZ, USL, WB9s LLY, HVJ, NAQ, OK 561- 80- 7-A

Wisconsin

K9OXY 407- 37-11-A
WA9LZM 283- 41- 7-A
WB9UQD 117- 39- 3-A
W9DI 18- 4- 2-B

0

Colorado

WA0GUB/0 10- 5- 2-A

W0DYB 10- 10- 1-A

Iowa

K0IDAS 480- 40-12-B

Kansas

WA0TRQ 4- 2- 2-B

Minnesota

K1WVL/0 108- 36- 3-A

Missouri

W0KC 497- 71- 7-A
K0ELMI+WB0ILA) 3501- 50-11-A

Nebraska

WA0MRH 10- 5- 2-A

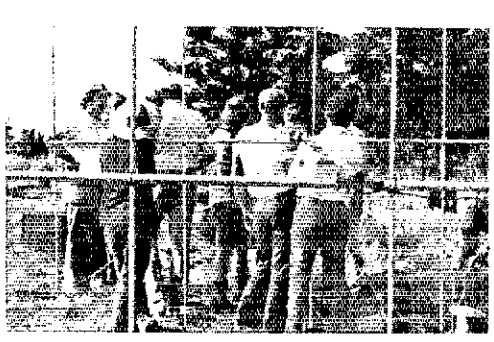
North Dakota

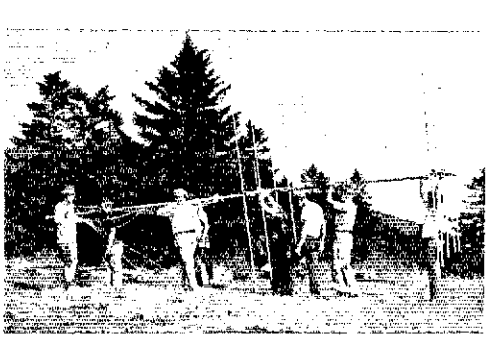
WB8TGY/0 80- 20- 4-A

Check Logs

K1AGB, WA1SHM, WA1SVI
WA2UXW/1, WA2UXW/1,
WB6INN/6, WB6RAB/6

*Indicates Hq. staff, ineligible for awards.





The Mecklenburg ARS, W4BFB/4, has been making big noises from North Carolina this year. Operating from Roan Mountain (elev. 6300') helps, as does having assistance from 18 club members. Here we see 5-over-5 on six assembled and ready to go up.

42nd ARRL International DX Competition

Several changes implemented in the 1975 DX Competition continue in 1976: high/low band single-operator entries, the "one-weekend DXpedition" class, and the 1000-QSO award for DX entries. The Contest Advisory Committee and Headquarters are, as always, ready to receive comments on any facet of the DX Competition (and *all* ARRL contests, for that matter).

NOTE the following minor rule change: Single transmitter entries, i.e., single-operator and multi-single entries, *must* submit logs arranged in chronological order, *not* separate logs by band. The example shown below is the proper form for single-transmitter entries. This change does not apply to multi-transmitter entries.

Request the proper forms *now*; supply an s.a.s.e. with plenty of postage for dependable delivery. Check sheets must be included with all W/VE entries, and entries must be postmarked no later than April 19, 1976, to be eligible for *QST* listing and awards. – *WA1STN*.

Rules

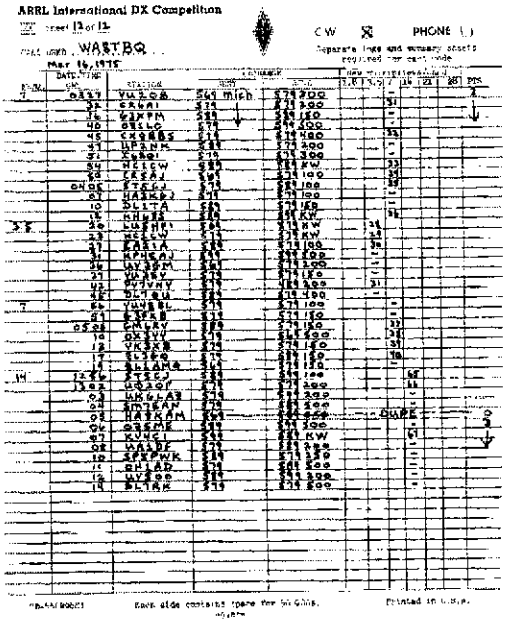
1) *Eligibility:* Amateurs worldwide operating fixed stations are invited to participate.

2) *Object:* Amateurs in the 48 contiguous United States and Canada will try to work as many amateur stations in other parts of the world as possible. Other amateurs work W/VE.

3) *Conditions of Entry:* Each entrant agrees to be bound by the provisions of this announcement, by regulations of his licensing authority, and the decisions of the ARRL Awards Committee. The ARRL Awards Committee will void or adjust entries as its interpretation of these rules may require. Its decisions will be final.

4) *Entry Classifications:* Entries may be made in either or both the phone or cw sections. Cw scores are independent of phone scores. Entries will be further classified as single or multiple-operator stations. Single operator stations are those at which one person performs all the operating, logging and spotting functions. Multiple- operator stations are those obtaining any assistance, such as from spotting or relief operators, or in keeping the station log and records. Single-transmitter multi-operator entries will be recognized as a distinct category from multi-multi. The use of electronic or mechanical devices or any other methods of simultaneous operation on two or more bands is prohibited. Two transmitters simultaneously on one band is prohibited. The use of spotting nets (operator arrangements involving assistance through DX alerting nets, etc.) places an entry in the multi-operator category.

Single operator stations may enter in the all-band, high-band or low-band categories. The

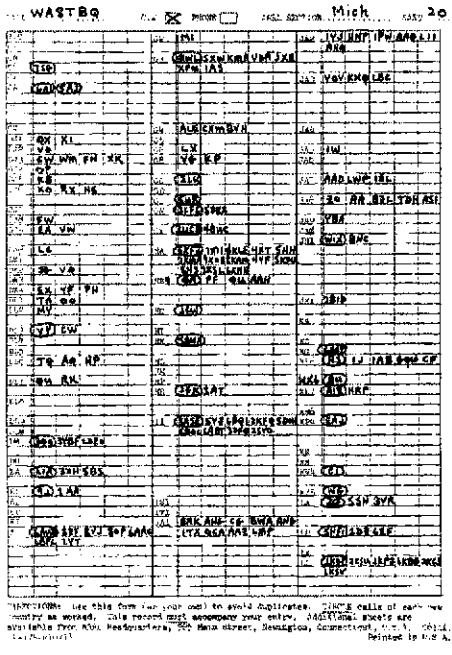

ARRL International DX Competition

CW ☒ PHONE ☐

WA8TBQ

Mar 16, 1975

▲ Sample check sheet


WA8TBQ

Mich

20

◀ Sample log sheet

CONTEST PERIODS			
Phone		*CW*	
Starts	Ends	Starts	Ends
Feb. 7 0001 GMT	Feb. 8 2359 GMT	Feb. 21 0001 GMT	Feb. 22 2359 GMT
Mar. 6 0001 GMT	Mar. 7 2359 GMT	Mar. 20 0001 GMT	Mar. 21 2359 GMT

all-band class may use any combination of legal amateur bands; the high-band class is for those using only 20, 15, and 10; the low-band class is for those using only 160, 80, and 40. Single operator stations may enter in only one class and that class must be clearly indicated on your summary sheet. Operation on a band not allowed in your class (i.e., operating on 20 while competing in the low-band class) is permitted although those points cannot count towards your score. For those competing in either the high-band or low-band class, it is recommended that a separate list of any QSOs made on a band(s) not within your class be submitted for checking purposes. Multi-operator stations may compete only in the all-band class.

A person(s) able to operate for only one of the two weekends (be it one cw or one phone or one of both) from a country different from that in which the operator(s) normally lives may submit a log in the "one-weekend EXpedition" class. Such logs will be listed separately in the results. Operation from the 48 contiguous U.S. states or Canada is not valid for this class.

5) *Contest Periods:* There are four weekends, each 48 hours long: two for phone work and two for cw.

6) *Valid Contacts:* In the phone section, all claimed credits must be made voice-to-voice. In the telegraphy section, only cw contacts count. Cross-band contacts may not be counted. Three points are earned for each completed two-way exchange. Incomplete QSOs will not count for contest points or multipliers. The same station may be worked again for additional points if the contact is made on a different frequency band.

7) *Exchanges:*

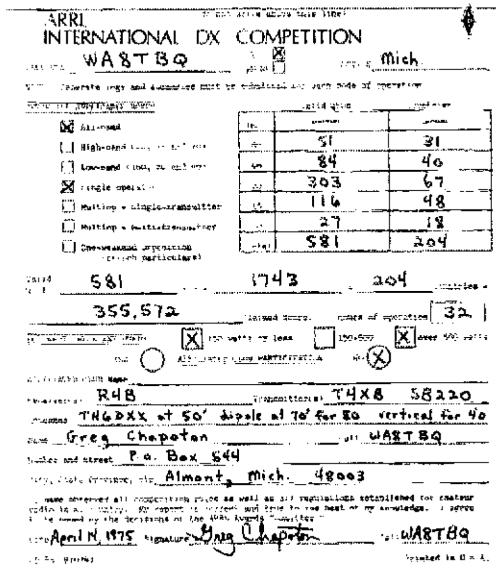
a) Amateurs in the 48 contiguous U.S. states and Canada transmit a two- or three-figure number, representing the RS(T) report, plus state or province. (The latter may consist of an appropriate abbreviation.) Example: WA8VRB might transmit "579 MI" on cw, "57 Michigan" on phone.

b) Other amateurs will transmit five- or six-figure numbers, each consisting of the RS(T) report plus three "power" numbers. The power indicator will represent the approximate transmitter power input. Example: OZ1LO, with 150 watts input, might transmit "579150" on cw, "57150" on phone.

8) *Scoring:* W/K and VE/VO stations multiply total points earned under Rule 6 by the number of countries worked on one band plus the number of countries worked on each other band. All other stations multiply total points earned under Rule 6 by the sum of the number of continental states and VE/VO licensing areas worked on each band.

There are 48 continental states plus VO and VE1-VE8, a possible total of 57 multipliers *per band.*

9) *Reporting:* A summary sheet, log sheets and a DX checkoff sheet for each band used (CD-175 or CD-175A or facsimile) are required from all W/VE/VO entrants (except KH6 and KL7). DX entrants (including KH6 and KL7) must submit log



Sample summary sheet

sheets and a summary sheet. Separate logs, summaries and check sheets (when required) are required for each mode used from all entrants. Single-operator and multi-single entries must submit logs arranged chronologically *not* on a by-band basis.

Contest reports must be postmarked no later than April 19, 1976, to be eligible for *QST* listings and awards. All DX competition logs become the property of the American Radio Relay League and none can be returned.

10) *Awards:* To document the performance of participants in the ARRL International DX Competition, a full report will be carried in *QST* In addition, special recognition will be made as follows:

a) A personalized plaque will be awarded to the highest single-operator DX phone and cw station (non-W/VE) in each continent.

b) On both phone and cw, a certificate will be awarded to the highest scoring single operator station in the all-band, high-band and low-band categories in each country, in Alaska, Hawaii and in each of the contiguous U.S. and Canadian ARRL sections (see page 6 in any *QST*) from which a valid entry is received. In addition, a certificate will be awarded to the highest scoring multi-single and the highest scoring multi-multi station in each W/VE call area and DX country from which a valid entry is received.

c) A certificate will be awarded to each non-country winner DX entrant making 1000 or more QSOs on *either* mode.

(Continued on page 80)

IARU News

INTERNATIONAL AMATEUR RADIO UNION, THE GLOBAL FEDERATION OF NATIONAL NON-COMMERCIAL AMATEUR RADIO SOCIETIES FOR THE PROMOTION AND CO-ORDINATION OF TWO-WAY AMATEUR RADIO COMMUNICATION

SCOUTS VOTE TO SUPPORT AMATEUR RADIO

Delegates from 86 countries representing the 14-million-strong World Scout Organization have voted unanimously to support amateur radio's efforts to retain its frequency allocations. The 25th World Scout Conference, meeting in Copenhagen in August, noted that the Jamboree-on-the-Air annually involves some 6,000 amateur stations in 70 countries, with participation by more than 100,000 members of the Scout and Guide movements. The text of the resolution, which was proposed by New Zealand and seconded by Jordan and many other delegations, is as follows:

COOPERATION WITH AMATEUR RADIO SERVICE

The 25th World Scout Conference requests all member organizations:

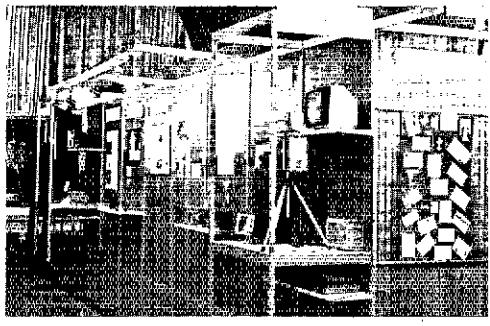
1. to urge their Governments to resist any attempt to reduce the number and size of frequencies presently allocated to the Amateur Radio Service and,
2. to cooperate with their National Amateur Radio Organizations in any actions designed to this end.

GERMANY MAKES AMATEUR LICENSES AVAILABLE TO 14-YEAR-OLDS

The *Deutscher Amateur Radio Club* has announced that licenses to operate club stations under the supervision of the station license holder are now available for the first time to 14- and 15-year-olds who have successfully passed the amateur examination. The license thus acquired is converted to a normal license at age 16, and is revocable until age 18. The *DARC* anticipates that this arrangement, a concession to the normal minimum age of 18 for amateur licensees, will permit mature youngsters to gain the benefits of participating in amateur radio communication.

AUSTRIA, CANADA CONCLUDE RECIPROCAL AGREEMENT

Effective September 2, the telecommunications administrations of Austria and Canada have agreed to issue permits to amateur radio operators of the other country who are temporarily in their country. Thus, Austria joins the nations listed on page 80, *QST* for October 1975, which have reciprocal operating agreements with Canada.



The amateur radio service had one of the most impressive displays at the World Telecommunication Exhibition, Telecom 75, held in Geneva in October under ITU sponsorship. The display was prepared by members of the CERN Amateur Radio Club and the International Amateur Radio Club, 4U1ITU, which was operated under the special call sign 4U2ITU during the exhibition. Support was provided by the IARU Region I Division and IARU Headquarters. Space for the display was made available through the courtesy of M. Mili, secretary-general of the ITU. The picture at the left shows Roy Stevens, G2BVN, arranging literature behind a replica of Oscar 7.

QSL BUREAUS OF THE WORLD

Most countries of the world have QSL bureaus, usually sponsored by the national amateur radio society, which serve as collecting points for QSL cards sent from amateurs in other countries. The following is a list of countries where there are QSL bureaus known to be operating. For delivery of cards to amateurs in these countries, simply mail them to the bureau of each country as listed below. Cards for territories and possessions not listed separately may be mailed to the bureau in the parent country: for example, cards for the British Antarctic Territory (VP8) go to the RSGB in Great Britain. See "How's DX?" for QSL information on specific stations. U.S. and Canadian amateurs *only* may send cards for countries not listed, and for whom no routing is known, to ARRL. Note that some bureaus do not forward cards to non-members of the national society.

Algeria: ARA QSL Service, P. O. Box 3, Alger-Gare, Algiers

Angola: LARA, P. O. Box 484, Luanda

Antarctica: Dave Porter, K2BPP, Mountainside Rd., Mendham, NJ 07945

Argentina: RCA, Carlos Calvo 1424, Buenos Aires, BA

Austral/French Antarctic Lands: via Malagasy Republic

Australia: VK1 QSL Officer, VK1ACA Canberra Radio Society, P. O. Box 1173, Canberra City, A.C.T. 2601; VK2 QSL Officer, WIA Hunter Branch, P. O. Box 134, Charlestown, N.S.W. 2290; VK3 QSL Bureau, Mr. E. Trebilcock, 340 Gillies St., Thornbury, Vic. 3071; VK4 QSL Officer, P. O. Box 638, G.P.O. Brisbane, Qld. 4001; VK5 QSL Bureau, Mr. Geo. Luxon, VK5RX, 27 Belair Rd., Torrens Park, S. Aust. 5062; VK6 QSL Bureau, Mr. J. Rumble, VK6RU, Box F319, GPO Perth, W.A. 6001; VK7 QSL Bureau, P. O. Box 371D, G.P.O., Hobart, Tas. 7001; **VK8, VK8HA, Box 1418, Darwin, N.T. 5794;** VK9, Ø, Federal QSL Bureau, 23 Landale St., Box Hill, Victoria 3128

Austria: OeVSV, Box 999, A-1014 Vienna

Azores: via Portugal

Bahama Islands: BARS, Box 6004, Nassau

Bahrain (MP4B and A9X only): ARAB, P. O. Box 472, Awali

Barbados: ARSB, Box 814E, Bridgetown

Belgium: UBA, Postbox 634, 1000 Brussels

Bermuda: RSB, Box 275, Hamilton 5

Bolivia: RCB P. O. Box 2484, Cochabamba

Brazil: LABRE QSL Bureau, P. O. Box 070004, 70000 Brasilia DF

Bulgaria: CRCB, Box 830, Sofia

Burundi: via Zaire QSL Bureau

Canada: Central QSL Bureau, P. O. Box 396, Downsview, Ontario, M3M 3A8, or see ARRL QSL Bureau this issue

Canal Zone: Lee DuPre, KZ5OD, Box 407, Balboa

Cape Verde Islands: RCCV, CR4AA, Praia, Sao Tiago

Chagos: (via Seychelles)

Chagos (U.S. personnel/Diego Garcia only): Communications Officer, U.S. NAVCOMMSTA, FPO San Francisco 96685

Chile: RCC, P. O. Box 13630, Santiago

Colombia: LCRA, P. O. Box 584, Bogota

Cook Island: ZK1 QSL Bureau, c/o Radio Station Rarotonga, Rarotonga

Costa Rica: RCCR, Box 2412, San Jose

Cuba: FRC, Apartado 1, Habana

Cyprus: CARS QSL Bureau, P. O. Box 1267, Limassol

Czechoslovakia: CRC, P.O. Box 69, 113 27 Praha 1

Denmark: EDR QSL-Central, Harry Sorensen, OZ6HS, Ingstrup Hovdegaden 51, DK 9480-Lokken

Dominican Republic: RCD, P. O. Box 1157, Santo Domingo

Ecuador: GRC, P. O. Box 5757, Guayaquil

El Salvador: CRAES, P. O. Box 517, San Salvador

Ethiopia (ET3US-stations only): Asmara QSL Bureau, P. O. Box 379, Asmara, or Kagnew Station ARC, Stonehouse Facility, Box 11, FPO New York 09545

Ethiopia: Telcoms ARC, Box 1047, Addis Ababa

Faeroe Islands: OY-QSL Bureau, P. O. Box 184, DK 3800 Torshavn

Fiji Islands: QSL Bureau, P. O. Box 184, Suva

Finland: SRAL, Box 306, 00101 Helsinki 10

France: REF, 2 Square Trudaine, 75009 Paris

French Oceania: RCO, P. O. Box 374, Papeete, Tahiti

Germany (Democratic Republic, DM-DT): DM QSL Bureau, P. O. Box 30, 1055 Berlin

Germany (Federal Republic, DA-DL): DARC Amateurfunk-Zentrum, P. O. Box 1155, D3507 Baunatal 1

Ghana: GARS QSL Bureau, P. O. Box 3773, Accra

Gibraltar: RAF Amateur Radio Club, RAF North Front, Gibraltar

Great Britain: (and British Commonwealth): RSGB QSL Bureau, G2MI, 29 Kechill Gardens Bromley, Kent BR2-7NH

Greece: RAAG, P. O. Box 564, Athens-107

Greece: (SVØ only): c/o Mars Station, APO NY 09223

Greenland: via Denmark

Greenland: (U.S. Personnel) OX5A-E via MARS Director, XP1AA, 1983 Comm. SQ., APO New York 09023. OX4F-H via MARS Director, XP1AB, 2004 Comm. Sq. APO NY 09121

Guam: MARC, Box 445, Agana, USPO 96910

Guantanamo Bay: GARC, Box 12, FPO, New York, NY 09593

Guatemala: CRAG, P. O. Box 115, Guatemala City

Haiti: RCH, Box 70-B, Port-au-Prince

Honduras: RCH, Apartado 273, San Pedro Sula

Hong Kong: HARTS, P. O. Box 541

Hungary: HRAS QSL Bureau, P. O. Box 214, H-1368, Budapest

Iceland: IRA, Box 1058, Reykjavik

India: ARSI, QSL Bureau, P. O. Box 534, New Delhi 1

Iran: ARSI, Box 1000, APO New York, NY 09205

Ireland: IRTS, QSL Bureau, P. O. Box 462, Dublin 9

Israel: IARC QSL Bureau, P. O. Box 65, Herzliya

Italy: ARI, Via D. Scarlatti, 31, I-20124 Milan

Ivory Coast: ARAI, B. P. 20036, Abidjan

Jamaica: JARA, Red Cross Bldg., 76 Arnold Rd., Kingston 5

Japan: (JA): JARL, Box 377, Tokyo Central

Japan(KA only): FEARL(M), c/o Sam Fleming, GARH-ID-GS-T, APO San Francisco 96343

Japan (KA6 only): Radio Society of Okinawa, P. O. Box 653, Fort Buckner, APO San Francisco 96331

Johnston Island: KJ6BZ, c/o MARS Stn., Det. 1, 1957 Comm. Gp., APO, San Francisco 96305

Jordan: RJRAS, P. O. Box 2353, Amman

Kenya: RSK QSL Bureau, P. O. Box 45681, Nairobi

Korea: KARL, Central Box 162, Seoul

Korea (HL9 only): Amateur Radio Bureau,

Headquarters, Eighth Army, Office of the AC of S, J6, APO San Francisco 96301
Kuwait: Alhalf Nasir H. Khan, 9K2AN, P. O. Box 736, Kuwait, Persian Gulf
Laos: QSL Bureau, P. O. Box 115, Vientiane
Lebanon: RAL QSL Bureau, P. O. Box 8888, Beirut
Liberia: LRAA, Post Box 1477, Monrovia
Liechtenstein: via Switzerland
Luxembourg: R. Schott, 35 rue Batty Weber Esch-Alzette
Madeira Islands: via Portugal
Malagasy Republic: QSL Bureau, P. O. Box 587, Tananarive
Malawi: H.Y. Bvumbwe, 7Q7AE, P. O. Box 24, Blantyre
Malaysia: QSL Manager, MARTS, Box 777, Kuala Lumpur
Maldives: (8Q6) via Ceylon
Maldives: (VS9) via Great Britain
Malta: 9H QSL Bureau, P. O. Box 575, Valletta
Mariana Islands: see Guam
Marshall Islands: KX6 QSL Bureau, via KX6BU, Box 444, APO, San Francisco 96555
Mauritius: Paul Caboche, 3B8AD, Box 467, Port Louis
Mexico: LMRE, P. O. Box 907, Mexico, D.F.
Midway Islands: KM6BI, Box 43, FPO, San Francisco 96614
Monaco: ARM QSL Bureau, Pierre Anderhalt, 3A2CN, 41 Bd du Jardin Exotique
Mongolia: JT1KAA, Box 639, Ulan Bator
Morocco: ARRAM, c/o M'Rabety Driss, CN8BH, 3 bis Rue Al-Farabi, Rabat
Mozambique: LREM QSL Bureau, P. O. Box 812, Laurenco Marques
Netherlands: VERON, Postbox 400, Rotterdam
Netherlands Antilles: VERONA, P. O. Box 383, Willemstad, Curacao
New Zealand: NZART, P. O. Box 489, Wellington
Nicaragua: CREN QSL Bureau, Apto. 925, Managua
Nigeria: NARS QSL Bureau P. O. Box 2873, Lagos
Northern Ireland: via Great Britain
Norway: NRRL, P. O. Box 21, Refstad, Oslo 5
Oman: ROARS, Box 981, Muscat
Pakistan: PARS, P. O. Box 65, Lahore
Panama, Republic of: LPRA, P. O. Box 9A-175, Panama 9-A
Papua. New Guinea: Box 204, Port Moresby
Paraguay: RCP, P. O. Box 512, Asuncion
Peru: RCP, Box 538, Lima
Philippine Islands: PARA QSL Bureau, P. O. Box 4083, Manila
Poland: PZK QSL Bureau, P.O. Box 320, 00-950 Warsaw
Portugal: REP, Rua de D. Pedro V., 7-4, Lisbon
Puerto Rico: See ARRL QSL Bureau this issue
Rhodesia: RSR, P. O. Box 2377, Salisbury
Romania: CRC, P. O. Box 1395, Bucharest 5
Rwanda: Box 663, Kigali
Samoa (American): D. E. Earnest, KS6DY, P. O. Box 1618, Pago Pago 96799
Scotland: via Great Britain
Senegal: Ch. Tenot, 6W8BF P. O. Box 971, Dakar
Seychelles: QSL Bureau, Box 191, Victoria, Mahe
Singapore: SARTS, P. O. Box 2728, Singapore 1
South Africa: SARL, P. O. Box 3037, Cape Town 8000
Spain: URE, Hortaleza 2, Madrid 4
Sri Lanka: RSSL QSL Manager, P.O. Box 907, Colombo
St. Vincent: QSL Bureau, P. O. Box 142, St. Vincent, West Indies
Surinam: VRAS, P. O. Box 566, Paramaribo
Sweden: SSA, Ostmarksgatan 43, S-123 42 Farsta
Switzerland: USKA QSL Bureau, P. O. Box 9, 4900 Langenthal
Syria: TIR, P. O. Box 35, Damascus
Tanzania: 5H3 QSL Bureau, P. O. Box 2387, Dar-Es-Salaam
Thailand: RAST, GPO Box 2008, Bangkok
Trinidad and Tobago: T&TARS, P. O. Box 1167, Port of Spain
Uganda: via Kenya
United States: See ARRL QSL Bureau in this issue
Uruguay: RCU, P. O. Box 37, Montevideo
U.S.S.R.: CRC, Box 88, Moscow
Vatican: HV1CN, Domenico Petti, Radio Station, Vatican City
Venezuela: RCV, P. O. Box 2285, Caracas
Virgin Islands: Graciano Belardo, KV4CF, P. O. Box 572, Christiansted, St. Croix, V.I. 00820
Wales: via Great Britain
Western Samoa: WS ARC, P. O. Box 1069, Apia
Yugoslavia: SRJ, Bulevar Revolucije 44/II, P. O. Box 48, 11001 Belgrade
Zaire: UZRA QSL Bureau, B.P. 1459, Kinshasa 1
Zambia: RSZ, P. O. Box 332, Kitwe QST

Technical Correspondence

(Continued from page 51)

Wondering if 400 volts of ac through a 25-kΩ resistor was a big enough jolt to discourage any possum, beaver, or woodchuck from raiding the garden, I decided to test the fence for "joltage" myself since I was wearing rubbers. Not the slightest tickle. Back to the greenhouse to measure the voltage, thinking the series resistor had opened up, but no, the voltage feeding the line after the resistor still read 400, and shorting the resistor to ground gave an arc, so I knew the resistor was okay.

Taking the voltmeter to the far end of the line, I got a reading of about 80 volts, so I started to follow the fence line around, taking spot readings, in spite of my being able to see that the line was solid and clear of all objects. I finally arrived at the start of the line — and there it was! When the fellow had installed the line he had started by putting in a turnbuckle with the thought perhaps of keeping the line taut by taking up on the turnbuckle. In fact, I had noticed it before and had even turned it, since I am a turnbuckle turner by instinct. At any rate, corrosion was the cause of the problem — one eye of the turnbuckle read 80 volts and the other eye read 400. Jumpering the turnbuckle with a piece of aluminum wire cured the problem and the fence charger was put back in service. There's been no trace of noise since. P. S. Apparently it took the capacitance of 175 feet of fence line to cause the charger to break down the insulating effect of the corroded turnbuckle. — *John Labaj, W2YW, 12 Park Place, Elsmere, NY 12054.*

Strays

I would like to get in touch with . . .

. . . Novices who are in their teens, to start a teen-net. WN1UAW.

. . . others who sell real estate for a living. K8EKG.

Correspondence From Members-

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

FRIENDLY OBSERVER

● I recently received a nice little card from an OO. He seemed to be of the opinion that I had a chirp. Me? A chirp? I couldn't believe it. I never had a report previously that I had a chirp. I asked the next two contacts I had, and one said yes and one said no (on two different frequencies 20 kHz apart). I got in touch with W1KBP, who helped me get my ticket, and had him monitor my transmissions. I then found out one of my two 80-meter crystals chirped like a bird. Well, many thanks to the OO who reported the problem and to W1KBP for helping solve it; but I think it would be a much greater help if more hams would give more honest reports — feelings be damned! That one bad report just might help prevent a notice from the FCC. Be honest! — *Scott Nowell, WN1VOG, N. Salem, NH*

MY ELMER IS GONE

● It was a cold January night in 1974. I nervously arrived at the home of Mr. Marvin Seimes, W2POL. I swallowed hard and gently tapped on the door. Almost immediately a warm, smiling, aged face appeared greeting me, a perfect stranger. We shook hands and I was led into his living room. There I was offered some refreshments as I was being shown all of Marvin's grandchildrens' photos. Marvin had a very unique way of calming my nervous bones, and before I knew it I was being led to a small nine by nine house in his backyard. It was there that I was to take my 5 wpm code test. The tiny shack was a real radio shack, the first I had ever seen. It was far from a modern shack, but it looked like it meant business.

There against one wall was a receiver that measured three feet wide by five feet tall. Marvin threw the switch and we listened to ships at sea. A picture hung nearby of a ship where Marvin had been "Sparks." He was a proud ham, cw his forte, and 40 wpm his idling speed. There was no microphone in this shack: only an old receiver, an old Hallicrafters transceiver, and a few "bugs."

Well, after a few minutes of demonstrating his equipment, all the while laughing almost constantly, this friendly and very proud man said, "Let's get down to business."

I passed my 5 wpm code test and bid Marvin a good night. In the few hours I spent in the shack with my Elmer, he had made me feel like a ham, a proud ham. I only feared that I could never fill his shoes.

I remember calling Marvin a few times with questions that he laughed at. However, I knew he wasn't laughing at me. He used his laughter to pacify me into believing that soon all this technical garble would come easy to me. His voice always urged me on; he always said, "When you get your General ticket, get a 'bug' and let the cw fly." He actually made me start to believe that one day I would be a General.

Well, it took me two tries at General and one at Advanced. I never even thought of quitting for my Elmer even in his absence was prodding me onward.

A while ago Marvin stopped in to see me at work. He had a young Chinese boy with him that he was tutoring in the arts of hamming. There we were, a 13-year-old schoolboy, a 37-year-old salesman, and a retired old man talking about our first love — ham radio. I guess that little get-together, the three of us laughing and talking, depicted ham radio as clearly as any book ever could.

Today I read that W2POL became a Silent Key. All of those fond memories flew past and as my body shivered in shock, I felt the warm hand shaking mine, the hand that flew at 50 words per minute for fifty years.

My Elmer is gone. I just had to tell somebody. — *Gary L. Feldman, WA2UGO, Poughkeepsie, NY*

COMPUTER BITS

● I read with interest in October *QST* that the FCC had granted special temporary authority for the use of the 8 bit ASCII code by hams communicating through Amsat Oscars 6 and 7. I hope this is the beginning of a trend by the FCC to integrate the growing ranks of computer hobbyists into amateur radio.

The last rule change by the FCC regarding the present 5 bit RTTY code was made in 1956 and met the needs of the hardware of the day. However, much has changed in electronics in the last 20 years.

I hope that the ARRL will continue to petition the Commission for further rule changes that will allow amateur radio to keep abreast of technology. — *James J. Martin, W8AQJ, Euclid, OH*

STRAIGHT KEY NIGHT.

● Having been a reader of *QST* for over 50 years, and a licensed amateur for 48 of those years, I have observed that you do take suggestions from individual members of the ham fraternity/sorority and I would like to offer one now: Move Straight Key Night from December 31st to December 30th.

Apparently, whoever selected December 31st was of the opinion that those of us still interested in straight keys were too old and fossilized to want to celebrate New Year's Eve in the conventional manner: i.e., with family and/or friends. Moving SKN to December 30th would make it possible for those of us who still enjoy using our old brass to communicate with others of our kind and still celebrate New Year's Eve in the more socially accepted manner the following night.

I am sure that moving the starting time for SKN ahead 24 hours would result in greatly increased participation in SKN. Moreover, it might also result in fewer "slurred" fists being heard because fewer of the participants will be trying to "celebrate" and participate in SKN simultaneously. Perhaps

other brass pounders would like to express their opinions on this subject. *Russ Bennett, W6DTJ, Sacramento, CA*

● I am writing to you to support the proposal of Bob Mauro, WB2UHY, to have an A-M Phone Night for three hours twice a year following Straight Key Night. As a-m is our heritage we must not let it die! As you know, a-m is still prevalent on 160, 75 10 and 2 meters and some of us want to keep it that way. Thanks – *Arthur Eckman, WA2ECI, New York, NY*

'TIS BETTER TO RECEIVE

● Once in a while an article appears, the knowledge of which can lift our hobby by its bootstraps. Such an article, on receiver evaluation, appeared in *QST* for July 1975. Wes Hayward, W7ZOI, is the author.

Using methods outlined by Wes, ARRL could analyze *Handbook* and currently manufactured receivers and transceivers and publish comparative data in *QST*. Future designs, both manufactured and homebrewed, could be analyzed, and updated comparative data published in *QST*.

Such a program by ARRL would make manufacturers strive harder to produce better receivers for our crowded band conditions and would provide impetus to homebrewers. I intend to build a receiver at the present time. As Wes says, "You can build a better receiver than you can buy." – *Vic Cassman, W6OR, Berkeley, CA*

OLD SOUNDS

● Having been a licensed ham since 1957, I have developed a curiosity as to what the bands, particularly 20 meters, sounded like before the second world war. I've read many articles about the earliest days of ham radio but don't recall ever reading a reminiscing description about the nature of the bands in the 1930s. I would certainly enjoy it if one of your older readers would write an article telling us about the "big guns" both stateside and DX. – *Mark N. Busch, W2GRD, New Brunswick, NJ*

HIGH FREQUENCY FAX

● This item may be of interest to those amateurs who are interested in amateur facsimile.

The following six amateur stations have received special temporary authorizations (STA) to experiment with facsimile on the high frequency amateur bands. The STA expires June 6, 1976.

K6DYX, W. C. Smith
WA6WUI, Howard M. Krawetz
WB9AOU, David J. Nicolaus
WA9HCZ, Jerome C. Grokowsky
W9HWQ, Duane R. Fruchte
W9LFH, Ronald J. Knapp

The emissions are restricted to those portions of the hf bands where SSTV (A5 and F5) is now authorized.

Two nets have been organized for technical exchange and experimental facsimile transmissions. One is on 20 meters at 2100 UTC Saturdays, Sundays and Wednesdays; the frequency is 14.235 MHz. The other net is on 75 meters at 0000 UTC Tuesdays, Thursdays, and Saturdays (7:00 P.M. Central time Mondays, Wednesdays, and Fridays). The frequency is 3.841 MHz.

We are using the Western Union "Deskfax" machines (180 RPM) and A4 and F4 emissions.

Amateurs are invited to listen for these experimental transmissions and we will appreciate any reception reports in the form of facsimile copy showing band, date, and time of reception. – *Jerome Grokowsky, WA9HCZ, La Crosse, WI*

LICENSING DELAYS

● For the sake of keeping this short, I will try not to take as much time as it takes the FCC to move. I requested forms for upgrading in February, 1975, and took the test April 30. I received notice that I passed on June 5 and as of this date, September 5, I have not received my revised license.

During a call to the Detroit office this week, I was told, "It's in the mill; Gettysburg is working 7 days a week." In the meantime, my own personal incentive program is fermenting into frustration.

The point is that February to September (I hope) sure seems a long time to me. How in the world would the FCC handle the increase in paper work if they expanded the number of classes of licenses? – *Craig W. Leslie, W8KNZ, Cincinnati, OH*

● When a person passes his driver license exam, a driver permit is issued to him, valid until he receives his license.

When a Novice, Technician or General upgrades to a General or higher, why can't he be issued a permit by the local FCC office authorizing him to operate immediately with his newly earned privileges? His call letters and all pertinent information are already on file at FCC headquarters. Why is he made to wait until his new license is sent to him – a waiting period of between two and three months!? – *Edwin Hill, WB5PJO, Kaufman, TX*

● I recently received my Novice license and submit the following facts for your information: (1) License received 10 weeks and six days after test was mailed. (2) License received 28 days after the effective date appearing on license. (3) Received promotional material from commercial printers eight days prior to receiving license from FCC. – *Donald G. Howell, WN3ACE, Baltimore, MD*

● Recently I passed the exam for my General license and was informed that because of a back up of applications in Gettysburg, there would be a three to four month delay before my ticket would arrive.

It would appear to me that all other government agencies have some kind of temporary arrangement for this kind of a situation, and why not for amateurs? Why cannot some form of temporary call letters be granted immediately following the exam? These could be used until the final call letters arrive, thereby eliminating the need for the long wait. – *Norman Kutcher, WN2WJE, Verona, NJ*

● After reading "Licensing Delays," page 9, October 1975 *QST*, I must let you know that the FCC box address is much faster. I obtained my Novice ticket in 4 1/2 weeks.

So thanks for placing the box address in *QST*. It could have been much longer and I could have been less enthusiastic about ham radio. – *Jerry L. Dycus, WN4BVC, Brunswick, GA*

[EDITOR'S NOTE: As this last letter indicates, service has improved greatly since the advent of FCC's new box number. Remember, amateur applications and renewals go to FCC, P.O. Box 1020, Gettysburg, PA 17325.]

Happenings of the Month

K3BNS BACK AT AMATEUR DIVISION

John Johnston, K3BNS, is back at the Amateur and Citizens Division of FCC, now as its Chief replacing A. Prose Walker, W4BW, who retired in July. John has recently been deputy chief of the Spectrum Management Task Force in the Office of Chief Engineer. From 1972 to September 1974, he'd been chief of the Rules and Legal Branch of the Amateur and Citizens Division, the position now held by Joseph Johnson, W3GGO. (Chance for real confusion, eh? "Which JJ initialed the memo, and when?")

Prior to joining the Commission, John held various engineering positions in research and development projects with RCA, General Electric Company and Sperry Rand Corporation. His BS degree was in electrical engineering, taken at Ohio University in Athens.

K3BNS is a Charter Life Member of ARRL, past president of the Frankford Radio Club and the Penn Wireless Association, and he's written quite a few articles on radio for the popular press. John and his wife reside near Derwood, Maryland and have two grown sons.

NEW BANDS IN THE GIGAHERTZ RANGES

The FCC Table of Frequency Allocations has been realigned for the frequencies in the microwave region above 40 GHz, so as to conform to the decisions reached at the 1971 World Administrative Radio Conference for Space Telecommunications. The new assignments, effective November 14, are exactly as proposed in Docket 19973 in March, 1974.

These frequencies are:

48 to 50 GHZ
71 to 76 GHZ
165 to 170 GHZ
240 to 250 GHZ

all primarily to the Government Radiopositioning Service, shared on a secondary, non-interference basis by the Amateur Service.

Also, the Table allows amateurs to use all of the frequencies above 300 GHz and this is explained in the Order:

> ". . . Also, since no equipment capable of operating at frequencies above 300 GHz is expected to be available in the foreseeable future, neither the ITU, the Office of Telecommunications Policy (OTP) or the Commission suggested any allocations there. Instead, we have followed our usual practice of allowing amateur stations to operate on these unallocated frequencies."

This last allocation may seem like more of a "white elephant" than a useful gift, until we remember that the scientific and business worlds had not much use for "200 Meters and Down," back in 1912! Do we accept the challenge, to make the "World Above 300 GHz" equally useful?

BEHIND THE DIAMOND

", . . in his many travels for the League, he wins many friends for the organization . . ." It was thus that the ARRL Board of Directors commended *LEWIS G. McCOY, W1ICP*, at its January 1975 meeting. Our featured subject this month prefers the nickname "Mac," and no one can deny that his honesty and frankness in discussing League affairs has created many long-time ARRL supporters.

Mac, first licensed in 1946 as WØICP, held the positions of Assistant SCM for Missouri and Net Control Station for the Missouri amateur radio communications network (the prehistoric term for phone net). He arrived at Hq. in 1949 to fill a slot newly created by the Board of Directors – Assistant Communications Manager for Phone. Ironically, one of Mac's first assignments was the sending of code practice over W1AW. After a couple of years in the Communications Department, Mac moved over to the Technical Department where his latent talent came to the forefront – his ability of explaining technical concepts in simple terms easily understood by newcomers to amateur radio. As Technical Assistant he wrote over 200 beginner and Novice articles for *QST*. It wasn't until 1965, however, that the position of Beginner and Novice Editor was created, and, of course, Mac was the natural choice. In June of this year, he was promoted to Assistant Technical Editor of *QST*.

Our new FCC amateur division chief (see story), John Johnston, K3BNS, (second from left) visited the Shenandoah Valley ARC hamfest recently, where he chatted with John W. Weaver, Jr., WB4SXJ, the club president (far left); J. William Miller, K4MM, president of the Foundation for Amateur Radio; and Virginia Pinkerton, K4SHE, new editor of the Foundation's famous publication, *Autocall. (Photo by Lamp's Photography, courtesy of K4SHE)*

Mac does so much traveling for the League that it's often hard for other staff members to find him when they want to. He started to earn his "traveler" reputation back in the early 50s. It was then that television was becoming accepted commercially and TVI was the amateur's most vexing problem. Mac became the League's expert on TVI and soon was touring the country, lugging monstrous TV sets with 13" screens, giving TVI demonstrations to both amateurs and TV servicemen.

Mac is married and resides in Simsbury, Connecticut, with his wife, Martha. They have two daughters – Marsha, W1JAQ and Sharon, ex-WN1GQR. When he's not chasing new DX (He's already worked over 300 countries!), he enjoys making jewelry, reading science fiction, gardening, and astronomy. He has also written articles for the boating magazines *Yachting* and *Rudder*.

Mac's primary responsibilities these days are the editing and writing of technical articles. He also writes "Repeater News", serves as Hq. Liaison for the VHF Repeater Advisory Committee, and continues to travel extensively. One point that we forgot to mention is that Mac is also an amateur magician. His favorite trick is making refreshments disappear!

FEWER COPIES FOR FCC

About two years ago, Gary Stilwell, W6NJU, filed a rulemaking request, asking the Federal Communications Commission to delete the requirement that an original and 14 copies of comments made be sent to FCC during rulemaking. Gary lost "the war" – FCC claims as many as 20,000 comments have been filed in a single proceeding, and thus it couldn't possibly generate all the needed copies in house – but he did win a battle: only an original and eleven copies will henceforth be needed! More importantly, FCC reaffirmed what we've said in this space many times:

> ". . . Moreover, the copy requirement should not deter the submission of comments. In rulemaking proceedings, the Commission is interested in getting full information and the best thinking possible from the public before making a decision, and does not reject comments on narrow technical grounds. Compliance with the copy requirement is helpful to the Commission and is encouraged. However, if the duplicating cost is a deterrent, a single copy should be submitted. The single copy will be placed in the docket."

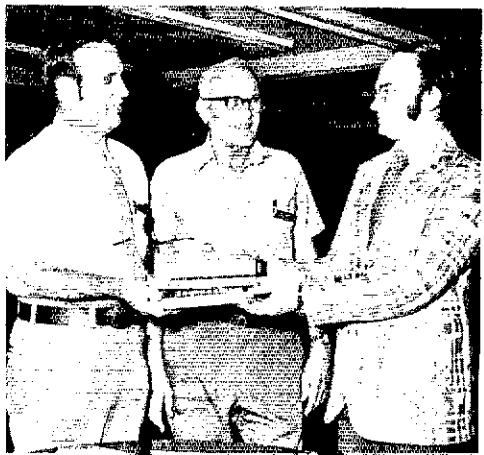
It follows, however, that a single copy will not circulate as widely within the Commission as one which follows the rule, so where possible it is helpful to FCC and useful to the Amateur Service to file an "original and eleven."

HALF CENTURY AFFILIATES

In October, 1975, the following clubs were awarded special certificates commemorating more than 50 years of ARRL affiliation:

Atlanta Radio Club, Inc., GA
Bronx Radio Club, NY
Chicago Radio Traffic Association, IL
Dartmouth Amateur Radio Association, NH
Houston Amateur Radio Club, TX
Huron Radio Club, SD
Memorial Student Center Radio Club, TX
MIT Radio Society, MA
Providence Radio Association, Inc., RI
Radio Association of Western New York, NY
Radio Club of Tacoma, Inc., WA
San Antonio Radio Club, TX
South Jersey Radio Association, Inc., NJ
Stanford Amateur Radio Club, CA

(Continued on page 146)



Another library gets a set of ARRL publications, this one in Portsmouth, Ohio. Portsmouth ARC President James Hodgen, WN8QPV and Secretary Treasurer Earl S. Keevil, WB8GVU present the books to Charles T. Cook (right) acting head librarian. Has your club taken advantage of the very special $17.50 deal yet? *(Portsmouth Times photograph)*

YL news and views

CONDUCTED BY LOUISE RAMSEY MOREAU,* W3WRE

Ladies' Aid

WHEN William Wordsworth wrote about "those little nameless, unremembered acts of kindness," he might well have been defining the help that so many of us have received from another amateur. This boost comes not only as that "big lift" we are given in getting on the air, but also as those extra helping hands which YLs have adopted as part of their activities.

Canada's YL clubs are noted for their assistance to sightless amateurs. Their efforts to bring amateur radio into the veterans' hospitals through code and theory classes have opened a new outlook to many permanent patients.

Here in this country the YLRL "Adoptee Program" has long been a method of cutting the red tape of international monetary exchange to enable DX women to become YLRL members. More recently "Tape Topics," the second major permanent activity of the club, has made *YL Harmonics* and the YL News and Views column in *QST* available to all blind YL operators in this country.

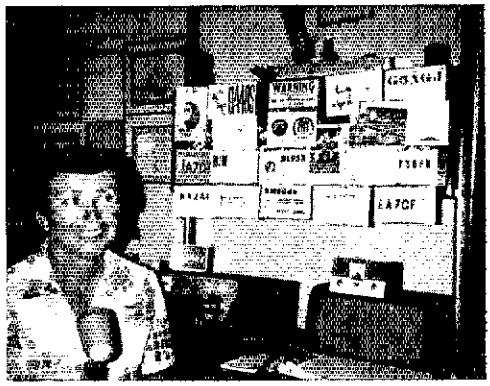
The many women who participate as a part of the Handicapped Net and Handi-hams have been not only helping the members, but in many cases have been responsible for special gadgets to facilitate operating.

Across the country the ladies of the three MARS services have been devoting much of their on-the-air time to phone patches and message handling between service men and their families. YLs are setting special schedules so that foreign students in this country are able to talk with their parents in Central and South America.

YLs, such as Darleen, HC2YL, have not only helped arrange the transportation of orphans to their new homes here in the United States, but have also traveled with them to assure safe arrival. The members of YLISSB give countless hours working to spread international friendship through their global system. Still others teach code in beginners' classes or introduce amateur radio through demonstrations in schools.

At the end of the year, we may sometimes pause to wonder if we have accomplished very much, but through our clubs and nets we have done much to benefit others while we personally enjoy the privileges of amateur radio.

* YL Editor, *QST*. Please send all news notes to W3WRE's home address: 305 N. Llanwellyn Ave., Glenolden, PA 19036.



WA5HZL, Jean Pajares.

Another YL First

The Ontario Trilliums Ladies Amateur Radio Club assumed the duties of the ARRL VE3 QSL Bureau in August of this year. This is the first time that a YL club has assumed the duties of QSL manager.

The Bureau was formerly operated by VE3UW who resigned because of ill health. All the envelopes that were on file with VE3UW will be used. Any incoming envelopes that are sent to the VE3 QSL Bureau should be addressed to the new address: The Ontario Trilliums, P.O. Box 157, Downsville, Ontario, Canada, M3M 3A3.

Multilingual DX Chaser

Like many other amateurs, family interest sparked WA5HZL's curiosity about amateur radio. After observing the on-the-air activities of her uncle and aunt, Jean earned her call W5JJK in 1940 when she was 16 years old. A subsequent move to Peru changed the call to OA4HK, and it was there that she earned DXCC, WAS, WAC, WAC-YL, WBE, DXYL, DUF/1, TPA, and RCP certificates. In 1962 Jean and the OM, Luis, OA4JF, returned to the United States, and she was given the present call WA5HZL.

She has taught Spanish for 8 years and particularly enjoys working DX using her linguistic ability in Spanish, French, Italian and Portuguese. Jean and Luis, now an American Citizen with the call WN5JKL, have two sons who, according to her, have not yet shown any interest in amateur

Marge Campbell, K4RNS, custodian of the Floridora YL Certificate. Marge is also the eastern membership chairman for YLRL.

radio. "But," says Jean, "it won't be long with it the main topic of our conversation." When not chasing DX on 15 meters, Jean's hobbies are golf, bowling, and fishing.

Contest Reminder

Beginning January 1976, the logs for the first of the YLRL sponsored contests for the year, DX YL to North American YL, should be sent to Beth Newlin, WA7FFG, 826 W. Prince Road-06, Tucson, AZ 85705. The 1976 YLRL vice president will also be the club contest custodian.

This contest is for women amateur radio operators only. Here is an excellent opportunity for the gals to make the necessary contacts for the YLRL certificate DX-YLCC and the CLARA sponsored DXCC-YL, since the women in other countries will be looking for contacts in this newest of the contests. Cw portion is January 14 & 15, 1976, UTC; phone, January 28 & 29, 1976, UTC. Full rules and operating times are listed in Operating Events, *QST*.

Listed in Who's Who

Jane Jones, K3ZDN, an active member of PJ-YL Club, was honored recently when she was included in the 9th edition of *Who's Who of American Women*, 1975-1976. Among Jane's listed activities are those as librarian in the Free Library of Philadelphia, 1941-42; in Bartlett Junior High School, 1942-54; and from 1954 to the present at Fels Junior High School in Philadelphia.

K3ZDN is a former third district chairman of YLRL and has been both president and secretary in the Penn-Jersey YL Club. As unofficial club photographer, she records activities for its historical archives.

A member of YLRL and ARRL, Jane spends most of her on-the-air time on 20 meters ragchewing with a friend in Switzerland. Fluent in several languages, Jane particularly likes to work DX.

Note New Date

Effective January, 1976, the new deadline for news of YLs will be the 10th of each month. All pictures and information of YL activities should be received by this column by the tenth of any month. Reports received later than deadline time will be included in the next issue.

It is also requested that all YL clubs send their contest rules to Ellen White, W1YL, to be included in *QST* Operating Events.

Requirements Change

The Floridoras, Florida's statewide YL club, has announced changes in the requirements for the Floridora Certificate. Because of the lack of operating by club members on frequencies other than local bands, the number of contacts made by amateurs in this country has been changed.

Certificate requirements effective from September, 1975, are: contacts with five (5) Floridora members. DX amateurs also must show contact with five (5) members. Stickers will be awarded for each five (5) additional contacts after the certificate has been awarded. There is no charge for this certificate, but return postage is requested.

Mail list confirmed by two other amateur radio operators (preferably radio club officers if possible) to the Floridora YL Certificate custodian, Marge Campbell, K4RNS, 65 N. Arbor Drive, Ormond Beach, FL 32074.

Maritime Sparkettes who attended the 1975 Atlantic-Canada Radio Convention were: seated, Chris Haycock, WB2YBA, 1975 YLRL president; standing l-r, Margie, VE1YU; Gernen, VE1BCB; May, VE1AMB; Jean, VE1YW; Joan, VE1APL; and Judy, call not given. *(Photo courtesy of WB2YBA)*

The World Above 50 Mc.

CONDUCTED BY BILL TYNAN,* W3KMV

THE FINAL month of the year is usually considered to be the time for summing up the events of the past year and looking ahead to the next. In this tradition it seems appropriate to devote some space to looking over the accomplishments in the world above 50 MHz for 1975 and for doing some speculating on what may transpire in the coming months.

The great strides of EME, particularly the increased number of stations using the mode on 2 meters, were probably the most notable trend this year. Contributing significantly to this popularity was the operation of WA6LET using the SRI 150-foot dish. Although necessarily confined to a few weekends only, many would-be moonbounceers were treated to their first taste of what EME has to offer and were spurred on to improve their installations to the point where they could work lesser equipped stations. What impact this mode has had on 2-meter operation can be gleaned by comparing the states-worked boxes appearing in the November and January columns. New calls like WA2BIT, W4DFK, K5VWW, WB5LUA and WA7KYZ now appear with substantial totals. And that's just the tip of the iceberg! Many other stations now active on 2-meter moonbounce are just getting well established and thus do not yet appear in the states-worked box.

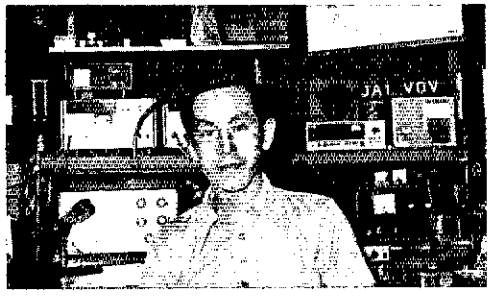
Nor was EME action confined to 2 meters. The 70-cm contingent was not to be outdone. As reported in the monthly 432-MHz newsletter of K2UYH and VE7BBG, new stations are appearing each month. DX is very much in evidence with calls such as JA1VDV, F9FT, ZE5JJ, SM5LE, OZ9CR, PAØSSB, LX1DB VK2AMW and Gs 3LTF and LQR regularly listed on the sked sheet. Numerous contacts have been made including some very long hauls such as Britain and France to Australia. Many stations are experimenting with circular polarization and variable polarization in order to overcome Faraday rotation.

In the months and years to come, EME can be expected to increase in its importance in the world above 50 MHz. In order to provide a chronicle of the accomplishments made via this mode, the November issue carried for the first time an EME standing box. The information which we were able to piece together for the box's first appearance was quite sketchy but future listings will certainly more properly reflect the true moonbounce picture and provide a gauge of progress. Though such a prediction may now seem wild, the appearance one of these days of an EME-DXCC would not be surprising. That a 2-meter WAS is not too far away is evident, with KØMQS now claiming 48 states worked and several other stations hot on his heels. Such record accomplishments such as DXCC and WAS above 144 MHz would not be possible with conventional terrestrial techniques.

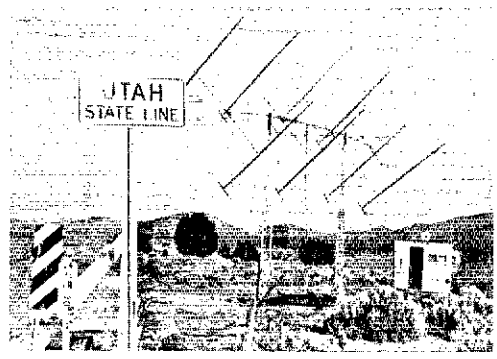
Unless the next sunspot peak is better than the last one, 6-meter operators may have to resort to the moon to complete WAS on that band as well. A few 6-meter EME pioneers have proved that it can be done. Now it's up to the rest of us to capitalize on it. All that's needed is 6-meter EME activity in KH6 and KL7 and just watch how many hungry 50 MHz-WAS hunters will follow suit. Other modes of propagation also made headlines in 1975. It was quite a good year for tropo, particularly the tremendous openings across the Gulf of Mexico at the beginning of the year. The 2-meter fm contingent had a field day with the ducts that formed resulting in a number of 70-cm QSOs as well as a new terrestrial record on 23 cm with K4NTD on the Florida end working Houston stations K5LLL and W5LDV. The record went to K5LLL by a few miles. Just how high in frequency such work can go will hopefully be determined during similar openings in future years.

Sporadic E also made news with 6 meters having a good summer season, but the real E_s news was on 2 meters. The band was open on several occasions during the summer with the red letter day being July 20th. On that Sunday afternoon, the whole eastern half of the country was treated to conditions which will be long remembered.

*Send reports to Bill Tynan, W3KMV, P. O. Box 117, Burtonsville, MD 20730 or call (301) 384-6736 and record your message.



One of the successful 70-cm moonbounce contingent is JA1VDV.



The K6YNB/7 2-meter EME operation from the Nevada/Utah border. The 2 towers supporting the 8 Yagis are mounted on a modified catamaran trailer.

Numerous contacts were made with very strong signals by stations running only a few watts. New and veteran operators alike were amazed, and many state totals took significant jumps.

If tropo and E_s were good, they were balanced by the lackluster performance of aurora. This low point in the solar cycle produced few buzz sessions and only one or two that could be called "good." One thing that can be predicted with reasonable certainty is that better years are ahead in this department.

A trend beginning in 1975, almost certainly to be felt increasingly in the coming years, is the effect on vhf/uhf operation of the availability of a number of types of commercial ssb/cw transceivers. Both fm and long-haul, weak-signal work benefit from such a shift. With fm repeaters less crowded, they can better serve the function for which they are well suited, that of providing a communications channel always available when needed. On the other hand, the increased activity on ssb, cw and am should help in taking better advantage of good propagation conditions when they exist.

Not yet known is the effect of new license proposals advanced by FCC in Docket 20282, but there will certainly be one. On the darker side loom the attempted raids on our bands above 50 MHz. Everyone is familiar with the proposal to reallocate a portion of the 220-MHz band to CB, and we don't yet know the outcome of this proposal. In addition, there have been suggestions from some quarters for creating a new vhf TV channel out of our 6-meter band. There is continuing pressure on our 420- to 450-MHz band particularly from radiolocation devices for use in offshore oil and gas exploration.

Thus, like most other aspects of our complex contemporary lives the world above 50 MHz offers a mixture of the hopeful and the ominous. All we inhabitants of it can do is make the best of what we have while continually working to improve our lot.

Controversy over EME Reporting System

In the October column, we discussed the "TMO-5" EME reporting system and the recommendations made concerning it by the moonbounce forum held at this year's Central States Vhf Conference. Briefly, the group urged that a common system be used for all EME work and that the system employed on 70 cm be adopted as the standard. Previously the system used on 70 cm has been somewhat different than that used on 2 meters. Summarizing the differences and similarities: on both bands *T* signifies that snatches of signals are being heard – enough to tell that there is something there but not enough to copy full calls. Likewise, the definition of *O* is the same on 2 and 70 cm: it indicates that full calls are being received and that signals are all but good enough for transmission of a standard RST report. The difference comes in the use of *M*. On 2, *M* has denoted that the signal is better than would be indicated by merely stating that it is possible to detect a signal, but it is not strong enough to permit copying complete calls. The 70-cm EMEers use *M* to convey the information that while too weak to send an *O*, the signal is, nevertheless, strong enough to copy full calls. Since reporting these recommendations, we have had a number of comments from active 2-meter EME operators who were unable to be present at the forum to voice their opinions. One who has written is W4DFK who, although in attendance at the conference, says that he was forced to leave before the EME forum in order to start the long drive back to the East Coast. Dana feels strongly that the 2-meter system makes more sense and that it should be adopted as the standard. He suggests that a poll of active EMEers be taken in order to get a wider sample. If you are active on EME, please pass along your thoughts on the matter. We will tabulate the responses and publish the results in a forthcoming column.

Midwest Division Convention

It was a distinct pleasure to be invited to address the Midwest Division Convention held this year in Lincoln, NE. Many of those attending appeared to be very interested in the goings-on in the world above 50 MHz and it is hoped that some new converts resulted. The hospitality shown me by those in charge of the convention was truly marvelous and I enjoyed myself fully.

On the Bands

6 Meters

The old band dies hard. One doesn't normally expect good E_s openings in late September but we in the middle Atlantic states, were favored with S-9+ signals from south Florida on Sunday, Sept. 28, at about 1400Z. Only 2 stations were heard at this location, but they both had good signals and were in for about an hour. An OVS report from WAØMRH confirms the period to be active. John notes that 6 meters was open to California from his Omaha, NE, QTH from 2055 to 2145Z. He worked WB6ECD/6 and heard WB6ECC. Two days later he heard 4s working 9s between 1345 and 1415Z but did not contact anyone on that occasion. WA1OLK's OVS report adds more on this late season E_s flurry with information that 8s, 9s, and Øs were workable from Spencer, MA, on Sept. 27.

On another mode of propagation, WA5IYX of San Antonio, TX, reports that the F_2 muf went

above 50 MHz Sept. 9. Commercial signals were heard from the south but no amateur stations were identified. Pat's summary for September lists the muf as above 35 MHz on 15 days, over 40 MHz on 6 days and up to 50 MHz on one day.

Let's hope that this portends better things to come. It's not too soon to start encouraging stations to get going on 50 MHz, particularly those in areas where F_2 propagation should be good such as the Caribbean, Central and South America. One already doing this is Ray, K5ZMS, who has been spreading the good word on 10 meters. He writes that LU2DEK is already on and has heard the TI2NA beacon. YN1FWN is reported to be about ready to go. Another known to be on, but so far not able to hear anything is OA8V. Paul cannot currently tune above 50.23 MHz. South American operators take note.

In another part of the world, JA1PLI provides an insight on 50 MHz in the Far East. Yoshi, who has been at 6-meter DXing since the heydays of the late 50s, says that conditions are off this year; nevertheless, he managed contacts with VS6BE, Hong Kong; JD1YAA, Marcus Island; H19WI and HM1FJ, Korea. Also he heard the KG6APP beacon on Guam.

Occasional reception of the Brisbane, Australia, Channel 0 sound transmitter indicates that 6 meters is not completely dead. Unfortunately, one of the best indications of band openings from VK to JA, the VK8VF beacon in Darwin has been off the air since a cyclone hit the area last Christmas Day.

W1HDQ makes a plea for a concerted attempt to exploit east-west E_s paths during next summer's season. Ed feels that we are missing a lot by not establishing an organized effort to collect data on transatlantic E_s propagation. He suggests that we transmit on both 50 MHz and 28 MHz on a regularly scheduled basis and ask Europeans to listen for us. Two-way testing could, of course, be arranged on 10 meters but unfortunately not on 6. A good time to start planning such an effort would be now. Any volunteers?

WB8LNF of Blanchester, OH, is back on 6 after a 12 year absence. Jerry says that he is amazed by the greater effectiveness of the ssb equipment used today in comparison with the am gear of the late 50s and early 60s. To take advantage of this, he would like to set up regular skeds with stations out to about 200 miles. He can be reached at 5230 Ash Grove Ave. Many other letters speak of low activity when the band isn't open. Regular schedules are one way of combating this. We'll have some other suggestions in the months to come.

2 Meters

Tropo provided the principal source of operating activity for K7ICW of Las Vegas during September. On the 225-mile path to Phoenix, AI was able to copy the 12-watt, ssb signal from WA7FPO. A notable first was working K7CVT in Tucson, a distance of 410 miles. On Sept. 28 AI notes that conditions were so good that he worked WA6JRA with his beam pointed toward Arizona. K7ICW notes that his EME project is progressing well. He has some more mechanical work to do before getting the 80-element collinear up, but in the meantime, he is beginning sun-noise tests. It looks as if it won't be long before we have regular moonbounce activity from Nevada.

One EMEer who would probably welcome regular activity from Nevada is K6YNB. That way he won't have to go back there next year. What about Utah, Wayne? Everyone still needs that one! The K6YNB/7 "EMExpedition" did have its troubles of the sort that usually plague operations away from home, but when paraphernalia necessary for moonbounce are involved, the trouble probability multiplies many-fold. Despite this, K6YNB/7 on the Utah/Nevada border did manage QSOs with K1WHS, WA7KYZ and K3RYL. Good signals were copied from K2RTH, WA2BIT, WAØCHK, VE2DFO, WA7BJU, and SM7BAE. WA2BIT and WA7BJU were able to copy complete calls from K6YNB/7 but unfortunately not at the same time that they were being received. The 2-meter state hunters, no doubt, appreciate Wayne's considerable effort in their behalf.

Another station approaching EME capability is K3QCQ in Pennsylvania. Bill is running sun-noise tests and is making some modifications to his array in order to optimize the pattern. WA4CQG Auburn, AL reports hearing K1WHS for about 90 seconds at 0203 Sept. 18. Because of the fading characteristics, Dale does not think that the propagation was m.s.

The tropo opening at the beginning of September, reported last month, was apparently very widespread. For example, using 12 watts of fm feeding an 11-element beam at 45 feet, WBØGZR near Kansas City worked 7 states, the farthest contact being WA8PIE in Michigan. For about the same period, copies of two log pages from W3GN/8 on the northern peninsula of Michigan show QSOs throughout Michigan, Ohio, Wisconsin, Indiana and Illinois. Many were accomplished through repeaters but some were on simplex.

If conditions during the September contest were only so-so in most places, they were quite good in the Pacific Northwest according to K7ZCB. Dave reports hearing W7FHZ working (from a 7000 foot vantage point) all over Oregon, Washington and possibly into British Columbia.

The Northeast Vhf Association has voted to make Monday nights the time to concentrate on 2 meters. Time is 2100 local and primary frequency is 144.110 with a conscientious effort to also look above 145 MHz. Speaking of regional activity, the Tidewater net continues to meet on 145.025 at 2100 local time on Tuesdays. The 6-meter net meets one hour earlier on 50.150 MHz. Stations within range of the Norfolk, VA, area are urged to check in.

WB6RVE of Duarte, CA, would like to set up fm simplex schedules with stations in Arizona and Baja, California. Normal frequencies are 146.64, 76 and 94.

1¼ Meters

WØKZT reports that St. Louis, MO, now has a 220-MHz repeater. It's on 223.34/224.94 with 5-watts output. From atop a 20-story building, the coverage is quite good. In Austin, TX, a number of the gang are putting URC-11s on 223.5 MHz. WB5HRT, WA5HLE, WA5RON, WA5ZBN and WB5HRI are already on. The *Rocky Mountain 220 News* is being published by KØOST, ex WB8IDD. To receive a copy send an s.a.s.e. to Box 842, Denver, CO 80201.

70 cm and Down

A difficult place from which to work 70 cm is the California desert but that doesn't stop WA6EXV. Located at Ridgecrest near the Navy's China Lake facility, Chuck maintains regular sched-

(Continued on page 98)

How's DX?

CONDUCTED BY ROD NEWKIRK,* W9BRD

When:

The record-shattering 1938 'round-the-world flight by Howard Hughes, ex-5CY, merits recall beyond our terse reminiscence of last month. It turned out to be much more than the sensational headline-grabbing airplane stunt so common in those years.

Lindbergh's solitary '27 transatlantic triumph was then still a booming echo, the Pacific tragedy of Amelia Earhart barely one year old. Yet aviation's daredevil DX days were clearly numbered. It was inevitable that the machines should soon overshadow and transcend those who flew them. Time had come when there no longer was justification for bungled navigation, slipshod meteorology and haphazard communications. The precisely planned and executed Hughes venture did much to push seat-of-the-pants aerial adventuring into the dusty attic of history.

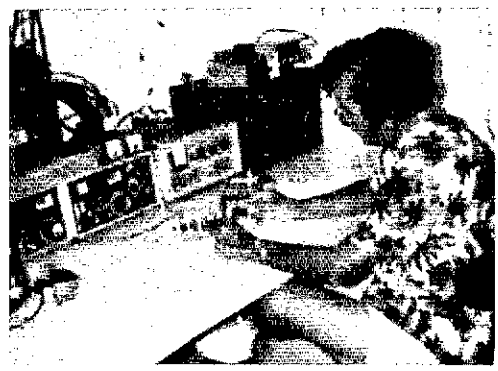
Flight headquarters was established at the New York World's Fair where W2GOQ was operated under the supervision of ground communications chief Perrine, W6CUH. Thomas, W2UK, was on the job at his potent DX installation in nearby Quogue, sometimes keying W2GOQ by remote control. Evans, W4DHZ, manned the famous W6CUH layout at Hermosa Beach. Effective beams, transmitters and National HRO receivers enabled ground stations to work each other as necessary, crossband or otherwise, on 7 and/or 14 MHz. Contact with the plane was amazingly reliable.

Prominent communications expert Dick Stoddart, responsible for the whole wireless bit, flew with HH aboard the Lockheed. The craft was fitted with a neat 100-watt multifrequency rig specially designed and built by the Hughes Aircraft Company, another hundred-watt Bendix for backup, and a beautifully compact (for those days) 15-watt emergency station. Two Bendix supers did the receiving, and accurate antenna lengths were reeled out through the ship's tail cone. Rugged and dependable direction-finding equipment was aboard.

Leaving nothing to chance, the ground network labored hours on end working DX at 30 wpm to collect, compile and deliver highly refined up-to-snuff weather data for every leg of the odyssey. A neat piece of technical trailblazing, indeed. Ever the organizer, Howard Hughes really got it all together, as today's young squirts would say. And amateur radio was there.

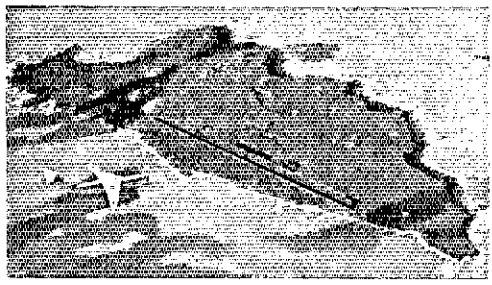
What:

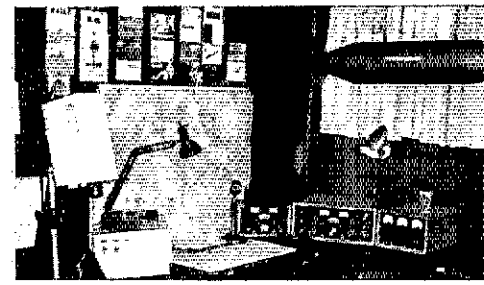
160-meter time it is for sure this month. QRV for your annual ARRL top-band Test? Just load up the nearest substantial chunk of metal and see what comes back. With higher-frequency bands swooning by nightfall as we sink lower and lower on the sunspot curve, the ranks of 1.8-MHz folk swell noticeably. DX life on old 160 doesn't stir till twilight when all of a sudden a "dead" band starts to sound like 40 on Saturday night. The faithful already are packing their logs with DX items per the new season's transoceanic tests announced here by W1BB and friends last month. Ws 1BB 1HGT 2HUG 4WFL 5RTQ 6BYB, WAs 2YPO 3SWF and VO1KE take time out to tell us of 1.8-MHz activity by CO2KP, CP1EU, CX3BH, DJs 3BJ 5PN 6QT/CT3 6SI/I3 6TK ØYD, DK3BJ, DL7HA, EIs 1AA 2BB 91, EP2BQ, FP8AA, FYs 7AA ØBHI, Gs 2CIL 2HDU 3AAQ 3BFP 3LIQ 3OQT 3RBP 3RCE 3RCQ 3SZA 3UBR 3UEG 3UTC 3VMU 3VYF 3XAP 3XVY 3XZK 3YRA 3ZFM 3ZYY 4AFS 4BNO 4DPT 5WP 6BQ 6CJ, GC3SVP, GD4BEG, GI5UR, GMs 3KRH 3YCB 4AGG 4ASY, GW3UCB, HBs 9AQA 9CB 9NL ØNL, HC1s CW XG, HH2WF, HI8LC, HKØBKX, HP1XJB, HR2HH, HS1AHM, I2XKF, JAs 1MCU 2GQO 2UEO 3AA 3ONB 3PNP 5DQH 6GG 6WGE 7AO 7NI 9FOC, KGs 4AO 6APP, KH6s BZF CHC, KL7S FA GCH GKY, KPs 4AN 4EAJ 6AL, KV4s CI FZ, KZ5AA, LU6EF, OA8V, OD5IQ, OEs 1KV 2JG 3SGA 3VP 5ANL 5KE, OHs 1FBH 2BO 3MG 3VV 3XZ/Ø, OJØMA, OKs 1ATP 1FCW 1KPF 1WT 3KFF 3KPU, P29KE, PAØs HIP RYS, PJs 2VD ØEE, PTs 2FRU 9DM, PUØYS, PYs 1MB 1RO 2BCS 2FUS 7CNI 7VNY 7YS, PZ1BC, S21CW, ST2AY, TI9DX, UP2XTU, VKs 2AHK 2AUG 2AVA 3AKH 3CM 3CZ 3OP 3QI 3XB 3XY 5BC 5GC 5KO 5PB 6HD 6NK, VPs 2DX 2E 2EEC 8KF 8NP 9BO, VS6DO, W4BGO/TG/TI, XW8HP, YS1WPE, YVs 1OB 4AGP 5CKR, ZB2s CJ CS, ZC4AK, ZD7PS, ZE7JX, ZF1s AG DM TT, ZLs 1AH 2AGY 2BT 3RB, ZM7AH, ZP9AY, 4S7s DA GV, 4X4s NJ UR, 6Y5s BF LA, 8P6S DR EU, 8Q6s AD AG, 9A1C, 9H1BX, 9L1JT and 9M2AX.



PJ9CDC (W1CDC) rushed the W/K/VE island-hopping season with a batch of August QSOs from Martha Bay, Curacao, hangout of PJ9JT. Alex rolled up 1040 contacts with all states and 58 countries, mostly on cw. W1CDC's dad came along to do an FB logging job.

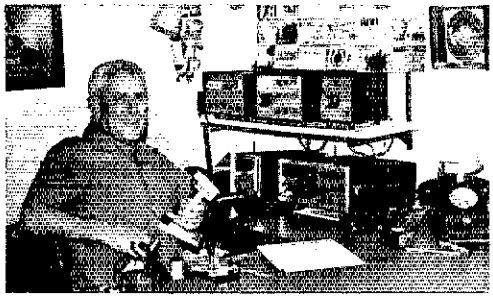
*c/o ARRL, 225 Main St., Newington, CT 06111.





KL7IAG is half the hamshack population of your remote QTH of the Month, rugged Shemya Island at the far end of the Aleutians chain. Bill nears DXCC on slow-scan TV with an SR2000 and TB6EM rotary, usually haunting 14,240 kHz around 2200 UTC. That unusual station conversation piece is a genuine WW-II bomb resurrected from among the battle souvenirs that dot the environment. Bill should be returning to Massachusetts as W8PEY/1 early next year, leaving club station KL7FBI in charge of all Shemya QSOs.

. . . One of the factors limiting 160-meter DX activity is crumbling rapidly: unavailability of up-to-date factory equipments covering the range. No longer must one dig up ancient Rangers, DX-100s, Vikings, etc., for 1.8-MHz sport although plenty of those venerable outfits continue to pile up top-band DX. Meanwhile the most serious obstacle to large 160-meter countries' totals erodes more slowly: lack of 1.8-MHz operating privileges in many overseas regions. In Europe, for example, only DJ-DK-DL EI G HB OE OH OK PA ZB2 4U and 9H stations are officially authorized use of the band. Other countries tolerate 160-meter operation temporarily now and then by special authorization. . . . An eager bunch of people hops around in search of final continents for 160-meter WAC. Among this year's proud recipients of that premier DX achievement certification are, in order of issuance, 5Z4KL (now GM3VLB), W2DEO, JAs 2UEO 3AA 3ONB 7NI, OK1FCW, JA2GQO, GM4AGG, G3SZA, DK3BJ, 9L1JT, WB8APH (first ssb endorsement), JAs 6WGE 3PNP 5DQH, and GW3UCB. . . . A few 1.8-MHz countries' totals noted in W1BB's dispatches and the club's press include W1BB 121, KV4FZ 101, W2QD 90, W8ANO 85, W1HGT 80, W8LRL 78, W2DEO 72, W4BRB 70, K2GNC 70, W9PNE 70, W2BP 65, PY1RO 62, W3IN 60, K4CIA 60, WA8IJI 58, W0NFL 54, OK1ATP 49, PA0HIP 49, W9NFC 36, EP2BQ 34, DK3BJ 34, VE1MX 34, WA9UET 30, OK1MCW 29, GM3YOR 28, W6BYB/VE1 27, ST2AY 26 and PA0RYS 22. With the Caribbean vacationers beginning to stream southward with transceivers and reels of copper in hand, those scores will increase. . . . Veteran 1.8-MHz stalwart EP2BQ, Mr. Asia in so many top-band WACs, shuts down for return to New Zealand after sixteen years in Iran. . . . VK5XK aims to give 160 a whirl from Niue early this month if all goes according to DXpeditionary plan. . . . G3RWL, previously EI4AP, VP2AGA and 8P6DR, is expecting reassignment to another spot of potential 1.8-MHz significance. . . . HB0NL, recently worked by VO1KE on 160 and 10 meters, is the first station Mike has QSOd on six bands. Neighbor VE1MX heard VK6HD on the long path a year ago, *real* DX, and wonders what this December will bring. . . . HC1s CW and XG, with a 250-foot-high dipole at the site of famed SWBC juggernaut HCJB, emphatically put Ecuador on the top-band DX map. . . . KV4FZ's contact with VK2AHK at 1000 UTC on September 9th may be the longest 160-meter single-sideband two-way on the books. Herb says other VKs were also peaking S9 at the time. . . . Looks as though YV5CKR is the only YL fully imbued with 1.8-MHz DX spirit. Helena gets out impressively with her 75-meter skywire tuned against ground. . . . W3IN tried an invisible Beverage receiving antenna with good DX results, sneaking a vast length of exceedingly fine magnet wire along the ground through neighboring yards, shrubbery and fences. It survived about 24 hours, just long enough to hear and work some Europeans inaudible on Don's transmitting skyhook. Better have your dog along and look real nonchalant when you try this one. . . . Will PY1RO score the very first 160-meter WAS from the DX end? Rolf needs only Montana, Nevada, New Mexico, and the Dakotas. . . . You'd think that QRP and 160 would be a foolhardy combination but the G-boys still do well with their 10-watt limit, G4DFB crossing the pond jauntily on two watts. On our side W9PNE keeps adding to his 5-or-less watts DX collection and nears 1.8-MHz WAS by this minimeans. . . . On the high seas JA2SVG/mm monitors the band aboard *Dampier Maru* plying Pacific waters, logging quite a few W/Ks under the murderous sidebands of Oceania's loran monsters. . . . One-sixty mobiles aren't exactly plentiful but they're still radiating corona galore. WA4SGF/m gets into Britain with his, and we hear that K1PBW/m has worked South America. . . . From K2FJ: There seems to be varying opinion on usage of the 1825-1830-kHz "DX window." As an operator from many Caribbean Islands, I prefer transmitting in the window while listening in the fairly clear spots I specify. This gives my normally modest signal a decent chance to be worked. Look for me as PJ8DX and VP2VAN come February-March, cw and ssb. . . . That 5-kHz DX



9V1RQ pitches in with the Singapore gang to help keep North American DX diggers supplied with Asian QSOs. Les, known as K5ZUZ down Louisiana way, expects to try DX life next in the British Isles.

ZL1KN, with VE3EZM at right, was among many DXers visited by the latter on a recent tour of Oceania. "Mac and XYL Lorna really poured out the ham hospitality," exclaims Ian. VE3EZM scored his own New Zealand QSOs as ZL1BCG, also signing KX6ZZ, VK2BZM/KH6, VE3EZM/C21, VE3EZM/KH6, VR4AZ, ZK1DD and 3D2DD for some 5600 contacts on a 25,000-mile junket that was a highlight of the DXpeditionary year.

window to Europe and other points is kept reasonably clear by W/K rag-chewers. Most incidental QRMers are willing to QSY on courteous request. Great diplomacy should be exercised, however; they don't *have* to move. . . . Since so many DX contacts on 160 are of the split-frequency variety, and because locating and tuning in weak signals is particular tough on the band, some operators suggest W/K/VEs announce a DX station's frequency when signing with him. Or would that give competition too much of a tumble? . . . W1BB's *160-Meter Newsletter* goes out to nearly 300 self-addressed-stamped-envelope applicants, quite a chore. Stew's been at it since 1932, ever faithful to his favorite ham band. . . . Several top-band propagation indicators are closely watched by experienced 1.8-MHz enthusiasts, especially such markers as WCC, WNU, KPH and DHJ on 2036, 2048, 2054 and 1830 kHz, respectively. W1AW's scheduled 1805-kHz transmissions are helpful, too. Just getting on the band? To minimize QRM to radionavigation systems sharing 160, amateurs are required to observe frequency and power restrictions applying to their locations. Exact limitations appear in Section 97.61 (b) (2) of the FCC Amateur Regulations. This information is also available in recent ARRL *License Manuals*. Charts of this data are available from League headquarters – request form S(15) a – for stamped self-addressed envelopes. CU on top band!

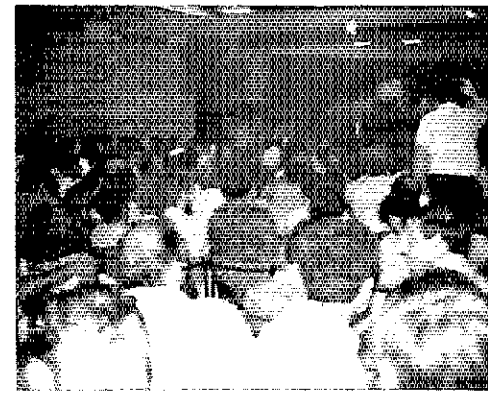
W h e r e :

NORTH AMERICA – For delightfully pronto pasteboard production this month's super-QSLers are nominated in "How's" mail from Ws 1CDC 2QXA 7YF, Ks 4DAS 9GMT, WA4HHG and WB4FOT: CN8DX, DM2CDM, EP2SN, FC9UC, HC8GI, HP1AC, KØCGE/HBØ, KH6FX, LZ1KDP, OE1ZGA, OHØAM, P29EJ, TU2GA, VP2s MB ST, VR1AA, YN9JMP, ZB2FX, ZD8AB, 3D2ER, 5Z4PP, 6W8EX and 9V1RD, plus QSL aides WØIPU, K9KXA, JAs 1SWL and ØCUV. Any snappy deliveries out your way? . . . W2MIG has accepted appointment as my QSL manager. Ed also does the job for VP2SQ and 8R1CB. (VP2LL) . . . After returning to Bedford from FPØXX DXcitement, I found four monstrous sacks of mail already awaiting me. The puzzled postman thought I must have been gone a year or two instead of only two weeks. After taking care of all my St. Pierre QSLing I'm ready for another DXpedition. (K1DRN) . . . QSL managers plagued by W/K/VEs who neglect to include required self-addressed stamped envelopes, or s.a.e. plus International Reply Coupons, might consider reminders via ARRL NTS QTC originations. (WB5KUJ) . . . Continental airmail/landmail distinction is due for discontinuance but the airmail term still will be valid for foreign mail. Also be alert for increased U.S.P.S. rates early in '76. Correcting previous info, current IRCs will not be superseded by the new model until 1977. (WCDXB) . . . All VP2SPI contacts are being confirmed via the bureau's route, according to 8P6ES, whether or not matching QSLs are received. (WCDXB) . . . W4LR turns over the WA4-WB4-WN4 portion of ARRL's Fourland Bureau branch to WA4HPF, c/o Sterling Park Amateur Radio Club, Box 599, Sterling, Virginia, 22170. (SCDXC) . . . I'll be glad to serve as QSL manager for DX operators in the Pacific rim area, especially A35 DU JA and YB stations. Central Americans are also welcome. (W7HPI) . . . 'Alp! Parenthesized brethren need news toward running down wallpaper from reluctants indicated: (WA3ERG) CT3AS, FR7AI/t, GC2LU, TU2s AF BK of '72, 5Z4OA '73, 9J2BO; (WA4HHG) OHØPA, OJØMA, 6D1HR; (WA7DYH) CT1IG, FYØBHI, PJ9GQN, 6F8J all on 75 ssb; (WB9JEN) DJ6QT/CT3, VR1AA, ZB2BL; and (WBØNOU) ZX1ITU. Any aid?

EUROPE – Italian prefixes out of the ordinary include IA5 for the Tuscan archipelago; IBØ Ponziane archipelago; IC8, Neapolitan archipelago; ID9, Eolie or Lipari archipelago; IE9, Ustica island; IF9, Egadi islands; IG9, Pelagia islands; IH9, Pantelleria island; IL7, Tremiti islands; and IMØ, the isles surrounding Sardinia. (LIDXA) . . . In behalf of Uska the Swiss QSL Bureau managership is inherited by HB9APF from long-time proprietor HB9NL who retires this month. (WWDXC) . . . Publications compiling lists of QSL managers should delete my connection with GD3ENK, now a Silent Key. (WA4NRE) . . . QSLs for reactivated club station I3DFQ may go via Box 400, Vicenze, Italy, 36100, or via my address as published in recent *Callbooks*. The "C. Hamilton" I3DFQ address is no longer usable. (W3JZJ)

OCEANIA – I'd like to close the VKØDM log for QSOs made by Dave Meldrum who left Macquarie island last December. The customary s.a.s.e., or s.a.e. plus IRCs, please. I became QSL manager for A35AF as of the first of this year. (WA4NRE) . . . JAØCUV/1 does an FB job managing the cards of VR1AA and other rarities. Self-addressed envelopes and IRCs bring fast response. (W1CDC) . . . Mail for JAØCUV/1 may go direct, via 1SWL or via JARL. Dan officially became VR1AA's QSL agent as of August 7, 1975, but he does have earlier logs. (DXNS) . . . W7OK still holds unclaimed Norfolk Island VK4AK/9 QSLs for QSOs of last April. (LIDXA) . . . KJ6CF contacts by WA6QFO may be QSLd via his home address. (DXNS)

ASIA – I know there must be hundreds of QSLs for my Thailand activity gathering dust at the RAST bureau, but I've been unable to get them forwarded to my present Okinawa address. Sincere apologies to the many operators awaiting my replies, but I cannot answer their cards until they are delivered to me. Hopefully this should be soon. (KA6DX- WA4BKC, ex-HS2AIG-HS3AIG-HS3AB) . . . We hear that AC3PT logs are in the hands of W1FLS. (WCDXB)



WB4FDT/4X at left in the station photo, attended a summer Tel-Aviv meeting of Israeli Amateur Radio Club and recorded a view of the lively goings-on. More than a third of the country's 750 hams showed up. Among many amateurs visited by Phil was 4Z4NTI of Beersheba.

AFRICA — QSLs sent to W6OAL's home address for his Cocos and Diego Garcia work may be long delayed. Use the address in the listings to follow. (W4EO) . . . Be advised that I no longer act as QSL aide to EL2s CI and DK, both now Stateside. Likewise for EL2NAP who has relocated elsewhere in Africa. I do, however, still handle EL2C's QSLing. (K8LUH) . . . Old-timers may think they've hooked China, but the C8-C9 prefix bloc now goes to Mozambique courtesy International Telecommunications Union. (DXNS)

SOUTH AMERICA — I retain logs for K4ERO/HC1 dating from August 1, 1975, and eventually should have a record of all Joe's QSOs from Ecuador. (WA6PED) . . . KC4AAC's operator Shane requests cards via K7ODK. (DXNS) . . . Contrary to recent QTH listings and despite spurious notifications otherwise, W9BNH has no connection with 8R1, T1 and VP2 managerial matters. Along the same line WA8MCH disclaims ZB2 QSLing responsibilities. Sorry! (K4HHD) . . . Here goes with the monthly QTH catalog but heed our usual caveat: Each specification is not necessarily accurate, complete or "official." . . .

A9XBO, G. Smith, P. O. Box 14, Manama, Bahrein
C6AEM, D. Schultz, Box 90, Exuma, Georgetown, Bahamas
CE2EN, Chilean Naval Academy, P. O. Box 23V, Valparaiso, Chile
CN2AQ, S. Quast, P. O. Box 40, Tangier, Morocco
CR9AJ, H. Torres, P. O. Box 798, Macao
DA1QE/HBØ (via DA2QW)
DA1QM/HBØ (via WBØCEH)
DJØIP/HBØ (via WA4ZBS)
EA9FE, P. O. Box 191, Melilla, Spanish Sahara
EL2s CI DK NAP (see text)
F9UW, C. Bazillou, 221 Av. Aristide Briand, F-06190 Roquebrune, Cap Martin, France
FY7AK, J. Siebert, 510 Palliser St., Johnstown, Pennsylvania 15905
HM2IR, P.O. Box 25, Inchon, Republic of Korea
IL7VTB, P.O. Box 4073, Milan, Italy
IV3VLS, P.O. Box 313, Trento, Italy
JA8AQN/JD1 (via JA8JL)
KA6DX, J. Corson, PSC Box 25913, APO, San Francisco, California 96230
K4ERO/HC1 (via WA6PDE)
LU2DC/KV4, F. Milia, P. O. Box 746, Adelphia, Maryland 20783
SM2EOB/SU (via SM2CEV)
ex-TJ1AD, Dr. D. Chaffin, WB4WHE/4, 3264 S Perkins, Memphis, Tennessee 38118
VE2AQS/TG9 (to VE2AQS)
VE6CGS, M. Bloomquist (K5ABV), 228 Lake Moraine Pl., Calgary, Alberta, Canada T2J 2Y9
VK5XK/ZK2 (via WØJRN)
WP2MCT, C. Taylor, W6KXT, P.O. Box 8502, Oakland, California 94662
VQ9s OM YL (to FL8s OM YL)
VQ9SS/c, Royal Navy Party 1002, NavComSta, Diego Garcia, BFPO 656, London, England (or via G4DII)
W6OAL/VK9/VQ9, D. Clingerman, Patron 4, c/o FPO, San Francisco, California 96601
WA6LRG/KB6 (via WA6OWM)
YB2SV, J. Soejoso, P.O. Box 73, Salatiga, Indonesia
YS1GW, Box 242, Biscayne Blvd., Miami, Florida 33132
ZD9GE, Box 8672, Johannesburg, South Africa
ZP5AO, P.O. Box 504, Asuncion, Paraguay
3D6BD, J. Beltroa, P. O. Box 1158, Mbabane, Swaziland
3V8CA, J.-P. Niort, 9 Rue Said Boubaker, Menzah 5, Tunis (or via F6CPU)
5R8AL, P.O. Box 3833, Tananarive, Malagasy (or via F6ACT)
5T5BJ, P.O. Box 121, Zouerate, Mauritania
6D1SA, P.O. Box 622, Puebla, Pue., Mexico
6W8MW, P.O. Box 1646, Dakar, Senegal
7P8AC, K. Younger (G3OIB), P.O. Box 829, Maseru, Lesotho
9G1AT, P.O. Box 194, Accra, Ghana
9J2AB, Box RW-456, Lusaka, Zambia
9M6MA, P.O. Box 113, Kota Kinabalu, Sabah (or via JA2KLT))
9Y4RH, P.O. Box 714, Port of Spain, Trinidad

A2CBW (via DK3KD)
AP2AD (via K1KNQ)
C31JL (via DJ9EV)
CT2BS (via WA4CAD)
CT7BER (to CT1DW)
DK5WL/HBØ (to DK5WL)
EL2C (via K8LUH)
EP2SR (via W3FYT)
FØACO (to K1HG)
FØATY (via DK7MW)
FØCAM (to DK6MN)
FØCFB (to HB9AAA)
FØDR/FC (to DJ8RR)
FB8YC (via F9MD)
FC2CH (via WA8TDY)
FM7WE (via K4CFB)
FWØLP (to WB5ERR)
GM3COX (to G3COX)
HBØNL (to HB9NL)
ex-HS2AIG (see KA6DX)
I3DFQ (see text)
JY9CS (via K5OEA)
K9GMT/LA (to K9GMT)
KC4AAC (see text)
KL7IFC (via WB9BPS)
OA4AHZ (via RCP)
ex-OA4U (to VE6CGS)
OD5IO (via W4UL)
OI3TAM (via SRAL)
P29GW (via VK4AE)
SM7JZ/SU (via SK7GH)
TA3HB (via WA4ZSB)
TU2GA (via K9KXA)
VEØNWC (via VE7CFB)
VKØDM (see text)
VP2ABB (via 9Y4SF)
VP2DM (via K1VTM)
VP2GEB (to GC2CNC)
VP2LL (via W2MIG)
VP2MB (via WA8TDY)
VP2MIR (via W7FCD)
VP5DF (to K4VMA)
VP9HX/mm (via G3VAO)
ex-VS9AWR (to G3SUQ)
VU2CK (via W1GL)
XJØNEH (to VEØNEH)
ZD8BD (via ZD8AR)
3D2RM (via WB5MXO)
5L2DT (via W2DNV)
5L2FY (via JA1QOQ)
6W8FP (via WA3NCP)
9G5AC (via W1YRC)
9J2CJ (via DX6XF)

Your QTH contributory committee on this run: Ws *ICDC 2PQZ 3JZJ 4EO* 6KXT 7HPI 7YF ØGBJ, Ks 2YFE 4DAS 4HHD 9GMT, WAs 4HHG 4ZSB 7DYH, WBs 4FOT ØNOU, Canadian DX Association *Long Skip* (VE1AL/3), Columbus Amateur Radio Association *CARAscope* (W8ZCQ), *DX News-Sheet* (G. Watts, 62 Belmore Rd., Norwich, NR7 OPU England), International Short Wave League *Monitor* (E. Chilvers, 1 Grove Rd., Lydney, Glos., GI15 5JE, England), Japan Radio DX Club *Bulletin* (JA3KWJ), Long Island DX Association *DX Bulletin* (WA2RJZ), Newark News Radio Club *Bulletin* (M. Witkowski, Rt. 5, Box 167, Stevens Point, Wisconsin 54481), Northern California DX Club *DXer* (Box 608, Menlo Park, California 94025), North Florida DX Association *News* (WA4UFW), Royal Signals Amateur Radio Society *Mercury* (G3DPS), Southern California DX Club *Bulletin* (WA6KZI), VERON's *DXpress* (PAØTO), West Coast *DX Bulletin* (WA6AUD) and Western Washington DX Club *Totem Tabloid* (WA7JCB). Got a few for the crew? K!

W h e n c e :

Let's catch up on the local scene as another DX year draws to a close. Heavy traffic! . . . TAD, the Ten American Districts award, is newly offered by Lockheed Amateur Radio Club, 2814 Empire Av., Burbank, California 91504. Newcomers heading for WAS should find this an encouraging certification along the way. Consult W6LS for details. (WA7RFH) . . . Hams interested in International Amateur Radio Hosts, a world-wide group formed for the purpose of mutual reciprocal assistance and fellowship, are invited to write me with s.a.s.e. for IARH information. The organization is intentionally simple with regional coordinators running their own shows. Any volunteers Stateside or across the waters? (W5QPX) . . . Check with W4QAW regarding National Capitol DX Association's U.S.A. Bicentennial Award, a diploma earned by contacting ten NCDXA members during '76. The club's officers are K4DXO pres., W4WWG v.p., WA3NGS sec. and W4IDG treas. (W4WSF, K4WVT) . . . Fifteen has its good days at my end, recent QSOs with LUs 1 DHE 7 EKA, PY6AQJ, VP2LAW and ZL2AUS, the latter at 0100 UTC. I use a T50, 2B and dipole. (WN4MJP) . . . Interesting European opening on 21 MHz August 22nd while W/Ks were rolling through on ten. September 5th saw Europe crack through on 160 with PAØHIP and G3SVK at 0200 UTC. (WA2s VUH YPO, WB2STZ) . . . Fifteen really boomed here September 4th when an HR1 YS3 and ZS3 came back to my Tempo One and poor ground-mounted vertical. I'm a 15-year-old high school junior with an Advanced ticket, a severe case of DXitis and 51 countries so far. (WA3UPX) . . . Spent another sunny summer as KV4IF, the only ham on ST. John, 10 through 160 meters but mostly on 14,280 kHz. There soon will be a V.I. vhf repeater on the air. Now it's back to K2TKE, Ward Melville High School, Setauket, for the 1975-'76 school year. (W2AAF) . . . Five months of 160-meter DXing brought me 44 countries on five continents. Best catches include EP2BQ, JY9FOC and VP8NP. Hawaii eludes me but a new 3/4-wavelength inverted-L at 70 feet may do the trick. (W6BYB/VE1) . . . Sunspots are still on strike but the 21-MHz Novice band recently supplied CX KV LU PY VP2-9 YN YV1-3 ZP and 8P6 contacts. (WN2TRS) . . . W3WLO/VO1 gets out well on 20 from our Argentia base with an indoor dipole. I've worked A1 with my own indoor antenna, a Slinky design. (WA2ROD) . . . My July operation as K5ETA/6Y5 at Sandy Bay netted 300 stations, the majority Europeans on 20 and 40, using a KWM2 and 14AVQ. (K5ETA) . . . Regarding the farthest great-circle 160-meter QSO, an 11,939.9-mile contact between G6GM and ZL3RB in 1955 appears to be the one to beat. An 11,881.6-mile G3PU-ZL3RB contact ten years later seems to be the two-way voice record. These distances are calculated accurate to within two miles. (W5RTQ) . . . August 28th was a red-letter day for 21 MHz in New England, open to Europe most daylight hours with the Middle East also popping through. Later Asia and the JA crowd showed up. Great experience for me since I wasn't around when 15 was in its DX heyday. (WA1NRF) . . . My old DX60 and inverted-V dipole are good enough for a two-year total of 152 countries and application for ARRL's new cw-style DXCC. (W3OJS) . . . My first 10-cw Europeans of the new season were F8VJ and I8RFD in August. (K1RQE) . . . Moving up fast on DXCC here but QSL holdouts are frustrating. (WB4KTR) . . . Maybe ham radio really hasn't changed so much. A striking percentage of thousands of stations worked from the Canal Zone complained about various equipment problems. (WA8WWM, ex-KZ5WA) . . . Put my Radiotelephone First to work at a summer TV job, regularly missing the best DX openings on 20 and 40. I'm getting mighty impatient for DXCC at the 94-country mark. (WA8YTL) . . . K4ERO/HC1 works 21-MHz cw or 3.8-MHz sideband when not on duty at HCJB, the Voice of the Andes. (WA6PDE) . . . Made 1251 contacts with 111 countries and all states as VP2MCT in late August. Except for Asia conditions were very good on 40, 20 and 15; no antenna for 75, nil heard on 10. Forgot to bring my keyer so all this was on single-sideband with a 350/SB200 and two-element quad. Next April-May I hope to add Nevis and Saba to my itinerary. (W6KXT) . . . On 7-MHz cw I've been working VKs, ZLs, Europe and loads of W/Ks with a 5-watt HW7. But then this prefix must be worth a few extra dB. (6D1SA) . . . I'm heading out again to put C6ADF on the air for a few months, then off to Grand Turk as VP5DF for an indefinite stay. (K4VMA) . . . In Missouri 20 enjoyed some autumnal improvement with longer openings on numerous paths. (WØGBJ) . . . Closed K5ABV in June and moved to Calgary for a two-year stint. My 150-watts-or-less cw total in Texas reached 238 confirmed plus 5BDXCC thanks to a two-element triband quad and a 40-foot vertical for 7 and 3.5 MHz. Not much DXing from Canada yet but I'll be giving it a try with 75 watts and a 17-foot vertical. (VE6CGE) . . . PJ9EE deserves thanks from the 80- and 40-meter boys I worked for climbing PJ9JT's tower to hoist my low-frequency antenna. A good radiator was a must during my Curacao stay due to generally poor conditions. (PJ9CDC) . . . Recent cw DX results here confirm conditions good on 40, fair on 20 and almost zilch on 15. (WA2JZX) . . . During our family-style FPØXX DXpedition this summer, my ten-year-old daughter Lauree became so excited about radio that she's now WN1VUM. (K1DRN) . . . Occasional DX breakthroughs on 15 and 10 cw keep me interested enough to reach 110/49 worked/confirmed. (K4DAS) . . . After sweating 105 ssb countries on my dipole, I'm more and more disturbed by pile-up antics and profanity. Where's our self-discipline? (WA4HHG) . . . Glad to move from an apartment to a house with outside antenna potentialities. Nine months with an indoor antenna and 200 watts on 7-MHz cw scraped together 68/48 countries and 50/49 states worked/confirmed. Say, we could use a lot more DX activity in the 40-meter General segment. (WBØNOU) . . . West Coast *DX Bulletin* subscribers topped the thousand-mark in October. (WA6AUD) . . . More localisms via literature of clubs and groups: VE3s CHS and DCT keep each other company on Ontario's Manitoulin island. . . . W6KNH is off on a three-month junket through Asia and Africa while OM-XYL DXpeditionary team W6s KG and DOD threaten imminent wanderings of their own. . . . Hurricane Eloise chased the YV8AL/YVØ bunch off Aves in a hurry. . . . YS1s GDD and JWD are an avid father-son DX team on 20 phone. . . . VE3DXV/W6 takes the editorial seat of retiring Northern California DX Club *DXer* editor K6SSJ. . . . According to WA6EPQ at least three groups are plotting to put Clipperton island back on the air.

Hamfest Calendar

Minnesota — The winter hamfest of PICONET and the Handi-Ham system is Saturday, December 6, at the Eagles Hall in Faribault, Minnesota. Registration begins at 9 A.M. Program, prize drawing and Handi-Ham equipment auction.

Pennsylvania — W3VC, Carnegie Tech Radio Club will hold its first annual hamfest and flea market at Carnegie-Mellon University, Skibo Hall, on Forbes Ave., Pittsburgh, PA, 8 A.M. to 5 P.M. December 7. Indoors, table rental $2.50. Talk-in on 146.52.

COMING ARRL CONVENTIONS

January 23-25, ARRL Tropical Hamboree, Miami, Florida
February 13-15, Florida State, Orlando, Florida
April 9-11, Southwestern Division, Tucson, Arizona
July 9-10, Central Division, Milwaukee, Wisconsin
July 16-19, ARRL National, Denver, Colorado
July 24-25, Atlantic Division, Philadelphia, Pennsylvania
September 3-5, Canadian Division, Halifax, Nova Scotia
September 3-5, Pacific Division, San Jose, California
September 10-12, New England Division, Boston, Massachusetts
October 8-10, Midwest Division, Omaha, Nebraska

DX Competition

(Continued from page 62)

11) *Club Competition:* Only ARRL Affiliated Clubs may participate in the club Competition. A member must be listed in the regular score listings before he can be counted for a club. The member's score, as published in *QST* will be the number of points contributed to the club.

In order for a club to be listed at least 3 entries from members of the club must be submitted. All members wishing to be included in the club scores must indicate the club name on their summary sheet. Members eligible to compete:

a) Bona fide club members living up to 50 miles from the club affiliation address need not attend any minimum number of club meetings. However, to be considered bona fide, a member must be active in club affairs.

b) Members residing between 50 and 175 miles from the club affiliation address must attend at least 50% of the in-person club meetings during the year immediately prior to the date of the contest. If, however, he has not been a member for a year's time, he must have attended at least 50% of the meetings since he became a member.

c) Members living outside of 175 miles and/or members operating stations outside of 175 miles may not compete in the club competition.

Scores of members meeting the requirements of section 11a may be submitted for club credit. Single and multi-operator station scores may be counted. At a guest-operated single-operator station, both the guest-operator and the station licensee must be members of the same club in order to count the score for that club. At multi-operator stations at least 66% of the operators must be members of the same club in order for the score to count for that club.

In order for a member to attend at least 50% of the in-person club meetings, it is necessary that the club hold *at least* 4 in-person meetings a year so the member can attend at least 50%.

It is not within the intent of these rules that a club should vote out a member or a member resign and then be voted back into the club later in order that he can meet the 50% attendance rule.

The highest affiliated club entry will be awarded a gavel.

The highest single-operator cw score and the highest single-operator phone score in any club entry will be rewarded with a club certificate where at least three single-operator cw and/or three single-operator phone scores are submitted.

12) *Disqualifications:* If the claimed score of a participant is reduced by 2 percent or more, the log may be disqualified. Score reduction does not include correction of arithmetic errors.

Score reductions may be made for taking credit for unconfirmed QSOs and/or multipliers, duplicate contacts, banned countries, and/or other scoring discrepancies.

If a participant is disqualified, he will be barred from submitting an entry in the next annual running of that specific contest, (e.g., disqualification from the 1976 Phone DX Competition prohibits submission of an entry for the 1977 Phone DX Competition but 1977 CW DX Competition participation is okay).

The calls of all disqualified participants will be listed in the *QST* report of the contest.

Any participant on the borderline of disqualification but not actually disqualified may receive a warning letter from the Communications Manager.

For each duplicate contact that is removed from the log by Hq., a penalty of 3 additional contacts will be exacted. The penalty will not, however, be considered as part of the 2% disqualification criteria.

In all cases of question, the decisions of the ARRL Awards Committee are final. QST

Strays

Oscar 6 and 7 orbit predictions for 1976 (prepared by Amsat) are available for $3 postpaid from Skip Reymann, W6PAJ, P. O. Box 374, San Dimas, CA 91773.

STOLEN EQUIPMENT

Homebuilt power amp VHF with transistors BLY 87/ BLY 89 was stolen from car in San Francisco while on visit to U.S. HB 9 MJW inscribed on circuit boards. Willi G. Vollenweider, HB 9 AMC, Auf der Steig, 8444 Henggart 052 391782.

ICOM IC-22, Serial No. 1309718. Eugene R. Smar, WA3EWV, 2823 Klein No. 4, Allentown, PA 18103.

AMATEUR RADIO PUBLIC SERVICE

NTS RACES AREC

In the Public Interest, Convenience, Necessity HRH

CONDUCTED BY ROBERT J. HALPRIN,* WB2NOM

SET Soliloquy. According to W1YL, on a certain night in 1775, Paul Revere rode through town shouting "To arms, to arms, the *Gs* are coming!" Well, he *could* have. Actually, think of all the wear and tear (on himself and his horse) he might have saved, had he possessed a two-meter transceiver. All he needed to do was to make his announcement on the Boston repeaters. Yes, in 200 years we've come a long way.

Today, amateurs have the technology to handle emergency communications should the need arise. But do we have the training? That's what the annual Simulated Emergency Test is all about (see SET announcement elsewhere in this issue). SET weekend is January 24-25, 1976, but any SET held between January 1 and February 29 is countable toward the bi-national total. Check with your emergency coordinator or section emergency coordinator for the info on what's happening in your area.

No one should be surprised about the change in procedure in the 1976 SET. The hint of impending change was indicated by WA1FCM last year. See April 1974 *QST*, page 61.

During the SET, make sure the words "TEST MESSAGE" are used in any non-routine test traffic. To minimize migraine headaches, please use handling instructions HXB (followed by a number where applicable). When you have to cancel a message with those handling instructions, don't forget to send a service message to the originator.

Once again, we have to mention the paucity of stations equipped to operate without commercial power. Let's try to pick up the slack in this department. Obviously, the overwhelming majority of emergency-powered stations are on two-meter fm. The goal is to get as many repeaters and repeater groups as possible into the act this year.

If you're unsure about the true meaning of the terms that are continually being strewn about in this column, you might want to get a copy of the *Public Service Communications Manual*, which explains the principles of NTS and AREC. It is available from Hq. for a legal-size s.a.s.e. with 20 cents postage. If you want more generalized information, ask for *Operating an Amateur Radio Station*. Another very useful tome is the 1975-76 *Net Directory*. A s.a.s.e. with 20 cents postage will get you a copy of your very own. Among other aids we have CD form 3, which lists ARRL numbered texts and Op. Aid 9, which explains message format, precedences and handling instructions. If you need anything, drop us a line.

On any net, traffic should be handled in order, according to precedence. Here are the definitions:

EMERGENCY (never abbreviated) – Any message having life-and- death urgency to any persons or groups of persons. This includes official messages of welfare agencies during emergencies requesting supplies, materials or instructions vital to relief of stricken populace in emergency areas.

Priority (P) – Important messages having a specific time limit. Official messages not covered in the EMERGENCY category. Emergency-related traffic not of utmost urgency. Notice of death or injury in a disaster area.

Inquiry (Q) – Inquiries as to the health or welfare of someone in the disaster area.

Routine (R) – Routine messages.

ECs, RMs, PAMs and others must get their SET reports to Hq. by March 15, 1976. How about making sure that you are mentioned in this year's report?

■ **Signs of the time.** In a recent Douglas County, Kansas, ARC newsletter, WBØKDE asked his fellow club members to vote for a proposal to

On September 14, the Illinois Section Net held a meeting at Peoria, IL. Those attending were (kneeling) from left: K9DDA W9NXG WB9NVN K9ZTV WB9OEH. Standing: W9NJP K9KHI WB9NOZ W9MVE W9OYL K9MFI WB9DED WB9JTK WB9JPS K9BGL.

*Communications Assistant, ARRL

purchase magnetic signs which read *Amateur Radio Public Service*. The signs are to be affixed to mobiles. As Rick said: "The time spent providing amateur public service is tripled in value if the public is aware that amateurs provided it a service."

■ **Sticky fingers.** Attention net managers! Thanks to a suggestion from WA9NEW/4, net certificate endorsement stickers are now available from Hq., one for "Net Control Station" and the other for "Liaison to Higher-level NTS Net." Both types of endorsements have space for the date and signature/call of the net manager. This is a good way to reward the efforts of the active and reliable net members. It should also stimulate activity among those operators who seldom go beyond the QNI stage. Additionally, new *section* net certificates are about to be printed which will reflect the availability of the stickers. – *WB2NOM*

On Emergency Communications

Most of the time, this section is devoted to AREC and/or repeater activity, with good reason. However, the following account, adapted from K4EJY's report, involves neither. It is significant in that it proves, without a doubt, that amateur radio can provide emergency assistance to the public at any time, at any place, and under any circumstances.

This summer, K4EJY was mobiling through the midwest on vacation, recuperating from a heart attack. While operating from a "scenic overlook" near Ames, Iowa, on August 7, he happened to contact someone on 20-meters who also had a heart condition. While the QSO was going on, another traveler at the rest stop came over and listened to the conversation. After discussing mutual problems for some time with the ham on 20, K4EJY signed-off and prepared to resume his trip.

Suddenly, the chap who was listening announced that he too had a cardiac problem and "suspected that he was in distress at that moment." K4EJY's wife, a registered nurse, immediately took the man's blood pressure and decided that he was, in fact, in serious trouble. She told her husband to get an ambulance *pronto*.

Speaking of Paul Revere, the Paul Revere Net, which boasts over 200 check-ins at times, recently had its first anniversary. At left, Midwest Division Director WØFIR congratulates the net founder, WBØEJJ. *(Photo by WBØMDF)*

K4EJY's fm rig was useless because he didn't have crystals for the local repeater. So he switched resonators on his low-band mobile antenna, and tuned to 7258 kHz. Unfortunately, MidCARS was not in operation. He then went down the band and broke into a QSO between WB8GFJ and WB9ELP. He explained the situation, and WB8GFJ called the Michigan State Police, who in turn contacted the Iowa State Police. Within ten minutes, an ambulance arrived at the rest area. "It was the opinion of the medical people involved that if we had not acted promptly and obtained assistance which resulted in 'Paul' arriving in the hospital at the time that he did, he probably *would not have survived* another 30 minutes to an hour." Paul is now recovering at his home in Florida. How was your summer vacation?

■ Here is some food for thought from W3ZUH, Western Pennsylvania Section Emergency Coordinator, edited from his SEC report:

Let's emphasize the strong points of the AREC – organization, versatility, and training.

1) *Organization.* We have one! The fact is that individuals come and go but AREC continues. We have a source of experience readily identifiable through the SEC, SCM, Director, or ARRL Hq. if necessary. There is a central source of information through Hq. to share ideas, but also to have a common format for reporting and operations. This also means that there is someone to turn to, in an emergency, by going to the next level in the organization.

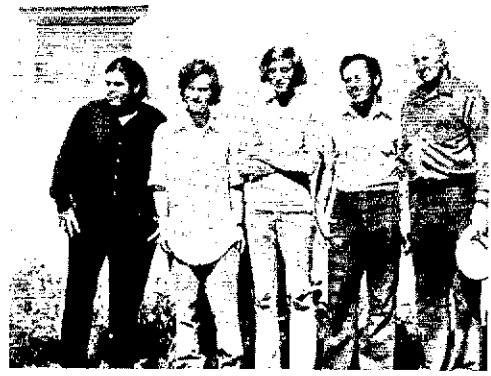
2) *Versatility.* AREC can supply local short-range coverage and medium coverage to state authorities and c.d. We have both vhf and hf capability

3) *Training.* Interest in net sessions and training activities must be maintained. This is accomplished by having emergency-power-only sessions, surprise net sessions, local SETs and special activities on behalf of public service agencies. Critiques of the exercises improve the operation.

Don't be sidetracked by the "disaster here?" syndrome or apathy about emergency communications. During flooding and ice storms, our services are always needed. But we can't relax during normal conditions. Offer your services for communications for local parades, Halloween patrols, bike hikes, walk-a-thons, etc. Let's put *our* best foot forward.

Interest in emergency preparedness in the WPA section is increasing through the work of W3ZUH and others. Do you want to get involved in the Amateur Radio Emergency Corps? If so, contact your SEC. His address appears in this issue. – *WB2NOM*

■ For September 36 SEC reports were turned in, with the number of AREC members totaled up as 13,136. Last year at this time, 42 SEC reports were submitted, with membership totaling 13,523. Sections reporting: Alaska, Alta, Ariz, Colo, Conn, Del, EMass, EPa, Ill, Ind, Kans, Ky, Mich, Miss,



This is the New York City-Long Island contingent who represented their section at the New York State Net picnic. From left: WB2FLF WB2OYV WB2PYM WA2WKH and W2GKZ. *(Photo by WA1JZC)*

Mont, NLI, NC, NFla, NNJ, NTex, Okla, Ont, Ore, SDgo, SBar, SCV, Sask, SFla, SNJ, STex, Utah, Va, Wash, WMass, WPa.

Traffic Talk

■ *That new chap on a cw traffic net.* He's a rare one these days. Quite a brave soul, with all our shortcut procedures today. The Q signals he's been introduced to, but with the QNs he's in a very strange smog. Up 5 down 10, ASAP, HXC, ARL and others — one session is enough to make most novices return to their comics. Break-in and QNZ ain't even entered his mind. Try recalling your first QNI, bewilderment and stark terror in your mind. It all points to the fact that it's up to the seasoned netter to cooperate and treat these new brave operators with broad-mindedness and a little going out of ones way to make them feel wanted and appreciated. It's their first impression that sez whether they'll be back for a second baptism. If they do, there's a good chance they'll become a part of the gang, but they still need red-carpet treatment for a while. Let's *keep* 'em, not chase 'em away. — *W8KQB*

■ Both veterans and newcomers work hard in NTS nets. Section and local NTS nets are just as much a part of the system as region and area nets. A list of these nets that report net statistics to Hq. is carried in the Public Service column each month. These reports are necessary in order to adequately gauge traffic trends and to determine just *how much* traffic is being handled. Section/local net managers should be submitting monthly reports. Post-card size CD-125s are available for this purpose. Keep reading; if you don't see your net listed, it's not getting the credit it deserves. The aforementioned hard work might be going for naught. — *WB2NOM*

■ National Traffic System. Congratulations to WB2EMU, new D2RN mgr. CAN is now sharing 3670 kHz with the Mexican Police. A new crop of good operators is starting to appear on 2RN, writes W2MTA. Summer doldrums have ended on 3RN; W3NEM reports a full roster. W5PNY commends WA7VTM and K7VWA for filling in the gaps on DTWN. D8RN still needs WVa representation. WAØYNP received DTWN assistant mgr. certificate.

September Reports

Net	*Sessions*	*Traffic*	*Avg.*	*Rate*	*%Rep.*
FAN	30	1445	48.1	1.265	97.7
CAN	30	930	31.0	.886	100.0
PAN	30	1234	41.1	.889	96.1
DFAN	60	410	6.8	.410	77.2
1RN	60	490	8.1	.467	93.0
D1RN	30	131	4.3	.353	89.0
2RN	60	545	9.1	.814	100.0
D2RN	25	83	3.6	.278	98.0
3RN	60	350	5.8	.365	97.2
D3RN	30	186	6.2	.353	98.3
4RN	50	404	8.1	.360	76.9
D4RN	—	—	—	—	—
DRN5	30	87	2.9	.152	74.8
RN6	58	637	10.9	.442	96.6
DRN6	30	169	5.6	.183	55.8
RN7	56	463	8.2	.520	73.1
DRN7	39	65	1.6	.142	20.7
8RN	56	287	5.1	.317	89.4
D8RN	30	79	2.6	.342	66.7
9RN	60	461	7.6	.390	94.5
D9RN	30	93	3.1	.263	87.5
TEN	—	—	—	—	—
DTRN	—	—	—	—	—
ECN	60	215	3.5	.310	88.8
TWN	59	417	7.0	.303	92.0
DTWN	21	46	2.1	.101	58.6
CTN	—	—	—	—	—
TCC Eastern	116[1]	756			
TCC Central	87[1]	554			
TCC Pacific	114[1]	881			
Sections[2]	3977	14221	3.6		
Summary	*4971*	*25639*	*5.1*		
Record	*4668*	*27764*	*15.4*		

[1] TCC functions not counted as net sessions.

[2] Section and local nets reporting (112): AENB AEND AENJ AENM AENW (AL), ASN (AK), ATEN HARC (AZ), AMBNX APN ARN ATN OZK (AR), NCN NEN SCN (CA), CCN (CO), CN CPN CSN (CT), DEPN DTN (DE), FAST FMTN FPTN NFPN QFN QFTN VEN (FL), GSBN GSN (GA), IMN (ID,MT), ILN (IL), I75MN TLCN (IA), QKS-SS (KS), KNTN KRN KTN KYN MKPN (KY), LAN LSN LTN (LA), MDD MDCTN (MDC), EMRI EMRIPN EM2MN WMN WMPN (MA), BR/MEN MACS MNN QMN (MI), MSN MSPN MSSN PAW (MN), MSBN MSN MTN (MS), MON MSN MOSSBN (MO), NAN WNN (NE), NJN NJSN (NJ), SWN (NM), NLI NLIPN NLS NYS (NY), NCSSBN THEN (NC), NDRACES (ND), BN BRTN OSSBN GoMTRN OSN (OH), OAN OLZ OPEN OTWN STN (OK), BSN NSN (OR), WPTN (Pac.) EPAEP&TN PTTN WPA (PA), CN SCNN (SC), TPN TWN (TN), TEX TEX-SS TTN (TX), BUN UCN (UT), VSBN VSN (VA), WVN (WV), WIN WNN WSBN (WI), APSN (AB), APN (Mar.), MTN (MB), WQV/UHF (PQ).

Transcontinental Corps

TCC-E held extra skeds to handle Hurricane Eloise traffic out of Northern Florida. W2FR writes that 20 meters is going to pot. KØAEM reports that September was a good month but wonders why this only happens when he is out of town for an extended period. "Fairs in the state of Washington sure boosted our tfc totals" comments K5MAT. WØLRN received a TCC-Pacific certificate.

Area	*Functions*	*%Successful*	*Traffic*	*Out-of-Net Traffic*
Eastern	121	95.9	1933	756
Central	89	96.6	1108	554
Pacific	120	95.0	1786	881
Summary	*330*	*95.8*	*4827*	*2191*

The TCC roster (September): Eastern Area (W2FR, Dir.) – W1s NJM QYY, K1s EJR GMW, WA1s MSK POJ S1N, W2s FR GKZ KAT/3, WA2s DSA ICB PJL UWA, WB2s NOM/1 PYM RKK, W3EMI, K3s CB MVO, W4UQ, K4KNP, WA4VFW, W8PMI, K8KMQ, WA8HGH, WB8ITT, VE3s GOI SB. Central Area (KØAEM,Dir.) – W4OGG, WB4DXN, W5s GHP MI QU UGE UJJ, WA5IQU, W9s CXY DND NXG,

WA9EED, WB9NOZ, WØs HI INH LCX QMY ZHN, WAØs MLE TNM, KØCVD. Pacific Area (K5MAT, Dir.) – WA1QME/Ø, W5RE, K5MAT, WB5KSS, W6s BGF BVB EOT MLE TYM VZT, K6HW, WA6DET WB6s DJP OYN, W7s BQ DAN DZX GHT KZ, K7s IWD NHL NHV QFG, WØs LQ URN, KØDRL, WBØHCK, VE7ZK.

Independent Nets (September)

Net	*Sessions*	*Traffic*	*Check-ins*
Central Gulf Coast Hurricane	30	95	2072
Clearing House	–	202	497
Hit & Bounce	30	1099	429
Hit & Bounce Slow	17	75	174
IMRA	28	1098	489
Mike Fanad	26	56	203
Mission Trail	30	170	1185
North American SSB	26	261	455
Washington Region PON	13	73	145
20 Meter ISSB	21	1425	292
75 Meter ISSB	30	411	1301
7290 Traffic	42	463	1661

Public Service Diary

■ Madison, WI – May 19. The Dane Co. (WI) AREC provided communications for the American Red Cross and the Salvation Army when a violent wind storm (80 mph winds) hit the area. Approximately 226 emergency messages were handled on two-meter simplex and the Madison repeater WR9ABT. – (K9PKQ, SEC WI)

■ Great Falls, MT – June 19. Within an hour following notification by the National Weather Service of extreme flood conditions, district six communications officer K7LDZ and area amateurs caused emergency communications to be set up between the local e.d. and the state e.d. headquarters. Simplex and WR7ADO/WR7AFW were used to provide communications to the flood area, where the only means of communication was by amateur radio. This link saved the lives of several injured persons vacationing in the area. – (K7LDZ)

■ Hour Glass Lake, AK – July 25. Following a near drowning,a girl went into shock. KL7HHR, on the scene, put out an emergency call on 14,292 kHz. Several amateurs answered, among them WA8ZDE, who used the SAC hotline to notify authorities in Anchorage. KL7HHR talked the rescue helicopter into the area. The girl was safely evacuated. – (KL7CFX, EC Fairbanks)

■ Gambel, AK – Aug. 30-Sept. 5. On behalf of the Airline Pilots Assoc., KL7GOY provided communications for a group investigating the crash of an F-27. – (KL7CFX, EC Fairbanks)

■ Belmont Co., OH – Sept. 5. Operators at special-prefix station KX8BCF (Belmont Co. fair) opened the local emergency net when a severe storm hit the Ohio Valley. Emergency communications were supplied when a local broadcast station was knocked completely off the air. – (WA8KPN, EC Belmont-Monroe Cos.)

■ Cochise Co., AZ – Sept. 11. Several area amateurs provided on-the-scene communications for the rescue of a couple trapped on a cliff in Carr Canyon, AZ. – (WA7KYT)

■ Union, WA – Sept. 17. Two members of the BEARS net, WA7BSQ and W7LIO, aided the sheriff's department in the search and rescue of an 89 year-old man. – (W7RJW, EC King Co.)

■ Lake Erie – Sept. 20. WA8EXQ/mm8 requested assistance on two-meters when his boat ran out of gas in the midst of a storm. Seventeen amateurs answered his call. The Coast Guard and the man's wife were notified. The amateurs provided him with beam headings and other navigational information. Communications were maintained until 5 A.M. when WA8EXQ was picked up by the Coast Guard. – (WA8HGH, EC Fulton, Lucas, Wood & Ottawa Cos.)

■ San Diego, CA – Sept. 22-26. Hundreds of county amateurs furnished communications during some 58 fires caused by high temperatures and low humidity. Communications were supplied for RACES, AREC, the Dept. of Forestry, several evacuation sites, animal rescue units, and the San Diego office of Emergency Service. – (W6GBF, SEC SDgo)

■ Tucson, AZ – Sept. 22-28. The Tucson RACES net was activated during the police/firemen's strike in the city. The net operated 24 hours a day, with 30 RACES/AREC members participating, including 15 mobile units, for a total of 147 hours of continuous operation. 122 rescue missions were carried out. – (K7NTG, EC Pima Co.)

■ Wileyville, WV – Sept. 28. When a woman fell ill and was rushed to the hospital in Ohio, amateur radio was utilized to contact her husband, who was hunting in the West Virginia mountains. WB8TRR and WA8NDY were among the amateurs who enabled the husband to be notified. – (WA8KPN, EC Belmont-Monroe Cos.)

■ *Repeater Log.* According to reports received, repeaters were used to report 17 traffic accidents and related occurrences, 4 dangerous situations, 3 fires, 1 violent wind storm and twice provided individuals with emergency medical aid. The following repeaters were involved: WR1s AAC ABP AED, WR4s AAD ABR ADF ADJ AEJ, WR6AEP, WR9ADZ, WRØs ADU AIP.

■ Special Activities. *June.* Nine members of the Lakehead, ON, ARC supplied communications for the Boy Scout canoe brigade in the Thunder Bay, ON, area on June 28-29. – (VE3AYZ). *August.* WR8AFZ was used as a communications link in order to facilitate the transfer of participants in olympics for the mentally retarded in the Lansing, MI, area, on August 7. – (W8ISC, EC). On August 25, members of the Cherryville Repeater Association set up an information and message-handling booth at the Flemington (NJ) Agricultural Fair. A local radio station conducted interviews with club members on amateur radio public service. – (WB2GGE). *September.* Volunteers from the St. Petersburg (FL) ARC coordinated communications for the Jerry Lewis Muscular Dystrophy Telethon

BRASS POUNDERS LEAGUE

Winners of BPL Certificates for September Traffic

Call	*Orig.*	*Recd.*	*Sent*	*Del.*	*Total*
W3CUL	523	1059	1512	47	3191
WØWYX	43	623	271	352	1289
W3VR	249	341	557	15	1162
K9CPM	0	150	478	251	879
KØZSO	0	434	0	434	868
WBØHOX	14	356	366	10	746
WB2SHL	145	301	220	81	745
W6RSY	6	363	361	6	736
W1PEX	3	295	296	23	627
WA9VGW	7	313	358	28	606
K8NCV	4	289	286	7	586
WB2EDW	13	263	266	23	565
KØYHK	0	273	0	273	546
WB9NVN	3	245	277	3	528
WB8MZZ	0	224	277	16	517
K7CTW	0	267	247	1	515
WA9VGW(Aug.)	298	40	236	17	591

BPL for 100 or more originations-plus-deliveries

W7DK	456	W9NJP	112 WB5MEO(Aug.)158
WØEIR	159	WA4CLK	105 WBØKWJ(Aug.)121
WA3ATQ	134	WB4IGX	104 WA3WRN(June)108
WB5MEO	116	WA3UYF(May)	107

BPL Medallions (see December, 1973 *QST*, p. 59) have been awarded to the following amateurs since last month's listings: WA3UKZ, WB5HVY.

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.

Public Service Honor Roll September 1975

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.

WB5AMN	72	WBØLJH	52	W1BVR	44
WB5LII	72	WB9MDS	51	WA1RXA	44
WA5YEA	72	K1PAD	50	WA2DIW	44
WBØHOX	68	WB4OXT	50	WB2UJD	44
WB4YKM	63	WB8IGW	50	K3KAJ	44
WA1MSK	61	WBØLOR	50	K3OIO	44
K1PNB	61	WB2IZN	49	WA3SWF	44
WA2DSA	61	W2OE	49	WA3WPY	44
WB2FWW/3	61	WA2PIL	49	WB4DJU	44
WB2SHL	61	WB2RMK	49	WB4EKJ	44
WA4FBI	61	WB2RUZ	49	WB4GHU	44
W5GHP	61	WA3WRN	49	WB4IYW	44
WA5IQU	61	WB4DXN	49	WB5KGP	44
K5ITC	61	WB5EKU	49	WB5MTN	44
WA5ZZA	61	WB5EHA	49	W5VZO/4	44
WB6BDL	61	WB5KQJ	49	WA6DMB	44
W7OCX	61	K5MAT	49	W7CAF	44
W8IBX	61	WB5MTQ	49	W7DAN	44
W9MFG	61	W5MYZ	49	W7GIP	44
VE3FRG	61	WA5PRI	49	K7NTG	44
VE3GFN	61	W6INH	49	WB9KTR	44
W4WNY	59	W7GHT	49	VE3GOL	44
W4OGG	58	WA7MEI	49	VE3GIF	44
WA1QKD	57	K9LGU	49	VE3SB	44
WA1ECM	56	K9ZTV	49	WB8NII	43
W2MLC	56	KØCVE	49	W1EIH	42
WB2RKK	56	W5UGF	48	WA1MJE	42
WA2VPA	56	WAØHMD	48	WA1QME/Ø	42
WB2VTT	56	WBØOCT	48	W2MTA	42
WB2WBH	56	KØZXE	48	WA3DUM	42
WB2WRT	56	WA2PCF	47	WA5VBM	42
WB4JHQ	56	WA3VBM	47	WA5YEA	42
WA5IQA	56	WB6OYN	47	WA6DEI	42
K7CTW	56	W6RNL	47	WB6PVH	42
W7VSE	56	W6RFI	46	WA1SQB	41
K8LGA	56	WA6IVA	46	K4FTB	41
VE3FQZ	56	WAØGLI	46	WA4HYB	41
WA4FPJ	54	WA3BKZ	45	WB4SKI	41
W5KLV	54	K3YHR	45	VE4PG	41
WB9ICH	53	W4WXZ	45	WA3EOP	40
WØOIF	53	WA9QVT	45	W7LG	40
WB5MFQ	52			WAØYNP	40

in Pinellas Co., FL, on September 1. – (WA4APS). Twelve amateurs provided communications along the 60-mile route of the third Atomic Bike Hike on September 7, in the Argonne, IL, area. – (K9GHR). Communications for the "Howard Hundred" 100-mile bike race which covered four counties in MD, were handled by 11 amateurs on September 7. – (WA3SWS, EC). Twenty-nine Hamilton, ON, area amateurs handled communications for a fund-raising drive on behalf of the Cystic Fibrosis Foundation on Sept. 13 – (VE3FHQ, EC). On September 20, members of the Lynchburg, VA, ARC provided communications for the second annual Virginia 10-miler foot race in which over 450 runners participated. – (W4GCE, EC). The Raleigh NC, ARC participated in a "talk-a-thon" on September 20 at Crabtree Valley Mall, NC, for the purpose of handling traffic for visitors. – (W4FMN, EC). The Arctic ARC provided communications for the Vernal Equinox marathon race at the University of Alaska campus on September 20. – (KL7CFX, EC). Columbus (OH) area amateurs handled communications for the Sunriser 400 road rally on September 20-21. – (WB8JBZ). Members of the Quannapowitt Radio Assoc. provided communications for cross-country horse trials in Hamilton, MA, on September 27. – (WA1SYO). The Far West Repeater Assoc. furnished communications for the March of Dimes bike-a-thon near Eureka, CA, on September 27. – (W6GGR). As their first official on-the-air activity, the Burlington Co., NJ, AREC provided communications for a 148 mile motorcycle race on September 28. (K2QIJ, EC). The Tulsa Repeater Assoc. provided communications when a group of handicapped children visited the Tulsa, OK state fair on September 30. – (K5HDO). *October.* The WR8ACS group provided communications for the Rochester, MI, Jaycees bike-a-thon on October 4. – (WA8ZCO, EC). The Milford ARC used their portable repeater for the first time on October 5 to provide communications for a "walk for mankind" in Oakland Co., MI. – (K8SWW, EC). Members of the Lake Co. (IN) AREC supplied two-meter communications for the March of Dimes bike rally in Gary, IN, on October 6. – (WB9HCH, EC). Several Howard Co. (MD) amateurs handled communications for a Boy Scout "camporee" in Ellicott City, MD, on October 10-12. – (WA3SWS, EC). For the second year in a row, the Gainesville, FL, amateur radio society furnished communications for the emergency medical team at all University of Florida home football games. – (WA4YPY). Ten amateurs provided communications for a walk-a-thon in Wilmington, MA, – (K1UAQ, EC). Thirteen members of the AC-ARTS of Fort Wayne (IN) assisted the March of Dimes in their annual walk-a-thon in the area. – (K9PSD).

Seasons Greetings from the Hams of the ARRL/IARU Staff

Doug DeMaw	W1CER
Jean DeMaw	W1CKK
Laird Campbell	W1CUT
R. L. White	W1CW
George Grammer	W1DF
Bob Myers	W1FBY
Hal Steinman	K1FHN
John Nelson	W1GNC
Charles Carroll	W1GQO
E. P. Tilton	W1HDQ
Lewis G. McCoy	W1ICP
J. A. Moskey	W1JMY
Jay Rusgrove	WA1LNQ
George Hart	W1NJM
Jerry Hall	K1PLP
R. L. Baldwin	W1RU
John Huntoon	W1RW
Tom McMullen	W1SL
Jim Cain	WA1STN
Rosalie Cain	WA1STO
Perry F. Williams	W1UED
C. R. Bender	W1WPR
Ellen White	W1YL
Tony Dorbuck	W1YNC
Arlene Bender	WN1VMC
Dave Sumner	K1ZND
Chod Harris	WB2CHO
Bill Dunkerley	WA2INB
Bob Halprin	WB2NOM
Chris Schenck	WB2SEZ
Al Bloom	WA3JSU
Kevin Olson	WA3NAF
Louise Morean	W3WRE
Chuck Watts	WA6GVC
John Troster	W6ISQ
Rod Newkirk	W9BRD
Dave Newkirk	WB9CJS
Maxim Memorial Station	W1AW

Operating News

GEORGE HART, W1NJM
Communications Manager
ELLEN WHITE, W1YL
Deputy Communications Mgr.

ASST. COMMS. MGRS.: *DXCC*, R. L. WHITE, W1CW; *Hq. Station*, C. R. BENDER, W1WPR; *Contests*, JIM CAIN, WA1STN; *Public Service*, BOB HALPRIN, WB2NOM
Affiliated Clubs, ROSALIE CAIN, WA1STO

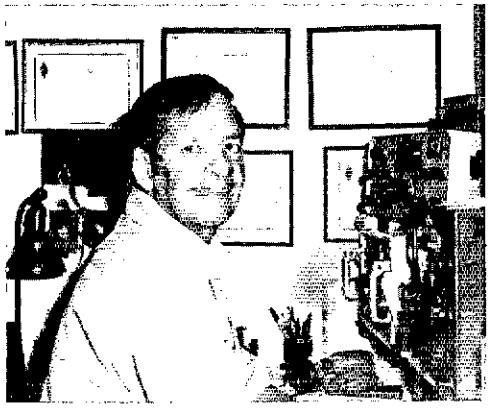
Frequency Coordinators. Those of you active in repeater operation know that throughout the country there are a number of "frequency coordinators" who try to see that new repeaters coming on the air do not find themselves interfering with an established repeater in the same area and who try to settle problems that develop. Most of them do an absolutely stellar job, at considerable expense of time, effort – and yes, even money. It's another one of these amateur radio jobs that has to be done and, as in most cases, someone just plain steps forward and does it. No matter that the position is unofficial, has no status, reaps few rewards in the form of thanks, plaudits, or appreciation. On the contrary, it reaps more headaches than anything else. But if no one steps forward to do it, it won't get done, and so we have frequency coordinators. There are 58 of them listed in the back of the current ARRL Repeater Directory.

Where do they come from? Mostly from repeater clubs and councils or other affiliated clubs with a large contingent of repeater enthusiasts. Or, occasionally in an area without an energetic repeater organization but a lot of repeater activity, an individual will step forward and volunteer to coordinate frequencies. Or, in some cases he will just start doing it and acquire recognition through doing.

Who appoints them? At present writing, nobody. Not officially, anyway. Usually an individual will seek appointment or some club or council will seek appointment of one of its members through ARRL headquarters in the person of the headquarters liaison to the VHF Repeater Advisory Committee (W1ICP) and Mac will say okay, I recognize you, and the guy finds himself listed in the next printing of the directory. It's a very informal sort of arrangement and it has caused problems, but generally speaking it seems to work.

Of course, it could work better. Repeater frequency coordination is a leadership type of job and should have leadership operating status. A conference on the subject recently at headquarters discussed this matter in some detail, revolving mainly about the question: Shouldn't ARRL appoint repeater frequency coordinators? Other questions were: Can the present status quo, enjoying as much success as it has so far, be maintained? Who would appoint them? What would be their specific duties? To what extent, if any, could they be funded? And here's a key question: What authority would they have?

A number of possibilities present themselves. The most obvious one is that frequency coordinator be made a regular SCM leadership appointment, similar to emergency coordinator. The problem with this is that the scope of an FC's function would often transcend section boundaries. An alternative would be appointment by the communications manager (probably delegated) in the same manner as NTS region and area net managers are now appointed, coverage areas (and indeed individuals) to be recommended by repeater clubs, councils and federations in the area concerned, with the cognizance of the individual's resident SCM. The latter looks like "the way to go," and by the time



Newly reelected Louisiana SCM Bob Schmidt, holder of W5GHP since 1936, resides in New Orleans. Bob holds an EE from Louisiana State University and is a senior computer for Offshore Navigation, Inc. In addition to his SCM duties, Bob is an ORS, Assistant Director and a former RM. He is a member of the Delta DX Association and the Greater New Orleans Amateur Radio Club. W5GHP is a proficient cw operator (40 wpm) and holds BPL as well as 3 Public Service Awards for work during hurricanes in the Gulf. The W5GHP station includes a Heath HX-10, a Globe King modified for RTTY, Collins 75A-4, Heath SB-303 and surplus APR-13 Navy receiver. Antennas are a triband two-element quad, 40-meter dipole and center-fed longwire. Favorite bands are 40-80 cw/RTTY and 20-15 ssb/RTTY. Other activities include photography, the Masonic Lodge, golf and Navy MARS NØJNC.

you read this the wheels may be in motion. The tendency is to move rather swiftly on this, to fill what appears to be an urgent need.

Duties? Besides the obvious one of assigning frequencies, the FC (frequency coordinator) would determine power levels to minimize cochannel interference and, where required, time-sharing of repeater groups on the same channel.

Funding? Provisions now exist for reimbursement of certain administrative expenses of certain leadership people. FC expenses should not be great and could probably be worked into this same pattern. Travel expenses should not be required.

Sounds like the FC will need some authority. FCC has been involved in a number of repeater frequency hassles in the past and would like to be able to turn to a recognized authority to settle such matters. Although the Commission of course cannot abdicate its function of regulating, arbitration is a different matter. It can give official cognizance to responsible individuals appointed by a responsible organization and act on his recommendations in any given situation. It might work something like the TVI Committees of recent years. Someone comes to FCC with a frequency problem. FCC refers the matter to the frequency coordinator concerned, who looks into it and, if possible, effects a solution. If no specific solution is possible, the FC may submit a finding and make some recommendations, which FCC can follow or not follow but probably usually will.

Yes, an official frequency coordinator is needed and ARRL should set it up. Just how best this can be accomplished is being studied both at headquarters and in the field, with, we hope, suitable action forthcoming in the very near future. – *W1NJM.*

W1AW – THE MAXIM MEMORIAL STATION

Operating-visiting hours are Monday through Friday 1 P.M. to 1 A.M., Saturday 7 P.M. to 1 A.M. and Sunday 3 P.M. to 11 P.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 details and the general contact schedule are available upon request. All frequencies shown are approximate. If you wish to operate, you must have your original operator's license with you. The station will be closed Nov. 27 and Dec. 25-26, 1975; Jan. 1, Feb. 16 and Apr. 16, 1976.*Staff:* Chief Operator/ARRL Asst. Communications Mgr. C.R. Bender, W1WPR; Alan Bloom, WA3JSU; Chris Schenck, WB2SWZ.

Code Practice

Approximate frequencies: 1.805 3.58 7.08 14.08 21.08 28.08 50.08 and 145.5888 MHz. For practice purposes the order of words in each line may be reversed during the 5-13 wpm transmissions. Each tape carries checking references. Details on Qualifying Runs appear monthly in *QST* Operating Events. The 0230Z practice is omitted four times a year on designated nights when Frequency Measuring Tests are sent in this period.

Speeds	*EST*	*UTC*
5-7 1/2-10-13-20-25	9 A.M. MWF	1400Z MWF
	9:30 P.M. TThSSu	0230Z MWFS
10-13-15	4 P.M. M-F	2100Z M-F
	7:30 P.M. Dy	0030Z Dy
35-30-25-20-15	9:30 P.M. MWF	0230Z TThS
	9 A.M. TTh	1400Z TTh

To improve your fist by sending in step with W1AW (but not over the air!) and to allow checking the accuracy of your copy on certain tapes, note the UTC dates and *QST* text to be sent in the 0230Z practice from the September issue of *QST*

12/5	It Seems to Us	12/18	Pub. Sv.
12/9	Correspondence	1/2	World Above
12/15	League Lines	1/5	YL News

BULLETINS
(Columns indicate times in EST-PST-UTC.)

Phone Bulletins (1.82 3.99 7.29 14.29 21.39 28.59 50.19 145.588 MHz):

2100 Dy	1800 Dy	0200Z Dy
2330 M-S	2030 M-S	0430Z T-Su

CW Bulletins at 18 wpm (1.805 3.58 7.08 14.08 21.08 28.08 50.08 145.588 MHz):

1630 M-F	1330 M-F	2130Z M-F
2000 Dy	1700 Dy	0100Z Dy

CW Bulletins at 10 wpm (same frequencies as above):

0000 M-S	2100 M-S	0500Z T-Su

RTTY Bulletins at 170 Hz shift are repeated at 850 Hz shift when time permits (3.625 7.095 14.095 21.095 28.095 MHz):

1730 M-F	1430 M-F	2230Z M-F
2300 M-S	2000 M-S	0400Z T-Su

Oscar Bulletins (18 wpm on cw frequencies):

0840 M-F	0540 M-F	1340Z M-F
1400 M-F	1100 M-F	1900Z M-F
1600 Su	1300 Su	2100Z Su

Oscar RTTY:

1700 Su	1400 Su	2200Z Su

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.

5-BAND AWARDS

(Updating the November 1975 listing.)

5BDXCC: (Starting with number 460), LU8AJG I1UW F2VX.

5BWAS: (Starting with number 228), WA6GHH.

New A-1 Operators

W1DKU W1TM K2TCF WB2RDO W3BWZ W3ZSR W4CRW K4DAS W6MHR K8RMN WBØCZR

DXCC Notes

Announcement is hereby made of two additions and two deletions to the ARRL Countries List. The two additions are *Papua New Guinea* and *Tuvalu*. The two deletions are Papua Territory and Territory of New Guinea.

The deletions of Papua Territory and Territory of New Guinea, and the addition of Papua, New Guinea, are in view of the final stage of the combining of the Territory of New Guinea with Papua and the independence of Papua Territory from Australia. Confirmations of contacts with stations located in Papua, New Guinea dated September 16, 1975, and after will be creditable toward the new Papua, New Guinea listing. The prefix of stations operating in Papua, New Guinea is currently P2.

On January 1, 1975, an administrative separation will be made in what currently is, and has been, the Gilbert and Ellice Colony. The Ellice Islands will become a Crown Colony, completely separate and no longer a part of the Gilbert and Ellice Colony. The name will be known as Tuvalu. It is expected that the prefix for stations operating from Tuvalu will be VR8. DXCC credits for Tuvalu will be for contacts made January 1, 1976, or after.

Submissions for DXCC credits for Papua, New Guinea and Tuvalu will be accepted starting January 1, 1976.

SCM ELECTION NOTICE

To all ARRL members in the Sections listed below.

You are hereby notified that an election for Section Communications Manager is about to be held in your respective sections. This notice supersedes previous notices.

Nominating petitions are solicited. The signatures of five or more ARRL full members of the Section concerned are required on each petition. No member shall sign more than one petition.

Each candidate for Section Communications Manager must have been both the holder of amateur Conditional Class license or higher (Canadian Advanced Amateur Certificate) and an ARRL full member for at least two years immediately prior to receipt of petition at headquarters. Petitions must be received on or before 4:30 P.M. Eastern local time on the closing dates specified. In cases where no valid nominating petitions were received in response to previous notices, the closing dates are set ahead to the dates given herewith. The complete name, address, zip code of the candidate and signers should be included with the petition. It is advisable that a few extra full-member signatures be obtained, to insure that it will be valid.

Elections will take place as soon after the closing dates specified as full information on the candidates can be obtained. Candidates' names will be listed on the ballot in alphabetical order. The following nominating form is suggested. (Signers should be sure to give city, street address and zip code.)

Communications Manager, ARRL (Place and date)
225 Main Street., Newington, CT 06111

We, the undersigned full members of the . . . ARRL Section of the . . . Division, hereby nominatee . . . as candidate for Section Communications Manager for this Section for the next two-year term of office.

You are urged to take the initiative and file nominating petitions immediately.

George Hart, W1NJM, Communications Manager

Section	*Closing Date*	*Current SCM*	*Present Term Ends*
Vt.*	12/19/75	J. H. Viele, W1BRG	3/1/74
Sask.*	12/19/75	P. A. Crosthwaite, VE5RP	4/10/75
S.N.J.*	12/19/75	C. E. Travers, W2YPZ	3/4/76
N.N.J.*	12/19/75	W. S. Keller, III, WB2RKK	5/11/76
Mo.*	12/19/75	B. H. Moschenross, WAØFMD	5/11/76
Quebec*	12/19/75	L. P. Dobby, VE2YU	6/1/76
S.C.*	12/19/75	R. H. Miller, WA4ECJ	6/5/76
W.Pa.*	12/19/75	D. L. Myslewski, K3CHD	6/12/76
E.Mass.*	12/19/75	F. L. Baker, Jr., W1ALP	6/15/76
Wyo.*	12/19/75	J. P. Ernst, W7VB	6/26/76
Minn.*	12/19/75	T. Olson, WØIYP[1]	8/1/76
W.N.Y.*	12/19/75	G. W. Hippisley, Jr., K2KIR[2]	8/18/76
Neb.	2/20/76	C. R. Dyas, WØJCP	7/1/76
NYC-L.I.	2/20/76	J. H. Smale, WB2CHY	7/5/76
West Indies	2/20/76	J. S. Sepulveda, KP4QM[3]	7/12/76
SJV	2/20/76	R. Saroyan, W6JPU	8/20/76

*Repeat Solicitations
[1] Resigned 9/1/75
[2] Resigned 8/18/75
[3] Resigned 9/5/75

SCM ELECTION RESULTS

Valid petitions nominating a single candidate were filed by members in the following sections completing their elections in accordance with applicable rules, each term of office starting on the date given.

Manitoba	S. Fink, VE4EO	1/11/76
SCV	J. A. Maxwell, K6AQ	1/11/76
N. Dak.	M. J. Worcester, WAØWLP	2/11/76
E. N.Y.	G. J. Ferdinand, WA2PJL	10/21/75

Balloting Results: In the Kansas Section, Mr. Robert M. Summers, KØBXF, and Mr. Curtis R. Williams, WBØCZR, were nominated. Mr. Summers received 294 votes and Mr. Williams received 203 votes. Mr. Summers new term of office began September 5, 1975.

In the Louisiana Section, Mr. William E. Mixon, K5SVD, and Mr. Robert R. Schmidt, W5GHP, were nominated. Mr. Schmidt received 255 votes and Mr. Mixon received 245 votes. Mr. Schmidt's new term of office began November 4, 1975.

In the Virginia Section, Mr. Robert L. Follmar, W4ODY, and Mr. Leland W. Smith, W4YZC, were nominated. Mr. Follmar received 701 votes and Mr. Smith received 441 votes. Mr. Follmar's term of office began November 11, 1975.

In the Maritime Section, Mr. Aaron D. Solomon, VE1OC, and Mr. Antoine Villeneuve, VE1XM, were nominated. Mr. Solomon received 197 votes and Mr. Villeneuve received 46 votes. Mr. Solomon's term of office begins December 10, 1975.

In the Illinois Section, Mr. Lawrence I. Cotariu, WA9MZS, Mr. Roman G. Martin, Jr., W9AES, and Mr. Edmond A. Metzger, W9PRN, were nominated. Mr. Metzger received 1,358 votes, Mr. Martin received 402 votes and Mr. Cotariu received 148 votes. Mr. Metzger's new term of office begins December 15, 1975.

In the Northern Florida Section, Mr. Frank M. Butler, Jr., W4RKH and Mr. Desmond E. Yong, WB4DXN were nominated. Mr. Butler received 417 votes and Mr. Yong received 159 votes. Mr. Butler's new term of office begins December 15, 1975.

In the Eastern Pennsylvania Section, Mr. Paul D. Mercado, W3FBF and Mr. George S. Van Dyke, Jr., W3HK were nominated. Mr. Van Dyke received 582 votes and Mr. Mercado received 570 votes. Mr. Van Dyke's term of office began October 22, 1975.

In the Delaware Section, Mr. Roger E. Cole, W3DKX and Mr. James E. Hicks, WA3DUM were nominated. Mr. Cole received 111 votes and Mr. Hicks received 49 votes. Mr. Cole's new term of office began October 10, 1975.

In the Michigan Section, Mr. Allen L. Baker, W8TZZ and Mr. Keith D. Harris, WB8OBR were nominated. Mr. Baker received 952 votes and Mr. Harris received 394 votes. Mr. Baker's term of office began September 29, 1975.

ARRL AFFILIATED CLUB HONOR ROLL

Central Kansas Amateur Radio Club, Salina, KS
Central Ohio DX Association, Groveport, OH
Charles River Wireless Society, Walpole, MA
Cincinnati Chapter – O.M.K.K. Electronics Assoc., Cincinnati, OH
Kentucky Amateur Radio Association, Louisville, KY
Lake Area Radio Klub, Watertown, SD
Lower Columbia Amateur Radio Association, Kelso, WA
Mile Hi DX Association, Lakewood, CO
Northern New Jersey Radio Association, Englewood, NJ

(Continued on page 98)

DX CENTURY CLUB

The following list contains the call letters and country totals of holders of the DX Century Club Award who have submitted confirmations to ARRL Headquarters for the period from October 1, 1973, through September 30, 1975. New Members for the period from September 1, 1975 through September 30, 1975 also appear in this list. Since the necessary space to run the complete DXCC Roster is not available, (the total number of DXCC certificates issued as of September 30, 1975 was 22,696), this list contains only the calls and totals of those who have shown an active interest in their DXCC rating over the indicated 24 month period.

355
W6AM
W9BG
354
IU6DJX
W2AGW
W2BXA
W4FX
W8DAW
353
K6ZO
W1BIH
W3KT
W5KC
W7MB
W8EWS
W8GZ
W@ELA
352
W1AX
W3MP
W4AIT
W4OM
W9LNM
W@DU
ZL1HY
351
OE1ER
VK4QM
W4GXB
W7KH
W8BF
W@BW
350
PY2CK
W1HX
W2CTO
W3EVW
W5MMK
W6HX
W6ZO
349
GW3AHN
LA7Y
OH2NB
W2IVU
W2OHH
W3LMA
W8WZ
348
CE3AG
G5VI
VE2NV
W2CYS
W2LV
W2OKM
W3CGS
W6ANN
W6BZE
W7ENW
W7PHO
W8LKH
W8MPW
4X4DK
347
DL1KB
G3FKM
G3HXB
HB9MQ
K2BZT
K4KQ
K6AN
K6NA
ON4NC
W1HZ
W4BYU
W4ML
W4VPD
W5AO
W6CYV
W6EPZ
W6GPB
W6TZD
W@SYK
346
DJ2BW
DL4RK
G3HOZ
I@AMU
K6OI
PA@FX
W1DK
W1MV
W2AO
W2BOK
W2DOD
W2NUT
W2RGV
W2SSC
W3NKM
W5PQA
W6CHV
W6FT
W8DMD
W8JBI
W9EKC
W@KI
345
K2FL
W1FZ
W2CR
W2GT
W4QCW
W4IM
W5IO
W6DZZ
W6ID
W6WWQ
W8BT
W8PHZ
W9GIL
W9JUV
W@MLY
YV5AB
344
DL6EN
G3AAE
K2BK
K6DC
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W2HTJ
W2QM
W3WGH
W5UX
W6KZL
W8QJR
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W9RKP
W@PGI
W@QGI
343
G2HVN
IT9TAE
K4LNM
K6CH
W1AZY
W1JNV
W2AYJ
W3LMO
W6CAE
W6NJU
W7ADS
W7OE
W7SGN
W8ZCO
W9HB
W9SFR
342
DL7EN
G6TA
GI3IVJ
K2LWR
K3HW
K6EC
SM3BUZ
W1CBZ
W2AX
W2GLF
W2HO
W5FFW
W6FOZ
W8KPI
W9DWQ
4X4JU
341
KH6CD
LU4DMG
W1GYF
W2BHM
W4ELE
W4LRN
W4MR
W5MMD
W6RKP
W9GFF
W9TKV
ZL3IS
340
DL9OH
K6LGF
LU5AQ
OK1EF
W2BMK
W2FXA
W2FZY
W3GRS
W4HJ
W4HQY
W4MCM
W5PT
W5NMA
W6OSU
W7AQB
W8OK
W@AIH
YS1O
339
DL1BO
DL1JW
G3HCT
HB9KB
IIZL
JA1DM
K4PDV
PY1HX
W2CKY
W2GC
W2TP
W6PO
W8KBT
W9RCJ
W9WYB
ZS6LW
338
JI9ZGY
K8IKB
K8LSG
W2IRV
W2PDB
W3AFM
W4IF
W5HDS
W5QK
W5TIZ
W6KG
W6SQP
337
GI3JIM
I8KDB
K2UVU
K6RQ
OZ3Y
VE3BWY
VE5RU
W1CKA
W5PWW
W6KUT
W6ZM
W7QK
W8LY
W@GKL
W@LWG
336
DL1HH
DL3BK
JA1AG
JA1BK
K7GCM
K9ECE
OK3MM
PY7YS
W2DXX
W2YY
W4DQS
W4SSU
W5KGX
W5NOP
W5NW
W5PM
W6FF
W7CMO
335
DL7HU
JA2JW
K8ONV
VE2WA
W1HH
W5GC
W5LCI
W5WZQ
W6ONZ
W6TS
W6UQQ
W9MQK
334
KI1XG
K2TQC
K2YXY
K4EZ
K4VW
K5BGB
K6KII
K6OW
KP4RK
VE3AAZ
W1BPW
W2CP
WA2DIG
W5HIA
W5OB
W5QKZ
W6ISQ
W9DIW
W9TKD
333
I3A1
G2FYF
K4RPK
K6GA
K8KIW
OH2LA
UR2AR
W1AS
W3DJZ
W8DA
W8KIT
W@BK
YV5AIP
332
F9RM
HB9MX
JA3UI
W4BFR
W6REH
WB6DOP
W9CH
W9GB
W@AUB
XE1AE
331
DL7AP
K6WR
K6ZM
OK1ADM
SM7ANB
W1WY
W4NJF
W5GJ
W6FZJ
W9HJ
W9ZTD
W@BN
W@CJZ
YV5BX
330
DL1DC
G3IOR
JA1ADN
K1SHN
K2OO
K2PXX
K4JC
K4MQG
K6OM
K6RN
K8OHG
OE1FF
W1AXA
W1DGJ
W1MIJ
W2GKZ
W2PV
W3GJY
W4KC
W5LJT
W6ABA
W8BGU
W8CT
W8CUT
329
JA1BN
K4SCT
OH2QV
SM0AJU
W1GL
W1QJR
W2QK
WA2KAU
W6FL
W6KTE
W8ARH
YV5BZ
ZS6YQ
328
JA1BKK
K6AHV
WA2RLQ
W3VW
W6YMV
WA6FPQ
327
DJ7ZG
GI3OQR
OH2BH
PY2CQ
PY2PA
PY2SO
W2ZIV
WB2HXD
W5KTW
WA6GLD
W7QPK
W7RS
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326
DJ5DA
DJ@KQ
K8WOT
K9BGM
UA9VB
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W4FEU
W5UR
W6IKJ
W6KZS
W9QLD
W@CKC
YV5AHR
YV5BPJ
325
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K4YYL
K5AAD
K5GOT
K6GLC
K6QH
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ON4BA
PY1HQ
SM5AZU
UA1CK
UA3CT
W2PN
W4KFC
W5RDA
W6RGG
W2QNA
YV5ANF
YV5BBU
324
I2KMG
K4MZU
K4TWK
K6EV
PY2PF
W2GQN
WB2EMK
W3CS
W4HOS
W6EUF
W6MUR
WA6MWG
323
DL1CE
JA4ZA
KIRQE
KIYZW
K4MPE
OE1FT
PY2BKO
WB2CKS
WA4WIP
W8JQ
W9LTR
322
DJ7CX
I4ZJG
I7ZPB
JA7AD
JA8ADQ
K4IKR
K8EHD
SM6AEK
VE1VR
VE3MJ
VE3WT
W8KGR/4
W6DOD
W6HVN
WA6OET
321
W6PN/DL
I5ARS
JA1ZZ
PY4AP
OB5WF
VE7CE
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W4BRB
W4ZXJ
W6FW
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W8YGR
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W9JK
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YU1BCD
ZL3OY
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DL7AB
DL7BK
HB9DX
JA1BBX
JA1MIN
JA8AA
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OH2QQ
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W9RQM
W9WNB
YV5BNW
319
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W5LZZ
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WA9NUQ
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318
DL3OH
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PY4OD
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WA3ATP
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317
F2IU
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PY7APS
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W6KYJ
WA8NYB
YV5AE
316
IA8IL
K2LGJ
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VE3NE
W2HI
W2LL
WB2UKP
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K6AO
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OZ6MI
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SM6CWK
VE3DBT
W1AA
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W4JVU
WA4MUB
W6GMF
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W8ROC
WA9IVL
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JA8ZO
K1KDP
OK1ADP
VK3YL
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W4AUH
W4BRE
313
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EA8CR
K2OUS
K4ET
K4GXO
K4RTA
K8IEF
OH2BR
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W2CNO
WA3IKK
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JA2AAQ
K1JHX
VE3DDR
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W9NVJ
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ZL1ARY
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IT9SEZ
JA1UQP
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OH5VT
WA4PFD
WA6AUD
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DJ4PI
DJ5IA
DJ6RX
DL6KG
EP2TW
JA2PJC
JA7PHU
K2KTK
K6JR
OH3NY
OZ5DX
PY1DH
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KH6GLU
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SM6BQC
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W2AJR
WA2JBV
WB2PGM
W3EYF
W4AAV
W4ORT
W4SYL
W4UMF
W4ZSH
W5LJT
W5UU
WA5AUZ
W6GC
W6MI
W6YHF
WR6DXU
WB6PNR
W7PK
W8CEG
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WA9WJE
YV5AK
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K6BFT
K6LAL
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YU3EY
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K6SOK
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W6CDJ
W9HK
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297
I7HH
W4JD
W4QVJ
WA5RTG

296
W7LJ
295
JA1FDU
JA8MS
K8IDE
WA1GUH
WA2BLV
W3HNK
294
W4YUU
W5QN
WB6APX
W7LZF
293
W3JXH
W7MVC
W7YOI
W8BQV
292
EP3AM
WB2NUU
W4CRW
W5EDX
WA9JDT
WA9DUB
ZS6RM
291
DL1YA
JA3DY
K5FKD
K6PZ
K6SVT
K6UFT
VS6DR
W1DXB
W5IJW
W6HJA
WA8PYL
W9KNI
290
DK1EW
OK3GI
UBUP
JA1HHM
K3UIP
K4MG
K6HIM
K6OJO
K9PQG
OZ7BG
OZ8BZ
VE3HBH
W1EW
W1GRE
W1LQ
W2HAI
W2UI
W3KA
W3LB
W4WWG
W5HCJ
W5NBI
WA5IMK
W7VRO
W8QXQ
W9MYD
289
K4GSS
SM5AM
WA1HFN
W4ASF
288
WA2FAH
W4EJN
W4QQN
W6BJJ
W6VBI
W9LNQ
287
SM2EKM
W1AM
WA4DRU
286
OF1ZGA
W6WG
285
JA6BEE
K6GWN
W9LW
W9ZWH
284
JA2AN
K4EWG
W5PAQ
W7YEN
283
JA2IOD
K5EVA
KP4DJE
OH2SB
OK3EA
VE5KG
W1ESN
WB2AMO
W7DQM
W8LBM
282
EA4CR
K4GLA
OH8SR
W1EOA
W2UBI
WA4HHW
WA8INJ
YU1EXY
ZL1AMO
281
JA3KWJ
K3SXQ
K4RA
K5AEU
K5JZY
K9VQK
PY5UG
SM0MC
W1OR
W2OST
W3AXW
W3QLW
W3ZUH
WA3ATX
W4NT
W4VJH
WA6LLY
280
F2NB
I2YDX
JA2AH
K2DNL
K4BHG
K4CKA
K4DXO
K4GFI
K8TVO
KP4BJM
SM7TV
WA1ABW
WA2BCK
W3RRB
WA4YVQ
WB4SIJ
WB5BID
W6OL
WB6WHM
W9IDO
W9LJU
WA9SLD
WA9UCE
279
K0IEL
SM5WI
VE3BMB
278
OZ7PH
277
YU4EBL
276
JA1GTF
K4TSJ
K7RLS
W3RBO
W4GIW
W5DJ
275
K5EVA
K6UIS
K0PMZ
VK6CT
WB2QMU
W8EUU
W0HBH
274
HB9NL
K0GSV
KV4AM
W5LPO
WB6HDG
W7ONL
273
F2VX
K2QHL
K0IEA
WB4UYD
W5RO
WA7PMI
WB9EBO
272
G3KAA
K6FWT
OH2BCV
W1KGH
W2SJM
W5JJA
W7ETZ
WA9UER
ZL2ACP
271
JA1AAT
JA3BG
JA8JO
K8CSG
W2MB
WA2UWA
W4KNP
WA4MSU
W5KHP
W5QIX
WA5ZWC
W8UM
W9ALI
WA0FLT
270
DK9FB
LA3NC
JA8KB
K2AHO
K4AEB
K4FJC
K6IR
K8UNG
OZ7IZ
OZ8KR
SP3DOI
W1DAL
W2CUC
W2FB
W2GA
W2RSJ
W3HTW
W5KKZ
WA5WEY
WA8TDY
W9CI
W9VCQ
WA9UEK
WA9VIZ
WB9GIT
W0AO
4X4NJ
9H4G
269
SM6IDBB
WA9ZCP
YU1ODO
268
DJ0MW
DL1TA
OH2FS
W0NAR
267
JA1RWU
JA2BUR
K3SEW
R4ARP
W1AB
266
WA1SSH
WA3DVO
265
JA1BLV
W5IMN
W6JHV
264
HB9RX
PY1JN
W8LAV
WA9IBT
263
DL3AR
DL3BJ
JA3BRI
K6DT
SM5BFJ
WA3MBQ
WA9NHQ
WA9QAM
262
K1NDK/4
SM5AQB
W3GID
WA5RXT
W7ZHZ
261
HB9AMO
K1EJO
OK3HM
WA3GIZ
W4KN
W5QBG
W9NN
260
CT3AN
DJ5GG
DK3LP
DL1LD
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G3GIQ
JA1WWK
JA6HSM
JA6ILO
K2GBC
K3CHP
K4KIN
K6NM
K6WD
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K0DYM
KP4DKZ
OE1CP
OE1IRW
OH2BGO
SM6EQS
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W2BBK
W2REH
WA3BGC
W4EZ
W4HY
WA5UBV
W6OMR
W6VD
WA6JVD
WB6WIW
WA7RFH
WA8GPX
WA8VFK
W9ELG
WA9EQG
W0CDC
W0IBZ
ZC4CB
9Q5QR
259
DK9WB
JA3DWT
W4AES
WA4NRF
VE3DXV/W6
W6UA
W8OBI
258
OZ7HT
257
DJ4AX
HK0BKX
W3QOR
W4KNW
WA5ALB
256
I4TH
OK2DB
WA6CMX
255
WA2FCA
WA6FYC
W9VIN
254
DJ4QQ
EA2CR
W3ZSR
W6FFD
W7GSP
WA8QIY
253
G3KMQ
JA3BQE
JA3MF
K4OD
VE2AYY
WB2OZW
W7BE
W7TE
252
G3NKQ
K4JWD
K7GYA
OE1GHC
WA1JMP
W2BXY
W2MBU
WA2AUB
WA2CLQ
W3FSF
W6KQY
W7TLG
W8DUA
251
DK5WL
JA0GRF
K6TXA
W1QUS
W1SG
W2ABM
WA2CCF
WA2DYK
W3GL
W3KJ
W5KFN
W6YOY
ZL1QW
250
CP1EU
JA2DJH
JA3MXR
K4LR
K4UN
K6ARS
K0SGI
OE3HOW
OH2VZ
W3KVS
W3YHR
W3YX
W3ZBW/4
W5HMM
WA5EMH
W6APW
W8UND/6
WB6RIU
W7DH
W7JWE
W7PFZ
W8EPM
W8SYR
W9MCR
W9QEQ
WA4EXL
W0IU
WA0OMA
249
K4OMR
K5CIT/KH6
WB6ZUC
YV5CWO
248
JA4EHE
W2EVI
W4LBP
247
WA4FHK
246
DJ5BW
JH1BAY
245
K1ZND
PY2DBU
WIRED
W2DEO
W3TVB
W4DQD
W4TK
WB4JSV
244
JA8AQX
W1CNU
W2BVN
W4WRY
W4WWD
YU1NYP
243
CT3BH
G3TOE
K5DGI
OH1MK
SM5BNZ
SP7HT
WA4CQD
WA9TVM
242
HB9AT
K2YUJ
OZ1AJ
PA0LRK
W1GTJ
W4DSW
W4KA
WA4LDM
W9VBV
YU4HA
241
DL1LZ
DL7MQ
JA1FHK
JA6CNL
K4LDR
PY2BW
VE3BS
W2HL
W4BAA
W5HIC
WA5FEM
WA8BJQ
W9MLG
W0YZB
YU2CBM
YU2OB
240
EA3NA
G3TXF
HB9AGU
IH1LPF
JA3FMU
K4CDZ
K4SGL
K4ZYU
K5ISR
K8HLR
K9ZXG
KP4DDO
PY2BBQ
VE3CVZ
W1CMH
W2ABL
W2PSU
WB2AIO
WB2AQC
WB2BNF
W3AX
W3MDO
W4UPJ
W4WHK
WB4PUD
W5SBX
W5UDK
WA5YMW
W8MFW
W9BMD
239
CE6EZ
K2HVN
OH3MF
SP3AIJ
W1MX
W2BZL
WA3GNW
W5LW
W6LVN
W0AV
238
F8OP
IA8AYN
W8QFR
YU2BBH
237
JA7ZF
236
W6OAT
235
K6OT
W2RHK
W4JAT
234
K1AWP
OK2BOB
WA9JCO
233
WA4EYR
W9BQE
232
DL1AM
HB9ALX
W2IYX
WA2MBP
W8TJQ
231
K8VRZ
W0JMB
W0JYE
230
DK3SF
DL0WW
JA6BZI
PY7VON
SM7AVA
W4HNW
W6RFX
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OF1KN
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W8LBU
WB8DBA
W89PRG
WB9IVC
108
DK1HO
G4BVH
HKBZ
JA3OSL
JR3EDN
JA7SPI
K5SWW
OK3ZMT
TU2DE
OW3UH
VE4OM
W2DOE
W2GLF
WA3HQ
WA3TUW
WB9RXX/3
WA6GPW
WA7IHN
WA7NXS
W8CTR
ZL2AUS
107
DL8VJ
DM3OML
I3EGD
JR1ENE
JA3FY
JA7JWF
K9IWA
KØUTX
KX6LA
OH7OQ
OH8BX
UK6LDZ
WA2NPQ
W3SRK
WB6PZW
WA7HRE
YU2REE
6V5RM
9V1RF
106
DJ5TH
DK3QE
DL8DU
DL8WX
F2JD
F6APP
G2HLU
G3RYV
G6RO
HA4YF
HS3ACP
JA1HQ
JA1KQX
JA4BUA
JA5NC
JA6WW
K1UJB
K8SQR
K7CLO
K7MCG
K7YUR
K9MKC
OH6XY
OK1XN
SM5DXE
UK3AAB
UWØIQ
W1GME
W1IHN
W2RC
W2RRY
WB2JGD
W4MVM
W4SCI
WB4TAF
W5FIB
WB5IYB
WB6CKO
WB6HAR
WB6PDD
WA7PVU
WØNZS
YU1INO
105
DJ6CK
DJ9UN
DK1OIJ
DM2CRJ
DM2EBL
ET3USC
G4BGY
GW3SYL
HB9ASL
I6ANZ
JA1BUI
JE1HSD
JH1EYM
JR1RRV
JA2WAA
JA6BMB
JA6XE
K4HWW
K8MNP
K8WLS/KL7
KX6GS
LA1PG
LA8UK
OH1MO
OK1KPZ
OZ9VO
UB5PS
UK6LEZ
VE2GA
VE2IR
VE3SLC
WA1OEP
WA2GUR
WB2ABD
WB2BXL
WB5EHF
W6LS
W7IMP
WA8ICQ
WB8HYE
WB8NVD
W9MOQ
WØNGS
XE2MX
YU2NPY
ZL4FT
4Z4IX
9V1QD
104
DJ8XO
DK6GN
DM2AHB
EA3JJ
JG7AM
G3CPA
G4BGE
JA1HOM
K1EVS
K5PHB
KØQNN
KØZTV
KH6HDB
LZ1KDP
LZ2RB
OH9ED
OK1MAW
SM5AKS
SM6EHP
UA6AE
UI8AQ
VP2MAH
W2IFE
W2JI
WA2TTJ
WB2AEH
WA3ERG
WA5IOU
WA7JSC
WA7QCN
WA8GRR
WB8MVX
WØIYR
YU1KJ
YU2HA
YU2RVL
YU3TCQ
WA8TEJ/YV6
103
CX7BBB
DJ1NG
DJ6LK
DK5VC
DK6NC
DL6VW
I3AJP
F6CZU
HA5HS
HS5AEJ
IA1KW
IE1HDF
IH2EVL
JH3MOC
JR3ISM
JA6HCS
KIGBU
K4BOE
K4RTI
K6ILM
K6MEN
K6YQ
K9SJJ
LA5BE
LA6LS
OZ6ZS
SM6DSW
UA3IO
UA3PN
UA9IAJ
UA9PY
UP2BB
UY5EJ
VE3ADJ
VF4EW
VE7UBC
VP2ELA
WIDYH
WIEYG
WIIO
WA1RHA
W6BS/2
W2HGN
WA2BIQ
WA2EYH
WB2EQR
W3BHF
W4JGE
W4NXD
W4LYZ
WA2APQ/4
WB4LYU
WB4ZTI
WB5EDV
DJ6RX/W6
WB6EXW
WB6KSZ
WB8ACK
WB8IDA
WA9UMP
WØOXN
WA9FBQ
YU1GMN
YU1NET/X
YU1NOT
ZS6AEC
102
A2CEW
DJ3CO
DJ3MJ
DK5MP
DK6QQ
DK8MA
DL6WF
DLØVK
DM2CJJ
DM2DXO
EL4D
EP2WH
FI8AC
FY7AN
G4ZRH
GM5BAZ
HS2AFV
I5BWJ
IØZG
JA1GQV
JA2AJA
JA5HGC
JH1KLA
K6RW
K8CVJ
K9ARZ
K9GCX
KSVNJ/Ø
KH6IAC
KX6BB
LA5IS
LA8VP
OH6RI
OK1DKR
OK1DMM
UA9AAP
UL7TA
UT5YF
UY5ZH
VE3FDP
VE7BLE
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WA1EJJ
WA1MYX
WA1NAE
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W2NUV
WA2CLC
WA2NCE
WB2LOF
WB2PMW
WB2PWS
WB2QCF
VE1BUJ/W3
WA3OBF
WA4LA
W4UPV
W4VAB
WA4CWU
WA4SCI
W6MA
WB6WPO
W7CRC
WA7GCT
WA7JRL
WA7KJD
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YIIIAG
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G3ZQW
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GW3ZWU
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IS0AEW
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JR1BMH
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KP4DMJ
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LA3WG
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OK1APS
OK1CEH
UA3GBI
UB5GBD
UL7HD
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UW3GE
UW1VV
UWAPW
UW9AI
VE3DH
VE4EA
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W2TND
W2VAV
W2YKQ
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WA2BWE
WA2KDB
WA2LUF
WA2PCW
WA2URD
WB2FLF
WB2VEF
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W4THU
WA4GQJ
WB4AOD
WB4BAU
WB4SRX
WB4VKW
WB4WDH
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WA6WZN
WB6RPK
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WB0AEW
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XW8EV
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YU2RJQ
YU3TEC
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DK6ML
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EA8HJ
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GI6YEY
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JA2RGH
JH3AIU
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K2SJN
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K4HHD
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K4JNM
K4ING
K4RSU
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K5LXZ
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K6QPG
K7LAY
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K8NIA
K8PFY
K8SWW
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K9HDX
K9IYT
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KL7HMO
KP4DLC
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LZ2KWR
OH7RM
SMØDL
SP2FBC
SP7PBC
UA3DBG
UA3WI
UA6BZ
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UB5SG
UB5ZA
UK5IAB
UT5IB
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VE2RH
VE2TH
VE3BRJ
VE3FIM
VE3GGS
VE6FY
VE7AQL
VX6AW
W1GBL
W1LQZ
WA1KVM
WA1LVW
WA1PSK
WA1STO
W2GGC
W2YWK
WA2DLV
WA2ERJ
WA2FUJ
WA2HQH
WA2JZX
WA2LJM
WA2PAT
WA2TRK
WB2ERM
WB2KBH
WB2RXF
W3AMF
W3CRG
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W3EKT
W3EAE
W3GPI
W3GQC
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WB4ASV
WB4BUJ
WB4DEL
WB4HSM
WB4IWN
WB4JHN
WB4TIN
WB4WHK
WB4ZNH
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WB8DCY
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W6NVM
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W6PGQ
W6TPR
W6UBJ
WA6BWJ
WA6GSV
WB6PYI
WB6UIA
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WA7CUW
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WB8BOR
WB8IQO
WB8MTR
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WB9KTA
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WAØIYL
WAØPKE
WAØOZN
WBØAFA
WBØBIY
WBØCLS
YO3QK
YU4VAS
ZE1CQ
ZL2IR
ZS6ADT
4Z4BR
6Y5RS
9H4L

This annual DXCC listing contains close to 5000 calls (3168 CW/F, 1736 phone, 14 cw). During the 12-month period preceding preparation of this list, new DXCC issuances averaged almost 90 a month; for a total of 1059 new members.

Radiotelephone

353
W6AM
W8GZ
352
W2BXA
W4EX
351
TI2HP
W8RF
350
W6GVM
ZL1HY
5Z4ERR
348
PY2CK
4X4DK
347
G5VT
W7PHO
346
I@AMU
VK5MS
345
W8BT
YV5AB
344
W1JEG
W2RGV
W3NKM
W5IO
W8QJR
W@BW
343
W2HTI
W2OKM
W3KT
W@CM
ZP5CF
342
G3FKM
W2GLF
W4OM
341
DJ2YI
G6TA
LU4DMG
PA@HBO
W4QCW
W4EEE
W9RNX
340
DL6EN
DL9OH
GI3IVJ
VE3QA
339
SM3BIZ
W5JWM
338
W3DHM
W4SKO
W9LNM
ZS6LW
4X4JU
337
I8KDB
W2CKY
W3WGH
W9JJF
ZL1KG
336
W1MMV
W2LV
W2TP
W5PQA
W8MPW
W@GKL
335
DJ2BW
K5JEA
K6LGF
LU9DAH
VE5RU
W5GC
W6CHV
W6RKP
W7ADS
334
K1IXG
K2EL
K9ECE
SM5HCO
W6NJU
W9HB
W9IEW
333
K4HEF
W5NMA
YV5AIP
332
DL1KB
EA7ID
F9RM
W6ZM
XE1AE
331
DL7HU
GI3JIM
K2BZT
PY7YS
YV5AJK
W1HX
W2YY
W4SSU
W7SGN
330
I6FLD
I@ZV
K6WR
W3DJZ
W4CW
W5KGX
W@GAA
329
JA1BK
K4AIM
W1DGJ
W2PV
WA2RAU
W9DWQ
W9NZM
W9SFR
328
K7GCM
SM5CZY
W4NJF
W6REH
327
F2MQ
OZ3SK
PY2PA
W3GRS
W6EL
W6YMV
W@QGI
326
DJ7ZG
EA2HX
VE3MR
W2FGD
W2QK
W2ZTV
W3AZD
W5HJA
W7QPK
W8CUO
YV5AHR
ZS6YQ
325
CT1PK
DL7FT
I5TDJ
K2YLM
K5GOT
VE2NV
W4UWC
W6KTE
W6PT
W8ZOK
W9HPS
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YV5ANF
YV5AXQ
YV5BBU
324
K4JC
K4MQG
W2GKZ
W2ODO
W7CMO
WA8AJI
YV5BPJ
ZP5FT
323
OK1ADM
PY2PK
UR2AR
WB2HXD
W4IC
WA4WIP
W6EUF
W9JT
W@AAA
322
I2KMG
K4YYL
K8IKB
PY4KL
SM5AZU
VE3MJ
VK4QM
WA2FQO
W3JK
ZL3NS
321
I8AA
K2IMY
PY2PC
VE2WY
VE3WT
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320
EA3GF
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K5AWR
K8CEU
K8ONV
KH6OR
PY2CYK
W2GQN
W2YYL
W3AEV
W3EVW
W3FWD
W5SZ
W6MBD
YV5BNW
319
G3JEC
IT9JT
IT9GAI
W5LZZ
WA9NUQ
ZL3OY
318
JA4ZA
K4HJE
K5QHS
317
EA4JL
G3UML
JA1MIN
W6KNH
316
DL8NU
I4ZJG
K4IKR
K4YFQ
K6EC
WA3ATP
YV4UA
315
I3PRK
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JA2JW
K1DRN
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K8DYZ
KH6BB
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PA@EEM
PY2DYI
OZ3Y
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W1EXD
W1FZ
W5NOP
W5QKZ
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W6ZKM
WA6MWG
W4JVU
W8ARH
W9IQD
W9TKD
314
OE1EF
WA4MUB
W6ZBS
313
K4RTA
PY3BXW
VE3CTX
WA6AHF
W8DCH
W4@OAH
YV1KZ
312
I2AT
K4GXO
W2CNQ
W3MP
311
EA8CR
K6EXO
K6IXR
K9WEH
K@BUR
OA4OS
PY2ASO
W1BIH
W1SEB
WB2UKP
WB2VAE
W3RX
W4QAW
W6CCB
W8GKM
W8V[illegible]Y
WA8ZDF
W9DNE
W9KRU
W9LTR
W@SFU
310
EA4LH
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JA8ADQ
K4BBF
OE7UD
ON8XA
PY3AHJ
VE3NE
W1JWX
WB2WOU
WA3IKK
W4BKE
W4EEO
WA4TSP
WA5IEV
WA5QYR
W6KZS
W7LFA
WA8OJI
W9QLD
309
I9MD
J1RB
JA1IBX
308
CT1BH
EA8JJ
I4ZSQ
K4ET
SM6AEK
VE3GMT
6W8DY
307
I2LAG
JA2AAQ
JA2BTV
SM@ATN
WA2HSU
W6DZZ
W@MYN
XE1KS
306
DJ1CG
DK3PO
G5AFA
I2SM
K6AQV
K8IFF
PY2DSC
SM6CKU
VE1VR
W6ABA
W6KOE
W9WYB
305
DL7EN
G3WW
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HB9AHA
HP1JC
K4CFB
K6GA
W1HGA
W7QK
W8JTD
W@OHH
304
G2BOZ
JA1JRK
JA3OCA
PY1MB
W4AUH
ZL3QN
303
CT1UE
G3FJW
UB5WF
VE3AAZ
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W6KUT
W9BZW
9M2DQ
302
EA7IR
HB9AAA
KV4FZ
WB2NYM
W5UR
WA5REB
W6CLS
W6KYJ
W7EZY
XE3EB
301
DJ5DA
EA4DO
F5II
F8RU
F9IE
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OH2BAD
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WA6AUD
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W9MWO
YV5ANQ
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DJ5LA
OK2BI
DL3AA
I3EVK
JA1BN
JA1UQP
JA8ZO
K4HYM
VE4OX
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W3NIG
W4TUC
W4UMI
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W6ARJ
W6YO
WB6DXU
W8JFD
WA9IVL
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K6JR
OH3SR
W1CMH
298
W9BEK
297
DL6KG
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I7HH
JH1JGX
JA7EHU
W6CDJ
W6FET
295
JA1MCU
SM6DHU
WA2EAN
W3AC
294
I7SCA
OH2BR
W3ICQ
W4WSF
W7LI
293
K1QMV
K8EVK
W1JNV
W5KTW
292
DL6NX
K6ZXW
W1YRC
W3COR
W8YEK
WB8EUN
291
CT1MV
DJ7CX
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K6SVL
SM5WJ
SP5BSV
W6LQC
WB6UJO
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F8CW
HB9GJ
I1UW
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KP4CQB
OE3SAA
OK1MP
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W6TTS
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W@BL
289
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W4AST
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EP3AM
K6OJO
287
ZS6RM
286
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UA3CF
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VE3AGC
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WB6PNB
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K2BK
W1HR1
283
K6RN
OZ6RT
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WA6OET
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DJ9ZB
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JA2HNP
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W7VRO
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W9YRA
WA9SLD
WB9BGS
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WA6DOB
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EA2CX
JA1RWE
ZL1ARY
277
WB4SIU
276
JA6BEE
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W6BJI
WA8PYL
275
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K6RN
VK6CT
WB6WHM
W9KB
W9ZWH
274
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K1INO
K4DXO
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SM2EKM
VE5KG
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OE1ZGA
W5RO
271
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OK1AWZ
WB4BAP
270
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I4LX
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KP4DJE
OZ8KR
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WB2FMK
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WA7DRP
W9LAA
WB9EBO
9H4G
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JA1EDU
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WA7PMT
XE1TX
268
K4LSP
W1FJJ
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F5RV
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JA1RWU
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W1BEB
WA5WEY
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W5TMN
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EA4CX
K7RLS
W9MYD
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W2IOZ
W5NQN
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WB4TPII
W5HCJ
WB5DJA
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KH6GLU
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W6GTL
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W8JXM
WA8VFK
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OE1PC
OE2GKL
WA4NRE
W7YTN
9G1DY
258
W5SOR
257
DK9WB
K1EJO
K6PZ
256
F6BFH
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W3ZNH
W7YQI
255
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DK3HL
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W6KG
WA6FYC
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JA1GC
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W8QBG
WA8OGR
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WA7FSZ
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WA9YEW
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JA6LLO
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SP5DZI
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W2GA
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W3KVS
W3YHR
W4ORT
W5HMN
WB6RIU
W8AQF
W8SET
WA8TDY
ZL1AAS
249
CT1UD
I1ASM
I5FCK
W2SSC
WA4MMO
W6ODD
YV5CWO
248
JA1BLV
K5CIT/KH6
247
DL5CM
246
JA4EAE
K@PMZ
K@SGJ
OZ5GF
245
KV4AM
WA4GVB
244
UW3IN
W3ATO
WA5EMH
243
EA3NC
EA7EM
G3TOE
K4HHG
OZ7IZ
W1IFL
W4DOD
W9VCQ
242
CX3BH
K8SQE
W@HBH
241
DI2UU
K2SHZ
VP9GE
W1FSN
LU1BAR/W3
W4WRY
WA4VJJ
W6SUN
YV4WT
240
EA3SA
I3DSE
K4MEZ
OZ1AJ
PY4AKL
UY5XS
VE3RO
WA2FIS
W4HOK
WB4PXW
W5SZV
WA5SMM
W7JWE
W9MLG
WA9QAM
WA@HZP
239
CE6EZ
W3IF
W5DJ
238
W3ZSR
237
K6AAB

236
WB2BNJ
235
K4ARP
LU8AJG
234
K4KZZ
WA3ATX
WB8CGC
233
CT1BT
JA7ZF
UA3FU
231
DK5EZ
EA3OJ
F3KE
I6AJA
HB9ALX
W2PSU
W3GL
W4FOD
230
I8LFL
K4JWD
K8IDE
OZ3PZ
W4UQN
W6EHA
XE1CI
229
K2CJD
W1EEP
W2IYX
WA5BXT
W6CYU
228
DK2MO
DK3SF
VE6AGV
227
G3IXT
JA8BAR
KH6GMP
WA7BPS
W8JSD
226
DL9HC
W3YX
WA5JMK
W7ILR
225
JA3BBI
W4CK
W4RKN
3B8CZ
224
CT1RM
UC2RF
W4KNW
W8DX
223
JH1LPF
KH6BZF
LA4DM
W8DEQ
W8TWA
W9HC
W9OEQ
222
DJ3HJ
DK4YA
DK5WL
DK8NK
HK3LT
W2ECR
WB2AQC
W4DUP
W5KDA
WØYOY
221
HP1KC
JH3EXI
K6RK
K9BWQ
VE3BIF
VE3CJ
W3AXW
W5IWI
WA9FWY
220
EA3JK
HK4CJR
I2LPA
JA3ART
KI4GXU
K2UHM
K6IJG
K6ZXS
OZ7BG
VE6MJ
WA1JHQ
WA2DXI
WA3EPR
W4DFK
W4HNW
W4MKB
WA4NIB
WB4JCV
W5KXQ
W5LJH
WB8BID
W6HLW
WB6MVK
W7FLU
W7EOI
W8GIO
W8PNC
W9RKP
WØUQD
219
K4RHL
VE3FFA
218
W5UDK
WA9JCO
216
W8KNH
215
DL2CQ
W7YR
214
DK5WS
SP5XM
W6OK
213
LA4LP
SM5BNZ
W2PEV
W8LAV
212
W6VVK
211
DL9JH
K9HMB
KZ5JM
UO5RZ
210
JA1QYY
K7GEX
UW4NH
WB4ECE
W6REK
WØIBZ
209
VE6SB
W9LW
208
JA1WVK
W2PBQ
W8KRS
207
DJ3QX
JA3LUK
OK3EA
W7GYP
206
I7VCA
JR3BHW
JY3ZH
KØALE
W4BAA
W9EGV
YV5DDF
205
JH1BAY
OZ8MG
W5OSH
204
CX6AM
LA7DB
VO1AW
W5GIW
W9ZNY
203
K3PUL
K4GJC
KL7HEQ
VK9BS
W4EPZ
W6ICQ
YV4AGP
202
DJ8PH
DL2VS
JA1HBC
K1ZCD
K5YMY
OK3YCE
WA5LUM
ZP5AN
SW1AII
9Y4MH
201
DJ3NK
DL7AB
EA8GK
I3GZI
K7RSC
OH2BGD
PY7BSH
VE1ARN
W7RCE
W8ETS
WA8GPX
WA8PJJ
WØSQD
200
G3YBH
HB9ASK
HC2TV
HGVJ
HTBE
I2ADN
I8CPK
JA3BQE
K4APL
K6JWQ
K6PO
KØIUC
KA2PJ
KX6FJ
OZ3KE
PY1BOL
W1EW
W1KSN
W1RL
W1WXZ
WB2EZU
W6PSQ
W7KOI
W9WCE
WB9BGJ
WB9BXQ
WØKH
WØWO
WAØRRJ
YU1TXT
ZL1ALE
3B8CV
9X5VA
199
EA3UU
WA4HHW
VE6DXV/W6
198
W1WQQ/4
WB5HIH
ZL1BKS
197
WA2TIF
196
DL1RA
K8VRZ
WB6HDG
WAØPVW
195
W7DQ
194
K6DJT
W3HCW
W4JVN
WAØHMP
193
DL6SW
JA1DDZ
W2MIG
W6OMR
192
DL7NC
191
DJ5IH
W6KYA
WB9HAK
YU2CAW
190
DL1MM
I8ERC
WB4VUP
W6BWM
189
JA4LKB
UV3GW
188
VA1AH
YV5IZ
187
JA6SVP
KA6DE
SM6BD
WA5EZQ
W8IHD
186
WB2QKG
185
CT1IC
W4NQD
WA7MGK
184
JH1EEL
K6TAA
WA4MGC
WB4NVH
W6BWG
W9WNB
6Y5AH
183
DJ4ZD
DK5SZ
KH6HDA
LU1AA/W1
W4GKE
ZL1AIL
182
CE3AEV
CP1DN
DJ3EJ
VE3ZT
WA2DHE
WB2FBF
WA5YMW
WA6LFN
W8EXD
YV5DFI
181
DK3NO
EA7EU
HI8XKP
JA3JOR
K6SE/2
PY2JY
W2BZL
W2CUC
W3OIW
W5NQR
WB5HGS
W7FF
W8JJK
180
CX7BF
EA4LK
FP8DH
G3YJI
I2AKI
JA6MBU
K3BCG
K6SX
W1CYB
WA2DVO
WB2GYD
WB2VHC
W3ECS
W6MEC
WB6AGP
WB6QNU
W7ZH
WA7HCQ
WA8PWZ
W9CRN
WA9ZAK
WB9DVV
179
JA2AYH
JA6CNL
W3WTJ
YV4YC
178
W3NM
WB6KUC
YU2OB
YU2RAZ
177
HS4AGZ
JA2BUR
WA3GZT
W5LJT
W6KNC
WA8DXG
WØLPA
176
DL3IS
JH1HTQ
JA8JN
K4QIP
K7MRU
K7UXN
175
CT1BB
JA3PBJ
174
JA1SKE
K3EUR
K6JAN
K8HBN
KG6SW
WA7UWO
173
I3RSK
VK2ADX
WB6BKN
172
W6OWL
WA8UHY
WB9ELB
171
DL2UW
PY4KB
W7AAW
170
DK2WR
JA6BPA
VE3ABP
WB2NHP
W7CUI
WØWAM
169
VU2DK
W3ACE
W3HHV
168
JA2JAB
PY9BJ
W4DPS
167
JH3HPX
UA3HR
WB6BMW
9G1EI
166
I3GRX
OK1ADP
W6AZQ
WA8QIY
165
I7TGT
K4QM
W3KV
W9FXZ
164
DJ9RB
IT9KZW
JA1ILN
K3NEZ
K8KLY
W1LQQ
W2FGY
W7RS
163
DJ6IN
DK3SN
I7CZI
IØAG
JA1WTI
JA3FD
JA7BJS
K2DA
K4IVJ
WA2MBP
162
I7TBL
I8SAT
LA3NN
VE3BJE
W3DNI
W4EBO
W4TZX
WB4NXR
W5PWW
WØBWJ
161
A4XFE
I8QSHU
JA1AEV
JA6GDG
K9KWK
W1TEV
W2SEL
WB2EXK
WA5LMG
WB5CBJ
W6ONV
WB6QCGJ
160
DK4YG
IØMBX
JA2LHG
JH3EHY
K4RKF/6
K6SMF
K8GWM
LU1SF
PY1JZ
SM7RS
VE7AGT
VO1CV
W1AB
W2CML
W2MOY
WA3GYY
W4AAA
W5SBX
W6ID
W7GUR
W9DES
W9KM
WA9AUM
WØFVF
WAØYZN
5H3MV
5U7BA
159
DK1YP
I8TUS
JH1AGU
JA8KSF
K2DPA
W3GJA
WB4OXD
WA5TYB
WØIF
WAØELW
4W1AE
WA2BVU/4X
9M2CJ
158
DK5XN
FO2DR
W5EEA
W6DAB
157
OZ7XU
VE3AXF
W4JJF/3
156
JA1WSK
JA6RCH
OV1EMM
ZL1AKO
155
JA3PPR
VP9AD
W7IOG
154
JA2USF
WØYZK
153
DJ3ST
JA7GIF
K6NM
P29FV
UW3DH
W2EQK
WA9HKN
152
JA6VQA
W7AE
W7BCT
W7TE
WØJCB
151
DK6FI
JA1FHK
JA8WY
W1CHA
WB4QNP
ZD8KO
ZP5NH
150
CT1XKA
F8BO
FØAYV
I5KRR
KA2AK
LA3K
PY8ADD
VF2RR
ZS1KZ
149
I3FDC
IØCGM
K7MKS
SM6CVE
VE2XG
VO1BT
WA8VHV
148
JA3BN
JH3DAE
K5HZ
KP4EAK
W2QL
W8KI
WB9LHI
WAØPUJ
147
JH1OCO
K2SPW
W2RRG
WA5WQT
WA6AJL
146
DL9EY
JA8HQI
KAIYZ
K4IBN
K5MEA
WB2TSB
WSOSJ
145
CT1TZ
DL8FX
OK2BLE
I8JO
VE2AYY
WA1IRN
W2CKR
W3NI
W7EXL
WA8ZCO
WA9DJO
WØAKT
144
JA1GTP
WA1SSH
WA4BTC
WAØQCU
5B4ES
143
JA4XH
PY1EI
WB9EFP
142
DK5AJ
DL3RA
DJ1RLA
W7WT
ZD7KH
141
DL6EL
I5AFC
JA6RIL
OH1ZK
VE3CKP
W1MX
W3GID
WA3HRV
WA4LPM
W6MOS
W8SDV
WB8IAY
ZP5HZ
140
DA2QW
FT5RS
HK4DEG
K1BUR
K3DH
K6SE
K5VIR
OZ9EI
VE2GS
VE4DI
VE3EFX
WA1LUQ
WA1NSJ
WA1PFL
W2EWK
W2NHV
W2OXR
W3YMB
WA3AFQ
WA4OQO
WB4ORS
WB4PAB
WA6BCD
WA6CPP
WA6GFH
W7HNL
W8NPE
WA8VXF
WA9BWY
WB9AAQ
WB9EIQ
WØIKM
ZS6BLK
139
KA2AK
LA3K
PY8ADD
VF2RR
ZS1KZ
149
I3FDC
IØCGM
K7MKS
SM6CVE
VE2XG
VO1BT
WA8VHV
148
JA3BN
JH3DAE
K5HZ
KP4EAK
W2QL
W8KI
WB9LHI
WAØPUJ
147
JH1OCO
K2SPW
W2RRG
WA5WQT
WA6AJL
146
DL9EY
JA8HQI
KAIYZ
K4IBN
K5MEA
WB2TSB
WSOSJ
145
CT1TZ
DL8FX
OK2BLE
I8JO
VE2AYY
WA1IRN
W2CKR
W3NI
W7EXL
WA8ZCO
WA9DJO
WØAKT
144
JA1GTP
WA1SSH
WA4BTC
WAØQCU
5B4ES
143
JA4XH
PY1EI
WB9EFP
142
DK5AJ
DL3RA
DJ1RLA
W7WT
ZD7KH
141
DL6EL
I5AFC
JA6RIL
OH1ZK
VE3CKP
W1MX
W3GID
WA3HRV
WA4LPM
W6MOS
W8SDV
WB8IAY
ZP5HZ
140
DA2QW
FT5RS
HK4DEG
K1BUR
K3DH
K6SE
K5VIR
OZ9EI
VE2GS
VE4DI
VE3EFX
WA1LUQ
WA1NSJ
WA1PFL
JAØFMB
W2IBR
WBØGP/4
SW1AR
124
KA8CN
IØCHF
JA6WHS
PY12HG
VE8OO
VS6CY
VE3AKZ
WA3FZT
WB8MCR
WØFHE
123
DL9XW
HB9AXB
JA1KTM
JA1LFR
K3OVT
OA4AKL
WA8NYB
122
DL3RE
I3ZJQ
JH1LBR
JA2OYT
K1WVX
K2QQV
K9UQN
OK1OAT
WB4KCL
WB6ECI
W8LDZ
WØRUH
ZS1OI
121
DK5OG
I6CQC
K2GXP
K8YRV
TA8PI
UA9CBO
W4HLY
WB4BWN
WA7GYR
W9IUH
120
IIORT
I8ACB
JA2FTQ
JA7IF
K1ATI
K2GAT
K2QLY
K5EJP
K7CUZ
K9UTN
KZ5LZ
VP9GD
WB2HFJ
WB2JJN
WB2MBP
WA3OTZ
WB4OVX
WB4QWM
WSULN
WA5STI
WAØSK
WA6NBY
WZ1SG
W7OK
WA7UVO
WB8DEK
WØIWM
WA9BHH
WB9DDQ
WBØNHG
YA1LM
5F5DV
9Q5RD
9Y1QJ
119
DJ4AH
G3BKY
WB6JMA
W7HR
WA8ESP
118
DO1MG
LU7QB
WA2QQO
W5NVU
117
G4BUE
JH1BNC
JH2MYN
JA4EAA
K7MJC
PAØTO
WICWG
W4CYT
116
IH3OTS
VE2AQS
WB2QQC
WAØVDX
115
HC1ME
IIPSO
ISØPYR
JA7EPO
4Z4MQ

014
DK4OG
EA4ND
H8AI
VE3GDO
113
DJ5CG
DK1GW
DL8GP
JA2WK
JA3AAD
LA6UL
112
DK3EA
G3CCX
IT9LFE
JR1VMC
JA2AO
JH3BPN
OK2BOB
UB5CT
VE1US
W1QMS
WA0LAM
XW8EO
YU1NPG
YO2ROZ
111
K4IU/DL
DL8JO
LA2DR
VP9H
W3EUO
WA0VXI
110
DJ9OV
DK7JH
EP2DB
F6AED
GI3ZSC
I2GGJ
I0DUD
JA3WBK
JH3EGD
JA6EFT
K2HAJ

K2IAB
W4WEL/1
WA6LHB
W9EVD
W9VWV
YV4YG
ZS2KG
4W1BC
109
DI5EA
DK5AD
LA6BZ
PY7AQ
G3ZTM
I4G6Z
I5BDE
I6VDB
I0PSB
JA4BBN
JA6SEH
K7ABV
K4ZDK/7
LA3JO
SM5DD
SV0WKK
UA9KAI
UW6NQ
W3CDG
WA6WZD
W7JVG
108
CR7FJ
DK3EU
DK3GG
EA7QZ
G4BVX
HJ5
JH1KIK
JH1WKW
JA0OE
LA3UQ
UI2DF
VE3AXO
WB4DQM
W3IZJ/8
ZL3UC

107
CT1DS
F1IXY
DA1RA
EA3VM
HC2VI
I0ZS
JA3EY
JA6IP
K1NOK
K3OFN
K4OEN
K6JWY
OA4AIW
WA1LRO
WB2HJW
YV9AF
9M2PV
106
DK4CQ
EA1LJ
I1BPI
JA3BUB
K4AFA
K6ELX
LA8BM
OA6NQ
UK2GDZ
VP9HM
HI8CMC/W2
WA3NCP
W4BUW
W5LGD
W6AMG
WB6RMG
W7RIR
W0NG
ZD7FT
ZL3AFA
3D2AN
105
DK3VJ
KP2MJ
G4BKE
IT9GCQ

JA1IST
JA1WWO
JR1BRV
JA4BUA
JA6WW
K4EBY
K6LQA
K0LVJ
OZ5EV
OZ5EY
SP9EES
W2IHK
WB2CIS
WA3MPH
W4PDX
W6BVN
W6DD
W7VCM
W8GUS
YO9HT
5K8AR
104
DJ3RD
DJ3KX
DK9ED
F3JW
I5VW
G3UVA
I1NDP
I6ICD
I8JH
IH9JT
JF1BSD
JA0SC
K8AIY
KH6GHZ
LX1LE
VE7KL
VO1CA
VP2AYL
WA1HMC
W2REH
WA2SLH
WA4UPR
WB4NLM
WB5EHF
WA8AHU

WB8LVA
W0NGS
WA0VKF
9V1OD
103
DJ8WQ
DK4PX
DK9EX
EP2JB
G3GMC
G4BAL
JA1TNV
JA3AAW
JH3MOC
JY6UNM
K2AMN
LA9BM
OE6HTG
VE3ID
WIDS
W1KE
WA3JSZ
W4ISF
W6OKX
W6UEJ
WA6ETN
WB6HAR
W7DQH
WB8AMY
WA9UEK
WA9YDO
WA0LGW
WA0YTL
102
DJ1QK
DK6QO
EA8JG
EA8JP
I1L4D
FG0AFA/FS7
JA1BUI
JK3ISM
JA6IMB
K3VAX
K8BZK
VP2VBK

W1UIF
WA1GUH
WA1JZC
W2ARC
W2MDM
WA2FDJ
WA3HXX
W4MSI
W4UPV
WA4CWU
WB4ZTI
WB5IHC
WA6GIC
WB6WPO
WA7LUS
WA8SWM
W0VUA
101
DK6XR
G3VLX
G3ZQW
G4AGZ
HC2DE
I3HJN
JA7KCY
K4HGZ
K5JAJ
K9ARZ
K9GCX
K0UBP
K0ZHD
LA6OL
OE2RIL
UA6JAD
UK9AAN
WA5VRT/VO2
W1PIV
W2AND
W2GBI
WA2MIS
I1U2DC/W3
W4UW
WB4IPI
WA6WZN
WB6RPK
W7BMS
WA7KJD

WA7TTM
WB8CTA
WB8HLI
WB8NVQ
W0NUH
XE1WF
ZP5AQ
100
A51PN
CT3BA
DK1TD
DL7KY
DU1EN
DU1MR
EP2MW
F6ASI
F6BVB
G4BYK
G4BZR
G5AXK
G8PY
GW4BLE
HKGF
HP1N
I0ZG
HP1XMM
JH1AGH
JA2MFM
JH2EVL
JY3BZ
K1CPJ
K2GI
K2PAY
K2SGH
K3BN
K3CNH
K4DFK
K6GNZ/4
K4NJS
K4ST
K5LVZ
K6LOP
K6TLG
K7DS
K7ICW
K7NFB
K9MFY

K9UBF
K9YQA
KA2QW
KA6WS
KG4FO
WA6EVX/KG6
KJ6DJ
KP4BJL
KP4EAJ
OE1BKW
OK1DVK
VE1AYE
VE2GA
VE3OEH
VP1PW
WA1RDH/VQ9
W1LQZ
WA1MQO
WA1NXR
WA2AJS
WA2ELA
WB2SKT
WB2SZH
W3DVY
W3ENT
WA3VQP
W4KZR
WB4MRA
WB4UHW
WS1DS
WS1TB
WB5AHL
W6KBB
W6VPZ
WA6ADL
WA6DNM
WA6ZNQ
WA7JSC
WA7OYL
WA7PQL
W9RR
WA9EUD
W0PRY
WA0VAQ
WB0ISW
YU1OBA
ZL2GJ

CW

172
W9KNI
133

W6PT
121
K6GA

W1DAL
108
W3KT

103
K9UTN
OE1ZGA

102
K1AGB
101

JA1KSO
K6VY
100

K4YFQ
K9KEV
OZ1VV

WB6ZUC

Tuning Aid

(Continued from page 39)

receiving monitor, as its own sync circuitry may operate most effectively at a frequency several hertz removed from 1200. Precision tuning is not essential for satisfactory use of the instrument.

The limiter balance should be adjusted first. Ground the audio input connection and, using a voltmeter, perform a coarse adjustment of the balance control by setting the voltage at pin 2 of U1 to exactly equal that at pin 3. If this condition cannot be reached within the range of the control, it is because one or more of the 4700-Ω voltage-divider resistors are somewhat removed in value from nominal. In this case selection of another 4700-Ω resistor or paralleling one resistor with another of much higher value (27 to 47 kΩ) is in order. Next measure the voltage at pin 1 of U1. Slowly adjust the balance control in either direction and note that just a small adjustment causes the voltage to swing from 1 V to 11 V. (This range will be greater for supply potentials higher than 12 V.) Carefully perform a fine adjustment of the control by setting it for a voltmeter reading at pin 1 of six volts (or one-half the supply voltage).

If you have an oscilloscope, you can check the balance adjustment by injecting a very low-level audio signal at the input of the tuning aid. Monitor the waveform at pin 1 of the IC. A signal below the limiting threshold should appear as a sine wave. As the level of the signal is increased, the top and bottom of the sine wave will be clipped symmetrically if the balance is correct.

The threshold adjustment for U1B acts like an intensity control for the LED. Its setting is not crucial, and in operation it almost becomes one of personal preference. With no signal at the input the LED will glow continuously at one extreme setting of this control. Back the setting off until the LED becomes extinguished. Now connect the SSTV signal from a camera, a tape recorder, or from a received signal that you *know* is properly tuned. The flashing or flickering of the LED will be readily apparent. As the control is backed off farther from the setting obtained earlier, the intensity of the flashes will diminish. You can find a setting for which the LED will glow only during the 30-ms vertical sync pulse, once every eight seconds. The setting should be advanced slightly from this position, so that a flash is observed for every sync pulse. Find the setting you prefer most by tuning around some SSTV signal frequencies on the air.

With a little experience, you'll find that it takes but a few seconds to tune SSTV signals "on the nose" with this handy tuning aid.

Operating Events

de W1YL

DECEMBER

3 ***West Coast Qualifying Run*** (W6OWP prime, W6ZRJ alternate). 10-35 wpm at 0500Z on 3590/7090 kHz. This is 2100 PST the night of December 2. Please note that dates are always shown at least 2 months in advance and times are always the same local "clock time," e.g. 9 P.M. local Pacific time. Underline one minute of the highest speed copied, certify copy made without aid and send to ARRL for grading. Please include your full name, call (if any) and complete mailing address. An addressed stamped envelope would be helpful.

6-7 ***160-Meter Contest***, p. 44 Nov.; ***Delaware QSO Party, Hong Kong Activity Day, Telephone Pioneer QSO Party***, p. 86 Nov.

6-14 ***10-X Net QSO Party***, Milwaukee Area Chapter sponsor, Dec. 6-14 (full UTC period). Stations may be worked once on each band, phone. Exchange identification no., QSO no., Milwaukee Chapter no., 10-X no., state. Logs must list previous info, plus date/time, band worked. Logs must be received by WA9TSG no later than Jan. 15, 1976. Score 1 point for each initial contact, 1 point if worked on 10 meters, 1 extra point if the station is a 10-X member, 1 extra point if the station is in Wisconsin, 2 if person contacting is a Milwaukee Chapter member. (One contact could possibly bring 6 points.) Awards: Report to Joseph Williams, WA9TSG, 114 East Brown Street, Milwaukee, Wisconsin 53212.

13-14 ***10-Meter Contest***, p. 44 Nov.; ***EA Contest*** cw, p. 86 Nov.

16 ***WIAW Qualifying Run***, 10-40 wpm at 0230 UTC transmitted simultaneously on 1.805 3.58 7.08 14.08 21.08 28.08 50.08 and 145.588 MHz. This is 2130 EST 19:30 P.M. local Eastern time) the night of December 15. Underline one minute of top speed copied, certify copy made without aid, and send to ARRL for grading. Please include your name, call (if any) and complete mailing address.

18 ***WIAW Morning Qualifying Run***, 10-35 wpm at 1400 UTC. This is 9 A.M. EST, same frequencies/details as above.

28 ***HA5-WW Contest***, p. 86 Nov.

JANUARY

1 ***Straight-Key Night***, a six-hour stretch starting at 0100Z (remember this is December 31 local time!). Rules require use of a straight key. Suggested areas on 80-40-20 from 060-080 kHz up from the bottom edge; 10 kHz up from the bottom of the Novice segments. If you're participating in SKN please use SKN in lieu of RST (followed by the 3 numerals). This will help spot participants more readily. Following SKN send a list of the calls of the stations you worked plus your vote for the best 1st heard that night (not necessarily worked). To make the March report we'll need your information within a week following SKN. Results of the last SKN appeared on page 91 of September *QST*. Please remember that this is not a contest and you're encouraged to chew the rag.

3 ***International Pacific DX Net 8th Birthday Party***, the full UTC period on Jan. 3, 10-80, ssb only. Members: RS/Net no./Name. Non-members: RS/state, country, province/name. Work the same station only once per band. Members score 1 point per contact with non-member. 2 points per member contact. Non-member score 2 points per contact with member. DX: sum of contact points X sum of countries and states/provinces worked; W/K/VE sum of contact points X countries worked. Awards. Suggested frequencies: 3665 3865 7065 7265 14165 14265 (primary) 21265 28565. Logs to reach the following by March 1: DX logs to Ed de Young, VK4ABA, POB 98, Newstead, Queensland 4006, Australia; W/K/VE to Dennis Scannell, WB6IXC, 4201 Mt. Hukee Ave., San Diego, CA 92117.

3-4 ***VHF Sweepstakes***, rules this issue, ***Nostalgia Radio Exchange***, sponsored by the Southeast Amateur Radio Club of Cleveland, Ohio, open to all. The object is to have civilized fun in working as many interesting persons and old rigs with your interesting old rig (a Nostalgia Rig is any gear built since 1945 but at least 10 years old – an advantage, but not required in the Exchange). Exchange period is 1900Z Sat. Jan. 3 to 0500Z Sun. Jan. 4 and 1900Z Sun. Jan. 4 to 0500Z Mon. Jan. 5. Exchange your name, RST, state/foreign country, transmitter type (home-brew use PA tube, i.e. "807"). The same station may be worked on each mode on each band. No a-m phone below 28 MHz. CW call "CQ NX", phone call "CQ Exchange." Suggested frequencies: 1810 and cw up 70 kHz from low band edges; phone 3910 7280 14280 21380 28580; Novice 3720 7120 21120 28120. To score, add the numbers of different transmitters, states, and countries for each band. Multiply by the total no. of QSOs. Multiply that total by Nostalgia multiplier: total years old of your transmitter and receiver (if transceiver, multiply years old by 2). Different transmitter and receiver combinations may be used by one station; figure scores separately for each and combine total score. Achievement certificates for persons scoring 150,000 or more plus special citations for unusual circumstances as determined by the committee (like working Antarctica with an AT-1). Send logs, comments, anecdotes, and legal size s.a.s.e. to the Southeast Amateur Radio Club, c/o W8KAJ, 2386 Queeston Road, Cleveland Heights, Ohio 44118.

7 ***West Coast Qualifying Run.***

10-11 ***CD Party*** cw, open to all ARRL appointees and officials, notified separately by bulletin. (Note it starts 2300Z Jan. 10 and ends 0500Z Jan. 12.) ***Hunting Lions in the Air Contest***, sponsored by the Lions International and coordinated by the Lions Club of Rio de Janeiro; starts at 1200Z Jan. 10 and ends 1200Z Jan. 11; open to all (Lions and non-Lions). Freqs. top 25 kHz of 40, 20, 15 and 10 phone and cw bands. Exchange name, QTH, no. of contacts and the time. Participating Lions/Leos should identify their club name. Usual log entries. One point per QSO (work a station once only). A bonus point for a contact with a Lion/Leo; a bonus point if the contact is between two different countries. If the contact is made with a Lion from the Rio club or the Curitiba club the following points are valid: (a) within Brazil 3 points total (includes one additional bonus point) (b) participants from other countries who make contact with the two aforementioned clubs received a total of 5 points which includes two additional bonus points. Awards. Logs must be postmarked no later than 30 days after the contest and sent to: Lions Club of Rio de Janeiro (Arpoador), Rua Souza Lima n. 310-Apartamento 802, Rio de Janeiro – 20.000-ZC-37, Brazil. ***YU 80-Meter DX Contest***, 2100Z Saturday through 2100Z Sunday, cw only. Exchange RST plus QSO no. starting with 001. Contacts between stations in the same country count 1 point, between stations on the same continent 2 points, between stations on different continents 5 points, contacts with YU stations 10 points. Only one contact with the same station is permitted. Multiples of one for each DXCC country including your own and one for each YU prefix. Score equals sum of points multiplied by the sum of multipliers. Categories are single op, and multiop, (club stations are considered multiop.). Awards. Full log data and usual signed declaration must be postmarked before March 15 and sent to the YU DX Club SJR, Box 48, 11001, Belgrade, Yugoslavia.

13 ***WIAW Qualifying Run.***

14-15 ***DX-YL to North American YL Contest*** cw starts 1800Z Jan. 14 and ends 1800Z Jan. 15, sponsored by the Young Ladies' Radio League. Open to all licensed YLs, and contacts with OMs do not count nor do net contacts count. Call CQ DX YL. All bands may be used, crossband not permitted. A station may be worked and counted once on each band. Exchange QSO no., RST, country or state. Usual clear log entries. Separate logs for cw and phone (phone Jan. 28-29). DX YLs, included KH6 may contact all of the North American continent which includes the states and Canadian provinces. Alaska YLs will be counted as DX but may not contact the western Canadian provinces (VE5, 6, 7, 8). KL7 YLs may contact KH6, the states and the eastern Canadian provinces. Contestants in the North American area may score contacts with DX stations to include KH6 and KL7 except as previously noted. The western Canadian provinces VE5 through VE8 may not contact or count Alaska as DX. A point per QSO; multiplier equals the no. of states/countries. Inputs of 150 watts or less on cw, and 300 watts ssb PEP or less, may multiply score of 1.25 (indicate input power on log). Signed logs must be postmarked no later than Feb. 5 and received no later than Feb. 19

(Continued on page 99)

Amateur Radio and the Weather Service

Strange Bedfellows.....

BY CHARLES HARRIS,* WB2CHO

ALBUQUERQUE, New Mexico, is one of fifty cities in the nation with a vhf weather information station, which continuously broadcasts up-to-date weather forecasts and conditions. Albuquerque is unique, however, in that its station was built, maintained and repaired by volunteer amateur radio operators.

The vhf radio system was started in 1967 by the National Oceanic and Atmospheric Administration (NOAA) as a means of passing on the ever-increasing amount of weather information directly to the public. The broadcasts can be received with a simple vhf-fm receiver designed for the purpose, or with a standard high-band monitor. The program has met with enthusiastic acceptance by the public, leading to the decision to expand the network of stations to cover other major cities.

In a recent club-sponsored tour of the NOAA facilities at the Albuquerque airport, members of the Amateur Radio Clubs of Albuquerque asked the local NOAA staff when they could expect a vhf station in their city. The answer was disappointing: not for about three years, due to funding priorities.

Not content with this answer, the amateurs continued to press: would NOAA accept a station built and maintained by the local hams? Back came a cautious yes, subject to clearance through channels. The consort of radio clubs, consisting of the Caravan Club, the Upper Rio Grande VHF Society, and the Albuquerque Amateur Radio Club, appointed Joe Knight, W5PDY, coordinator of the project. Knight, assistant SCM for New Mexico, negotiated the details with Dan Ocker of the Albuquerque NOAA staff and submitted a formal proposal to the NOAA regional headquarters. The regional staff enthusiastically endorsed the plan, and construction began.

Under the terms of their agreement, NOAA would provide space for the equipment and antenna, as well as electric power, and the radio clubs would provide the transmitter and antenna, as well as the construction and maintenance of the facility. The transmitter was a modified General Electric Progress-Line unit of the type familiar to many do-it-yourself fmers. Its 30-watt output was fed to a gain antenna to produce an erp of about 150 watts, more than enough to cover the metropolitan area. NOAA also assisted in obtaining the quality recording equipment needed for the continuous-duty station.

Using the same format as NOAA's regular 1000-watt stations, the Albuquerque facility trans-

Receiving a letter of commendation from NOAA Weather Service for construction and installation of the NOAA Weather Radio in Albuquerque, NM are (left to right) Dr. Larry Scott, W5TIG, Geo. Gregg MIC of NOAA, Joe Knight, W5PDY, and Don Oaker, WB5LVR, also of NOAA.

* ARRL Membership Services Assistant.

mits a current forecast for the Albuquerque area, updated hourly, as well as current weather conditions and more general forecasts for the entire area. Special weather bulletins are added immediately, for the most up-to-date weather information possible.

The station went on the air in late Spring, and after a few months of testing, was announced to the public. The announcement of the 162.40-MHz station praised the efforts of the local clubs:

> This service is possible at this time only through the volunteer efforts of a citizens group – The Amateur Radio Clubs of Albuquerque – [through whose action] Albuquerque residents can enjoy the service years earlier than the scheduled installation.

The local media jumped at the story. Two television interviews and numerous radio stories spread the word of the station and the dedication of the local amateurs who made the station possible. The local broadcast stations immediately began to make use of the vhf broadcasts to update their weather information on a much more frequent basis, further serving the Albuquerque public.

Nor did the hams' role end with the installation of the gear, as the continuing maintenance of the facility is also their responsibility. For example, when the station was damaged by lightning recently, the clubs each chipped in to repair the damage and return the station to service.

The Albuquerque experience is a fine example of what an amateur radio club can do in terms of public relations for ham radio and public service. What can *your* club do? QST

Fifty Years of ARRL

A bound 152-page reprint of the gold-edged historical articles which appeared in the 1964 issues of *QST* is available from the ARRL for two dollars postpaid. Titled *Fifty Years of ARRL*, the book covers the highlights of ARRL and amateur radio history during the fifty years from 1914 to 1964, and will make a companion piece to the classic *200 Meters and Down*, a reprint of which is also available from the ARRL for two dollars.

World Above

(Continued from page 74)

ules on 432 MHz with stations in the Los Angeles and San Diego areas. A 20-foot dish is now completed and efforts are under way to optimize the feed. EME certainly is the way to get signals out from behind those mountains Chuck! To get high stability without the customary many multiplier stages, another project at WA6EXV will attempt to phase lock a 2304-MHz transistor oscillator to a crystal controlled source.

Since his antenna, a 32-element extended collinear, was done-in by a windstorm last March, W3RUE of Pittsburgh has been trying various Yagis but with relatively poor results. Ted has finally gone back to collinears and says that he is back in business. Just as soon as the new antenna was up, he worked WA9HUV near Chicago (about 500 miles) followed by WA9EUA, Oskosh, WI (about 530 miles and a new state).

According to the K2UYH/VE7BBG *432 Newsletter*, the first 70-EME QSO between Europe and Africa took place Aug. 31 when G3LTF worked ZE5JJ. It is also understood that SM5LE has 8, 46-element J beams which appear to be working well, as attested to the fact that he is only running a single 4CX250. During September he worked K2UYH and K8UQA.

From down under we hear exciting news of an apparent terrestrial 70-cm record. The contact took place Feb. 2, 1975, between VK2ZBJ near Melborne and VK6WG on the southwest coast of Australia. According to a letter from VK3AUU, it's an overwater path of 1516 miles. From the same part of the world, we learn via *Break-in*, the magazine of the N.Z. Association of Radio Transmitters, Inc., of a New Zealand 3.3-GHz (9 cm) record. Equipment was carried by 2 parties of intrepid mountaintoppers from the Wellington Vhf Group. On Feb 2, 1975, interestingly enough the same date as the Australian 70-cm record, they established contact over a distance of 238 miles, using 60-milliwatt transceivers and 3-foot dishes. This distance is, incidentally, greater than the 214 miles established by W6IFE/6 and K6HIJ/6 on June 18, 1970, so it appears that the new Zealanders have a new world's record for 3.3 GHz.

Even higher in frequency, word comes of a laser QSO between F8DO and F1AVY. Signals were reported to be S9 over the 23 km (14.25 mi) path. Equipment consisted of RCA SG2007 solid-state laser operated in the pulsed mode at a power level of about 10 watts. For receiving, a CA 30807 PIN diode was used. They have also used the same equipment to communicate on voice, using the lasers in their fm mode. Distance in this case was 3 km (1.86 mi).

Variations on Oscar

Interest in propagation via Oscar beyond the normal line-of-sight distance continues in a number of quarters. WB6NMT in San Diego continues his Mode B observations in conjunction with KH6BZF and others. ZK1DX in the Cook Islands has reported reception of the 10-meter downlink signals from U.S. Canadian, and European stations, which would be expected to be well out of range. It is possible that antipodal propagation may be responsible for some of this reception. Using Oscar 7 Mode A, W6CG and G3IOR have reported completing a cw exchange using techniques similar to those employed in m.s. communication. This was back on July 28th and the distance was about 6000 miles, well beyond the normally expected range. QST

Operating News

(Continued from page 88)

Northwest Ohio Amateur Radio Club, Lima, OH
Radio Amateur Transmitting Society, Nashville, TN
Radio Operators Association Of New Bedford, North Falmouth, MA
Southern Nevada Amateur Radio Club, Inc., Boulder City, NV
The Nights Of The Round Table, Silver Spring, MD
Wireless Institute Of The Northeast, Inc., Madison, NJ

CLUB COUNCILS & FEDERATIONS

Amateur Radio Council of Arizona, Don French, W7IWL, 9509 Rolling Hills Drive, Sun City, AZ 85351.

Chicago Area Radio Club Council, Roger A. Baim, WB9BDP, Secy., 2753 W. Coyle, Chicago IL 60645

Council of Connecticut ARCs, James W. Parker, K1VII, 17 West Main Street, Niantic, CT 06357.

Federation of Eastern Mass. Amateur Radio Assoc., Eugene H. Hastings, W1VRK, Secy. Treas., 28 Forest Avenue, Swampscott, MA 01907.

Foundation for Amateur Radio, Inc., John Chitwood, K3RGB, Rt. 2, Box 379-L, Orchard Avenue, Jessup, MD 20794.

Indiana Radio Club Council, Willis E. Sample, K9RPZ, 207 E. Oak, Anderson, IN 46012.

Northern Virginia Amateur Radio Council, E. B. Redington, W4ZM, 5218 Light Street, Springfield, VA 22151.

Puget Sound Council of Amateur Radio Clubs, James J. Grinton, K7VNI, 1718 E. Sunset Drive, Bellingham, WA 98225.

Radio Society of Ontario, Inc., D.C. Robertson, VE3FOV, Secy., 85 George Henry Blvd., Willowdale, ON M2H 1E9.

San Diego County Amateur Radio Council, Joseph T. Calvin, WB6LBM, Chmn., 5820 Nagel Street, La Mesa, CA 92041.

Tennessee Council of ARCs, Robert P. George, WB4ZSZ, 106 Wedgewood Drive, Oak Ridge, TN 37830.

SET

(Continued from page 55)

and check with the net managers of the nets you are active in to determine when the net will meet for the SET. Both the daytime and evening segments of NTS will be employed for the SET. NTS (D) will be the primary vehicle for traffic flow during the daytime, with NTS(E) assuming the evening role.

All amateurs are encouraged to originate at least two messages during the SET period. One can be to your SEC (see address on previous page) and another to a friend or relative in a different part of the country.

The order in which messages are handled in any net session depends upon the precedence in the preamble of the message, as determined by the originator. The precedences are: EMERGENCY, Priority (P), Inquiry (Q), and Routine (R). See this month's Public Service Column for additional info.

For the SET, all NON-ROUTINE-precedence test messages should carry the word "Test" before the precedence, e.g. TEST Priority (or Test P on cw). As a clarification of earlier procedure, do not use "TEST" in the precedence of a routine message; a routine message is a routine message regardless of whether or not it was drafted for the SET.

As a further step to insure test messages will not be construed as the real thing, use the words "TEST MESSAGE" as the first two words in the text. For improved efficiency, try to avoid using long words such as participating, communications, simulated, emergency, etc., in texts whenever possible.

To prevent SET messages from "dragging out" beyond your SET period, the handling instruction HXB is used (after the precedence and before the station of origin in the preamble) on SET messages. Liberally interpreted, HXB means: "Cancel message if not delivered within the SET period; service (send a service message to) originating station.

For SET messages originated during exercises held on a date *other than* the official SET weekend, use HXB followed by a number, e.g. HXB48 which means "Cancel message if not delivered within 48 hours of filing time; service originating station." If the message is not a test message, and you would like to have it delivered even after the SET is over, don't use HXB at all.

Some exercises and net sessions will operate on the assumption that commercial power has been disrupted. Would you be able to communicate if you suddenly discovered that your home was without commercial power? Equip yourself with some sort of emergency-power source or battery operated rig. Be on the lookout for the emergency-power-only sessions; you'll be needed!

Radio officers, net managers, etc., who do not hold ARRL leadership appointments (such as RM, PAM, EC, etc.) should write Hq. for a copy of the 1976 SET Bulletin and reporting forms. The SET is open to all amateurs and public-service groups. Actually, every amateur, regardless of interests, should be adequately trained in handling emergency communications. Remember, amateur radio exists because it qualifies as a service. Will you be active during SET '76? – *WB2NOM*

Operating Events

(Continued from page 96)

(separate logs per model). Send to Beth Newlin WA7EFG, 826 W. Prince Road – 06, Tucson, AZ 85705. Awards.

17-18 *CD Party, phone.*

24-25 *SIMULATED EMERGENCY TEST*, rules this issue.

28-29 *DX-YL to North American YL Contest*, phone, see rules above.

31-Feb. 1 French Contest cw, sponsored by the French Society the REF, starts 1400Z Jan. 31 and ends 2200Z Feb. 1 (phone Feb. 28-29). Exchange RST and QSO no. (French stations will send the no. of their department). Score 3 points per QSO with French stations and with DUF ON HB LX VE2 OD HB 3B 9U-Q-X; contacts with F8REF earn 10 points. There is a multiplier of one for each different department and ON provinces and HB contacts and each different francophone country per band (OD HB VE2, etc.). Score equals total points X total multiplier. Awards. Report promptly to the REF, c/o Lucien Aubry, F8TM, rue Marceau 53, 91120 Palaiseau, France.

FEBRUARY

5 *West Coast Qualifying Run.*

7-8 *DX Competition phone*, rules in full this issue.

7-15 *Novice Roundup*, rules in January.

11 *WIAW Qualifying Run.*

14-15 *10-10 Winter QSO Party.*

15 *Frequency Measuring Test.*

21-22 *DX Competition cw*, see this issue. *YL/OM Contest, phone.*

28-29 *French Contest, phone*, see Jan. 31 listing.

Mar. 6-7, DX Competition phone, YL/OM Contest cw.

Mar. 13-14, BERU.

Mar. 20-21, DX Competition cw.

Apr. 3-4, CD Party cw, SP DX Contest.

Apr. 10-11, CD Party phone.

Apr. 24-25, PACC, Delta QSO Party.

June 12-13, VHF QSO Party.

June 26-27, FIELD DAY!

Station Activities

All operating amateurs are invited to report to the SCM on the first of each month, covering station activities for the preceding month. Radio Club news is also desired by SCMs for inclusion in these columns. The addresses of all SCMs will be found on page 6.

ATLANTIC DIVISION

DELAWARE – SCM, Roger E. Cole, W3DKX – SEC: K3KAJ. RM: W3EEB. PAM: WA3DUM. PSHR: K3YHR 45, K3KAJ 44, WA3DUM 42. W3EEB hosted the Northern Del. Ham Campout at his A-OK Campground near Glasgow. Campers were K3YHR K3NVV W3OWE W3TCI and W3DKX. Visitors enjoying beautiful weather and varied activities were K2CCN K3HRP WA3AVD WA3JPQ WA3QBD and WA3WPY. The Del. QSO party Dec. 6 & 7 has clubs planning DXpeditions to assure the availability of Kent & Sussex Counties. WA3WWU is heard from W9SAL the Campus Station at Valparaiso Technical Inst. in IN. WA3ZYZ thanks W3FFU, W3GQL and W3GAU for help in obtaining the new Advanced Class ticket. K6QS back in Newark joining WA3YLT on Del. nets. W3WD now NCS on Wed. DTN. DTN: QNI 381, QTC 107; DEPN: QNI 60, QTC 6. Traffic: WA3WUL 134, W3EEB 100, WA3WPY 96, K3KAJ 88, WA3DUM 64, K3YHR 25, WA3UUN 18, WA3KDR 13, W3DKX 33,

EASTERN PENNSYLVANIA – SCM, George S. Van Dyke, Jr., W3HK – SEC: W3FBF. PAMs WA3PZO W3AVI. RMs: K3DZB W3EML K3MVO WA3PHQ WA3WOE WB2FWW/3. A change in command and a change of address. Mail may get fouled up for a while, so be patient! A well done to W3FBF who took over until the elections were over! Only one net report received this month – PFN QNI 717, QTC 558. OO reports received from K3RDT K3OIO W3KCM and W3KEK for May to Sept. OVS reports from W3GOA and W3CL. OBS reports from W3ID and K3BHU. BPLs: W3CUL W3VR and WA3ATQ. Well, EPA had the real thing again and the nets were in there. All traffic nets and local repeaters were active. There are too many to mention here so I hope each manager writes to HQ giving the details and calls so all can be recognized. A well done for Ham Radio! W3EML reports traffic down, lets all get in there and prime the pump a little. Nothing new from W3WRE means no new Keys! WB2FWW/3 getting ready for 20 & 40 traffic! Same report from K3MVO means still busy. WA3CFU now fully QSK. W3ZGG running Novice classes at North Penn H.S. evenings. World traveler W3BNR on the road again! WA3VUE active getting AREC going in his area. WA3OGM back on active list. W3KEK says it took time but he finally got his quad going and it was worth it. W3KCM (OO) says the guys must know when he is monitoring no reports! WA3UZI and WA3WOE back in school and back on traffic skeds. W3EU reports active on Intruder Watch. WA3WJX got his big A, congrats. Lehigh Valley ARC active in VE/W contest, they meet the 1st & 3rd Fri. each month, 8 PM at 1733 Valtree St. Allentown. New members and visitors are welcome. New officers for U of P ARC WB2IIC, pres.; WA2NDU, vice-pres.; WB2BTA, secy.-treas. Now don't forget to mark down the new address, and get those reports in. RMs and PAMs take note! Message reports are OK and they fill the pipe line. All correspondence will be answered ASAP. Let me know what you, your club or your nets are doing so all can read about it here. Traffic: (Sept.) W3CUL 3191, W3VR 1162, WA3ATQ 341, WA3QYY 143, WA3UKZ 143, WA3THT 138, W3EML 130, W3WRE 91, WB2FWW/3 71, WB2RBA/3 65, K3MVO 50, WA3REY 41, K3OIO 38, W3AVJ 37, WA3CFU/3 23, W3BUR 21, W3ID 16, K3BHU 14, W3BNR 14, WA3TAV 14, W3HK 10, WA3MVP 11, WA3OGM 8, WA3VUE 8, W3LC 5, WB2BTA/3 4, W3ADE 4, W3OY 3, WA3UZI 2, WA3VDQ 2, W3EU 1, W3GMK 1, W3GOA 1, W3KCM 1, W3KEK 1, WA3WOE 1. (Aug.) K3OIO 44, WA3TAV 17, WA3CFU/3 7, W3KEK 1.

MARYLAND – DISTRICT OF COLUMBIA – SCM Karl R. Medrow, W3FA – SEC: K3LFD. MDD/3643 7 and 10 PM. MEPN/MDCTN/3920 6 PM. PON/3907 5:15 PM. The Nat. Capitol DX Assn. has K4DXO, pres.; W4WWG, vice pres.; WA3NGS, secy.; W4IDG, treas. W3JPT working on the WARC-79 Task Force. W3EKZ gets a new hip joint, sells the 55 acres for a 7 acre antenna farm on a hill in Joppa. Good Luck. W3EPR hosted the Balto QCWA at their last outing. W3MWD and his mill are between two hot spots. W3EBK goes right to work as OO. Other OOs W9SZR/3 WA3JSZ and W3PYW keep an ever watchful eye on the bands. Add WA3SJY on a traveling vacation trip. W3ZNW looking forward to the time change. W3CDO attended the National Convention and the QCWA meetings. W3JZY returned from his good vacation to find loads of work. W3EZT pres.; K3GEG, vice-pres. and OPs; WA3SEY, vice-pres. tech.; K3WX, secy.-treas.; WA3UMY, W3ENL and WA3WQF, dir. of T-MARC which now is The Mid-Atlantic FM and Repeater Council. They discourage 94 and encourage 52 as the National Simplex Freq. WA3UYF moving to a house on the Campus. WA3YJQ is QRL college. Congrats to WA3YKK and WA3ZCE new Generals and to WA3WRN new Extra. K3IQG is back and moving with new members, new equipment and the same old spirit says WN3ZKB. W3BHE reports WR3AGI 28/88 Cumberland, and good publicity on the Mountain ARC code classes. K3URZ getting back into the swing. WA3UZR delivers the hard ones. WA3YEE finds new popularity with his new scheme to feed and isolate metal towers. WA3SEE is a new trustee representing Frederick at the FAR. W3ABC is a busy Gaithersburg hamfest chmn. W2FZV takes off for visit to Japan. W3FCS enclosing the ham shack. WA3EOP keeps W3CWC hopping, and is pleased with the MDCTN stats to date. WA3UYB glad to back on regularly. W8BZY/3 runs a mean net session. WA3PRW has completed the summer rebuilding. MDD Top Brass W3EEB W3FA W3FZV WA3WPY and W8BZY/3. The MEPN topper was W3ADQ with W3LDD as other. MDCTN Top Honor Rollers WA3WRN W3ADQ W3LDD and WA3PRW with perfect attendance. With the nets sessions/Tfc/QNI Avg.: MDD/W3FZV 53/209/7.0; MEPN/WA3LPL 22/77/16.2; MDCTN/WA3EOP 17/33/16.6. Traffic: (Sept.) WA3WRN 234, W3FA 202, W3MWD 108, WA3EOP 98, WA3UYF 92, W8BZY/3 87, W3FZV 85, K3IQG 78, WA3SJY 68, WA3PRW 42, W3FCS 21, WA3UYB 16, W3BHE 8, W3ZNW 4. (Aug.) WA3SJY 62,

SOUTHERN NEW JERSEY – SCM, Charles E. Travers, W2YPZ – The SJRA publication Harmonics includes a very impressive history of its Field Day activities for a number of years. WB2RMK reports NJSN had 30 sessions, 337 stations and 100 pieces of traffic. NJN with 30 sessions reports 466 stations, 162 traffic for the Early Net; 254 stations with 85 traffic for the Late session. Recent elections of the RAM Assn. lists WB2UBG, pres.; WB2ORD, vice-pres.; WB2CGH, secy.; WB2MRD, treas. Congrats to WA2WLM on new Extra Class license. W2ORS will be off the air for a spell, change in QTH. The BCR Club announces plans for their Christmas Dinner on Dec. 5, 1975, 7 PM at the Vincentown Grange Hall. The NJSN continues to break records for activities. An impressive list of 42 stations maintaining high QNI for 3 consecutive months! Traffic: WB2LCV 77, W2ZQ 48, WB2LCC 28, W2JI 20, K2BG 14, WB2SFX 14, W2IU 8, WA2TRK 4.

WESTERN NEW YORK – SCM, Richard M Piteruse, K2KTK – SEC: W2CFP. A reminder – don't forget to nominate your candidate for SCM, deadline is mid-Dec. Many are quick to complain if the job isn't done right, but few are willing to step forward and do it. How about you? ESS handled 84 messages with 356 check-ins for Sept. According to WB2KUN, NYSPTEN again considering affiliation with NTS. W2RQF will soon have a Robot Monitor, Camera, and Viewfinder for Slow Scan TV. WA2TPR has proclaimed "Six meters has Died!" WA2OMN stationed at NTTC Corry station at Pensacola and is operating WA4ECY on the base. New General WA2ZJP busy with the traffic nets from his Binghamton QTH. New OBS is K2KWK. W2IAM and W2RQF sending 00 notices. Congratulations to WN2AUD on his new license. Sorry to report the passing of WA2GYN. WN2DTG of 1963 is now WN2YZL awaiting his Advanced. WN2UZZ becomes WA2UZZ. WA2ICB W2FR K2KTK K2KIR now all actively star-gazing with various sized lookers. Power company in Syracuse notes a significant energy savings with those four outside at the scope instead of inside at the rig! Traffic: (Sept.) W2UYE 157, W2OE 149, W2MTA 129, WA2ICB 112, WB2KUN 83, W2PZK 74, WB2THS 68, WB2QIX 44, W2RUT 38, WA2TPC 31, K2UIR 30, W2PZL 26, K2KTK 25, W2RQF 24, WB2KJT 21, W2HYM 20, WA2ZJP 14, K2OFV 13, WB2QDN 13, WA2HSB 12, WA2AIV 9, W2EAF 9, WA2HWT 7, K2IMI 7, WA2EAJ 1. (Aug.) WA2EAJ 2.

WESTERN PENNSYLVANIA – SCM, Donald J. Mystewski, K3CHD – SEC: W3ZUH. Asst. SEC: K3SMB. PAM: K3ZNP. RMs: W2KAT/3 W3NEM W3LOS W3KUN. WPA CW Traffic Net meets daily on 3585 kHz at 7:00 PM local time. PA. Traffic Trailing Net meets daily on 3610 kHz at 6:00 PM local time. Pa. Phone Net meets Mon. thru Fri. on 3960 kHz. at 5:30 PM local time. Recent appointments W3RUK EC for Fayette Co., WA3SXC EC for Butler Co. The following counties need ECs: Potter, Clinton, Fulton, Bedford, Somerset, Jefferson, Elk and Clearfield. It is with deep regret to announce the Silent Key of W3DCY. SEC W3ZUH reports the following counties active during hurricane Eloise: Blair, Centre, Clarion and Mifflin. Past WPA SCM W3GJY recently retired and actively DXing. WA3TFS finished a complete homebrew 2-meter fm rig. WA3IYA upgraded to Advance Class. W3HDH reports that 52 counties participated in the Pa. QSO Party. WA3WNU finally got on 75 meters by shunt feeding his tower. Welcome to a new Novice WN3ADR and thanks to W3KQD for his assistance. W3ENA W3NXZ K3TNH WA3PTV W3LEZ W3ZUX and WA3BWI participated in a flood watch in Sept. The Two Rivers ARC announces the following officers for 1975-76: W3IST, pres.; K3CHD, vice-pres.; WA3SOZ, secy.; WA3NLE, treas. Thanks to W3OFM WA3TRB and W3TZX the following have received their Novice tickets: WN3AFF WN3AFG WN3AFH. Congrats and welcome aboard. I would like this opportunity to extend holiday wishes to all of the WPA members and the best of everything for the New Year. Also, thank you for your support during 1975. The WPA CW Traffic Net had 31 sessions in Aug., 289 stations check-in and handled 90 messages. Sept. there were 30 sessions, 327 stations check-in and 158 messages handled. The Pa. Phone Net had 26 regular sessions and 5 emergency flood sessions, 717 stations check-in, handled 558 messages. PSHR credits WA3VBM 47 and WA3SWF 44. Traffic: W2KAT/3 291, WA3VBM 132, W3EGJ 92, WA3SWF 59, K3CHD 33, W3KUN 32, W3OW 22, K3HCT 19, W3LOS 15, W3SN 12, K3VQV 11, W3EGK 9, W3IDO 8, W3ATQ 8, W3YD 6, W3TIN 5, K3OYB 5, W3LOD 4, W3UT 3, W3HDH 4, WA3PMT 2, W3LEZ 1, W3GQJ 1, WA3WNU 1, W3KQD 1, WA3UDZ 1, K3SJN 1.

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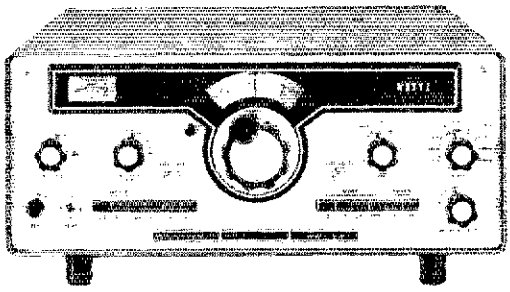

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Kit HWA-104-1, 10-M Accessory 16.95
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Kit HS-1661, Matching Speaker 19.95
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Kit SBA-104-1, Noise Blanker 26.95
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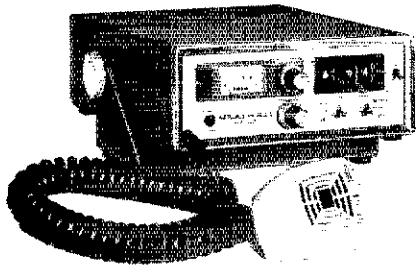

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LEDs indicate that the synthesizer is locked on-frequency and warn if channel is already in use. A mode switch selects simplex, —600 kHz offset or an "aux" crystal with a different offset frequency. A built-in continuous/burst encoder accesses most closed repeaters.

The HW-2026 is one of the smallest synthesized rigs you can buy, but it's not difficult to build—just 5 circuit boards to wire. Alignment requires only a VTVM, although a frequency counter would be helpful.

Kit HW-2026, Synthesized Transceiver 289.95
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To make the HW-2021 an even better value, we've included accessories worth up to $60—a crystal for 146.94 MHz, a —600 kHz offset crystal, a flexible "rubber duckie" antenna plus an output for an external antenna, a built-in nickel-cadmium battery pack and a separate AC charger. And you get them all at no extra cost when you buy the HW-2021.

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CENTRAL DIVISION

ILLINOIS — SCM Edmond A. Metzger, W9PRN — Asst. SCM: Harry Studer, W9RYU. SEC: W9AES. PAM: WA9KFK. RM K9ZTV, Cook County EC: W9HPG.

Net	Freq.	GMT/Days	Tfc.
ILN	3690	0300/2330 Dy	289
IL Phone	3915	2245 Dy	371
NCPN	3915	1300 MS	
NCPN	3915	1800 MS	
IEN	3940	1400 Su	no report

The Western Area FM Amateur Repeater Club, Inc. of Western Springs was approved as a club affiliate of ARRL by the Executive Committee. Lewis G. McCoy, W1ICP and Edmond Metzger, W9PRN were guests of the Western IL Radio Club on Sept. 24 and The Sangamon Valley Radio Club on Sept. 25 with FB audiences at both meetings. The Central Division gang was well represented at the National ARRL Convention in Washington and many eyeball QSO's were held there. Our sympathy to family and friends of WB9MFF who recently passed away after being electrocuted by a linear amplifier. WA9VGW has purchased a new rig after fire damaged his old equipment. The Starved Rock Radio Club has received its FCC Repeater license, WR9AFG and should be on the frequency very shortly. New Advanced licensees are: W9PRN W9QKE and WA9JJE. WN9RVY WN9RYX WN9RYW WN9RZQ WN9RXK WN9RXJ and WN9RQD are new Novices from the Sterling Rock Falls ARS code and theory class. WN9RFP is also a newly reported Novice. Bob W1CW, and Ellen W1YL, of ARRL headquarters were guests of honor together with Armin Meyer, W3ACE/Y12AM at the W9DXCC banquet on Sept. 20. New appointees this month include: W9NJP as ORS and WA9LZA as OO, WN9OZK is waiting for his General ticket. The International Radio Hosts was formed on July 28, 1975 for the purpose of mutual assistance and fellowship with members under reciprocal privileges. Contact W5QPX for further details. WA9IPZ won the ICOM-2 at the Peoria Hamfest. The West Allis WI Radio club will host the 1976 Central Division Convention in Milwaukee in May 14 at the Red Carpet Inn across from the Milwaukee airport. WN9RVF is a new call in Naperville. WA9VGW WB9NVN and W9NJP are BPL recipients for the month. Traffic: WA9VGW 606, WB9NVN 528, W9NXG 249, WB9NOZ 196, K9ZTV 133, W9NJP 112, WA9KFK 68, W9KR 53, W9OYL 53, W9LNQ 52, WA9ULP 51, W9HPG 45, W9IXV 44, K9KHI 42, W9JJE 41, WB9PHM 34, WB9DED 31, W9HOT 25, W9OLF 24, W9PRN 24, K9WMP 12, W9RYU 10, W9UHD 9, WB9NIO 7, K9DDA 6, K9UIV 2.

INDIANA — SCM, M.P. Hunter, WA9LED — SEC: W9UMH. Congrats to WA9BWY for fourth place over-all in the July CD phone party. Also to K9UWA for his new DXCC. The Central Division will hold its convention in Milwaukee on July 9-10, 1976. If any of our groups wish to hold a meeting at this convention, please notify me so that I can notify the officials of your request for a room. K9SIJ has a new Classic 36 signal snatcher. Congrats go to WB9LHI WA9BWY W9LT and K9UWA for top scores in IN during the DX tests. Congrats to W9SFR on winning the "DX Hog of the Year" at the W9DXCC annual banquet. The IRCC held its fall meeting on Oct. 5, I was unable to attend but will submit a report when I receive it. K9DCX reports ITN is functioning very well with some great assistance from W9HUF. K9DCX also reports that 20-meter DX looks good through the day. Blackford Co. AREC provided communications for their 4H parade. The Gary area ARPSC did the same for the March of Dimes Bike Rally and ACARTS of Ft. Wayne did the same for the March of Dimes Walkathon. We're happy to report these worthwile contributions to public service. W9ZRK back on the air, after a few years, with all new antennas and a big signal. Net QTC: QIN 216, ITN 524; Hoos. VHF 2; IPON 19; Marshall Co. Emer. Net. 2. Traffic: WB9KTR 222, K9EZX 204, WB9OMX 198, W9HUF 101, WB9FOT 93, W9ENU 82, K9DCX 81, W9DKP 75, WA9OKK 72, W9QLW 68, WB9MDS 67, W9UEM 66, WB9DIX 55, WA9TJS 52, WB9IHR 50, WA9OLM 43, W9JBQ 39, WA9OHX 38, W9KWB 34, K9EQT 31, W9LTU 29, K9YBM 27, WB9HCH 26, K9LZN 23, W9PMT 19, K9RPZ 18, K9CBY 17, K9TKE 14, W9MCJ 12, WA9OAD 12, K9JQY 11, K9RWQ 11, W9IOH 10, W9CMT 9, WA9CYG 9, K9HMC 8, W9DZC 7, W9BDP 5.

WISCONSIN — SCM — Roy A. Pedersen, K9FHI — SEC: K9PKQ. PAMs: W9AYK WA9LRW K9UTQ. RMs: WB9ICH K9KSA K9LGU W9MFG. RTTY: K9GSC. Nets, Freq, Time(Z)Days, QNI, QTC, Mgr.: BWN 3985, 1145 M-S, 493, 365, W9AYK; BEN,3985, 1700 Dy, 694, 182, WA9LRW; WSBN, 3985, 2330 Dy, 1273, 232 K9UTQ; WNN, 3725, 2215 Dy, 79, 15, WB9ICH; WSSN, 3662, 2330, M-W-F, 63, 10, K9KSA; WIN-E 3662, 0000 Dy, 299, 180, W9MFG; WIN-L, 3662, 0300 Dy, 279, 226, K9LGU; XPO Net, 3925, 1701 M-F, 557, 47, WA9NIX. OVS renewed K9OXY. Mancorad club meeting had 30 people present, W9NGT had film on tornadoes. Sorry to report WB9MNS a Silent Key. Don't forget Central Division Convention in Milwaukee July 9-10, 1976, Red Carpet Inn, WA9POV, WA9KRF co-chmn. K9KSA appointed PRA, Dane Co, Swapfest well attended. K9CPM made BPL. Ham campout was held at Castle Rock Park. K9UTQ has new inverted V on 75. W9CTI now 5Z4CTI in Kijabe Kenya E. Africa. W9EWC had his 5,000 QSO with ZS6KD on ssb started in 1953, 91 present at the QCWA banquet at Wausau Oct. 4. New officers for QCWA are W9VOW, chmn; W9EWC, vice-chmn; W9VQD, secy -treas. W9BKD correspondence aided by W9OUT the newsfinder. Outgoing chmn. W9NJH was presented a home made lamp made out of an old vacuum tube by W9NZF. W9YFW will be on with four-elements on 20-15-10, twenty-two-elements on 2, long wire on 75M, all at 60 feet. WN9PTX worked 11, HA9, C6, HK4, YV5, OA4, KH6, T12, WB9NME, WN9QDX passed Advanced Class. W6FU had FB visit with W9AOW, Spooner, W9ONI, Superior and K9MOD, South Range. W6FU is ex-W9BSK South Range. W9CSM a Silent Key. Traffic: K9CPM 879, W9DND 265, W9CXY 203, W9PVH 173, WA9QVT 159, WB9NME 125, K9LGU 122, W9MFG 121, WB9ICH

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516F-1 DC supply 75
351D-1 Mount 25
KWM-2 Xcvr 595
KWM-2A/NB (round) 1395
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2AC Calibrator 9
2NB Noise blanker 15
R-4 Receiver 269
R-4A Receiver 289
R-4R Receiver 339
R-4C Receiver 399
FL-4000 Filter 35
MS-4 Speaker 15
SC-2 2m converter 59
DPS-1 Conv supply 12
DC-1 Conv console 39
TR-3 Xcvr 299
RV-3 Remote VFO 69
TR-4/NB Xcvr 459
TR-4C Xcvr 449
34PNB Noise blanker 75
2NT Transmitter 99
T-4X Transmitter 339
T-4XB Transmitter 375
T-4XC Transmitter 425
AC-3 AC supply 65
DC-3 DC supply 75
DC-4 DC supply 89
TR-77 2m FM Xcvr 225

DYCOMM
10-0 2m FM amp $129

ETO
FA-70 Linear $995
Alpha 374 Linear 895

EICO
730 Modulator $ 39
753 Xcvr 129
751 AC supply 49

GALAXY/GLOBE/WRL
755A VFO $ 34
V-10 VFO 39
Galaxy 300 Xcvr 129
PSA-300C AC supply 39
G-300 DC supply 39
Galaxy III Xcvr 149
Galaxy V Xcvr 189
Galaxy V Mk II Xcvr 229
Galaxy V Mk III Xcvr 269
GT-550 Xcvr 279
GT-550A Xcvr 299
AC-35 AC supply 69
AC-400 AC supply 79
G-1000 DC supply 89
RV-1 Remote VFO 59
RV-550A Remote VFO 69
VX-35 VOX 12
CAL-35 Calibrator 9
F-3 CW filter 15
SC-35 Speaker 12
Economy AC supply 39
R-530 Rcvr w/6 KHz 695
Rejector 9
AC-210 AC supply 19

GENAVE
GTX-2 2m FM Xcvr $149
Ham Pak 19

GONSET
Comm IV 2m Xcvr $149
Comm IV 6m Xcvr 119
GC-105 2m Xcvr 119
G-50 6m Xcvr 149
910A 6m SSB Xcvr 199
911A AC supply 39
913A 6m Linear 175
Thin-Pak DC supply 19
G-76 DC supply 39
GSB-100 Transmitter 169
GSB-201 Mk IV Linear 395

HALLICRAFTERS
SX-96 Receiver $119
SX-101 Mk II Receiver 119
SX-101A Receiver 159
SX-110 Receiver 99
SX-111 Receiver 139
SX-122 Receiver 225
SX-133 Receiver 175
SX-146 Receiver 175
R-49 Mobile speaker 12
HT-32 Transmitter 179
HT-32A Transmitter 219
HT-37 Transmitter 159
HT-40 Transmitter 49
HT-44 Transmitter 159
HT-46 Transmitter 199
SR-150 Xcvr 249
PS-150-120 AC supply 75
PS-150-12 DC supply 99
MR-150 Rack mt 15
SR-400 Xcvr 495
P-500AC AC supply 85
FPM-300 Xcvr 349
HA-6 Transverter 89
P-26 AC supply 45
SR-34AC 6-2m Xcvr 175
SR-42A 2m Xcvr 89
HA-5 VFO 49

HAMMARLUND
HQ 100 Receiver $109
HQ-110C Receiver 119
HQ-110A Receiver 149
HQ-110AC Receiver 159
HQ-150 Receiver 169
HQ 170C Receiver 159
HQ 170A Receiver 189
HQ-170AC/Immunizer 239
HQ-180A Receiver 369
HQ-180AX Receiver 399
HQ-215 Receiver 199
SP-600 Receiver 175
HX-50 Transmitter 169
HX-50A Transmitter 199

HEATHKIT
HR-10B Receiver $ 69
HRA-10-1 Xtal cal 9
RA-1 Receiver 149
SB-300 Receiver 199
SB-301 Receiver 229
SB-303 Receiver 269
SBA-301-2 CW filter 15
SB-600 Speaker 15
QF-1 Q-mult 6
DX-60B Transmitter 69
HX-10 Transmitter 179
HX-20 Transmitter 99
SB-401 Transmitter 249
HA-10 Linear 175
HA-20 6m Linear 75
HW-22A 40m Xcvr 85
HW-32 20m Xcvr 75
HW-32A 20m Xcvr 85
HW-100 Xcvr 249
SB-100 Xcvr 299
SB-101 Xcvr 329
SB-102 Xcvr 369
SB-610 Signal monitor 79
SB-640 External LMO 89
SB-650 Freq display 149
HG-10B VFO 34
GP-11 Power supply 9
HW-17 2m Xcvr 89
HW-202 2m FM Xcvr 159
HWA-202-1 AC supply 19
HP-13 DC supply 49
HP-13A DC supply 54
HP 23 AC supply 45
HP-23A AC supply 49
HP-23B AC supply 54
HD 10 Keyer 24

ICOM
IC-21 2m FM Xcvr $299
IC-22A 2m FM Xcvr 189
IC-230 2m FM Xcvr 359

JOHNSON
Ranger I Transmitter $ 69
Ranger II Transmitter 139
Valiant I Transmitter 139
Invader 200 Xmtr 219
Invader 2000 Xmtr 449
Courier Linear 139
275w Matchbox/SWR 109

KW
KW-204 160-10m Xmtr $349

KENWOOD
PS-511S AC supply $ 79
T 599A Transmitter 349

KNIGHT
TR-108 2m Xcvr $ 89
V-107 VHF VFO 19

LAFAYETTE
HA-800 Receiver $ 89

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NC-270 Receiver 119
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NC-300-C2 2m converter 29
Converter cabinet 19
VFO-62 VFO 34
XCU-22 Calibrator 15
XCU-303 Calibrator 19
NCX-3 Xcvr 169
NCX-5 Xcvr 279
NCX-5 Mk II Xcvr 299
NCXA AC supply 69
NCXD DC supply 75
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HR-212 2m FM Xcvr 179
HR-2S 2m FM Xcvr 239
HR-2MS 2m FM Xcvr 189
AR-2 2m FM amp 89
HR-6 6m FM Xcvr 179

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SB1-LA Linear 149
SB-34 Xcvr 249
SB2-LA Linear 175
SB2- VOX 15
SB1 XC Calibrator 12
SB2-MB Mount 9
SB2 MIC Mic 9
SB-36 Xcvr 395
Scanvision SSTV 399
SB-144 2m FM Xcvr 169

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SR-C146A 2m FM HT 189
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SW-12 DC supply 69
400 Xcvr/410/117B 299
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260 Cygnet Xcvr 289
270 Cygnet Xcvr 329
270B/SS 168
1200W Linear 199
350 Xcvr 269
350C Xcvr 299
500 Xcvr 309
600CX Xcvr 389
700CX Xcvr 459
117C AC supply 65
512 DC supply 69
117XC AC supply 95
14X DC module 39
14C DC module 49
117x Basic AC PS 65
14-117 DC supply 99
Mark I Linear 395
250 bm Xcvr 239
250C 6m Xcvr 349
NS-1 Noise silencer 24
FM 2X 2m FM Xcvr 169
FM 1210A 2m FM Xcvr 249
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VX-2 VOX 15
FP-1 Phone patch 49

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9-26-75

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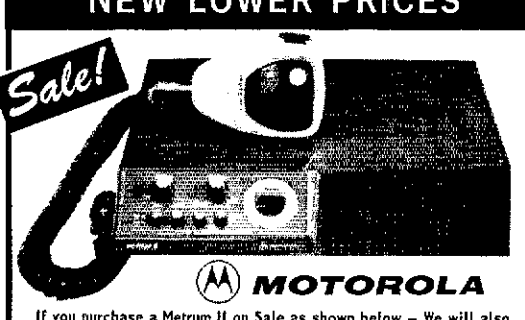

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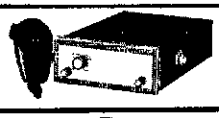

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102, WN9PTX 92, K9FHI 83, WA9GJU 82, K9KSA 79, WA9PKM 69, W9AYK 57, WB9HLS 53, W9IHW 44, K9UTQ 42, W9ESJ 39, K9EYA 36, K9JPS 33, WB9JSW 28, WB9LKC 23, W9YFW 23, W9KHH 16, WB9IDU 14, WB9LIW 11, WB9PYG 11, WN9OEC 10, WB9HRP 7, WB9AMC/0 7, W9BKD 6, WB9NKC 1.

DAKOTA DIVISIONS

MINNESOTA — SCM, Frank Lepps, K0ZXE — Net QNI, QTC: MSN1 275, 79; MSN2, 164, 60. MSPN(n) 900, 190; MSPN(e) 939, 190; PAW 3985, 426; MSSN, 116, 14. Aug. OBS action, 271 sent. WA0RLD is chmn of the Amateur Education Committee for the Metro area. The State Fair Committee now also the Amateur Radio Public Relations Committee is planning to implement traveling displays, including an Oscar system for state-wide showings to clubs. The Piconet Handi-Ham Winter Hamfest will be Dec. 6, 9 A.M. at the Faribault Eagles Lodge. Unfortunately, two active amateurs, K0FOW and WB0OBD are now Silent Keys. The VARS sponsored the Waseca swapfest in Oct. with an ARRL and FM forum plus several prizes. W0GYH and many others worked during Courage Week generating 13 upgradings and a new Novice. Don't forget the 160- and 10-meter contests in Dec. Congrats to WN0MHH. WN0OAN new Generals, WB0NIU now Advanced, WA0GLI new PAM and WB0NGX new OPS. The Mobile Amateur Radio Corps provided communication between fire trucks during a simulated test. MARC has a new VP, K0FTI and secy., WB0OCT. WA0GLI sez the Minn. Amateur WX Net is reactivated; every night after MSPN. Novice classes start Jan. 13, contact WA0QIT Duluth. The Mesabi Radio Club gave code practice during Oct. Several appointees are conducting secret activities. The SCM is looking for a few good people to handle outstate traffic on ssb, please consult. WB0FTL is at Luther College in Decorah, Ia. WB0KTH built his own tower. WB0HOX BPL again. Traffic: (Sept.) WB0HOX 746, W0QMY 303, K0CVD 268, K0ZXE 211, WB0OCT 135, K0ZBI 119, WA0YVT 108, WB0EKC 100, WA0YWA 94, W0AA 87, WB0LJH 82, WB0LOR 77, WA0TFC 59, K0FLT 58, WB0LDW 55, WA0URW 51, WB0CPC 45, K0PIZ 43, K0SRK 34, WA0CCA 28, WA0YAH 28, WB0NZX 26, WA0GLI 25, WA0JPR 15, WB0JYT 13, WB0KTH 12, WA0IIB 8, WB0CYM 7, W0HNU 6, WN0OAG 5, WN0NZB 5, K0UPO 5, WA0WOV 4, K0SXO 3, K0GNI 2, WB0NIU 2, W0UMX 2. (Aug.) WA0WOV 49.

NORTH DAKOTA — SCM, Harold L. Sheets, W0DM — OBS: K0PVC. OO: W0BF, WA0SDQ/0 has the 75m antenna up at new QTH. W0DXC has a good antenna system now working for him on all bands. Congrats to WA0WLP on his election as new SCM. I am sure you fellows will be well served in all ARRL activities. Thank you all for the support given me during the past years. WA0SUF continues to do good work on the 40m DTRN representing ND for most of the sessions. WA0RWM, planned to start the NO WX net on Nov. 1 at 7:30 A.M. on 3995.0. She will report into Bismark for statewide distribution. W0DM lost his son through a high pressure spray gun accident discharging into the palm of his hand. Don't be careless when using one. W0DM started his radio classes at Valley J. High. W0OUX received a visit from his son ex-K7NEW and XYL and also W6FU.

Net	kHz	CDST/Days	Sess.	QNI	QTC	Mgr.
Goose River	1990.0	Su	4	58	2	W0CDO
RACES	3996.5	1830 S-S	30	411	73	WB0ATJ WA0SUF

Traffic: WA0SUF 98, WB0BMG 6, WA0JPT 5, W0MXF 5.

SOUTH DAKOTA — SCM Ed. Gray, WA0CPX — WA0KKR of Vermillion has moved to Boise ID. Dennis will be missed on the S.D. nets. The Sioux Falls ARC has joined the Sioux Valley Repeater Assn. in a joint effort to sponsor the 1976 S.D. Ham Picnic. WN0PHW is a new Novice licensee and is on from Madison, mainly active on 80 meters. A great big thank you to all the net mgrs; net controls and participants who kept up the activity during the summer and early fall. WA0CPX of Salem received SBDXCC No. 458 the first one in S.D. and apparently the 7th for the Zero district. It is reported that WB0AMK of Clear Lake has moved to MN. Net Reports: Morning Net 482 check-ins and 20 formals; NJQ — 702 and 50, Evening Net — 1376 and 49; SDN CW remains active. Traffic: WA0VRE 98, W0NZA 88, W0HOJ 58.

DELTA DIVISION

ARKANSAS — SCM, S.M. Pokorny, W5UAU — SEC: W5RXU PAM: W5POH, RM: W5MYZ. Net, kHz, Time/Day, QNI, QTC Mgr.: OZK, 3765, 0000/Dy, 173, 44, W5MYZ; APN, 3937 1100/M-S, 733, 42, W5POH; M-Bird, 3925, 2130/M-F, 446, 10 WA5ZWZ; ATN, 3995, 2230/Dy, 175, 21, WB5IGF; ARN, 3995, 2330/Dy, 510, 30, W5UAU. Welcome to new hams WB5s OWQ OWO OYH PAE PAG PAN PBP PDA PDK PGO PJN WN5OYA OYZ OZD OZE OZI PBB PBG PBT PBU PBV PCM PDM PDO PEE PFE PFG PFL PFM PFT PHK PHL PIA PIB PIC PID PIE PIH PII PIJ PIK PIR PJT PLC. The OZARC had exhibit at Baxter Co. Fair in Sept. with booth at main entrance where exposure was greatest. A feature of exhibit was demonstration of WR5AGS Mtn Home Repeater. OZARC had joint picnic with Branson Mo ARC Sept. 6th. OZARC has another Novice class going for 20 week period under direction of W5SHY. Your SCM attended the Wilhemina and Caren/Ozk hamfests. PSHR: W5MYZ 49, W5POH 39, WB5OHD 27. Traffic: W5MYZ 57, WB5IGF 56, WB5GAX 53, W5UAU 42, K5AO 36, WB5OHD 21, WB5FMK 16, WB5GWU 16, W5POH 11, K5GKN 6, WA5HNN 3.

LOUISIANA — SCM, Robert P. Schmidt, W5GHP — Asst. SCM: John Souvestre, WA5NYY. SEC: W5TRI. RM: WA5PRI. PAM: WB5EKU. VHF PAM: WA5KND. Congratulations to the Jefferson Club on a very successful Hamfest in New Orleans. The Al Powel W5MXQ award went to WA5IOU for his work with LSN the slow

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. . . and SSB-CW (don't forget OSCAR!)

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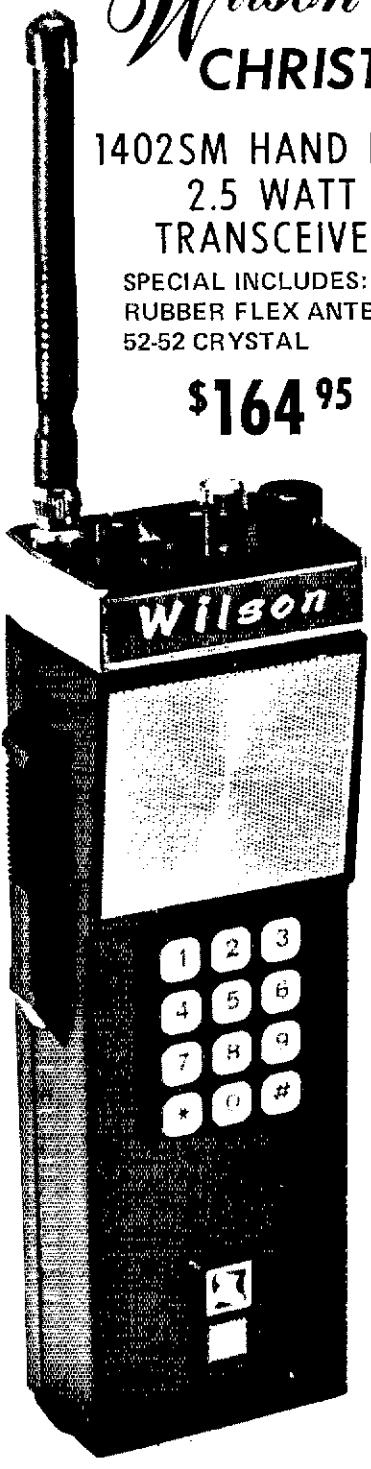

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52-52 CRYSTAL

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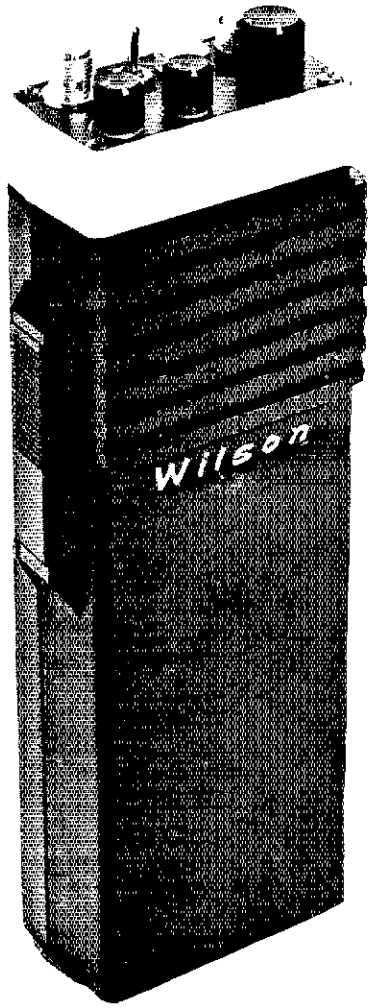

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1405 SM

- 6 Channel Operation
- Individual Trimmers on all TX/RX Crystals
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- Weight: 1 lb. 14 oz. less Battery
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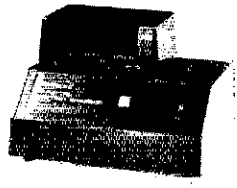
Add $7.50 per Transceiver for Factory Crystal Installation



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_____ SM2 @ $24.95. _____ TE1 @ $34.95 (SPECIFY FREQUENCY _____)

_____ TTP @ $44.95. _____ XF1 @ $8.95. _____ TX XTALS @ $3.00 ea. _____ RX XTALS @ $3.00 ea.

EQUIP TRANSCEIVER AS FOLLOWS: XTALS A. 146.52/52 B. _____

C. _____ D. _____ E. _____ F. _____

ENCLOSED IS _____ ☐ CHECK ☐ MONEY ORDER ☐ MC ☐ BAC

CARD # _____ EXPIRATION DATE _____

NAME _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

SIGNATURE _____

SHIPPING AND HANDLING PREPAID FOR CHRISTMAS SPECIAL

SALE VALID DECEMBER 1 - 31, 1975 QST NEVADA RESIDENTS ADD SALES TAX

speed net. The first Annual AL Traffic Award went to WA5TQA for his work with LTN, the Voice Net. The Greater N.O. ARC operated special call KD5OME over the Labor Day weekend to celebrate the grand opening of the LA Superdome. Over 1000 contacts were made. QSL cards should be sent to WA5TRX. Please include s.a.s.e. The MTA Club reports 43 members in their new novice class. W5RTX new DX club member with 275 countries. WB5KAX, pres. of VHF Club, back from G-land. WB5LBT active on Oscar 6 and 7. Baton Rouge club reports 17 of 20 members successfully completed summer Novice Class. New class started in Oct. K5TFG new Extra licensee. WA5YOU active on 6 and 2 with Tropo Skeds.

Net	kHz	Time/Days	QTC	QNI	Mgr.
LAN	3615	7:00/10:00 Dy	166	298	WA5PRI
LTN	3910	6:45 PM Dy	84	336	WB5EKU
LSN	3703	8:30PM M-F	58	155	K5ITC

Traffic: (Sept.) WA5IQU 282, W5GHP 261, WA5ZZA 190, W5MI 121, K5TTC 88, WB5NWO 21, W5YN 14, WB5PEP 13, WB5NSR 4, (Aug.) W5YN 18.

MISSISSIPPI – SCM, W.L. Appleby, WB5DCY Asst. SCM: C. E. Gibbs W5LL. Congrats to WB5PNQ, W5TAT, WB5SFC, and WN5LAI all upgraded to Adv. Vicksburg ARC now league affiliated. Another record month for both MTN and MSBN. Jackson ARC officers WA5DPO, pres.; WB5HQH, vice-pres.; WB5BUE, secy.; W5QDC, treas. Special calls WM5ISS and KM5BSA both report good activity. Univ. of MS ARC elected WB5DZC, pres.; WB5NTV, vice-pres.; W5CYG, advisor. Please coordinate all new repeater activity with WA5EIL. Latest Oscar user is WB5KDV. W5MUG new PR asst. for Delta Div. K3OWN/5 K4EOH/5 and WB5MDR regulars on MTN. Congrats to WB5OVF's XYL on harmonic. WB5KXT new 6-mtr beam. W5DT now on 2m fm. K4EOH/5 appt ORS. New ARC forming in Laurel. WB5NQS now op RTTY. MS amateurs and Nets responded in fine shape for the Hurricane Eloise alert. MS stations heard during Delta QSO Party. Welcome new MS amateurs WN5s PDP PHP PFN PJC PMK PKV PMJ PKY PLE; WB5s PCT PCU PDI PFC PCQ PEO PDG PHN PEN PKS. Heard WB5HVY on 160, and WA5IDF & WA5KBR on 6 mtrs. W5VPX and WA5DVV heard on hf. WB5MDR well on his way to DXCC.

Net	Freq.	Time(Z)/Days	QNI	QTC	Mgr.
MSBN	3987.5	2315 Dy	1182	96	WA5ZLX
CGCHN	3935	0100 Dy	2072	95	WA5SXD
MTN	3668	2345 Dy	212	85	WB5FHA
MSN	3733	0000 MWF	61	15	WB5MTQ

Traffic: W5EDT 89,WB5KUJ 70, WB5FHA 68, WB5DCY 60, WB5MTQ 46, WA5YZW 42, W5WZ 39, WB5BUE 19, W5NCB 17, W5BW 7, W5SBM 7, WN5NJZ 4, WB5MDR 1.

TENNESSEE – SCM, O.D. Keaton, WA4GLS – SEC: WB4DYJ. PAMs: WB4PRF, K4LSP. RM: WB4DJU.

Net	Freq.	Time(Z)/Days	Sess.	QNI	QTC	Mgr.
TPN	3980	1040 M-F	78	2990	174	WA4EWW
		1145 M-F				W4PFP
		2330 M-S				WB4YPO
		1300 SSuH				
TWN	3980	2100 S	4	106	1	WB4DYJ
TN	3635	0000 Dy				K4YFC
TNN	3707.5	2300 Dy				
ETVHFN	50.4	0000 TThS	13	105	0	WA4YKN
ETVHFN	145.2	0000 WF	8	37	1	WB4DZG
ETTMN	28.7	0100 WF	8	118	6	WB4NFI
MTTMN	28.8	0100 TF	9	50	0	W4EAY
ACARECN	146.28	0100 T	4	59	0	WA4DEP
	146.88					
KCARECN	146.52	2130 F	5	31	1	WA4IPT
WTVHFN	146.37	2000 S	9	123	4	WA4VVX
	146.97	0130 F				

The music City Hamfest was a success. WB4CQC was the winner of the first prize and W4VJW winner of the second prize. WA4DPF had 158 phone patches. Traffic: K4CNY 246, WB4DJU 102, WA4UAZ 95, W4OGG 88, K4KCK 63, WB4ZSZ 45, WB4YPO 28, W4RUW 26, K4JSF 22, WB4DYJ 16, WB4ANX 14, WA4GLS 12, K4TAX 12, W4SGI 10, WB4GDI 6, WB4IDV 2.

GREAT LAKES DIVISION

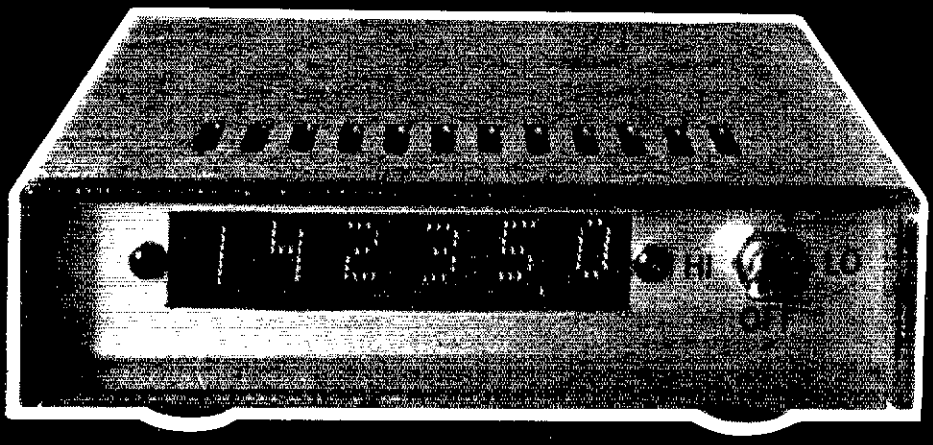
KENTUCKY – SCM, Ted Huddle, W4CID – SEC: WA4GHQ. Appointment: WB4BYN as ORS.

Net	QNI	QTC	Net	QNI	QTC
KRN	302	26	KYN	367	214
MKPN	928	70	KNTN	20	54
KTN	1296	153	6DAREC	60	13

KNTN meet at 0900 EDST at 3725, all are welcome. WB4AUN now has his his Advanced ticket. W4CDA lost his antennas to a hackberry tree. W4YOK lost his rig to lightning. The Louisville Hamfest was well attended in its new location. The LVL gang is to be congratulated on an FB Hamfest. Funds are still needed for our call-letter plate fund. They can be sent to me or Third National Bank in Ashland. Traffic: WB4BYV 174, WB4ZML 110, WB4EXQ 64, W4CID 58, K4UNW 48, WA4GAL 47, K4DZM 42, WB4QVS 38, WB4AUN 37, WB4EOR 33, WA4IGS 20, WA4AGH 19, WA4FAF 19, W4VWQ 17, WA4GHQ 9, W4YOK 3.

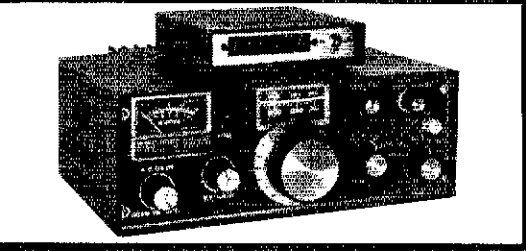
MICHIGAN – SCM, A.L. Baker, W8TZZ – SEC: W8MPD. RMs: W8JYA, W8RTN, W8IQ, K8AMU, K8KMQ. PAMs: K8LNE, WB8LNE, WB8JIX, WB8BYB. VHF PAM: WA8WVV.

DIGITAL DIAL



NEW FROM ATLAS

All L.E.D. Dot Matrix Display



- Plugs into any Atlas transceiver.
- Six digit display reads to 100 Hz.
- Bright display clearly visible under high ambient light.
- Reads on both Receive and Transmit.
- Measures 1⅛" x 4½" x 5".

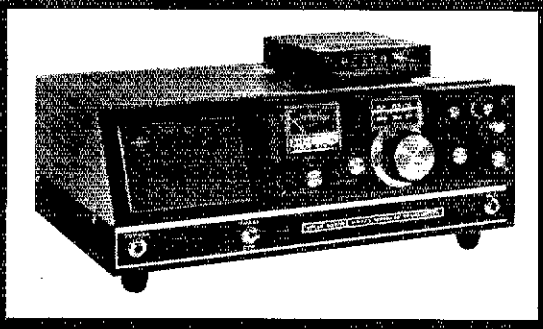
MODEL DD6 . . . . . **$199.**

Available now at your Atlas dealer.

THE ATLAS 210x/215x

Solid state SSB/CW transceivers
200 watts P.E.P. input
No transmitter tuning
The ultimate in sensitivity, selectivity, and overload immunity.
Plus extended frequency coverage for MARS operation when used with 10x crystal oscillator.

210x or 215x	$649.
AC Console 110/220V	$139.
Portable AC Supply 110/220V	$ 95.
Plug-in Mobile kit	$ 44.
10x Osc. less crystals	$ 55.



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Phone (714) 433-1983

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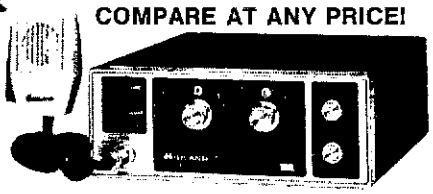
"SEE YOU AT SAROC '76!"

Season's Greetings from the gang at Atlas

● 30 WATTS OUTPUT, ALL SOLID STATE (NO TUBES) ● MOTOROLA FINAL TRANSISTORS ● SUPERB PROFESSIONAL LEVEL QUALITY AND CONSTRUCTION ● TRIMMER CAPACITORS XMIT *AND* RCV XTALS ● SEPARATE CHANNEL SELECTORS GIVE SIMULTANEOUS OR SELECTIVE CONTROL OF TRANSMIT AND RECEIVE FREQUENCIES-144 CHANNEL COMBINATIONS ● DISCRI-METER SHOWS FREQUENCY SHIFT OF RECEIVED SIGNALS, ACTS AS CALIBRATION METER FOR RECEIVER AND TRANSMITTER ● S/RF/SWR METER SHOWS RECEIVED SIGNAL STRENGTH, RF POWER OUTPUT, SWITCHES TO SHOW ANTENNA SWR-D'ARSONVAL METERS ● HI/LO TRANSMITTER POWER: 5 WATTS OR 30 WATTS ● FULL SHORT OR OPEN SWR PROTECTION ● PRIORITY CHANNEL ● DYNAMIC MICROPHONE ● SUPERB UNEQUALED EMPHASIZED EFFECTIVE HI-FI AUDIO QUALITY ● MOBILE MOUNT ● ACCESSORY JACK FOR TONE PAD, ETC. ● EXTERNAL SPEAKER JACK ● TEST POSITION TO MONITOR OWN SIGNAL ● AND MUCH, MUCH, MORE. SIZE: 9½ X 8½ X 3. ALL CORDS, PLUGS, MOBILE BRACKET, MICROPHONE HANGER, ETC., INCLUDED.

NEW!

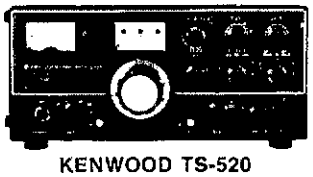
30 WATTS OUTPUT
COMPARE AT ANY PRICE!



2--meter FM amateur band mobile transceiver
-- 30 watts, 12 channels MODEL 13-505

NEW! (1) Midland 13-505 (built-in DC PS) . . $299.95
(2) NEW DELUXE REGULATED 12 AMP AC SUPPLY $89.95
(3) 5 crystals: Tx 34, 16, 94; Rx 94, 76 . N/C
REGULAR . . $389.90

***OUR SPECIAL PACKAGE PRICE . . $299.00**



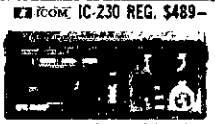
KENWOOD TS-520

Unequaled at any price!

Please write for special Package offer

ATLAS, COLLINS, REGENCY, ICOM, BRIMSTONE, CUSHCRAFT, BIRD, STANDARD, KLM, HYGAIN, KENWOOD, TEMPO, MINI PRODUCTS, MIDLAND, VHF MARINE, ETC.--PLEASE WRITE FOR QUOTE. YEASU FT-101E'S

ICOM IC-230 REG. $489--



Please write for special deal!

. . . you need Kenwood's NEW TS-700A

- 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. Can operate from your car, boat, or as a base station through its built-in power supply
- 4 MHz band coverage (144 to 148 MHz) instead of the usual 2

NEW!

COMPLETE PROFESSIONAL LEVEL 2-METER REPEATER--READY TO OPERATE. PRICE $595--

NEW! *20 AMP FULLY REGULATED AND PROTECTED* AC-PS (115 VAC to 13.6 VDC). All solid state. Not a kit. *OUR SPECIAL PRICE* $89.95. **1-YEAR GUARANTEE.**

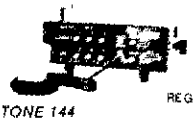
GENTRONICS GT-300 VHF-FM MARINE RADIOPHONE

25 watt VHF marine radios, 12½ channels with 8 channels installed and 8½ foot high gain antenna with deluxe marine chrome lavdown ratchet mount, 1 year guarantee. (Reg. $544.95).

OUR PRICE $349.00

NEW--
CDR HAM II ROTATORS
Reg. $159.95 $119.95

25 WATTS OUTPUT
• PRECISION PROFESSIONAL QUALITY--UNEQUALED AT ANY PRICE
• 2 YEAR WARRANTY



REG. $650.00

BRIMSTONE 144

• COMPLETE BAND COVERAGE, plus MARS 143.000 to 149.99 MHz digitally dialed 5 khz steps. ANY FREQUENCY, ANY SPLIT • NO CRYSTALS TO BUY! • COMPLETELY INDEPENDENT TRANSMIT AND RECEIVE FREQUENCY CONTROL, YET SIMPLEX OR REPEAT MODE WITH THE FLIP OF A SINGLE SWITCH! • .25 UV SENSITIVITY • OPTIONAL PLUG-IN MODULES FOR TOUCH TONE, DIAL TONE BURST (selectable), AND SUBAUDIBLE TONE • TRUE FM--NOT PHASE MODULATION • HI FI EMPHASIZED EFFECTIVE AUDIO QUALITY • G10 GLASS PLUG IN BOARDS, GOLD CONTACT SOCKETS AND RELAYS. 100% AMERICAN MADE • AUDIO OUTPUT 2 WATTS • TWO TRANSCEIVERS IN ONE AND MUCH, MUCH, MORE

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OPTIONAL PLUG IN ACCESSORY MODULES

Touch-Tone* interface	$28.95
Dial Tone (specify frequency)	$39.95
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Tone Burst 1800 to 2400 HZ	$39.95
142.00 to 149.99 MHZ extended range	$15.00

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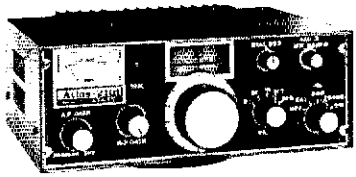
Introducing the new **Atlas 210X (and Atlas 215X)**

SOLID STATE SINGLE SIDEBAND TRANSCEIVER
5 Band--200 Watts 10, 15, 20, 40 and 80 meters
NO TRANSMITTER TUNING. MODULAR CONSTRUCTION. ALL SOLID STATE

PRICE LIST

Atlas 210X-215X SSB Transceiver	$649
200CS Power Supply	139
PS-200 Portable AC Power Supply	95
Mobile Mounting Bracket Deluxe Plug-in Model	44
DC Battery Cable	12
Mobile Bracket Kit	6
Mobile Antenna matching Transformer. Broadband design transforms base impedence to 50 ohms	24
Model-10X 10 position crystal oscillator, less crystals	55
Noise Blanker Conversion Kit Replaces PC-100 Board in Transceiver Model PC-120	48
VOX Conversion Kit, for AC Console Model VX-5	45

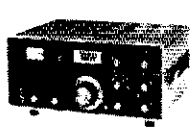


- Superb commercial grade quality-G10-glass modular plug-in boards
- Crystal clear precise audio quality second to none
- SELECTIVITY that must be experienced to be believed--9 2 kHz at 120 dB down!
- EXCEPTIONAL immunity to overload and cross modulation resulting in performance almost unheard of until now.

1) ATLAS 210X or 215X (built in DC-PS) **$649.00**
2) 20-amp FULLY REGULATED and protected AC-PS **89.95**
Regular $738.95

***Our Special Package Price $659.00**

** (Please write for other package prices with 200CS, PS-200, etc.)*



Yaesu FT-101E Transceiver
Yaesu FT 101E's in stock.
Please write For Special Deal

KLM MULTI-2000's
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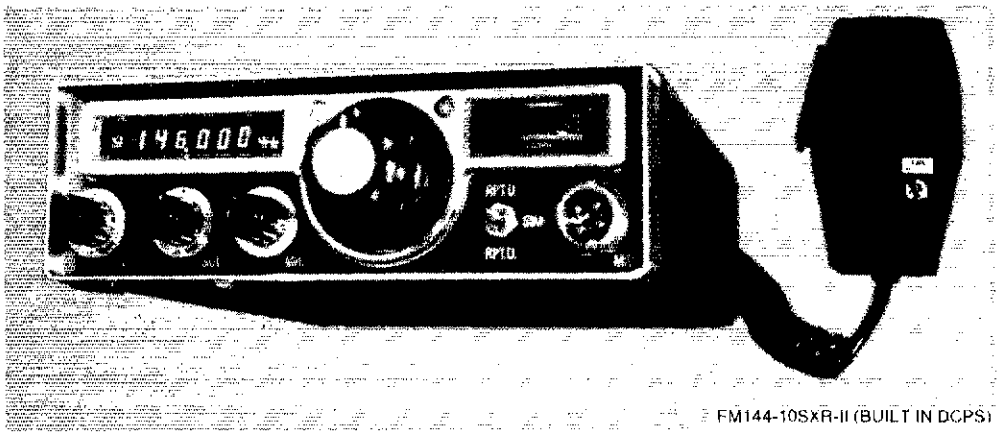
NEW!
FM144-10SXR-II



FM144-10SXR-II (BUILT IN DCPS)

All Solid State-PLL digital synthesized — No Crystals to buy! 5KHz steps — 144-148 MHz-LED digital readout.

Introducing the standard for all others to compare with for years to come. No other competitive unit **at any price** even begins to compare with the superb engineering and superior commercial avionics grade quality and construction of the FM-144-10SXR-II

INTRODUCTORY PRICE
$389.00

Regulated AC/PS
MODEL FMPS-4R...$49.95

- **FREQUENCY RANGE:** Receive 144.00 to 147.995 MHz, 5KHz steps (1000 channels). Transmit: 146.00 to 147.995 MHz, 5KHz steps (400 channels).
- **FULL DIGITAL READOUT:** Six easy to read LED digits provide direct frequency readout assuring accurate and simple selection of operating frequency.
- **AIRCRAFT TYPE FREQUENCY SELECTOR:** Large and small coaxially mounted knobs select 100KHz and 10KHz steps respectively. Switches click-stopped with a home position facilitate frequency changing without need to view LED'S while driving and provides the sightless amateur with full Braille dial as standard equipment.
- **FULL AUTOMATIC TUNING OF RECEIVER FRONT END:** DC output of PLL fed to varactor diodes in all front end R-F tuned circuits provides full sensitivity and optimum intermodulation rejection over the entire band. **No other amateur unit at any price** has this feature which is found in only the most sophisticated and expensive aircraft and commercial transceivers.
- **TRUE FM:** Not phase modulation — for superb emphasized hi-fi audio quality second to none.
- **FULLY REGULATED INTEGRAL POWER SUPPLIES:** Operating voltage for all circuits, i.e., 12v, 9v and 5v have independently regulated supplies. 12v regulator effective in keeping engine alternator noises out and protects final transistor from overload.
- **MONITOR LAMPS:** 2 LED'S on front panel indicate (1) incoming signal-channel busy, and (2) un-lock condition of phase locked loop.
- **DUPLEX FREQUENCY OFFSET:** 600KHz **plus** or **minus** 5KHz steps. Plus simplex, any frequency.
- **MODULAR COMMERCIAL GRADE CONSTRUCTION:** 6 unitized modules eliminate stray coupling and facilitate ease of maintenance.
- **ACCESSORY SOCKET:** Fully wired for touch-tone, phone patch, and other accessories.
- **RECEIVE:** .25 uv sensitivity. **9 pole filter** as well as monolithic crystal filter and **automatic tuned** LC circuits provide superior skirt selectivity.
- **AUDIO OUTPUT 4 WATTS:**
- **HIGH/LOW POWER OUTPUT:** 10 watts and 1 watt, switch selected. Low power may be adjusted anywhere between 1 watt and 10 watts.
- **PRIORITY CHANNEL:** Instant selection by front panel switch. Diode matrix may be owner re-programmed to any frequency (146.52 provided).
- **DUAL METER:** Provides "S" reading on receive and power out on transmit.
- **OTHER FEATURES:** Dynamic microphone, mobile mount, external speaker jack, and much, much, more. Size: 2⅛ x 6½ x 7½. All cords, plugs, fuses, mobile mount, microphone hanger, etc., included.

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BANKAMERICARD
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Net	Freq	Time/Days	QNI	Tfc.	Sess.	Mgr.
QMN	3663	2300/0300 Dy	649	273	60	W8IYA
MACS	3953	1600 Dy	840	320	35	K8LNE
WSBN	3935	0001 Dy	829	89	30	WB8JIX
MNN	3720	2230 Dy	213	69	29	WB8NCD
UPEN	3922	2230 Dy	692	50	34	K8VOA
GLETN	3932	0230 Dy	849	130	30	WB8OBR
BR/MEN	3930	2130 Dy	727	134	30	WB8BYB

W8CVQ reports SW Mi 2M net QNI 51 in 5 sessions. 2M Catfish net had 61 QNI in 4 sessions. W8SS is active on 15M with considerable phone patch traffic. Motor City RC Transmitter Hunt a real challenge. Mich. SEC W8MPD is hard to find. QMN officers for 1975-76 are general mgr. W8IYA, inte net W8YIQ, slow Net K8AMU, fast Net W8RTN, 8RN liaison K8KMQ, secy-treas. W8UFS. Chippewa ARC elected co-pres. WN8TIS and WN8TKZ. K8SWW will be active from ZF1AG in Dec. K8NTK is sure he will win RTTY contest with new microprocessor. WB8UYA has a new Technician license. WB8UAY has General and WB8PEO now Advanced. WN8UHZ WN8VBC and WA8QGU are new members of SVARA. LARK Novice program is big success with new licensees WN8s VQS VQT VQU VXN VXO VYJ. Congrats to all. K8SWW reports continued growth at Milford ARC with 8 new members. WB8PLQ reports a new Kenwood transceiver at W8CJT. W8OXV WA8RZJ WB8UKC WB8JLR and WN8RVL are new members of SARA. Regretfully I report WA8V W8MWG and K8IGO are Silent Keys. Traffic: WB8ITT 353, K8LNE 232, K8DYI 228, K8KMQ 201, W8PDP 158, WA8WZF 132, W8MO 108, WB8NCD 92, W8NOH 87, W8TZZ 79, W8UFS 78, WB8NII 71, W8VIZ 51, WB8EBG 50, K8VOA 47, WB8JIX 45, WB8POL 43, W8YIQ 42, WB8OBR 39, K8JED 38, WB8BYB 35, WA8TBL 34, K8AMU 29, W8RTN 25, W8IUC 23, W8RNQ 23, WB8HNB 20, WB8DJS 19, W8EU 18, WB8EEU 17, W8QBE 16, W8TBP 16, WA3RWO/8 15, W8LOU 14, K8RNP 13, WA8MTI 13, W8DCN 12, WA8MDK 12, WB8TTL 12, WB8GKB 10, W8OOQ 10, WA8ENW 9, W8JUP 9, WB8LWW 9, WB8RVG 9, K8GXV 8, W8SDB 8, W8WVL 8, K8ZJU 8, W8IXJ 7, W8JAX 7, K8KCF 7, K8MJK 7, WA8WVV 7, WB8AXI 6, WA8RXI 6, K8WRJ 6, WA8FXR 5, W8HKL 5, W8PVB 5, W8FZL 4, WA8YPY 4, WB8UVA 3, W8BFZ 2, K8HGA 2, K8SWW 2.

OHIO – SCM, Hank Greeb, W8CHT – Asst. SCM: William K. Shaeffer, WA8MCR. SEC: WA8KPN. PAMs: W8MOK WA8VWH. RMs: K8IKD WB8JGW WA8WAK.

Net	QNI	QTC	Sess.	Freq.	Times	Mgr.
ONN				3710	2330	K8IKD
OSN	131	46	29	3577	2310	WB8JGW
BNR	133	154	30	3605	2300	K8NCV
OSSBN	2350	845	81	3972.5	1530/2100 2345	W8MOK
O6MN	294	114	29	50160	0200	WA8VWH
BN	409	250	60	3577	2345/0300	WA8WAK

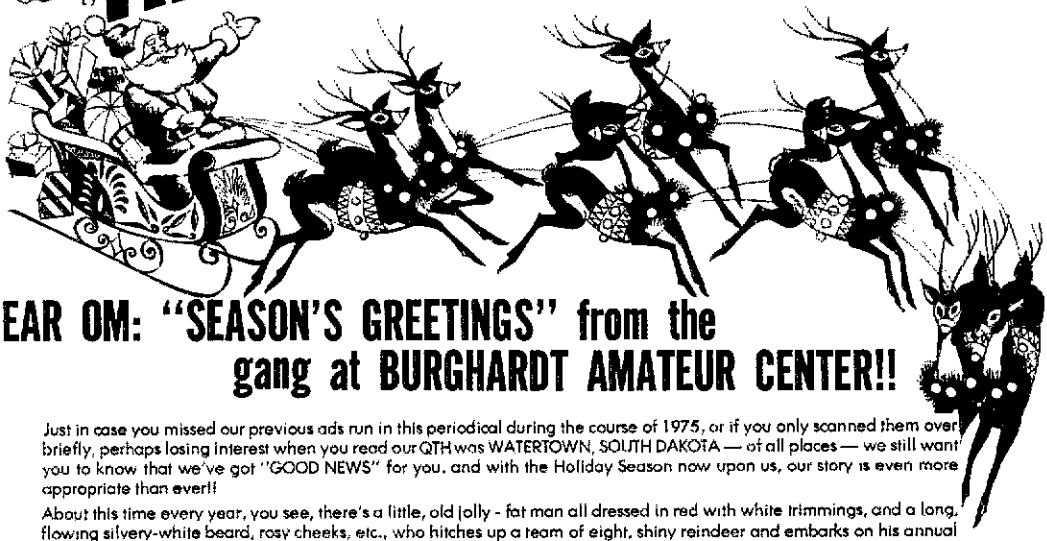
OH Novice Net (ONN) QND 2330Z 3710 kHz Sun., Tue., Thur., K8IKD Mgr. All Novices and those interested in building activities among Novices are cordially invited to check in. Crystals will be available at cost from K8IKD. WB8JGW takes over OSN Mgr. from WB8KKI. Thanks for a fine job to WB8KKI, and let's support WB8JGW and the OSN. Our new SEC is WA8KPN, taking over the reins of AREC from WA8COA. Thanks to WA8COA for building a fine organization. New officers of Affiliated Clubs: Xavier Univ. RC: WB8NUT, pres.; WB8OWX, vice-pres. Massillon ARC: WB8MSA, pres.; Wb8GXL, vice-pres.; W8YHU, secy-treas. Canton ARC: K8BYC, pres.; WB8TSJ, vice-pres.; WB8NBY, secy-treas. Milford ARC: WA8CXO, pres.; WB8FDX, vice-pres.; WB8FDY, treas.; WB8MVF, secy. Lancaster & Fairfield Co. ARC: WB8PCN, pres.; WA8HJH, vice-pres.; WA8HIO, secy.; WA8SSJ, treas. Burning River Traffice Net (Cleveland) elected WB8PSO as mgr. New appointments: WN8TRK ORS-H; WA8UKX OO-I: WB8LIG/WR8AHC OBS. Mgr. W8IBX reports that Hit & Bounce Slow Net 3714 kHz 1230Z and 7140 kHz 1300Z will go daily during Dec. K8BCF & KO8HIO made very impressive displays at Belmont Co. and Ohio State Fairs, respectively. Code & theory classes are being held in Athens & Nelsonville by Athens Repeater Assn.; in Cincinnati by Greater Cincinnati ARA; in Bowling Green At BG State Univ.; in Lima by NW Ohio ARC. Traffic: K8NCV 586, WB8MZZ 517, W8PMJ 399, WA8MCR 325, WB8OMQ 203, W8DIL 191, WB8OZA 148, KK8BCF 141, W9PTT 140, W8IBX 138, WB8KWD 132, K8LGA 124, W8OE 89, K8YUW 87, W8FGD 85, W8MOK 81, W8QZK 81, WB8KKI 75, WA8HGH 72, W8JD 56, W8MGA 49, WA8SSJ 44, WB8MRL 43, WB8QXN 41, WB8IGW 40, W8OUU 33, W8TH 33, W8CHT 31, W8WEG 30 K8KWO 26, K8BYR 23, WB8TKW 23, WB8CJU 22, W8ALS 21, WB8AYC 21, WA8GPO 21, WB8HWF 20, K8LXA 19, WA8MHO 15, WB8MGW 15, WB8RTY 15, K8MLO 14, W8XCM 13, W8GOE 13, WB8PIY 13, WB8TEM 13, WA8BOV 12, WB8VKS 12, K8JPF 11, WA8VWH 10, WB8NUT 8, K8ONA 8, WA8TSX 7, WA8MAZ 6, K8CKY 5, W8UQY 5, WN8TRK 3, WA8DWL 1, WB8PGW 1.

HUDSON DIVISION

EASTERN NEW YORK – SCM Gary J. Ferdinand, WA2PJL – SEC: W2KGC. Asst. SEC: K2AYO. RMs: WA2FBI WB2IXW K2DN. PAM: WB2QEI. Traffic nets: ESS (3590, 6 PM), NYS Section Net (3675, 7&10 PM), NYSPTEN (3925, 6 PM), CHN (3925, 11 AM),PON (3913, 5 PM). New appointments: W2CRS as OVS, WB2RUZ as ORS. The Albany ARA reports two more new Novices, WN2AEW and WN2BBR – Welcome! Also welcome new Novice, WN2CBQ in Westchester. WB2VVS reports demonstrating ham radio to patients at the VA Hospital. The Mt. Beacon and Poughkeepsie clubs participated in providing comm. for the Heart Fund Cyclethon. W2CXC, WB2EMU and WA2PJL among those participating. K2OUA reports he's back on after excess solder blew up the rig. (It doesn't take much.) Good 160-meter openings are being worked by WA2YPO. WB2RUZ received Advanced Class ticket. WB2EAQ is busy setting up the school station for net

BULLETIN

HI! HI! HI! We Fill SANTA'S ORDERS



DEAR OM: "SEASON'S GREETINGS" from the gang at BURGHARDT AMATEUR CENTER!!

Just in case you missed our previous ads run in this periodical during the course of 1975, or if you only scanned them over briefly, perhaps losing interest when you read our QTH was WATERTOWN, SOUTH DAKOTA — of all places — we still want you to know that we've got "GOOD NEWS" for you, and with the Holiday Season now upon us, our story is even more appropriate than ever!!

About this time every year, you see, there's a little, old jolly - fat man all dressed in red with white trimmings, and a long, flowing silvery-white beard, rosy cheeks, etc., who hitches up a team of eight, shiny reindeer and embarks on his annual journey around the world bringing gifts of joy to all the good little boys & girls (Hams & XYLs). Now, Mr. Claus, or just plain "SANTA" if you prefer — is a wise, industrious old gentleman with hundreds of helpful elves aiding him in the production of toys all year long, but busy as she is and aiming to please as he does, he just can't find the time to get into HAM RADIO equipment. So, rather than leaving any empty stockings come Christmas Eve, ol' SANTA's been stopping at BURGHARDT AMATEUR CENTER for over 38 years now, and *checking his list* for all his favorite DX'ers, VHF'ers and "rag-chewers!!"

Watertown has always been SANTA's first stop on his tight schedule, because it is CONVENIENT, just SOUTH (Dakota) of his headquarters at the NORTH POLE. He likes our FAST DELIVERY, HONEST DEALING, TOP-DOLLAR TRADE ALLOWANCES, and our GOOD SELECTION of all the LATEST MODELS in new & used ham gear. Furthermore, he appreciates our FRIENDLY-PERSONAL approach in doing business, and he knows that he can DEPEND on us for PROMPT/RELIABLE SERVICE if he has any problems along his way. In short, SANTA'S CHOICE in ham radio outlets IS BURGHARDT AMATEUR CENTER!!

We have always held that there are TWO IMPORTANT FACTORS in any purchase of ham radio equipment — the PRODUCT and the DEALER, or in other words, WHAT you buy & WHERE or from WHOM you buy it!! At BURGHARDT AMATEUR CENTER, we stock & sell AND guarantee & SERVICE virtually every major quality product in the ham radio field today, but it's not so much WHAT we sell — rather HOW we sell it that's worth your consideration when you're in the market for a new or used piece of equipment. Your CONFIDENCE in us is our MOST important asset, and even if it may seem like we're out in the middle of NO MAN'S LAND — we'll go a long-long way to gain your trust & SATISFACTION!!

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BILL BURGHARDT WNØNBO
JIM SMITH WBØMJY

operation, The U. of Pa. new officers are WB2JIC, WA2NDI WB2BTA. Auctions were reported held by SARA, AARA, ar Poughkeepsie ARA. The Westchester ARA viewed a film abo VR6-land presented by W2AIM. WB2RUZ now an Asst. EC f Dutchess Co. and is sporting a new eleven-element 2 meter bea WA2PJL and WB2EMU used the ole bow and arrow to loft new and 40 meter antennas. Net totals: NYS (QNI 906/QSP 368 NYSPTEN (QNI 1221/QSP 141). Public Service Honor Roll WB2RUZ and WA2PJL. Traffic: (Sept.) WA2PJL 342, WA2YB 158, WB2TGL 114, WB2EMU 102, W2BIW 76, WA2CJY 3 WB2VVS 33, K2TTG 25, WB2RUZ 18, WB2TDX 18, W2WSS 1 WB2IXW 13, WA2PAU 7, WB2EKM 5, WB2ELA 4, K2HNW K2OUA 2, WB2GOJ 2. (Aug.) WB2IXW 46.

NEW YORK CITY – LONG ISLAND – SCM, John H. Smal WB2CHY – Asst. SCM/PAM: Art Malatzky, WB2WFJ. SEC K2HTX. RM: WB2LZN.

NLI*	3630 kHz	1900/2200 Dy	WB2LZN Mg
NLI PHONE*	3928 kHz	1730 Dy	WB2PYM Mg
NLS*	3730 kHz	1830 Dy	WB2EDW Mg
Clear House	3925 kHz	1100 Dy	WA2DDD Mg
All SVC	3925 kHz	1300 Su	W2OE Mg
MIC FARAD	3925 kHz	1300 MTWThFS	W2OE Mg
ESS	3890 kHz	1800 Dy	K2UIR Mg
NYSTPEN	3925 kHz	1800 Dy	WA2RSP Mg

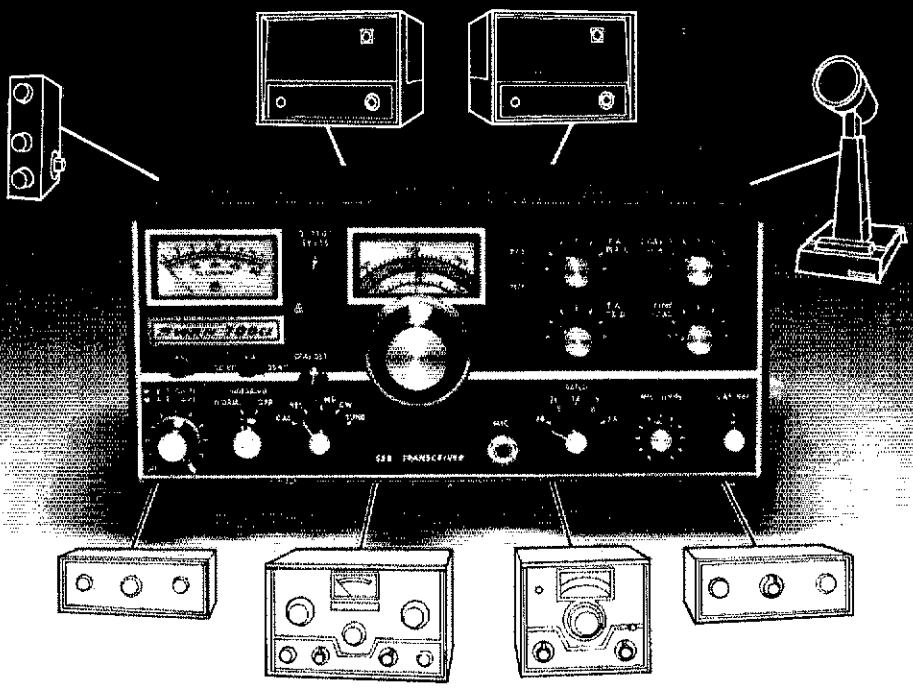
*Denotes section net, all times local. Since the month of De usually produces a large amount of traffic, help is needed in all ne On behalf of my XYL and two Jr. ops and myself, I would like wish everyone Season's Greetings and hope for a Happy New Ye for all. New appointments: WA2WZD ORS/OPS; WA2ZG WA2YAY ORSs; WA2BTI WA2VOS OBSs. WA2YAY has Advanced and a TR22C. Welcome to newly affiliated clubs: S Mary's H.S. ARC in Pt. Wash. United Nations ARC wi HB9RS/W2, pres. and Citibank ARC WA2BTC, whose officers a WA2ROD, pres.; WB2PHT, vice-pres. They also had 3D2GK for speaker at their Sept. meeting. He is now on his way to 5Z4-lan On July 28 the International Amateur Radio Hosts (IARH) w formed. The purpose is for economic and social aid to forei visitors on a reciprocal basis. For further info, contact G.L. Bake W5QPX/YN4IM, 101 Rita Blanca Trail, Amarillo, TX 7910 Welcome to new Novices WN2ABT and WN2CDK, who would li to thank WA2VEN and WB2WRT for making it possible. WB2BT has been elected secy-treas. of the Univ. of Penn ARC. WA2Y now with Advanced, also has joined the Intruder Watch and helping his Electronics shop teacher study for his Gen. WA2BRF h his Gen and 2nd phone. WA2UDS/3 elected vice-pres. of Carneg Tech ARC/W3VC. WA2PUG WB2KAW WB2ANT W2BE W2C and WA2YZX, all members of Suffolk Co. ARC, paid visits various hams in upstate NY this past Aug. WB2MSJ appointe administrator of the Parish of St Martin of tours in Bethpag WB2OUN installed antennas on the roof of the hospital for W2DB who says hello to all and appreciates visitors. LIMARC also h another FB flea market in Oct. K2HTX received a PS award fro ARRL Hall of Science ARC reports new upgrades: WB2IUF Extra; WA2VOS and WA2TRY to Advanced; WA2AXP WN2A WN2ZKA WB2POX to General; new Novice WN2BRJ. The club al presented WB2FHN and WN2UAW with solid gold tie clips engrav with their names and calls in appreciation for all they have don And in closing, again, ARL fifty eight to all. Traffic: (Sep WB2SHL 745, WB2LZN 207, WB2WRT 201, WB2EDW 16 WA2VPA 152, W2GKZ 146, WB2WBH 144, W2EC 143, WB2YK 116, WA2YAY 78, W2MLC 50, WA2ROK 29, WA2USJ 2 WB2HTM 20, W2HXT 18, W2PF 8, W2GP 7, K2JFE 4, WN2ZPV WA2JZX 3, WB2WFJ 2. (Aug.) WA2ROK 50, WA2BRF 15. (Jul WA2YAY 177.

NORTHERN NEW JERSEY – SCM, William S. Keller,J WB2RKK –

Net	Freq.	Time (PM)	days	Sess.	QNI	QTC	Mgr.
NJN	3695	7:00 Dy	30	466	162		WA2DSA
NJN	3695	10:00 Dy	30	254	88		WA2DSA
NJPN	3950	6:00 Dy	30				
NJPN	3950	9 AM Su	4				
NJSN	3730	8:15 Dy	30	337	100		WB2RM
PVTEN	145.71	8:00 Dy	30				WA2DI

SEC: WB2PBO. PAM: WA2OPY (VHF). RMs: WA2DSA WB2RM (training). WB2RMK reports another recordbreaking month NJSN. New appointments: WA2AXB W2EQK WA2RMZ a WB2ZYR as ECs. A meeting of all NNJ ECs and other ARI officials was held on Oct. 4 at the Cranford Municipal Bldg. We ha decided to continue to appoint ECs for each zip code area. Ea group of ECs in a given co. will select one EC among themselves coordinate AREC work within the co. The frequency of 146.52 h been chosen as our primary VHF frequency for times of emergen requiring AREC activation, with a secondary frequency at t option of the local EC. OO reports received from WB2CST K2E WB2IEC K2JFJ and WB2TFH. The Rutgers ARC WA2NPP, holdi cw classes and presently reports five students. The Cranford A invites nearby amateurs to attend their meetings every 2nd and 4 Thur. at 8 PM in the Cranford Municipal Bldg. They are planning bicentennial activities for the coming year. How about your club? is with pleasure that we welcome new Novices WN2BWP WN2BN WN2AES WN2AET and WN2EAU. Congrats to WA2TZM w passed his General class exam, now checking into NJPN with HW101, NNJ also congratulates the following on their accompli ments: K2JFJ, on attaining an accuracy of 2.7 ppm in the Se FMT; K2KF, on receiving the 2000 miles/watt award for workin VK with QRPP; WA2DNU on becoming vice-pres. of the Univ. Pa. ARC, W3ABT, FB! WA2UDT now using a Drake 2C/2C receiver, a 220 MHz ssb mixer, and a fifteen-element 220 MHz ya WA2UDT and WA2GEZ operated in the Sept. VHF Conte WA2CAK is preparing for some 432 MHz mobile work. On a qui QSY, K2JFJ reports activity in the Washington and W/VE QS Parties. Cranford Police Chief K2MNQ now drying out after

Swan 700CX transceiver.



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700CX Champion Transceiver.... $649.95
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recent floods in that area following the hurricane. All ECs/AREC members are encouraged to join the NNJ EC net, which meets each 4th Sun. at 1:30 PM on 3945. Best wishes to all for an enjoyable and safe holiday season. Traffic: (Sept.) WA2DSA 424, WB2RKK 364, K2BHL 195, WB2VTT 146, K2OQJ 113, WB2RMK 108, WA2PCF 94, W2CU 73, WA2DIW 53, WA2RZP 47, WB2UJD 44, WB2HSG 42, W2ZEP 41, WA2GYB 33, W2SWE 32, WA2NPP 31, WA2CCF 22, K2ZFI 19, WB2AEH 18, WA2UOO 9, WB2KNS 6, WB2TDI 6, WB2PBO 5, WA2QJU 5, WA2SRQ 5, K2KF 4, K2MFF 3, WA2SLF 3, WA2CAK 2, WA2FUJ 2, W2NKD 2, WB2RJJ 1, W2SHM 1, WB2ZYR 1. (Aug) K2ZFI 12.

MIDWEST DIVISION

IOWA – SCM, Max R. Otto, WØLFF – The Cedar Valley ARC of Cedar Rapids can be proud of their Oct. Hamfest. Iowa Repeater Council elected WØFTM, veep; WAØYGJ, secy.; KØUJJ, treas. They will join WBØGGI, pres. The 3900 Club had over 100 of their 360 members at their eyeball meeting at Luverne, MN. WAØZZG is using 4 radio and 1 TV station plus the local newspaper for PR in the Cedar Rapids area. New appointments: WBØHOG EC, WBØJGS and WBØJYK OOs. WØYJ will soon be working Oscar. Congrats to WBØCQU on becoming Extra, and to WAØYFQ and WBØIAX on Advanced. WØFZO got in some PR in an interview on KWOA. The Johnson Co. 2M net now in session at 7:30 PM on Sun. Change in time made so members could participate at 7 PM with Linn Co. Iowa City ARC planning a demo-display in a shopping center, also Santa will be contacted from the children's wards on WRØACU. WBØNCX now portable 6 using his new Advanced ticket. KØSVW sporting a new Brimstone for 2M. WNØOKA getting his cw speed up by handling traffic. WBØJYK working lots of DX with a home-brew beam, will soon have a new R4B. Midwest Dir. WØFIR, Vice Dir. WØFZO and yours truly manned the ARRL booth at Cedar Rapids Hamfest. Happy Holidays to all. (Net, Freq., Time(Z)Days, QNI, QTC, Sess.,Mgr.): Iowa 75 Meter, 3970, 1830 M-S, 1357, 102, 26, WAØVZH; Iowa 75 Meter, 3970, 0030 M-S, 985, 50, 26, WAØACX; Fall Corn, 3560, 0030/0400 Dy., 247, 80, 60, KØAZJ. Traffic: (Sept.) WAØAUX 188, KØAZJ 143, WØYLS 74, WØOMV 57, WØLCX 42, WBØAVW 26, WØLFF 14, KØKOJ 12, WNØOKA 10, WBØHOG 8, WØMOQ 7, WAØKHF 6, WBØDGF 5. (Aug.) WAØAUX 241, KØAZJ 202, WØLCX 40.

KANSAS – SCM, Robert M. Summers, KØBXF – SEC: KØJMF. PAMs: WAØSEV, WAØBCL. RM: KØMRI. VHF PAM: WAØEDA. It was a sad day indeed when we heard of the passing of WØWOB. Our sincere sympathy is extended to the family. Other sad news is the loss of an FT 101-B, SWR and HB antenna tuner by WAØOMB, mgr. of the Central State Traffic net. New officers of the Hiawatha ARC are reported by WØPB as follows: WAØUQA pres.; WAØKDC, vice-pres.; WAØ UCZ, secy-treas.; WAØUHW act. mgr. KØJMF our hard working SEC reports 748 members signed up in the AREC ranks as of Sept. 1, listing 31 active nets and 104 tests or drills during the month.

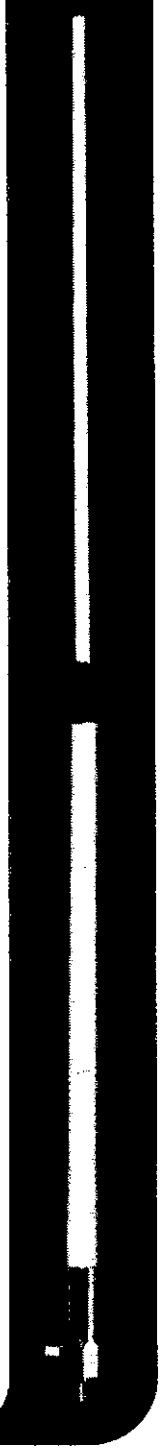
Net	kHz	Local Time/Days	QNI	QTC	Mgr.
KSBN	3920	6:30 PM Dy	981	154	WAØSEV
KPN	3920	6:45 AM MWF 8:00 AM SSu	170	8	WAØSEV
QKS-SS	3735	8:00 PM Dy	93	12	KØMRI
QKS	3610	7:00/10:00 PM Dy	444	163	
KWN	3920	6:00 PM Dy	532	137	WAØLBB
MMM	3920	7-10 PM Dy*	1330	70	WBØBCL

*Time, Traffic: KØBXF 168, WØFIR 164, WØHI 114, WØINH 99, KØMRI 86, WØCHJ 75, WAØLBB 71, WBØCZR 63, WØOF 62, WBØHBM 58, WØOYH 47, WØPB 43, WAØSEV 42, WØGCI 38, WAØKVP 25, WAØMLE 20, KØJMF 16, WBØOCK 16, WNØPWF 15, WBØLKA 11, WØRBO 10, WØNYG 8, WØFDJ 7, WAØGSG 6, WBØJJX 5, WBØKWI 4, WØKL 3, WBØKWJ 3, WNØOLA 2, WAØOWH 2.

MISSOURI – SCM, B.H. Moschenross, WAØFMD – Asst. SCM SEC: Cliff Chamney, KØBIX. Net/QNI/QTC: MOSSB/1166/99; MEN/458/24; MSN/269/45; HBN/235/57; MON/188/116; MON2 /107/42; SCEN/67/4; STLAREC/48/10. WBØMTX WNØOKA WNØPWF WN5NCK WN5NKD and WN5OYU earned MSN certificates. The Harry S. Truman Neurological Center is organizing a Missouri chapter of the Handi-Hams. Center Place ARA now an ARRL affiliate. The Jefferson Barracks ARC annual auction will be held Feb. 27, 1976 at the Mosley Auditorium. WØKYS trying to organize a checker players net. Contact him for details. New club officers for WØEEE are WBØGOP, pres.; WBØGRJ, vice-pres.; WBØEAT, secy.; WBØOEK, treas. Regret to report WØMXI WØOMM and WAØPFR as Silent Keys. They will be missed by all. WNØOIY, and WNØPJH passed General. WNØOIZ passed Advanced. WBØFKY now has an XYL. KØCPV is a proud papa. WAØQOA working DX with a 7-ft. horizontal helical antenna. WAØLGW a new DXCC member. KØRWL lost his finals while sending traffic to WØGBJ. Traffic: (Sept.) WØOTF 172, WØBV 119, WBØHSP 82, WAØFMD 78, WØNUB 72, WØOUD 30, WBØLMW 28, WAØQOA 28, WØEPI 27, WBØMEO 17, WØFFF 14, WBØFOM 14, WBØNXX 10, WAØNYC 10, WBØLRX 8, WBØENV 7, WØGBJ 7, WAØMOF 7, KØAHL 6, KØRWL 5. (Aug.) KFØSM 874, WBØFKY 5.

NEBRASKA – SCM, Dick Dyas, WØJCP – SEC: WAØASM. New Sandhills Weather Net which meets daily except Sun. on 3950 kHz at 1830 UMT. QCWA NE Chapter has 62 plus members. WØVEA was recently awarded the National Weather Service's Public Service Award. Dayton had been instrumental in establishing a weather data collection and relay system between amateur radio operators in NE which enables the Weather Service Office to have current weather statistics from places where a weather service office is not established. Clubs are requested to advise the SCM of the name of pres. for the coming year. Nebr Morning Net, QNI, 816, QTC 18; Sandhills WX Net, QNI 239, QTC 4; Western Nebr Net, QNI 486, QTC 6; AREC Net, QTC 1, QNI 184; Afternoon Net, QNI 208.

Hy-Gain 270
2-meter antenna
A great mobile that's also a great base.



The same state-of-the-art qualities that make the Hy-Gain 270 antenna a great 2 meter mobile, make it a great 2 meter base.

Hy-Gain design has eliminated hard tuning, high VSWR and poor pattern due to irregular ground plane. The 270's slim mobile configuration makes it ideal for apartment or urban installations where space is at a premium.

Fiberglass 270 develops gain through the use of 2 stacked 5/8 wave radiators with a self-contained 1/4 wave decoupling system. Gain that helps reach distant repeaters.

Since the antenna and feedpoint are sealed in fiberglass, the Hy-Gain 270 delivers top performance year after year without corrosion loss.

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- 250 watt rated
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OTC 6; QCWA Net, QNI 46; Nebr Storm Net I, QNI 1157, QTC 2
Nebr Storm Net II QNI 676, QTC 39; Cornhusker Net, QNI 1299
QTC 82; East Neb 2 Mtr Net, QNI 308, QTC 36. Traffic: WØCK
50, WØHOP 35, WØVEA 35, WAØCBJ 30, WØJCP 16, WØVYX 1
WBØIWQ 13, WØMW 11, WØFOB 10, WØGEQ 8, KØDGW 7, KØSF
7, KØFJT 6, WBØGAK 6, WØNIK 6, WAØQEX 6, WØLMY
WAØPCC 5, KØODF 4, WBØCLP 2, WBØGMQ 2, WAØLOY
WAØOQX 1, KØSDG 1.

NEW ENGLAND DIVISION

CONNECTICUT – SCM John Mc Nassor, W1GVT – SEC
W1DGL. RM: K1EIR. PAM: K1YGS. VHF PAM: WA1ELA.

Net	Freq.	Time/Days	Sess.	QNI	QTC
CN	3640	1900/2200 Dy	60	423	33
CPN	3965	1800 M-S	30	471	17
		1000 Su			
VHF-2	28/88	2130 Dy	30	381	5
CSN	3725	1830 Dy	30	147	10

HIGH QNI: CN – W1CTI K1EIR WA1RUR and WA1UAX, VHF
HIGH QTC: W1DGL. SEC W1DGL CT EC Net reveals considerabl
EC activity in many areas. Good cooperation between AREC
MARS and Civil Defense. Sept. EC reports from: WA1NGL
WA1RXA, WA1IKN and WA1KMV. Dir. W1HHR enjoyed over
workload of the NE Division Convention in Hartford! WA1FCM
generated a host of friends and a wonderful record while here in C
Section. – Best wishes from all to him and XYL WA1JCN – ou
loss is a gain for Maine! Tri-City has Novice Class of 34! Shorelin
ARC publicity and interesting club program drawing new members
Hamden HARA-SCOPE again in print with an outstanding bulleti
covering considerable activity. Murphy's Marauders Net Thur. a
0000Z on 3860 held Annual Reunion during Sept. Please write you
Congressman requesting support of HR-7052 Bill which should hel
reduce RFI! Congrats to: WA1UBI on Advanced Class; WN1UAV
and WA1TUH General Class; and to WA1FCM for Sept. High traffi
count! My sincere thanks to all for your help in making this anothe
wonderful year. May Santa fulfill your every request! A Very Merr
Christmas to All! Traffic: WA1FCM 243, WA1RUR 189, WA1GF
187, WA1UAX 153, WA1RYL 91, WB2NOM/1 88, WA1SQB 71
WB2SFZ/1 68, W1CTI 52, K1YGS 50, W1AW 45, WN1UHN 41
WA1HLP 40, W1GVT 39, W1DGL 36, WA1STN 24, WA1RXA 22
W1BDI 19, WA1IKN 19, W1KV 14, W1QV 14, W1BDN 13, W1CUF
5, WA1RRZ 5, WA1RUS 5.

EASTERN MASSACHUSETTS – SCM, Frank Baker, W1ALP –
SEC W1AOG received reports from ECs WA1RTR W1BAB K1ZU
K1NFW W1UJF W1EQH WA1QKD K1CCW K1PNB. New ECs
WA1QQV Stoneham, WA1HVS Natick. WA1TFF new OPS. En
dorsements: WA1QMZ as ORS; W1SR/W1MTQ OO; W1QMN EC
Ex-K1AKT a Silent Key. WA1KZT now Advanced, also WA1SPA
Novice course sponsored by Bellingham AREC, instructed b
WA1QQF & WA1VAM. W1BPW moved to Falmouth. T9 Club me
at W1ISX's K4BHD here for visit. K1HHN on 20 DXing and phon
patching. WA1PKG new in Foxboro, in CD group. W1NJL nev
TS-520 in his Audi for mobile and has Advance. South Shore Clu
met. W1EOF moving to Framingham. WA1PIT wrkd a UL7 and ha
WAS. K1EPL now an Asst. Dir. to W1HHR. W1NF sked wit
WA1LKZ/MM on 20. K1IPB in hospital, K1SOP and XYL went t
VP9, visited XYL VP9BK/VE2BK. WA1JWQ new pres. of Mid
dlesex ARC. WA1IDA & K1SOP named to the Order of Paul Reve
Patriots by Gov. Dukakis. WA1PTL has his Advance. W1AEC Clu
had Flea Market, also holding Code Class. W1KVII working DX a
W1AEC. W1PEX made BPL. A Radio Club being formed i
Lexington. Sharon RC had auction. W1UX going to Colo. Springs
seeing W7ILX in Vegas. WA1TFF checked in the Panama Hurrican
Net. Officers of Barnstable RC: K1OIK, pres.; W1AED, vice-pres.
W1PLH, treas; K1HBY, secy. K1OUO & K1REW W1BEO leavin
for Fla. Our sympathy to W1OTN on the death of his wife. Bosto
Univ. ARC WA1VMU, officers are WA2CMH, pres.: WA2OJK
vice-pres.; WA1UZE, treas. Framingham RC held first meeting
EM2MN had 47 QNIs, 14 QTC. W1KKD Mgr. of NEEPN on Sun. a
1230 GMT on 3945; (Sept) 58 QNIs, 7 QTC; (Aug.) 69 QNIs
QTC. EMRI 261 QNIs, 254 QTC. NENN QNI 58, QTC 12
Quannapowitt RA had lecture on "Lasers and their Application" b
Walter Mc Isaac of W.E. Co. W1HKU, ex-K1NKP now in Gloucester
QRA classes being held, call WA1QQV, also had an auction
Chelmsford ARA had Dr. Mac Donald of Itek give a talk on "Wha
sort of Data can be collected from Air & Space." The Nashob
Valley Hamfest sponsored by RMs a great success. WA1PHR is Asst
EC to WA1SXU. A meeting was held at K1PAD's QTH to talk ove
emergency communications. This section well represented at
luncheon at the Marshview Restaurant in Scarboro, Me. New
England DXCC held a meeting in Waltham, highlighted by
presentation on the KC4NI Navassa Island DXpedition by member
of the team, it was excellent, slides and talks, W1JAA spoke, QS
Bureau, Mr. Connell on "Insurance", W1CW W1HHR W1AI
W1DAI, W1YL W1VAH present with chmn. DL2AA & DK6C
moving to Medfield, WA1JHQ has a TH6DXX beam up 50 ft
Traffic: W1PFX 627, WA1MSK 266, WA1QKD 190, W1DMS 153
W1UX 151, W1ETH 139, K1PAD 134, W1MX 94, W1CE 90
K1PNB 74, W1EMG 38, WA1OWQ 21, WA1IFL 14, W1AOG 12
W1DMH 12, W1PJ 5, WA1TFF 5, WA1PGY 4, W1PL 3, WA1TCP

NEW HAMPSHIRE – SCM, Robert G. Mitchell, W1SWX – SEC
K1RSC. PAM: K1YSD. RM: WA1GCF. The Central New Englan
New outing held at Saunders Bay. The NHVTN had 177 check-ins
96 traffic in 30 sessions. W1SWX & XYL chatted with W2NSD &
XYL at local DL restaurant. W1IXL revamped his antennas an
repaired the Hamm-M. WA1JSD visited WA7DCO and othe
Phoenix hams during 6500 mile trip to the Southwest. K1PQV &
XYL vacationed in Maine with QRP rig. The GSPN report show
432 check-ins, 153 traffic. Equipment of WA1PSI struck b
lightning. The Port City ARC issues the WANE award, details fro
W1DZZ, secy. Welcome new hams WN1s VLW, VLF, VMJ, VKN

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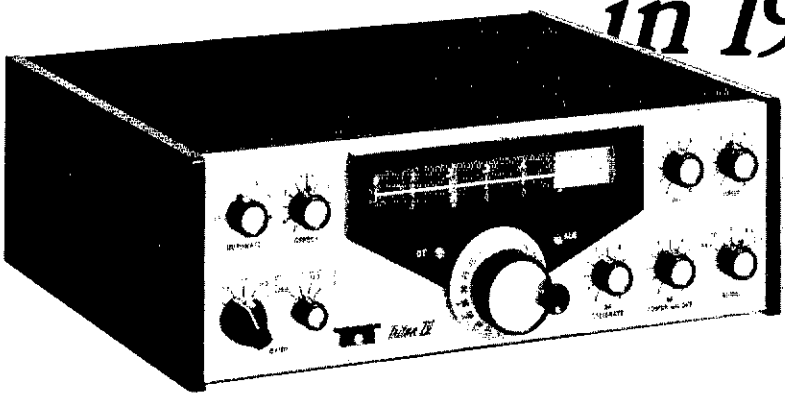

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VKF, VJM, VEM; WA1s VMS, VJJ, VJI, VJH, VIP. WA1JSD has a new Hal keyer. W1BYS/K1TXC now WB4BCP in Fla. WN1UAV is NCS of the Conn Slow Net on Mon. W1DY/K1QLZ has retired and moved to Bristol. New Hampshire was represented by K1LMS, K1VBL, WA1PEL, WA1RGP, W1SWX at the New England DXCC meeting in Mass. Season's Greetings to all. Traffic: K1BCS 150, K1PQV 55, WA1GCE 46, K1LMS 29, W1SWX 4, W1BYS 2.

RHODE ISLAND – SCM, John E. Johnson, K1AAV – SEC: W1YNE. RM: WA1POJ. PAM: WA1RFT. New appointment: W1RMV as ORS. Endorsements: W1YNE OBS; W1FVY EC; W1KMV OVS; W1JFF EC. The following Newport Hams took part in the recent March of Dimes Drive in Middletown, WA1FFL as base and mobiles W1AGB W1IAG and W1JFF. W1AM recently received a Distinguished Award at the Ocean 75 Conference co-sponsored by the Institute at Woods Hole and the Marine Technology at San Diego, CA. WA1RXI recently passed his Advanced Class exam. The Newport RC recently supplied Radio Communications for a walkathon sponsored by Christian Rural Overseas Program led by WA1HXK. Members participating were W1JFF W1AGB WA1AUI K1MCT WA1CSO also Fred Carr, Nelson Moss and Robert Volicity. This will be my last communication as your SCM and I want to thank all who have been so loyal in reporting over the past years. Your new SCM K1GMW will take over this month and all reports should be sent to him. I will look forward to seeing my many fellow hams in and around the state. Traffic: WA1POJ 174, WA1RFT 15, W1KMV 3.

VERMONT – SCM, J.H. Viele, W1BRG – SEC: W1VSA

Net	Freq.	Time(z)Days	QNI	QTC	Mgr
VTSB	3909	2300 M-S 1230 Su	701	79	WA1PSI
Carrier	3935	1300 M-S			W2DSK
Green Mt.	3932	2130 M-S	445	31	W1JL
Vt Phone	3909	2130 M-S	73	4	W1KKM

Welcome new amateurs WN1VLS and WN1VLH. New officers of BARC are WA1QGR, pres.; WA1TEO, vice-pres.; WA1REL, secy. W1BRG, treas. We regret to report the death of K1WSP and WA2OLY. K2GDX has become KH6IOC. WB2RKF/1 and WA3FFR/1 have been appointed ORS and both are active on NHVTN. Traffic: WB2RKF/1 220, WA1QOP/1 81, W1LMO 17, WA3FFR/1 10, W1KJG 2.

Welcome new amateurs WN1VLS and WN1VLH. New officers of BARC are WA1QGR, pres.; WA1TEO, vice-pres.; WA1REL, secy. W1BRG, treas. We regret to report the death of K1WSP and WA2OLY. K2GDX has become KH6IOC. WB2RKF/1 and WA3FFR/1 have been appointed ORS and both are active on NHVTN. Traffic: WB2RKF/1 220, WA1QOP/1 81, W1LMO 17, WA3FFR/1 10, W1KJG 2.

WESTERN MASSACHUSETTS – SCM, Percy C. Noble, W1BVE – PAM WA1MJE reports WMEN held 22 sessions with QNI 226 and traffic 34 (with total number of different station 55). CW RM W1DVW reports WMN held 30 sessions with QNI 127 and traffic 95. A newcomer to WMN W1DOY was 2nd highest in attendance. We now have better attendance in Worcester Co. with W1DOY WA1OUZ and W1TQB. SEC WA1DNB reports WMEN held 4 Sun sessions with QNI 86 with 43 of those thru liaison from 2-meter repeaters. Tri-County VHF PAM WA1PLS reported that WM ARES Repeater held 22 sessions with QNI 194. VHF PAM W1KZS reported Berkshire Co. 2-meter net held 3 sessions with QNI 39. One session was given over to directions for reaching a NY hospital during a long emergency run.

WMPN	3935	4:30 PM M-F
WMEN	3935	8:30 AM Su
WMN	3562	7:00 PM Dy

MARC reports Silent Key W1PRS. The club repeater now much improved. HCRA reports W1UCB, secy. of HCRA, now CD RO for Southwick, Mt. Tom Repeater reports WA1JHK moved to East Mass. WA1SXV moving to Wash. D.C. New officers: WA1GZC pres.; WA1ECR, vice-pres.; W1UCB, secy.; WA1WLE, treas. New members of NOBARC are K1JCG WA1RKS WA7CSL/1 WA2URS WB2FQT WA1UJM. The Mt. Lincoln Bulletin says WA1PLS was NCS for Audubon Hawk Watch. Traffic: WA1MJE 180, W1BVE 105, W1TM 91, W1KK 42, W1DVW 41, W1BBI 18, W1STR 13, WA1DNB 12, WA1OUZ 12, WA1RWU 10, W1DOY 5, W1KZS 5.

NORTHWESTERN DIVISION

ALASKA – SCM, Roy Davie, KL7CUK – KL7HDX will soon have new SB220 on the air. Also Rick reports he will be on board ship part of the time. KL7HOV reports 30 sessions of ASN with 48 check-ins. KL7HNQ reports 100% membership in AREC in his area. KL7JDO and KL7GCH are busy trying to finish KL7GCH generator house and living house before winter sets in. KL7HMH has new gear coming for 2 meters. KL7HMK teaching extra classes so his activity is limited. The Anchorage Club has some real good classes going for new licenses and upgrading too. SEC KL7JDO and yours truly planning a trip to visit the Juneau and Ketchikan clubs next month. Looking forward to meeting the gang in S.E. Alaska. Conditions are improving considerably with the approach of winter. Please advise me if any one is interested in cw nets. We need more activity for cw nets. KL7IS moved back to Fairbanks for the winter. Traffic: KL7HDX 28, KL7CUK 10.

IDAHO – SCM, Dale A. Brock, WA7EWV – SEC: W7JME PAM: WA7HOS.

Net	Freq.	Time/Days	Sess.	QNI	QTC	Mgr
FARM	3.935	0200 Dy	30			W7TW
IMN	3.635	0300 M-F	22	191	82	W7GH
RACES	3.99	1415 M-F	22			K7UB
Id. Silver	3.93	0115 MWF				W7I

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K7UBC has resumed net control of RACES; thanks to retiring ne control W7KDB on a job well done. W7EYR is the proud owner of new ICOM. W7YAD is trustee of Boise's 2-meter repeater. T WA0KKR/7 Boise, welcome to ID. Condolences to W7GHT in th passing of his father. K7NHV made an impressive score in the Jul CD Party. Spouts Springs' repeater, 19/79, is off the air temporarily but WA7TRO assures us it will soon be back in operation. Traffic W7GHT 338, K7NHV 51, W7GBO 16, W7FIS 3.

MONTANA – SCM, Harry A. Roylance, W7RZY – Asst. SCM Bertha A. Roylance, K7CHA. SEC: WA7IZR. PAM: WA7PZC Butte Radio Club provided communications for a Boy Scou Camporee using their repeater. They also provided communication for the 4 X 4 Mini Baja. WA7HAG and W7DXQ have flown our nic climate for the southland. Sorry to report the passing of W7MIZ WA7OBH has purchased a new home and is busy moving. 1NM ha 22 sessions, 82 QTC and 191 QNI. W7ZUJ working the Billing repeater from Roundup. Traffic: W7NEG 26, WA7PZO 15, K7BM 6.

OREGON – SCM, L.R. Perkins, WA7KIU – SEC: W7HLF. RM K7OUF. PAM: K7RQZ.

Net	Freq.	Time	QNI	QTC	Mg
BSN	3908	0300	485	65	WA7MH
OSN	3585	0145			WA7TX
AREC	3993	0200	388	14	WA7NE
Pdx AREC	04/64	0130	307	8	K7WW
Nuclear	50.25	9:30AM Su	17		W7FF
NSN	3702	0200	365	95	WA7OV

Dec. the month of Christmas Greetings Via Amateur Radio. Wh not send at least one "Greetings" message to a friend or relative? T get a message to another state enter it into Oregon Section Net (cw Beaver State Net (ssb) or Northwest Slow Net (cw). It will go fron there into the National Traffic System (NTS) and will be a graphi demonstration of one of the aspects of Amateur Radio. Then whe the big winter storm comes along all of us will be a little bette prepared to handle the really important traffic "in the publi interest". One OO is sending out 15 to 30 notices each month mostly for out-of-sub- band or flattopping. This is ridiculous. Find class and upgrade to work down there and also learn how to operat a transmitter at the same time. Most often heard comment fron OBS, "I don't know if I'm doing any good". Let these people know they are being heard and appreciated. Traffic: (Sept.) W7DAN 179 K7IWD 166, K7IFG 103, WA7TXV 81, K7NTS 68, WA7YEU 59 WA7MHP 49, WA7QDC 46, W7MLM 30, W7ET 10. (Aug.) K7NT 77.

WASHINGTON – SCM, Mary E. Lewis, W7QGPP –

Net	Freq.	Time	QNI	QTC	Sess.	Mg
WSN	3590	2045	296	150	30	W7L
NSN	3702	0200			30	WA7ND
NWSSB	3945	18:30	868	165	30	
NTN	3970	11:30	1545	94	30	W7PW
WARTS	3970	18:00	2347	423	30	W7QG

W7AXT enjoying a 2m walkie-talkie and putting up an eleve element 2m Long John on a 50-ft. tower. W7BQ's antennas ar down for re-roofing job on house. W7AQ & W7DK pushed traffi totals up with public service booths at their county fairs. Tacom ARC's repeater is ready but still waiting a license. K3MNT/ constructing new antenna. K7CTW assigned as liaison coordinato for RN7 to AK-Pacific Net also made BPL, Mike's first BPL Congrats. W7HAD on air with quad element for 40 & 80 an two-element quad for 20m. Cascade repeater 147.99/39 now i operation with good coverage N.W. WA and some coverage o central WA. Mission Ridge Repeater 146.07/67 has new repeate package and extensive antenna improvements extending coverag area to Seattle, S.E. corner of WA and Western ID. WR7ADW 147.90/30 on a new 100 ft. tower plus a new duplexer, helixx an antenna, greatly increasing area from Kelso & Longview. Wit regrets I report W7BVO and W7HBX as Silent Keys. K7GWI received his WAS cert. No. 130 for 6-meter WAS. K7TVO sti looking for cards from RI and DE to complete 6-meter WAS. ARR Northwestern Division Convention will be a triple header wit National Quarter Century Wireless Assn. Inc. and Northwestern DX conventions joining the ARRL group, so mark your calendar Jul 29, 30 & 31, 1977, See You in Seattle. Traffic: (Sept.) K7CTW 515 K7GIP 482, W7DZX 459, W7DK 456, WA7BDD 109, K7DZA 109 W7APS 93, W7LG 62, W7AQ 56, W7KEI 51, W7BQ 41, W7EBU 30 K7CTT 22, WA7RCR 19, W7BUN 18, W7IEU 13, WA7DJI 5 W7AIB 3, WA7VHW 2, K3MNT/7 2, WA7GVC 1, K7VNI 1. (Aug. K7OZA 80, WA7VHW 33, WA7RCR 14, W7AXT 2.

PACIFIC DIVISION

EAST BAY – SCM, Charles R. Breeding, K6UWB – Asst. SCM Ronald D. Martin, W6ZF, SEC: WB6RPK, Asst. SEC: WB6DS With its Oct. meeting the North Bay ARA will meet on the 4th Wed of the month at the Green Room at Dan Foley Park. WA6IF improved her signal with a new inverted V on 40 and 80. DC4OM an exchange student now living at Lake County. Look for Jorg on meters. WA6YCD is now a General and sharing the big rig with th OM. WA6JXK hard at work on NCN after a fine vacation. W6PB hard at work getting 2 meters on the air. K6RI of the San Francisc FCC office was the speaker at the Sept. meeting of the Silverad ARS. K6BYQ working on miniaturization and micro-processin WA6WAI building solid state clocks but still finds time for D W6MIS and K6OKO are both active on the 2-meter Vallejo Ne From CCRC the following stations were listed as new in the Section WN6AED WB6AJO WN6ARP WA6APJ WN6ALG WN6AN WA6ALN WN6AND WN6ALX WA6AWI WN6AEO WA6AI WN6AEE WN6AEG WB6AJP WB6AJP WN6ADO WN6AG WN6ADY WN6ADZ WB6BIK WN6BER WN6BFR WB6B

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- HT-32A Transmitter 219
- HT-37 Transmitter 159
- HT-40 Transmitter 49
- HT-41 225
- HT-44 Transmitter 159
- SR-150 Xcvr 249
- SR-160 Xcvr 149
- PS-150-120 AC sup. 75
- PS-150-12 DC sup. 49
- MR-150 rack 19
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- HQ-100C Receiver $109
- HQ-110C Receiver 119
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- HQ-120X 69
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- HQ-170C Receiver 159
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- SB-301 Receiver 229
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- SBA-300-4 2m conv. 19
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- Dx-60B Transmitter 69
- Dx-100B xmtr 99
- TX-1 Transmitter 99
- HR-10 69
- HX-10 Transmitter 189
- HX-20 Transmitter 125
- VHF-1 6-2m Xmtr 79
- SB-400 Transmitter 225
- SB-401 Transmitter 249
- HWA-7-1 AC supply 9
- HW-12 75m Xcvr 75
- HW-12A 75m Xcvr 85
- HW-22A 40m Xcvr 85
- HW-100 Xcvr 249
- SB-100 Xcvr 325
- SB-101 Xcvr 349
- SB-102 Xcvr 369
- SB-200 219
- SB-303 269
- HM-102 27.50
- SB-630 stn. console 69
- SB-650 Digital frequency display 169
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- HR-212 2m FM 189
- AR-2 2m Amplifier 89
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- SB-450 UHF FM 229
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- SR-700 $250

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- SW-240 Xcvr $169
- 400 Xcvr/420 VFO 299
- 406B VFO 49
- 410 VFO 69
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- 160 external VFO 75
- 350 239
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WN6BFQ WN6AZM WN6AZY WA6BKQ WN6BAC. Good luck
all. For those who worked VP2MCT and still need a QSL, s.a.s.
to PO Box 8502 Oakland, CA 94662 may do the trick. Traffi
K6HW 375, WA6IPL 85, W6JXK 53, K6PMG 32, WA6BMV
WB6WBG 2, WA6VEF 1.

NEVADA – SCM, John D. Weaver, W7AAF – Welcome news
appointee WA6INF/7 OO Class II. Congrats to WN7BGP WN7BK
WN7BHO WN7BSP and WN7CCQ, all graduates of W7HOP. A w
done to new Generals WA7YEF and WA7WZL. W7DIK and XY
have returned from a European trip some 4,000 35mm slides riche
WA7ZZZ moved to Carson City. WA6SPU new in Reno. The 22
MHz repeater in Reno may soon go to a mountaintop locatio
Contact W7AAA W7DDK or W7IAD for details. WR7ACW, 34/9
on Virginia Peak is on carrier access while WR7ABI, 34/94 at Sli
Mountain requires a 2400 Hz burst. The new 22/82 machine
Utah Hill recently installed by the Cedar City bunch fills the g
between Las Vegas and the UT state line. LVRAC and LVR
members provided the communications for the annula March
Dimes Walkathon Oct. 18 in Las Vegas. Traffic: (Sept.) W7ILX 28
K7OHX 18, WA7WYF 2, (Aug.) W7ILX 262.

PACIFIC – SCM, Pat Corrigan, KH6GQW – RM: KH6IA
ORS: KG6JAQ. EC: Windward Oahu KH6HOU, EC. Leeward Oa
KH6HRG. KH6GMP has new Drake equip. Congrats to new Li
Members KH6s AGK AWJ GSH. MS SCM, WB5DCY had nice vis
to KH6 in Sept. Also here on trip to Guam was AMSAT's W3TM
Sad to note W6TTS known to many Pacific stations a Silent Ke
KH6GKD got together with VK6RU when he was in town. KH6IK
is at new QTH near Hon. A/P. Our RM KH6IAC is moving
WI-land. We will miss Wondy and all the fine work he has done
the Section Net and in the Hon. DX Club. Life Member, W8RI
now in residence at Wheeler. W1ZPB now on staff at Haw. Pre
Acad. at Kamuela. KH6GQW visited with him during Big Islar
jaunt and Walt will be active in traffic in the section. Kauai now h
both new repeaters active, both audible on Oahu. Manoa repeat
has been shut down because of low level activity and oth
considerations. Your SCM will be on the West Coast this month
attend the Division Director's meeting in preparation for the ne
Board meeting. We still need help on our section net. KG6JAQ
net mgr. We also need more ARPSC activity to increase our imag
Traffic: KH6IAC 287.

SACRAMENTO VALLEY – SCM, Norman W lson, WA6JVD
SEC: W6SMU. The Calif. QSO Party was an unprecedented succe
with all Calif. counties represented. DXpeditions by K6SG (Colus
W6KYA (Sierra), and W6NJU (Nev. and Yuba) were made and
outstanding showing by the Lassen ARC put more Susanvil
stations on than Sacramento. K6KWN's four-element beam fell ju
prior to the contest and forced him to rely on dipoles. Congratul
tions to WN6ALV and WN6ANV, new hams in Sacrament
WB6YKJ has been operating portable at his job site East of Sonor
The Golden Empire ARS of the Chico area kicked off their activi
season with their annual Steak Bake on Sept. 13. WA6WNE check
frequencies and deviations at the last meeting of the RAMS. T
Grant School District is offering amateur and commercial cours
this Fall. K6TWE has already overhauled the PE-75 generat
getting ready for the next Field Day or emergency. Traffic: K6RP
10, K6KWN 1.

SAN FRANCISCO – SCM, Rusty Epps, W6OAT – Thanks
the many stns who participated in the Calif. QSO Party, all six
Section counties were well represented. Congrats to: newly licens
WN6MDS and WN6CLK; WN6DXH who passed his Gener
WB6BDL and W6RNL on making PSHR in Sept.; and to the Bech
ARC upon receiving its ARRL affiliation. HARC and FWRA a
frantically working to get all their repeaters going on Mt. Pier
Humbolt Hill, and Horse Mtn before winter snows arrive. MAR
started code and theory classes in Nov. at the san Rafael Red Cro
Bldg. K6MZN made Honor Roll in the Sept. FMT. WA6LLX hard
work publishing an excellent bulletin for the Amateur Comm. So
(WR6ACS/ACR). WA6YDU now on the air with a T4X and R4
W6NUT busy putting up a new set of antennas in time for t
contest season. WB6MOV a new member of SFRC. W6IPL no
settled in his new Fortuna QTH. MARC Christmas party will
Dec. 5. WB6ITN is QRL with school and homework. W6GGR doi
an excellent job of transmitting OB for Wureka area hams. K6SR
has a new TR-226 for 2m fm. Traffic: W6RNL 197, WA6BYZ 16
W6IPL 91, WB6BDL 42, WB6UPV 35, W6NL 23, WA6BTF 2
W6OAT 5, WB6ITN 4, K6SRM 1.

SAN JOAQUIN VALLEYs – SCM, Ralph Saroyan, W6JPU
The Kern County ARC held their second annual Mini-Hamfest Sep
26, 1975 with 140 in attendance. W6JPU won the Argonna
transciever. WA6NGF now in Fresno and on 2 meters using an IC2
WA6ONI is EC for Western Kern Co. WA6RXI busy teaching co
and theory to Novices. W6YKS and WA6CPP participated in the
QSO party. WR6ALK (147.93-33) serving as the northern SJV-SA
Oscar net. WN6BXI has 6 countries on 6 meters. W6YKM is truste
W6YKS secy. WA6CPP moderator, and K6PBT and K6OZI are t
important personalities of WR6ALK. WA6PRU and W6MHD h
their 2-meter equipment stolen from their cars. W6YKS worked N
on 6 and 2 meters. It is with deep regret that I report the passing
W6KOB. WA6SHO moving to Guam. WB6BVK has an IC-22A
does WB6LMP. WA6MGG and W6ARE attended the Hamfest
Bakersfield. W6DPD and WB6ITM conducting code and theo
classes to encourage youngsters to be hams. WA6ONI has an NCX
I would like to take this opportunity to wish each and every one
you a very Merry Christmas and Happy New Year. Traffic: WA6R
48, WA6JDB 11.

SANTA CLARA VALLEY – SCM, Jim Maxwell, K6AQ/W6CL
– SEC: WA6RXB. W6RSY made BPL (as usual!), W6RFF ma
PSHR (as usual!) WA6GYD tore into the Sept. VHF QSO Par
from 50 thru 220 MHz. 432/1296 rigs are expected to he operati
again for the next bash. VHF DXpeditioner WB6JNN operat

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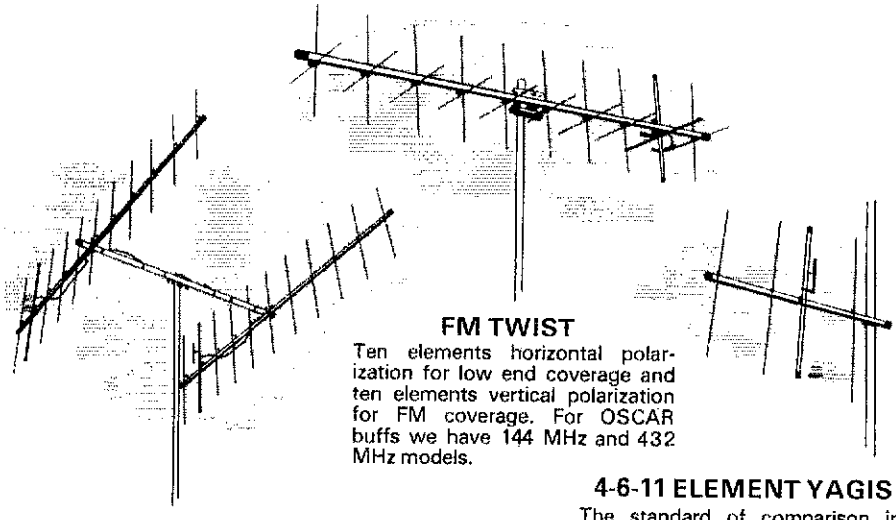

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Chew's Ridge during the VHF affair and managed some ATV work on the side with WA6VAB and WB6RAE. JNN also at work on a 28 to 432 MHz RX converter for an AMSAT portable satellite terminal. F0BPR (AKA: W6FKF) now back in his local diggings after a vacation in France with family. Nearly 1500 QSOs were made with a 15W battery powered, homebrew cw rig. School work is causing WB6VBG's tfc activities to take a nosedive. W6ONB and WA6TAH were very QRV in the CA QSO Party from a portable location in Mendocino Co. The SF SCM W6OAT found QSO Party conditions irresistible in SCV, as did DJ6RX/W6, W6PAA and many others. Congrats to WB6JNN for his new Advanced Class ticket. Thanks to WB6ESF for his help with handling emergency traffic to AK after responding to an appeal for help on a local AM radio station. SCCARA is continuing with their Novice, General and Advanced license classes, following the formula set by K6CU. Contact K6CU or SCCARA pres. W6ZM for details. W6KHS has satisfied his lust for adventure (8 months of travel in a motor home!) and has replanted self plus family in Santa Cruz. Check out his fan at any regular meeting of the Santa Cruz County ARC, meeting monthly on the first Fri. at 1900 in room 716 of Cabrillo College. Traffic: W6RSY 736, W6YBV 267, W6BVB 123, W6NW 104, W6RFF 98, W6AUC 60, W6DEF 33, WB6VBG 30, W6KZJ 8, W6QNB 5, K6AQ2.

ROANOKE DIVISION

NORTH CAROLINA – SCM, Chuck Brydges, W4WXZ – SEC: W4EHF. PAM: W4OFO. VHF PAM: K4GHR. RMs: K4MC, WB4ETF. EC of the Month is ex-SCM, current AD, WA4UQC covering Nash, Edgecombe, Bertie and Martin Co. Many new amateurs owe their start to WB4VKK who has been running many radio classes at Guilford Tech. Inst. K4GHR family is approaching 100% ham with XYL now WN4BQT, WN4BQC & Sherrill waiting for new ticket. Mecklenburg ARS and Charlotte ARC had joint effort in placing display stations in four large shopping centers. W4JG reports Raleigh ARS had 27 report for new Novice classes; many were recruited from booth at recent CB Jamboree. WB4ZTV new Advanced. Eden tenth graders WA4TML now Advanced and WN4NNA General. W4NAP reports Rockingham Co. had successful drill (simulated flooding) and RACES net meets weekly 147.06 at 2100 local Wed nights. Suggestion: if you need propagation info monitor WWV at 14 and 18 minutes past the hour for solar flux number and other geomagnetic data. Effective Jan. 1, 1976 the new QSL bureau for WA4-WB4-WN4 will be the Sterling Park ARC, PO Box 599, Sterling, VA. 22170.

Name	Freq.	Time/Day
Tarheel Emergency	3923	7:30 PM Dy
NC SSB Net	3938	7:30 PM Dy
Carolinas Net (cw)	3573	7PM/10 PM Dy
Central NC Tfc Net	13/73	10 PM Dy
Non-NTS affiliated:		
SFK Net	3923	6:30 PM Dy
Costal Carolina	3907	7 PM Dy

Traffic: (Sept.) K4FTB 118, W4OFO 114, K4EZH 95, K4MC 77, W4RWL 72, WB4KHZ 48, WA9NEW/4 45, W4WXZ 38, WB4OXT 34, WB4MXG 32, WA4KSO 28, W4ACY 23, K4AIH 14, WA4CBL 11, W4EHF 7, WB4DNP 5, WB4CES 4. (Aug.) WA4KSO 48, W4RWL 48, WB4OXT 35, WB4FFX 10, WA9NEW/4 6. (July) WB4FFX 37.

SOUTH CAROLINA – SCM, R. H. Miller, WA4ECJ – SEC: W4ZMZ. RM: WB4OBZ. The Palmetto Chapter QCWA received its charter from the national organization during the ARRL National convention at Reston. The SC Distribution System (primarily for message traffic) was inaugurated on Sept. 16 with the activation of the Palmetto Traffic Exchange. The Distribution System can be described as a grass-roots extension of NTS, with all nets and groups within the Section invited to participate. Plans are under way to reorganize and revitalize the SC AREC. Clubs and repeater groups are being asked to nominate local ECs from within their own ranks and are invited to cosponsor local AREC units. OBS W4EGH for the SC Phone Net, and K4KAX for Carolina Repeater Soc. are continuing to flash the latest news via official bulletins. Early CN had 225 check-ins in 30 sessions, traffic 145. Late CN: sessions 16, check-ins 71, traffic 30. SC Novice Net: sessions 26, check-ins 41, traffic 14. PTE: 15 sessions, 96 check-ins, traffic 3. Traffic: WB4OBZ 149, W4NTO 112, WA4ECJ 2, K4FRX 2.

VIRGINIA – SCM, Robert J. Slagle, K4GR – Asst. SCM: A. J. Martin, Jr., W4THV. SEC: WA4YIU. Asst. SEC: WA4PBG. PAM: WB4YKM. RMs: W4SHJ K4IAF WB2VYK/4 WA4AVF WA4DHV. Since this is my final report after six years I want to record my appreciation to all you wonderful League Officials who made it a most rewarding experience. The many kudos I have received made it worthwile. Continue to do so for our new SCM W4QDY. Bob drove up from Norfolk Oct 11 and picked up the files, and is now in the saddle. W5VZO/4 finally figured up how to total up his PSHR! W4ZDN says picture on page 82 of Oct. QST definitely not him, that correct picture should be printed in Nov. issue. Va. Beach AREC family picnic on Sept. 27 a fine affair. WA4HHG operating WG4NEP Special Events Station. K4EZ reports pileups on 21 MHz. K4FFL reports Novice Class of WB4FDT has new HR-6 on 6. WA4AJF reports now has fone patch. For the first time in 6 years W4DM didn't promise more activity. OO W4HU in EMT and VHF tests. College in mornings and work evenings hurting QNI of WA4KKP. K4DHB spent day in city VA manning CD freq. during brush by Eloise and flooding in Northern VA. W4JUJ up to 3031 confirmed counties. National Convention: Reston was a very nice affair. W4TZC hopes to have some good news next time (?). WB4YKM busy at UVA and wrestling and QNIing all the nets. The VA Radioteletype net still struggling, but hard. Nets QNI/QTC: VSBN (Aug.) 1026/259, VSN 351/12, CV2MSN 456/88. K4MSG reports slack month. Sterling Park ARC taking over WA/WB/WN QSL Bureau. New Hampton Roads Radio Assn. officers: W4LMB, pres.; WA4MMP, vice-pres.; WA4UTS, secy; W4JEM, treas. Congratulations on ARRL affiliation to Woodbridge

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Wireless Soc. Also heard from Lynchburg ARC and Tidewat
SSBN. BPL: WA4CLK. Traffic: (Sept.) WB4YKM 383, WA4CL
197, W4UQ 190, WA4EPJ 187, W4QDY 171, W5VZO/4 13
K4MLC 99, W4SUS 90, WB4FLT 85, K4KDJ 84, K4GR 8
WB4KIT 60, WA4YIU 56, WA4AJF 50, WA4HUB 48, W4YZC 3
WA4JVO 30, WB2VYK/4 28, W2TPV/4 22, K4KA 20, K4VWK 1
WB4YXN 15, K4FEL 14, W4ZDN 14, WB4AFA 13, WB4FDT 1
WB4WUX 12, WB4DRD/4 11, WA4KKP 11, K4EZL 10, WA4PB
8, W4MK 6, W4KFC 5, W4TZC 4, WA4HHG 3, W4KX 2, WB4LE
2, K4DHB 1. (Aug.) WA4VFW 328, WB4FDT 24. So long Gang!

WEST VIRGINIA – SCM, Kay Anderson, W8DUV – SEC WA8NDY, RMs: W8HZA W8JWX, PAM: WB8DQX. New Y operator in Flemington in WB8WET, WB8DQX's Mom. WB8NM passed Extra Class exam in Reston at National Convention WB8NFZ back on the air after repairing the SB-102. W8HZ thinking about 160 meters, anyone want to join him? WB8JIL activ on WVN, just appointed ORS. Mid Day Net handled 80 messages 30 sessions, 591 stations. WV Fone Net in 30 sessions had 3 messages and 756 stations. WVN (cw) in 30 sessions handled 10 messages, 169 stations. Traffic: W8HZA 64, WB8DQX 48, W8CK 32, W8EUE 30, W8FZP 12, WB8CPU 11, W8DUV 10, WB8CNN K8QFW 7, WB8QYN 6, WA8LFW 5, K8CFT 3, W8JM 3, WA8PO 3, WA8NDY 2, WA8RUZ 2, K8ZDY 2, WB8IHA 1.

ROCKY MOUNTAIN DIVISION

COLORADO – SCM, Clyde O. Penney, WAØHLQ – SEC KØFLQ. RM: WBØHCK. PAMs: KØCNV, WAØYGQ. We are please to note that SSN is picking up a little more activity this mont KØQIX is now taking Alamosa, Colo. traffic on CCN, KØHF attended the ARRL National Convention in Reston, Va., Sep 12-13-14. We are sorry to learn that WØUXN is back in the hospita in serious condition. KØSPR is acting as Asst. NCS on CTN almo every day. It turns out now that contrary to last month's repor WAØMOJ was in fact, the first 500 club (10-X) member in CO wit WAØYNQ second. The International Amateur Radio Hosts (IARH is a newly formed organization to promote mutual assistance an fellowship among its members. Anyone who is interested is urged t contact G.L. Baker, W5QPX, 101 Rita Blanca Trail, Amarillo, T 79108. The IARH is a revival of the old "Ham-Hop" club that w around some 20 years ago. It is with deep regret that we add the ca of WNØDLH to the list of Silent Keys from the CO Section. Newl elected officers of the Empire Radio Club are KØSUH, pres WAØDQJ, vice-pres.; WBØDUV, secy-treas. The CO Section's fir 220 MHz repeater has now been established on Squaw Mtn. wit freqq's. of 222.34 in/223.93 out, using the call WRØABG. Net T for Sept.: Hi-Noon QNI 578, QTC 24, informals 96, 27 session 898 Minutes. Columbine QNI 1317, QTC 66, informals 290, 133 minutes. CCN QNI 277, QTC 83, 31 sessions. Traffic: (Sept WØWYX 1289, KØZSQ 868, KØYFK 546, WA1QME/Ø416, WØET 160, WBØIBS 124, WAØYNP 93, WØIW 90, WØHXB 77, KØSPR 4 WØSIN 37, WØLAE 25, KØQIX 17, WAØTMA 16, WBØIZO 1 WAØYED 7, WAØYNQ 4, WBØLFQ 3. (Aug.) WBØHCK 21 WNØMRU 85, WØIW 61, WAØTMA 22.

NEW MEXICO – SCM, Edward Hart, Jr., W5RE – SEC W5ALR. PAMs: W5PNY W5DMG. RMs: W5UH K5KPS. Southwe Net (SWN) meets daily 3585 kHz at 1915 local this month had 17 check-ins and handled 192 messages. New Mexico Road Runner N meets daily on 3940 kHz at 1800 local and handled 35 messag with a check-in list of 623. WA2DEQ/7 is a new member of SW from Tucson. WA5YBA W5MEF WA5LTP and WB5CFU installed repeater at Caprock. Now all they need to put a new repeater on t air is a license and about 1/4 mile of control line. K5KPS w portable from Winfield, KS, using a William Tell antenna. K5MA has devised a keyer with a speed readout. Now he wants to add memory. W5HRS will be in Sterling for the next few months, usi call WBØPVT. WA5ROU entered the FMT on Sept. 7. Watch *QS* for results. Traffic: W5ENI 225, WB5KSS 225, K5KPS 21 K5MAT164, W5RE 59, W5HRS 32, W5DMG 31, WA5OHI 8.

UTAH – SCM, Ervin Greene, W7EU – SEC: WA7ZBO. RM W7OCX. BUN 1230M daily 7272 kHz; UCN 1930M daily 3 kHz; VHF Society Net 1900M Tue .34-.94; SL Co. AREC (SCAN 1945M Tue .28-88; Davis Co. AREC 2100M Wed. 146.58; Web Co. AREC 1945M Tue. .22-82; Utah Co. AREC Tue. 1930M .16-7 We now have 8 vhf repeaters serving most of the state an overlapping into adjacent states. A new novice class was started Oc. at Murray High with good enrollment. A program has be organized to assist those who wish help in obtaining license Contact one of the UARC officers or members for one closest you. A new film is being produced by the local club to publicize o hobby and should be of help on TV public service advertisin WA7MEL reports some good DX openings to Europe on 20 and t South Pacific on 10. W7OCX reports bad band conditions for BU this month making short distance communication very difficult. 7 check-ins were logged with 41 messages handled notwithstanding. wish you a a very happy holiday season and a very prosperous ne year with lots of good signals. Traffic: WA7MEL 73, K7HLR 6 WA7OAU 57, W7OCX 55, W7RO 14, W7DKB 12, W7EU WA7LGX 1.

WYOMING – SCM, Joe Ernst, W7VB – Congratulations to t Fremont County Amateur Radio Society whose affiliation wit ARRL was announced Oct. 3, 1975. The club meets regularly Lander, secy-treas is K7WUR. The Sweetwater Amateur Radio Clu has been holding regular meetings and was active at the County Fa in Aug. After spending a month on Boysen Peak W7VB relinquishe the post to WBØUOH from San Francisco who will be the new T transmitter engineer and see that repeater WR7AEQ functio properly. W7VEW got his KLM beam up with the help of pow company and local hams and is ready to work Oscar six and seve also the meteor showers. W7VB made a trip to Seattle, Oct. 1st, a was pleased to work repeaters almost continously out and back, big improvement over a year ago. The Laramie Peak repeater expecting delivery of their equipment Oct. 19th. Hope you a

planning to attend the national convention at the Denver Hilton July 16, 17, 18, 1976.

SOUTHEASTERN DIVISION

ALABAMA – SCM, Jim Brashear, WB4EKJ – SEC: W4DGH. PAM: W4LNN. RM: WB4EKJ. With deep regret I report W4ZIY a Silent Key. The Mobile ARC enjoyed their annual Campout at Wiggins, Miss. The Huntsville ARC annual picnic was a success. New affiliated clubs are Cullman ARC and St Clair ARC (Trussville). WN4UCO QNI AENM via W5HGT. WA4JBC put up 20-10 quad and 40-meter loop. He operated 24 hours during hurricane. Birmingham ARC has new solid state Motorola repeater. The Birmingham and Calhoun ARCs have a 6-meter repeater in operation. WB4SVH made a trip to Fort Walton Beach to assist with communications on 2 meters. UA club station, WB4LDG, active on AENM and is NCS on Sun. nights. K4LYY lost antennas when Eloise went through Ala. Congratulations to WB4KSL and Beverley, who were married Oct. 12, '75. Appointed WB4CXD as EC. Endorsed K4CUU and WB4SVH as ECs and WB4SVH as OBS. Welcome to the AL Section: WA4s AND AOR ARF BEZ; WB4s AQC ARU AYR AZO BES BKH BKI BOR; WN4s AMA AMB AMG APW ASN ATG ATT AUX AUY AUZ AVB AVC AVV AVY AVZ AWA AWB AWE AWG AWH AWN AWO AWP AWX AXN AYA AYG AYH AYK AYL BAY BCM BCX BEF BHS BII BIJ BIB BJD BJM BJO and BMA. Much activity on AENM during Eloise; separate report planned. WN4JDH acting NM AEND. Traffic: (Sept.) WB4EKJ 236, K4AOZ 92, WN4JDH 68, WA4AJA 44, WB4RCF 37, K4UMD 30, WA4ZUW 26, WB4TVY 19, K4CUU 18, K4VF 14, WB4IYW 13, K4ICP 12, WB4BAP 8, WB4SVH 4, K4LYY 2. (Aug.) W4DGH 3, WB4SVH 2.

CANAL ZONE – SCM, Roderick J. Isler, KZ5PI – Club is researching the possibility of getting an FCC Examiner from Puerto Rico to come and administer Extra and Advanced Class radio exams to Canal Zone hams. Classes are presently being conducted to prepare CZ Hams for license up grading. Plans are underway by the Chagres River Radio Club, Gamboa, CZ to conduct the Annual Crossroads of the World Hamfest. Last year the event was a huge success and the club is expecting a better turnout this year. KZ5TC, our new secy, has published a new CZ newsletter monthly announcing upcoming ham meetings and a swap and shop section. The first issue was a huge success and was well accepted by all CZ hams. Many new novices are trying for their general ticket soon and best wishes and good luck to all. KZ5TC is attending college in the states this year but contact is kept on a regular basis with "dad" KZ5AS.

GEORGIA – SCM, A. H. Stakely, K4WC – Congrats to WB4IGX on making BPL, WB4GVJ making Extra, K4DNH WB4SOA making Advanced, WA4BZY WA4EZN making General. Thanks to WA4AKU W4BKK W4HON WA4HBL WB4ILR WA4KSB WA4OQO W4TJS W4YEK WA4ZYT and many others for helping with hurricane Eloise who blew W4VTA at State CD Hq. off air while K4WC giving WX bulletin but made TV stars of W4TJS and W4YEK in participation with WA4HBL. Antenna restored by WB4ILR and WA4KSB at height of storm. K4ZYK starts ninth year of code and theory class with W4RFI and WA4EPK helping. Retarded Children's Fund of Metro Atlanta helped by W4s BJT DBZ ORI UCC USG; K4s AEJ CRY JAO JMX JSR LAQ LVU OSW UEZ VCB VGO WC WRS; WA4s AKU ENC WBL; WB4s BFK CBM DCZ DYQ EXX GFI ILR KCD QVR TJS. W4JM got two new countries on 75. W4BTZ on 2 as well as 80-10 mobile. WB4ACV WB4BOP WB4STD active and looking for appointments. How about some others? WA4GZP and WN4KXY join AREC. K4VHC has new hf rig on. GSN Aug. report QNI 227, QTC 88 with Sept. QNI 227 QTC 87. GSBN QNI 1490, QTC 129. Traffic: WB4IGX 110 W4AAY 77, WB4WQL 69, WA4LLI 18, W4HON 15, K4VHC 15 K4WC 13, W4JM 4.

NORTHERN FLORIDA – SCM, Frank M. Butler, Jr., W4RKF – Hurricane Eloise hit NW Fla. hard; state NTS nets and local AREC groups were active. SEC WA4WBM is preparing a written report. New appts: K4RZM EC of Bay Co.; W4WNY and WB0HHC/4 ORSs. WB4GHU renewed ORS, WN4NID earned OPTN Net Cert. WA4AYO WA4MYK WB4MUS and WB4JHQ tried sky-diving, using a 2m HT on the way down! WB4JGY received Extra Class. The FFARA sponsored a 6m VHF contest. WB4LJH is a Silent Key. W4DFY WB4EQU WB4GMH and K4IUH, as well as CD Centers in Fort Walton and Defuniak Springs lost towers during hurricane. WB4WHR new on 2m fm in Crestview. K4VFY & W4KIJ handled much H&W traffic for Panama City during storm. K4RZM now located in Monticello – on 6m ssb with a TR6. W4FP moved to Gainesville; GARS providing comm. for First aid teams at UF football games. WB4IER is Asst. Principal at Leesburg Jr. HS, while WB4OAC is a teacher at Wildwood HS and responsible for many new novices there. W4LDM tried 'phone during Eloise, but reports wouldn't take it! W7EM/4 now W4JL, New Jax. Novice Net meets at 4:00 PM Sun. on 21,120; run by WN4NID. W4LWP WA4SGO K4OAC WA4UFW WA4QIM WN4MST & K4DDY appeared on talk show on local BC station. New officers of N. Fla. DX Assn. are WA4EYR EB4UYD WA4UFW and W4ORT. Fla. Jr. College has repeater on 147.795/.195. WB4VTB going to 160 meters for the Winter. Traffic: (Sept.) WA4FBI 308,WB4GHU 265, WB4JHQ 253 WB4SKI 253, K4VFY 157, W4RKH 152, WB4DXN 150, W4KIJ 146, W4LDM 111, WB0HHC/4 97, W4WNY 96, WB4HKP 94 W4SDR 93, WN4NID 76, WA4MYF 72, W4COE 65, W4JL 64 WA4CRI 61, K4DDY 60, WB4FJY 59, K4CVO 51, WB4VDM 38 WA4EYU 25, W7EM/4 23, WA4BAX 20, WB4NJI 20, K4OER 13 K4RNS 9, WB4ADL 8, W4FP 8, WA4IWW 8, WB4VAP 5, WB4VMI 5, W4IA 2. (Aug.) W4WNY 160, W4SDR 101.

SOUTHERN FLORIDA – SCM Woodrow Huddleston, K4SC – SEC: W4IYT. Asst. SEC: W4SMK. RMs: K4EBE W4EH. PAM: WA4NBE W4OGX. New appointments this month: K4GYF E Sarasota Co., K4URX EC Monroe Co., W4DL OBS, WA4GN WA4LGT ORSs. K4TH attended National Convention in Reston V then vacationed about 2 weeks in New York. WA4GNI, OPTN mgr

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announced time change for QFTN to 8 PM. WA4LGT is new mgr. of Early Bird Net. K4DAS received A1 Op. and Extra ticket. He plans 160-meter activity this winter. K4DRH back to work after bad heart attack several months ago. WA4CTM going full speed ahead with VHF RTTY, gaining 3 converts this month: WB4IRY WA4ROX and WB4ARN. CTM has nearly completed a UT-4 circuit. ROX uses an ST-6. Plans and work on the 2-meter RTTY repeater continue. On Sept. 1, the Tampa Bay Repeater Assn. provided communications and mobiles to pick up pledges for Jerry Lewis Muscular Dystrophy Telethon. Volunteers from St. Petersburg ARC worked the Pinellas County side, including W4GAC/4 (set up at Chan. 44 studios) WB4GFD WA4FYR WA4KNI WB4IKK WB4ARN WB4EEE W4GPL WA4GCH WA4FNY W4APV K5IHH/4 WA4ZQZ WA4FPS W4EGM K4TH and WB4CST. TBRA primary repeater WB4HAE 16/76 was used. On Sept. 23, hurricane Eloise struck near Fort Walton Beach, Fla. Under direction of W4WYR, 88 stations (listed on separate sheet) kept the Fla. Amateur Sideband Traffic (FAST) Net, Fla. Sideband Emergency Net and Tropical Phone Traffic Net all on 3940 kHz, open and handling health and welfare traffic as necessary. Traffic: (Sept.) K4SJH 393, K4SCL 366, WA4SCK 288, W4WYR 174, WB4HVE 149, W4EH 146, WB4AID 86, WA4KKE 85, WA4CTM 78, W4DVO 76, WB4ALH 59, WB4KSG/4 57, WA4EIC 48, K4TH 47, K4CFV 43, WA4NBE 42, K4BLM 37, W4DQS 28, WA4HDH 28, W4IYT 28, W4GDK 26, W4GOG 23, W4IRA 20, W3VDT/4 16, W4OGX 7, K4DRH 5, W4SMK 5, WA4BGW 4, W4MML 4. (Aug.) WA4LGT 232, WA4JWN 76, WA4GNI 67.

WEST INDIES – SCM, David Novoa, KP4BDL – Hurricane Eloise gave us a chance to prove that ham radio communications are reliable when others fail. Hundreds of messages were handled by stations around the Island. Many thanks to all those who helped to save many lives and property. Members interested in leadership appointments for the Section's field organization please contact me at once. Want to fill EC OO PAM RM ORS and OVS vacancies. Also need an Asst. SCM for the KV4-Land. New on two meters are KP4s EGO EGL EGT EBS EBQ EDV and DET. Reactivated after a long QRT: old timers KP4s CV CG BJ DL DN and EK. KP4DDP has new Drake "C" Line. KP4DPQ a Yaesu FT-101-B. KP4s AQM BHN DBS and DJR new Midlands. KP4ZC a TH6DXX and KP4CKY an RTTY rig. KP4s HH BBK SV and EBS visited KV4-Land. KP4DPN has returned from trip to W4-Land. Please report all activities before the first of the month.

SOUTHWESTERN DIVISION

ARIZONA – SCM, Marshall Lincoln, W7DQS – RM: K7NHL. PAMs: WA7KQE W7UQQ. The Pima Co. AREC-RACES group directed by K7NTG, EC provided emergency standby communications in Tucson during a six-day strike by police and firemen in Sept. The net used 2 fm and was in session continuously for 147 hours. About 30 members, including 15 mobils, participated, and executed 122 rescue missions with five minute response time. WB7BGC has been appointed EC for Coconino Co. Members of the Prescott ARA demonstrated amateur radio at a booth at the Yavapai Co. Fair. Explorer Post 710, sponsored by the AZ ARC in Phoenix, had to have its number changed since Troop 710 is now sponsoring an explorer post. The new number has an amateur radio flavor – Post 599! WA7ZOA is the new post advisor, replacing WA7NXI, now post committee chmn. There's a rapidly-growing epidemic of false alarm panic calls to police by CBers who report bad traffic accidents and other emergencies when no emergency really exists. Amateur radio operators should keep this in mind when calling for emergency assistance – Be sure you know what you're talking about when you make emergency calls. False calls are dangerous, expensive and annoying, and give a black eye to all members of any group which makes them. ATEN QNI 630, QTC 57, certificates to K7NMQ W7RQ W7CAF K7NTG WA7VTM. Cactus Net QNI 1157, QTC 258 plus 101 phone patches: SWN QNI 172, QTC 192. Traffic: K7NHL 294, W7CAF 58, WA7VTM 56, WA7KQE 20, K7NTG 10, WA7EXL 8, W7RQ 5, W7DQS 5, WA7JCK 4, K7NMQ 1.

LOS ANGELES – SCM, Eugene H. Violino, W6INH – Asst. SCM: Kevin A. Berasley, WB6QYN. RM: K6UYK. Thanks to W6RXP the United RC of San Pedro and the LERC group had a tour of the Los Angeles Dept. of Water and Power dispatching facilities, hosts were W6OAW and W6INH. With the younger members of SCN going back to school we are in need of new or more operators, you fellows with interest in getting up your speed should take advantage of this. WB6MKV is back in town after sailing around the Pacific in his sailboat. The United RC featured J. Lee Smith, W6AWP our former RI as speaker at a recent old-timers night. K6UYK reports a new ham in the household, WN6BRQ an exchange student. K6ASK took a vacation trip through 15 western and central states, covered the 5, 6, 7 and 0 call areas and communicated via 30 different 2-meter repeaters during the trip. K6OU is back in town after working up in AK for a long time. W6USY back from another trip to KH6-land, reports entering a sailboat race to 4 different islands. Attention ssb traffic men, DRN6 meets on 7265 at 2100 GMT daily. W6FU visiting friends around the country with visits to K9ONF in WI, and W0OUX in New England, ND. WA6IDN off the air, tree limb fell into 80-meter antenna, will be back on soon. W6HUJ really going strong on SCN and RN6 turning in good traffic totals. WB6VZI purchasing new QTH planning on building a big antenna farm in the City of Sepulveda, will soon be active. WA6TLV moving to Berkeley this month plans to be active from club station W6BB. WB6JFD getting active on MARS and checking into DRN6 getting shack back in shape after moving. W6WBS plans on becoming active on 220 MHz besides being a regular checkin on the daily WP net. K6BUU was recently heard chasing DX on 15 and 20 meters, really went wild during the ZD9 appearance. The TRW RC group are really putting up the raffle prizes, at a recent meeting they had a sub for QST and an RF Wattmeter, that should alert the membership. The QCWA had their Fall banquet at the Petrolium Club the first part of Oct with an attendance of 137 members and their XYLs. Many thanks

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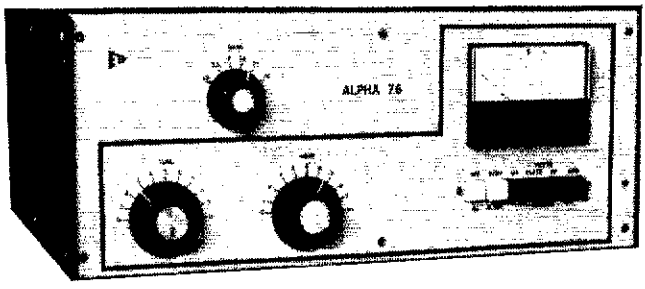

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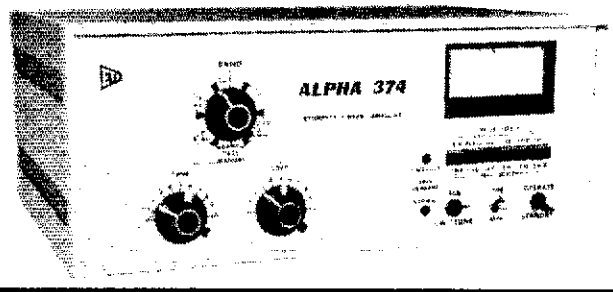

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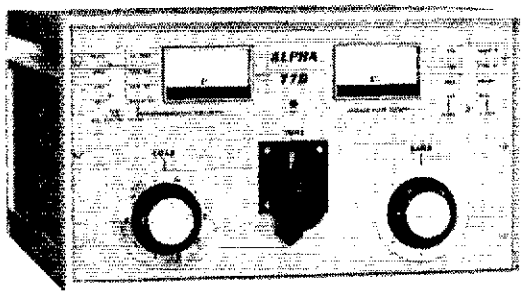

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to W6CL W6PHE and other officers of the QCWA for such a grand affair. One of the most active hams W6MLZ can be found at most club meetings plugging amateur radio besides providing many programs. WB6ETB reports good activity of 310 check-ins for Sept. on the Metro Net. RM K6UYK spent his vacation touring the east coast. Traffic: W6INH 272, W6HUJ 138, WA6IDN 138, K6UYK 85, WA6TLV 83, W6BRO 38, WB6ETB 24, WB6VZI 24, K6CL 19, WA6ZKI 15, W6USY 12, WA6TCH 6, W6NKE 2.

ORANGE – SCM, William L. Weise, W6CPB – Asst. SCM: Dick Birbeck, K6CID. SEC: WA6TVA. RM/PAM: WB6AKR. The new DRN6 Mgr. will be WB6PVH. Congrats. You have a fine group to work with. The last open CD Party found several members in the Orange Section competing. Glad to see all of you join in the CD Party. Vacation time is about over so its "back to school" for the younguns. Should now have more activity on the various nets. Traffic has been very slow but it will pick up during the year end holidays, so be sure to check in in your free time. Numerous incidents of deliberate interference has been observed lately. If you have a solution to correcting the situation please let me know. Congrats to K6YNB who set a new West Coast record with 16.5K points in the ARRL Sept. VHF contest. Nice going! WA6SSZ has curtailed his operation while college is in session. Hope to CU back on SCN soon Bob. Be sure to listen K6UZ for the latest OB. Hal is very active primarily on the VHF nets. Sorry to report the passing of WA6KFC in San Jacinto. Our condolences to the family. Traffic: (Sept.) WB6EIG 412, WA6TVA 59, W6WRJ 31, W6QBD 25, WA6YWS 22, W6CPB 18, K6GGS 14, WA6NSZ 2. (Aug.) W6WRJ 33, WB6AKR 31.

SAN DIEGO – SCM, Arthur R. Smith, W6INI - SEC: W6GBF. ECs SD Co.: K6HAV Northern, W6INI Central, WB6JQI Southern; Imperial Co. WB6RMG. Chula Vista City Council turned down ordinance to regulate antennas. Operation of W6IAB from Camp Pendleton Refugee Center ended Oct. 3. Thanks to operating staff W6GBF K6AM WA6DMB WB6GYB WA6HXB W6INI W6IPP K6KX K6NC WA6ODQ WB6PVH W6PZU W6QGU WA6TQF K6UV; equip and assistance from WB6CNK W6JSL W6SLF WA6UGG. Most ops made round trips of 110-140 miles. WB6PVH new Net Mgr. for DRN6. More activity needed to preserve 6 meters. AREC net operates Sun. at 0930 on 50.25. WA6ENU won top feature photo award from SD Press Club. New QCWA officers: W6OSD, pres.; K6UV, vice pres.; W6DEY, secy; W6JWU, treas. W6MI holds 50 wpm cert from Conn. Wireless Assn. Club 10-meter nets: Mon. Poway 2000 28.7; SOBARS 2030 28.6; Tue. Pt Loma 2000 28.6; Wed. QCWA 2000 28.6. New Novice WN6AIT. WB6MTX upgraded to Advance. WA6DMB joined gang on 2-meter am. WC6WQI now on Palomar repeater. WN6AUP hospitalized from train accident. W6IPP has new hip joint thru courtesy Camp Pendleton hospital. WA6MHZ won homebrew contest at El Cajon ARC. Traffic: WA6DMB 355, W6RGF 149, WB6PVH 108, W6PZU 77, W6GBF 61, W6DEY 27, WB6ERF 21, WA6CXK 10.

SANTA BARBARA – SCM, Paul Gagnon, WA6DEI – W6ITW busy handling phone patches to Antarctica and Canton Island. W6POU busy generating QST's for the TRICAR Bulletin Network. WB6VGC built new antenna tuner. WB6MXM received Advanced ticket. WB6GRW retired from the USAF. He is pres. of the Sattelite ARC and NCS of the AREC Net on 81/21. WA6DPL a new Novice in Oxnard. WN6AHI checked into the Fiesta City Net and passed written traffic for his first contact. WA6MWH and WB6IYW originated the Golden Yagi award for T Hunt winners. Two daughters of WB6TFW are hams WN6AGA and WN6MPO. The Estro ARC working with Cuesta college to set up amateur related courses. Pres. of the Central Coast ARC is WA6EQI, WA6ZRA, vice-pres. They meet the 2nd Sun. at Gigi's. W6AJY of World-radio spoke at the Santa Barbara club. WA6LBP showed slides of amateurs in Africa, Europe and Vietnam at the Poinsettia Club. K6YX spoke at the National convention on interference. WA6WRF WB6HJW WB6GRW W6KPS WA6EZZ WB6WWY WA6CRX WB6TFW working on new 100-ft. tower for WR6AHZ. W6JRV and family vacationed in CO. WB6TFW vacationed in TX. W6QMV has new Genave for 2-meter base station. WA6HCD, W6EHY building a portable repeater for emergency use. W6PN working DX from Santa Barbara. W1UUQ transmits bulletins on the 31/91 repeater in Santa Barbara. PSHR: WB6VGC 10, K6YX 29, WB6MXM 24, WA6DEI 42. WA6HJW and WB6GRW providing code classes for the Satellite ARC. K6AZB K6QBF and K6CQB assisted a car on fire on the Ventura Freeway and called for help on WR6AEP. Code Classes in Santa Barbara are taught by WN6AHN WA6BLS WA6BRW W6PIE WN6HOZ. Traffic: WA6MBZ 142, WA6VBS 93, WA6DEI 55, W6ITW 52, K6QPH 45, WB6MXM 30, W6POU 17, K6YX 6.

WEST GULF DIVISION

NORTHERN TEXAS – SCM, L.E. Harrison, W5LR – Asst. ACM: Frank E. Sewell, W5IZU. SEC: W5SHN. RM: W5QU. PaM: W5GSN. Now looking for a volunteer for SEC job. Any you guys, gals feel so inclined lemme know. W5SHN has turned in remarkable job as SEC. Tnx Om. WB5BFX writes from Kansas City, KS sez howdy to all. His son WB5BFX graduated from UTX BS in Math, now doing graduate work at MIT. Congrats. WA8SWM/5 desires ORS. W5EWW applies for OBS. Dallas Radio Society continues meet each month 1st Mon. Engineers Club 8th floor Republic National Bank Bldg. W5TI meets 3 nets daily while active as OO FB. W5KR STX SCM reports no Hamfest in Brownsville 1976 and sez Snowbird traffic now on increase come 2nd cold front. Arlington ARC, PO box 3608 gave results of questionnaire and Christmas party now planned. W5BCW chmn, K5JTB Novice Advisor. Ham Radio being demonstrated in larger Shopping Malls Arlington area. Club meets Student Union Bldg. UT of A campus, off Cooper Ave. 102 members. W5QPX Sr. OO NTX founder International Amateur Radio Hosts. Formed for purpose of economic & social aid for foreign visitors on a reciprocal basis. Members 11 states, 4 foreign countries. Gil's OO report includes 18 T9C reports, 2 backwaves, 1 keyclix, 1 side-tone and 1 scratchy note. Reports via ARRL. SCM

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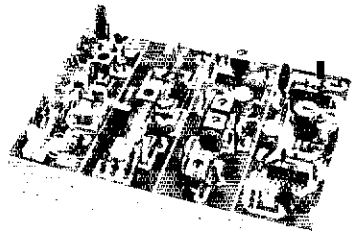

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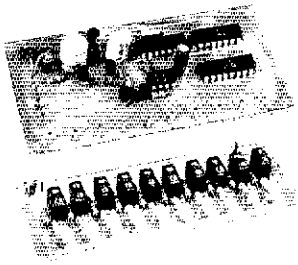

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Season's Greetings From The Staff At VHF Engineering

invited to speak before Red River Valley ARC meeting Paris TX at early date. WB5GLC secy. Irving ARC report Sept. 18 advises several interesting items including illegal operation on 2-meter repeaters. These intruders are all being watched. SEC W5SHN reports WB5KJT K5MWC WB5MDT W5GY W5LGY W5YK WA5UDC 12 emergency nets, reported. W5EMZ has agreed to take Panola county. There are 49 AREC members. The Frequency sheet of Fort Worth reports their regular meeting 3rd Thur. each month at Oak Grove Air Port. K5SXK updates all present on the latest in VHF UHF activities such as the Temple meeting, Prose Walker and etc. Harold is active on all bands from 80 meters to and including 450 MHz so he should be qualified. Traffic: (Sept.) WB5MFQ 269. WB5DXB 83, WA5INJ 23, WB5MTN 12, W5YK 8, W5LR 5. (Aug.) WB5MFQ 278, W5TI 189, (July) WB5MFQ 54.

OKLAHOMA – SCM, Cecil C. Cash, W5PML - Congratulations to new OBS, OPS and PAM WA5QQP, net mgr. of OFON. New equipment in the shack of W2GKK/5 includes the Drake T4XC, R4XC and C4 console. He also is motorcycle mobile on 2 meters as is WA5TRS. New equipment in the shack of WN5NKD, net mgr. of OAN, her OM WN5NKC and son WN5OYU is a Galaxy 5 MK3. Congrats to regular check-ins of OAN who have up-graded go to WB5NKC, WB5LAT, WB5NQH, WB5NXO and WBØNPC. The net mgrs. of both cw nets are begging for more check-ins especially from Lawton. Congrats to new Extra class WB5IYK; General WB5LHO; Novices WN5s OHY ONL OLO OIQ. WN5OIQ had a birthday since his ticket arrived, he is now an old man of 10 years. W5JJ and wife just returned from New Orleans and are now off to cool CO. The Shanee ARC has new antennas up at their club house; they also recently received a letter of appreciation for successful operation of a radio patrol communications assistance, from the Chief of Police and City mgr. of Shanee. Traffic: W4RB 205, WN5KND 62, WN5KNC 59, WB5AZS 57, WB5ELG 42, WB5HQX 25, W5SUG 24, WN5OYU 23, WB5KGP 22, W5FKL 19, W5PML 16, WA5OUV 12, W5REC 6, WA5QQP 5, W5JJ 2.

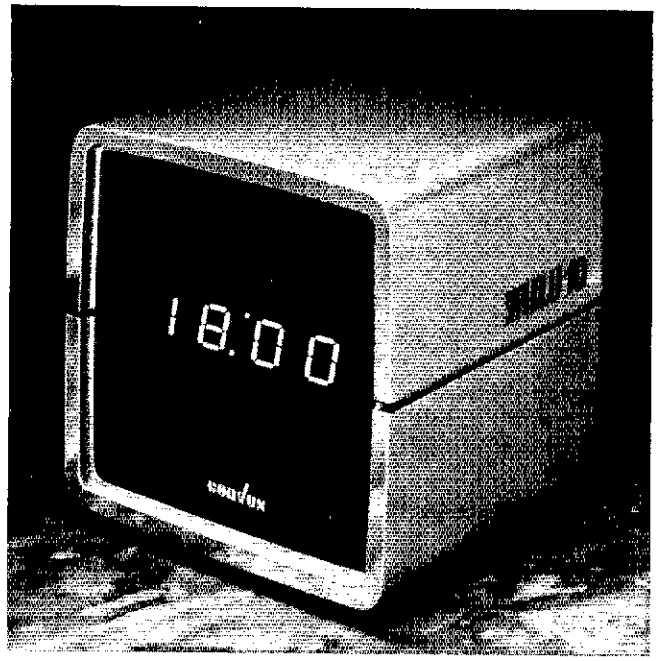
SOUTHERN TEXAS – SCM, Arthur Ross, W5KR - SEC: WB5CUR. RM: W5UGE. PAM: WB5AMN. OO reports received from W5NGW WA5LTQ K5HGB and K5DAE, reports for May, June and Sept. OVS reports from WB5CIT WB5HRI. W5APX and K5INE to National at Reston. ORS W5QO has moved to Bryan and has installed full break-in. OO K5HGB has planted seeds for REAL antenna farm. OVS WB5HRI upgraded to Advanced. OPS WB5GQH reports W5RBB operating /1, waiting for 1 call and enjoying East Coast DX. W5QPX in Amarillo finally has International Amateur Radio Hosts going good; get in touch with him if you're interested in visiting overseas amateurs or in having them visit you. W8UX/5 new OBS in Mercedes, active on several nets. OO WA5LTQ sent along some replies to his OO notices. El Paso ARC reports fantastic success with something called "salad bar" which might be fun; contact W5ES if you want to know more. RM W5UGE has new self-supporting fifty-foot tower with tribander. WA5VBM has been awarded Certificate by MARCO at their International meeting at Reston; Sister Mary says it is a beautiful gold-plated plaque. Traffic: (Sept.) K5HZR 411, W5UGE 261, WA5YEA 165, WA5VBM 158, W5TQP 145, W5KLV 118, WB5AMN 71, WB5LII 53, WA3VWJ/5 49, WB5OOW 49, WB5IJR 25, WA5INJ 23, WA5ZJY 19, WA5KKU 16, WB5WUM 14, W5TFW 12, K5ROZ 11, WB5GFU 10, WB5GNP 8, WA5CTJ 7, W8UX/5 6, K5RVF 5. (Aug.) WB5IJR 10.

CANADIAN DIVISION

ALBERTA – SCM, Don Sutherland, VE6FK – Asst. SCM: John Wilkinson, VE6ALR. SEC: VE6XC. I am very pleased to have VE6ALR as my assistant for the balance of my term of office. It is with regret that I report that ex-VE6CN, formerly of Calgary has joined Silent Keys. Congratulations to VE1SH on his election as Director, Canadian Division. VE6AMU has just returned from a vacation in Holland.VE6CCB now reports a new tower with the beam about the 18-meter level. VE6AMM does a fine job on the BCEN. VE6AAT is now in Grande Prairie and reports the repeater should soon be going again. I wish to welcome WBØHII/VE6 to Alberta. Also best of luck to PAØYS on his move to Edmonton. Now that VE6FS has recovered from the flu he may be able to try the new car. Traffic: VE6FK 207, VE6FS 95, VE6AFO 19, VE6WN 8, VE6FU 5, VE5AMM 2, VE6BBU 2, VE6JL 2, VE6AFW 1, VE6BAH 1.

BRITISH COLUMBIA – Acting SCM, Otto Schulz, VE7CDF – Mgs. BCEN, VE7CDF. Statistics for Aug. and Sept. show splendid activity on both the fone net 3755 kHz and BCEN cw net on 3650 kHz. Mobile stations were plentiful and it seems more than ever. VE2s, VE3s. VE4s, 5s, 6s, and 7s were heard and accommodated, also K6, K7, W6 and W7s joined the net with excellent signals. The introduction of a slow speed net, BCSN, proved to be a winner and operates on the same frequency as BCEN; 3650 kHz at 0330Z daily. With VE7DKY at the geared down key, the first week of its operation was dedicated to the introduction of essentials in a traffic net and got good response. Former VE2OJ now VE7DFY. VE7DDL was elected pres. of the revived ARC in Duncan and gets his crew ready for the traffic nets. VE7CCJ enjoys his retirement tremendously and pilots his way through the country via 2-meter mobile, just like the SCM VE7FB. Traffic: VE7CDF 90, VE7BLO 25, VE7DFY 25, VE7DKY 24, VE7MW7.

MANITOBA – SCM, Steve Fink, VE4FQ – RM: VE4PG. PAM: VE4JP. Good band conditions have seen increased and vhf activity in the province. Our cw net, MTN, still needs additional stations. The net meets daily at 6:45 P.M. on 3660 kHz. MTN certs. were issued to VE4CA and VE4UV. VE4NE says he is doing FB again. New repeaters are planned for Pinawa and Winnipeg at Red River College. The ARRL Net Directory is available for an s.a.s.e. from ARRL HQ. VE4PG and VE4IX are working QRP these days with some success. Remember, this is your column and reports on yourself or others are always welcomed. Season's Greetings to all! MTN: 30 sessions, 148 ONI, 54 QTC. MEPN: 30 sessions, 1061



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ONI, 17 QTC, Traffic: VE4PG 60, VE4IX 33, VE4XP 22, VE4OW 17, VE4CR 8, VE4HR 7, VE4LU 7, VE4AP 3, VE4LB 2, VE4LN 2, VE4JP 1, VE4WF 1.

MARITIME – SCM, WD, Jones, VE1AMR – VE1ABU VE1ADE and VE1HG kept P.E.I. active in the VE/W contest using the Charlottetown Club call VE1CRC. The new executive of The Moncton Area ARC include VE1PG pres.; VE1ACA, vice-pres. VE1AZT, secy.; VE1BDM, treas. The Charlottetown ARC and the Moncton VE1RPT Assn. are having hidden transmitter hunts, if in the area, get in on the fun. Traffic: VE1AMR 84, VE1ARB 51, VE1ZH 44, VE1ABU 31, VE1AAO 30, VE1AMN 9, VE1AFM 3, VE1AMB 3, CY1AHM 2.

ONTARIO –SCM, Holland H. Sheperd, VE3DV – VE3BR, secy of the Ottawa Chapter QCWA retired early in Sept. and then attended the QCWA meeting at the ARRL National Convention in VA. VE3EKC earned a Section Net Certificate from VE3GFN of the OQN. Congratulations to VE3EQF of the WSRC for being their man of the year. Chris is also secy. and editor for their fine bulletin Westside Signal. The following visited the Maritimes during the summer: VE3DUD VE3GTH VE3GTI VE3CRA VE3GXO VE3ZC and VE3DOL. VE3BPR of Toronto now VE1BFB and is Dean of Faculty of New Admin. Studies, Dalhousie Univ. Ron Hesler VE1SH, who was appointed Vice Director Canadian Amateur Radio League early in the summer has now assumed the role of Acting Director because of VE2MS being forced to step down. Although there will be an election (probably by the time you read this) you are urged to provide the Director and the Vice Director with your views and opinions on amateur matters as a matter of routine, at least once a month! We are now heading into a tough period for Canadian amateurs, i.e., WINTER and the opportunity to provide emergency communications in the event of local breakdowns. Please review your emergency powered equipment and get things in shape. One of Canada's most active amateurs VE3FQZ of Mississauga was sent to bed early in Sept. after suffering broken ribs in a fall while at the cottage. Hopefully he will once more be on the nets when you read this. May I take this opportunity to extend to you and yours a very Merry Christmas and a New Year of good conditions. Chimo. Traffic: (Sept.) VE3GOL 277, VE3SB 251, VE3FQZ 125, VE3GFN 87, VE3FRG 83, VE3DPO 73, VE3GT 71, VE3HJA 66, VE3EKC 55, VE3DV 44, VE3CDK 38, VE3CYR 37, VE3AIR 32, VE3EWD 32, VE3DVE 24, VE3BZB 17, VE3GCE 17, VE3GCC 8, VE3DH 4, VE3FHQ 2. (Aug.) VE3BZB 25, VE3EBC 12.

QUEBEC – SCM, Larry Dobby, VE2YU – Season's Greetings. Your SCM has been inactive on the traffic nets because of work committments out of the city. An Asst. SCM will be appointed shortly to cover for me in my absence. The West Island RC started a new year with VE2DPI VE2UY VE2RT VE2YH and VE2KN as the executive. The Westminster School continues its code and theory classes with over 50 in attendance this year. Those of you who are interested in teaching or assisting at the school are invited to contact VE2RBP. The VE2RM group continue with their efforts to install an auto-patch system on the repeater. VE2RM is sporting a new repeater acquired from a local manufacturer. Much of the credit for this goes to 2AYY. Many local amateurs and their XYL's attended the RSO convention in Ottawa. Traffic: VE2DR 170, VE2BP 47, VE2UY 23, VE2APT 21, VE2EC 19.

SASKATCHEWAN – SCM, Percy A. Crosthwaite, VE5RP – VE5RA and VE5VK were hard at it during the VE/W contest. Club activities are very much alive now with the election of officers over. VE5OH has been elected pres. for Prince Albert. Some of our amateurs are setting up public displays showing the public what Amateur Radio is all about. There seems to be a little interest generating on the use of six meters. Traffic: VE5VK 20, VE5KS 6, VE5RP 4, VE5SM 3, VE5XY 1.

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Happenings

(Continued from page 69)

MINUTES OF EXECUTIVE COMMITTEE MEETING

No. 355 September 27, 1975

Pursuant to due notice, the Executive Committee of The American Radio Relay League, Inc., met at the Headquarters offices of the League in Newington, Connecticut, at 8:55 A.M., September 27, 1975. Present: Harry J. Dannals, W2TUK, in the Chair; First Vice President Victor C. Clark, W4KFC; Directors Roy L. Albright, W5EYB, Max Arnold, W4WHN, John R. Griggs, W6KW, and Robert B. Thurston, W7PGY; and General Manager Richard L. Baldwin, W1RU. Also present were Vice President Carl L. Smith, WØBWJ; Secretary John Huntoon, W1RW; General Counsel Robert M. Booth, Jr., W3PS; Senior Assistant Secretary Perry F. Williams, W1UED; Directors John C. Sullivan, W1HHR, and Stan Zak, K2SJO; and Vice Director George Diehl, W2IHA.

On motion of Mr. Griggs, affiliation was unanimously GRANTED to the following societies: Amateur Radio Club of Lawrence Institute of Technology, Southfield, Michigan; Amateur Radio Education Association, Palisades Park, New Jersey; Bechtel Amateur Radio Club, San Francisco, California; Berne-Knox-Westerlo School ARC, Berne, New York; Center Place Amateur Radio Association, Independence, Missouri; Central Michigan Amateur Repeater Assoc., Inc., Shepherd, Michigan; Charlottetown Amateur Radio Club, Charlottetown, Prince Edward Island; Citibank Amateur Radio Club, New York, N.Y.; Cullman Amateur Radio Club, Cullman, Alabama; Fremont County Amateur Radio Society, Lander, Wyoming; Grayson County VHF Society, Sherman, Texas; Greenwood Amateur Radio Club, Greenwood, N.S.; M.T.A. Amateur Radio Club, Inc., New Orleans, Louisiana; Mile Hi DX Association, Lakewood, Colorado; Milford Amateur Radio Club, Milford, Ohio; Northern Kentucky Amateur Radio Club, Ft. Mitchell, Kentucky; Northwestern Radio Amateur Assn. (N.Western State Univ.), Natchitoches, Louisiana; Reelfoot Amateur Radio Club, Union City, Tennessee; St. Mary's High School Amateur Radio Club, Manhasset, New York; Skylands Amateur Radio Club, Ringwood, New Jersey; Stone Harbor Amateur Radio Klub (SHARK), Stone Harbor, New Jersey; United Nations Amateur Radio Club, New York, N.Y.; University of Tennessee at Martin ARC, Martin, Tennessee; Vicksburg Amateur Radio Club, Vicksburg, Mississippi; Western Area F.M. Amateur Repeater Club, Western Springs, Illinois; Woodbridge Wireless Inc., Woodbridge, Virginia; St. Clair Amateur Radio Club, Trussville, Alabama.

On motion of Mr. Griggs, unanimously VOTED to grant approval for the holding of a Florida State Convention in Orlando, on February 13-15, 1976; a Pacific Division Convention in San Jose, California, on October 2-4, 1976; and a Hudson Division Convention in the general New York City area on a date in October, 1976, to be selected later.

On motion of Mr. Arnold, Life Membership was unanimously GRANTED the following applicants: Herman Aalderink, PJ2HA/KP4; Wayne J. Abdella, WBØDOS; Joseph E. Ahnell, WA3VTO; Kenneth S. Albright, WBØ GMQ; Denis Allen, K9GMT; Richard J. Alter, Jr., WB2ERK; Stephen J. Ames, W1WHR; Louis N. Anciaux, WB6NMT; Joe C. Anderson, WB4YHI; Robert E. Anderson, K1TVF; Raymond N. Andrews, K9DUR; Todd Michael Axelrod, WA2VRM; Allan L. Bacon, WA1MSK; Patrick N. Bacon, WA7NIN; Walter H. Bailey, K4RWP/WA5WPZ; Jesse G. Ball, W6BFO; Leonard C. Bandala, WA 9UVF; Kenneth J. Barker, WA8PST; Richard F. Barr, WA1QBY; Dr. Caesar S. Bassette, Jr., K8DPR; John S. Bazzell, W5AFR; Robert L. Beacham, Sr.; John C. Beal; John E.

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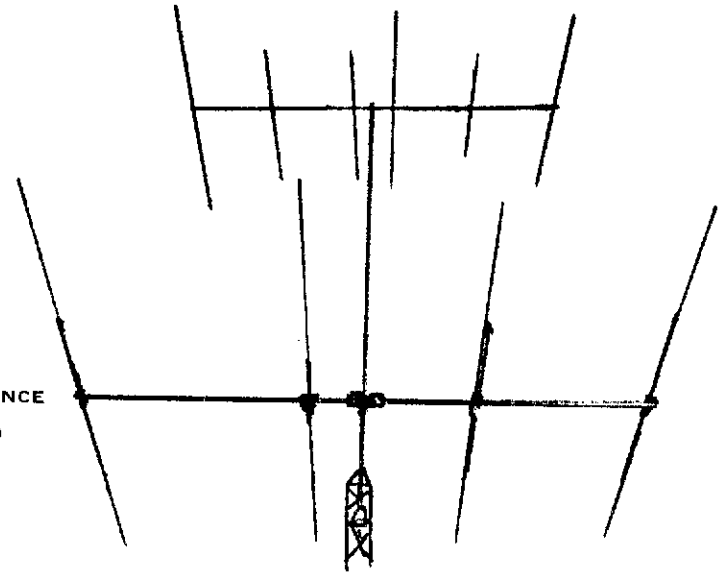

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- **Calibration constant mode to mode**
- **300 Watts PEP input on SSB**
- **Shifted-Carrier CW** 260 watts input
- **Upper and Lower Sideband** all bands
- **Superb Receiver Overload and Cross-Mod characteristics**
- **VOX or PTT**
- **Output Impedance Adjustable** with pi-net
- Traditionally high resale/trade-in value and excellent customer service

For more details on these units and other Drake gear, please contact:

TR-4C SPECIFICATIONS: • **Frequency Coverage:** Full Coverage on all amateur bands 80 thru 15 meters and one 10 meter segment, in five 600 kHz ranges: 3.5 to 4.1 MHz, 7.0 to 7.6 MHz, 13.9 to 14.5 MHz, 21 to 21.6 MHz, 28.5 to 29.1 MHz. Accessory crystals needed for 28 to 28.6 MHz and 29.1 to 29.7 MHz ranges. • **Solid State VFO:** Has linear permeability tuning. Tunes 4.9 to 5.5 MHz for all ranges. • **Dial Calibration:** Two concentric dials. 100 kHz Markings on one dial and 1 kHz divisions on second dial. • **Frequency Stability:** High stability solid state VFO tunes same range on all bands. Drift is less than 100 cycles after warm-up, and less than 100 cycles for plus or minus 10% line voltage change. • **Modes of Operation:** SSB Upper and Lower Sideband, CW and AM. • **Misc:** 20 tubes including voltage regulator; two transistors; 8 diodes; 100 kHz crystal calibrator built in; Dimensions: 5½" high, 10¾" wide, 14⅜" deep. Weight: 16 lbs. . .

TRANSMITTER: • **Single Sideband:** 300 watts P.E.P. input power, VOX or PTT. Two special 9 MHz crystal filters provide upper or lower sideband selection on any band, without the necessity of shifting oscillators. • **CW:** Power input 260 watts. Carrier is shifted approximately 1000 cycles into one sideband, and mixer and driver are keyed. Grid block keying is free from chirps and clicks. Automatic transmit/receive switching when key is operated. CW sidetone oscillator for monitoring. • **AM:** Controlled carrier AM screen modulator is built-in. 260 watts P.E.P. input. Low carrier power increases 6 times to 50 watts output at maximum modulation. This system is compatible with SSB linears. VOX or PTT. Diode detector used for receiving on this mode. Product Detector can be used by switching manually . . .

RECEIVER: • **Sensitivity:** Less than ½ microvolt for 10 dB S/N • **I.F. Selectivity:** 2.1 kHz at 6 dB, 3.6 kHz at 60 dB. • **Antenna Input:** Nominal 50 ohms. • **Audio Response:** 400 to 2500 cycles at 6 dB. • **Audio Output Power:** 3 watts. • **Impedance:** 4 ohms.

R.L. DRAKE COMPANY DRAKE®

540 Richard St., Miamisburg, Ohio 45342
Phone: (513) 866-2421 • Telex: 288-017

See us at SAROC in Las Vegas

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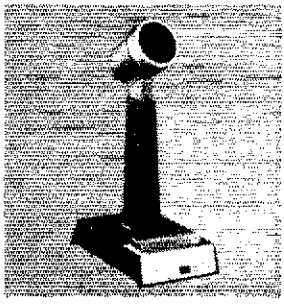
SSB-ers:

increase talk power, cut "splatter"



Our *444 base station microphone* not only gives you increased talk power, but cuts "splatter" (and QRM complaints) to an absolute minimum! It has superbly tailored response, with sharp cutoffs below 300 and above 3,000 Hz and a rising response characteristic for maximum intelligibility. The 444's rugged, reliable Controlled Magnetic element has been proved in safety communications, and other tough professional communications applications. It delivers a clean signal to the transmitter at levels as high as crystal units! (And, unlike crystal and ceramic units, the element is totally immune to the effects of temperature and humidity.) The 444 also features an adjustable height stand that makes for comfortable "ragchewing" sessions, an optional-locking bar for push-to-talk or VOX operation, and a practically indestructible Armo-Dur® case. Write:

Shure Brothers Inc.,
222 Hartrey Ave., Evanston, Ill. 60204

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K8DMZ; Richard Wagar, KV4GC; Ralph E. Wagner, WA3QLI; Jeff H. Walker, Jr., W4AAD/K3WIK; James R. Walkinshaw, W8JGB; Ralph E. Wallio, Jr., K9JPR; Jean P. Warden, WØRGS; Jeffrey P. Weger, WB5KLB; Eric H. Weiland, W5NUE; Sister Lauren Weinandt, WAØRRJ; Jeffrey I. Weinstein, W1JMN; Lloyd S. Westbrook, Jr., K4HQI; Paul D. Whitaker, WAØYGQ; Edward W. White, W1WRV; Jack E. White, WB8CTA; Ralph L. Whiteley, VE1APM; Rex Widmer, WB9KQX; Dave Williams, WA7UWO; Elbert T. Williams, WB9DZJ; Leland V. Williamson, KL7IAC; Roy C. Winters, WB6DAT; Clinton E. Wise, K2LQQ; Steven C. Wolf, WB8NII; Dell Wolfington, KL7EKB; Mitchell B. Wolfson, WA6GSN; Robert Wurth, Jr., WA2LIN; John C. Yodis, WA2EAH; Makoto Yoshimuro, JA9AMR/1 B. Arlen Young, K6KZM; Robert F. Zeiter, W6NAA;

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: Richard J. Karl, W3ZUH, and Harry A. McConaghy, W3SW, were found lawfully nominated and eligible for their names ordered listed on ballots to be sent to Full Members of the Division.
For Vice Director: Jesse Bieberman, W3KT, David Heller, K3HNP, and Harold C. Smith, WA2KND, 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, 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 Canadian Division for the 1976-1977 term without membership balloting.
For Vice Director: William W. Loucks, VE3AR, William L. Skidmore, VE3AUI, and Henry W. Thel, VE7WJ, were found lawfully nominated and eligible and their names ordered listed on ballots to be sent to Full Members of the Division.

DAKOTA DIVISION

For Director: Garfield A. Anderson, WØKE, and Benjamin J. Layton, WØUTT, 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: Ernest G. Anderson, WØRRW, Edward C. Gray, WAØCPX, and Theodore A. Olson, WØIYP, were found lawfully nominated and eligible and their names ordered listed on ballots to be sent to Full Members of the Division.

DELTA DIVISION

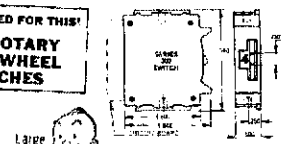
For Director: Max Arnold, W4WHN, was found lawfully nominated and eligible. Being the only eligible nominee, he was thereupon declared, pursuant to the By-Laws, to be duly elected as Director from the Delta Division for the 1976-1977 term without membership balloting.
For Vice Director: Malcolm P. Keown, W5RUB, and John H. Sanders, WB4ANX, 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: Wells Chapin, W8GI, was found lawfully nominated, but the Committee was in receipt of communication from Mr. Chapin withdrawing his name as a candidate. Richard A. Egbert, W8ETU, was found lawfully nominated and eligible. Being the only eligible nominee, he

YOU'VE ASKED FOR THIS!

EECO ROTARY THUMBWHEEL SWITCHES



Large Easily Read Dual Characters

$4.95

2 for $12.

IT'S NEW! "TO-5" MICRO MINI 0-8 ROTARY SWITCH

IMAGINE! 8 DIFFERENT ROTARY CIRCUITS IN 1/4 x 5/16" Space

$1.95

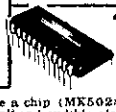
3 for $5.

- TO-5 Transistor Case!
- Screwdriver Adjust!
- 8 Separate Positions!
- 1/4 x 5/16" Space Saver!

MICROPROCESSORS! ROMS! RAMS! MEMORIES!

☐	8008 Microprocessor	$29.95
☐	8080 Super 8008	150.00
☐	2102 1024 Static RAM	3.95
☐	2102-1 1024 Static RAM	4.50
☐	2102-2 1024 Static RAM	4.95
☐	1101 256 bit RAM	1.50
☐	1103 1024 bit RAM	2.95
☐	MM5260 1024 RAM	2.95
☐	MM5262 2048 bit RAM	6.50
☐	2513 Character generator	12.50
☐	MM5203Q Eraseable PROM	14.95
☐	MM5202Q Eraseable PROM	14.95
☐	1702A Eraseable PROM	29.95
☐	8223 Programmable ROM	2.95

'BEEPER" AND "DATER" CLOCK ON THE CHIPS



Alarm and Date . . . $6.95

BEEPER **8.50**

Imagine a chip (MK50250) "Beepin" and audible alarm! All others are external. It also features internal brightness control. The CT7001 requires external triggering of alarm, date of the month and direct drive to LED readouts. Both require minimum current drain and voltages, for either 4 to 6 LED readouts, 12 or 24 hours, AM and PM.

'BLASTAWAY' ON 1N4000 RECTIFIER PRICES

	Type	PIV	Sale
☐	1N4001	50	10 for 45c
☐	1N4002	100	10 for 55c
☐	1N4003	200	10 for 65c
☐	1N4004	400	10 for 75c
☐	1N4005	600	10 for 85c
☐	1N4006	800	10 for 99c
☐	1N4007	1000	10 for 1.29

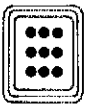
CLOCK CHIPS ON A "DIP"

WITH DATA SHEETS

☐	MM5311	6-digit 28-Pin	$5.50
☐	MM5312	4-digit 24-Pin	5.50
☐	MM5313	6-digit 28-Pin	5.50
☐	MM5314	6-digit 24-Pin	5.50
☐	MM5316	4-digit 40-Pin, alarm	5.50
☐	MM5316-A	no alarm	3.95

POSTAGE STAMP MOBILE SPKR MIKE

☐ **$1.98**



This unit is not advertised anywhere! Made for Motorola Communications at the original cost of $4.50 each (for insertion in their Walkie Talkie Program). It's a 50-ohm imp MIKE. It's an excellent speaker too, covering broad range in sound.

SPECTROL TYPE 43 RECTANGULAR CERMET POTS

Ohms	Ohms	Ohms
☐ 10	☐ 1K	☐ 100K
☐ 20	☐ 2K	☐ 200K
☐ 50	☐ 5K	☐ 250K
☐ 100	☐ 10K	☐ 500K
☐ 200	☐ 20K	☐ 1 Meg
☐ 500	☐ 50K	☐ 2 Meg

2 for $1.00

Cermet sealed. Screw driver adjust with idling and stops. Resistance ±10 percent, ½ watt. Size .750 x .25 x .19.

Touch Tone KEYBOARD KIT ☐ $4.95

Kit includes 4 x 2½" G-10 glass etched pc board with 10 OAK "smooth touch" white keys with black numerals, plus diagram on "touch tone encoder". Makes many "keyboard systems" readily available. *(1-to-9*

NATIONAL LM-340T VR's

- TO-220 Case
- 1 Amp
- POSITIVE VOLTAGE

$1.75 Each

Buy 3 — Take 10%

Type	Volts
☐ LM-340-05T	5 v
☐ LM-340-06T	6 v
☐ LM-340-08T	8 v
☐ LM-340-12T	12 v
☐ LM-340-15T	15 v
☐ LM-340-18T	18 v
☐ LM-340-24T	24 v

MINI REED RELAY

Only $1

For PC board and micro circuitry 24VDC SPST normally opened cont. at 5.6 mils. 2500 coil, Relay closes at 14VDC. 1 x ¼ x ¼".

INDUSTRIAL SPEED CONTROL ☐ $4.95

A $30 item from G.E. Model 533A (made for Xerox) that controls home, shop and industrial lighting too! A very elaborate circuit for controlling many electrical and electronic devices. Easily controls speeds of electric drills, brush type motors, etc. 115vac, rated at 1100 watts. With variable speed or dimming control in heavy-duty aluminum case. 3 x 2¾ x 2. With diagram and hookups.

☐ **555** Timer **2 for $1**

OR

☐ **558** Dual 741 **3 for $1**

TELE TYPE CHIPS

☐	COM2502	UART, 40 pin	$12.50
☐	COM2601	USRT, 40 pin	24.00
☐	KR-2376ST	Keyboard encoder ROM	12.50
☐	NMX-5010	10 channel multiplex	9.95
☐	CAL1022	12 digit calculator Printing Chip	24.00

RELAY IN A DIP

IT'S NEW! GRIBSBY-BARTON REED RELAY IN A DIP PACKAGE

Type **GB 821B-2**

$2.50

3 for $6

One of the special outstanding new buys of 1976 for you hobbyists looking for something different in relays. Designed so that you can insert in standard 14-pin IC socket. Rated at 5 volts @ 150 ohm coil, SPST NC contacts. Designed to work with integrated circuits. Max. IC rating 100 mils, breakdown voltage 100 VDC. Needs 1 volt to break circuit. With built-in coil suppression diode.

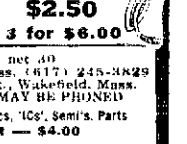
Wow! INCREDIBLE PRICES

TTL's BUY ANY 10 TAKE 15%

BUY 100 TAKE 25%

☐	SN7400	$.16	☐	SN7442	$.70	☐	SN7489	2.45	☐	SN74155	.95
☐	SN7401	.16	☐	SN7444	1.25	☐	SN7490	.59	☐	SN74156	.95
☐	SN7402	.16	☐	SN7445	.89	☐	SN7491	1.10	☐	SN74157	.95
☐	SN7403	.16	☐	SN7446	1.15	☐	SN7492	.59	☐	SN74158	.95
☐	SN7404	.19	☐	SN7447	.99	☐	SN7493	.59	☐	SN74160	1.35
☐	SN7405	.19	☐	SN7448	.99	☐	SN7494	.95	☐	SN74161	1.25
☐	SN7406	.35	☐	SN7450	.16	☐	SN7495	.79	☐	SN74163	1.35
☐	SN7407	.35	☐	SN7451	.17	☐	SN7496	.79	☐	SN74164	1.50
☐	SN7408	.19	☐	SN7452	.17	☐	SN74100	1.40	☐	SN74165	1.50
☐	SN7409	.19	☐	SN7453	.17	☐	SN74104	.44	☐	SN74166	1.50
☐	SN7410	.16	☐	SN7454	.17	☐	SN74105	.44	☐	SN74173	1.45
☐	SN7411	.25	☐	SN7455	.22	☐	SN74106	.52	☐	SN74174	1.39
☐	SN7413	.59	☐	SN7460	.17	☐	SN74107	.44	☐	SN74175	1.30
☐	SN7414	1.65	☐	SN7462	.22	☐	SN74108	.89	☐	SN74176	1.20
☐	SN7416	.34	☐	SN7470	.29	☐	SN74112	.89	☐	SN74177	1.20
☐	SN7417	.34	☐	SN7471	.49	☐	SN74113	.89	☐	SN74180	.95
☐	SN7420	.16	☐	SN7472	.29	☐	SN74114	.89	☐	SN74181	2.98
☐	SN7421	.45	☐	SN7473	.36	☐	SN74121	.49	☐	SN74182	.74
☐	SN7423	.29	☐	SN7474	.36	☐	SN74122	.48	☐	SN74184	1.98
☐	SN7425	.29	☐	SN7475	.59	☐	SN74123	.85	☐	SN74185	1.98
☐	SN7426	.25	☐	SN7476	.39	☐	SN74125	.59	☐	SN74190	1.40
☐	SN7427	.29	☐	SN7478	.79	☐	SN74126	.59	☐	SN74191	1.40
☐	SN7430	.16	☐	SN7480	.52	☐	SN74132	1.75	☐	SN74192	1.25
☐	SN7432	.25	☐	SN7481	.99	☐	SN74140	2.10	☐	SN74193	1.25
☐	SN7433	.49	☐	SN7482	.89	☐	SN74145	1.05	☐	SN74194	1.20
☐	SN7437	.34	☐	SN7483	1.25	☐	SN74148	2.25	☐	SN74195	.85
☐	SN7438	.34	☐	SN7485	1.25	☐	SN74150	.98	☐	SN74196	1.80
☐	SN7440	.16	☐	SN7486	.37	☐	SN74151	.75	☐	SN74197	.90
☐	SN7441	1.00	☐	SN7488	3.95	☐	SN74153	.90	☐	SN74199	1.75
						☐	SN74154	1.35	☐	SN74200	4.95

G.E. DYNAMIC MIKE



Crystal clear response for all types of ham, audio eqpt. Size only 2¾ x 1½ x ⅞". Gray impact case. ON-OFF switch. With multi position stand, 6-ft, bf cable for plug and external switch control. 50K ohms imp. 60 to 9000 hz. Wt. 6 ozs.

$2.50

3 for $6.00

Terms: add postage **Rated:** net 30
Phone Orders: Wakefield, Mass. (617) 245-3829
Retail: 16-18 Del Carmine St., Wakefield, Mass. (off Water Street) C.O.D.'S MAY BE PHONED

☐ 20c **CATALOG** Fiber Optics, 'ICs', Semi's, Parts

MINIMUM ORDER — $4.00

POLY PAKS

P.O. BOX 942M LYNNFIELD, MASS. 01940

was thereupon declared, pursuant to the By-Laws, to be duly elected as Director from the Great Lakes Division for the 1976-1977 term without membership balloting.

For Vice Director: George H. Goldstone, W8AP, was found lawfully nominated but the Committee was in receipt of communication from Mr. Goldstone withdrawing his name as a candidate. William E. Clausen, W8IMI, 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.

MIDWEST DIVISION

For Director: Paul Grauer, WØFIR, 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 1976-1977 term without membership balloting.

For Vice Director: Claire Richard Dyas, WØJCP, and Richard W. Pitner, WØFZO, were found lawfully nominated and eligible and their names ordered listed on ballots to be sent to Full Members of the Division.

PACIFIC DIVISION

For Director: J.A. Gmelin, W6ZRJ, and Gary A. Stilwell, W6NJU, 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: Marcel B. Skinner, K6LU, was found lawfully nominated but ineligible because of lack of the required membership continuity. William W. Fitel, W6UF/WA7LRU, and Albert F. Gaetano, W6VZT, 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, 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: Gene Sykes, W4BRB, and William Walker, WB4EYX, were found lawfully nominated but the Committee was in receipt of communications from each withdrawing his name as a candidate. Bev B. Cavender, K4VW, and James A. Gundry, W4JM, were found lawfully nominated and eligible and their names ordered listed on ballots to be sent to Full Members of the Division.

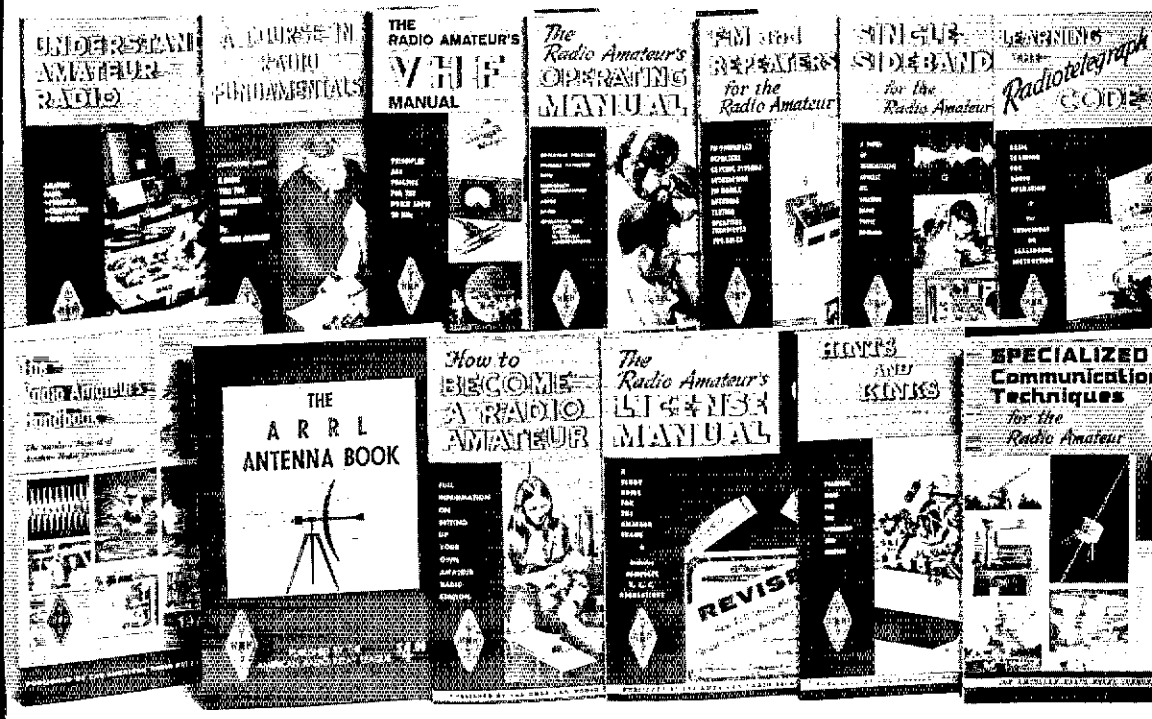
The Committee was in recess from 9:45 A.M. to 9:53 A.M.

On motion of Mr. Arnold, after extended discussion, unanimously VOTED to reimburse the Radio Amateur Satellite Corporation the amount of $4,149.59 for certain administrative expense incurred in the first and second quarters of 1975.

On motion of Mr. Thurston, unanimously VOTED to increase authorized expense reimbursement totals for 1975 by $600 to approve the payment of $237.54 of additional expenses for the Roanoke Division in 1974.

At this point the Committee examined and discussed the merits of several designs of banner carrying the League name and emblem; on motion of Mr. Griggs, VOTED to approve two designs, one primarily for indoor use and a second primarily for outdoor use by the division director in the League booths and displays at conventions and hamfests. Mr. Albright requested to be recorded as voting opposed.

The Committee next considered a staff draft of proposed new rules concerning conventions and hamfests, in response to the Board's instruction in Minute 40 of the second 1975 meeting. After discussion, on motion of Mr. Thurston, the following text was unanimously ADOPTED to replace the present rules:



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I would like these publications shipped to me postpaid. (The prices above apply to U.S.A. only.) Ship to:

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Total enclosed or charge to MC or BAC Account: $_____

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THE AMERICAN RADIO RELAY LEAGUE, 225 MAIN STREET, NEWINGTON, CT 06111

RULES AND REGULATIONS CONCERNING AMERICAN RADIO RELAY LEAGUE CONVENTIONS AND HAMFESTS

1. American Radio Relay League Conventions and Hamfests are meetings of persons interested in amateur radio which are authorized and conducted in accordance with the rules to follow. ARRL Conventions may be sanctioned at the Section, State or Province and Division levels; normally there will be not more than one Convention at each level in a given area per year.

2. Neither the name of the American Radio Relay League, nor the initial letters thereof, nor its emblem, shall be used in connection with any meeting or convention, or in the advertising thereof, unless it has been approved in the manner set forth below.

3. Parties desiring to conduct an ARRL Convention shall obtain the approval of the director of the division in which the convention is to be held, by an application setting forth the place and date of the proposed convention, the area to be served, the particular purpose to be served thereby, the clubs, associations or groups who propose to sponsor it, and the names and addresses of the officers chosen to conduct it. When the director is satisfied that the approval of such convention will be in the best interests of the League, he shall submit the application to the Executive Committee for its formal approval. Upon such final approval the headquarters shall notify the chairman or secretary of the convention group. The management, program and financial plans of every such convention shall be subject to the approval of the director of the division in which the convention is to be held. Every such convention will make provision for an ARRL forum or meeting and for an ARRL display booth or table. On its part, the League will make every effort to provide a speaker from among the headquarters staff or from among the officers of the League at no cost to the convention treasury; to provide editorial support in QST for the event; to accept paid advertising at rates lower than for commercial purposes; and to contribute publications to be used as awards or prizes.

4. Parties desiring to conduct an ARRL hamfest shall obtain approval of the director of the division in which the hamfest is to be held, by an application setting forth the place and date of the proposed hamfest; the area to be served; the clubs, associations or groups who propose to sponsor it; and the names and addresses of the officers chosen to conduct it. The director will notify the headquarters that the hamfest has been approved. ARRL hamfests will make space available for an ARRL display, and those ARRL hamfests which include formal speaking programs will provide time for an ARRL meeting if so requested by the director or other elected League official. There is no limit to the number of ARRL hamfests which may be held, but care should be taken to avoid conflict with other hamfests serving the same general area. The headquarters will provide editorial support in QST for the event, will provide for advertising in QST at rates below commercial rates, and will on request provide publications to be used as awards or prizes.

5. Notwithstanding the foregoing provisions, the Board of Directors may, at any meeting, authorize or direct, upon such terms as it may prescribe, the holding, as a National Convention, of a meeting of persons interested in amateur radio from throughout the operating territory of the League. The management, program and financial plans of every such convention shall be subject to the joint approval of the director concerned and the Executive Committee.

6. The General Manager, with the approval of the Executive Committee, is also authorized to provide (upon the request of the directors affected), for the holding of a State Convention designed for amateurs residing in any state which lies partly in each of two divisions.

The Committee examined at considerable length a proposal from the Stanford Research Institute for a comprehensive study and assessment of the Amateur Radio Service, with the objective of its use as part of the preparation for the 1979 World Administrative Radio Conference. During extensive discussion of the proposal, concern was expressed whether several of the outlined programs would actually be useful in facilitating preparation for the world conference, and whether they might have undesirable effects in countries other than the U.S. The Committee requested the President and General Manager to undertake further discussion with SRI staff, as well as with other experts in the field of international conferences, to acquire as much information as possible to assist in a proper evaluation of the proposal.

The Committee was in recess for luncheon from 11:55 A.M. until 12:28 P.M.

On motion of Mr. Albright, after discussion, in order to strengthen and formalize an existing relationship, unanimously VOTED to approve the text of a "Cooperative Understanding Between the American Radio Relay League and Sister Cities International" aimed at a common goal of improved international understanding and friendship among the peoples of the world.

On motion of Mr. Thurston, unanimously VOTED to approve IARU Proposal 140, concerning admission into membership of the Guyana Amateur Radio Association.

On motion of Mr. Arnold, unanimously VOTED to appoint Noel B. Eaton, David H. Houghton and Stan Zak as a Committee of Tellers, with F.E. Handy and John Huntoon as alternates, to count the ballots in the current elections.

On motion of Mr. Clark, unanimously VOTED to authorize the holding of an ARRL Technical Symposium in connection with the 1976 IEEE Vehicular Technology Conference in Washington on March 24-26, 1976.

On motion of Mr. Griggs, after discussion, unanimously VOTED that, because of inevitable disruption of the normal growth pattern in the Amateur Radio Service caused by continuing delays in the processing of license applications, the Committee directs the President to explore with the staff of the Federal Communications Commission, in even greater depth, the practical problems of administering the licensing function and to seek possible solutions, including an offer by the League of whatever direct assistance ARRL can properly provide.

(During the course of the above deliberations, the Executive Committee discussed, without formal action, future funding of Amsat expenses, QSL Manager travel reimbursement, amateur projects during the Bicentennial year, an amateur station at the 1976 Montreal Olympics, and documentary films on amateur radio.)

There being no further business, the Committee adjourned at 1:50 P.M.

Respectfully submitted,

JOHN HUNTOON, W1RW
Secretary

See Page 178

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$250,000 ham gear

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Mobile antennas mount to car roof with tough strap. No holes, no magnets, ideal for vinyl roofs. Complete assembly instructions, Antenna pre-tuned.

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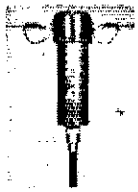

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(All about Yagis, 6-40 meters; triband & compact beams; dimensions)

NEW VHF HANDBOOK by W9EGI & W6SAI. $5.95
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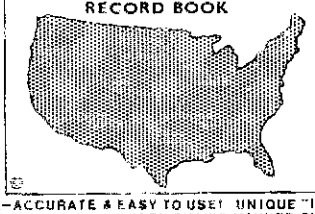

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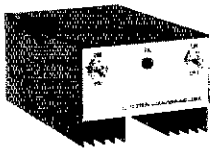

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HAM-ADS

(1) Advertising shall pertain to products and services which are related to amateur radio.

(2) No display of any character will be accepted, nor can any special typographical arrangement, such as all or part capital letters, be used which would tend to make one advertisement stand out from the others. No Box Reply Service can be maintained in these columns nor may commercial type copy be signed solely with amateur call letters. Ham-ads signed only with a post office box or telephone number without identifying signature cannot be accepted.

(3) The Ham-Ad rate is 60 cents per word, except as noted in paragraph (6) below.

(4) Remittance in full must accompany copy, since Ham-Ads are not carried on our books. No cash or contract discount or agency commission will be allowed.

(5) Closing date for Ham-Ads is the 20th of the second month preceding publication date.

(6) A special rate of 20 cents per word will apply to advertising which, in our judgement, is obviously non-commercial in nature. Thus, advertising of bona fide surplus equipment owned, used and for sale by an individual or apparatus offered for exchange or advertising inquiring for special equipment, takes the 20-cent rate. Address and signatures are charged for, except there is no charge for zipcode, which is essential you furnish. An attempt to deal in apparatus in quantity for profit, even if by an individual, is commercial and all advertising so classified takes the 60-cent rate. Provisions of paragraphs (1), (2) and (5) apply to all advertising in this column regardless of which rate may apply.

(7) Because error is more easily avoided, it is requested copy, signature and address be printed plainly on one side of paper only. Typewritten copy preferred but handwritten signature must accompany all authorized insertions. No checking copies can be supplied.

(8) No advertiser may use more than 100 words in any one advertisement, nor more than two ads in one issue.

(9) Due to the tightness of production schedules, cancellation of a Ham-Ad already accepted cannot be guaranteed beyond the deadline noted in paragraph (5) above.

Having made no investigation of the advertisers in the classified columns except those obviously commercial in character, the publishers of QST *are unable to vouch for their integrity or for the grade or character of the products or services advertised.*

QCWA Quarter Century Wireless Association is an international non-profit organization founded 1947. Any Amateur Radio Operator licensed 25 or more years is eligible for membership. Members receive a membership call book and quarterly news. Write for information. Q.C.W.A. Inc., 2012 Rockingham St., McLean VA 22101.

PROFESSIONAL CW operators, retired or active, commercial, military, gov't, police, etc, invited to join Society of Wireless Pioneers — W7GAQ/6 Box 530, Santa Rosa CA 95402.

FREE sample copy Long Island DX Assn. bulletin. Latest DX news. Business size s.a.s.e. to the L.I. DX Assn., P.O. Box 73, Westbury NY 11590.

EDITING a club paper? Need public relations help? You should belong to the Amateur Radio News Service. For information write: Sybil Allbright, W6GIC, 8658 Encino Ave., San Diego CA 92123.

THE New York Radio Club invites Hams to club meetings, 2nd Monday of each month, 8:00 PM at the Williams Club, 24 E. 39th St., NYC NY 10016. For information, same address.

SAROC Eleventh Las Vegas National Convention, January 8 - 11, 1976, Hotel Sahara Space Convention Center. Advance Registration $12 per person; with midnight show $22, with dinner show $29. Special Hotel Sahara Safari airfare packages from selected cities with scheduled airlines serving Las Vegas. SAROC special room rate extended only to those who advance register or register at the door. Send for details, SAROC, POB 945, Boulder CITY NV 89005.

FOR SALE: Hammarlund HQ 110 AC rcvr w speaker 6-160M $100. Heath DX 100 xmtr 10-160M over 100w cw or phone, xtal or VFO $50. WA2GWT Sam Cohen 95-06 67 Ave., Forest Hills NY 11374.

FOR SALE — By owner — Home in Winter Park, Fla — with 40 ft tower, Rotor, TA33 Jr. Spacious 3 bedroom ranch. Fully equipped — $29,900. Rosen — 2114 Biscayne Dr., Winter Park, FL 32789. Phone (305) 647-8436.

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VACUUM variable, Jennings 375pf, 14kv, other sizes — $25.00 ppd.; 99.9 turn dial drive — $5.00; Paul Perryman, WA5WCP/5, 1959-H Josey Lane, Carrollton TX 75006.

WANTED: AN/URM 25 D, E, F signal generators for ARRL laboratory. 225 Main St., Newington CT 06111.

QSLs??? "America's Finest!!! Samples 75c DeLuxe $1. Religious 75c.(Deductible). Sakkers, W8DED, Box 218, Holland MI 49423.

TRAVEL-PAK QSL Kit — Send call and 25c; receive your call — sample kit in return. Samco, Box 203, Wynantskill NY 12198.

FREE Samples—Stamp appreciated. Samcards, 48 Monte Carlo Dr., Pittsburgh PA 15239.

QSLs, samples 20c. Fred Leyden, W1NZJ, 454 Proctor Av., Revere MA 02151.

QSLs 300 for $4.65, samples 20c, W9SKR, Ingleside IL 60041.

QSLs "Brownie" W3CJI, 3035A Lehigh, Allentown PA 18103. Samples with catalog 35c.

DELUXE QSLs. Samples 20c. Petty, W2HAZ, P.O. Box 5237, Trenton NJ 08638.

DON'T buy QSL cards until you see my free samples. Fast service, economical prices. Little Print Shop, Box 9848, Austin TX 78766.

QSLs — Variety, value, quality, custom. Samples and catalog 20c. Alkanprint, Box 3494, Scottsdale AZ 85257.

RUBBER stamps $2.50 includes postage. NJ residents add tax. Clinton Hoar, W2UDO, 32 Cumberland Ave., Verona NJ 07044.

QSLs catalog. Samples 35c. Ritz Print Shop, 5810 Detroit Ave., Cleveland OH 44102.

CREATIVE QSL cards. Personal attention. Imaginative new designs. Send 25c. Receive catalog, samples. Wilkins Printing, Box 787-1, Atascadero CA 93422.

COMPLETE 36 page QSL catalog! 300 cuts, stock and ink samples. Ten sample QSLs. 25c. Cornelison's, 321 Warren St., N. Babylon NY 11704.

N&S QSLs, samples 25c. P.O. Box 11184, Phoenix AZ 85061.

QSL samples 35c. W9CL Press, 15525 Oak Road, Carmel IN 46032.

PICTURE QSL cards of your shack, etc. from your photograph or art work. 500 — $14.00, 1000 — $19.25. Also unusual non-picture designs. Generous sample pack 35c. Half pound of samples 65c. Raums's, 4154 Fifth Street, Philadelphia PA 19140.

QSLs — Send 2 stamps for samples. Webb's, Box 6, Morganton NC 28655.

3-D QSLs — increased returns assure users' satisfaction. Samples 25c (refundable). 3-D QSL Co., Monson 2, Mass. 01057.

DISPLAY and protect your QSL's with 20 frame plastic holders. Seven for $3.00, prepaid. TEPABCO, Box 198T, Gallatin TN 37066.

QSL Cards — Something completely different! Samples: 25c W5UTT; Box 1171C; Garland TX 75040.

QSLs. Second to none. Same day service. Samples 50 cents. Include your call for free decal. Ray, K7HLR, Box 331, Clearfield, Utah 84015.

C. FRITZ, yes, we're still printing better QSLs! Samples 25c. Box 1684, Scottsdale AZ 85252.

PRINTING — QSL Cards, Desk Note Pads, Custom Service, Free Samples. Fast Processing and Good Designs Our Specialty. B & P Specialty Printers, P.O. Box F, Section AL 35771.

WANTED — Squires-Saunders SS-IR. C. Gutman, 7526 Mountbatten Rd, Montreal, Que. H4W 1J9.

WANTED: Mint 75A4 with vernier knob. Western Electric brand electron tube 300 B. Please state price and quantity. Charlie H. Fujikura 1-27-9, Tabatashinmachi, Kitaku Tokyo, JAPAN 114.

CANADIAN Surplus Catalog and flyers $1. Etcox Electronics, Box 741, Montreal Canada H3C 2V2.

CASH paid for your unused tubes and good ham and commercial equipment. Send list to Barry, W2LNI, Barry Electronics, 512 Broadway, NY NY 10012.

CALL toll-free (800) 327-7798. Ask for Bob Hoffman (Jaro Electronics Corp.) We buy all types of tubes. Top prices paid for Varian, Eimac, Amperex. Address: 412 27th Street, Orlando FL 32806. In Florida call collect (305) 843-9551.

SPIDERS for boomless quads. Heliarc welded aluminum. Al's Antennas, 1339 South Washington Street, Kennewick WA 99336.B

VERY in-ter-est-ing! Next 4 big issues $1. "The Ham Trader," Sycamore IL 60178.

TRANSFORMERS rewound, Jess Price, W4CLJ, 507 Raehn, Orlando FL 32806.

NOVICES: Need help for General Ticket? Complete recorded audio-visual theory instruction. Easy, no electronic background necessary. Write for free information. Amateur License, PO Box 6015, Norfolk VA 23508.

WE BUY electron tubes, diodes, transistors, integrated circuits, semiconductors. Astral Electronics, 150 Miller St., Elizabeth NJ 07207. (201) 354-2420.

MOBILE Ignition Shielding gives more range, no noise. Kits and custom systems. Literature. Estes Engineering, 930 Marine Dr., Port Angeles WA 98362.

TELETYPEWRITER parts, manuals, supplies, equipment. Toroids, S.a.s.e. for list. Typetronics, Box 8873, Ft. Lauderdale FL 33310. W4NYF. Buy parts, late machines.

WANTED: An opportunity to quote your ham needs. 36 years a ham gear dealer. Collins, Drake, Ten-Tec, Swan, Kenwood, Tempo, Regency, Icom, Hy-Gain, etc. Trades, terms. Request catalog. Chuck, W8UCG, Electronic Distributors, 1960 Peck, Muskegon MI 49441. (616) 726-3196.

AMSAT/OSCAR 6-7 slides, set of 5 — $1.25 Lift-Off and Equipment. Proceeds AMSAT, K6PGX, P.O. Box 463, Pasadena CA 91102.

WANTED, Make, Model and Serial Numbers of stolen ham gear, for big list. W7UD, 3637 West Grandview, Tacoma WA 98466.

BUILD your own radio desk/console cabinet. Design drawings, photographs, $4.75. Bill Morris, WA5RSC, P.O. Box 411 Lubbock TX 79408.

SERVICE by W9YKA. Professional grade lab, FCC commercial license. Amateur and commercial SSB-FM equipment. Repairs, calibration, modifications, consultation. Low overhead, reasonable rates. Write or call Robert J. Orwin, Communications Engineer P.O. Box 1032, La Grange Park IL 60525. (312) 352-2333.

BUILDERS Teflon stock. Write W9TFY, Frank Wirt, Alpha IL 61413.

WANTED: Mobile telephone equipment such as Delco, GE, etc. Also heads, duplexers, decoders. Greg Hyman, WA2OTG, 19 Sicard Ave., New Rochelle NY 10804. (914) 636-2494.

TOROIDS — 44 and 88 mHy 5 — $3.00 P.P. M. L. Buchanan, P.O. Box 74, Soquel CA 95073.

INTERESTED in obtaining parts, components, etc. concerning SW receiver by Hallcrafter's "Super Skyrider", Serial H54260. Contact S. V. Mariowe, 15 Webster Ave., Jersey City NJ 07307.

WANTED: Any type of parts for the R-390A. W6ME, 4178 Chasin Street, Oceanside CA 92054.

TELETYPE Equipment for beginners and experienced operators. RTTY machines, parts and supplies. Beginners special: Model 15 Printer and TH5-TG demodulator $125.00. Atlantic Surplus Sales Co., 3730 Nautilus Ave., Brooklyn NY 11224. Tel: (212) 372-0349.

SIGNAL/ONE Repairs. Mandelker (415) 548-1839.

ICOM and Swan. Also 2 meter amps and antennas. WØNGS, Bob Smith Electronics, 1226 9th Ave. North, Fort Dodge Iowa 50501. (515) 576-3886.

PC BOARD negatives made photographically from your or magazine's artwork. Now obtain professional results quickly, simply. 4X5 $3.00 or SASA for information10139 Apache Road Richmond VA 23235. (804) 272-8403.

WANTED: Heathkit HA-14 Kompact Kilowatt Linear with/without power supplies Please state condition and price in first letter, Selman, 212-10 85th Avenue, Hollis NY 11427.

FREE Literature Catalog; Theory, Practice; Littleton Hobby Circuits. Box 453, Littleton Mass., 01460.

HEATHKIT SB401, SB303, SB220. Best offer over $750.00. Call (203) 354-9735. Hipp, Box 431, New Milford CT 06776.

WANTED: Drake TC-6, SC-6. Must be at least good condition, no modifications. Call collect (713) 331-6174. WA5TMJ, Byron, P.O. 506, Alvin TX 77511.

WANTED: Heath — KW Kompact HA-14 linear with mobile supply, SB600 speaker, SB series CW filter. All letters acknowledged. K2OLI, 173 Woodlae, Ballston Lake NY 12019. (518) 877-8006.

RTTY — Model 32 ASR — $300.00. Model 33 ASR — $600.00. Both like new and working perfectly. Can arrange shipping. K9HJU, Tony, (312) 349-9002.

CX7A — Excellent, 6 mo. Warranty — $1400. K6GA (714) 962-5940.

MOBILE OPS. Tired of Ignition Noise? Please send SASE for info on shielded ignition systems. Summit Enterprises, 20 Elder Street, Yarmouthport, MA. 02675.

NATIONAL NCX-5 5 band transceiver, NXC-A power supply speaker, VX-501 external VFO, manuals, spare tubes mint condition. $380 FOB. Marv Polan, W2MVS (516)334-3767. 7 Maxwell Dr., Westbury NY 11590.

HAM Radio Repair. Expert repair and alignment in our new Lab. Prompt, reasonable. "Grid" Gridley, W4GJO, 3824 Malec Circle, Sarasota, Florida 33581.

MOTOROLA HT220, HT200, Pageboy, and other popular 2M FM transceiver (Standard, Regency, etc.) service and modifications performed at reasonable rates. Hatfield, WA4FRV (804) 272-8403.

UPGRADE Your Ham Ticket Now! Use Posi-Check — original, expertly devised, multiple choice questions and diagrams covering all areas tested over in FCC exams. IBM sheets for self testing. Keyed answers with explanations. New postal rates require new prices. Novice Class now $3.50; General Class (including latest rules and regulations), $5.30; Advanced Class, $4.90; Extra Class, $5.15. Postage prepaid U.S.A., first class only. Also newly revised Radiotelephone Third Class, Elements 1, 2 and 9, now $10.15. Send check or money order to POSI-CHECK, P.O. Box 3564, Urbandal Station, Des Moines IA

STRANDED stainless steel antenna and guy wire our specialty. Wilcox Electronics, Box 1331, S.L.C., Utah 84110.

EICO 753 tri-bander with transistorized VFO, like new, $130. Moreland, 14718 N.E. 38, Bellevue WA 98007.

SBE-34 solid-state 80-15 built-in AC-12V supply with calibrator $225 SBE-2 codaptor $25 WB8CHK 3105 Silver Rock Ave., Dayton OH 45414. (513) 890-6874.

HAM Buy Lines send name and address for literature. Iacopelli 1720 77 St., Brooklyn NY 11214.

FOR SALE: KWM-2, 516F2, 312 B-4 all late Rd Emblem, SB 220 new, Drake Match box new in box, Hy-Gain 18 HT, TriEx HZ 471 w/remote control TA 36 w/40 mtr conversion, new Ham II rotator, 100 Ft. Andrews 7/8 teflon coated 52 ohm cable SASE for prices and details Varney, 12 Grove St., E. Rochester NH 03867. After 5PM.

WANTED: Heathkit HR20. Monteer Call Collect (401) 846-6158.

SB-104 OWNERS Club — Newsletters, Builders Guides, Modification Information and other services on current Heathkit Amateur Equipments. Send SASE for details to Chuck Harrison, RD 2 Box 1, North Stonington CT 06359.

CASH for working or repairable gear. State price and best price. Miller, 505 Roxbury, FT. Wayne IN 46807.

WANTED: your unused tubes, transistors, test equipment, vacuum variables, receivers, transmitters, antennas, towers, linears, spare parts. We pay 10% above on any cash or trade in deal. We also pay shipping. We're buyers not talkers, for details write Ocean Electronics Co., P.O. Box 103, Rockville Centre NY 11570.

MICRO-TO MK II deluxe epoxy-glass drilled circuit boards. $4.00 postpaid; with semicons $11.80. K3CUW, 1304A Mass. Av. S.E., Washington D.C. 20003.

"PROBLEMS And Solutions in KWM-1, KWM-2 and S/Line" is a new and useful booklet for owners of these radios. Contact Frank Andrei, W3OEL, MR 1, Saltsburg PA 15681 for details.

YOUR CALL, club, hamfest, etc., printed on white cotton tee shirt. $4.00. Limit 30 letters. Print, give sizes. Darco-QST, Box 5553, Cleveland OH 44101.

ORIGINAL Petit Morse to RTTY converter inventory closeout. Manufacturer discontinued production. Fantastic price reductions — semi-kit $95., parts kit $225., assembled and tested $380. Also Baudot to Morse for $135 and Baudot to Ascii (perfect for TV typewriter!) $59. Sase for details. Walters, Box 563, Oak Harbor WA 98277.

VESELE bozicne praznike in srecno novo leto 1976 voscilo vsem slovenskim radijskim amaterjem sirom sveta W8FAZ, Joze Zelle, 1227 Addison Road, Cleveland OH 44103. QSL SARU, in Karl G. Smrekar, ml. WA3PJB; Karl Smrekar, st., WA3QEK; Egon N. Kornicer, WA4GGF; John J. Podpechan, WA5HTS; Edward Baznik ml., WB8CFO; Bogomir Glavan; Tone Kaluza, K8OHL; Bernard Campa, K8THK; Tony Vahcic, ml., K8ZWH; Janez F. Vesel, W8FBU; Frank Vertacnik, W9MOU; Roman Zakrajsek, VE3DQZ; Victor Zakrajsek, VE3EQT; Frank Toplak, VE7BZC; Rudi Breznik, VK2AOT; Jernej Podbevsek, SWL.

SEASON'S Greetings to all from D.B. and Paul, W4UDQ/AAM4UDQ and W4HHK/AAM4HHK, ARRL, MARS, and SWOP 1625-PA 1943 — SS SAMOSET/KOIP. Box 417, Collierville TN 38017.

MERRY XMAS and HAPPY NEW YEAR from WØCVU. On the air since 1913. The World's Finest Hobby.

CRYPTOGRAPHY devices, machines, books, related material wanted. German Enigma machine especially sought. Leads appreciated. WN2TSD, 17 Alfred Road, Merrick NY 11566. Call Collect (516) 378-0263.

HW-17-A, 2M. AM transc: HW-17-2 FM adapter, D.C. Mobile P.S. $95.00. Gus Leverone, Medway, Mass. 02053 (617) 533-2969 P.O. Box 208.

SELL EBC-144 Jr. CLEGG 031 ACPS, Cushcraft 4-El Yagi, 5/8 mobile whip all in excellent condition. Marvin Fein, Box 307, Scarborough NY 10510. ((14) 472-1100.

HEATH DX-60 and HR-10. Look good, work well. With manuals-$100 both. WN2UGI, Box 562, Chatham NJ 07928 (201) 635-8727.

HW-202 2 meter FM, full of crystals $170.00, Twoer, $25.00. WA3IWW Monocacy Station, Monocacy 8A 19542. Phone (215) 385-3343.

FOR SALE: Drake 2C receiver, MS-4 speaker, Hy-Gain vertical ant., cable, SWR Meter, $300.00. 212-9946721, Chris, WN2ZKJ.

SELL OR TRADE: National NCX-200 transceiver and NCX-A supply $250.00; Allied AX-190 Receiver $175.00. All perfect w/manuals, cables. Trade for SB200 or SB220 Linear or best offer. Send s.a.s.e. You ship. Dave Peterson WA4EPW, 4924 Rowe Ridge Rd., NW Roanoke VA 24017.

NCX-5MKII, NCX-A, NCX-D: $350, SWAN-250, 117XC; $300. SX-101MKIII; $130. HQ-110; $100. Heath TX-1; $80. Polycomm PC-6; $60. Offer/Haggle. WB6KXL, Paul Hansen, 4924 Hansen Dr. Santa Rosa CA 95405. PH.(707) 539-8538.

SELL: Heathkit HW-202, HWA-202-1. Mint condition. $185. Will ship. Steve Mowrer (WA3YVM) 237 W. State St. Quarryville PA 17566. (717) 786-2344.

WANTED: Motorola HT-220 OMNI or HT-200 vhf portable. D.W. Kelly, 100 Sylvan Court, Alexandria VA 22304.

TWO Hygain vertical radiators 18 Avt. used few hours. Already assembled. List Price $97.00. Will sell for $150. each. Must pick up units. Write C. Taliaferro, 20 Shelter Lane, Locust Valley NY 11560.

WANTED: Instruction Manual for Hammarlund HQ-180A general coverage receiver. Must be in readable condition. J.H. Cannon, 903 West Daniel, Champaign IL 61820.

WANTED: SB610/HO-10; FV-400/FV-401; SB-630. Thurber, 372 Crabapple, Wright-Patterson AFB OH 45433.

SELL: Murch transmatch $110. WA2RUD Bill. 349 Old Roaring Brook, Mt. Kisco NY 10549.

HEATHKIT SB-102, HP-23B, SB-600 Excellent condition. $450.00 or best offer. WN5NKJ. 236 Oklahoma Dr., Potales NM 88130, Area code (505) 356-8415.

WILL PAY $100 for an Atwater Kent "breadboard" radio to complete my collection. Parsons, 22 Forest St., Branford CT 06405. Tel. (203) 488-4267.

SELL: FRDX 400SD, 160M-2m, $275: DX100B, $80; EICO 720, $30. K5MHG/16, 419 Westbourne Drive, Los Angeles CA 90048.

UNUSED: Drake TR4C, 34PNB, RV4C, MC-4 console, FF-1, DC-4. $1070 value for $750. John Mathis 2415 Pierce 310E, Nashville TN 37212.

HAMMARLUND H Q-180, manual/cal., Immaculate, $195. Tyler, 1515 Bayshore Blvd., Apt. 7 Denedin FL 33528.

COLLINS 75S-3B 500 Hz filter round emblem, manual, excellent condition, $635. WB8CTY 1575 Mistletoe Dr., Cle. OH 44106.

SELL: KWM2A w/gold plug in relays $850.00, 312B5 $395, 516F2 w/speaker $135, CP1 xtal pack $165, DX Eng. processor for Collins $75.00. Call Marty WA3IFQ (215) 884-6010.

COLLINS KWM2-A and SB-220 Linear. Both like new in appearance and operation. Collins has plug-in relays and all bulletins by Collins rep. 220 has new 3-500Z tubes. Collins $725, plus $75, each for AC or DC supplies. 220 price $350. WA2CFX/4 Stephen Crow, Harbor West, Ft. Lauderdale FL 33316. (305) 525-9196.

FOR SALE: Hallicrafters SX88 general coverage rcvr, incl. 160-10/11 M. Vry good cond. $225 HT37 XMTR $125. Phone (413) 442-0117. Lazits.

VHF HAMS - Clegg interceptor, $150; Swan 250c with N/S, AC 117X, and DC 14A, $375; AMECO TX62 with 621 VFO, $100. WA1IGV 26 St. Joseph Ave., Norwood MA 02062. (613) 762-1926 evenings.

FOR SALE: Four new 8295 EIMAC tubes $75 each; all four $250. HW-16 & HG-10B $125. Will ship Andy WA5GYM 1610 E. County Line Rd. Apt 11E, Jackson MS 39211.

SELL: Heath SB-102 with 400 hz filter $365.00 Heath Electro-Voice SSB Mic. $20.00. HP23B p.s. with SB-600 spkr. $65.00. SB-200 Linear $195.00. Hygain Th-3 Jr. triband beam $50.00. All equip. like new cond. You ship. W.H. Wiley, P.O. 852, Montara CA 94037. Ph.(415)728-7136.

OAHU HAWAII: Eithty foot heavy duty tower $400.00. HW-202, extras Norm KH6INT 682-5235.

DX60B Transmitter $65. HR10B receiver/calibrator $55. Ed Smith, Eastpoint GA 30344. (404) 767-2566.

TEST EQUIPMENT for sale. Heath IO-102 — $120, IB-1100 — $140, IP-28 — $55, IG-18 — $80. All like new. Knight KG-686 rf gen. — $90. Good. J.A. Esposito, WB4AJA, Route 5, Box 129A, Nicholasville KY 40356.

CONTEST station complete. Drake B-line, SB220, all antennas, etc. Call or write for specifications. W6RTT (213) 445-0429. Pete Grillo, 2018 Eighth Avenue, Arcadia CA 91006.

COLLINS station for sale. KWM2, 30LI, 312B5, Johnson bug, 2 Mike SM 3, 3 section self support crank up and over Rohn tower, Ham M Rotor, Thunderbird tribander, coax connectors and switch, odds and ends, $1950.00. F.O.B. 6204 East Joshua Tree Lane, Scottsdale AR 85253.

WILL SELL: Heath HW16 with HG10B VFO. $110 pr. Charles Bess R.R. 2, Peru IN 46970.

SWAP: HW22 with mike, HP-23A AC pwr. supply, HP-13 DC pwr. supply. Cables & manuals. All in good condition. Swap for Tempo FMH 2-Meter Handy Talkie with AC pwr supply, or equiv. Tony Drabicki, W2ESS RD 1, Clifton Springs NY 14432.

FREE: 8 Extra Crystals of your choice with the purchase of a new ICOM IC-22A at $249. With the 10 crystals that come factory-installed in the IC-22A, this gives you a total of 18 crystals! For equally good deals on Drake, Collins, Kenwood, Ten-Tec, Regency, Swan, Atlas, Tempo, Midland, Alpha, Standard, Genave, Curtis, Hy-Gain, Antenna Specialists, CushCraft, Hustler, Mosley, and others, write or call Hoosier Electronics, your ham headquarters in the heart of the Midwest and become one of our many happy and satisfied customers. Hoosier Electronics, P.O. Box 2001, Terre Haute IN 47802. NEW PHONE NUMBER! (812) 238-1456.

HALLICRAFTERS SX-117 RCVR, HX-50A xmtr, mint new tubes, realigned $350. WA8TUO Clio MI 48420. (313) 687-0652.

COMPLETE STATION: All mint, DX 60B, Ten Tec VFO, HR 10B, speaker, calibrator (factory alligned). HD 1410 keyer, SWR meter, antenna switch. All manuals, cables and accessories. $290 P. LaRocco 2042 E. 65st., Brooklyn NY 11234. (212) RN30491.

"DON and Bob" new guaranteed buys. CDE Ham-II 117.00; Belden 8448 rotor cable 13c/ft; CD44 89.95; Hygain TH6DXX 192.00; Mosley Classic 33 179.00; 18HT Hytower 208.00; write prices 18AVT/WB;4BTV; Dentron Skymaster; Belden 8214 RG8FOAM 23c/ft; 8237 RG8 19c/ft; RG628/U 10c/ft; coming soon: Telstar 0-1500W digital wattmeter 99.95; CDE .001/10KV doorknob cap 1.95; 22GA/7STD phosbronze 2.50/100ft; quote TS520, Atlas 210X, write needs. Collins. Prices FOB Houston, good until Jan 1; Madison Electronics 1508 McKinney, Houston TX 77002. (713)224-2668. Nite (713)497-5683.

COLLINS S line 32S1 No. 2468, 75S1 No. 2307, 516F2 No. 2871 excellent condition. Will crate and ship collect upon receipt of certified check for $700. Chuck Camp W7HEV 8900 W. Bopp Rd. Tucson AZ 85705. (602) 883-0878.

HOSPITAL bills forces sale SB-104 SB644 SB604 HP1144 CW filter and noise limiter just back from Heath Service Department works perfect $800 plus shipping W3GVR Zugermayer 348 2nd Street Pike, Southampton PA 18966.

WANTED: Heathkit SB313 Name your price. Ray Turbin 93-24 Queens Blvd. Rego Park NY 11374.

WANTED: Copy or buy owner's manual for Elmac AF-67. K4RJA, 3009 Sterling Road, Augusta GA 30907.

FOR Trade or sale: Clegg FM-27B & pwr. supply model011, WV-4 Drake wattmeter,2-meter 4CX250 amplifier,Will trade all of the above items for a Drake TR-6 transceiver.Lenhart Box 304, Stanford, KY 40484.

WANTED: High power linear parts. Also need HP13 mobile supply. WB2GDZ, Jeff Pohl, 103E Sharp Hall, R.P.I., Troy NY 12181. (518)270-7339.

WANTED: Amateur Radio Magazine; QST, Ham Radio, CQ, and 73. Please state price in first letter or call. W1GUD Ron Vanke, 173 Shear St., Wrentham, Mass., 02093, (617)384-2281.

HEATHKIT HP-13B mobile power supply never used - $75. Deluxe metal locator GD-348 new — $75. K9ICG, 1300 Eden St., Elkhart IN 46514.

HR-10, mint, $55 or best offer. T-Lee, Losee Road, Wappingers NY 12590.

COLLINS 75S-3B: Round emblem, nice receiver. $550. Will trade for Drake T4XC and AC-4 or Swan 500 Up. Drake R4B: $300, Mint Condition. Ken Blanton W5CBT, Box 7291, Amarillo, Texas 79109.

ITC Multi-2000: $600. Love the radio-Need the cash! Works perfect. Ken Blanton W5CBT, Box 7291, Amarillo, Texas, 79109.

QUALIFIED HF/VHF Electronics graduate engineer desires position in USA. Wife is Montessori teacher. Sunil Abeyesunders, (GJ2AB/4S7AB) P.O. Box RW-456 Ridgeway, Lusaka, Zambia, or contact Don Payne K4ID, (615) 384-2224.

DRAKE R4-A Receiver, MS-4 speaker 10-80 M plus 3 shortwave bands excellent cond. $225.00 shipped prepaid UPS. Larry D. Tucker WB9CLU 802 W. Joliet, Ottawa IL 61350. (815) 434-6020.

HAM II 100 ft cable $119.00 (W6RQZ) 1330 Curtis Berkeley, CA 94702 (415) 526-7345.

HELP clean out our church electronic rummage sale basement. Stamp brings info. Padre-K9DNR, 916 No. Western Avenue, Chicago IL 60622.

INTER-AMERICA Traffic Net, 21,413 kHz, Monday through Sunday, 4:00-5:00 PM E.S.T. (2100-2200 GMT), in English, for U.S.A., Canada, Mexico, Central- South America, Caribbean. K4GOS Net Manager, WA4KKR Assistant Manager for questions or suggestions; starts November 1, 1975; Please check in with or without traffic — help us get started!

PORTABLE antenna for travel use. English "Joystick" with tuner. All bands. $35. W8RWC 2651 Manchester Rd, Ann Arbor MI 48104.

WILL DONATE to youth center etc. Rohn 40 ft. tower plus parts. Saul, Placentia Cal. (714)528-2882.

SALE: KWM-2, NCL2000, R388, etc. SASE. W5DJO 988 Enfield, Bryan TX 77801.

WANTED: 432MC power tripler (4CX250B) (2M input) in ARRL VHF manual (1972) (pge297). Vernier modification & knob main tuning dial (1kc) tuning dial (1kc) 51J3. (W6RQZ) 1330 Curtis Berkeley, CA 94702 (415)526-7345.

WANTED: R389 VLF receiver. K2GW 100 Webb Ave, Ocean Grove NJ 07756.

SOLID state sweep generator. .3 to 30 MHz. several solid state miniature communications receivers. Details sase. Ray Megirian, K4DHC, 606 SE 6th Ave., Deerfield Beach FL 33441.

DRAKE R-4B receiver, MS-4 matching speaker, manual, like new, $295. Osborne, (716)293-3543, 320 Burntmill, Churchville NY 14428.

SELL: complete 80-10 mtr station (AM/CW/SSB/FSK). Heath HX-10 transmitter, $125. Lafayette HA-350 ham band receiver w/mechanical filter, $70. Both for $185 w/all cables and coax relay. Hallicrafters SR-42A, 2mtr AM, w/crystals, $60. All equipment w/manuals and in exc. condition. 4 new 811A's, $20. WA1LZA, 79 South Rd., Bedford MA 01730.

RTTY demodulator: ST-5, new, switchable 170/850, meter, loop supply, all usual features plus autostart, neat case. $125 UPS prepaid 48. Fred Firestone WB9IEE, 806 N. School St., Normal IL 61761. (309)452-4032.

T44AAV Motorola 450MHz wanted.Will buy from 1-10 units. W4YFI. W R Smitherman Rt. 4, East Bend NC 27018

DRAKE 2B, 2BQ, 2AC and HT-37 with manuals $250. Local pick up N.Y.C. vacinity, WB2HDE (212) 592-9769.

HEATHKIT HW-22 40M SSB transceiver with HP-23 AC supply, HRA-10-1 Xtal Calibrator, HP-24 Speaker and all manuals — $100. Dave Green, WA2MWU, Closter Dock Rd., Alpine NJ 07620.

SELL: R-390A, excellent, $425. Hammarlund HX-50 xmtr (CW,AM,SSB) 100 watts, $150, or $525. for both. All Manuals, no mods., and in mint operating condition. Dick Schultz, WN6LDW/0. 1135 Florida Rd., Apt. B-21, Durango CO $1301. (303) 259-1869.

SWAN 350, Mark I Linear, Regency HR2, NA202 Amp., V7A VTVM, 65ft. tilt tower, Ham M Rotor, TA36 beam, 22 element 2 mtr beam, TR44 rotor, HW17 2 mtr. tx. plus tubes, old QST's, manuals. $1000.00. To be sold as unit. U ship. C. Pulliam WA9TVJ, 3401 West "A" St., Belleville IL 62223.

KENWOOD: R-599A, T-599A, mint, almost new, $795. SB-200 $200. Will ship. Clif Power (617)344-2620.

SIGNAL/One/Alpha Amplifiers: New Alpha-374, Alpha — 77D. CX7A — $1395, CX7B — $1695, mint, warranty. Payne Radio, (615)384-2224 anytime.

SB-104, HP-1144, SB-644, SB-604, Noise blanker, CW filter, all brand new, factory cbkd & alnd, and oprg perf; $900 Neil WB6CRP; Abrams 7B, Escondido Village, Stanford, CA. 94305 or 415-326-0705 all updates!

FOR SALE: Hallicrafter SR 150 with P/S. Transceiver 80-10. Nice Condx. $295 plus shipping. Firm. Randy WA2DEW 372 Essex Ave., Bloomfield NJ 07003.

SELL — Drake C-4 console $295 Heath Monitor scope SB610 $90 Structural glass Gem Quad ant 3 element $150. Ham — M-Rotator motor $75. Homebrew ARRL antenna transmatch box 160m to 10mm $60. All above sweet and mint W6UCJ (213) 342-5654.

BUY-Sell-Trade. Write for free mailer. Give name, address, and call letters. Complete stock of major brands. New and reconditioned equipment. Call us for best deals. We buy Collins, Drake, Swan, etc. ssb & fm. Associated Radio 8012 Conser, Overland Park KS 66204. (913)381-5901.

SELL: Telonic SN3 UHF Sweep Generator — $70.00 Boonton 210A FM Signal Generator $60.00 Heathkit IM 58 Distortion Analyzer — $45.00. W9AQK.

CALL letter license plates: need Alaska, Del., D.C., Ga., Neb., N.J. for WAS; B.C., Man., Nfld., NWT, N.S., PEI, Yukon for WAVE. Art Phillips WA7NXL, 3401 N. Columbus 5-O, Tucson AZ 85712.

SWAN MB4OA, 1975 Model used one month, 160 watts, 100% solid state, 40M mobile transceiver, including Hustler RM-40 mobile antenna w/bumper mount, coax, microphone. $320.00 Steve (614) 676-3872.

COLLEGE forces sale: Heath SB-220, $325. Excellent. WB4MRI, 4405 Guinea Road, Annandale VA 22003.

HALLICRAFTERS SR400 w/acps $580; SR2000 w/acps $800, HA 20 goes with first sale of either. Good condx. You pay UPS shipping. WB9BPM RR2/ Bridgman RD., DeForest WI 53532.

YAESU owners — Present or Prospective — Help us celebrate our fifth birthday by joining the International Fox-Tango Club. Send SASE or IRC for complete details and sample Newsletter. Milton Lowens WA2AOQ/4, 248 Lake Dora Drive, W. Palm Beach FL 33411.

SELL: As complete station: Apache, TX-1, SB-10, HQ110C, relay, cables, manuals, $200.00 plus shipping. KØUMM, Dennis 2927 Greenway Drive, Bettendorf IA 52722.

SB-303, cw filter-$285; DX-60B, HG-10B, $99 all mint, prefer pick up, WA3TLF 561 Woodward Dr., Huntingdon Valley PA 19006. (215) 946-1635.

COLLINS — MP-2 portable power supply never used, factory box, MP-1 DC power supply, 351 D-2 mobile mount, both used one week. All cables, parts instruction books etc. Price $400 for all — R. Taylor W1QCC 02865.

CRYSTALS Air-1st-cl — Novice, active FT-243, all frequencies, minimum five 40M, 15M, 10M 99¢ each, 80M $1.85. Less than five $1.50, 80M $1.95. Novice band — Edge Marker-QSO combination package, 80M, 40M, 15M, 10M — four bands, eight crystals — EBM-QSO-8 — $9.95. Same less 10M pair — EBM-QSO-6 — $7.95. Both novice packages for QSO just inside HI-LO band edges and calibration of your receiver or VFO. Satelliting? — 8107 HC-6/u $2.45, 160M FT-243 pins $2.95, four for $9.80. Sockets 25¢. Air-1st-cl, 20c/crystal. Free listings, 160M-2M. "Crystals since 1933". Bob Woods WØLPS, C-W Crystals, Marshfield MO 65706.

NEED one each in new condition for HQ-145: Telechron clock assembly kit, Hammarlund No. PL26380-GI with instructions for converting to HQ-145C. Plug-in crystal calibrator assembly XC-100P, Hammarlund No. PL38653-G7. Richard H. Nixon 1517 N. 8th street, Boise ID 83702.

PAIR brand new 3-500Z's, ARRL Nat'l Convention prize — $75 PP. Chet Koziol WA2BGS 129 N. 19th St., Olean NY 14760.

SELL: R390/URR receiver. Clean, no scratches, modifications, or tinkering. With spares and complete tech manual. $350.00 Gene Eltstrom, 3 Franklin Pl., Lakehurst NJ 08733.

SALE — Swan 500-CX & a.c. power supply; both $450. — mint cond. W3YCO — John Salada 2520 Columbia Ave, Swissvale PA 15218.

COLLINS VHF receiver, type RUQ (used in control towers), rack mount, looks good, $30 as is, U ship. M.M. Kovar, 3 Puddingstone Ct., Morristown NJ 07960.

FOR SALE: Drake C-line all mint asking T4XC, AC4 $500.00, R4C, MS4 — $470.00 MN2000 $150.00, SB220 — $340.00 Bob Yourwith, Mott Hill Road, East Hampton CT 06424. (203) 267-0160 After 8:00 PM.

SELL: 3 element 20 meter beam; 40.00; W2HQ, 174 E. Cresent Ave., Ramsey NJ 07446. (201) 327-1333.

DRAKE: R-4C $475; R-4B $285. External 8-pole xtal filter for R-4B, in minibox w/switch and cables $55. Motorola 2-frq 2-meter on rack panel, xtals for 31/91, 19/79, 94/94 $95. Comco 60B 2-meter FM, 6 channel, 8 watts, xtals for 94/94, 34/94, 88/88, 19/79, 31/91 $125. WANT: SR-200, HW-101. John Limbach, Box 74, Spring Lake NC 28390.

DX-60, HG-10, $50 plus shipping. SASE for other items. WB6PCV, Marty Bigos, 1926 Fell, S.F., CA (415) 387-0409.

SWAP Atlas 180 with deluxe mobile mount, mike, antenn transformer, mobile antennas and/or TV Odyssey game fo commercial SSTV, 2 meter fm Walkie Talkie or transceiver. An offer considered. WA6FXM/9 1960B Lexington, Great Lakes I 60088, (312) 689-8580.

DRAKE 2C Receiver, 2CQ, 2AC, 2NB, all new — $235.00. W9CO, 604 Wyatt, Lincoln IL 62656.

SELL: Johnson Viking Kilowatt power amplifier (CW, AM or SSB) with matching steel desk and Viking Ranger transmitter/exciter. Both factory wired and mint condition. Complete manuals. Original owner, in operation under 45 hours. $700, F.O.B. Brookline, MA. Weight around 900 pounds. Bob Whittemore, W1SGT, 203 Heath, Chestnut Hill MA 02167. (617) 566-2030.

WANT HW-202 and pwr supply complete, operational plus Heath monitor scope. — Have 500 plus items science fiction, 29 yrs astounding-analog 95% complete everything mint near mint many others & firsts. WB5LOT Rt 3 Box 112, Comanche TX 76442.

HUSTLER 4-BTV vertical with 80 meter resonator, 50 RG 8, all new (used two weeks & bought beam) first $65.00 K3MSV, 4944 Whitaker Ave., Phila. PA 19124. (215) 289-5368).

TRADE — Single channel VHF receiver 108-152 MHz Ex-FAA crystal control squeich double conversion want R390 or R389 or R648. Bob Bose 6821 Sally Lane, Edina MN 55435.

WANTED: Heath IG-37, IG-57A, IG-72 Generators, IB-28 Bridge. Bill Phillips, 250 California St., Santa Cruz CA 95060.

TOP Dollar paid for Rohn 25, 45 tower sections and associated hardware. Will take down/pick up within several hundred mile radius. Rusgrove, RFD No. 3, Folly Dan Rd., Burlington CT 06013. (203) 584-0776.

HEATH HP-14 wanted with or without HA-14 John Yodis WA2EAH 43 Beacon Avenue, Albany NY 12203.

LAMPKIN 105-B S/N 4208 with instruction book; swap for HT-37 or HT-32. W8FEI; 300-14 Mile Rd., Sparta MI 49345.

SCOPE: Heath 10-103 $150 WA2DMF.

WANTED: Used 14AVQ/WB or 18AVT/WB — seller must be in L.A. vicinity — Mike Ungar. 183 So. Detroit St., Los Angeles CA 90036, (213) 934-9034.

FOR SALE: HW 16 and VFO, in excellent condition. For more information please contact, Zane Bates, WB8TRD, PO Box 337, Parma MI 49269. Phone: (517) 531-3388 (evenings).

WANTED: Heathkit XC-2 two meter converter with Xtal good condition. KH6ARG, 3612 Puuku Makai Dr. Honolulu HI 96818.

RADIOS Unlimited now has KLM mult. 2000, amplifiers and antennas; Cushcraft antennas; and Regency HR2Bs in stock. Available soon KLM Echo 70-432 cw/ssb transceiver. Radios Unlimited, 86 Balch Ave., Piscataway, N.J. 08854, (201) 752-4307.

FALMOUTH, Massachusetts (on Cape Cod): 4 bedroom, 2 bath home, antennas and some radio equipment included in sale. Reasonable price. (617) 447-1555 days, (617) 548-2825 evenings Geitner.

WANTED: Couple "Iceman" 2 meter FM transceivers advise condition price. Ed Aymond W5UHV 6730 Westlake, Dallas TX 75214.

HARDLINE coax cable, 3/4 inch dia. solid aluminum jack brand new 250 foot length. 70 ohm impedance. $50.00 plus shipping.C. Carroll (203) 224-4603, 9 to 11 P.M. eastern time only.

LIKE new model 19 with sync motor. Want ARR15, SP200 BC779, U haul, 50 miles W. of Chattanooga. A.T. Pickering Sewanee TN 37375.

OSCAR cw rig - WRL Hi Bander (50 watts) $27.50, Marvin Feldman 463 Kensington, Biloxi MS 39530.

FOR SALE: Drake TR4 transceiver W/NB, AC4 and MS4 very mint $475 shipping paid Robert Ramborger 7547 11th Ave. N.W., Seattle WA 98117 (206) 789-0935.

SELL: Argonaut 505, built-in xtal calibrator and cw filter antenna tuner, AC power supply — all excellent condition $265 plus shipping. Package only. David Schwartz 118 Southeast St., Amherst MA 01002.

WANTED: Heath unassembled SB-102 xcvr, SB-610 signa monitor. Clyde Burnett WA5KFO/7, NW 1445 Turner Dr. No 5, Pullman WA 99163.

SELL 3600-0-3600 1 Amp plate xfmr with 110/220 pri $4 fob. WANT TR-44, Ham M Rotators, Matchboxes, Rohn 25 o 45 Tower Sections. WØAIH, Paul Bittner, 304 W. 17, Gran Island NE 68801.

6 METER amplifier: Raytrack Horizon VI L 2KW six mete amplifier. Mint. $400.00 Firm. K5FVA, Box 927, Metairie L 70004. (504) 833-5648.

HUSTLER Mobile antennas (80-10M) with base for sale Complete set for $50.00! Jon E. Fimmel, 19 Johnson Drive Dickinson ND 58601.

COLLINS 75S-3A top condx $450. Johnson matchbox 250W new w/indic ator $100 will ship — W2MFE G. Burwell 1 Ridgedale Ave., Madison NJ 07940.

ASR 33 w/stand $500. ASR 32 w/stand $275. Am insterested in Kenwood "A" twins or Drake C-line. Mike WB9JAS (312 349-6743 (eve).

SWAN 350 (late) with XC117, Mint, never mobile, origina cartons, $250 prepaid. R. Van Dyke 822 Miller Lane, S Joseph MI 49085.

GALAXY: GT-550A, RV-550A, SC-550A AC-400, VOX-35C, and CAL-250. All unused and mint $675. WA2NVB, 11 Berkley Road, Scotia NY 12302.

WANTED: Johnson Navigator with manual, either dead or alive, state condx. and reasonable price. WB6TMY 323 Alameda Street, Vallejo CA 94590. (707) 642-5900.

COLLEGE forces sale: Swan 400, 406, 117XC, 12C, extras — ask $250. Bob McDonald, Box 12265, Santa Barbara CA 93107. (805) 685-2385.

ENTIRE Station, all Heathkit. SSB xciever, new linear, scope, tower, beam and more. All mint condition. Peterson (916) 489-2343.

HOSS-Trader, Ed says we refuse to be undersold: If you didn't buy it form the HOSS you paid too much. Shop around for the best price then telephone the Hoss last. New Atlas 210 transceiver, $519.00 Demo TR4-C, $489.00. New Display SWAN 700-CX, $509.00; Demo T4XC, $469.00; Demo HR-2B, $179.00; New ICOM Demonstrator, $399.00. New Rohn 50 ft. foldover tower prepaid $365.00. Demo Ham-2 rotator, $116.95; New Display Atlas 210-X, $529.00. Hoss-Trader specials TR-4, $395.00; R4-C, $429.00; New Heath-Kit SB-303 Receiver, $289.00. New Collins at old prices, factory sealed: make offer. Moory Electronics Company P.O. box 506, DeWitt Arkansas 72042, Tel.: (501) 946-2820.

NOVICES — Get that General ticket the easy way. CW on Hour cassette tapes. $1.90. WB9QJA 312 Tower, East Alton IL 62024.

HEATH SB620 spectrum analizer $90., R390A good condition $395. Vic, WB2PYE, 325 Wilson Ave., Westwood NJ 07675.

FOR SALE: Hammarlund HQ145X receiver like new — CB transceiver — D 104 mike, other mikes and electronic parts and equipment. Any reasonable offer. Norman Leet, 458 Dunster Drive, West Hempstead, NY 11552.

LINEAR Amplifier, Heath KL-1 uses (2) 4-400 for easy 2KW P.E.P. $300. Lon Martin WB0IAQ, 5234 Nall Ave., Roeland Park KS 66202. (913) 362-6826.

INSTANTLY find exact distance and bearing anyplace in the world. A one of a kind computer generated multi-colored world map locates you in the center. Three sizes are available; 10", 20", and 30" for $9.95, $14.95, and $19.95. Send check, name, address, and call letters + 75c handling to CDCA P.O. Box 88559, Seattle WA 98188.

WANTED: Specifications on: Hallicrafters SX-122; Hammarlund HQ-170, HQ-180, HQ-215; will send back if needed. Thomas Lebryk, 230 Mt. Vernon Pl., Apt. 2-C, Newark NJ 07106.

SELL Hustler antenna MO-2 bumper mast RM-75 resonator new $24. F. Thiede W2EC, 8 Nathan Hale Dr., Setauket NY 11733.

HEATHKIT IB-1102 frequency counter, mint condition — $275. Kurt Hafner WA1RGX, 181 Ann Ave., Mystic CT 06355.

DRAKE CC-1 console SC-2, SC-6, CPS-1, SCC-1 $150. solid state CCTV camera — don't know brand but it works — $90. Don WB8BKC (313) 663-8921.

WANTED for cash TR4C w/NB, AC4, MS4, or T4XB or T4XC. Larry Widmann 6317 Main St., Kirkville NY 13082. (315) 656-3824.

MIDLAND 13-505 2mfm transceiver, 30 watts out, 4 extra xtals, magnetic antenna, perfect condition: $250. or best offer. M.R. Owen, Box 956E, Richmond IN 47374.

SELL: HW101, HP23B, SB600 $325, SB-33 80-15 transciever $175., HW-7 $55, TA33jr. $75. AR-22 rotator $50., dynamic mike $10., box of tubes $25. Gorman 64, Summer St., Andover MA 01810.

SALE: Tempo One, AC One, Shure 444, Heath SB200, Hustler 4BTV, Immaculate — best offer. WA7ZVU, 868 McVey no. 22, Lake Oswego OR 97034.

VENUS SSTV monitor in mint condition $250. WB9EXI 330 N. Washington, Hinsdale IL 60521. (312) 323-1735.

SELL: Ten-tec KR-20 keyer. mint - $50. WN3ZKD, 1525 Mission, Lancaster PA 17601.

WANTED: Back issues of "Amateur Radio Defense" and 1945 issues of CQ magazines. Sell: 6-channel Brush recorder and Bristol 8-point temperature recorder. Nagle, 12330 Lawyers, Herndon VA 22070.

WANTED: Spools of recording wire for a Webster Model 80 wire recorder. William Crowell, 48 Oxford Dr. Deerfield, IL 60015. (312) 945-3533.

FOR SALE: Swan 250C 117 CX P.S. 3 el cush Ant mint condition $350. WA2YGT 135 Cupsaw Drive Ringwood, N.J. 07456 (201) 962-7425.

Jobs For Hams

Radio and power plant engineers, antenna riggers. Supervisory openings are available overseas with Voice of America. Transmitter technicians — openings in California, North Carolina, and Ohio. Salaries $12,285 to $17,556. Civil Service applications (Form SF-171), available at Post Offices and Federal Buildings, should be sent to: VOA Personnel Office, HEW-South Building, 330 C Street SW, Washington DC 20547. An equal opportunity employer.

COUNSELORS — Ham radio, electronics, rocketry, auto mechanics childrens camp, NE Penna. Write Corpuel, 633 Barnard Av., Woodmere NY 11598. (516) 295-5544.

HAM with general class license, high school graduate minimum. To teach radio to campers at outstanding Co-ed camp. Write for application to New Jersey YMHA-YWHA Camps, 589 Central Ave., East Orange NJ 07018. Phone (201) 678-7070.

COUNSELOR: Operator with general license to teach ham radio at Pennsylvania co-ed camp. Have completely equipped ham station. Write Trail's End Camp, 215 Adams Street, Brooklyn NY 11201.

STATEMENT OF OWNERSHIP, MANAGEMENT AND CIRCULATION (Act of August 12, 1970: Section 3685, Title 39, United States Code). (1) Title of Publication – *QST*; (2) Date of Filing – September 26, 1975; (3) Frequency of Issue – Monthly; (3A) Annual Subscription Price – $9.00. (4) Location of Known Office of Publication – 225 Main Street, Newington (Hartford County), Connecticut 06111; (5) Location of the Headquarters or General Business Offices of the Publishers – 225 Main Street, Newington (Hartford County), Connecticut 06111; (6) Names and Addresses of Publisher, Editor, and Managing Editor: Publisher – The American Radio Relay League, 225 Main Street, Newington, Connecticut; Editor – Richard L. Baldwin, 26 Ridge Road, Simsbury, Connecticut 06070; Managing Editor – William I. Dunkerley, Jr., 275 Batterson Drive, New Britain, Connecticut 06054; (7) Owner – (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding 1 percent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a partnership or other unincorporated firm, its name and address, as well as that of each individual must be given.) The American Radio Relay League, Inc., 225 Main Street, Newington, Connecticut 06111 (an association without capital stock); (8) Known Bondholders, Mortgages, and Other Security Holders Owning or Holding 1 Percent or More of Total Amount of Bonds, Mortgages or Other Securities – None; (10) For Completion by Nonprofit Organizations Authorized to Mail at Special Rates – The purpose, function, and nonprofit status of this organization and the exempt status for Federal income tax purposes have not changed during preceding 12 months; (11) Extent and Nature of Circulation – Average No. Copies Each Issue During Preceding 12 Months – (A) Total No. Copies Printed (Net Press Run) – 123,284, (B) Paid Circulation – 1. Sales through Dealers and Carriers, Street Vendors and Counter Sales – 4,992, 2. Mail Subscriptions – 114,979, (C) Total Paid Circulation – 119,971, (D) Free Distribution by Mail, Carrier or Other Means – Samples, Complimentary, and Other Free Copies – 2,146, Copies Distributed to News Agents, But Not Sold – 65, (E) Total Distribution (Sum of C and D) – 122,117, (F) 1. Office Use, Left-over, Unaccounted, Spoiled after printing – 1,101. 2. Returns from News Agents – 66 (G) Total (Sum of E & F – should equal net press run shown in A) – 123,284, Actual Number of Copies of Single Issue Published Nearest to Filing Date – (A) Total No. Copies Printed (Net Press Run) – 130,502. (B) Paid Circulation – 1. Sales Through Dealers and Carriers, Street Vendors and Counter Sales – 5,349, 2. Mail Subscriptions – 117,438, (C) Total Paid Circulation – 122,787, (D) Free Distribution by Mail, Carrier or Other Means – Samples, Complimentary and other Free Copies – 2,189, (E) Total Distribution (Sum of C and D) – 124,976, (F) 1. Office Use, Left-over, Unaccounted, Spoiled After Printing – 5,476, 2. Returns from News Agents – 50, (G) Total (Sum of F & F – should equal net press run shown in A) – 130,502. I certify that the statements made by me above are correct and complete. (signed) Richard L. Baldwin, Editor.

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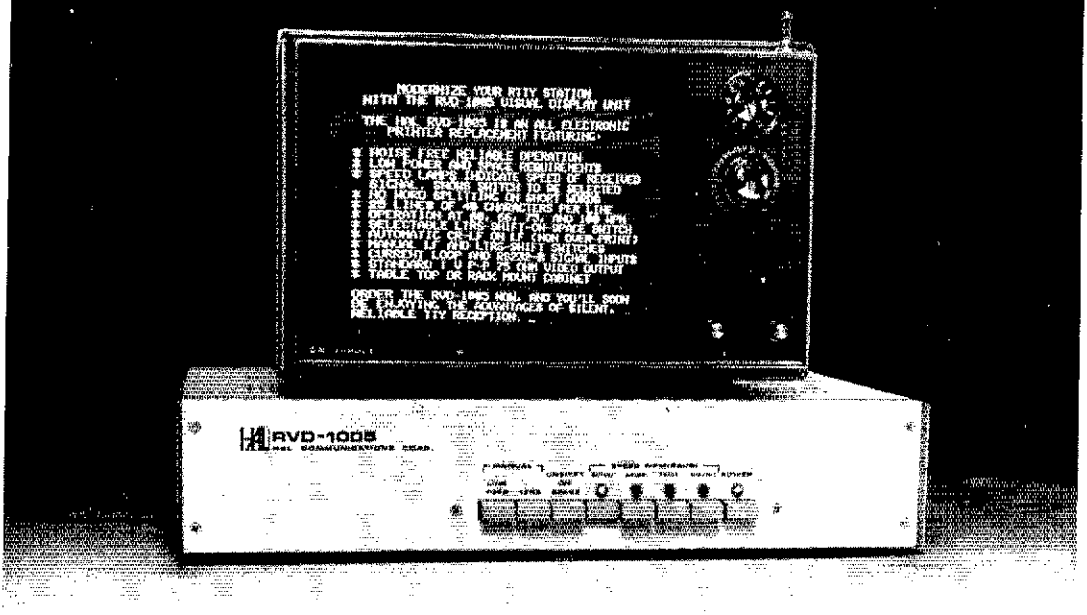
With the HAL RVD-1005, what you see is what you get.



And you get more of what you expect from noiseless, trouble-free all solid-state TTY reception. The RVD-1005 converts the output of any TU into a clear, easy-to-read RTTY readout. The signal can be fed to a TV monitor* or, with slight modification, any standard TV receiver (Just imagine a 23-inch teleprinter!). It's the beginning of enjoyable TTY communications and the end of electromechanical devices with all of their maintenance headaches. The display above points out the many reasons why the RVD-1005 makes all other TTY systems seem obsolete—and it's just part of the HAL lineup of quality, state-of-the-art RTTY components for the serious amateur.

The HAL DKB-2010 dual mode keyboard is another example. It allows you to transmit TTY or Morse—TTY at all standard data rates, and CW between 8 and 60 WPM. You also get complete alphanumeric and punctuation keys, plus 10 other function keys, a "DE—call letters" key and a "QUICK BROWN FOX ..." diagnostic key. In both modes you have a three character buffer for bursting ahead (larger buffers optional); and in the CW mode you can adjust the dot-to-space ratio (weight) to your liking.

When we say what you see is what you get, you can count on getting all that and more, including quality construction throughout. So if you're into RTTY, join the ranks of amateurs the world over who are enjoying this hobby at its best—with professional gear at amateur prices from HAL—the leader in amateur RTTY equipment. Send today for the HAL products you want!

*RVD-2110 9-inch Monitor/TV shown is optional

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Enclosed is $_____ (RVD-1005 Video Unit)
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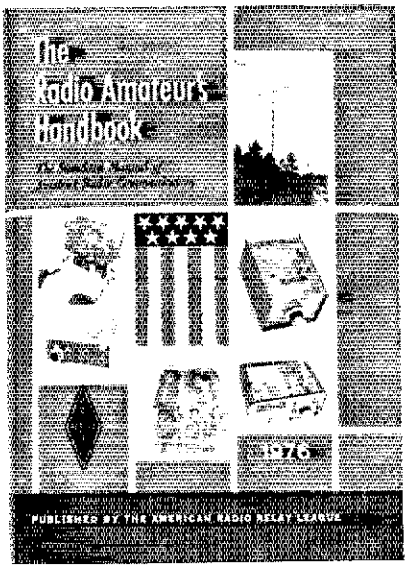
RVD-1005 Video Unit: $575. RVD-2110 Monitor TV: $150. DKB-2010 TTY/CW Keyboard: $425.
All prices include USA shipping. Add $10 each for air shipment. Illinois residents add 5% sales tax.



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The AMERICAN RADIO RELAY LEAGUE, INC.

NEWINGTON, CONN., U.S.A. 06111

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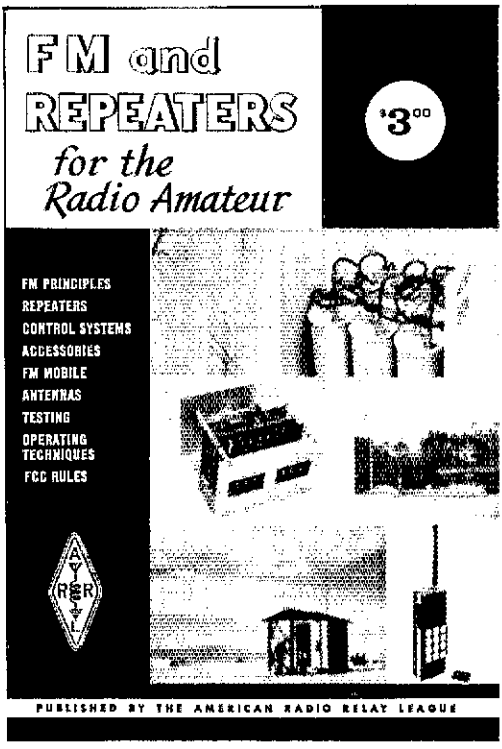

This book is a *must* for the fm buff as well as the operator just breaking into fm and repeaters. Everything is covered! Fourteen chapters include: mobile installation, transmitters, receivers and antennas for mobile and base, and fm test equipment. Special sections treat alignment and troubleshooting gear as well as repeater technical problems and cures. Club organization, repeater location planning, and operating under the new regulations are all covered. If you operate fm or are just becoming interested, you cannot afford to be without this book.

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The **AMERICAN RADIO RELAY LEAGUE, INC.**
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Yaesu. Known for the worlds best rigs ...and the test equipment to prove it.

Worldwide, you'd be hard put to find an amateur who didn't recognize Yaesu as a name that spells top quality in amateur radio communications. The same holds true in test equipment. Because the same high standards of quality that have made Yaesu known as The Radio Company – apply to the test gear we make.

You can choose from a variety of components, such as the YC-355D 200 MHz frequency counter – every amateur station should have one. And our frequency counter has some extra pluses: like an easily-affordable price. Also advanced IC circuitry, rugged epoxy PC boards, operation on AC or DC, super-accurate readout from 1.8 to 200 MHz, and a design that promises stable and accurate measurements for years to come.

The YO-100 monitor scope helps you maintain the cleanest sounding signal on the air. It's compatible with virtually all rigs, and accepts a wide range of inputs for all-mode monitoring – even RTTY. A built-in 1500/1900 Hz tone generator adds to the YO-100's versatility. What's more, all the controls you need in a professional scope are to be found here. It's a must for any shack.

The Yaesu YP-150 Dummy Load/Power Meter has a frequency range to suit all amateur needs – from 1800 KHz to 200 MHz at wattages up to 150. The meter operates on three switch-selected scales to assure accuracy. A built-in fan cools the unit for stable, reliable measurements. And its price is attractively low.

For accurate digital display of transmit and receive frequencies on all amateur bands, the YC-601 is the ideal instrument. Designed for use with Yaesu rigs in the 101 or 401 series, the YC-601 features six-digit readout with accuracy to 100 Hz. The unit also has a built-in power supply, calibrator, and a band switch that includes 80 through 160 meters, plus WWV/JJY position. For razor-sharp tuning, the YC-601 is your answer.

These four Yaesu products are built to the same high-quality standards as are Yaesu amateur radio components. And they're just as much the value. So see your dealer or write today for more information on Yaesu measurement/test gear, plus a catalog of Yaesu amateur radio equipment.
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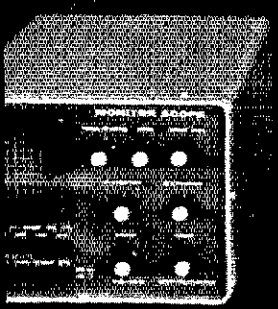
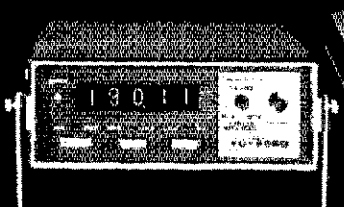
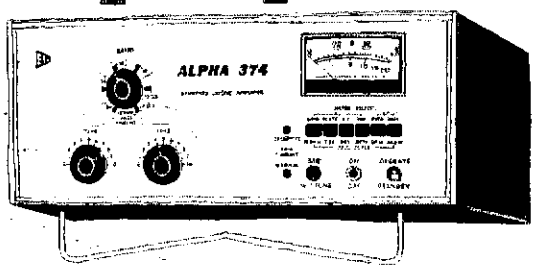




The "no tune-up" Alpha 374 is powered by EIMAC 8874's.



EIMAC 8874s were the first choice of Ehrhorn Technological Operations, Inc. for their desk-top Alpha 374 bandpass linear amplifier. It's designed to make it easier than ever before to run maximum legal power on all popular modes—it's capable of continuous operation at a kilowatt average power input for CW, RTTY and SSTV—with plenty of reserve for two kilowatts PEP on SSB.

Besides power, the Alpha 374 permits total "no tune-up" operation with modern broadband transceivers. With conventional exciters, it eliminates time, confusion and damage risk previously associated with amplifier tune-up. "Manual" or "Bandpass"—the choice is yours with the 374.

An amplifier like this obviously requires exceptional output tubes. And EIMAC 8874 high-mu, ceramic-metal triodes fill the bill. Three 8874s with axial air-flow cooling fit neatly in a corner of the amplifier—keeping the 374 size down to about one cubic foot and weight below 55 pounds. Yet, the EIMAC 8874s provide 1200 watts plate dissipation, allowing the 374 to coast along at maximum legal power.

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