

August 1969

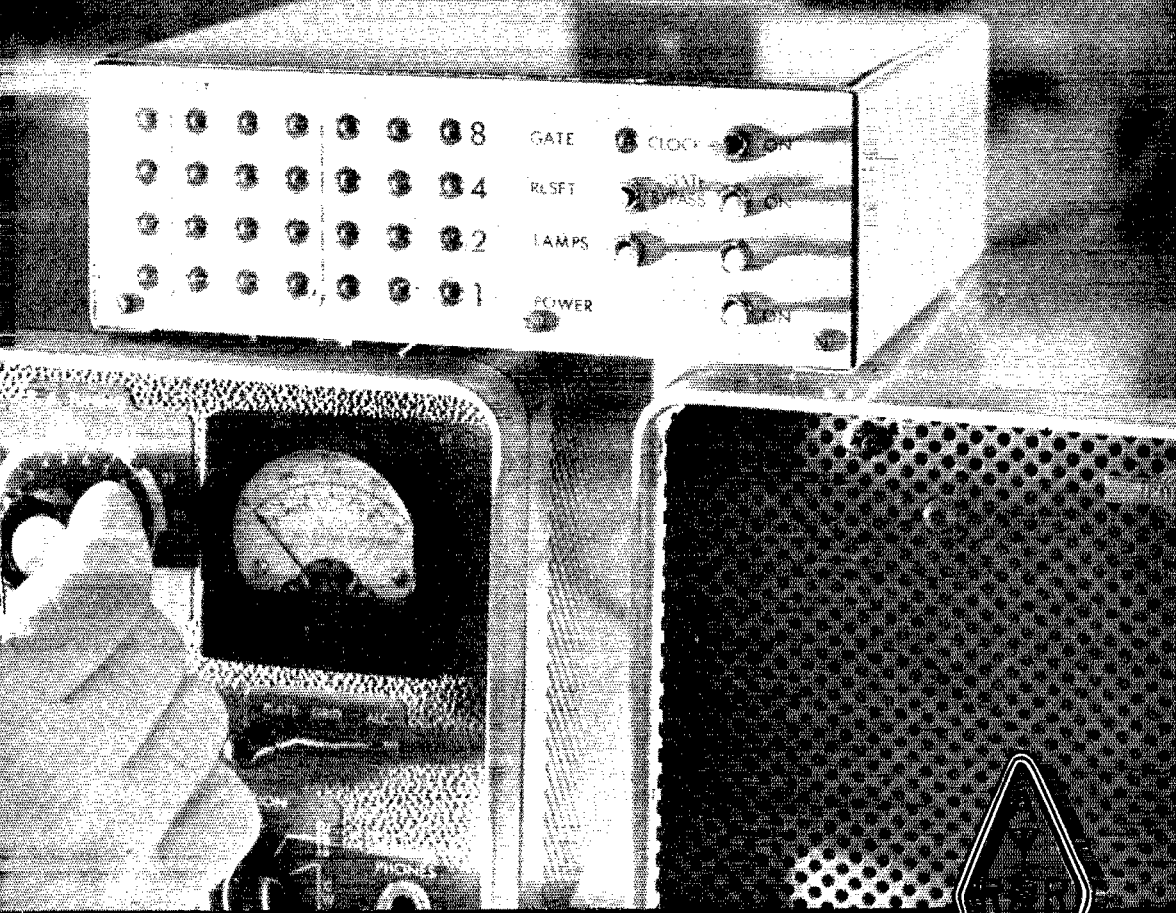
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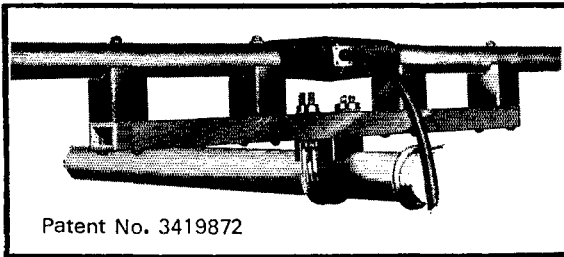
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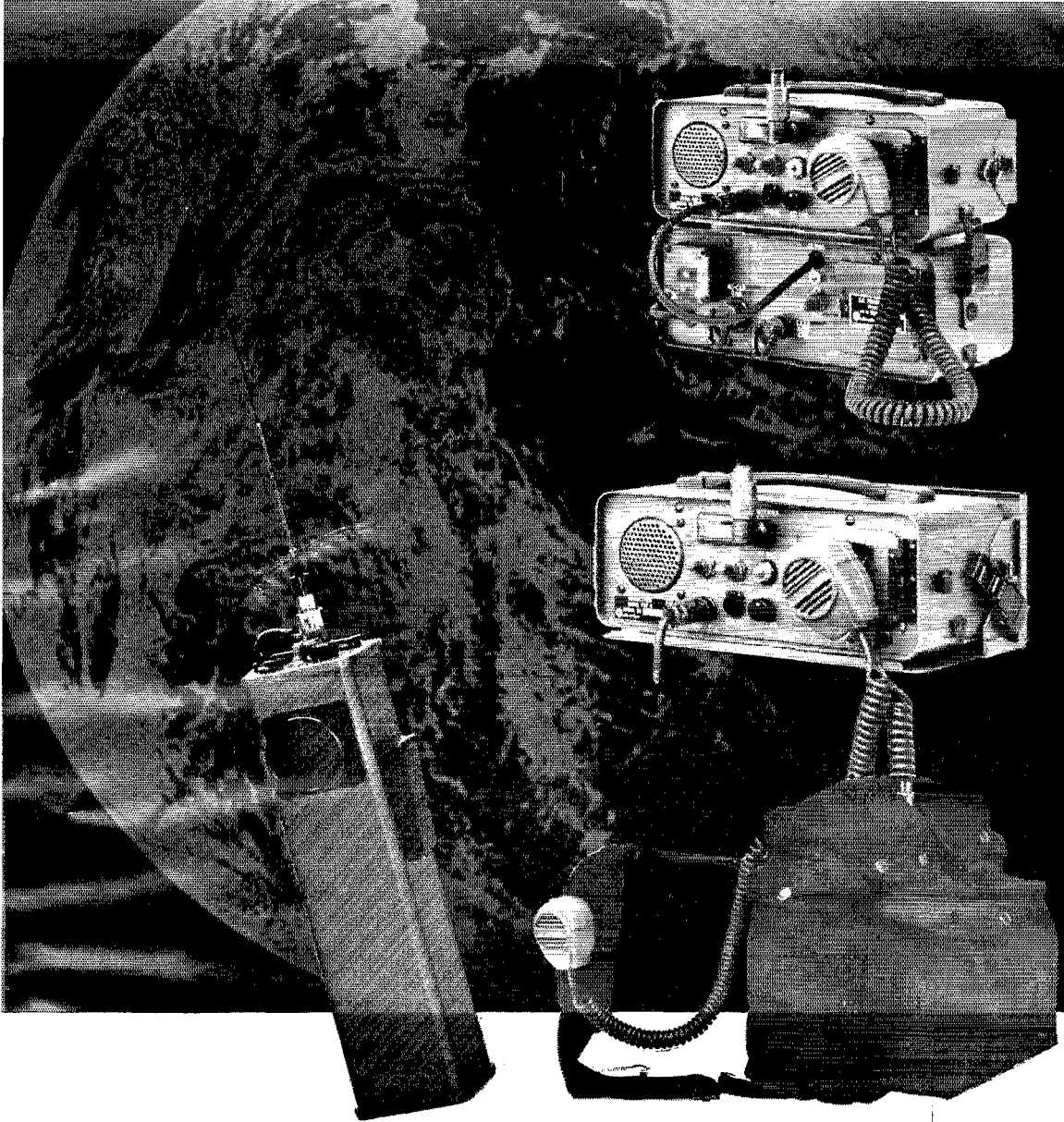
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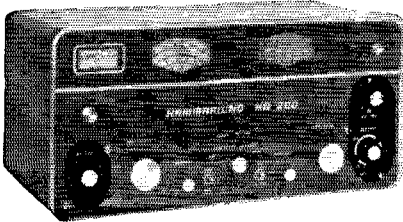


OUR COVER
This little frequency counter by WB2MEX, with its binary-coded decimal readout, will count r.f. as well as audio frequencies. See page 24.

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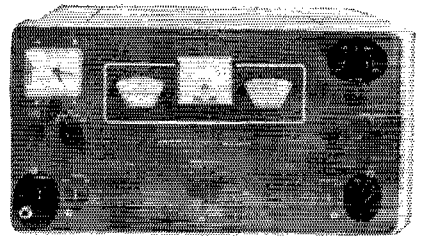
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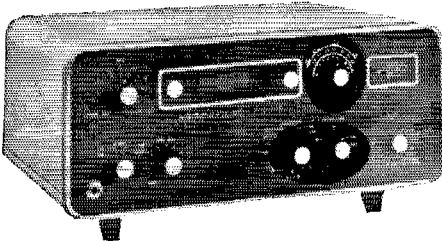
Maximum pre-mixer selectivity is a valuable aid in reducing spurious responses and such selectivity is most easily achieved with an R.F. stage. (See all Hammarlund receivers for this --)

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MODEL HQ-180A

of the two is the *shape* factor of the receiver. The ideal would be a shape factor of one—but this is presently impractical. The inclusion of step selectivity by use of a mechanical or crystal filter or by changing LC circuit parameters can provide shape factors close to the ideal. (Check the front panel of any Hammarlund receiver!)



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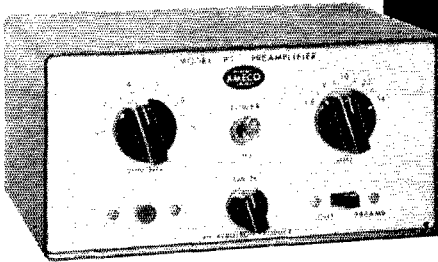
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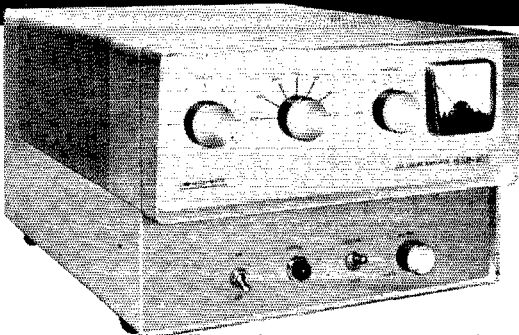
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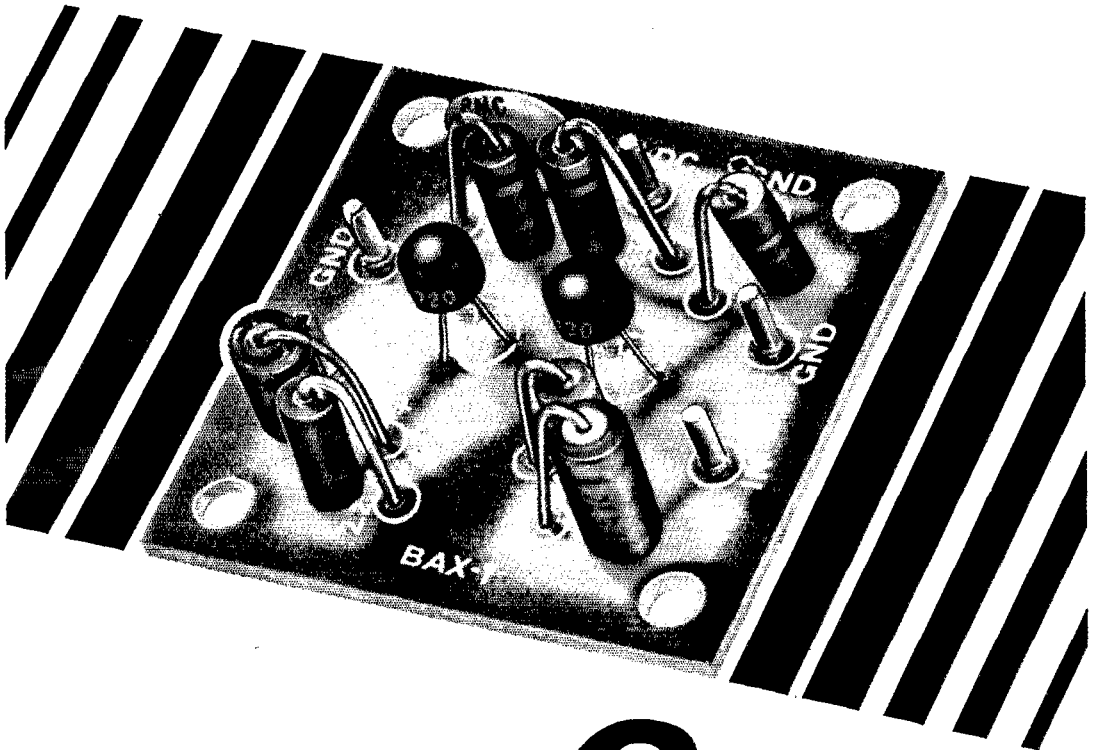
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A League objective of many years has been brought to fruition with the production of a half-hour 16-mm. color motion picture describing amateur radio for the uninitiated.

The purpose is both to tell our story to the public with greater impact, and to stir up a more intense personal interest on the part of many — particularly youth — who may be prospects to join our ranks.

Its accomplishment has had superb cooperation from all quarters. Arthur Godfrey, K4LIB, did the narration. Barry Goldwater made a special trip home to Phoenix to describe activities at K7UGA/AF7UGA. The West Valley (Southern Calif.) club, mostly teenagers, let us film their Field Day. Enrique, XE2RH, lends international flavor; Sharon, WA7DSW, adds eye appeal. Bill Leonard, W2SKE, of CBS, did a news sequence. To top it all off, the producer-director is Dave Bell — a ham (W6BVN) thoroughly skilled in the film game.

Premiere showing was at the National Convention in Des Moines, where the potential interest was underestimated and there were numerous standees despite scheduled showings nearly every hour. With two exceptions (one a magazine editor who is probably green with envy, so prepare to read an adverse view elsewhere!) reaction was wholly favorable — ranging from moderate approval to enthusiastic raves.

What next? Well, at the moment of writing only one print exists; others are in the works. TV exposure will get first priority — network if it can be arranged, local if it cannot. Then come showings to public groups — school assemblies, civic clubs, and the like. We'll eventually have prints for ham club programs, but it will be quite a few months; we're sure you'll agree that the first aim should be to impress the public, not to admire ourselves.

But meanwhile, if you have a particularly good outlet for public showing — a good contact at a TV station, a sympathetic high-school science teacher — let Hq. or your director know, so that it may be scheduled. Let's give this film as much exposure as we can, all pulling together.

NOVEMBER 22 — ACT II

In less than four months after you read this, the second installment of the "incentive-licensing" program is scheduled to go into effect. Unless, that is, FCC acts to modify the timetable.

Right from the start, Commission pronouncements have stated an intention to give the script of Act II a full review some time prior to November 22 this year. At the New England Division Convention in May, W4GF of FCC repeated this aim and provided some interesting statistics (see page 66), but gave not a hint of any official view. Indeed, there may not yet be one, if the intention is to hold off until the last minute so that as much input as possible may be available.

There are varied amateur opinions on whether changes should be made, especially from those expressing philosophical views without benefit of actual operating or listening experience in the restricted segments. There are even differences of appraisal among those who have paid close attention to such operating activity. One thing is certain — the activity observed can depend on the time of day, or day of week, and the band involved. Thus to be useful a survey effort has to encompass an extended period, or at least sample over a long time.

FCC is engaged in such monitoring. The corps of stalwart ARRL Intruder Watchers will undertake a similar set of observations this autumn. Occupancy, however, will not be the sole basis of decision, as W4GF points out. Many other factors will be considered.

What is the League's position? Not yet determined. ARRL directors wish to acquire all possible input of information before a decision, and have scheduled a special meeting November 1 largely to take up this point. They will welcome your views.

Is the level of activity satisfactory? Does it fulfill the purpose of incentives in the first place? Since FCC's original edict, is the growth of the Extra Class (nearly 100%) and of the Advanced Class (25%) meeting the challenge? Does a projection of this growth indicate accomplishment of the aim?

Let the directors hear from you, please. **QST**

League Lines . . .

W/K hams must be gadabouts; so far this year we've had some 325 inquiries about licensing arrangements overseas; in destinations, England leads with 37, Germany 30, Switzerland 19, and Italy 15. With this kind of activity, we may someday have an international license the late W1EH editorialized on many years ago.

VE hams are invited to participate in an essay contest sponsored by the Radio Society of Ontario. Subject: "How I justify my existence as an Amateur (Experimental Station Licensee." Food for thought for all of us!

League Hq. and that of the Boys Clubs of America are hatching up a pilot project on ham radio for selected Boys Clubs around the country. If it works, it will spread -- and W9YHB and the Lawndale (Ill.) Boys Club will have plenty of company!

Special temporary permission was given U.S. hams last month to provide third-party traffic channels with Curacao during the recent problems there. Was also done in the case of Congo a few years back. Proves once again that we're ready with vital emergency communications when the chips are down.

Your voice in the League starts with nomination of suitable candidates for director and vice-director. Election notice appears in "Happenings" this month for members in the Atlantic, Canadian, Dakota, Delta, Great Lakes, Midwest, Pacific and Southeastern Divisions.

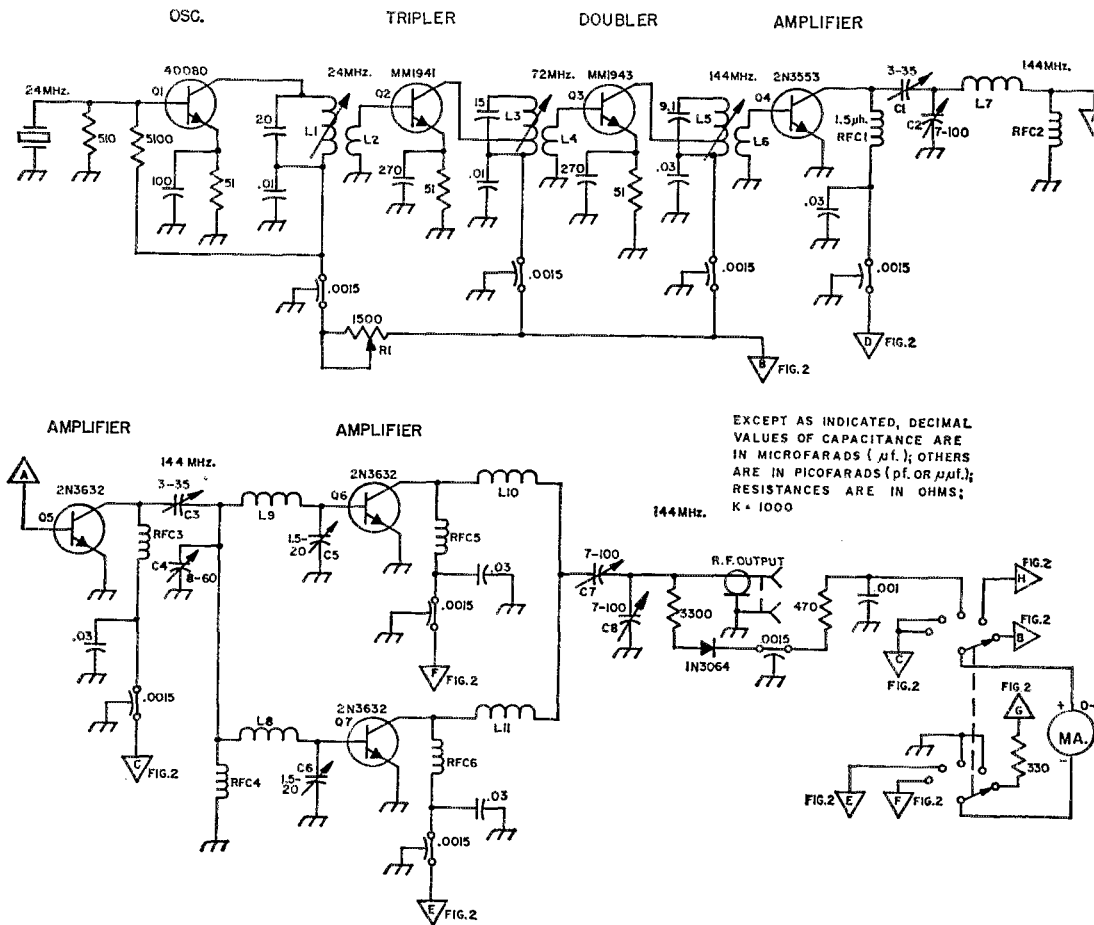
Having got through the Hertz cycle with not too many bruises from our readers, we're ready now to tackle further changes in abbreviations. Mostly this means getting rid of periods, so that v.t.v.m. becomes VTVM, etc. But our old i.f. can't become if, nor old a.m. become am, so they'll be i-f and a-m. We're planning to adopt the list worked out by the Society of Technical Writers and Publishers.

Speakers Bureaus -- has your club provided a speaker on amateur radio to a local service club, women's club, or school group? Why not let local organizations know you are ready, willing and able to present a program? Hq. will supply speech outlines and handout literature on request. Don't just wait for the new film (see previous page), since that may be some months away for such use.

Behind that Flash item, page 74, June: the old New Ocean House in Swampscott, Mass., scene of ARRL New England Division conventions for years, caught fire around 10 p.m. May 8. By 1 a.m. May 9, while it was burning to the ground, the convention committee was meeting, and by 10 a.m. had signed a contract with the Statler in Boston! The affair was held May 24-25 as scheduled, without a hitch. Hats off to W1HKG and W1VRK, and for their crew, a masterly job!

W3USS is the call sign of the newly-formed Capitol Hill Amateur Radio Club. K7UG is the best-known member; others are Congressional staff and committee personnel.

Quote-of-the-month, from W5JJ in "Collector and Emitter" of the Aeronautical Center A.R.C.: "It's amazing how many presently-encountered problems can be washed away in a flood of enlightenment loosed by reading an old QST article. Maybe that's because QST is years ahead in the matter of basic theory and basic applications."



EXCEPT AS INDICATED, DECIMAL VALUES OF CAPACITANCE ARE IN MICROFARADS (μf); OTHERS ARE IN PICOFARADS (p.f. OR $\mu\mu\text{f}$); RESISTANCES ARE IN OHMS; $K = 1000$

Fig. 1—Schematic diagram and parts information for the 2-meter transistor transmitter. Component numbers not listed below are for text reference only.

- C₁ through C₈—Ceramic trimmer; value on drawing.
- L₁—1 to 1.4- μh . iron-slug coil (Miller 4305).
- L₂—1½ turns insulated No. 28, around low end of L₁.
- L₃—0.3 to 0.39- μh . iron-slug coil (Miller 4302) tapped ¾ turns from low end.
- L₄—¼ turns insulated No. 28, around low end of L₃.
- L₅—0.19 to 0.25- μh . iron-slug coil (Miller 4301) tapped ½ turns from low end.
- L₆—¾ turn insulated No. 28 around low end of L₅.
- L₇—3 turns No. 20, ¼-inch diam., ⅜ inch long.
- L₈, L₉—Like L₇, but ½ inch long.
- L₁₀, L₁₁—3 turns No. 20, ⅜-inch diam., ⅜ inch long.
- Q₁—40080.
- Q₂—MM1941.
- Q₃—MM1943.
- Q₄—2N3553. 2N3961 may be substituted.
- R₁—1500-ohm wirewound linear control.
- RFC₁—1.5- μh . r.f. choke.
- RFC₂—Ferrite bead r.f. choke (National R-45-254).
- RFC₃—2 turns No. 20, ¼-inch diam., ¼ inch long.
- RFC₄—1.0- μh . r.f. choke (Miller 70F106A1).
- RFC₅, RFC₆—1 turn No. 20, ¼-inch diam., ⅜ inch long.

It will be seen that two bypass capacitors are provided on the collector supply voltage leads throughout the design. The feedthrough types are for low shunt impedance at r.f. Since the overlay transistors have much higher gain at low frequencies than in the v.h.f. range, a large value of bypass is added at each feed through, to reduce the possibility of low-frequency oscillation.

In order to monitor individual currents to the final transistors, separate current shunts, R₁ and R₂ in Fig. 2, are used with a 1-ma. meter, giving a full-scale current reading of 500 ma. Provision is made for reading relative output power, with

the isolating resistor and crystal diode network on the output lead. The panel meter also reads supply voltage, on a 20-volt scale, and modulator current on a 1-amp. range.

The overlay transistor lineup described was based on a stage-by-stage analysis of power output, power input, frequency, power gain and supply voltage. Obviously many other types of transistors could be substituted for those used here, if the same considerations are made.

Power Supply

The output of the power supply is 13.5 volts d.c., so that the transmitter can also be run

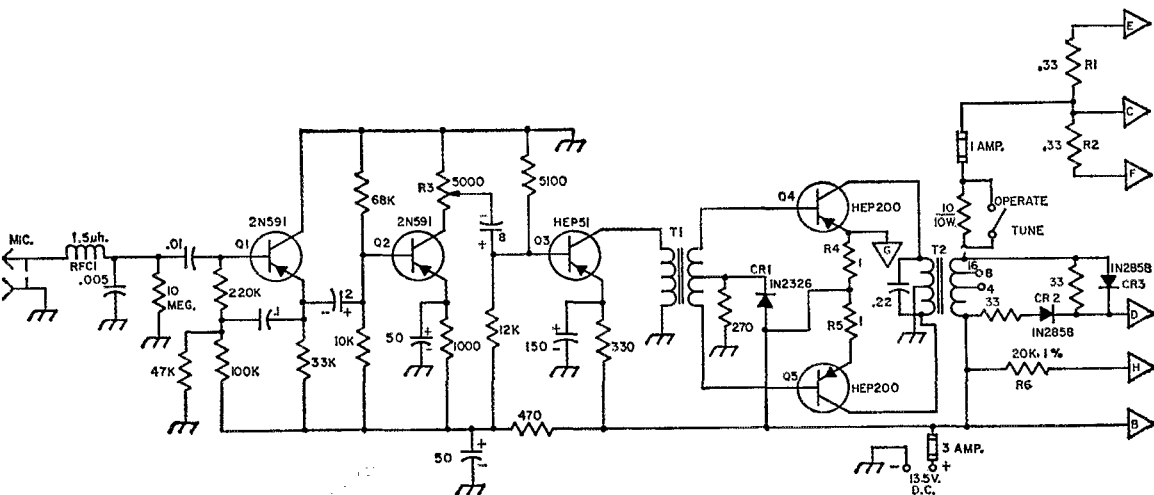


Fig. 2—Schematic diagram and parts information for the modulator. Capacitor values are in microfarads (μf). Polarity marked indicates electrolytic. Working voltage 25 or higher. Component numbers not listed below are for text reference only. Lettered leads go to corresponding points in Fig. 1.

R₁, R₂—0.33-ohm wirewound, 1/2 watt, 5 percent.
 R₃—5000-ohm control, audio taper.
 R₄, R₅—1 ohm, 1/2 watt, 5 percent.
 R₆—20,000 ohms, metal film, 1/4 watt, 1 percent.
 RFC₁—1.5- μh . r.f. choke (Miller 4604).

T₁—Driver transformer, 100 ohms each side, 1/2 watt.
 One winding c.t. (Triad TY61X).
 T₂—Output transformer, 10 watts, pri. 32 ohms, sec.
 16 ohms (Triad TY64X).

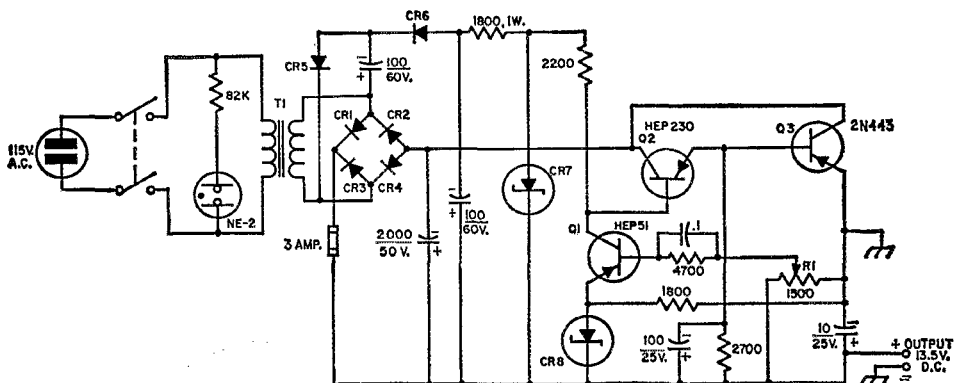


Fig. 3—Power supply information for the 2-meter transmitter. Capacitor values are in microfarads (μf). Polarity marked indicates electrolytic.

CR₁—CR₄—15-amp. 50-p.i.v. rectifier.
 CR₅, CR₆—0.5-amp. 200-p.i.v. rectifier.
 CR₇—27-volt 1-watt zener diode, 1N3030.
 CR₈—6.8-volt 0.4-watt zener diode, 1N754.

R₁—1500-ohm linear control.
 T₁—21-volt 3-amp. power transformer (Microtran M8222
 or Transonic TS-2656).

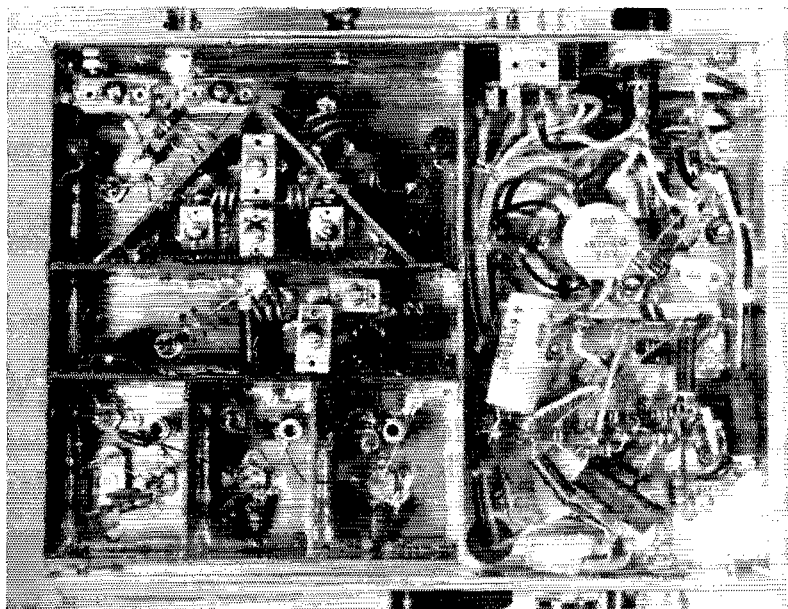
directly from a car storage battery, without appreciable change in operating conditions. The important thing in the choice of the operating voltage is the peak voltage encountered with amplitude modulation. A peak-to-peak collector-voltage swing of more than twice the d.c. voltage often exists where the collector works into a series inductor.² Then, with amplitude modulation the modulated voltage varies between zero and twice the d.c. voltage. Consequently, a total peak-to-peak voltage of greater than 4 times the collector d.c. voltage is possible with amplitude modulation. Thus the supply voltage

must be held to approximately one-fourth the maximum V_{ce} rating for the transistors used in modulated stages.

Voltage regulation is desirable because of the large variations in current drawn by the modulator. The output stage alone swings from 100 ma. quiescent to 850 ma. peak current. This is handled nicely by a car battery, but regulation of some kind becomes necessary with an electronic supply. The supply described is the series-regulation or emitter-follower type.

The transformer provides 21 volts a.c. at a current rating of 3 amperes. The rectified d.c. voltage at the output of the full-wave

² Motorola Application Note AN-214, p. 3



Bottom view of the transmitter. The r.f. assembly, left, uses circuit-board material for partitions and shielding. The crystal oscillator, tripler and doubler are at the lower left. The low-level amplifiers are in the middle, and the two-transistor final stage at the top. Modulator circuits occupy the right side.

bridge is 28. Voltage doubling is provided by CR_5 and CR_6 and the two 100- μ f. capacitors. The reason for voltage doubling will soon be apparent.

The output voltage is sensed by the comparison voltage amplifier, Q_1 , and compared with the reference voltage at the emitter, which is maintained at 6.8 volts by the zener diode, CR_3 . When a load is applied the supply voltage will try to drop, due to internal impedance. However, this change is transmitted to the base of Q_1 , which will draw less collector current, increasing V_{cc} . This rise in voltage will be transmitted to the output directly through the emitter-follower, Q_3 , without phase inversion, achieving the voltage-regulation effect desired.

The reason for voltage doubling can now be given. The 27-volt Zener diode, CR_7 , provides a stable reference voltage for the 2200-ohm collector load resistor. This is important because any instability would be transmitted directly to the output, since it is the voltage division between the 2200-ohm resistor and the collector-emitter voltage of Q_1 which determines the output voltage. Therefore, considerable improvement in regulation can be gained, making the additional components well worth their cost.

A Darlington configuration is used on the output, to get Beta multiplication for the emitter-

follower. The 100- μ f. capacitor, when multiplied by the Beta (40) of the output transistor result in an effective capacitance of 4000 μ f. across the output.³ Base current limitation is provided by the 4700-ohm resistor, without which excessive base current would flow when the potentiometer arm is at the high end. The 10- μ f. capacitor across the output and the 0.1- μ f. capacitor across the 4700-ohm current-limiting resistor provide improved transient response.

A good heat sink is required for Q_3 . In general, the larger the surface area of the heat sink the lower the operating temperature of the transistor will be. The one used here, visible in the photographs on the side of the power supply case, is about the minimum safe size. A heat-conductive compound such as silicone grease, applied between Q_3 and the heat sink, will provide optimum heat transfer.

Modulator

The modulator power output should be about 6 watts. As seen in Fig. 2, the input stage, Q_1 , is an emitter-follower, employing "bootstrapping" from emitter to base, which effectively increases the input impedance to better than one megohm.⁴ The stage provides good impedance match, with current gain, to the next stage. An r.f. choke and r.f. bypass capacitor in the microphone input circuit prevent feedback in the modulator resulting from r.f. pickup in the first stage. The output of the second common-emitter stage is transformer-coupled to the bases of the two power transistors, Q_4 and Q_5 , for maximum power transfer, impedance matching and phase inversion.

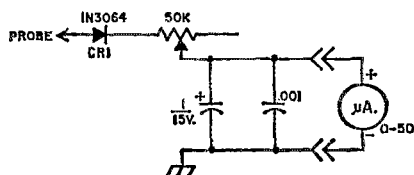


Fig. 4—Circuit of the simple relative-output meter used in lining up the transmitter.

³ *Motorola Power Transistor Handbook*. Motorola Semiconductor Products Inc., Phoenix, Arizona, 1961

⁴ "Hints and Kinks," December, 1965, *QST*, p. 47.

The power transistors are biased approximately to cut-off by the junction voltage developed across the 1N2326 diode, CR_1 . This diode's negative temperature characteristic provides a degree of thermal stability. The 1-ohm emitter resistors introduce some degeneration, to keep down distortion, and provide some additional thermal stability.

It is usually desirable to modulate the r.f. driver stages, as well as the final stage, for good modulation characteristics with transistor transmitters. Increased r.f. drive is required for the increased r.f. power output on modulation peaks. The second driver stage is modulated with the final; however, the negative modulation voltage swings of the first driver are limited to approximately half of V_{cc} by the 1N2858 diode network, CR_2 - CR_3 . This prevents removal of drive on the negative modulation peaks to the second driver, and lessens the load variations reflected back to the doubler by the first driver.

It should be mentioned that some degree of decoupling was necessary to prevent low-frequency feedback (motorboating) in the modulator. The 470-ohm resistor, with an additional 50- μ f. filtering capacitor, gives about a 1-volt drop, and sufficient isolation. The frequency response is 300 to 3000 Hz., plus or minus 3 db. The half-power points should occur at 300 and 3000 Hz., relative to 0 db. output at 1000 Hz.

Layout and Construction

The transmitter and power supply are shown in the first photograph. Top and bottom views of the transmitter and modulator are given in the next two. Copper-clad circuit-board material was used throughout the r.f. portion, for stage isolation and r.f. shielding.

Layout is important as to lead length and dress. Connections are made as short as physically possible, to reduce stray capacitance and

inductance. D.c. grounding of the emitter is critical in r.f. power amplifiers for v.h.f. service. To make the emitter-to-ground path as short as possible, a small piece of metal with a hole in the middle was slipped over the emitter pin and soldered to it and to the edge of the TO-60 transistor case. The collector is isolated, so the transistor may be bolted directly to the chassis, for efficient heat-sinking and grounding.

The modulator and power supply could have been built on circuit boards, but most of the "bread-boarding" was done directly on the chassis, so this was not practical. If other similar units are built in the future this will most likely be done, in the interest of neatness and ease of assembly.

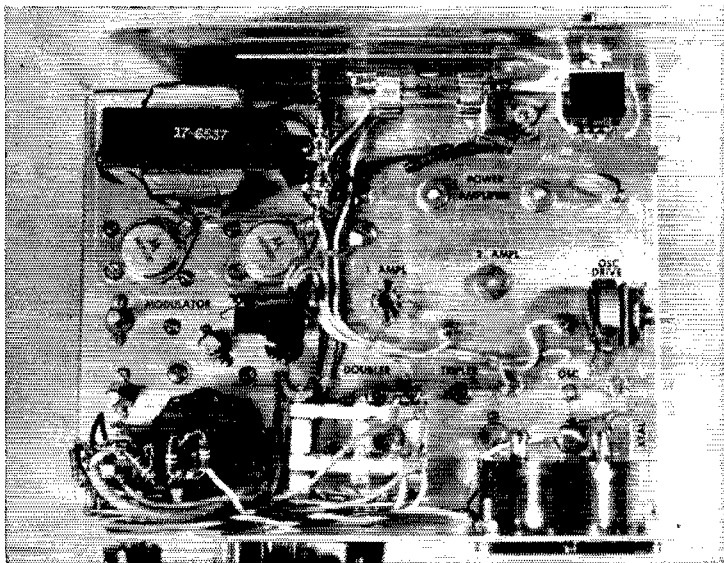
Testing and Use

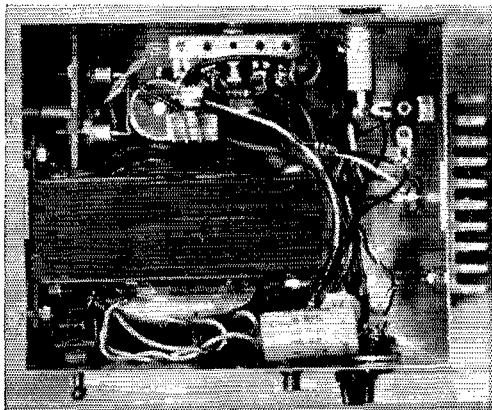
The transmitter and power supply were tested stage by stage during the assembly process, to insure proper operation. As the result of extensive testing and on-the-air use, the following test and initial tuneup procedure can be recommended. A noninductive 50-ohm load of at least 10 watts dissipation capability is required. A Hewlett-Packard 434A Calorimetric Power Meter was used, permitting direct reading of power output. The Heath "Cantenna" or similar dummy loads may be used, though they do not provide absolute power readings directly.

Remove the 1-amp. fuse in the power lead to the final stage, and set the microphone gain to zero. Turn on the transmitter and check the supply voltage, which should be about 13.5. Modulator current should be about 100 ma., with no audio input.

A simple relative-output meter, shown in Fig. 4, can be used as a tuning indicator for the oscillator, tripler and doubler stages. Connect the anode of CR_1 to the base of Q_2 , and adjust L_1 and R_1 for maximum indication. Then connect

Interior of the transmitter. Modulator components are at the left and r.f. circuits at the right.





Bottom view of the transistor power supply. The heat sink on the end of the case is for the 2N443.

the diode to the base of Q_3 , and adjust L_3 similarly. Repeat with Q_4 and L_5 . Recheck all adjustments for maximum reading at the base of Q_4 .

At this point it should be possible to monitor the signal on a 144-MHz. receiver. Set C_5 and C_6 to minimum capacitance. Set C_1 , C_2 , C_4 , C_7 , and C_8 to mid-range. Put the 1-amp. fuse back in, set the tune-operate switch in the TUNE position, and the meter switch to RELATIVE OUTPUT. With an insulated alignment tool, adjust C_1 , C_2 , C_4 , C_7 , and C_8 for maximum output. After several passes through these adjustments, a relative-output indication of about 0.4 should be obtained, with current to Q_6 and Q_7 running 200 to 250 ma. each.

Switch to OPERATE, and recheck amplifier adjustments. Current to Q_6 and Q_7 should be 450 to 500 ma. each. Adjust C_5 and C_6 for approximately equal current sharing between the two transistors. If their Beta differs widely it may not be possible to balance within 50 ma. If possible, substitute another 2N3632 for the lower-Beta transistor, though this is optional. Current unbalance of 100 ma. has been observed with no adverse results.

A final recheck of all tuning adjustments should give a relative-output indication of about 0.8, indicating an output of 7 watts or better to the load. No trouble has been encountered in working into loads offering up to 3 to 1 s.w.r., though useful output is somewhat lessened.

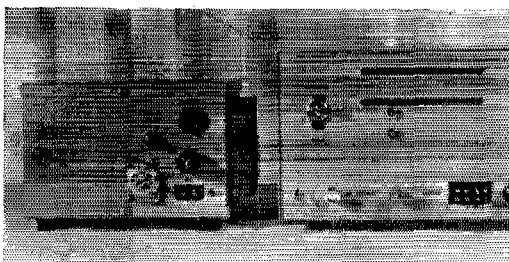
Up to 28 watts output is possible with c.w. or f.m., if a 28-volt supply and higher current levels are used. The modulation transformer secondary should be shorted out, and the supply to the amplifier stages keyed for c.w.

This transmitter project proved to be extremely interesting and timely, and it is hoped that the ideas set forth will help to accelerate the trend to solid-state design in v.h.f. mobile equipment. Because of the much higher power output that can be obtained on f.m., without the complications involved in high-level modu-

lation, the design should be a natural for the devotees of this mode.


Availability of overlay transistors at relatively moderate cost is improving, and mass production and use of some types should bring costs down gradually. Higher power levels are also in view, though the range of this design may be near the practical maximum for amateur equipment running from a 13-volt supply. Improved performance at still higher frequencies is on the way, and is already available if cost is no object.

The performance and overall efficiency of the transmitter were better than anticipated. Amplitude-modulation quality is excellent, and 100 percent modulation is readily obtained. The tune-operate switch was found very helpful for reducing the driver and final voltages and currents during adjustments, or when changing antennas or operating frequencies. As with many



Rear view of the transistor transmitter and its power supply.

such projects, some of the most useful experience comes from mistakes made, even though these mistakes can be costly, especially when working with v.h.f. power transistors! There is very little heat generated anywhere in the transmitter, so long-term reliability is to be expected.

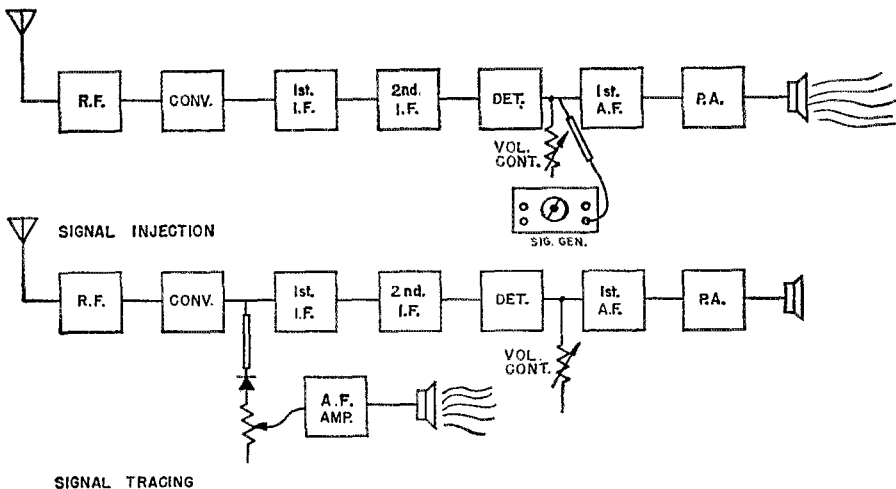
Special thanks are given to Mr. John Hunt, WA6HXE, Motorola District Sales Manager, for his generous assistance. 

Strays

HEADQUARTERS VISITS

The League Headquarters building is open to visitors Monday through Friday, 8:30 to 4:30, on a "drop-in" basis, and at other times by appointment. The headquarters is on Main Street (Conn. Route 176 and 176-A) about a mile north of the center of town, and about 3 miles west of Conn. 15-U. S. 5, the Wilbur Cross Highway. (For WIAW visiting hours, see the schedule on page 103).

Important postal changes in handling second-class mail matter are now in effect. Please advise us direct of any change of address. Four weeks notice is required to effect change of address. When notifying, please give old as well as new address. Your promptness will help you, the postal service and us. Thanks.



Once the dead stage is isolated it is usually a simple matter to locate the defective component. Voltage levels for each element of each stage can be found in the schematic or service manual for the set you are repairing. Some manuals even give a chart of voltages and resistances that should appear between each tube pin and a specific point (usually ground). Finding a missing path for current, or an unwanted path, is what this type of repair usually involves. Using a little common sense and the theory required of at least a General/Technician Class amateur will in most cases point up a glaring defect within the stage involved.

Oscillation

Another type of problem encountered in radio receivers concerns the presence of unwanted oscillations. These oscillations occur in a variety of forms and at a number of different points. A few of the more prevalent are motorboating, whistles or birdies, and an all-encompassing howl that can drive you up the wall!

Motorboating is a slow putt-putt sound that resembles an idling outboard engine. It is often, but not always, found to originate in the audio stages. A birdie is a whistle that rides along with the desired signal; you can get a good idea of what one sounds like by listening to an a.m. station with the b.f.o. turned on. It is usually caused by oscillation in the i.f. strip, the front end, or by way of the a.g.c. loop. That outlandish howl is a loud audio oscillation that usually can be traced to the various a.f. stages. These definitions are by no means all-inclusive, but serve as a starting point.

The most often used means of locating the source of one of these defects is to shunt a capacitor across appropriate capacitors in the circuit. Although servicemen are prone to check each capacitor in succession with the power on, this is not a recommended procedure. It does save time (which is what servicemen are selling) but it greatly increases the chances that the

"shuntee" will have a very shocking experience. A better, or at least safer, method is to attach the capacitor with alligator clips or solder with the power off and then turn the set on for a check. Don't forget to discharge the power supply filter capacitors after each time the set is on. The capacitors to check include all appropriate bypass capacitors, power-supply filter capacitors (the electrolytics), a.g.c. capacitors, and any miscellaneous decoupling capacitors that may be in use.

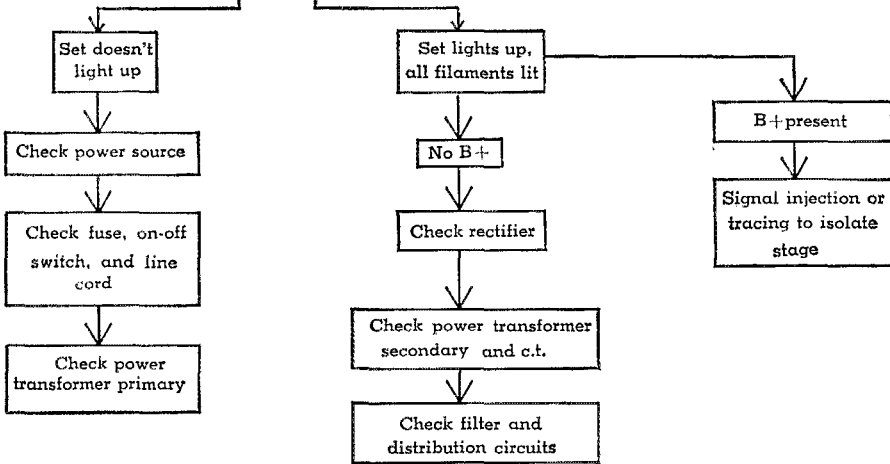
In sets that use vacuum tubes there is also the possibility that a microphonic tube or a tube with an open suppressor grid will oscillate. The microphonic tube can usually be found by tapping (lightly) on the glass envelope, but the open suppressor grid will have to be found on a tube tester or by replacement.

Hum and Distortion

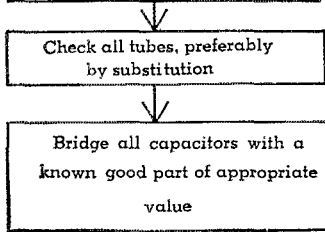
Sets that exhibit a raw 60- or 120-Hertz hum usually have either an open power-supply electrolytic capacitor or a tube with an interelectrode short. It is considered to be good preventive maintenance to replace any electrolytics that are the least bit suspicious. If a liquid or a dry flaked substance is seeping out of the capacitor it is a sure sign of impending trouble.

Distortion is caused by nonlinearity somewhere in the receiver. It is a good idea to begin searching for distortion at the loudspeaker. This is a very vulnerable part that is often the main cause of nonlinear sound. In auto-radio servicing activities we often receive a "distorted" radio from a car dealer, only to find all too often that it plays fine when we check it. If said dealer had sent the speaker along with the radio he would have come up smelling like a rose! So don't overlook the speaker or earphones when searching for the cause of a distorted radio. Other causes that are likely (we are still assuming that all the tubes have been checked) are shorted coupling capacitors, improper operating conditions (shown by voltage and resistance checks), and

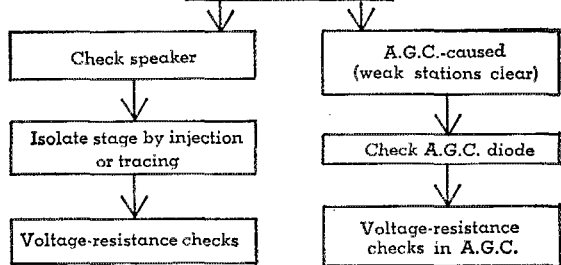
DEAD SET



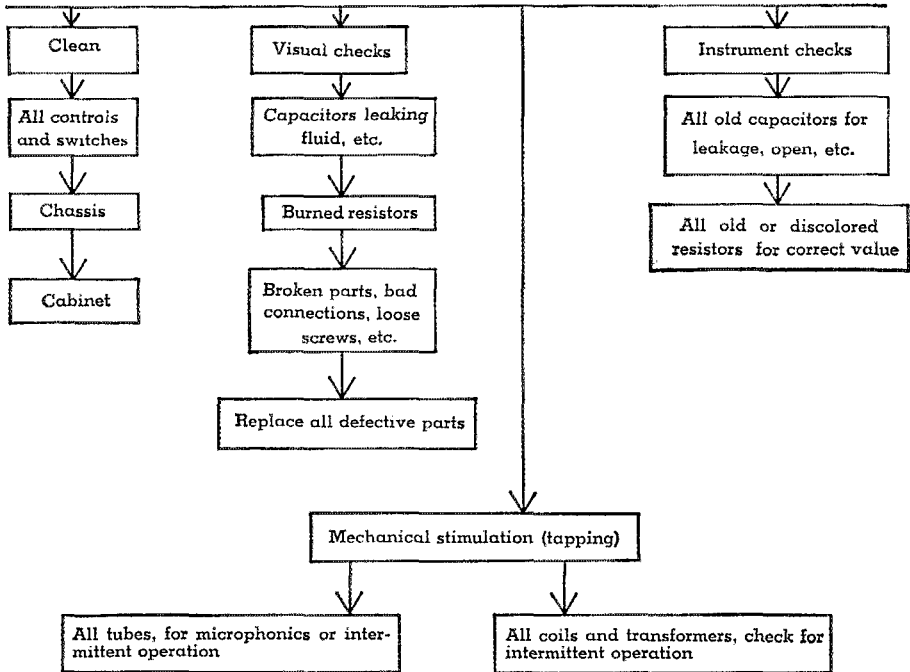
UNWANTED OSCILLATION



DISTORTION



PREVENTIVE MAINTENANCE



a.g.c. troubles. A.g.c. troubles can be distinguished by the fact that only the stronger stations are affected. (It sounds very much like the time that clown around the corner called you with his full legal limit amplifier beamed right at your antenna.)

Equipment

The test equipment that is necessary in servicing amateur radio receivers need not be the expensive laboratory grade of beast. The signal generator can be of the \$50.00 "d.c. to daylight" variety. Although this type of generator has somewhat dubious accuracy and stability it will suffice for most signal-injection purposes. Be sure to supply a 0.1- μ f. 600-volt capacitor to go in series with the hot side of the probe. This isolates the generator from the d.c. present in the receiver. If alignment is contemplated, some means of calibrating and stabilizing the generator is essential. K4NFU can tell you of a time when the author aligned his HQ-110 without taking this elementary precaution. The job was pretty good except for the 20-meter band, which was 100 kHz. off! This was caused by calibrating the cheap generator against the 100 kHz. oscillator in the set.

Another piece of required equipment is some means of measuring voltage and resistance. The preferred unit is a vacuum-tube voltmeter or a 20,000 ohms/volt volt-ohm-milliammeter. These units are not very expensive in kit form, and no ham should be without one.

The signal tracer mentioned earlier is merely a high-gain audio amplifier with both a low-capacitance probe for a.f. applications and a demodulator probe for higher frequencies. These tracers can be effective at least up through the f.m. broadcast band (88-108 MHz.). Several kit manufacturers offer tracers in attractive housings and at a nominal cost. One can also make a tracer with either a homebrew a.f. stage or one of these new solid state modules that are on the market.

(If the reader will permit the author to do a little "politicking" at this point, I will suggest a test-equipment purchase program as a worthy club project. It is possible that one of the suppliers can even see his way clear to open a credit account for an established organization. Having this type of equipment available for club members will facilitate service work, help in building projects, and aid the members to increase their individual technical ability. Why not bring it up at the next meeting?)

The choice of which test equipment and procedure to use is often a matter of personal preference. It is common to find two men in the same service shop using different techniques to troubleshoot similar problems on identical sets. A little experience gives a person a slight edge in the insight department. As an example of this, when servicing a dead set that has a lot of background hiss it is likely that the problem is in the front end — either the r.f. or converter stages. An experienced man is apt to take a noise generator and inject signal right into these stages without

Do's and Dont's

1. Check out all connections before opening receiver.
2. Never use a.c./d.c. test equipment or service an a.c./d.c. unit without using an isolation transformer.
3. Observe the symptoms and try to analyze possible causes before any time is spent inside the set.
4. With complex sets try to obtain a schematic and parts layout diagram. It will save time — a lot of time.
5. Never use anything but clearly marked "Radio-TV" solder. Acid-core solders will ruin any set.
6. Never work on live circuits, especially when tired or intoxicated.
7. Use brand-name parts. It would be a shame to degrade the performance of several hundred dollars worth of receiver by using "bargain" parts or some barely identifiable scud from the bilges of your junk box.
8. Give yourself ample time, working area, and light.
9. Don't be embarrassed to ask for help if you need it. Even in service shops men with many years' experience would rather ask for a colleague's aid than foul up the job.
10. Clean all controls and switches. Get all of the dirt and grime from both inside and out. Replace any parts that look suspicious (burned resistors, capacitors that are cracked, leaking fluid, or have the wax plugs dangling off the ends, etc., etc., etc.). This is classified as preventive maintenance and is well worth the effort.
11. *Switch to safety!*

worrying about the i.f. or audio portions of the set. In the vast majority of the cases this apparent procedural sloppiness is vindicated by rapid repair of the bad set. Other things that make for happy, quick diagnosis is volume-control noise (you can thereby eliminate the audio stages), presence of b.f.o. (all stages after b.f.o. injection are operating) and static when the antenna is disconnected (all *amplifiers* have a good chance of being good, pointing the finger at either the antenna or the local oscillator or oscillators¹). The best procedure for any given person in any given situation is best determined by a little experience-based preference. "If it works, and is more convenient: use it" is advice given out by a number of older technicians.

Any article dealing with service procedures would be sadly lacking if it didn't repeat the League's time-honored axiom: "Switch to

¹ This is possible when the oscillator fails, but the mixer or amplifier portion of a converter continues to work.

Safety." The insides of most amateur radio equipment contain some dangerous voltage levels that have the current available to ruin the best of us. The matter of electrical safety is a lesson that *isn't* best learned by experience! A review of basic safety precautions every now and again is a very good idea.

Cleaning Up

When the trouble has been located and the set restored to normal operation many people are tempted to button the unit up and get it back on the air pronto. However, a truly professional (as well as very practical) touch can be added by cleaning the set. Besides the obvious internal dust and the residue from the coffee of three previous Sweepstakes that should be removed, it is also desirable to clean all of the potentiometers and switches. This can be accomplished by spraying with one of the commercial control cleaners

available at most electronics stores. This type of product comes packaged in any size aerosol can that you need, and comes equipped with a small tube for getting into tight corners (the invariable location of the devices that need cleaning the most!). If the contraption manages to spray three consecutive times without clogging that small tube, you have purchased one of the better brands. The only thing to remember about cleaning controls and switches is that it will not cure a real bad case of "noisy control". These parts are often damaged by the dust that is *causing* the noise and must be replaced!

If you keep the above principles in mind the next time you attempt homebrew surgery on your receiver, you will have a lot better chance of curing the patient and saving yourself operating time galore (have you waited three weeks for the local service man to find a bad tube? Not any more you won't).

QST

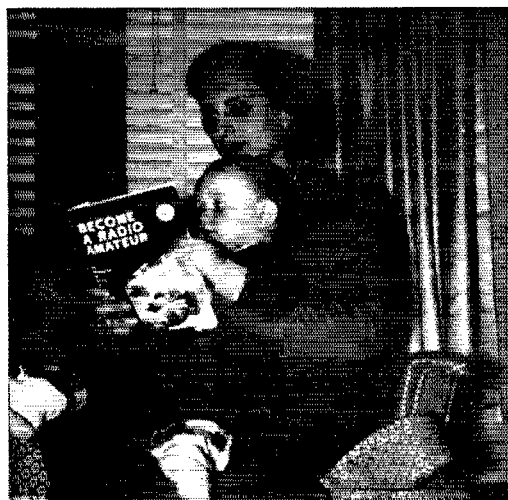
Strays

Feedback

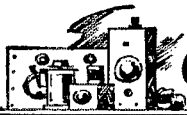
In the article, "Limited Space Antennas and Methods of Coupling," *QST*, February 1969, page 25, the parts list should read a single-pole, double-throw toggle switch for S_1 . However, the circuit diagram is correct.

Although we never make mistakes, it cannot be denied that the call of W3MSN was incorrectly printed as W3MSM in the V.H.F. SS scores on page 64 of June *QST*. . . . On page 66, the call of the second-ranking multioperator station in the Connecticut section should have been WA1IOX, not WA1IUO.

It isn't often that an error goes more than a year without detection by some sharp-eyed reader, or disgruntled would-be builder of an item on which the error was made, but here is one such. In *QST* for May, 1968, page 21, "Low-Cost R.F. Attenuators," the 67-ohm R_2 should be made from 16 1100-ohm or 18 1200-ohm 2-watt resistors in parallel. The original text, as published, left off the last zero in both values. Thanks to W3VS for calling it to our attention, and our apologies to the author and any would-be builders of the attenuator, for this long delay.



Here's a photographic testimonial to the reliability of ARRL publications. At left, young Dave Weisman, son of Sumner Weisman, W1VIV, studying his *How To Become A Radio Amateur*. At right, Dave, now 11 years old, and WN1LFE, enjoys the fruits of his labor.



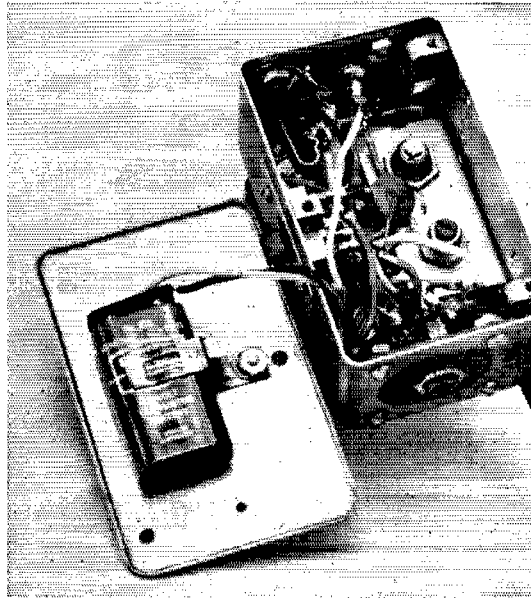
A2 Adapter

BY ZEB WILLIAM RIKE III, *K5BBN

ALTHOUGH amplitude tone-modulated telegraphy (A2) is permitted on the 6- and 2-meter bands, few v.h.f. rigs are designed to generate this type of emission. One common solution to the problem is to place a microphone in front of the speaker of a conventional code-practice oscillator. Unfortunately, this cure suffers from the drawback that the microphone may pick up extraneous background noise. Although the transmission of extra sounds, such as coughs and phone rings, while A2 is being used may be only a minor annoyance for the owner of a Technician or higher class of license, it is illegal for the Novice licensee. The A2 adapter to be described eliminates the noise problem entirely.

Fig. 1 shows the A2 adapter in schematic form. C_1 , C_2 , and the inductance of HS_1 make up the tuned circuit for Colpitts oscillator Q_1 . When S_1 is in the position shown, the p.t.t. switch on the microphone controls the transmitter or receiver, and any sound picked up by the microphone causes an audio signal to be sent to the microphone input circuit in the rig. However, when S_1 is switched to the OSCILLATOR position, S_{1A} turns on the transmitter by grounding the control wire, and S_{1B} feeds the audio output of the oscillator into the microphone input circuit in the transmitter. Because the microphone's audio lead is disconnected at this time, there is no need to worry about any extraneous sounds.

It's easy to monitor one's sending with the A2 adapter, since an audio tone can be heard in the headphones when the key is closed. R_4 controls the pitch somewhat, so this potentiometer can be set for the most pleasing tone. If the inductance of the particular phones used differs greatly from the inductance of this writer's 2000-ohm magnetic headset, the pitch of the oscillator may be too high or low for comfortable listening. In that case, the basic frequency of the oscillator can be shifted up or down by changing both C_1 and C_2 , keeping the ratio of their capacitances at about 1 to 2. R_5 determines the amount of



The A2 adapter was constructed in an electrical outlet box. Pieces of bakelite are used to insulate the input and output connectors and the key terminals (nuts and bolts) from the metal case.

oscillator signal that is fed to the transmitter; it has no effect on the level of the monitor signal.

Several models of this circuit have been built and used over a number of years. The CK722 and 2N1265 have been used at Q_1 , but these types are no longer readily available. However, any small audio transistor ought to work in the oscillator, provided the correct battery polarity is observed for the type (n-p-n or p-n-p) chosen. Depending on the forward current transfer ratio (h_{FE}) of the transistor used, the circuit may function with a supply voltage as low as 1.5 volts.

The actual construction of the unit is left up to the builder; any way that suits one's fancy is all right. The models built so far have ranged from bulky to compact. As shown in the photograph, my present version is built in a 2 × 2 × 4-inch box. However, if R_4 had been replaced by a fixed resistor and R_5 by a pair of resistors, the whole circuit could probably have been built on a 1 × 1½-inch circuit board.

The plugs and jacks employed will, of course, be determined by what is required by the particular transmitter used (a PL-68 phone plug and corresponding jack are used with my Communicator).

*2033 Coronado Place, Orange, Texas 77630.

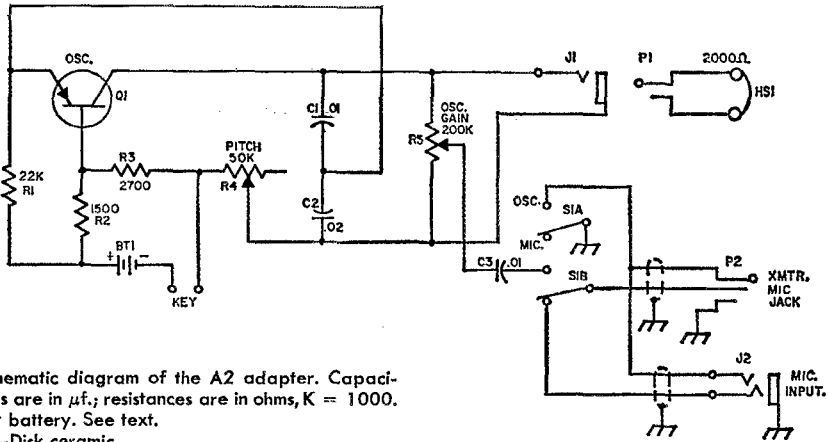
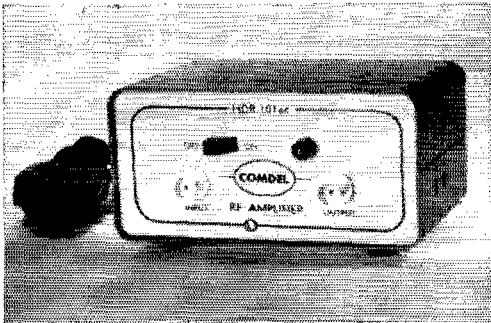


Fig. 1—Schematic diagram of the A2 adapter. Capacitance values are in $\mu\text{f.}$; resistances are in ohms, K = 1000. BT₁—9-volt battery. See text. C₁, C₂, C₃—Disk ceramic. HS₁—2000-ohm magnetic headphones. J₁—Open-circuit phone jack. J₂—Three-conductor jack to mate with existing microphone plug. P₁—Phone plug. P₂—Same type plug as existing microphone plug.

Q₁—CK722, 2N1265, HEP254, SK3003, SK3004, GE2 or similar small audio transistor. See text.
R₁, R₂, R₃— $\frac{1}{2}$ -watt composition.
R₄, R₅—Control, audio taper.

QST

• New Apparatus



Comdel HDR-101ac Broad-band R.F. Amplifier

A COMMON fault of many older receivers is a lack of sensitivity, especially on the frequencies above 14 MHz. The addition of a preamplifier, such as the Comdel HDR-101ac shown in the photograph, can make these sets as sensitive as most of today's models.

The HDR-101ac is designed for use in 50-ohm systems. It has a rated power gain of 9 db. from 0.5 to 50 MHz., and it will handle, without overload, input signals of up to 2.4 volts r.m.s. The noise figure of the HDR-101ac is said to be 2.5 db. maximum.

The circuit of the HDR-101ac consists of a grounded-gate FET amplifier and a voltage-doubler power supply. A 5-watt Zener regulates the output of the supply at about 20 volts.

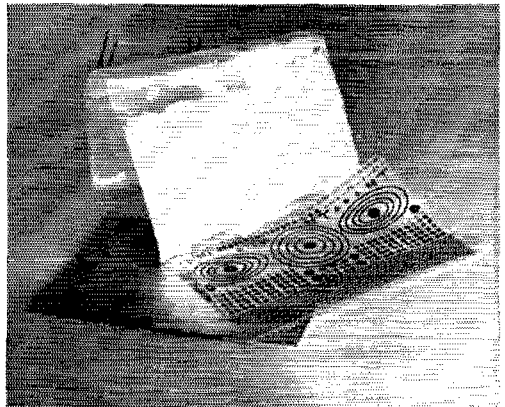
Dimensions of the HDR-101ac are $2\frac{3}{4} \times 4\frac{7}{8} \times 3\frac{3}{8}$ inches and the weight of the unit is approximately $1\frac{1}{4}$ pounds. BNC fittings are used for input

and output connectors, and a slide switch is used to turn the device off and on. A neon lamp on the front panel indicates when the preamplifier is operating.

The HDR-101ac is manufactured by Comdel, Inc., Beverly Airport, Beverly, Mass. 01915, and the price class of the device is \$115. — W1YDS

Amidon 146-D E-Z Etch Kit

AMIDON Associates, 12033 Otsego Street, North Hollywood, California 91607, recently announced a new circuit board kit. The kit, E-Z Etch type 146-D, contains a 4×6 -inch copper-clad fiber-glass board, a pressure-type transfer sheet of terminal connections, and the chemicals necessary for etching the board. The kit is priced at \$3.49. — W1ICP



A Frequency Counter with Binary-Coded Decimal Readout

BY ROCCO GRILLO,* WB2MEX

If you have never played with integrated circuits, you are in for a wonderful experience. It is like playing with children's blocks; each one is an entity, a black box that, when connected to another, and another, builds into a castle, a receiver, a digital clock, or perhaps a frequency counter. The little counter described here was built primarily to count transients in the debugging of equipment, but it works quite well in use around the amateur station at frequencies up to about 9 MHz.

To count pulses and display the results within a reasonable budget requires a mountain of compromises. It is most economical to count in binary numbers,¹ but you get bogged down in decoding the readout. If you count in decimal numbers, decoding is simple but expensive. So a compromise works out fairly well, with only a minor inconvenience in reading the final result. Our approach uses a binary-coded decimal (BCD) system which is a bit different than one described earlier.² We arranged four toggled flip-flops to count to nine in straight binary fashion and then reset to zero on the tenth count. Basically, a toggled flip-flop is a device that alternates states with successive impulses. Its action is similar to a one-step stepping relay. One pulse makes contact, another breaks it, the third makes the contact, and so on. The basic flip-flop and decade frequency dividers were described in an earlier issue of *QST*.³ That same issue also contains general information on the operation of digital logic devices.⁴

The Integrated-Circuit "Chip"

The Texas Instrument SN7493N circuit "chip" we use has four flip-flops tied together with provision for a BCD output, and is called a four-bit binary counter. This chip contains four toggled flip-flops in one flat-pack package, which is smaller than a standard 0.01- μ f. 400-volt capacitor. This chip is a 7-volt device with a total dissipation of 160 milliwatts, 40 milliwatts per flip-flop, and a maximum output current of 60 milliamperes. Its maximum speed is 10 MHz. See Fig. 1.

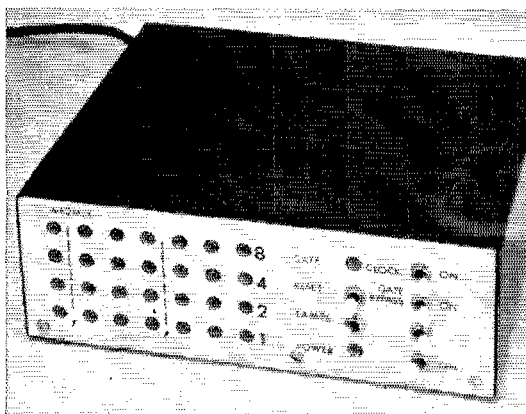
* 118 Ardmore PL, Utica, N. Y. 13501.

¹ Skeen, "Low-Cost Precision Frequency Measurement," *QST*, January, 1965.

² Technical Correspondence, "Binary-Decimal Counter Readout," *QST*, April, 1968.

³ Staples, "Integrated-Circuit Frequency Dividers," *QST*, July, 1968.

⁴ Pos, "Digital Logic Devices," *QST*, July, 1968.



The WB2MEX counter with binary-coded decimal readout. Each decimal digit of the count is read in binary numbers. The cabinet is home-made from 1/4-inch thick aluminum stock and galvanized sheet metal. Its dimensions are 7 3/8" X 2 3/4" X 6 inches deep. The natural-finish front panel was given an attractive appearance by rubbing a few times with a very coarse abrasive.

For our use, we can exceed these specifications, primarily due to the short duty cycles imposed upon the device. If greater duty cycles are contemplated, a heat sink can be made by epoxying the top surface of the chips to a radiating plate. (We have done just that in a digital clock utilizing these chips, and although it gets warm, there have been no failures.)

With our flip-flops, a toggle pulse with a slope that goes from a positive (+ or ON) to a ground (- or OFF) level will cause it to change state. Our chip has four flip-flops that, with one external connection, are tied together in series. A reset gate is available through pins 2 and 3 to permit us to place all four flip-flops in an OFF condition, with all the stages reset to zero. A pulse at FF_1 will cause it to go on. Another pulse will turn it off, but its going off toggles FF_2 on. The next pulse turns FF_1 on without affecting FF_2 . The fourth pulse resets FF_1 , which resets FF_2 , which turns on (sets) FF_3 . This procedure continues, letting us count to 15 with our little chip. On the 16th count, all flip-flops will return to OFF. Counting by sixteens is rather bulky to operate with, so we reset our counter at a count of ten. We do this by recognizing when FF_2 and FF_4 are set ($2 + 8 = 10$) and feeding this information to the reset gate, pins 2 and 3.

We now have a counter chip that allows us to count to 10. String seven of these chips together and we can count almost to ten million (10

SERIES CONNECTION FOR
FLIP-FLOPS 1 AND 2.

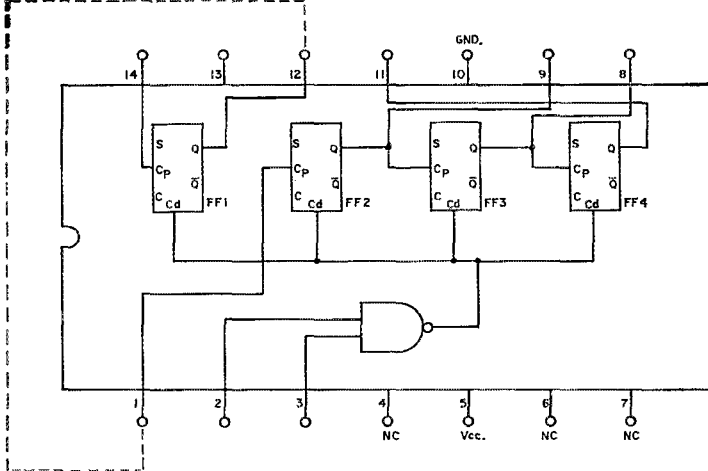


Fig. 1—The Texas Instruments SN7493N integrated circuit. The chip is a 14-lead dual in-line plastic package.

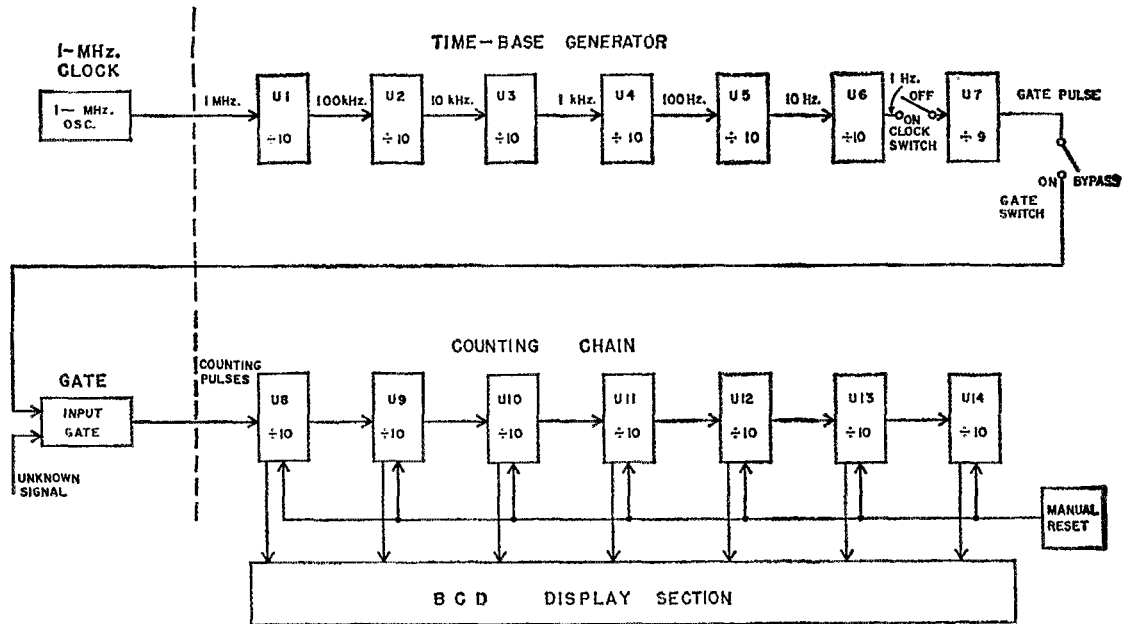


Fig. 2—Block diagram of the WB2MEX BCD frequency counter. The counter will display counts to 9,999,999. U₁ through U₁₄—SN7493N or equivalent.

MHz.). Add a time base, a visual display, a couple of switches and a power supply, and we have our counter.

The Counting Chain

The counting chain consists of seven chips connected in series. Refer to Fig. 2. A gate at the input to the chain prevents counting for those periods when counting is not desired. The gate will be "enabled," permitting the pulses for counting to be passed through, for the period established by the time-base generator. This is done as follows:

The counting chain input flip-flop counts (toggles) when the input pulse goes from a high

to a low. If the gate from the time-base generator keeps the input voltage low, the flip-flop cannot count. A diode is connected such that when the gate is to be "inhibited" or closed, a low is coupled to the input flip-flop from the time-base generator. When the time-base generator output goes high, we will count.

Time-Base Generator

To count pulses with respect to time, a reference must be established. This reference is arbitrary; any period can be extrapolated into cycles per second. For ease of decoding and interpreting, we use the period of counting as

one second, obtained from a 1-MHz. clock (oscillator). The clock is a crystal-controlled multivibrator.

Not wanting to get exotic in Schmitt triggers, single-shot stages, and recycle circuitry to develop the counting gate, we use a system that results in a 1-second duration pulse every nine seconds. (This is normally enough time to read the resultant count and manually reset the counting chain.) This one-second pulse is used to enable our counting chain.

To produce this pulse, we divide the 1-MHz. clock signal one million times, using 6 chips. This gives us repetitive 1-second pulses, which we pump into another chip, U_7 . At the count of 8, the output from FF_4 of this last chip goes high, and is used to enable the counting chain. The chip is wired so that at the count of 9, all four flip-flops are reset and the output goes low, inhibiting the count for the next 8 seconds.

Provision is made to disable the time-base generator chain, by opening the clock switch. This permits the gate to be disabled for extended periods. We also have the provision to bypass the gate, by opening the GATE switch to the BYPASS position. This enables the counting chain to count continuously, as long as the switch is open.

In addition to providing the count gate, the time-base generator will supply several frequency markers which are useful in the h.f. bands.

The Display

The most desirable type of display is unquestionably decimal in nature, but unfortunately this happens to be the most expensive. Since we count in binary-coded decimal, why not display it the same way? With a short period of experience (10 minutes is about average), one can become a rapid decoder.

With a constant eye toward simplicity and economy, we selected lamps that could be driven by the ICs directly with no buffering, thereby

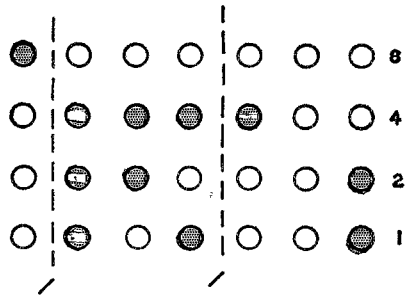


Fig. 3—The BCD display. The indicated count here is 8,765,403.

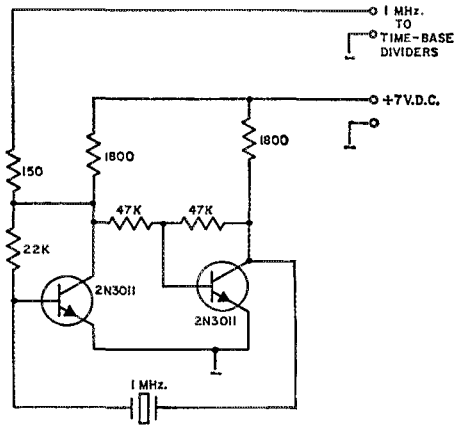


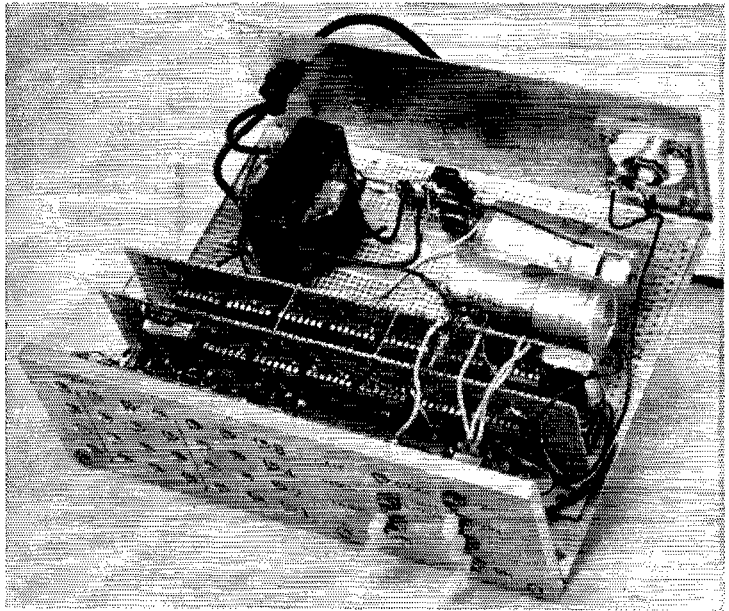
Fig. 4—The 1-MHz. clock. Resistances are in ohms, $K = 1000$. Resistors are $\frac{1}{4}$ or $\frac{1}{2}$ watt, 10% tolerance. Leads terminating in negative signs are used in this and following figures to indicate a common return, which is isolated from the chassis.

TABLE I

| Lamp Value | Number of Input Pulses | | | | | | | | | | Reset |
|------------|------------------------|---|---|---|---|---|---|---|---|---|-------|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | |
| 8 (FF-1) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 |
| 4 (FF-3) | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 |
| 2 (FF-2) | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 |
| 1 (FF-1) | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 |
| Total | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 |

Counting sequence versus states of the lamps in a chip wired for binary-coded decimal operation. This table represents the ten different combinations of one column of lamps. To read the count, add the values for the illuminated lamps. At the count of 10, all four flip-flops in the chip will reset to zero, and a 'carry' output pulse will be passed to the next chip on the left. The adjacent lamp columns would then indicate 10. Rapid interpretation of the BCD readout is probably easier to learn than Morse code, as there are only four lamps to observe for each digit. (There are five sounds in the Morse code for figures, even more for punctuation marks.)

This view of the counter shows the fourteen integrated-circuit packages mounted on vertical strips of phenolic board. (One IC is almost hidden by the capacitor in the reset line.) The strip nearest the rear of the chassis contains the complete time-base generator section. The 1-MHz. crystal is visible at the right end. The power supply, with ample room, occupies the rear half of the unit. The input jack is mounted on polystyrene material at the right rear of the counter.



saving dozens of transistors. Our tests indicated that the chips can drive No. 345 lamps. These lamps are rated at 6 volts, 40 milliamperes. Less voltage is actually applied, so the lamps are not illuminated to full brilliance and don't draw that much current. The type No. 344 lamps, rated at 10 volts, 15 milliamperes, might have been a wiser choice; the cost is the same. More common types such as No. 48 and No. 49 lamps could be used with proper dropping resistors. These lamps are rated at 2 volts, 60 milliamperes.

A lamp is connected to each flip-flop in each of the seven counting chips. Four lamps are grouped vertically (i.e. 1, 2, 4, 8 for each chip), so that a normal left-to-right decimal reading arrangement is displayed. This arrangement can be seen in the photographs.

Table I shows how the states of the various flip-flop stages of a chip change with counting pulses applied at the input to the chip. Fig. 3 shows how the count is displayed after a counting period. Once you get accustomed to it, the count can be read out almost as quickly as if it was a decimal indicator display.

A lamp switch is used to remove the lamps from the counting chain. The maximum flip-flop speed depends on its load. To utilize a chip's highest speed, it should not be loaded during counting, so the lamps are switched off during the counting period. Disabling the lamps also prevents commutating spikes from causing erroneous indications.

Power Supply

Power requirements are extremely meager, being six to eight volts d.c. at 750 milliamperes. We use a 6.3-volt filament transformer rated at 1.2 amperes. The a.c. is rectified with a full-

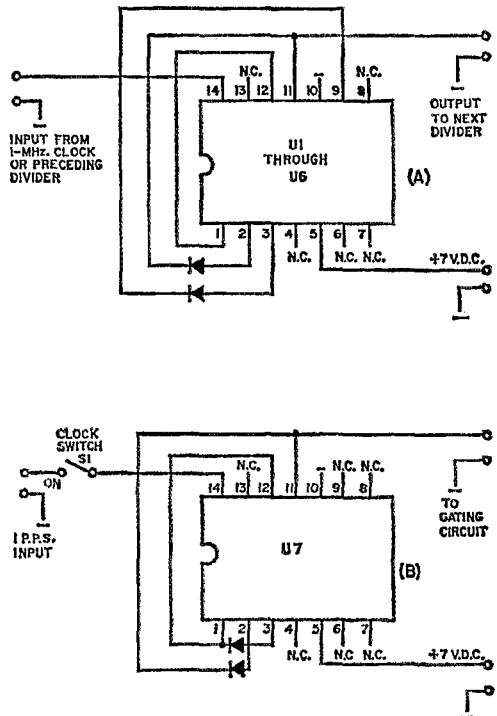
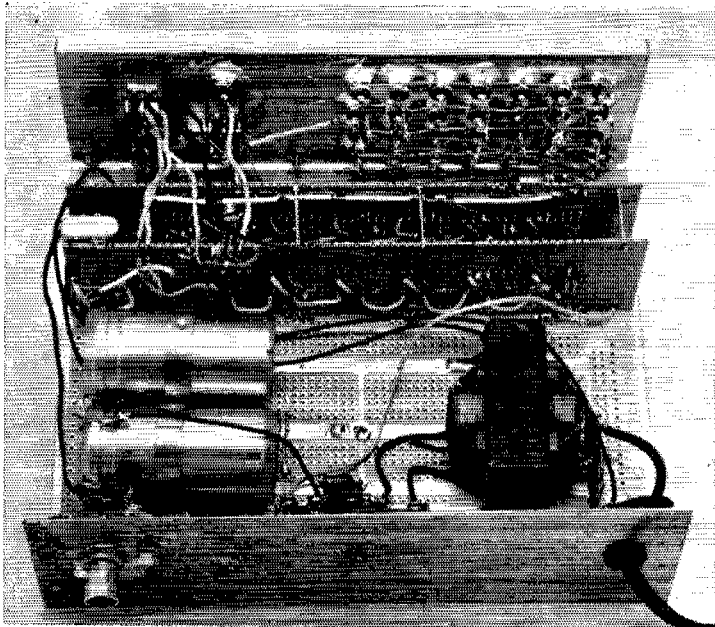


Fig. 5—Wiring of the integrated circuits for the time-base dividers. Diodes are any high conduction signal diode with a p.r.v. rating of 30 or greater, such as 1N270.

S₁—Subminiature s.p.s.t. toggle (C&K 7101 or equiv.).

wave bridge, and the ripple is smoothed out with 5000 μ f. of capacitance (two 2500- μ f. 15-volt capacitors in parallel). This is not fancy, but is adequate.



This rear view shows the methods of mounting and wiring the front panel components and the ICs. Sub-miniature switches are used. The lamps are epoxied directly into holes drilled through the front panel, being flush at the front. The spacing of the perforated board holes matches the spacing of the pins of the ICs, which are held in place by the leads soldered on the back-side of the board.

Construction

Figs. 4 through 7 show the schematic wiring of the various stages of the counter. We isolated the common return from the counter's metal enclosure, as indicated in the Figs. The basic component of the counter is the SN7493N IC chip. There are 14 used, and 13 are wired identically except for the display and reset circuitry included in the counting chain. The last chip in the time-base generator is wired in a slightly different manner, as shown in Fig. 5B.

The time-base generator and the counting chain are built on two strips of perforated circuit board, each measuring approximately 2 by 7 inches. They are mounted vertically to save space. The remainder of the space is taken up by the power supply.

The control panel houses the display section diodes, control switches, and indicating lamps. One extra switch is shown in the photographs. This was included as a spare, but is not used. The input jack is located on the back of the unit. The lamps are epoxied into the front panel, and connections are made directly to the bases. The life expectancy of the lamps (about 200,000 hours) at the voltage applied (about 4 volts) is greater than our predicted life span, so we don't plan to change any.

This device, sans cabinet, can be duplicated by the average ham in a weekend of concentrated endeavor. With the chips that we used, approximately 28 solder connections per decade, including lamps, are necessary.

The counter is not restrictive as to the type of ICs specified. Any JK-type flip-flop is adequate, as long as the speeds are appropriate. Many IC packs are available on the surplus market that are completely adequate, and quite

reasonable in price. Concerning speed, only the first few flip-flops need to operate at high switching speeds. As the chain progresses, slower and slower chips can be utilized. (Our next counter will utilize some of the newer 50- or 80-MHz. chips at the front end, followed by our little counter here.)

Operation

The power switch supplies line voltage to the power supply and lights the power indicator lamp. The GATE indicator lamp is lit for the 1-second period that the counting gate is enabled. The RESET switch, a momentary contact device, resets the counting chain to zeros. The CLOCK switch allows the time base generator to produce the desired gating pulse. When the

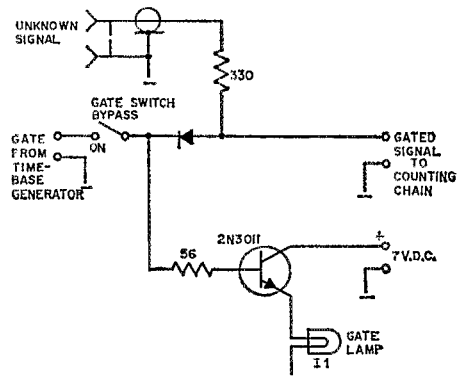


Fig. 6—Input gating schematic. Resistances are in ohms. Resistors are 1/4 or 1/2 watt, 10% tolerance. The diode is any high conductance signal diode with a p.r.v. rating of 30 or greater, such as 1N270.

I₁—See text.

S₁—Sub-miniature s.p.s.t. toggle (C&K 7101 or equiv.).

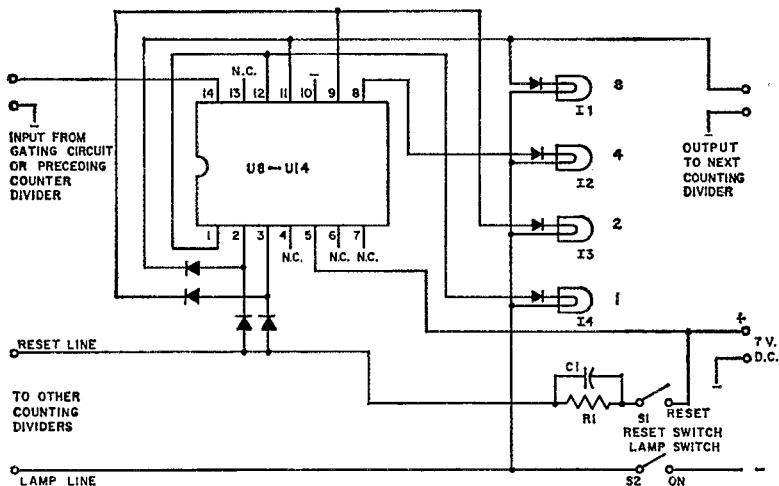


Fig. 7—Wiring of the integrated circuits for the counting dividers and BCD display. Diodes are any high conductance signal diode with a p.r.v. rating of 30 or greater, such as 1N270.

C₁—0.068μf. ±10%, 75- or 100-volt paper or mylar.

I₁ through I₄—See text.

R₁—470 ohms ±10%, ¼ or ½ watt.

S₁—Subminiature s.p.s.t. toggle, momentary on (C&K 7109 or equiv.).

S₂—Subminiature s.p.s.t. toggle (C&K 7101 or equiv.).

CLOCK switch is off, the count in the counter can be displayed indefinitely. The GATE switch in the BYPASS position allows input pulses to toggle the counting chain without the enabling pulse of the time-base generator.

To operate the device, a signal of approximately 10 volts peak-to-peak is applied to the input terminals. The POWER switch is turned on, the lamps are turned on, and the GATE switch is turned to BYPASS. At this point, you should observe the lamps flashing and counting.

Turn the GATE switch to ON and flip the RESET switch, setting the counter to zero. All BCD display-section lamps should be extinguished. Turn the LAMPS switch off, and turn the CLOCK switch on. In a short while, the GATE lamp will light for one second. After it goes out, turn the CLOCK switch off and the LAMPS switch on. Read the frequency indicated. Repeat the above procedure to obtain additional counting periods.

Many of the above operations could easily have been made automatic. We tried automatic reset, a single-shot time base, and automatic lamp switching. It was impressive, but lacked the flexibility available with a little manual labor.

Due to the speed of the counter, it will also count transients and transitions that satisfy the switching parameters. A good clean signal at the counter input will work just fine, and the only time we need to be concerned is when counting a complex waveform, such as one with high harmonic content, the output of a synchronized free-running multivibrator, and the like. In these cases we might count the frequency of the harmonic rather than the fundamental waveform.

Accuracy

An infinite number of periods might be selected for the gate duration. We selected a period of one second, which enables us to count the input signal directly in cycles per second (Hertz). Either a half-second, or five seconds,

for example, is completely reasonable, and easily obtained by modification of the wiring of the last chip in the time-base generator. If we reset at the count of 10, the gating period would be two seconds, reset at 11 and the period would be three seconds, etc. Resolution is directly related to the gating period.

Of course the accuracy of the entire device is dependent upon the accuracy of the gating chain. The more accurate the clock, the finer will be the results, but this need not be a drawback if a frequency standard of acceptable accuracy is available. Just measure its frequency, and use the figures obtained as a basis of correction. For example, if a 1-MHz. standard signal counts as 1,000,020, we know our counter is reading approximately 20 Hz. high per MHz. Since the ratios can get complicated at frequencies away from multiples of 1 MHz. or from counting periods of other than 1 second, use as accurate a crystal as possible.

The counter, due to the gating arrangement, may count high by one cycle. The absolute accuracy of the device is -0, +1 Hz., due to the gate at the input flip-flop. If the polarity of the pulse being counted is positive at the time the gate is disabled, a count of one will be produced. The extra indicated cycle may be annoying at power-line frequencies, but is perfectly acceptable at higher frequencies. By sampling for several periods, this can be averaged to one-half a cycle.

Connect one of these little counters to your rig (using attenuators, please!), and when the other guy says, "QRG?" let him have it, right down to the nearest cycle per second! QST

**SWITCH
TO SAFETY!**



Long-Wire Inverted-V Antennas Sans Tuner



The end of one leg of the 10/15/20-meter inverted V. Band changes are made near ground level, using alligator clips.

BY EDWARD M. NOLL,* W3FQJ

THE long-wire inverted V antenna can be fed at the center with a low-impedance coaxial line, and operated as a truly resonant antenna on a number of bands. No form of tuner is required between the antenna and the line. By proper selection of the transmission-line length, one can even dispense with a line tuner at the transmitter. The techniques covered in this article permit the construction of a low-cost and effective multiband antenna, using a single mast or other high support for the apex of the V.

Resonant V

Efficient operation of a long-wire inverted V antenna occurs when it is made a truly resonant antenna on the operating band, and when it displays a resistive low impedance at the center feed point.¹ The resistive low impedance is obtained by making each leg of the V an odd multiple of a quarter wavelength long. This is the basic principle of the center-fed half-wave dipole, which has a quarter-wavelength leg on each side of center. Nearly the same impedance can be obtained by making the leg length $3\lambda/4$, $5\lambda/4$, $7\lambda/4$, etc. Table I lists a series of constants that may be used to determine leg lengths which are an odd quarter-wavelength long, to insure a low resistive impedance at the center feed point.

An attractive feature of a center-fed antenna, in addition to having no reactance if the leg lengths are cut precisely, is that the resistive impedance remains low in ohmic value despite the long length of each leg. The theoretical impedance for the dipole is 72 ohms. The center-point impedance rises slowly with $\lambda/2$ additions to the original dipole leg length, toward 100 ohms for legs a number of odd quarter-wavelengths long. The impedance value depends on the height above ground, and on other factors.

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¹Covington, "Radiation Resistance of Inverted V Antennas," *QST*, October, 1968.

Line Length

The rise of the center impedance value of the long-wire antenna over that of a simple dipole is not great, and the mismatch to 50- or 72-ohm line is not really serious. (Of course, we have assumed that the leg lengths have been controlled precisely so as to minimize the introduction of any reactive component.) If a section of transmission line that is some multiple of a half-wavelength long is chosen, the line will repeat the impedance of the feed point. Therefore, whatever resistance is present at the feed point will be seen by the transmitter.² It is significant that the output tuning systems of most transmitters can provide an exact match over a sub-

²As the author points out, careful adjustment of the antenna length will provide a fair impedance match to 50- or 75-ohm lines. In such cases, adjustment of the feed-line length usually would not be necessary, because the line s.w.r. is determined solely by the impedance match at the antenna. If a transmitter is rated to handle some specified value of s.w.r., such as 2:1, then it *should* handle any line input impedance that represents a 2:1 s.w.r., whether it be purely resistive, or contain reactance. However, cutting the line to length as described by the author will eliminate any reactance at the input end of the line, and might be required at low frequencies, particularly 1.8 and 3.5 MHz., if the transmitter output tuning network is not flexible enough to compensate for such reactances. — Editor.

When multiband inverted V antennas are mentioned, most amateurs immediately think in terms of open-wire feed lines and a transmatch or other tuning methods, because such systems can operate efficiently with a high v.s.w.r. in the line. But multiband antenna systems using coaxial feed lines without tuners are practical, if the s.w.r. in the line is kept low. This article gives data for such systems.

TABLE I

| Leg Lengths in λ | Leg Lengths in Feet |
|--------------------------|---------------------|
| 1/4 | 234/f |
| 3/4 | 725/f |
| 5/4 | 1215/f |
| 7/4 | 1710/f |
| 9/4 | 2205/f |
| 11/4 | 2690/f |
| 13/4 | 3185/f |
| 15/4 | 3670/f |
| 17/4 | 4165/f |
| 19/4 | 4655/f |

Table I. Factors for converting leg lengths in odd quarter wavelengths to feet.

TABLE II

| Line Lengths in λ | Line Lengths in Feet V.F. = 0.66 | Line Lengths in Feet V.F. = 0.81 |
|---------------------------|-------------------------------------|-------------------------------------|
| 1/2 | 325/f | 400/f |
| 2/2 | 650/f | 800/f |
| 3/2 | 975/f | 1200/f |
| 4/2 | 1300/f | 1600/f |
| 5/2 | 1625/f | 2000/f |
| 6/2 | 1950/f | 2400/f |
| 7/2 | 2275/f | 2800/f |
| 8/2 | 2600/f | 3200/f |
| 9/2 | 2925/f | 3600/f |
| 10/2 | 3250/f | 4000/f |

Table II. Factors for converting line lengths in multiples of a half wavelength to feet, for nominal velocity factors of commonly available coax. In the tables, *f* equals the operating frequency in MHz.

stantial range of loading resistance (up to 200 ohms is not unusual).

One must consider the velocity factor of the line when cutting it to length. Table II provides a list of constants that can be employed in selecting an optimum length of line. It assumes a velocity factor of 0.66 for conventional coaxial lines and 0.81 for the foam types.

A Practical Single-Band Antenna

A long-wire inverted V antenna can be simple, as shown in Fig. 1. Assume 15-meter operation is desired with resonance at 21.3 MHz. If the pole height is to be 40 feet and the mounting space is limited, a leg length of five quarter-wavelengths would be suitable. In this case the leg length becomes:

$$\text{Leg length} = \frac{1215}{21.3} = 57.1 \text{ feet.}$$

This corresponds to an antenna with an overall electrical length of $2\frac{1}{2}$ wavelengths.

Since the ends of the antenna are brought down near ground level, the exact dimension is somewhat shorter than the above calculated value. The two ends can be trimmed conveniently, using an s.w.r. meter or an antenna noise bridge.

The transmission line can be an integral number of half-wavelengths long. For a velocity factor of 0.66, a half-wavelength line has a physical length of:

$$\text{Half wavelength} = \frac{492 \times 0.66}{21.3} = 15.25 \text{ feet.}$$

The line can either be this length, or any whole multiple of this length. If you estimate that the line length must be somewhat over 100 feet, a precise cut can be made to 106 feet 9 inches. Refer to Table II and the constant for seven half-wavelengths:

$$\text{Line length} = \frac{2275}{21.3} = 106.75 \text{ feet.}$$

See Fig. 1B.

Leg Length Changes

One of the attractive features of the inverted V construction is that the ends of the legs are near the ground, and changes can be made conveniently. For example, it is possible to cut the above antenna to near the high end of the 15-meter band as follows:

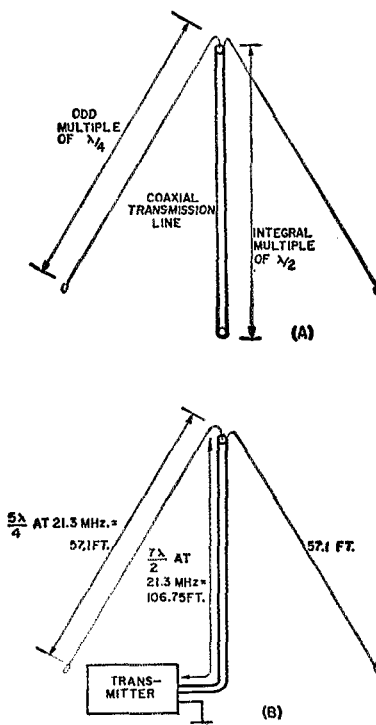
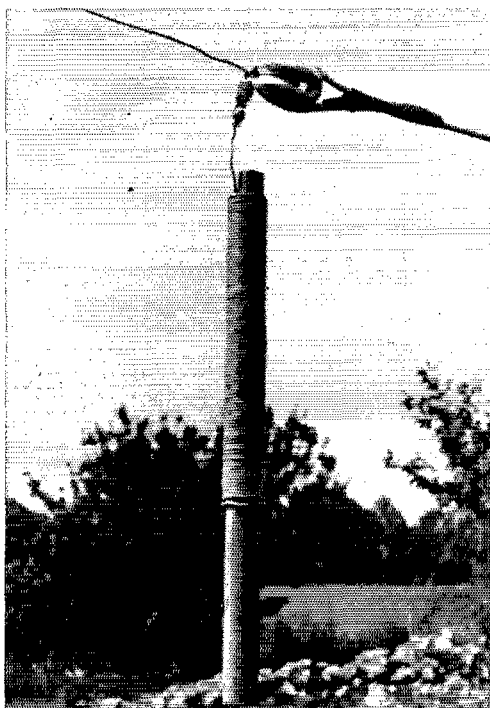


Fig. 1—Dimensions for resonant and matched long-wire inverted V antennas. General dimensions are shown at A, while B shows lengths for 15-meter operation.



A clip-on loading coil for end-loading of the antenna. See text for coil data.

$$\text{Leg length} = \frac{1215}{21.45} = 56.7 \text{ feet.}$$

By making alligator clips or other connectors and two or three pairs of very short segments of antenna wire available, the antenna can be resonated to any precise frequency in the band by clipping additional lengths onto the ends of the antenna, as shown in Fig. 2. Lengths of one foot can change the resonant frequency from one end of the band to the other. The calculated length at 21.1 MHz. is 57.6 feet, as compared to 56.7 feet at 21.45 MHz.

Multiband Operation

One of the unique advantages of end-tuning the long-wire inverted V is that rather limited adjustments in length permit the antenna to be operated as a truly resonant antenna on more than one band. Let us plan an antenna for 10/15/20-meter sideband operation. We can select preferred center points at 14.3, 21.3, and

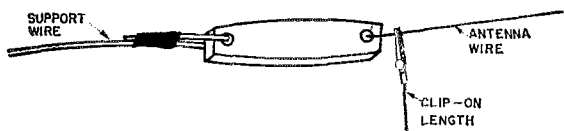


Fig. 2—Short lengths of wire may be clipped to the leg ends to decrease the resonant frequency of the antenna. A one-foot length of wire can shift the resonant frequency from the high to the low end of an amateur band.

28.6 MHz. By referring to Table I, we can come up with an inverted V that operates as a $3\lambda/2$ antenna on 20, a $5\lambda/2$ antenna on 15, and a $7\lambda/2$ antenna on 10. The required leg lengths are:

$$(20) \text{ Leg length} = \frac{725}{14.3} = 50.7 \text{ feet.}$$

$$(15) \text{ Leg length} = \frac{1215}{21.3} = 57.1 \text{ feet.}$$

$$(10) \text{ Leg length} = \frac{1710}{28.6} = 59.8 \text{ feet.}$$

Note that the difference spread is about nine feet. Appropriate sections of line for attachment to the antenna ends can permit multiband operation.

Such an antenna was actually constructed, and resonances at the desired frequencies were obtained with the dimensions given in Fig. 3. The

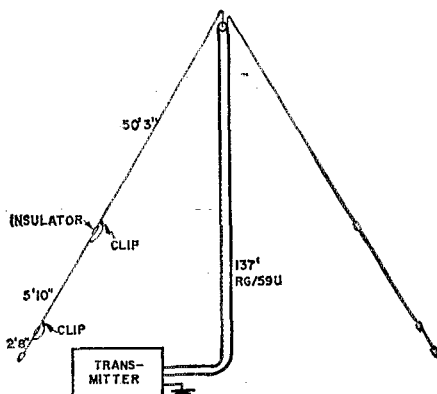


Fig. 3—A long-wire inverted V antenna for the phone portions of the 10/15/20-meter bands. This system was cut for use in working DX s.s.b. stations.

end of each leg includes three insulators and appropriate wire sections. Alligator clips are used to jumper across the first two insulators to permit operation on the 10-meter band. Opening the clip connection at the insulator nearest the center feed point permits 20-meter operation. With the clip closed at the first insulator and open at the second, it is possible to obtain 15-meter resonance. With both clip connections closed for 10-meter operation, we also have a bonus in the form of 75-meter sideband operation, where the antenna performs as a simple inverted V dipole.

Of course, with the proper optimizing of frequencies and lengths, reasonable operation can be obtained over each of the three bands, 20, 15, and 10 meters. An alternate plan is to cut the leg lengths for the high end of each band and use small clip-on sections to tune to any frequency range on any band, as shown in Fig. 2.

How does one choose a length of transmission line that is able to accommodate more than one band? Here again it is possible to come up with values that provide integral half-wavelengths on the various frequencies, and, at the same time,

Loading Coils

When pinched for space, it is possible to use loading coils to resonate the long-wire inverted V on more than one band. Construction of loading coils is a cut-and-try proposition, and is aided with the use of an antenna noise bridge and s.w.r. meter.

For example, it is possible to tune the basic 20-meter antenna of Fig. 3 to 15 meters by clipping a loading coil onto each leg end, as shown in one of the photographs. Again, the antenna operates as a $3\lambda/2$ antenna on 20 meters and $5\lambda/2$ on 15 meters. The loading coil consists of 96 turns of No. 18 insulated wire, close-wound on a 1-foot length of $3/4$ -inch wooden dowel.

Inverted V for 6 — 160 Meters

Additional bands can be added to the basic construction of Fig. 3 by increasing or adding leg lengths. Top-band 160-meter operation is feasible without requiring any additional space, by folding the legs back toward the mast as shown in Fig. 4. This return span to the mast can be made at a height of about $6\frac{1}{2}$ feet above ground, to keep all band-changing positions for additional bands within easy reach.

Adding a length of some 40 feet provides an overall leg length of about 101 feet, the dimension for obtaining $3\lambda/4$ operation on 40 meters. This length also has a $\lambda/4$ multiple in the 6-meter band. A further addition of some 20 feet provides proper loading for 160-meter operation as a dipole.

All-band operation from 6 to 160 meters is possible with a *single* 35- to 45-foot mast in a space under 125 feet. Only one transmission line is needed, and *no* antenna tuner. The antenna operates as an inverted-V dipole on 80 meters, a modified inverted-V dipole on 160 meters, and as a long-wire inverted V on the remainder of the bands. It is indeed a very inexpensive antenna and yet gives good performance as a multiband type. It is one you can construct yourself. Be careful in cutting the lengths and be patient in tuning these lengths on each band. Start on 20 meters (shortest span) and continue through 160 meters (longest span). QST

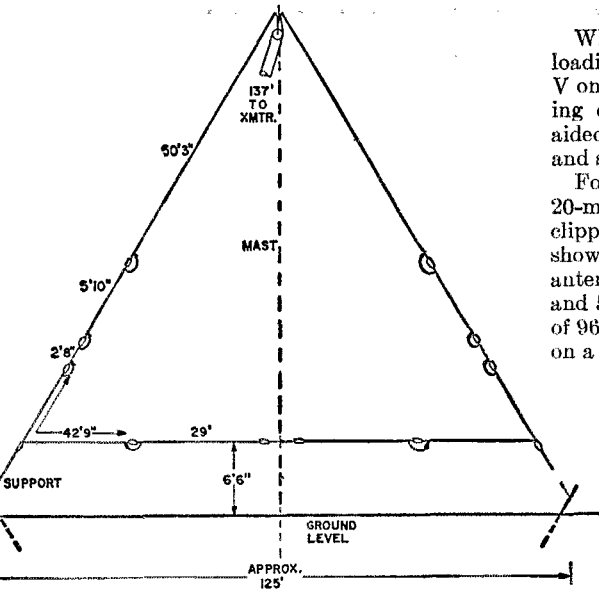


Fig. 4—Inverted dipole and long-wire inverted V assembly for 6 through 160 meters. This is an inexpensive but efficient multiband antenna system.

are very near to each other. We can use the constants of Table II to locate these possibilities. Let us assume again that the total line length must be something in excess of 100 feet. Calculations then produce values of:

$$(20) \text{ Line length} = \frac{1950}{14.3} = 136.3 \text{ feet.}$$

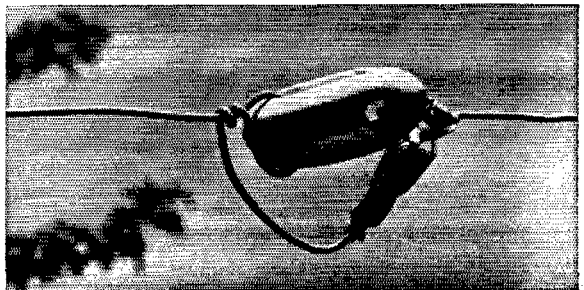
$$(15) \text{ Line length} = \frac{2925}{21.3} = 137.3 \text{ feet.}$$

$$(10) \text{ Line length} = \frac{3900}{28.6} = 136.4 \text{ feet.}^3$$

Cutting the transmission line to 137 feet provides a good impedance transfer on all three bands. Of course, if you do wish precise matching of your transmitter, a simple line tuner at the transmitter end of the line is all that is needed. (The method described here for coaxial lines, with the use of the appropriate velocity factor, can also be used for the pruning of open-wire feed lines in multiband systems if the line tuner has limited matching capabilities, or if a tuner is omitted.)

Elaborate line tuners can accommodate a wide range of reflected values from an antenna system. This does not always mean that the most favorable line conditions exist with coaxial feed lines, though, where high s.w.r. values increase the losses in the line. In fact, even when using an elaborate line tuner, the resonant tuning of the antenna itself and the matching to obtain the favorable s.w.r. on the coax line will encourage a better overall efficiency.

³ This conversion factor is not included in Table II. For numbers of half wavelengths greater than shown, the table progresses in multiples of the values given, so that 3900/f applies to twelve half wavelengths.



A jumpered insulator for increasing the antenna's leg length. The clip is permanently mounted on the short section of wire that is used to extend the antenna length.

A Modification For The Heath HD-10 Electronic Keyer

As members of the ham fraternity we are always seeking to make our equipment easier to operate. To this end, two simple, separate modifications have been performed on the Heath HD-10 keyer. First of all, the inboard paddle has been rebuilt to make its "feel" and response more like that of a regular bug. Secondly, a speed-range switch has been added to eliminate the necessity of unsoldering resistors when changing speed ranges.¹

Paddle Modification

The original HD-10 paddle used two microswitches to activate the dot multivibrator circuit. As the rather large travel distance of the paddle lever did not seem suited for higher keying speeds, a new method of making the required contacts was borrowed from the 1967 *Handbook*. The microswitches S_1 , S_2 were replaced by a s.p.d.t. Guardian 200-M1 relay-contact assembly. The relay-contact assembly is mechanically driven by a new paddle-pivot assembly.

The keyer will have to be disassembled for the modifications to be made. Since all of the parts associated with the paddle mechanism are mounted on the ballast plate, it will have to be removed from the lower cabinet. The microswitches S_1 , S_2 should be removed and all wires going to them should be unsoldered. All the parts mounted on the ballast plate should be removed. Don't throw any of the parts away as several of them will be used later in the modification.

It's helpful to prepare several subassemblies before going to work rebuilding the paddle. The original phenolic paddle lever was flexible and bent considerably when subjected to any amount of pressure. To alleviate this problem, a new paddle lever was made of $\frac{1}{8}$ -inch thick aluminum to the exact same

¹The parts required for these changes are not available from the Heath Company.

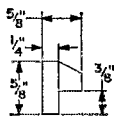


Fig. 1—Driver plate. Plate is constructed from one of the original leaf springs.



HD-10 shown with new speed-range selector switch mounted just below the original function switch.

dimensions as the original lever. The flat spring which connects the key lever and the switch bracket L was "beefed up" by using the metal from one of the original leaf springs. The new flat spring is in essence connected in parallel with the original flat spring. The metal driver plate shown in Fig. 1 may be constructed at this time from the other leaf spring. The mounting of the driver bracket will be done later to assure proper alignment.

Six threaded-bracket assemblies are made using 6-32 spade lugs and 6-32 nuts. A nut is soldered directly to the flat surface of a spade lug. Prior to soldering, thoroughly clean the surfaces to be soldered with a file. Put a little light machine oil on the threads of a screw and pass it through the spade lug and the nut. The machine screw will keep the nut in place during the soldering operation, and the oil will help prevent solder from getting into the screw threads. Once soldered, the machine screws may be removed from the bracket assembly. Four of the spade-lug brackets are then mounted on $\frac{1}{2}$ -inch threaded metal spacers.

Fig 2 should be used in locating all holes to be drilled in the ballast plate to assure the proper alignment of the new components. If a full-scale template is used, just lay the template on the ballast plate and spot the holes with a prick punch. The holes marked A should be enlarged slightly to accommodate fiber insulating washers. The cabinet bottom

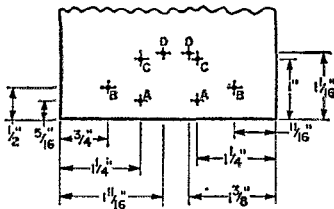


Fig. 2—Ballast plate with new hole locations shown. All holes are drilled with No. 28 drill for use with 6-32 hardware. Insulated fiber washers are used at the locations labeled A. Bottom of this figure is the front edge of the ballast plate. All measurements are made on the upper surface of the ballast plate.

will have to be hacked out in places to make room for the new hardware mounted to the ballast plate.

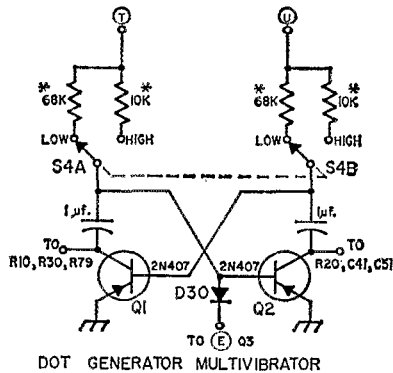
Because of the additional parts associated with the paddle assembly some extra room is needed between the paddle components and the circuit board. Q_9 , a 2N407 transistor, was mounted along with its socket on the foil side of the circuit board. In a similar fashion, C_{70} , a 0.05- μ f. disk capacitor, was mounted topside. Still more clearance was obtained by placing $\frac{1}{4}$ -inch spacers under each of the four studs used to support the circuit board.

The first step in the reassembly process is to mount the relay contact assembly using two spade lugs at location D. Machine screws of sufficient length to reach the lever from locations A, B, and C should be mounted in each of the spade lug brackets at this time. The relay-contact assembly spacing adjustment is mounted at location A. This adjustment device consists of an unelevated spade-lug bracket mounted on two fiber washers. The four spade-lug brackets mounted on $\frac{1}{2}$ -inch spacers are mounted at locations B and C. The spring travel guide is mounted at location B: the

lever travel adjustment is mounted at location C.

Assemble the new paddle-lever assembly by connecting the two flat springs to the paddle lever and switch bracket L. Secure bracket L to the ballast plate, keeping in mind that the paddle lever should be centered on the ballast plate. The exact location of the spring retaining screw can now be marked. The locations of the mounting holes for the driver plate should also be spotted, making sure that the extended arm of the bracket can make physical contact with the center connector on the relay-contact assembly.

Remove the lever assembly and drill the required holes. The spring retainer screw passes through the paddle lever and is secured on

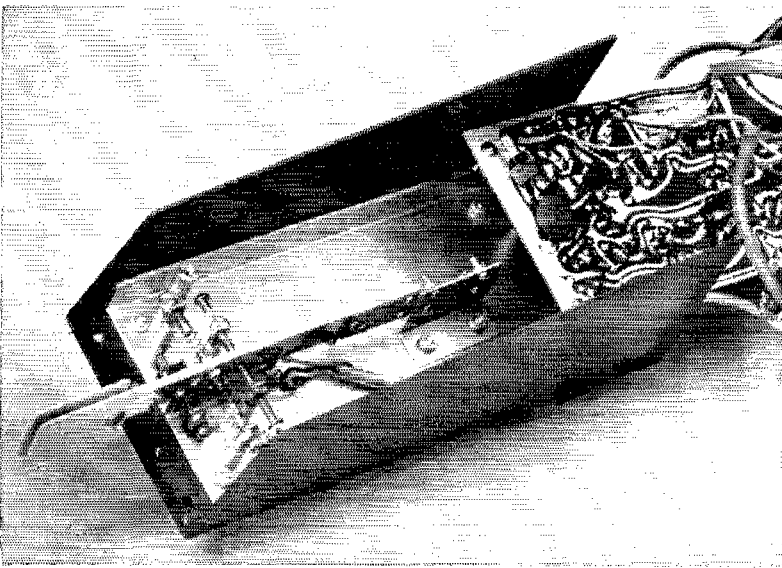


DOT GENERATOR MULTIVIBRATOR

Fig. 3—Modified dot generator multivibrator. S_4 , a d.p.d.t. slide switch, is used as the range selector. Resistors marked with an asterisk are mounted between a terminal strip and S_4 as discussed in the text.

Modified paddle assembly and circuit board. Proceeding from the front edge of the cabinet along

the paddle are: relay-contact assembly spacing adjustment, spring guide adjustment, and paddle travel adjustment. Just below the paddle travel adjustment is the body of the relay contact assembly. In line with the spring guide adjustment is the spring guide machine screw mounted in the lever. The two screws near the guide are used to secure the driver plate. Note additional metal flat spring between lever and bracket L. Visible on the circuit board are Q_9 and C_{70} which have been moved top side to obtain additional clearance for the new paddle.



each side of the lever by a nut. About a 1/4-inch extension of the screw beyond the nut on each side of the lever is sufficient. The driver plate is fastened to the lever using 4-40 hardware. Mount the paddle on the ballast plate, again making sure that the extended arm of the driver plate makes physical contact with the center contact of the relay-contact assembly. Solder the arm of the driver plate to the center contact on the relay-contact assembly. The springs used for the spring guide were obtained from an inexpensive ballpoint pen. Cut the ballpoint-pen spring in half, and use one half of the spring on each side of the lever. Solder the end of the spring on the bracket side to the machine screws.

The electrical connections to the rear terminals on the relay-contact assembly should now be made. Connect the white and black leads of the four-wire cable to the center terminal. Connect the green lead to the left terminal and the red lead to the right terminal.

The ballast plate need not be placed in the cabinet bottom to make the required adjustments. The relay contact-assembly adjustment is set so that there is only about a paper's thickness between the inner and outer relay contacts. The paddle lever travel adjustment is set to minimize travel on each side. With the keyer turned on, the final adjustments which result in personal satisfaction can be

made. The amount of tension supplied by the springs is simply a matter of preference. Once the adjustments have been completed, they may be finalized by placing glue on the point where the machine screw enters the spade lug bracket on each of the adjustment devices. The ballast plate can now be installed in the cabinet bottom, and the entire unit reassembled.

Speed-Range Switch

A d.p.d.t. slide switch has been added to the dot generator multivibrator circuit as shown in Fig. 3 to allow switching between the low and high speed ranges. Each pole of S_1 switches the collector load resistor in the multivibrator circuit which changes the circuit time constant.

The speed-range switch is mounted just below the function switch. After a starter hole has been made, the clearance hole for S_1 can be filed out with a small file. The four resistors marked with an asterisk in Fig. 3 are mounted between S_1 and a 3-terminal strip which is itself fastened by one of the screws that holds the switch in place. Resistors R_{13} and R_{22} are removed from the circuit board and hook-up wire leads from the four vacant holes are run up to the terminal strip and switch where the appropriate connections are made. Tape labels were added to the cabinet to identify the range in use.—KITVF.

● New Apparatus

RCA KD2117 Linear IC Pack

ONE of the best ways of getting acquainted with linear integrated circuits is to obtain a bunch of ICs and do some experimenting. The recent introduction by RCA of their KD2117 experimenter's IC variety pack can make this easy and inexpensive. Included in the KD2117 pack, which sells for less than \$5 from RCA distributors, are five linear ICs: two KD2114 transistor arrays, each consisting of two isolated transistors and a Darlington-connected transistor pair, one KD2115 wide-band power amplifier, and two KD2116 dual Darlington arrays. The sheet furnished with the pack gives some basic IC data, shows schematics and base connections for the ICs provided, and describes twelve practical circuits for using these ICs.

Eight of the circuits detailed find direct application in amateur gear. They are an audio power amplifier, which can be used as the output stage of a receiver; a crystal calibrator that provides 50- and 100-kHz markers; a crystal oscillator, which will accept crystals in the 50-kHz to 20-MHz range; a flip-flop, which can be used as a frequency divider; a microphone preamplifier; a wide-band rf preamplifier; a 0-200-mA regulated 9-volt power supply; and a fixed-frequency audio generator, which can be wired to generate any frequency in the 2-Hz to 175-kHz range. The four remaining circuits are for a two-channel mixer, an electronic thermometer, a wireless microphone, and a marine-band con-

verter. Of these four, the wireless microphone could be converted to a low power 6- or 2-meter fm rig, and the converter could be modified to cover 160 or 80 meters.—W1YDS



● *Beginner and Novice*

Building A Novice Rig

From An Old TV Set

How To Keep The Costs Down On 80-, 40- And 15-Meters

BY LEWIS G. McCOY,* W1ICP

ONE way of keeping the costs down when building your own transmitter is to use an old TV set for parts. For example, the most expensive item in a transmitter is usually the power transformer. This item, along with many others, can be scrounged from an old TV set. We have found that old TV sets can be obtained from TV dealers and servicemen almost for the asking.

The transmitter described in this article is a Novice design in the 75-watt input class that covers 80, 40 and 15 meters, with 20 meters thrown in as a bonus for when you obtain a higher class license. Most of the parts can be obtained from an old TV set, including the power transformer, capacitors, resistors, sockets, and so on.

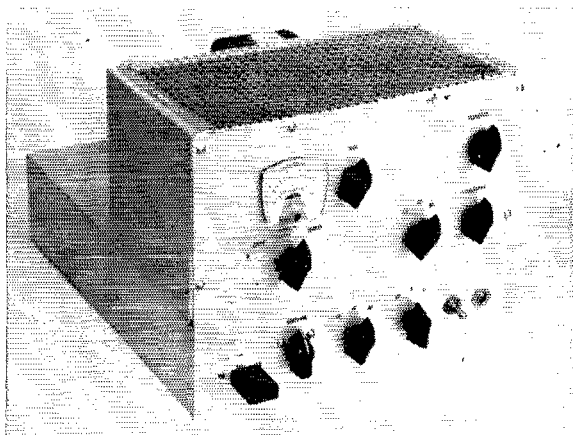
The Circuit

Referring to Fig. 1, the transmitter consists of a grid-plate type crystal-controlled oscillator using a 12BY7. The output of the oscillator can be tuned to the crystal frequency or to multiples of it, depending on which combination of C_1 and L_1L_2 is used. Crystals in the 80-meter band can be used for 80- and 40-meter output and 40-meter crystals for 40, 20, or 15 meters.

A 6146B is used in the amplifier, although a 6146 could also be used, with slightly lower screen voltage. The tank circuit of amplifier is a pi network, designed to work into 50- to 70-ohm loads.

Two methods of keying are used in the transmitter, both being cathode-type keying. In one condition both the oscillator and amplifier can be keyed together; in the other, the oscillator can be left running and just the amplifier keyed. With some crystals, there might be a tendency to have a "chirp" on 15 meters. In such a case, the oscillator should be left running during a transmission. Good keying characteristics are obtained by a "shaping" capacitor, C_6 , across the keying line.

Metering of the transmitter is taken care of by M_1 and S_4 , which can be switched to read either amplifier grid current or amplifier cathode current. Also, M_1 can be switched to read relative output, which is handy for checking the output



of the rig. In the grid position the meter shunts provide a full-scale reading of 10 ma., and in the cathode-current position, 300 ma.

Normally, 80- and 40-meter operation should be free of TVI problems with almost any rig, regardless of the shielding, but if one lives in an area where Channels 2, 3, 4, and 6 are used, TVI is very possible with any operation above 40 meters. For that reason, we have included tight shielding, consisting primarily of a shielded compartment around the r.f. amplifier and metering section. This, in conjunction with a bottom plate and use of an external low-pass filter, should take care of any TVI-causing harmonics from the rig.

Old TV Parts

When stripping down an old TV set you'll need a good hot soldering iron, a pair of long-nose

Getting parts to build your own gear is getting more difficult all the time. One way to find parts and keep the costs down is from a ready-made junk box, an old TV set. Here is a Novice rig in the 75-watt class that is just such a project.

* Novice Editor

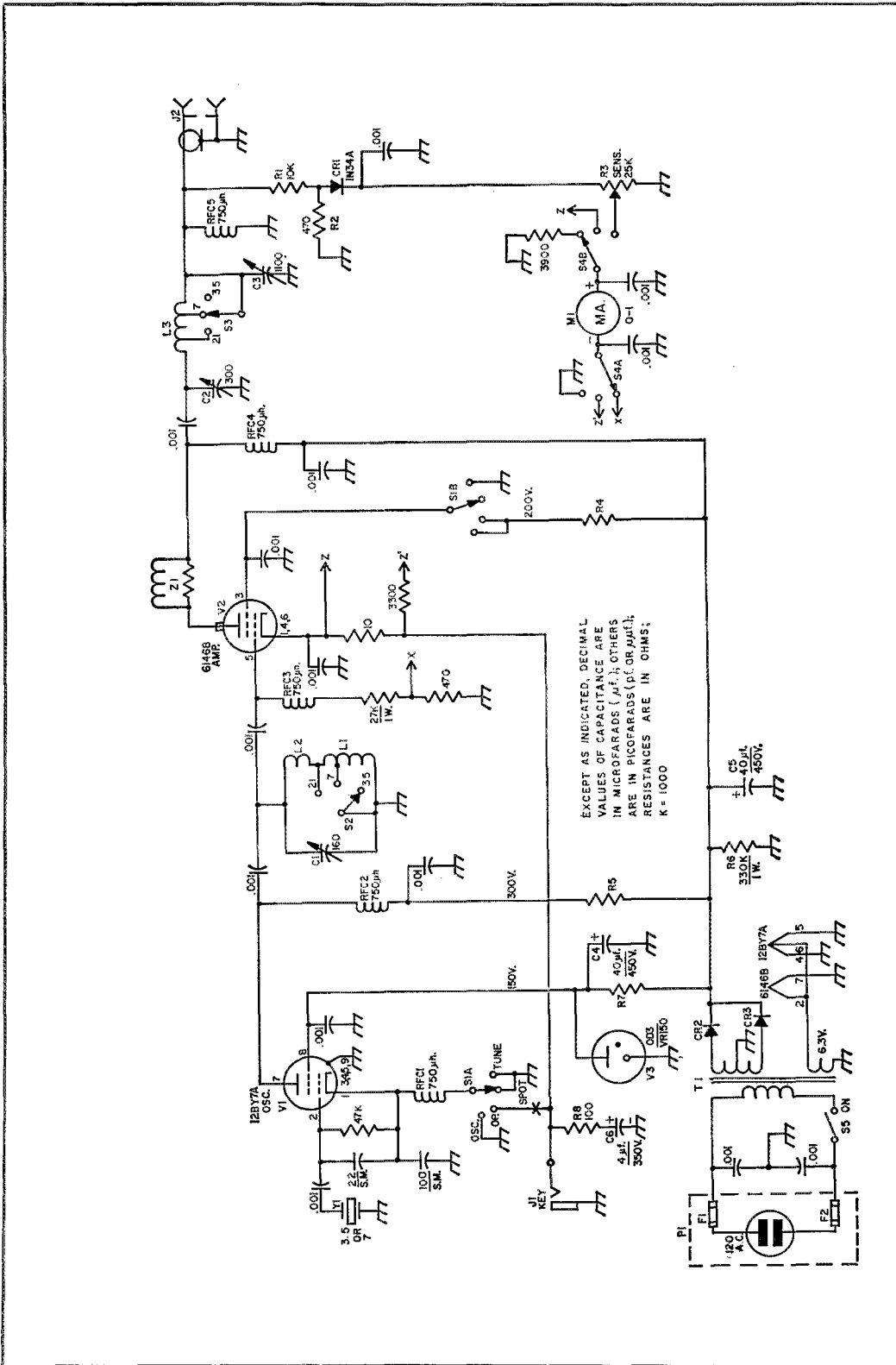


Fig. 1—Circuit diagram of the Novice transmitter. Except as specified, fixed capacitors are disk ceramic, polarized capacitors are electrolytic; S.M. = silver mica. Resistors are ½ watt unless specified.

- C₁—Approximately 160 pf., 365 pf. midget t.r.f. type modified, see text (Lafayette 32 H 1103, World Radio 10D152, or similar).
 C₂—300-pf. variable (Millen 19280 or similar).
 C₃—Three-gang, t.r.f. type variable, 365 pf. per section (World Radio Labs 10D154 or similar).
 C₄, C₅—40-μf., 450-volt electrolytic.
 C₆—4-μf., 350-volt electrolytic.
 CR₁—1N34A germanium diode.
 CR₂, CR₃—Silicon rectifier; p.i.v. must be 3 times ½ a.c. secondary voltage; 500 ma. or more. (1200 volts p.i.v. at 750 ma. should suffice for nearly all TV transformers.)
 F₁, F₂—3-amp., type 3AG.

J₁—Phone jack, open circuit.
 J₂—Coax chassis receptacle, type SO-239.

- L₁, L₂, L₃—See coil table.
 M₁—0.1 d.c. milliammeter.
 P₁—Fuse-type line plug.
 R₁—10,000 ohms, 1 watt.
 R₂—470 ohms, 1 watt.
 R₃—25,000-ohm control.
 R₄, R₅, R₇—See text.
 R₆—330,000 ohms, 1 watt.
 RFC₁, RFC₂, RFC₃, RFC₄, RFC₅—750 μh. r.f. choke (Millen 34300-750*).

- S₁, S₂—Phenolic rotary, 1 section, 2 poles, 6 positions (4 used). (Mallory 3226J or similar.)
 S₃, S₄—Phenolic rotary, 1 section, 1 pole, 5 positions (3 used). (Mallory 3215J, or similar.)
 S₅—Single-pole, single-throw toggle.
 T₁—TV power transformer, see text.

Y₁—80- or 40-meter crystal as required.
 Z₁—4 turns No. 16 enamel wound on a 47-ohm, 1-watt carbon or composition resistor.

* Millen components can be purchased directly from the factory: James Millen Co., Inc., Malden, Mass., Attn: Wade Caywood

Coil Table

- L₁—38 turns No. 22 enamel, close-wound on a 1-inch form, tapped 16 turns from the junction of L_{1L2} (Millen form type 45000).
 L₂—8 turns No. 16 enamel close-wound, ½-inch diameter.
 L₃—33 turns No. 20, 16 turns per inch, 1-inch diameter, 40-meter tap 17 turns from the C₃ end of the coil, 15-meter tap 26 turns from the C₃ end of the coil (BBW Miniductor type 3015, Illumitronic Air Dux type 816T).

pliers, and a pair of side-cutters. Also, a heat sink is very useful in protecting the component from too much heat when removing the part. The heat sink can be either a clip lead or a commercial heat sink, which is merely a spring loaded clip costing about 30 cents each. Always use a heat sink, because it is easy to ruin small resistors and capacitors if too much heat from the iron reaches the component.

In removing components, try and keep as much lead length as possible. In taking off the power transformer, it is a simple matter to trace out the 115-volt leads from the a.c. input and up through the switch on the set. Mark these leads for future reference. Usually, but not always, they are the black leads. Also, the high-voltage secondary leads are usually red with the center tap being red with a white tracer. The heaviest filament winding is usually the green lead. A voltmeter is necessary to check out the actual a.c. voltages out of the transformer. As a matter of fact, if you plan to do much construction, a multitest meter such as a v.o.m. or v.t.v.m. is a very good investment.

In Fig. 1, you'll note that many 0.001-μf. disk capacitors are used. In practically every case, larger values can be substituted without any change in the performance of the rig. In the TV set, you'll find many 0.001-μf. and also 0.01-μf. values. As any 0.001-μf. unit can be changed to any value up to 0.01μf. this provides you with a wide selection of available capacitors from the TV set. By the same token, you can usually go as much as 10 percent either way from the resistor values given in Fig. 1.

If in some instances you do not find a resistor with a close enough value it may be possible to parallel two resistors to obtain the desired resistance. The formula for two resistors in parallel is

$$R = \frac{R_1 R_2}{R_1 + R_2}$$

If resistors are connected in series, the total resistance is the sum of all the resistors used. The color codes for identifying the values of resistors and capacitors by their color bands or dots are given in any edition of *The Radio Amateur's Handbook*, Construction Practices chapter.

When terminal strips and tube sockets are removed from the TV set all terminals should be cleaned of solder and bits of wire. This could save you problems of undesired "shorts" later on.

All in all, an old TV set can be a gold mine for the builder with lean pocketbook.

Construction Information

After you have garnered all the parts you are ready to start construction. The unit shown was built on a 3 × 10 × 12-inch aluminum chassis. However, here again you can substitute since the chassis need only be large enough to hold the parts. The panel shown, and the shield around the r.f. compartment, can be made from aluminum cookie sheets. The panel measures 8 × 10 inches; for the shield enclosure the measurements

are 5 inches high and 10 inches wide with a $\frac{1}{8}$ -inch lip around the top and bottom for fastening to the chassis.

In wiring up the rig, wire the filament circuits first and then the high-voltage system, including the VR150 that provides a regulated 150 volts for the screen of the oscillator stage.

One point here: In order to obtain adequate filtering of the d.c., the minimum amount of capacitance for the two electrolytic capacitors, C_4 and C_5 , should be $30 \mu\text{f}$. The working voltage, which will be marked on the capacitor, should be 450 volts as this is higher than what your TV transformer will provide. Also, when installing electrolytics, be sure the negative (-) side is connected to chassis ground. You will find these markings on the capacitors so it should be easy to observe the correct polarity when installing the units.

Figuring Resistor Values

The values of three resistors, R_4 , R_5 , and R_7 , must be calculated by using Ohm's Law. To calculate the values, we must know the supply voltage (the d.c. voltage out of the filter) and the desired voltage. As an example, the voltage out of the filter in the rig shown is 400 volts. The required voltage for the oscillator plate,

via R_5 , is 300 volts. The formula for the resistance is

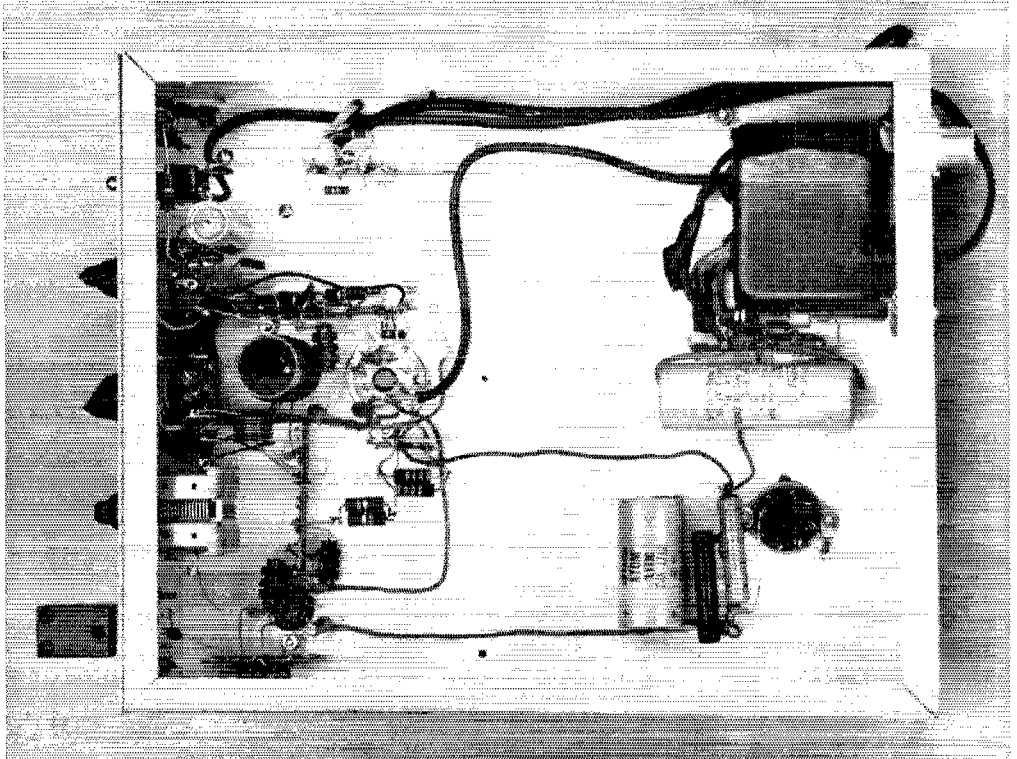
$$R = \frac{E_1 - E_2}{I} \text{ where } E_1 \text{ is the supply voltage}$$

and E_2 is the desired voltage. In the above case this comes out to $\frac{400-300}{I}$ or $\frac{100}{I}$

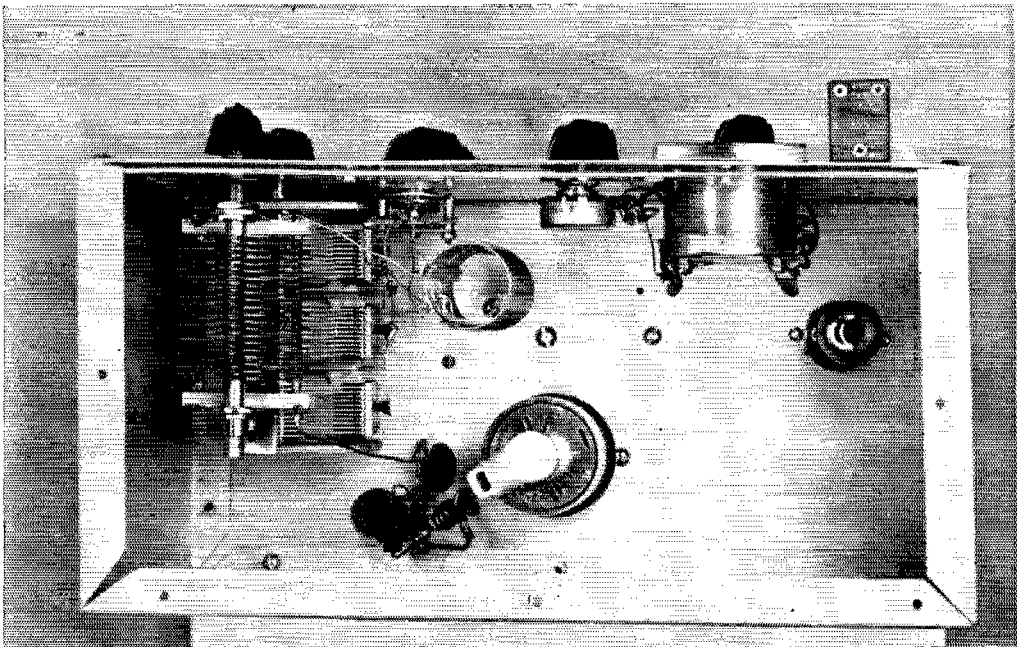
The current that the 12BY7 draws is about 15 milliamperes (0.015 ampere) so this comes down to $\frac{100}{.015}$ or 6,666 ohms. Any value between 6,000

and 7,000 ohms should do the job. One more thing we must know is how much power the resistor must handle. This is obtained from $P = EI$; in this case, 100×0.015 , or 1.5 watts. It might be hard to find a 2-watt resistor in the 6,000 to 7,000-ohm range from your junk TV set but it is likely that you'll find two 1-watters that you can parallel, such as two 12,000-ohm units.

The voltage on the screen of the amplifier should be 200 volts, or slightly less, based on a screen current of 10 ma. The voltage across the VR150 should come down to 150 volts, with the current figured at 40 milliamperes. A 2-watt resistor will be suitable for the screen of the amplifier, but more than likely a 10-watt rating



At the left, from the bottom up, are Y_1 , C_1 , S_2 , S_1 , S_3 and J_1 , in that order. The power transformer and filter capacitors are grouped near the back of the chassis.



At the left are the pi network tuning and loading capacitors, C_2 at the top, and C_3 at the bottom. Note the shielding on the meter.

will be needed for the VR dropping resistor, R_7 .

Layout of the various components is not critical, but the layout shown in the photographs should be generally observed. C_3 is a three-gang, 365-pf.-per-section variable, and the three stators should be connected together to provide a total of about 1100 pf.

In order to keep costs down, an inexpensive t.r.f. type capacitor is used at C_1 . However, only about 160 pf. is needed and the t.r.f. types, as they come, are usually about 365 pf. To modify the capacitor, turn the rotor all the way out and with a pair of long-nose pliers carefully remove the rear rotor plate by bending it back and forth until it breaks loose. Do this with all but the last six rotor plates. The six rotor plates will provide about 160 pf. maximum.

Also, unless you happen to get a shielded meter, M_1 should be shielded. This can be accomplished with a small piece of copper flashing fitted around the meter and the back, leaving two holes in the back large enough to clear the meter lugs. Soldering lugs can be soldered to the copper at the four meter mounting screws to make a metal-to-metal bond to the panel.

Testing and Tune-Up

Once the rig is wired, you are ready to start testing. Either a 60- or 100-watt light bulb can be used as a dummy load, and it can be connected to J_2 with some clip leads. Plug a key into J_1 and an 80-meter crystal into the crystal socket. Set S_1 to the "Tune" position and then turn on the power and let the tubes warm up but leave the key open. If the tube filaments don't light up, turn off the power and check

your wiring. One important point: *Whenever working on the rig make sure that power is off*; in fact, it is a good idea to unplug the a.c. line cord. The voltages developed can be lethal!

When the rig has warmed up, turn the meter switch to read amplifier grid current and set both band switches, S_2 and S_3 , to 80 meters. Close the key and tune C_1 for a maximum reading on M_1 . Full scale reading is 10 ma. but only about $1\frac{1}{2}$ to 2 ma. is needed to properly drive the 6146. You'll probably have much more than 2 ma. so detune C_1 to a point where the meter reads about 3 ma.

Open the key and then switch the meter to read cathode current. Put S_1 in the "Operate" position and set C_3 to maximum capacitance (plates fully meshed) and then close the key. Tune C_2 for a dip in cathode current and the light-bulb load should light up. By decreasing the capacitance of C_3 and redipping C_2 , you should be able to increase the brilliance of the bulb. You can increase the loading until the current reaches 160 ma.

Once you have the rig loaded up, check the voltages on the plate of the oscillator and screen of the amplifier to make sure they are "in the ball park." The oscillator plate, under load, should not be more than 300 volts for good tube life, and the screen of the 6146B no more than 200 volts. If the voltages are higher than that with the rig loaded (they will be higher with the key open or the rig unloaded but don't worry about that) you'll have to have higher-value dropping resistors . . . and *don't forget* to turn off the power when making any changes. Once you get all the voltages correct, you are ready to continue testing. Don't be concerned if the

voltages were higher than needed during the first tests; it won't hurt the rig for such short periods of tests. But continual use of the tubes at too high voltages would shorten their life.

With the lamp bulb fully loaded, switch the meter to read output and then carefully tune C_1 to the point where the output *just* starts to drop off. This point is the correct one for driving the amplifier grid, and is important because the harmonics generated in the amplifier are reduced under these conditions. You'll probably find that the grid current is less than 2 ma. but don't worry about it; the output versus drive test provides the best operating condition.

For 40 meters, the setup is similar with the exception that either 80- or 40-meter crystals can be used. The oscillator can be operated as a doubler if required. However, as a Novice, make sure your 80-meter crystal is the right frequency for doubling into the 40-meter novice band.

To get to 15 meters, the oscillator works as a tripler using a 40-meter crystal. When going through the tune-up procedure, you'll find two distinct points in the tuning of C_1 that provide grid drive to the final. One point will be near the minimum capacitance of C_1 , and that's 15-meters. Another, near the maximum capacitance of C_1 , will be 20 meters, and the oscillator will be doubling. If you don't want the 20-meter

feature just leave one turn off L_2 and then C_1 won't reach the 20-meter band. In any case, tune to the 15-meter point and tune the amplifier as mentioned earlier. As with C_1 , when tuning C_2 , the plate tuning of the 6146, the point near minimum capacitance will be 15 meters and the one with more capacitance, 20 meters. As mentioned earlier, use the output indication and tune C_1 for the minimum amount of drive no matter which band you are on. You'll find more than enough, even with the oscillator tripling.

Operating Notes

If you find that the note from the rig has a "chirpy" characteristic — this should only happen on 15 — the chirp can be cleared up by keying just the amplifier and letting the oscillator run. The only trouble with this type of operation is that you must turn switch S_1 each time you stand by, otherwise the oscillator signal will be heard. This can be taken care of by breaking the oscillator line at the point marked "X" and bringing two leads out to a desk-mounted switch. This same switch can be the one that controls the antenna changeover from receive to transmit.

Using the old-TV-receiver route for construction is a good way to cut the cost of getting started in ham radio!

QST

• New Apparatus

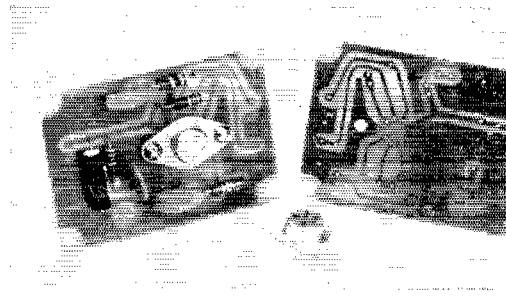
Integrated-Circuit

Voltage Regulators

A new series of ICs for electronic voltage regulation, recently introduced by Motorola, should go a long way toward simplifying the construction of regulated power supplies for semiconductor circuits. The models that probably will be of most interest to amateurs are the MC1460 and MC1461, the former rated at a maximum d.c. input voltage of 20 and the latter at 40 volts. Both types require a minimum of 9 volts input for proper biasing of the internal Zener reference.

These devices contain all the necessary regulator control circuitry, including provision for short-circuit protection, and can be used for obtaining regulated output voltages from 2.5 to 32, depending on the model. Output currents up to 500 ma. are possible directly, and by using the IC as the control for a larger-external transistor, the output can be increased to 10 amperes or more.

The MC1460 and MC1461 are available in two case styles. The suffix R designates the case shown in the accompanying photograph. A G suffix indicates a simple round-can enclosure, essentially the same as the R but without the integral mounting plate/heat sink. The case types determine the safe dissipation ratings: 0.68 watt for the G and 3.0 watts for the R at an ambient temperature of 25 deg. C without a heat sink. If the case is maintained at 25 deg. C by a heat sink, these ratings increase to 1.8 watts for the G and 17.5 watts for the R.



There are many options in the connections that may be used, and a prospective user would be well advised to get a copy of bulletin DS 9104 R1 (available from Motorola Semiconductors, Box 20912, Phoenix, Ariz. 85036) for full technical and circuit information. The assembly shown here was put together to try an MC1460R in a 12-volt, 150-ma. regulator with short-circuit protection. The output voltage was constant within less than 100 millivolts (difficult to measure any change on a v.t.v.m. 30-volt scale) over the 0-150-ma. range of load currents.

The circuit board, which measures 2½ by 3 inches, is available from Project Supply Co., P.O. Box 555, Tempe, Arizona, for \$1.25. It has provision for mounting parts in the various circuits described in the above-mentioned bulletin. The catalog prices on the ICs themselves are in the \$5.25-\$8.25 range, depending on the case style and input-voltage rating. — W1DF

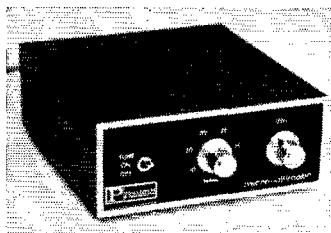


Recent Equipment



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

Pickering Radio Company K-1 Electronic Keyer



A NUMBER of years ago the pages of *QST* presented W6SRV's all-electronic Ultimate keyer,¹ which used the concept of "squeeze" keying for transmission of Morse code. That keyer used eight dual-triode and three dual-diode vacuum tubes, and all its components (including the paddle) were contained inside a 4 × 3 × 3-inch metal chassis box. (There could be no argument that the space was not well utilized.) Earlier squeeze keyers existed, but most designs included a system of relays.

More recently W1CFW described the Micro-Ultimate keyer,² which used integrated circuits with the squeeze-keying idea. In those comparatively early days of integrated circuit history, thirteen ICs were required to perform all the functions necessary for squeeze-keyed operation. The K-1 Micro-Ultimate keyer manufactured by the Pickering Radio Company is a deluxe version of that earlier IC keyer. With modern micrologic components, it uses only seven ICs and six transistors.

¹ Kaye, "The All-Electronic 'Ultimate' Keyer," Parts I and II, *QST*, April and May, 1955.

² Pickering, "The Micro-Ultimate," 73, June, 1966.

The keyer is completely self-contained except for the paddle. Two models are available, the K-1R which incorporates a high-speed reed keying relay, and the K-1G which uses a high-voltage transistor as the output keying device and is intended for use with blocked-grid keying systems. Front-panel controls include a three-position toggle switch for OFF/ON/TUNE operation of the keyer, a speed control, and a side-tone volume control. On the rear panel of the keyer are four jacks for connections to the paddle, transmitter, receiver audio section, and headphones. The latter two jacks and the volume control are provided for side-tone monitoring, and will be discussed later at greater length.

Inside the keyer all parts are mounted on an etched circuit board. Fig. 1 shows a photograph of the keyer with the outer cover removed. Very rugged construction is obtained through the use of 1/8-inch thick aluminum for both the U-shaped inner chassis and the seamless outer cover, which resembles a short length of metal ducting. Careful workmanship is displayed in the keyer's construction, and an attractive appearance is provided with black anodized and natural aluminum finishes.

The Circuit

The keyer circuit can be divided into five sections: the power supply, the pulse generator or clock, the memory and logic circuitry, the output keying section, and the side-tone oscillator audio section.

The keyer operates from 115 v.a.c., its power supply being of the full-wave bridge type. A Zener reference diode and a transistor provide a regulated d.c. output which is used throughout the keyer except for the reed relay in the K-1R model, where the unregulated supply voltage is used.

Three transistors are used in the pulse generator or clock circuit. The clock operates continually when the keyer is in operation, a feature which gives this type of keyer a distinctive "tape" sound. Dots or dashes can be started only at the instants when the clock produces a pulse, although they can be initiated earlier via the keyer's memory circuits. The speed con-

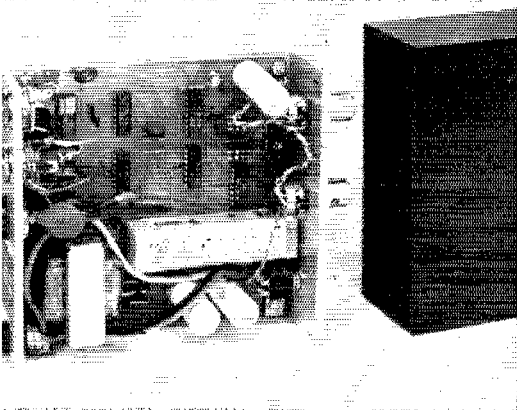


Fig. 1—The inside of the Pickering Micro-Ultimate keyer, model K-1R. The power supply components and keying relay occupy the lower portion of the etched circuit board. One of the seven ICs is hidden by the paddle input jack at the left center of the chassis. The pulse generator transistors are visible on the upper right portion of the board.

trol at the front panel controls the clock pulse rate. This control is calibrated linearly in w.p.m. from 10 to 60, and detailed information on calibration is included in the instructions.

The memory and logic functions necessary for squeeze-keyed operation are performed with a few resistors and capacitors and the seven integrated circuit packages consisting of three types — JK flip-flops, NOR gates, and inverters. The ICs are of the Motorola MC700P series.

For either model of the keyer, the K-1R or the K-1G, a single transistor is used in the output keying stage. The etched circuit board is cleverly arranged so that either model of the keyer can be constructed with the same board pattern.

Two cross-coupled NOR gates in a multi-vibrator arrangement are used to generate the keyer's side tone. The audio frequency was in the 630-Hz. range for the keyer we tested. A transistor amplifies the signal before it is fed to the output jack.

Side-tone Monitoring

The keyer's side-tone oscillator signal may be monitored directly by plugging a set of headphones into the jack provided on the rear panel. The front-panel volume control may be used in the normal manner in this application. Underterminated, the output is a square wave signal, but the shape is altered depending on the impedance of the load. The resulting tone is quite pleasing with high-impedance phones, but is a bit raspy with low-impedance "cans."

Provision is included in the Micro-Ultimatic to mix the audio from the receiver with that of the side-tone oscillator, making it convenient for the operator who wishes to use headphones for both transmission and reception. The mixing circuit arrangement is shown in Fig. 2. The audio from the receiver is connected to the phono jack, J_2 , and the received signal level is controlled with the receiver's volume control. The side-tone level is controlled independently by the keyer's volume control. Both signals are heard with headphones connected at J_1 . An alternative connection arrangement may also be used. The side-tone signal may be taken from J_1 and patched for mixing in the receiver via an auxiliary audio input, if one exists or is added. The combined audio may then be monitored either through a speaker or through headphones at the receiver's normal output.

We ran into difficulty when mixing the keyer's audio with that of our receiver. The receiver has only a 3-ohm output available externally, and when this output was connected directly to J_2 of the keyer, the side tone became inaudible even at full volume. Temporary connections between the keyer jacks and various points in the receiver's vacuum-tube audio circuits were tried, using various combinations of coupling capacitors, isolation resistors, and an impedance step up transformer. Several useful combinations were found, although in our situation the most pleasing results were obtained when the signals were mixed in the receiver's audio section.

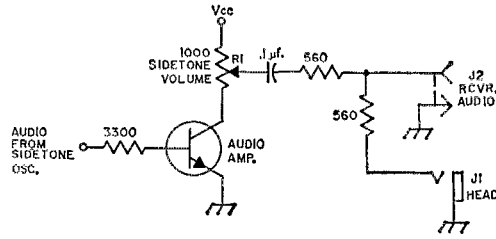


Fig. 2—Audio mixing circuit of the Micro-Ultimatic keyer. Resistor values are ohms. R_1 is a linear control. J_1 is a phone jack and J_2 is a phono jack.

Squeeze Keying

Some rather detailed information by W5GRJ has been published recently on squeeze-keyed operation using the W0EPV squeeze keyer.³ However, the Micro-Ultimatic keyer's memory circuits differ somewhat from those of the W0EPV keyer, and a slightly different type of operation is called for. The squeeze-keying concept relies on memory and logic circuits within the keyer to provide dots and dashes with the proper spacing in the desired sequence. The operating techniques with such a keyer are quite different from those with a mechanical "bug" and are not quite the same as those used with a conventional electronic keyer.

The modern conventional electronic keyer provides the correct timing for both dots and dashes, including the spacing between them. However, conventional keyers have a rather short "memory," being sufficient only to complete the element which has just been initiated, including a subsequent space. In operating the key paddle for such a keyer, the operator must hold the appropriate contacts closed until the desired character has begun. It is simple to send a string of repeated dots or dashes, being necessary only to hold the appropriate paddle contacts closed continuously. But to alternate between dots and dashes, as for the letter C or for a period, the operator must swing the paddle back and forth from left to right, alternately closing the dot and the dash contacts. To ensure against too long a space between the code elements, the operator must swing the paddle to the opposite contact *after* the desired element has begun, but *before* it and its succeeding space have ended. At slow code speeds this is no serious handicap, but requires a rather fast "fist" at higher speeds.

Squeeze-keyed operation permits independent and simultaneous closure of dot and dash contacts. A paddle with two independent levers is used to gain the full advantage of the squeeze-keying technique, although the keyer may be keyed with a conventional paddle using the conventional technique. Either way, the timing requirements imposed upon the operator for the formation of perfect code are less critical than for a conventional electronic keyer.

³ Moss, "The W0EPV Squeeze Keyer," *QST*, July, 1967.

The Micro-Ultimatic keyer contains two digital memories, one for dots and one for dashes. Only a very brief paddle contact closure is required to enter a dot or a dash into the appropriate memory, and the paddle may then be released. Digital circuitry of the keyer will complete the code element in progress, wait the proper amount of time for the space between elements, and then form the element stored in the memory section which has been actuated. The memory becomes empty and is again ready to be "set" as soon as the corresponding element (less its subsequent space) is completed. Thus, holding the paddle to either side will result in a string of repeated dots or dashes, as with a conventional electronic keyer. The dot/space ratio is fixed at 1 to 1, and the dash/dot ratio at 3 to 1.

Operating the Squeeze Keyer

Now, what if the dot and dash memories of the keyer are actuated simultaneously? First of all, such an event cannot occur when a code element is in progress because of the logic contained in the keyer's circuits. For example, if a dash is in progress the dash memory is not emptied until the dash has ended. During this time, only the dot memory may be actuated. Thus, continuously holding both contact levers of the squeeze-keyed paddle together will result in the repeated sending of *alternate* dots and dashes, because the dot and dash memories alternately become empty. This very feature of alternate memory-emptying is the really unique advantage of this type of squeeze-keyed operation! Instead of the necessity for "swinging the paddle" to form the letter C or a period, only a single squeeze with the proper release time is required. With a very slightly delayed closing action and a fast release on the dot contacts, a single squeeze will also result in a perfect letter K or Y, depending on the dash-release time. A bit longer delay in closing the dot contacts will result in a perfect Morse letter Q. The letters R, L, and F may be generated similarly except by appropriately delaying the dash contact closure. In fact the letters P and X are the only two of the entire English alphabet which cannot be sent with a single closure of either or both dot and dash contacts of a squeeze-keyer paddle.

As we already mentioned, the Micro-Ultimatic may be keyed in the conventional manner. But the squeeze-keying technique requires much less effort, and at high speeds one can take advantage of the memory functions and the associated timing leeway granted the operator. There are some operating habits to be broken when converting from a conventional electronic keyer to full squeeze keying, just as there would be for one converting from a bug to any type of electronic keyer. From a learning-period standpoint, the shift from an ordinary hand key to the squeeze keyer would probably be the easiest transition to make. There are no similarities in the two types of keying and therefore no old reflex techniques to unlearn.

Pickering K-1 Micro-Ultimatic Electronic Keyer

Height: 2¼ inches.
 Width: 5 inches.
 Depth: 6½ inches.
 Weight: 2 pounds, 5 ounces.
 Power Requirements: 105 to 125 volts, 60 Hertz, 8 volt-amperes.
 Price Class: \$85.
 Manufacturer: Pickering Radio Company, P. O. Box 29, Portsmouth, Rhode Island 02871.

Our earlier question, what if the dot and dash memories are activated simultaneously, still remains to be answered for the inquisitive. In practice with manually keyed operation, such a feat is difficult to achieve. A delay of several nanoseconds in the closure of one set of contacts is enough for the keyer to make a differentiation, and the first memory to be set will determine the first code element. The minute delay in a 12-foot test lead could be differentiated by the K-1R we tested. The lead was used to "short" the dot and dash contacts of the paddle together, so that closing either contact would almost simultaneously activate both memories. With this arrangement, closing the dash side would consistently result in a dash first, while closing the dot side would always result in a dot first. With a very short length for the test lead, the keyer we tested favored the dash, but this is probably due to variations in the two input circuits because of manufacturing tolerances in the component values. The two inputs are electrically symmetrical.

The keyer comes assembled, ready for operation. A three-circuit phone jack is included for connecting the paddle. The instruction booklet contains complete information on keyer installation and describes how one may modify a bug for operating the keyer. A discussion on squeeze keying operation is also given. The instruction book contains a schematic diagram of the keyer, but the IC types and pin numbers are omitted. No data on theory of circuit operation is included. However, a troubleshooting section covers all basic problems that could normally be cured by one not familiar with solid-state digital logic circuits. — *K1PLP*.

Strays

It is our unhappy duty to list in Silent Keys this month the call of Walt Knoop, W2LA, ex-W2PXR, whose technical articles in *QST* made his name well known to thousands of hams. His last was a description of a 4-element quad with driven directors, a monumental antenna detailed in August 1967 *QST*; the first, published 23 years ago, was an article on cathode-ray tube circuits. An amateur since 1935, he was an ardent DX man to the last.

Fast 'n' Easy

Printed Circuit Boards

BY W. HERBERT SCHIEBOLD,* WSEYM

WE wonder how often amateurs who previously enjoyed "rolling their own" abandon projects utilizing transistors and ICs when confronted with making an etched circuit board. Some simply turn to commercial gear, or at best, rely on available kits.

Others diligently use flea clips in perforated board (great for breadboard), or struggle along with plenty of drilled holes and tie strips. While these methods work fairly well with transistors, they still present a problem with ICs. To raise home-brew construction to "state of the art," we need an etched circuit board.¹

Photographic means of producing a board seem unduly complex for one-shot projects. Etch-resistant tape and the assorted "resist" dots, shapes, elbows, etc., work well (if the etchant doesn't leak under), but entail maintaining a supply of resist materials around the shack. Complex shapes and areas are not readily achieved with normal tape resist materials.

The Etch-Resistant Material

The method presented here may not be everyone's "cup of tea," as a small amount of manual dexterity is required. But for those with any art or drafting experience, or just a reasonably steady hand and a little practice, it will produce p.c. boards almost as fast as you can paint your connections, with complete flexibility of circuit shapes, grounded areas, and so forth.

You'll need a bottle of Photo Maskoid or a similar product liquid frisket, and a good quality pointed artist's brush. (We prefer a number 3 or 4.) These items are available at any art store supplying commercial artists. Liquid frisket is used by retouchers to mask areas of a photograph that are not to be worked on. It is brushed on, and removed by simply pressing a piece of masking tape to the frisket and lifting it off. When applied to the p.c. board, the frisket acts as an ideal resist material; errors can be removed by merely pressing masking tape over the affected

area and lifting. Small changes can be made by pushing the rubbery resist material back, and repainting the edge. (We use the tip of our wooden brush handle cut to a chisel point for this purpose.) This material clings and will not allow etchant to leak under, yet is simple to remove.

Preparing to Etch

For those trying their first p.c. boards, Fig. 1 shows a simple method I employ. After initial sketches are made or a pattern from an article is obtained, a final drawing is made on semi-transparent paper. Then the paper is folded over, and parts are drawn on the folded-over piece, to check for size and placement in the circuit layout. Colored pencils or markers add clarity at this stage. (Remember, you're drawing from the bottom.) Then rub the back of the paper on which the pattern is drawn with the broad side of a soft pencil, Fig. 2. The penciled shading will later act as a carbon to transfer the pattern. Carbon paper may be used instead, if preferred. Be sure to clean the copper with steel wool and give it a thorough washing first! Then the pattern is placed on the copper board and traced with a hard pencil, stylus, or ball-point pen, using a little pressure.

At this point, you simply paint on the frisket, following your outline. See Fig. 3. Lacquer thinner is fine for thinning or cleaning your brush. Drying takes just a few moments. Don't worry about how even the application is; it's only the edge that counts for neatness. If you need a few long thin lines and don't trust your hand, just lay down strips of masking tape or regular tape resist for them.

The Etching

Then slip your board into the etchant, Fig. 4, until the exposed copper has completely dissolved. When the etching is complete, wash the board in water and dry. Then simply press masking tape to the resist, which will peel off readily with the tape, shown in Fig. 5. Now, Fig. 6, you are ready to drill the component holes.

This simple paint-on resist has rejuvenated my interest in building, because I can paint my p.c. boards for whatever circuit pattern I'll need. The result is gear which is equal in compactness to the more modern amateur equipment. QST

* 3953 Charing Cross Rd., Bloomfield Hills, Mich. 48013.

¹ Copper-clad phenolic or glass-epoxy board, suitable for etching your own patterns, is available from most radio supply houses. Surplus materials are available from time to time at a lower cost, being listed in *QST* Ham-Ads. Etching chemicals are available through the mail-order houses; Kepro is one manufacturer. See page 521 in the 1968 edition or page 522 in the 1969 *ARRL Handbook* for tips on planning the pattern layout. — Editor.

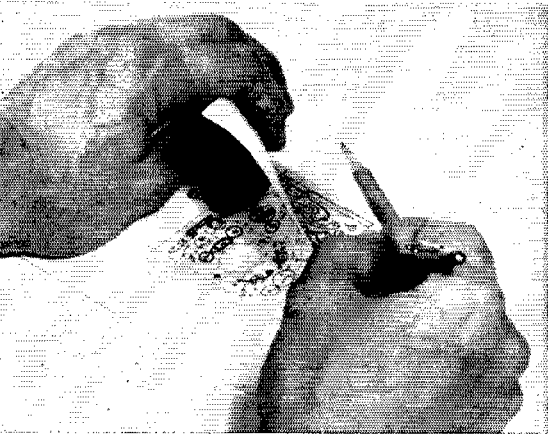


Fig. 1—The circuit pattern is drawn on semi-transparent paper. Then the paper is folded over to check the parts for placement and fit.

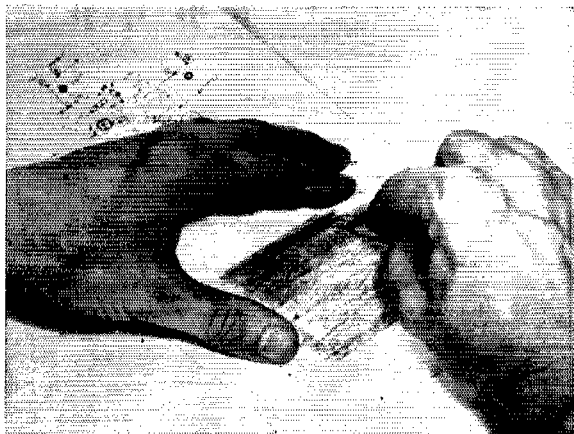


Fig. 2—Prepare the drawing for tracing by rubbing the back with the flat side of a soft pencil. Carbon paper may be used instead.

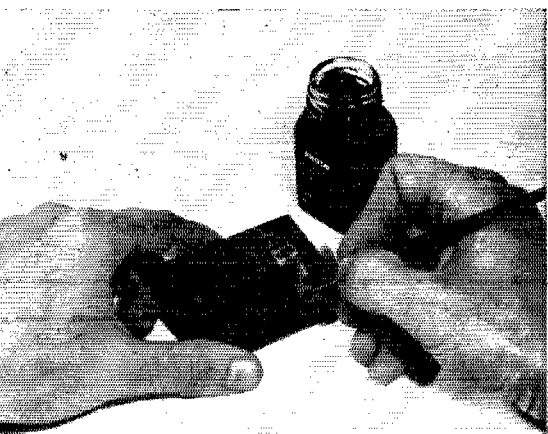


Fig. 3—Paint the frisket "resist" over your traced outline. Unpainted areas will be removed by the etchant.



Fig. 4—Inspecting the board during etching. Non-metal trays should be used for the etching process.

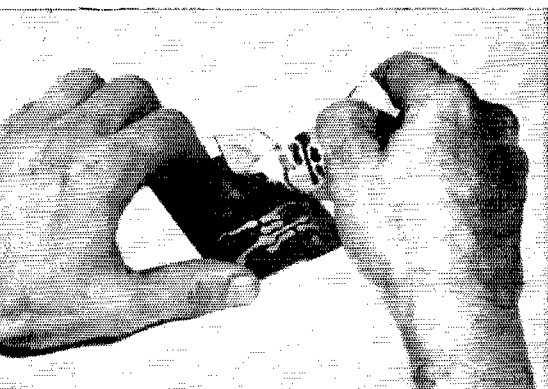


Fig. 5—Removing the "resist" is simple. Just lightly apply masking tape, and pull off. The rubbery "resist" sticks to the tape. (This is also an easy way to make corrections during painting; just be careful so the tape doesn't touch the part you want to save.)

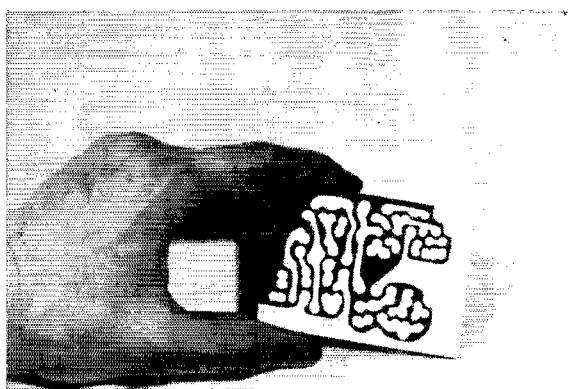


Fig. 6—The etched p.c. board, ready for drilling and mounting parts.



Hints and Kinks

For the Experimenter



POWER-DRAIN REMINDER

WHEN you park your car, do you occasionally forget to turn off your automobile lights or perhaps your rig? You may be interested in this simple power-drain reminder.

The reminder circuit, shown in Fig. 1, will not interfere with the normal operation of your car or radio equipment, and it will not draw current when the ignition is off, except during alarm conditions. It will allow the use of the lights if the ignition is initially off. However, if the ignition is turned on when the lights are on, or the lights turned on after the ignition is turned on, the alarm will be activated when the ignition is turned off if the lights are still on. Thus, you will be warned on foggy mornings if you inadvertently leave your lights on in the parking lot.

Referring to Fig. 1, relays K_1 and K_2 always operate when the ignition is turned on. K_{1C} closes the alarm circuit while K_{2B} opens this circuit. If the lights aren't turned on, K_{1A} and K_{2A} return to normal (draw no current) when the ignition is turned off. However, if both the auto ignition switch and the light switch are activated, K_{1A} will continue to draw current through the light switch and K_{1B} , keeping the alarm path primed as long as the lights are on. If the ignition is then switched off, K_{2B} will complete the alarm path, and the alarm circuit (a buzzer in the case of the author's automobile) will be activated. To deactivate the alarm, it is only necessary to turn off the lights.

Diodes CR_1 and CR_2 prevent current flow from the ignition circuit to the light circuit and vice versa. Capacitor C_1 is required to prevent momentary false alarm at ignition turn-off time. If you have no need to turn on the lights when the ignition is turned off, you can use a s.p.s.t. relay at K_1 and replace K_{1B} with a jumper. With this arrangement, the alarm will sound if the ignition switch isn't on when the lights are on. — Victor A. Damora, W2EML

TRANSIENT AND LOAD-MISMATCH PROTECTION FOR A TRANSISTOR P.A. STAGE

IT is not uncommon to destroy the last stage in a solid-state transmitter when the load is momentarily lost while drive is applied. The damage results from excessive collector-to-base voltage, V_{CB} , which can soar to values far in excess of the transistor's maximum ratings when there is no load (or an improper load) at the output terminals of the tuned circuit. Normally, the V_{CB} can swing to approximately twice the supply voltage during c.w. operation. It can swing to as much as four times the supply voltage during a.m. operation. Rule No. 1, of course, is to initially select a transistor whose ratings allow for the normal voltage swing, and to make certain that the load the circuit is designed to look into is always present.

During initial antenna adjustments, as when a Transmatch is used, the load is often anything except what it should be — a dangerous situation for the p.a. transistor(s). Also, should the antenna become detuned by ice, snow, or nearby objects (as is typical during mobile operation) the transistor ratings can be exceeded because of a high s.w.r. The excessive voltage spikes usually perforate the junction material and cause the transistor to become short-circuited.

Though elaborate s.w.r. sensing circuits can be tied to the output of the transmitter and used to control a protective circuit which removes drive from the p.a. transistor, a less complicated protective device is shown in the diagram of Fig. 2. By placing CR_1 , a Zener diode, between the collector of Q_1 and ground, the maximum collector voltage cannot rise above the clamping level of the Zener. In the example shown, the p.a. stage is designed for c.w. operation. Since the collector voltage can swing to 24 volts, the Zener should be selected to provide protection at some voltage greater than 24. Supposing that the transistor has a maximum V_{CB} rating of 40 volts,

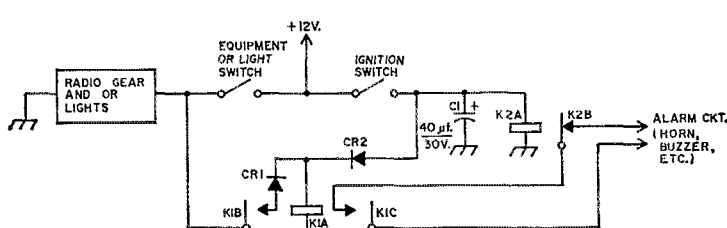


Fig. 1—Schematic of the power-drain reminder.

C_1 —Electrolytic.
 CR_1, CR_2 —50-p.i.v. silicon diode, current rating greater than coil current of K_1 .

K_1 —Normally open, d.p.s.t. 12-volt d.c. relay.
 K_2 —Normally closed, s.p.s.t. 12-volt d.c. relay.

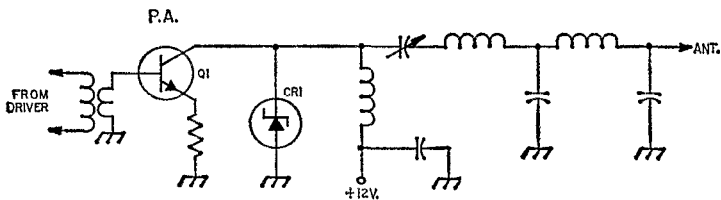


Fig. 2—Schematic of a typical transistor p.a. stage employing transient and load-mismatch protection. Part labels are for text reference.

we would select a Zener diode that would conduct at, say, 36 volts. Were the p.a. being used for a.m. operation, the maximum V_{CB} rating of the transistor would have to be 48 volts or higher to allow for the four-times swing that could occur (normally it is less than four). In such a case the Zener should conduct at 50 volts.

In addition to providing mismatch protection, the Zener diode shown in Fig. 2 will protect the p.a. transistor from d.c. spikes on the 12-volt collector supply. (Transients of considerable magnitude are quite common in automotive ignition systems.)

The protection technique shown has worked well in transmitters designed for h.f. operation. It has not been tried at v.h.f., though it is possible that the Zener would not impair efficiency in that part of the spectrum.

No additional harmonic output was noted with the Zener connected. If the p.a. tank is designed for good harmonic suppression it should serve as a safeguard against harmonic output that might be enhanced by the addition of the Zener diode. A 1-watt Zener should suffice in most applications. — *WICER*

THIN-WALL BRASS TUBING

ONE of the most useful construction materials I have found is the thin-wall brass tubing stocked by hobby shops. This comes in $\frac{1}{32}$ -inch increments from $\frac{1}{16}$ -inch o.d. to $\frac{1}{8}$ -inch o.d., and one-foot lengths cost only 20 to 40 cents each. Since the tubing wall is about 0.015 inch thick, each size slides smoothly inside the size $\frac{1}{32}$ inch larger, and over the size $\frac{1}{32}$ inch smaller.

A series of tubing lengths nested one inside another looks just like a collapsible whip antenna and can be made into one with little effort. A bushing of almost any size can be made by soldering short pieces inside one another until the necessary difference in diameter is built up. The same scheme can be used to reduce the end of a $\frac{1}{4}$ -inch diameter extension shaft so that the $\frac{1}{8}$ -inch diameter shaft of a small tuning capacitor can be accommodated. Sockets for 1N21-type cartridge crystals can be made from $\frac{1}{8}$ - and $\frac{1}{32}$ -inch o.d. pieces; just slot the ends of the tubing with a jeweler's saw and adjust the fingers for a good fit. — *From W3GKP's OVS report*

TR-4 BAND SWITCH

THE band switch on my Drake TR-4 began to get balky several months ago. Finally it got so bad it couldn't be turned for several minutes at a time. If the switch was jiggled enough, it eventually moved, but usually in the wrong direction. Naturally I became reluctant to change bands. Finally I wrote to Drake, and they suggested that I use some high grade grease that wouldn't melt at the temperatures encountered in the back of the set. It worked.

First, turn the set upside down and take the lower cover off by removing three screws from each side. Then locate the detent mechanism on the back of the band switch. It has a small ball bearing that fits into a hole or slot and secures the band switch whenever the switch is turned to a new position. Using a small amount of grease on the end of a toothpick, work it around the ball. In my case, this procedure freed the switch immediately. In the future I plan to lubricate the switch every year or so as a matter of routine maintenance. — *T. O. Thiebes, W0LLE*

NOTES ON THE THREE-WIRE TESTER

IN reference to the "115-Volt Three-Wire Tester" in *QST* for January 1969, there is only one thing wrong with the device: it uses neon lamps. As a ground tester or a circuit continuity tester, the neon lamp is useless. The National Electrical Code states that an electrical ground should not have a resistance of more than 25 ohms. However, the neon lamp will light through several thousand ohms. In fact, you can light a neon lamp through a piece of wet string.

For several years I have used a two-wire lamp socket, with one wire connected to the hot terminal of a three-wire plug and the other wire connected to the grounding terminal. If a large lamp (100 or 150 watts) is used and it burns brightly, all connections are correct¹. If the lamp burns dimly, there is high resistance in the ground lead. If the bulb doesn't light, there is no ground connection, or the connections are incorrectly wired at the outlet. Poor ground connection or none at all may be the result of poor conduit joints, or the use of cable having a nonmetallic sheath. — *T. Van Abbema, W9NEJ*

¹This test will not reveal the condition of the neutral conductor. — *Editor.*

Technical Correspondence

THE ICKEY INTEGRATED-CIRCUIT KEYSER

Technical Editor, *QST*:

I built Mr. Van Cleef's "Ickey,"¹ and I've got to say it's really great. It does about everything I could have hoped for. I added his automatic letter spacing,² which now also performs excellently. In installing it, I noticed a tendency for the reset pulses to travel along the memory sensing lines and permit the hold flip-flop to trigger, resulting in letter-spacing between each bit. This was easily cured by bypassing the memory set gate output to ground with a 0.001- μ f. capacitor. Bravo for a very excellent article. — Steve Hurder, WA9WVY, 1113 Devonshire Dr., Champaign, Ill. 61820.

MORE ON THE ICKEY KEYSER

Technical Editor, *QST*:

A few months ago I completed construction of the ICKEY Keyer.² It is an excellent project that performs exactly as the author described. For the circuit board, I used Vector board No. 169P59-032 because it has 0.150-inch spacing that accommodates the IC pin spacing and completely eliminates drilling holes to mount any of the components.

I incorporated a change to replace the output relay with an inexpensive transistor and three resistors. The transistor will key grid-blocked transmitters with negative open-key voltages up to 105 volts.

The circuit is patterned from one by Mr. B. L. Stuecker, WB8AAK. The keying transistor is a p-n-p type. In order to forward-bias the transistor, a negative base bias is required. I used the negative voltage drop available across the series regulator power supply transistor, Q_6 , about -4 volts. The circuit modification is shown in Fig. 1.

In the normally-off condition, resistors R_1 and R_2 are selected to completely shut off Q_7 with a positive base bias of 0.4 volt. In the forward-biased condition, less than 0.1 volt was measured across Q_7 . Resistor R_3 replaces the relay d.c. coil load resistance for driver Q_5 .

More recently I have added the following features. I replaced the Q_4 oscillator base resistor with a 1000-ohm resistor in series with a 2000 ohm potentiometer for a tone control, terminating the output transformer in 33 ohms and a parallel 10,000-ohm audio-taper front-panel-mounted volume control. The wiper arm of the control feeds a miniature all-transistor audio amplifier. I am also feeding my receiver output into my keyer speaker via a closed-circuit jack. This allows me to use headphones to monitor my keyer or receiver for break-in c.w. operation, with independent volume controls and no plug-changing. A 150-ohm resistor and 10- μ f. capacitor in series from the receiver's headphone output give adequate isolation from the miniature audio amplifier's output.

¹ Van Cleef, "ICKEY — An Integrated-Circuit Electronic Keyer with Dot and Dash Memories," *QST*, November, 1968.

² Van Cleef, "Automatic Letter Spacing for ICKEY," *QST*, February, 1969.

The keyer works to my satisfaction now. I frequently receive spontaneous reports as to its clean and easy-copy signals over the air. The total cost for all my components excluding the audio amplifier, purchased new, was less than \$45.00. — Carl A. Kolenda, WB8BTY, 1545 Cherbonneau Pl. No. 38, Detroit, Mich. 48207.

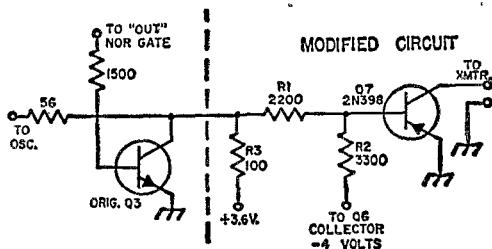


Fig. 1—Transistor output keying for the ICKEY keyer. This circuit will key grid-blocked transmitters with an open-circuit voltage as high as -105 volts. Resistances are ohms; resistors are 1/2 watt. Q_7 is an RCA 2N398 or equivalent.

4-400A VERSUS PL-175A TUBES

Technical Editor, *QST*:

The letter of R. F. Herbig, W6ME, in May *QST*³ regarding substitution of the 4-400A for the PL-175A in the Viking Invader-2090 was noted with considerable interest.

The "more expensive" PL-175A costs 12.5 percent more than the 4-400A. In return, it delivers approximately 25 percent more power output without flat-topping under the conditions existing in the Invader-2000. It is for this reason that it was chosen for this transmitter. — Leigh Norton, W6UEM, Penta Laboratories, Inc., Box 1469, Santa Barbara, Calif. 93102.

ADDITIONAL DATA ON THE MONODE NOISE GENERATOR

Technical Editor, *QST*:

During the development of the Monode noise generator⁴ the effects of the "cold" end-turns of the lamp filament were ignored; i.e., it was assumed that the filament was at a uniform temperature thus making the noise temperature, T_N , and the actual temperature, T_A , equal. The curve of temperature vs. lamp voltage gives the actual temperature.

It has been found that the end effects of the lamp filament are significant for precise work. Table I summarizes original as well as new data on the No. 12 lamp.

V is the d.c. lamp voltage, T_C is the original data from Nela Park for test 7824 giving the color temperature in Kelvin, T_A is the actual filament temperature which was obtained from the original color temperature data by means of Table 85 in *Smithsonian Physical Tables*,⁵ T_N is the corrected noise temperature in Kelvin. CORRECTION is the correction to be applied to the actual temperature in order to obtain the noise temperature, R_A is the actual d.c. resistance of the No. 12 lamp, and R_1 is the theoretical d.c. resistance of an ideal No. 12 lamp having a uniform-temperature filament.

³ Hints and Kinks, "Viking Invader-2090," *QST*, May, 1969.

⁴ Guentzler, "The Monode Noise Generator," *QST*, April, 1967.

⁵ *Smithsonian Physical Tables*, W. E. Forsythe, Ed., 9th Ed., Rev. 1956.

TABLE I

| V (V) | T _C (K) | T _A (K) | T _N (K) | CORRECTION (C°) | (%) | R _A (Ohms) | R _T (Ohms) |
|----------|-----------------------|-----------------------|-----------------------|--------------------|-------|--------------------------|--------------------------|
| 5.0 | 2112 | 2064 | 1993 | -71 | -3.44 | 37.25 | 40.05 |
| 6.3 | 2286 | 2223 | 2158 | -65 | -2.91 | 41.10 | 43.73 |
| 8.0 | 2473 | 2394 | 2346 | -48 | -2.02 | 45.70 | 47.75 |
| 9.0 | 2561 | 2478 | 2442 | -36 | -1.44 | 48.20 | 49.74 |

The noise temperature was determined theoretically by means of a process based upon the known deviation of the actual filament resistance from the value for an ideal lamp. The noise temperature values given in Table I have been verified by comparison with a 6852/TD-24 argon gas-discharge tube and a corrected 5722 diode noise generator.

Values of noise temperature for filament voltages other than those given in Table I can be obtained (over the range from 5 to 9 volts) by means of the formula:

$$T_N = 1187.52 + 188.24V - 5.4281V^2,$$

where T_N is in degrees Kelvin and V is in volts d.c. This formula was obtained by means of a least-squares fit of the Table I T_N data.

When I wrote the Monode article I was not aware that I had been preceded by 21 years! E. H. Ullrich and D. C. Rogers wrote a paper that appeared in 1946.⁶ They describe a method of noise-factor measurement using specially-constructed lamps; their measurements covered the range of frequencies from 45 MHz. to 3 GHz. — E. E. Guentzler, W8BBB, Route 1, Box 30, Ada, Oh. 45810.

MORE ON CATHODE-RAY TUBE DISPLAYS OF SATELLITE WEATHER PICTURES

Technical Editor, QST:

Fig. 2 is a circuit that will accommodate the sync signals from both the Essa and Nimbus III weather satellites. This circuit may be used to replace Fig. 1 in my earlier article.⁷

The Nimbus satellite sync signal differs from Essa in that the 12.5-millisecond pulse at the beginning of each line is broken up into a seven-pulse sync train.

The positive video signal is taken from the

⁶ Ullrich and Rogers, "An Absolute Method of Measurement of Receiver Noise Factor," *Journal of the Institution of Electrical Engineers*, Vol. 93, Pt. IIIA, p. 1347, London, 1946.

⁷ Spillane, "Cathode-Ray Tube Display Unit for Satellite Weather Pictures," *QST*, June, 1969.

Fig. 2—Line-synchronizing circuit for Essa and Nimbus III. Capacitances are in μf. Capacitors are paper, 600-volt, except as indicated; capacitors with polarity indicated are electrolytic. Resistances are in ohms (K = 1000); resistors are 1/2 watt except as indicated. L₁ is a small filter choke. S₁ is a s.p.d.f. toggle switch, used in position 1 for Nimbus III and position 2 for Essa satellites. The schematic references Fig. numbers of the original article.

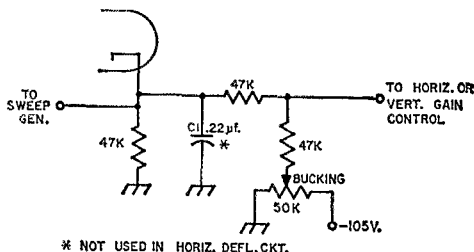
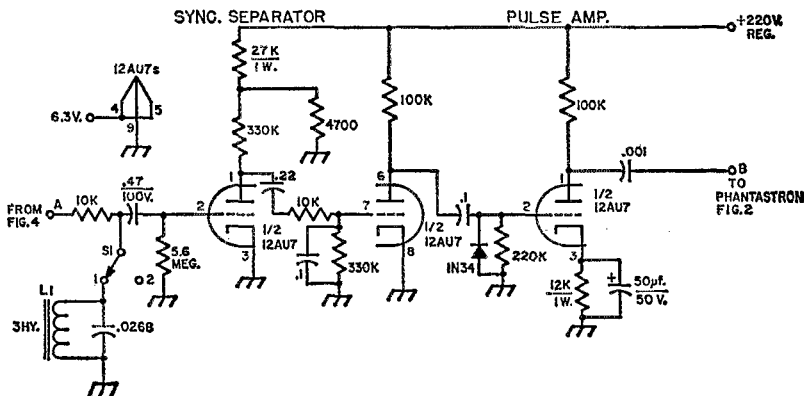


Fig. 3—Bucking circuit for horizontal and vertical deflection amplifiers. Resistances are in ohms (K = 1000); fixed resistors are 1/2 watt. The variable resistor is a composition control, linear taper, and is used only in the vertical deflection circuit.

10,000-ohm resistor on the output of the demodulator, and is coupled to the filter consisting of L₁ and a capacitance total of 0.0268 μf. This filter removes all but the seven-pulse sync train. The sync separator or sync clipper uses a small portion of the sync signal and at the output the seven pulses are integrated by the 10,000-ohm resistor and the 0.1-μf. capacitor to produce a single pulse. This pulse is amplified by the second stage. At the input to the third stage, the 1N34 diode removes any negative-going signal, and the signal is further amplified. The output is coupled to the gate diode of the 6AU6 phantastron circuit through a 0.001-μf. differentiating capacitor, and the pulse (negative at this point) triggers the sweep.

During the reception of the Essa pictures, the filter is switched out and the circuit operates as before. This system, as in most amplitude synchronizing systems, is subject to interference from impulse noise. The use of circularly polarized antennas of high gain and a low-noise receiver is recommended.

There are errors in the bucking circuits of Figs. 2 and 3 in my earlier article. The cathode follower circuit to either the horizontal or vertical amplifier should appear as shown in Fig. 3. — Jack Spillane, W7UGV, 3010 N. W. 60th, Seattle, Wash. 98107.

D.C. Voltages and the Pi Network

BY JAMES N. THURSTON,* W4PPB

MOST amateur transmitters and transceivers now in service make use of a pi-network output circuit. The shunt-feed circuit of Fig. 1 is preferred because the pi network is isolated from the high-voltage d.c. supply by blocking capacitor C_b . In some designs an r.f. choke is inserted at point X in Fig. 1, to insure that no high voltage will appear at the antenna terminals if C_b should become shorted for some reason. A point seldom realized is that an r.f. choke at point X is a most desirable element even when C_b is in perfectly good working condition.

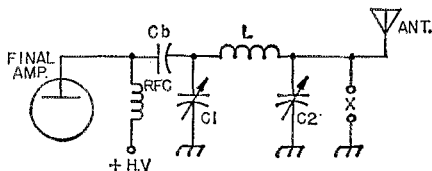


Fig. 1—Conventional shunt-fed pi-network output circuit. An r.f. choke should be installed at point x.

Consider the circuit shown in Fig. 2, which is the d.c. equivalent of that circuit given in Fig. 1. Suppose the high voltage is 1500 volts, C_b is 0.01 $\mu\text{f.}$, and C_1 plus C_2 in parallel add up to 500 pf. These values were selected as being typical. The usual assumption is that C_b blocks the direct current and that no d.c. voltage appears across C_1 and C_2 . This is completely incorrect, as a quick calculation will show. Since C_b is connected in series (for d.c. purposes) with the parallel combination of C_1 and C_2 , the same charge must appear on C_b and on the $C_1 C_2$ parallel combination. Going one step further, voltages on series capacitors divide inversely as the capacitance of each unit. In this example, since C_b is 0.01 $\mu\text{f.}$ and $C_1 + C_2$ is 500 pf., the voltage on $C_1 C_2$ is 20 times that across C_b . This means that C_b has about 72 volts d.c. across it, while C_1 and C_2 have about 1428 volts across them.

Of course other capacitance ratios would divide the voltage differently. In most cases however, C_b is considerably larger than C_1 and C_2 in parallel, which means that C_1 and C_2 would normally have a much higher d.c. voltage across them than does C_b .

If all that has been previously said is true, and it is, then how do we get by without frequent

* 212 Seneca Road, Clemson, South Carolina 29631.

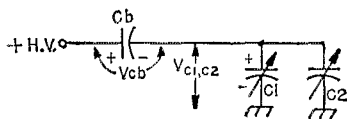


Fig. 2—D.c. equivalent circuit of Fig. 1.

voltage breakdowns on C_1 and C_2 ? The answer is that we don't unless we make the voltage rating on C_1 and C_2 very large, or unless we shunt these two capacitors by a path of low d.c. resistance. If an r.f. choke is connected at point X this immediately drains the d.c. charge from C_1 and C_2 , keeping the high-voltage d.c. drop where it belongs, namely across C_b . Of course, an antenna tuner or any other device which provides a low resistance d.c. path across C_2 to ground will serve the same purpose.

Not long ago I noticed intermittent sparking across the output capacitor in my own transmitter's pi network. A quick check revealed that the r.f. choke across C_2 had become disconnected, resulting in a condition where too much voltage appeared across the loading capacitor. Reconnecting the r.f. choke stopped the sparkover, as expected.

In many instances amateurs have gone to relatively expensive high-voltage capacitors for C_2 when the installation of a good r.f. choke across C_2 might have saved them money. Even with an output stage that will deliver 1000 watts into a 50-ohm load (s.w.r. 1:1), the peak r.f. voltage across C_2 should be no more than about 320 volts, and it doesn't take an expensive capacitor to handle this.

QST

NEW BOOKS

RCA Transistor, Thyristor & Diode Manual, by RCA Electronic Components, Harrison, New Jersey 07029. Technical Series SC-14. 656 pages, including index, 5½ by 8 inches, paper cover. Price, \$2.50.

This is an old familiar in somewhat new guise — an enlarged title (it used to be the *RCA Transistor Manual*) and revamped interior arrangement. Like each succeeding edition, it is larger than its predecessor, and now has a total of 656 pages against 514 for the SC-13. The increase in number of pages is partly accounted for by the population explosion in new semiconductor devices, of course, but only partly. There is also an expansion of the text material, to the extent of over 50 pages. Thus although the general scope is the same as in the preceding edition, the treatment has been updated.

Section headings give an idea of the book's subject matter: Materials, Junctions, and Devices; Bipolar Transistors; MOS Field-Effect Transistors; Thyristors; Silicon Rectifiers; Other Semiconductor Diodes; Linear System Applications; TV Deflection and Color Demodulation; Power Switching and Control; Computer Circuits; DC Power Supplies; Testing and Mounting; and technical data on RCA products in the above categories. As in earlier editions, a circuit section is a feature of the book — practical circuits for the hi-fi fan, amateur, and hobbyist. Some of these are repeated from earlier editions, but there are many new ones, too. Good reference material for the ham interested in semiconductors. — *WJDF*

College Competition -- Impending Disaster

BY ALBERT KAHN,* K4FW, ex-W8DUS

It all started pretty innocently, I think. Probably, a couple of hot operators got WSUM, the University of Michigan's station, wound up for the DX contest. Everything was right and it turned out to be a smash.

Last year WSUM was first in line for just about everything. They just sat there calling the roll like DX themselves. They were even working 80 as if it were the SS contest.

This stellar performance at a great university is fine. It is gratifying to see colleges enjoy ham competition. Up to a point, that is. But what does this portend?

How does a loyal Wisconsin alumnus feel when he learns the so-so score of W9YT? Does he hang his head in shame when he meets a Michigan colleague? Perhaps, holding back his tears, he pretends that it is just a game and unimportant.

What is the reaction of a Purdue alum when he compares the score of W9YB to UM? Anger? Humiliation? Need of revenge? Probably all three.

Are the Michigan graduates generous in their victory? Do they say, "Just a bit of luck, you'll do better next year."? Probably not, a lesson learned from football that remarks like this usually come true.

WSUM can't be expected to dominate college competition year after year any more than Minnesota could in football a few decades ago. Alumni pressure will mount. Students will organize protests. Station trustees will be hung in effigy.

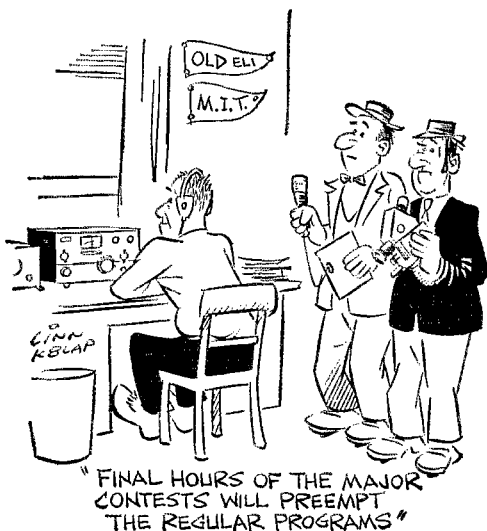
Soon there will be recruiting, ham-radio scholarships, ham training tables, red-shirting and regional conferences. The Novice Round-up high scorers, still in high school, will be visited by the ham-radio coaches.

Fund drives for rhombics, new stations and expanded staff will be under way by the 3000 colleges. Hams will become the Big Men on Campus. Letters will be earned, courses given in Amateur Radio Psychology. Then there will be an advanced degree MAC, Masters in Amateur Contesting.

All of this frenzied competition will quickly lead to expanded publicity, what with 3000 public relations officers feeding news releases to the press, radio and TV.

The weekly competition between conference schools will fill the sport pages. Box scores will appear in all the papers. Statistics will be published. W0YQ, they will say, has had 74.8% of

*TEN-TEC, Inc, Sevierville, Tenn. 37862



its CQs answered. On 7 Mc., W7UQ has worked 80.7% of all stations called, all bands. WIMX has had an average RST signal report of 4.951 - 7.132 - 9 compared with 4.768 - 7.103 - 9 last year, same period. Nice increase, especially the R.

Radio and TV coverage of the final hours of the major contests will preempt the regular programs. Sponsored, perhaps, by No-Doz. The cameras will switch from one high scorer to another as they fight for time in the closing minutes. The excitement will be dimmed somewhat by the computer forecast made during the first three minutes of the contest.

Then, inevitably, on to professional ham radio, the greatest spectator sport of all. Amateur amateurs and professional amateurs. Bowl contests.

Let's stamp out college ham radio before it is too late!

QST

**SWITCH
TO SAFETY!**



The New Ham Alphabet

BY PAUL C. AMIS,* W7RGL

Antenna: A metallic device used in receiving and/or transmitting electromagnetic waves. In later years, these devices have assumed bizarre shapes, forms, and gain calculations, and which, when erected, have often proven to work almost as effectively as the piece of rusty fence wire it replaced. Also, the second most discussed topic between male Hams (see XYL).

Bug: A semi-automatic key for the manufacture of c.w. Usually turns Hs into 5s, and Bs into 6s, and is primarily used to send error signs. When such a mechanism is electronically timed, it is known as an electronic keyer, and is capable of turning out flawless garbage which is transmitted in the fond hope it will be mistaken for c.w.

C.W.: A form of radio communication utilizing suppressed-sideband, exalted-carrier techniques, and modulated by a fast-acting switch. Often un-readable.

DX: In Ham lingo, a distant or rare foreign station. There are approximately 20 to 30 DX stations in the world, although there have been persistent reports that some stations have worked over 300 (presumably sometime AFTER the sun was over the yardarm).

Enigma: A Radio Amateur as seen through the eyes of his wife or family.

Epoch: That period of time between the working of DX country number 100 and the arrival of the QSL card.

Field Day: In military usage, a period of extensive housekeeping (obviously not applicable to Ham radio). Ham-wise, a contest wherein portable stations are erected to simulate emergency conditions. This effort turns WORK into a four-letter word, and renders all other adjectives unprintable.

Formulas: Those sets of numbers, letters, or symbols expressing a mathematical fact, principle, or rule. Formulas set forth in electronics articles should be treated as variables.

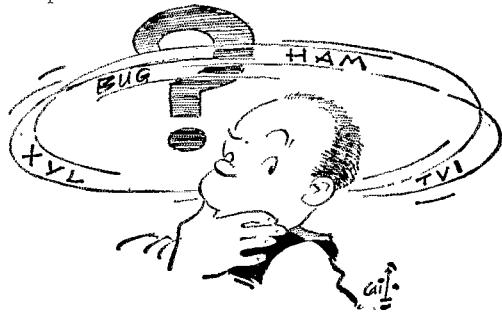
Ground: The return of an electric circuit, specifically, the area which B+ always arcs to, and where you have forgotten to connect your antenna to during a lightning storm.

Ham: A generic nickname for a Radio Amateur; a person who has a gnawing interest in things communicative and has acquired cauliflower ears from too-tight headphones, or can understand every word of a Donald Duck cartoon the first time. Male Hams, if still happily married, have the most understanding wives in the world or, if still bachelors, don't do much hamming.

Impedance: An engineering term depicting the resistance to radio-frequency energy. Referring to antennas, it invariably proves to be embarrassingly different than the station transmission line (see s.w.r.).

Invest: To spend money for some object, such as the ham shack, or other bottomless pit.

Junk Box: Ham slang for the collection of radio parts acquired as a gourmet acquires old wines. In posh ham shacks, this term is spelled "Junque Boxe," presumably because of the high-class components.



Knot: A fastening made by intertwining string, rope, etc. Of considerable impermanence when used with the station's dipole antenna, or in guy wires. Knots made during Field Day, however, can be only untied with a pocket-knife.

Log: The official record of times the station transmitter is on the air. Generally lists coffee rings, rips, solder burns, curled corners, and, occasionally, entries.

Mortgage: The pledging of property to a creditor for a purchase price. With the purchase of electronic equipment, the mortgage is held by your friendly radio store or bank until long after the equipment is defunct. From the term MORT = dead, and GAGE = pledge. Literally, a "death pledge."

Noise: The spurious, unintelligible signals interfering with the sound impulses being received, and originating from the junior op, the vacuum cleaner, or the family dog. (See also XYL). Occasionally received over the air. (See also s.s.b.).

Old Timer: A person who has been a Radio Amateur for twenty years or more; typically, a Ham with a "W" call still using a.m. or, if on s.s.b., claims he operates mainly c.w. Old Timers with two-letter calls are only found on the bands during contests.

Parts Salesman: A local electronics emporium hypnotist, usually male, who is expert in convincing beginning Hams who live in apartment houses that to own a transmitter of less than 1000 watts is poor economy.

QSO Party: An Amateur Radio contest perpetuated by the printers of QSL cards to assure that the 500 cards you purchased in October won't last until Ground Hog's Day. Generally, on c.w., 60% of all out-of-state contacts must have the rules explained at no more than 5 w.p.m.

Queasy: The feeling of nausea brought forth by a vocal but ill-informed oracle explaining Incen-

* R.F.D. 5, Box 5559, Bainbridge Island, Washington 98110

tive Licensing, or the efforts of a proud parent to get his three-year old child to say "hello" over the air.

Receiver: An electronic device which converts radio-frequency energy to un-intelligible audio and, after the guarantee period has elapsed, is found to be over-priced, insensitive, and unselective, except when you are listening for DX and can only hear Passaic, New Jersey.

S.S.B.: The initials for single sideband. An advanced form of speech generation for radio transmission. Contrary to popular opinion, it is NOT generated by tying a granny-knot in the microphone cable. Extremely useful for avoiding detection by irate TVI-sufferers (see TVI).

Surplus: Generally refers to obsolete electronic equipment released by the military for sale to the unsuspecting public. Often consists of fixed-frequency units, operating on implausible frequencies by virtue of a 400-cycle power supply, using tubes no longer manufactured, with all usable components welded to the chassis. Schematics and data sheets for this equipment can be sometimes purchased from more mercenary brethren for three times the price of the unit.

S.W.R.: The initials for standing wave ratio: an indication of how well two impedances are matched. This term is of controversial interest to most Hams, since one school will slash their

wrists over a s.w.r. of 1.2 to 1, while another group smugly feels that a s.w.r. of less than 6 to 1 is strictly academic.

TVI: The initials for television interference. Any radiation which distorts or blots out a television program (except commercials) falls into this category. Has converted hundreds of hams to model trains or ancient Babylon basket weaving.

Wireless: The original term for radio: specifically, operating with electromagnetic waves and not with conducting wire. No longer applicable to today's equipment, since one look at the south end of any transmitter facing north, or a typical Field Day set-up, will graphically point out the fallacy of today's "state-of-the-art" being "wireless."

XYL: In Ham lingo, a married lady, generally a Ham's wife. The term derives from the elaboration of YL for "Young Lady" in c.w. circles, with the unfortunate connotation that when married, she becomes a "X-Young Lady." Further definition usually results in a scene. XYL vagaries are the prime topic of discussion between male Hams.

Zero-Beat: Two signals exactly matched in frequency, a state of affairs where, in c.w. especially, two conversing stations never are, and the interference always is. □57□

ARRL QSL Bureau

The function of the ARRL QSL Bureau System 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 4½ by 9½ 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. W1, K1, WA1, WN1 — Hampden County Radio Association, Box 216 Forest Park Station, Springfield, Massachusetts 01108.

W2, K2, WA2, WB2, WN2 — North Jersey DX Assn., P.O. Box 505 Ridgewood, New Jersey 07451.

W3, K3, WA3, WN3 — Jesse Bieberman, W3KTT, RD 1, Valley Hill Rd., Malvern, Pennsylvania 19355.

W4, K4 — H. L. Parrish, K4HFX, RFD 5, Box 804, Hickory, North Carolina 28601.

WA4, WB4, WN4 — J. R. Baker, W4LR, 1402 Orange St., Melbourne Beach, Florida 32951.

W5, K5, WA5, WN5 — Hurley O. Saxon, K5QVII, P.O. Box 9915, El Paso, Texas 79989.

W6, K6, WA6, WB6, WN6 — San Diego DX Club, Box 8029, San Diego, California 92106.

W7, K7, WA7, WN7 — Willamette Valley DX Club, Inc., P.O. Box 555, Portland, Oregon 97207.

W8, K8, WA8, WN8 — Paul R. Hubbard, WA8CXY, 921 Market St., Zanesville, Ohio 43701.

W9, K9, WA9, WN9 — Ray P. Birren, W9MSG, Box 519, Elmhurst, Illinois 60126.

W0, K0, WA0, WN0 — Alva Smith, W0DMA, 238 East Main St., Caledonia, Minnesota 55921.

KP4 — Alicia Rodriguez, KP4CL, P.O. Box 1061, San Juan, P.R. 00902.

KZ5 — Gloria M. Spears, KZ5GS, Box 407, Balboa, Canal Zone.

KH6, WH6 — John H. Oka, KH6DQ, P.O. Box 101, Aiea, Oahu, Hawaii 96701.

KL7, WL7 — Alaska QSL Bureau, Star Route C, Wasilla, Alaska 99687.

VE1 — L. J. Fader, VE1FQ, P.O. Box 663, Halifax, N.S. VE2 — John Ravenscroft, VE2NV, 353 Thorncrest Ave., Montreal 780, Quebec.

VE3 — R. H. Buckley, VE3UW, 20 Almont Road, Downsview, Ontario.

VE4 — D. E. McVittie, VE4OX, 647 Academy Road, Winnipeg 9, Manitoba.

VE5 — A. Lloyd Jones, VE5JI, 2328 Grant Rd., Regina, Saskatchewan.

VE6 — Karel Tettelaar, VE6AAV, Sub. P.O. 55, N. Edmonton, Alberta.

VE7 — H. R. Hough, VE7HR, 1291 Simon Road, Victoria, British Columbia.

VE8 — George T. Kondo, VE8 ARRL QSL Bureau of Department of Transport, Norman Wells, N.W.T.

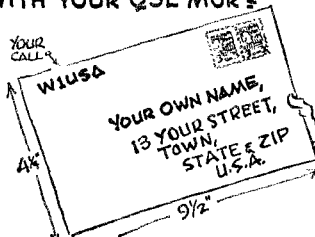
VO1 — Ernest Ash, VO1AA, P.O. Box 6, St. John's Newf.

VO2 — Goose Bay Amateur Radio Club, P.O. Box 232 Goose Bay, Labrador.

SWL — Leroy Waite, 39 Hannum St., Ballston Spa, New York 12020.

These bureaus prefer 5 x 8 inch or #50 manila envelopes.

IS YOURS ON FILE WITH YOUR QSL MGR?



COMING A.R.R.L. CONVENTIONS

August 15-17 — West Gulf Division,
Amarillo, Texas.

August 29-30 — Great Lakes Division,
Louisville, Kentucky.

September 13-14 — Georgia State Con-
vention, Augusta.

October 11-12 — Roanoke Division,
Huntington, West Virginia.

October 17-19 — Southwestern Division,
San Diego, California.

NOTE: Sponsors of large ham gatherings should check with League headquarters for an advisory on possible date conflicts before contracting for meeting space. Dates may be recorded at ARRL for up to two years in advance.

WEST GULF DIVISION CONVENTION Amarillo, Texas August 15-17

Amarillo, Texas, hub of the golden spread of the old west, will get its chance to display the western hospitality for which the city is so well known August 15, 16 and 17, when the 39th ARRL West Gulf Division Convention gets underway at the Holiday Inn West.

A big pre-convention attraction will be "Texas," a live musical production in Pioneer Amphitheatre at Palo Duro Canyon, of the early-day history of the Texas Panhandle, an extravaganza well worth the drive to Amarillo by itself. The price of \$4.50 includes transportation to and from the Canyon. For those who prefer it, a big pre-convention party will be held at convention headquarters; cost, \$2.75 per person.

A complement of topflight technical speakers will appear throughout the Saturday-Sunday technical sessions and will include Ed Tilton, W1HDQ, of QST staff; Pat Devlin, WA5BPS; George Munsch, W5VPQ; Carl Drumeller, W5JJ; Michael Wintzer, DJ4GA/W8; R. L. Drake Co.; and others. Special interest group meetings will include MARS, QCWA, RACES, AREC, DX and traffic nets. The ladies will be entertained with special programs, also, which will include a luncheon on Saturday. Special luncheons are slated for Saturday, and the breakfast Sunday morning, will be in conjunction with the special interest group meetings.

A big Saturday night dance at the Holiday Inn West will be one of the main social functions during the meeting. The cost is \$3.00 per person. Promptly at midnight on Saturday, the Aeronautical Center ARC of Oklahoma City will conduct initiation ceremonies for the Royal Order of the Wouff Hong.

Highlight of the three-day convention will be the appearance of Robert W. Denniston, W0DX, President of the American Radio Relay League, at the Sunday banquet, as main speaker.

General registration for all tech sessions, the banquet and viewing of commercial exhibits is \$10.50. All other events are optional and tickets are required for participation.

For further information or registration forms, write to the Panhandle Amateur Radio Club, P. O. Box 5453, Amarillo, Texas 79107.

GREAT LAKES DIVISION Louisville, Ky. August 29-30

That romantic rock called Navassa in the Caribbean (rare, rare KC 4-land) will be linked in spirit with the colorful city of Louisville this Fall, offering amateurs an opportunity to fill the Labor Day weekend with fun for the family.

Breathes there a ham who hasn't at least dreamed of operating a rig on a faraway island? A highlight of the meeting will be an "I-was-there" color slide report by K4FU/KC4 — showing the action at the DX-pedition to Navassa this past June.

Hosting the ARRL session will be Kentucky SCM, W4OYI — with Alban A. Michel, W8WC, Division Director, and John Huntoon, W1LVQ, General Manager, ARRL, as featured participants.

The Convention, at Stouffers Inn, downtown Louisville, will climax Amateur Radio Week in Kentucky, which has been officially proclaimed for August 24-30 by Governor Louie B. Nunn.

Top Navy communications brass from Virginia will attend to spark another "first" — showing a colorful new exhibit for the first time at this annual Kentucky event. A featured talk will be made by Dick Erhorn, W4ETO, General Manager, Signal/One. General Electric's Art Furey and William Mumford will present, respectively, solid state applications and a demonstration of how to solve amateur design problems by computer. Dr. Jim Lindsay, W0HJ, will discuss "Loaded Quads." Plans for a 1000-foot above-average-terrain 2-meter f.m. repeater will be revealed.

An RTTY program on "Digital Circuitry in Demodulators" has been prepared by WA4TWB. The net program will feature W9HRY. K4FJK will conduct a home-brew contest, with valuable prizes for skill in construction. Saturday night's banquet will be arranged by W4URG.

Festivities start Friday night at 6 p.m. with an exhibit preview. Advance registration is \$2.50, \$3 at door and room reservations can be made at Stouffers Inn in Louisville. Address correspondence to Louisville Ham Convention, 648 South Fourth Street, Louisville, Ky. 40202.

GEORGIA STATE CONVENTION Augusta Sept. 13-14

The ARRL Georgia State Convention will be held Saturday and Sunday, September 13 and 14. Saturday's activities will be at Horne's Motor Lodge and at the Julian Smith Casino on Sunday. Forums, technical talks and meetings are scheduled for MARS; Antennas, Dale Covington, K4GSX; Operating Contests, John Laney,

K4BAI; ARSPC; and s.s.b. The ARRL business meeting on Sunday will be led off by Division Director Chuck Bolvin, K4KQ and George Hart, W1NJM from League Hq.

For the bargain hunters there will be Hoss Traders Lot at the Casino on Sunday. The Club Station, W4DV, will be on the air, operating on a frequency of 3975 kHz. The station will be manned by members of the Amateur Radio Club of Augusta, for mobile talk-ins.

Festivities will include a banquet and dance Saturday evening at Horne's Motor Lodge. By popular demand the banquet will be served "Buffet Style," with a varied menu selection to

satisfy appetites of all convention goers. Following the dinner/dance at midnight, the initiation of the "Royal Order of the Wouff Hong" will be presented by members of the Amateur Radio Club of Augusta.

The ARRL Registration desk will be in the Hospitality room at Horne's Motor Lodge on Saturday, and at the Casino on Sunday. ARRL Convention Registration Package of \$4.50 includes Sunday BAR-B-Q dinner, and refreshments. Advanced registration is \$4.25 if received by September 5, 1969. Checks should be made payable to A.R.C.A. Hamfest Committee, P.O. Box 3072, Augusta, Georgia 30904.

Hamfest Calendar

Alabama — The North Alabama Hamfest will be held August 17 in the cafeteria of John C. Calhoun State Technical and Junior College located north of Decatur, Alabama on U. S. Highway 31.

California — The Sierra Hamfest will be held at Bower's Mansion, between Reno and Carson City, on Saturday, August 23. Ideal outing for the family, fenced playground and swimming area. For more information write the Nevada ARA, P.O. Box 2534, Reno, Nevada.

California — The Annual Palomar ARC picnic will be August 24 at Live Oak Park starting at 10:00 A.M.

California — The Wireless Pioneers Picnic is scheduled for Saturday, August 23 from 11:00 A.M. until 4:30 P.M. at Rossmoor, Walnut Creek (Senior Dollar Club House Grounds). Bring your own picnic lunch and drinks. Manning Cafeteria about 1 mile for those who cannot bring their own. All are invited, those eligible to join are welcome, \$1.00 donation. For map and information write Eben K. Cady, 2330 Roosevelt Ave., Redwood City, California 94061.

Delaware — The Delaware Hamfest will be held August 17 (Rain date August 24) at Wheeler Park in Harrington, Del. Picnic tables, barbecue pits, food and soft drinks, plenty of shade and parking, free rides for kids, contests, and games for the YL and XYLs. Talk-in on 3905 kHz. and on 6 and 2 meters. Tickets on sale at most electronic stores in Delaware and nearby areas. \$1.50 donation, \$2.00 at the gate. Tickets by mail from Robert Rodgers, Box 307, Bear, Del. 19701.

Florida — The Brandon ARS will sponsor the First Annual Ham Camporee, August 22-23 at the Royall Park Campground, Riverview, Fla. (off Highway 301). This campground has everything. There will be a demonstration of quick tree-top antennas and a tour of Busch Gardens. Pre-registration helpful but not required. For further details write BARS, P.O. Box 828, Brandon, Fla. 33511.

Illinois — The Quad City ARC will hold its annual Hamfest on August 24 at the Rock Island Arsenal, Rock Island, Illinois.

Illinois — The Hamfesters Radio Club, Inc. will celebrate their 35th Anniversary Hamfest on August 10 at Santa Fe Park, 91st and Wolf Rd., Willow Springs, Ill. For more information write Charles T. Borkowski, WA9TWA, Hamfesters Radio Club, Inc., 1851 W. 21st St., Chicago, Ill. 60608.

Illinois — The FRRL Swap-n-Shop Hamfest will be held August 24 at Phillips Park, Aurora, Illinois. Free coffee and donuts from 9 to 10 A.M. Fun for the whole family. Homing frequencies 145.35 and 3.94 MHz. For further information contact Roger Louks, P.O. Box 93, Plano, Ill. 60545.

Illinois — The Vermilion County ARA is planning a Hamfest for August 31. Write Joseph Scott, 508 W. Woodlawn, Danville, Ill. 61832.

Illinois — The Fourth Annual Mini Hamfest, sponsored by the Rockford ARA, will be held August 17 at the Boone County Fairgrounds in Belvidere, Ill. Hours are 9:00 A.M. until? Lunch and refreshments available on the grounds.

Talk-in on 3.910, 28.7 and 146.94 MHz. Advance ticket donation \$1.00, \$1.50 at the gate. For further information contact K9LUX, K9TKT, or K9SAN.

Iowa — The Iowa 75-meter phone net picnic will be held in Anson Park at Marshalltown, Iowa on August 17. All activities will begin around noon.

Kansas — The Kansas-Nebraska Radio Hamfest will be held this year on August 3 at the Moose Building, 113 West 5th, Concordia, Kansas. The program will include a hidden transmitter hunt, games, contests, and an auction.

Louisiana — The Central Louisiana Radio Club's Hamfest is scheduled for August 2 and 3 at Harold Miles Park in Alex.

Minnesota — The St. Cloud Hamfest will be held August 10.

Missouri — The Southwest Missouri ARC will hold its annual Hamfest and Picnic at Springfield Missouri on Sunday August 24.

Nebraska — See Kansas.

Nebraska — The West Nebraska Tech ARC will hold its first annual Hamfest on August 17 on the Campus of West Nebraska Technical School located 11 miles west of Sidney. Each family bring a covered dish and table service. Drinks will be furnished by the club. There will be contests and awards including a transmitter building contest. Don't forget to bring something for the swap table. Talk-in frequency is 3950 kHz.

Nebraska — The Tri-City Radio Club will hold its Annual Picnic and Hamfest on August 10 at the Bridgeport State Recreation Area. All hams are invited.

Nevada — The Nevada ARA has scheduled its second Annual Sierra Hamfest for August 23 at Bower's Mansion on Highway 395 between Reno and Carson City, Nevada. Camper and trailer facilities nearby. It's a chuckwagon picnic affair, bring the family, fenced playground and swimming pool. Write NARA Sierra Hamfest, P.O. Box 2534, Reno, Nevada 89505.

New Jersey — Announcing the 21st Annual Hamfest Picnic of South Jersey Radio Assn., September 7 at Molia Farms, Malaga, N. J. Transmitter hunts, picnic area, parking facilities, free rides for the kids, swap shop and much more. Talk-in on 50.55 and 145.7 MHz. Registration is \$2.00 per family. Write WA2MGV, 15 E. Camden Ave., Moorestown, N. J. 08057.

New Jersey — Saddle Brook Park will be the site of the East Coast VHF Society's (WA2WEB) 11th annual Hamfest and old style picnic. Sunday, August 10, beginning at 10 A.M. The park is located on Saddle River Road, Saddle Brook. Admission and parking are free. Food and soft drinks will be available. Listen for talk-in stations on 10, 6, and 2 meters; or, follow the signs from major arteries.

New York — The NYSPT & EN picnic is scheduled for August 16 at Chenango State Park. Details from WB2VJB.

New York — The NYS net picnic will be August 9 at the QTH of W2MTA.

Nova Scotia — The Nova Scotia ARA is sponsoring a convention to be held August 30 to September 1 at the Holiday Inn, Dartmouth, N.S. For information, write G. Harris, 8 Albion Rd., Halifax, N.S., Canada.

Ohio — The Findlay Hamfest will be at Riverside Park on Sept. 7. Tickets & information from Clark Poltz, W8UN. Tickets \$1.00 in advance, \$1.50 at park. Bring the whole family. No charge for flea market.

Ohio — The Second Annual Ohio Traffic Nets Picnic

will be held beginning at 10:00 A.M. Saturday August 2 at WRFD Picnic Park in Worthington. Details available on any of the nets.

Ohio—The Dayton ARA will hold its Family Picnic on August 24 at Variety Park.

Ohio—The Warren ARA announces that their Twelfth Annual Hamfest will be held at the Newton Falls Community Center in Newton Falls, Ohio on August 24.

Pennsylvania—The Mt. Airy VHF Radio Club will hold their annual picnic and family day on August 10 at the Fort Washington State Park in Flourtown, Pa. For more information write the club at 520 Larkspur St., Philadelphia, Pennsylvania 19116.

Pennsylvania—August 3 is the date of the Brass Pounders & Modulators Hamfest at St. Clair Beach.

Pennsylvania—The 7th Annual Swap & Shop of the Skyview Radio Society will be held Sept. 7. Follow direction signs from Camp Joan Junction Rt. 366 and 380, 10 miles north east of Monroeville, Pa. No registration, bingo

for the YLs. Bring your equipment for sale or trade. Food and refreshments available. Mobile talk-in on 29 and 50.4 MHz.

Tennessee—The 10th Annual Cedars of Lebanon Hamfest will be held August 31 at Cedars of Lebanon State Park, 10 miles south of Lebanon on Route 231 S. Talk-in on 50.25 and 3.980 MHz. Pot luck lunch at 1:30 p.m. Everybody bring enough food for your party. Drinks will be available on the grounds. For further information contact W4VJW.

Tennessee—The Memphis area hams will have their Hamfest in the Womens Building at the Fairgrounds on August 21. A Saturday evening dinner and get-together will be on August 23. For more information please contact K4NRV or W4OQG.

Vermont—BARC will again sponsor the popular International Field Day on August 16-17 at Green Lantern Inn, Charlotte, Vt. For early-bird registration write KIURQ, Fred Fields, 7 Park Terrace, Essex Jct., Vt. 05452. **QST**

The Rut

BY JOHN G. TROSTER,* W6ISQ

YV9DX this is **W6ISQ**. You're 5 and 7. **QTH** near San Francisco. Name is Jack. Over."

"**W6ISQ** this is **YV9DX**. You're 5 and 7. **QTH** Caracas and name is Pedro. Go ahead."

"Thanks swell Caracas QSO Pedro. 73. **QRZed W6ISQ?**"

"**W6ISQ** this is **DL1XXA**."

"**DL1XXA-W6ISQ**. 5-7 . . . San Fran . . . Jack. Go."

"Roger . . . 5-6 . . . Munich . . . Fritz."

"Thanks Fritz. Nice to QSO Munich. 73 **QRZed W6ISQ?**"

* * *

"58 . . . SF . . . Jack."

"55 . . . London . . . Olive."

"Thanks Olive. **QRZed?**"

* * *

"58SFJack."

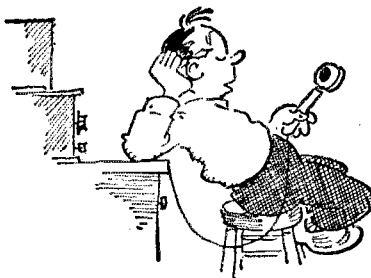
"55ParisPierre."

"73PierreQRZed?"

"5W1ARW6ISQ59SFJack."

"**W6ISQ** this is **5W1AR**. You're 58 . . . name is Trevor . . . **QTH** Samoa."

"**5W1AR** . . . **W6ISQ** . . . thanks Sam . . . ahhhhh . . . hmmm . . . I think you said your name there was Sam . . . ahhh . . . Oa?? (them two names must be a old native custom). Nice to talk to Trevor . . . that must be a island. At least my beam is pointed out toward some a them Pacific Islands . . . ahhhhh . . . guess that must be *Treasure* Island, not Trevor Island . . . little QSB here . . . sorry. Anyway, I read all about your island there Sam Oa. Yeeeeeaaahh. Like Long John Silver and the mutiny and Captain Bligh and the burried treasure ya got there and all. And I sure would



'57 ... SAN FRAN... JACK ... GO"

like your **QSL** for my Worked All Islands collection. OK? Break."

"**W6ISQ** . . . **5W1AR**. You've got things turned around there old man. My **QTH** . . . my *location* is the island of Western Samoa . . . Western Samoa. And my name . . . my *name* is Trevor. OK?"

"Ahhhhh . . . hmmm . . . well OK then . . . I'll have to change my log around here . . . yeeeeeaaah. First thing I *always* write down is **QTH** . . . and I wrote Trevor . . . hmmm . . . Can't understand how I got your name first . . . unless . . . unless you gave me your name and **QTH** in reverse . . . ahhh . . . out of order. Oh well, 73 there Sam . . . errrrr . . . Trevor. Please **QSL** anyway. **QRZed W6ISQ?**"

"**IYAA-W6ISQ**. 58 . . . San Fran . . . Jack."

"55 . . . Rome . . . Luigi."

"ThanksRomeQSOLuigi . . . **QRZed?**"

"57SFJack."

"56TokyoPatrick."

"ThanksTokyoPatr . . . errrrr Patrick????"

*45 Laurel Ave., Atherton, Cal. 94825.

V.H.F. QSO Party September 13-15

Judging by the first few logs we've received, plus some tantalizing scuttlebutt heard here and there, the June V.H.F. shindig was a lively affair. Let's do it all over again the weekend of September 13!

And rather than being required to operate a single 28-hour stretch, henceforth you may pick any two 14-hour periods out of the 35 hours available. All you do is exchange sections for QSO credit, add up your contact points and multiply that sum by the sum of your band-section-multipliers.

After an eagle-eyed scrutiny of the rules on this page, send for your free Party log forms; a sample is shown below. Mail your entry to us no later than October 6, 1969. QRV?

Rules

1) The September 1969 V.H.F. QSO Party begins at 1900 GMT, Saturday, Sept. 13, and ends at 0600 GMT, Monday, Sept. 15. Entrants may operate any two 14-consecutive-hour periods beginning no earlier than 1900 GMT Saturday (starting on the hour) and ending no later than 0600 Monday. All claimed contacts must be within the two chosen periods and must be made on amateur frequencies above 50 MHz., using authorized modes of operation.

2) Name-of-section exchanges must be acknowledged by both operators before either may claim contact point(s). A one-way exchange, confirmed, does not count; there is no fractional breakdown of the 1-, 2-, or 3-point units.

3) Fixed-, portable- or mobile operation under one call, from one location only, is permitted. A transmitter used to contact one or more stations may not be used subsequently under any other call during the contest period (with the exception of family stations where more than one call is designed to one location by FCC/DOC).

While no minimum distance is specified for contacts, equipment in use should be capable of real communications (i.e. able to communicate over at least a mile).

Contacts made by retransmitting either or both stations do not count for contest purposes.

3) Scoring: 1 point for completed two-way exchanges on 50 or 144 MHz.; 2 points for such exchanges on 220 or 420 MHz.; 3 points for such exchanges on the higher v.h.f. bands. The sum of these points will be multiplied by the number of different ARRL sections worked per band; i.e., those with which at least one point has been earned. Reworking sections on additional bands for extra section credits is permitted. Cross-band work does not count. Aircraft mobile stations cannot be counted for section multipliers.

4) Foreign entries: all contacts with foreign countries (such as Mexico and the Bahamas) count for score. All foreign countries are grouped together, and a multiplier of no more than one (per band) may be claimed for contacts with all foreign stations worked. Foreign stations may only work contacts in ARRL sections for contest credit and will give their country name.

5) A contact per band may be counted for each station worked. Ex.: W2EIF (S.N.J.) works K1YON (Conn.) on

| | |
|---|--------------------|
| STARTING TIME | ENDING TIME |
| 1900 GMT, Sept. 13 | 0600 GMT, Sept. 15 |
| Operate any two 14-consecutive-hour periods | |

50, 144 and 220 MHz. for complete exchanges. This gives W2EIF 4 points (1 — 1 — 2) and also 3 section-multiplier credits. (If W2EIF contacts other Conn. stations on these bands, they do not add to his section multiplier but they do pay off in additional contact points.)

6) Each section multiplier requires a complete exchange with at least one station. The same section can provide another multiplier point only when contacted on a new v.h.f. band.

7) Awards: Entries must be postmarked no later than October 6, 1969. A certificate will be awarded to the high-scoring single-operator station in each ARRL section. In addition, the high-scoring multi-operator station will receive a certificate in each section from which three or more valid multiple-operator entries are received. Certificates will also be given to the top Novice in each section where three or more such licensees submit logs and to Novices in sections of less than 3 entries, who in the opinion of the Awards Committee, displayed exceptional effort. Awards Committee decisions will be final.

SFT

ARRL V.H.F. QSO Party

STATION... K1ZND/1.....

ARRL SECTION... CONN.....

| Mhz. | (GMT) Date/Time | Station Worked | Section | Nr. mults. per band | | | | | Pts. |
|------|-----------------|----------------|---------|---------------------|-----|-----|-----|--------|------|
| | | | | 50 | 144 | 220 | 432 | 112/15 | |
| | SEPT. 7 | | | | | | | | |
| 144 | 1903 | K1ABR | RI | | 1 | | | | 1 |
| | 1918 | K2HLA | NLI | | 2 | | | | 1 |
| 50 | 1933 | K1MUJ/1 | CONN | 1 | | | | | 1 |
| | 1937 | WB4HIP/4 | EFLA | 2 | | | | | 1 |
| 220 | 1958 | K1YON | CONN | | | 1 | | | 2 |
| 420 | 2232 | W1QWJ | WMASS | | | | 1 | | 2 |
| 1215 | 2347 | W1LIX | CONN | | | | | 1 | 3 |
| | SEPT. 8 | | | | | | | | |
| 144 | 0031 | W1LIX | CONN | | 3 | | | | 1 |
| | 0042 | K1HTV | CONN | | - | | | | 1 |
| | 0217 | W8SH | MICH | | 4 | | | | 1 |

ENTER BELOW ON LAST SHEET USED.

Single Operator Multiple Operator

| Band | Contacts | Points | Mult. |
|-------------|----------|--------|-------|
| 50 Mhz. | 2 X 1 = | 2 | 2 |
| 144 Mhz. | 2 X 1 = | 2 | 2 |
| 220 Mhz. | 1 X 2 = | 2 | 1 |
| 432 Mhz. | 1 X 2 = | 2 | 1 |
| 112/15 Mhz. | 1 X 3 = | 3 | 1 |
| TOTALS | 10 QSOs | 14 | 9 |

Calls of all operators/loggers.....
 D.C. power input.....
 Transmitter.....
 Receiver.....
 Antenna.....

CLAIMED SCORE: 14 x 9 = 126
 (points) (mult.) (final score)

Mail promptly with comments and photos to ARRL,
 225 Main St., Newington,
 Connecticut 06111.

I hereby state that I have abided by the rules specified for this contest and that, to the best of my knowledge, the points and score as set forth in the above summary are correct and true. Dave Sumner, K1ZND 2 Grove Rd. Cromwell, Conn. 06416
 Signature Call Mailing address

AMATEUR RADIO PUBLIC SERVICE

NTS RACES AREC

In the Public Interest, Convenience, Necessity

CONDUCTED BY GEORGE HART,* WINJM

The Frequency Squeeze

ON Nov. 22, 1968, all public service nets and most functions were removed from those portions of the amateur bands restricted to extra and advanced class licensees. Why? Well, simply because public service communications is the function of *all* amateurs, not just those capable of attaining a certain license grade, and it is desirable to conduct operations in that direction on frequencies open to the greatest number of operators.

Then, you might say, why not conduct them on the novice frequencies, so novices can be included — or on those v.h.f. segments where both novices and technicians can work, as well as generals (conditionals) and above? Actually, the latter is not too bad an idea, for local nets — and for repeater-oriented nets which can extend coverage beyond the customary line-of-sight range. But to try to conduct public service activities in the high frequency novice segments seems a bit on the impractical side. Training sessions, yes; regular AREC or NTS or other public service nets, no.

The problem really does not exist on the v.h.f. or 10 meters, and not very crucially on 15, 20 or 40 meters either, because in the first instance there is plenty of space and in the second there aren't many nets. But the problem intensifies as we hit 80 meters, where the bulk of our public service nets meet. In mid-1968, with restricted segments in the offing, nets started migrating upward in frequency. Now in mid-1968, with the prospect of further implementation of restricted frequencies, the migration is intensifying to the extent that the segment 3550-3700 and 3900-4000 kc. will have become literally "squirmy masses of nets" by the time Nov. 22 rolls around — at least during the early-evening "prime time."

A few simple statistics, dredged out of past issues of the Net Directory (CD-50) very clearly show the trend:

| | '67 | '68 | <i>Prognosis</i> '69 |
|-----------------------|-----|-----|-------------------------|
| Nets on 3500-3525 kc. | 2 | 0 | 0 |
| Nets on 3526-3550 kc. | 8 | 7 | 1 |
| Nets on 3551-3700 kc. | 73 | 68 | 80 |
| Nets on 3800-3825 kc. | 17 | 7 | 0 |
| Nets on 3826-3850 kc. | 18 | 12 | 1 |
| Nets on 3851-3900 kc. | 49 | 30 | 5 |
| Nets on 3901-4000 kc. | 109 | 159 | 200 |

*Communications Manager, ARRL.



The Linn County, Iowa, Civil Defense hamshack. Operating are WAØTFV, seated, and WØLJ.

You can see where the biggest problem is — on 75 meter phone. If FCC implements the second half of incentive licensing this November, the squeeze will really be on, with approximately 200 nets crowded into a 100-kc. segment. Further analysis would probably show that a majority of these nets operate between 6 and 9 p.m. local time, which will mean that there will be a net in operation every 5-kc. or so above 3900 and the casual operator with only a general ticket might as well forget it.

This column in the past has been praised for clearly stating problems but criticized for failing to present solutions. Well, we have no pat solution for this one, either, so go ahead and shoot. There are several possibilities, however, most of them pretty obvious, but we'll go over them anyway.

The first and most obvious is to make the best of a bad situation. All these nets piling on top of each other are going to make a mess of things, no two ways about it — and those who were there first are going to resent intrusion from those who make camp on the same frequency or close enough to intrude. We are going to have "hassles" galore unless we all adopt attitudes of the utmost tolerance and cooperation. ARRL does not wish to have to referee such fights and hopes there will not be as many as we fear. If we all remember three important things, it may help: (1) it takes two sides to make a fight; (2) the "intruder" net has as much right to use of the frequency as you have; and (3) what

they are doing or trying to do is, *per se*, just as important (to them) as what you are doing (to you).

Second possible solution is to take your net to another band. We understand there are wide open spaces on 6 and 2 meters. Our pioneer forefathers migrated to unexplored territory when they became crowded; why can't we? If your net is a local one, it's worth some thought — and even medium-distance is rapidly becoming feasible using repeaters.

Third possible solution: Upgrade! That's what all the shouting is about, isn't it? Having a low grade of license isn't exactly an act of the Almighty about which nothing can be done. You had to do some work to get it, and you're going to have to do some more work to upgrade it. A job for an engineer? That's ridiculous. Speaking personally again (sorry about that), *we* did it in a breeze, and if engineers don't know any more about electronics than we do, then we fear for the technological future of our country! If all the members of a net upgrade, they can move back into the restricted portion of the band.

Fourth possibility might be to petition FCC to permit some kind of public service operating in the restricted portions regardless of grade of license. No promises regarding the possibilities of success of this, since privileges have always been geared to what kind of a license you have rather than what you do with it, but it *is* a possibility.

Fifth, an overall frequency plan. Some years ago this was talked about in connection with the National Traffic System, but the difficulties of implementation overshadowed the urgency of the need. It's no less difficult now, but the urgency has greatly increased. How would it work? Well, first of all it would require the cooperation of all concerned, and this is perhaps the biggest hurdle of all. Especially those nets which were

above 3900 in the first place will be unwilling to share. However, once this is attained the segment can be divided into channels and time shared in such a way that nets operating simultaneously are at least five and preferably ten kc. apart. What happens in an emergency? Wow! Who brought *that* up? This will just have to be part of the plan, perhaps a consolidated "channel-wide" net drilling every so often to keep in practice. It might even be fun!

At this moment of writing, there is no definite indication of whether or not FCC will implement the second stage of the incentive licensing docket. If it does *not* act, this means that the docket will be implemented automatically on Nov. 22. What this means in effect is that whether implementation is delayed or not, there is not likely to be any "saved by the bell" action for public service nets open to all amateurs now operating in what will be the restricted segments. We must plan ahead and be ready for the worst — a sound principle in any emergency planning. — *WINJM*.

Public Service Diary

On April 7, while mobilizing two miles west of Buford, Wyoming, WA7EGK discovered a serious accident in which an automobile had been hit by a trailer truck. WA7EGK called on his f.m. unit and was immediately answered by K0UFA who called Cheyenne by landline and notified the Wyoming Highway Patrol. Before the patrol car arrived, another call was put forth for ambulances and emergency equipment to cut away parts of the wreckage trapping the victims. In less than twenty minutes, the only survivor of the crash was on his way to the hospital; two other persons perished. — *W0WYX*.

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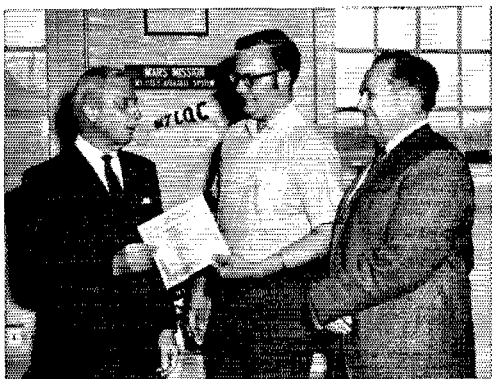
On April 13, members of the Calgary, Alta., AREC requested to provide communications for a mountain rescue operation. VE6AWV immediately organized a 2-meter link from the Calgary Mountain Rescue Corps Headquarters to VE6AIZ, who, with the help of VE6SB, maintained contact with VE6FK/m at the accident scene near Seebe, Alta., on 75 meters. The operation was secured in the evening when the victim was brought down and was rushed to a hospital. — *VE5AWM, EC Calgary, Alta.*

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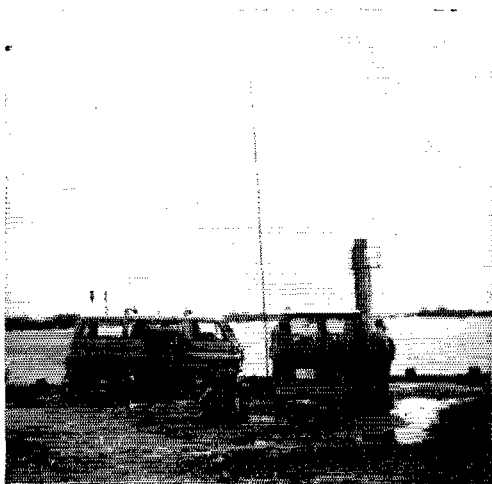
On May 10, much of Ohio was in the path of a severe weather front. At about 2200Z Stark County was put on a severe weather and tornado alert by the weather bureau. The ten-meter AREC net was activated by K8DHJ while WA8ETX and WA8UPI manned the emergency operations center. The weather bureau then requested confirmation from AREC that a tornado had touched down in Freeburg. Using the landing and CB facilities, in addition to their own, AREC kept the bureau informed as to weather conditions throughout the county. A liaison was also maintained with civil defense and Red Cross officials. — *K8DHJ, EC Stark County, Ohio*.

— * * * —

The Colorado RACES Net furnished communications, on May 24 and 25, when a small girl became lost at Horsetooth Reservoir near Fort Collins. K0UYF and WA0HLA moved portable equipment to the search area and manned it for the two days of the search. A total of more than 15 amateurs participated. Although the search for the child



W7OCX, manager of BUN, presents K7WYU, operator of W7LQC, the amateur station at the Ogden, Utah, Army Depot, with a Section Net Certificate, while Earl Lemmon, chief of Telecommunications for the base, looks on. W7LQC is primarily used in the Army MARS program for phone patches to Southeast Asia, but K7WYU has spent much of his own time checking in to the Utah Section.



On June 3, a tornado touched down in Anahuac, Texas, killing three people and completely devastating a small area in Chambers County. As there is no AREC organization in that county, outside help was necessary. WA5TXI, EC Grimes County, pulled a trailer containing a generator to the scene while K5CNU, EC Harris County brought two fully equipped radio vans. Assisting were K5HXR, W5CWL and WA5PEV.

was not successful, the communications furnished by amateur radio were successful in every respect. — WA9HLA, EC Weld and Morgan Counties, Colo.

A number of Connecticut amateurs participated in a simulated airplane crash drill held by the Bridgeport Civil Defense unit on April 27. Both VHF a.m. and f.m. units, including repeater WA1JTB, were employed. Two mobiles and a handi-talkie were assigned to the disaster site where more than 100 injured were to be given first aid and then transported to three local hospitals for further treatment. Eighteen ambulances were pressed into service from the surrounding area, each of which made several round trips from the disaster scene to the hospitals.

A control point was established at the civil defense headquarters and mobile units were assigned to each of the hospitals. A number of messages, each giving advance notice of the arrival of injured persons, was handled. — W1HBH.

On April 27, San Diego area amateurs and CBERs cooperated to provide communications for a "Walk on Hunger" march designed to raise money for the American Freedom from Hunger Foundation. According to local police, this was the largest such march ever held, with more than 17,000 participants, ranging in age from grade school children to senior citizens. The entire march course was approximately thirty miles long.

A number of checkpoints were established along the way where marchers could get first aid treatment, ice water, and transportation for those too weary to continue. At each checkpoint, either an amateur or a CBER, depending on the distance to be covered, was on duty to provide communications to the control center where NCSs were located, with a hot line to the police department. Only one emergency call was handled when one of the marchers was struck by a car and was slightly injured.

Seven hams, and an equal number of CBERs, participated in the operation which lasted for more than 14 hours. Cooperation was perfect and march officials were impressed by the professional manner in which communications were carried out. — WA6KHN, EC San Diego, Cal.

On April 27, the Land Rovers ARC (Clifton, N. J.) provided communications to assist the operation of a Safe Driving Road Rally sponsored by the North Bergen County Council of Explorer Scouts.

A station was set up at each of the five check points on the rally route, and another was located at the final scoring location. Car numbers and check-point times were radioed into the base station at the scoring position as each car passed the checkpoint, allowing judges to calculate scores and announce winners shortly after the last car finished the course.

Two-meter f.m. was utilized for the operation. An amateur with a walkie-talkie was provided to each official rally car, permitting the Rally-Master to maintain close contact throughout the rally operation.

Nine amateurs were active in the operation: W2s BVE, WBY, K2s TMA ZOO, WA2PTA, and WB2s CJD EQL FAT RUM. — W2FCL.

Members of the Cumberland Valley ARC (Chambersburg, Pa.) furnished communications for the Franklin County unit of the American Cancer Society during the annual fund drive on April 30. K3FFJ and W3LEZ set up at the Cancer Society headquarters and provided a radio link to the NCS, W3ZUK, assisted by WA3CIG. Mobile units were manned by W3s CUK HSU JKZ and K3s IDJ IWU. Each mobile carried an official of the Cancer Society. More than 170 messages were handled between the base station and mobiles during the three hours of the operation. — W3LEZ.

On May 2, W5JSM was notified by the Texas Department of Public Safety that a tornado had been sighted near Canyon. Potter, Randall and Swisher counties were placed under immediate tornado alert. The Northwest Texas Emergency Net was opened by W5JSM at 2230Z and remained active until 2330 when the alert was ended, no emergencies having developed. — W5JSM, SEC North Texas.

For the month of April, forty-three SEC reports were received, representing 15,742 AREC members. This is an increase of two reports and an increase of about 80 members from last year at the same time. Things are looking up a bit. The following sections reported during April: Ala, Alta, Ariz, Ark, Colo, Conn, EFla, EMass, EPa, Ga, Ind, Iowa, Kans, Ky, Mar, MDC, Mich, Miss, Mo, Mont, Nebr, Nev, NMex, NLI, NTex, Ohio, Que, SDgo, SF, SCV, Sask, SDak, SNJ, STex, Tenn, Utah, Va, Wash, WFla, WNY, Wpa. Welcome to newcomers Maryland-District of Columbia and Mississippi. We hope to see you in the above list often.

Traffic Talk

Traffic handlers are all cluttered up with a mess of procedural details and most of them, especially the old timers who learned their procedures on commercial or military circuits, are sticklers for it. Long years of training don't wear off easily or quickly, especially if you were paid for doing what you learned. Consequently, we have often become involved in long tirades with some old time traffic

men who feel we are doing it (handling our traffic, that is) all wrong because this isn't the way it used to be done on the railroad, or in the merchant service, or in the Navy, or on Western Union circuits. They even dig out their old reference books and quote them at us, as though this settles the matter.

But we're not laughing. No procedure is so perfect or so well tailored to its purpose that it cannot be improved, and our amateur procedure is certainly no exception. We can learn lessons from the OTs, one of the first of which is not to pooh-pooh old procedures just because they have fallen into disuse. Usually there was good reason, based on experience, for all such procedures, and just as often as not the reason still exists. On the other hand, sometimes the frothy-mouthed exponent of some former commercial procedure is simply exhorting us to adopt his procedure because it was what he was raised on and therefore *seems* simpler and better to him.

In the May issue, we wound up this column with the remark, "More about service messages another time." Since then, a number of correspondents have asked "when" and suggested some of the content. When, why and how to originate a service message is one of the small details referred to above, but it appears to be an important one these days in the hey-day of "Betty Garble." Let's start at the beginning and go right into the complete anatomy.

A service message is originated whenever the delivering operator wants to tell the originating station about the status of the message or make an inquiry about it, usually the latter. An example of the former might be to tell the originator the correct address or telephone number, in case it came through wrong; the informational type of service message is sent, if at all, after the message is delivered successfully. If the message is not delivered, the service message must be an inquiry — in effect, "your message was not delivered because, please advise what I should do." The delivering operator does *not* cancel a message unless advised to do so by the originator — that is, by the originating station. If he receives no reply to the service, he may have to file it undelivered. Same thing? Sure, but let's



People from both sides of the ARPSA fence gather at nearly every type of hamfest and convention. Here W5BJK, SEC Louisiana, and W5KRX, NTS stalwart, are caught discussing mutual problems at the Baton Rouge Hamfest early in May.

keep things in proper perspective. Don't tell anyone you are cancelling *his* message. That's for him to do.

How does a service message differ from any other amateur message? In only two respects: the symbol SVC (say "service" on phone) precedes the number (not the check, or in place of the check), and the text may contain abbreviations. Otherwise, it's the same. Yes, a service message does contain a check. It contains a complete address if you can get one (after all, it doesn't seem right to have an incomplete address on a service message complaining about an incomplete address!); in any case, please *don't* address it to the originating station in care of some net, without any other address at all!

We said above that the text might contain abbreviations. The reason for this is that on c.w. it is convenient to use them to shorten the text and thus speed handling — and since they are amateur-to-amateur messages the likelihood of being misunderstood is slim. But some operators, especially those who handle traffic on phone, object to this — and not without reason. The rule is to avoid c.w. abbreviations when using phone, and yet in this instance we encourage use of c.w. abbreviations in amateur-to-amateur service messages. Should a phone operator convert such abbreviations to plain language when they appear in service message texts?

The answer is NO. Neither should a c.w. operator convert them into abbreviations if they are spelled out. *The text of a message is sacred*, you make sure you have it right, then you relay what you receive. If the text says "UR" instead of "your," this is the way you transmit it. If it says "please confirm address your message" instead of the much shorter c.w. form "PSE CFM ADR UR MSG," you spell it all out even if you're sending it on c.w. What this amounts to is that if the message originates on phone it will contain no abbreviations; if it originates on c.w., it will contain many such. Whichever occurs, it should stay that way from origin to destination.

Now, precisely what should a SVC message say? Of course this depends on circumstances, but a few general principles can be observed to advantage. First of all, it should refer to the message number and date (*not* to the precedence, which is *not* a part of the number) of the message in question. Old-timers on c.w. often use such abbreviations as REF UR or REUR ("reference your") or SYM ("see your message") or SYS ("see your service," in reply to a service message), along with other standard c.w. abbreviations (see OpMan and the Operating Booklet).

The rest of the message text should explain the situation, whatever it is, in enough detail for clarity but with enough brevity to keep the check down to a minimum. This is an art in itself, and not all operators can be expected to master it, but the basic principle is to include only the information absolutely required. Too many services contain superfluous information that, while interesting and perhaps even significant, is not *really* necessary. For example, if a mailed message is returned by the post office, you simply ask for a better address (GBA) but *giving* the address on the message: "REURM (reference your message) 14 NOV 2 TO ADAMS 195 SMITH ST NORWICH UNABLE DLVR GBA," a check of 13. Another example, different situation: "SYM (see your message) 14 NOV 2 ADEE (addressee) MOVED NO FORWARDING ADVISE WE FILE," for a check of 11 to tell the originator that you could not deliver his message because the addressee moved and left no forwarding address so you are filing undelivered

until or unless he advises you what to do with it. In this case, neither the addressee's name or address were in question so they were omitted. Another: "SYM 14 NOV 2 TO JOPLIN MISS NO SUCH PLACE ADVISE WE FILE." In this case only the name of the city was included, because this was what was in question. The reply might be: "SYS (see your service) 57 NOV 4 SHOULD BE MO," telling you in seven words to dig the message out of your file and re-route it to Missouri. Or, "SYS 57 NOV 4 QTA" telling you to forget it.

By the same token, include the information required. If the address is wrong, give the address. If the telephone number was wrong, give the telephone number. If the name was wrong, give the name you received. Don't just say GBA, without supporting information. Where an unusual situation not covered by the rules exists, study ways and means of avoiding lengthy explanations. We can't give all such examples; it's up to you to make our traffic operations efficient by using your heads.

Service messages take the same precedence as the messages to which they refer. If the message in question is precedence P (priority), then the service message and its reply are also P. If it is EMERGENCY, then the delivering station should seek out the originating station on the air, if possible, and get the further information he needs for delivery *pronto*; if this is impossible, the SVC would carry the precedence EMERGENCY and be treated as such by all handling stations and nets.

Service messages count the same as any other traffic, so if you are interested in count it pays to use the device. You may not get credit for a delivery, but you make up for this by getting credit for an origination and a "received" credit if you get an answer, plus *maybe* a delivered credit if the answer enables you to make delivery. How can you lose?

Any questions, class? — WINJMM.

National Traffic System. W2FR says 2RN really had a rough one in May. WA6ROF reports that a RN6 certificate has been issued to WB6WGR. "Traffic and representation worst in years," says W7BQ. TEN manager W0LGG reports the alternate frequency of that net is 7105 kos. K7NHL says his net report is more like a disaster report. W6VWQ has issued PAN certificates to WA6DEL, W8ELW/6 and W8VDA/6.

May reports:

| Net | Ses- sions | Traffic | Rate | Aver- age | Represen- tation (%) |
|---------------------------------|---------------|---------|-------|--------------|-------------------------|
| EAN..... | 31 | 1526 | 1.313 | 61.4 | 96.3 |
| CAN..... | 31 | 1196 | .861 | 38.5 | 98.9 |
| PAN..... | 31 | 961 | .792 | 31.0 | 90.3 |
| 1RN..... | 62 | 619 | .384 | 9.9 | 94.2 |
| 2RN..... | 62 | 475 | .617 | 7.7 | 95.8 |
| 3RN..... | 62 | 570 | .464 | 9.2 | 98.4 |
| 4RN..... | 54 | 549 | .391 | 10.1 | 78.8 |
| RN5..... | 62 | 651 | .346 | 10.5 | 82.8 |
| RN6..... | 62 | 889 | .683 | 14.3 | 98.5 |
| RN7..... | 59 | 246 | .240 | 4.2 | 36.8 |
| SRN..... | 62 | 431 | .294 | 7.0 | 94.6 |
| 9RN..... | 62 | 726 | .624 | 11.7 | 92.3 |
| TEN..... | 61 | 405 | .423 | 6.6 | 59.5 |
| ECN..... | 53 | 162 | .209 | 3.1 | 76.2 |
| TWN..... | 43 | 131 | .197 | 3.0 | 40.0 |
| TCC Eastern... 124 ¹ | | 753 | | | |
| TCC Central... 93 ¹ | | 586 | | | |
| TCC Pacific... 124 ¹ | | 820 | | | |
| Sections*..... 2117 | | 13651 | | 6.5 | |
| Summary..... 2914 | | 25326 | EAN | 11.9 | — |
| Record..... 3237 | | 32465 | 1.322 | 17.8 | — |

¹TCC functions, not counted as net sessions.

²Section and local nets reporting (60): SSZ OLZ (Okl.); AENB, AEND, AENH, AENM, AENR (Ala.); GSN (Ga.); NCN, SCN (Cal.); GN, FMTN, VEN, QFN,

FPTN, TPTN, FAST (Fla.); NYS, NLIVHF, NLI Phone (N.Y.); WIN, WSBN, WSSN, Badger Weather (Wis.); TEX (Tex.); VSBN, VN (Va.); OZK (Ark.); KYN, KTN, FCATN (Ky.); ILN (Ill.); M6MTN, WSSB, QMNN (Mich.); PTTN, EPA EPAEPTN (Pa.); Franklin Co., OSSB, BN (Ohio); BUN (Utah); QIN (Ind.); WVN (W. Va.); NMRTN (N. Mex.); MDCTN (Md.-D.C.); LAN (La.); W. Que. VHF, RTQ (Que.); WSN (Wash.); MSN, MJN, (Minn.); RISPNN (R.I.); NCNE, NCNL (N. C.); BSN (Ore.); CN, CPN (Conn.); NJEPTN (N. J.); QKS (Kans.).

Transcontinental Corps.

May Reports:

| Area | Func- tions | % Suc- cessful | Traffic | Out-of-Net Traffic |
|--------------|----------------|-------------------|---------|-----------------------|
| Eastern..... | 124 | 90.3 | 2134 | 753 |
| Central..... | 93 | 93.5 | 1250 | 586 |
| Pacific..... | 124 | 91.9 | 1662 | 820 |
| Summary..... | 341 | 91.8 | 5046 | 2159 |

The TCC Roster Eastern Area (W3EML, Dir.) — W1s BJJ NJM YKQ, K1ESG, W2s FR GKZ PU, K2RYH, W4s BHN CAL UWA, W3EML, K3MVO, W4s NLC SQQ UQ ZM, K4KNP, WA4EUL, WB4DXX, K6CAG/1, K8KMQ, W4s POS ZGC, VE3GI. Central Area (W0LX, Dir.) — W4OGG, K4AT, WB4AIN, W5s MI RHF, W9s CXY DND VAY, W49s BVY RAK VZM, W6s HI INH LCX, W49s DOU IAW, K9AEM, Pacific Area (W7DZX, Dir.) — W6s BGF BNX EOT IPC IPW VNQ VZT, K6DYX, W46s LFA ROF, W7KZ, K7HLR, WA7CLF, K0JSP.

Independent Net Reports:

| Net | Sessions | Check ins | Traffic |
|------------------------------|----------|-----------|---------|
| Great Lakes E & T..... | 31 | 1003 | 217 |
| Northeast Traffic..... | 31 | 347 | 664 |
| Hit & Bounce..... | 31 | 315 | 489 |
| 7290..... | 45 | 1611 | 1346 |
| Clearing House..... | 26 | 329 | 206 |
| North American SSB..... | 27 | 554 | 333 |
| Interstate 20 Meter SSB..... | 22 | 413 | 6556 |
| All Service..... | 4 | 52 | 39 |
| EASN..... | 28 | 203 | 201 |
| Eastern U.S. Traffic..... | 30 | 66 | 21 |
| Mike Farad E & T..... | 27 | 294 | 319 |
| QTC..... | 22 | 171 | 63 |

QST



Astronet Aids in Apollo 10 Tracking Program

More than 100 astronomers joined together to track the progress of the Apollo 10 mission during May 1969. The optical tracking network included about 15 major observatories, the worldwide Baker-Nunn satellite tracking cameras, and about 80 radio-amateur groups associated with the Argus Astronet (Calkins, W1KUX/6 and Guter, WA6OQU, "Astronet," QST, February 1966, page 50; "Stays," QST, March 1969, page 73; and the American Asso. of Variable Star Observers. The amateur radio network provided a very useful means of disseminating new pointing data during the mission. Both the daytime frequency, 14.255 MHz. and nighttime frequency of 3.885 MHz. worked very effectively for intercontinental and interstate transmissions.

The Society of Wireless Pioneers will sponsor a 24-hour QSO Party over the weekends of Nov. 29-30 and Dec. 6-7, 1969, c.w. only. For information, write Arm Brattland-K6EA, at Box 530, Santa Rosa, California 95402.

1969 VE/W Contest Announcement

September 27-29

THE Montreal Amateur Radio Club, Inc. invites all W and VE amateurs to participate in the 1969 VE/W Contest. This year the contest period will fall on the weekend of Sept. 27 to Sept. 29.

This year the following changes have been made:

1. Elimination of power multiplier
2. Elimination of bonus multiplier
3. Simplification of log format (see sample)
4. Dupe check sheets (or ARRL Op Aid 6) required for log of 100 or more QSOs.

Stations look for each other in the "General" part of the phone and c.w. bands. Stations are reminded to check *all* bands for openings.

Although the MARC and ARRL *do not* stock forms for this event, Heathkit, 1480 Dundas Highway East, Mississauga, Ont. is supplying Canadian entrants with free International Contest log forms. They are a two-part affair, designed to give you a copy. VEs please address your requests to the Contest Department, giving your name, call, address, contest name, and the anticipated number of contacts. Others please follow the log sample shown below.

| Contest Period | |
|-------------------------------|-----------------------------|
| <i>Starts</i> | <i>Ends</i> |
| Saturday Sept. 27 2300 GMT | Monday Sept. 29 0200 GMT |

1) *Eligibility:* The contest is open to all amateurs located in the ARRL sections listed on page 6 of any *QST*.

2) *Contest Period:* All contacts must be made during the period shown above. Only 20 hours total operating time may be used in this period. Times on and off the air must be shown in the log. Minimum time off period allowed is 15 minutes. Listening time must count as operating time.

3) *Bands:* All bands and modes for which the participant is licensed may be used. A station may be worked once on c.w. and once on s.s.b. on each band.

4) *Classes of entry:* The contest is divided into two parts, phone and c.w. These scores must be tabulated separately and *not* combined. There are two classes of entry:

- a) single operator
- b) multi-operator

A single operator station is one manned by an individual amateur who receives no assistance from other persons during the contest period. He may not have assistance in any manner in keeping the station log and records, or in spotting stations during the contest period. Such entries must be placed in the multi-operator category. The operation of two or more transmitters simultaneously, whether by single operator or multi-operator stations, is *not* allowed.

A transmitter used to contact one or more stations may not subsequently be used under any other call during the contest period (with the exception of family stations where more than one call is assigned to one location by FCC or DOT).

5) *Exchange:* W/Ks will work VE/VO stations and vice-versa. W-to-W and VE-to-VE QSOs do not count. Valid points can be scored by contacting stations not working the contest if complete exchanges are made. The exchange consists of QSO number, RS or RST report, and ARRL section for W/Ks, geographical areas as listed below for VE/VOs.

| Area | Prefix | Abbreviation |
|----------------------|--------|--------------|
| Newfoundland | VO1 | NFLD |
| Labrador | VO2 | LAB |
| Prince Edward Island | VE1 | PEI |
| Nova Scotia | VE1 | NS |
| New Brunswick | VE1 | NB |
| Quebec | VE2 | QUE |
| Ontario | VE3 | ONT |
| Manitoba | VE4 | MAN |
| Saskatchewan | VE5 | SASK |

(Continued on page 98)

| VE/W CONTEST LOG 1969 | | | | | | | | | | |
|--|------------------|----------|--------------|--------|--------|------|-----------------|---------|---------------|---|
| Call... W1BGD/2 | | | Mode... C.W. | | | | Section: E.N.Y. | | | |
| Band | Times on/off GMT | NR | Time of QSO | Call | RST | | His NR | Section | New Sec. Wkd. | |
| | | | | | Sent | Rcvd | | | | |
| 7 | 2300 on | 1 | 2300 | VE7BDJ | 599 | 599 | 3 | BC | 1 | |
| " | | 2 | 2303 | VE2UM | 599 | 599 | 4 | Que | 2 | |
| " | | 3 | 2305 | VO1AA | 579 | 569 | 2 | Nfld | 3 | |
| 14 | | 2310 off | 4 | 2308 | VE6AAG | 559 | 579 | 3 | Alta | 4 |
| " | | | 5 | 2310 | VE2NI | 569 | 579 | 2 | Que | - |
| <p>Total operating time: 10 min. Bands used: 7, 14 MHz;</p> <p>Sections worked: 4 Points: 8</p> <p>Claimed score: 5(QSOs) × 2 (points per contact) × 4 (sections) = 40 points</p> <p>I hereby state that my station was operated strictly in accordance with the rules of the contest and governmental regulations, and I agree that the decision of the contest committee of the Montreal Amateur Radio Club, Inc., shall be final in all cases of dispute.</p> <p style="text-align: right;">Signature..... Call.....</p> | | | | | | | | | | |

The Amateur "Q"

An FCCer Views the Progress of Incentive Licensing

BY WILLIAM S. GRENFELL,* W4GF

ELECTRONICALLY, the letter Q stands for the quality factor of a circuit. I am using it here today as meaning the Quality factor of the Amateur Operator and the importance of the Quality of the radio amateur in contrast to the Quantity.

Before we get into the Quality factor, let's take a look at the Quantity, or growth in the number of licensed amateur radio operators over approximately the past two decades. Beginning with the July 1, 1950 figure of 86,662, the operator total shows a steady growth of 9 to 10% per year up through the July 1960 figure of 212,107. Then the growth slows to a rate of between 4 to 5% per year, including the July 1964 total of 256,237. From that period up to now the total has fluctuated between 256,000 and 262,000 *but with no significant trend either UP or DOWN* — contrary to what some people are saying and writing these days.

I wish to emphasize that, from our license statistics, there is no reason to conclude that the number of amateur licensees is on a downward trend. Over the past five years the operator total has fluctuated up or down as much as 2000 in one month and as much as 4500 within a single year but has not shown any significant trend away from the five-year average of about 258,000.

I don't know what has caused this plateau in the number of amateur licensees. There does not seem to be any correlation with such basic things as birth rate, average income, gross national product, and so forth. A few things did occur about 5 years ago which may have caused some slow-down in the growth rate but I can't believe they would account for all of it.

For example, a license application fee was first imposed in January, 1964. However, I don't believe the \$4 fee would result in any significant reduction in license renewals. The area in which a Conditional Class examination was available was drastically reduced in April of 1965. As a result, the Conditional Class totals which previously were showing a moderate increase each year, did start downward and have been moderately decreasing since the reduction in the area of eligibility.

Hobby Competition

I can only guess, but I suspect that in recent years people are more able to afford, and are therefore are attracted to, many other hobbies and activities. Also, I suspect that the ability

* Chief, Rules and Standards Branch, Amateur & Citizens Radio Division, FCC. This is the text of an address delivered at the New England Division Convention in Boston in May.

of modern-day newspaper, radio and television facilities to bring us information of current events from almost anywhere in the world, and even from out of this world, while they are happening, has served to take some of the romance out of person-to-person, do-it-yourself communication by amateur radio with people in far away places.

Now, let's take a look at the Quality of the Radio Amateur.

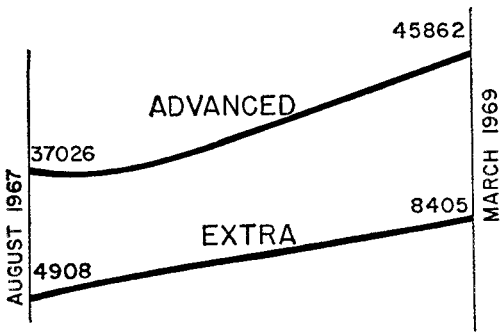
Back in March, 1965, the Commission said "It is altogether clear that justification for the continued allocation to the Amateur Radio Service of a substantial portion of the (radio frequency) spectrum in the face of . . . important demands by other radio services can not be founded on anything other than a continuing movement of the Amateur Service toward the goals specified in Section 97.1 of the Amateur Rules. It is the Commission's opinion that revision of the present license operating privilege structure is an appropriate and desirable step to take at this time to insure such progress and place a proper emphasis upon the quality of the service as well as upon its mere numerical growth and activity." This was, of course, the well known "incentive licensing" proposal, rule-making Docket No. 15928, which was the result of the ARRL RM-499 petition and ten other petitions, as well as the Commission's own ideas on the subject.

I am sure you all know and are reasonably familiar with the details of the resulting rule changes which were adopted in August, 1967. This result was founded upon two basic conclusions: (1) It should be obvious that the only way to really measure the degree of amateur self-improvement is by counting the number of amateurs who have succeeded in passing examinations at progressively higher levels. Furthermore, (2) experience has pretty well established that provision of reserved bands of operating frequencies for the higher classes of operators is the most successful incentive to encourage such a demonstration of progress, on a voluntary basis. It is voluntary in the sense that no licensee is deprived of operation in the band and with the emission he has been using even though he does not choose to undergo the examinations.

Extra and Advanced Growth

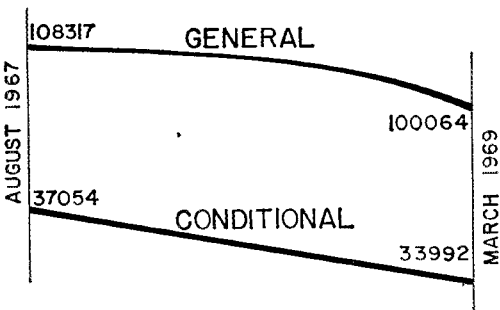
Looking at the totals of the Extra Class operators over the past several years, we see that from the time something "extra" was proposed for this class, there has been a steady, but very gradual, increase of between 7 to 10% per year. Then, beginning with the November 1967 figure, just 3 months after the "incentive" rules were adopted, the Extra Class total picks

up and has maintained a consistent growth rate of better than 40% per year. The gain during this last period was 3398, which puts the current Extra Class total at 8541 operators.



During the years since 1951, after which no new Advanced Class licenses were issued, the Advanced Class operator license total has declined slowly from a maximum of approximately 40,000 to the "low water tank" of 36,691 as of the first of December 1967. However, the new Advanced Class examinations were already being given that month, and by January 1968 the new licenses issued had overcome the natural attrition rate and the upward trend was started. This appears to establish a growth rate of 20% per year, certainly a very "healthy" rate. The actual additions of new licensees to the Advanced Class ranks during the past 16 months are 9,524 operators, making the current total 46,215 Advanced Class operators.

At the same time the ranks of the Advanced Class started growing, the General Class started a downhill trend. Beginning with the November 1967 high of 108,742 licensees, the General Class total has dropped 9040 to the current 99,702 figure.



During the past 16 months in which the General Class total lost 9040, the combined Advanced and Extra Class operator totals gained 12,922. This represents a 5% shift into the higher Class bracket and probably amounts to an actual 10% of the active amateurs. While this appears to be a very modest change, I hope it

forecasts a significant and continuing increase in the Quality of the Amateur Radio Service. While I feel it is too early to prophesy the eventual result, I do feel that the "incentive licensing" plan is off to a good start and that it has already proven to be worth all the effort to get it launched.

Incidentally, I notice an apparent upward trend in the Novice Class totals, and while most of it can be attributed to the first anniversary of two-year Novice licenses, I wonder if there is more to it than just that? Anyway, I think it bears watching.

As our Field offices can attest, the number of examinations conducted by them has certainly increased a great deal. Prior to November 1967, the annual rate of amateur examinations was about 15,000. During the past year and a half 31,938 amateur examinations were conducted by the Field offices which averages an annual rate of over 21,000, or almost a 50% increase. . . .

Future Actions

When it adopted the "incentive licensing" rules in Docket 15928, the Commission referred to the second phase of implementation which is the expansion of the reserved bands scheduled to take place on November 22, 1969, with the statement that: "Notwithstanding this schedule, the Commission intends careful review and if it is determined that there is insufficient occupancy of any part of the reserved frequency segments then the effective date of the implementation schedule will necessarily be stayed in whole or in part, as appropriate." In denying petition RM-1287 on August 9, 1968, the Commission said: "Moreover, the Commission stated in Docket 15928 that it is its intention to review the extent to which the reserved frequencies are occupied, and to make necessary changes if the effective utilization of the frequencies involved is threatened." Later in its Order of November 26, 1968, concerning petition RM-1352, the Commission said: "The Commission's intention to review the suballocations remains unchanged." I think you can conclude that a change before next November 22 is a distinct possibility although not an absolute certainty.

If you use any of the 3.5, 7, 14 or 21 MHz. bands, you have probably observed and formed an opinion on whether the reserved bands are adequately occupied or are too-thinly inhabited. You may wonder what the Commission will use to determine whether to modify the November 22 schedule changes. The answer to that is that the Commission will consider everything available to it at the time of decision. The Commission has made some recordings of the reserved bands and the adjacent band segments, which pictorially display the relative occupancy. While this method is very useful, it obviously has the drawback that it cannot show the difference between an amateur signal and the signal of a station in another service.

In addition to occupancy data, some consideration may be given to statistical factors. For example, if only the amateur classes which have access to the high-frequency bands are considered and, if the number of Novice licenses and the Novice sub-bands are excluded, a calculation shows that the Extra Class constitutes 4.4% of the licensees involved and they presently have exclusive use of 14.3% of the telegraphy space and 7.7% of the telephony space in the four bands involved. The combined Advanced and Extra Class constitute 28.8% of the licensees privileged to use telephony in these bands and they are allocated 17.7% of the total telephony space. While such a method of evaluation has some merit, it can by no means be the decisive factor since it is an over-simplification of the situation. The most obvious fault is that the Extra and Advanced Class operators do not confine their operation in these bands only to the sub-bands reserved for them.

Another consideration which cannot be ignored is the recent petitions which the Commission has received on the "incentive" sub-allocations. One petition, RM-1393, would stop the Extra Class telegraphy allocations at the low end of the 7 and 14 MHz. bands at the present 25 kHz. width. Another, more complicated petition (RM number not yet assigned), would give the Extra

Class licensees an additional 25 kHz. of exclusive telephony space just below the present 3800, 7200, 14200 kHz. 'phone band edges and 50 kHz. of exclusive 'phone space just below 21,250 kHz. These changes would be in addition to those now scheduled to go into effect in accordance with the Docket 15928 Order, on November 22, 1969. While the first petition might be acted on within the framework of the consideration promised in the Docket 15928 Order, because it goes beyond the extent of the changes originally proposed in Docket 15928 the second petition would likely require a further Notice of Proposed Rule Making with provision for comment, if the Commission is disposed to act favorably on it.

In summary, it appears to me that the so-called "incentive licensing" rule changes are off to a good start toward accomplishing the goal for which they were adopted, namely, improving the Quality of the Amateur Radio Service. It remains to us to further encourage the attainment of that goal through individual and organized action, including the modification of the rules in such a manner as to give maximum encouragement to all amateurs to positively demonstrate that they do indeed deserve the allocation of substantial portions of the precious radio frequency spectrum to their use. QST



August 1944

... Already, K. B. Warner is dreaming about the status of things at Headquarters after the war when hams are back on the air. He foresees a tremendous increase in activity, embracing all departments of the League. He doesn't see how all the extra personnel are going to function in the present building. Letting his thoughts wander, he thinks about Selden Hill, where many single League employees have lived in the old homestead. The possibility of a dormitory for visiting hams even crosses his mind. It's a great v.h.f. location and it was from here that the first 2-way between West Hartford and Boston took place on 5 meters. That's a separate story in itself. This writer was in on the deal.

... Marvin H. Kronenberg, W21JU, presents a solution to the problem of using several different receivers hooked to the same antenna. The trick is to use coupling tubes which isolate each receiver from the others. It is not a brand-new idea, of course, but many hams are probably unaware of this simple circuitry.

... Clinton B. DeSoto, W1CBD, follows up his articles on the AACS with a number of yarns about some of the personnel. All are hams, of course. Copiously illustrated with photos.

... A portable multimeter for servicing WERS equipment is described by Frederick Long, ex-W8NE, Ass't. Radio Aide, New York City WERS.

It is a pretty comprehensive meter and performs eight different functions.

... A certain amount of bootlegging is taking place on 112 Mc., by unlicensed youngsters, for the most part. Hams are urged to help track down these offenders and bring them to brook. This is a serious offense, especially in wartime. Some have been caught and punished.

... The FCC has come forth and stoutly defended its actions in securing deferments for a number of amateurs in the Radio Intelligence Division. Apparently the counsel for the House Select Committee thought that the term "amateur" meant that they were just novices. Of course we know that some amateurs are more competent than some professionals.

... In 1944, the presence of ripple in power supplies was still a problem and G. Edward Hamilton, W9GSS, discusses the problem and points out the principal factors involved. You might want to look this over if you still have a bit of "hum" in your d.c. supply.

... I mentioned Selden Hill earlier in this article. Cy Read, W9AA, then assistant secretary of the League tells a charming story about this place and the radio goings-on, over the years. Miss Selden still lives there but the meadows nearby are now all built up. — W1ANA

**SWITCH
TO SAFETY!**



Australis-Oscar 5 And You!

BY WILLIAM J. DUNKERLEY, JR., WA2INB

THE launch of Australis-Oscar 5 is imminent! To seasoned Oscar buffs, little more than this statement will be enough to arouse interest. Others may view it as just another esoteric project with little to interest the average ham. But, if you've not listened to amateur satellites before, don't tune-out yet, because this satellite is for you, *too*. In fact, it may be a new and exciting avenue to your amateur career.

Unlike Oscars 3 and 4, Australis-Oscar will not have a repeater aboard — it is exclusively a beacon-satellite, transmitting on ten and two meters.

According to Amsat (Radio Amateur Satellite Corp.), Australis' purpose is three fold: First, it will give amateurs a chance to gain familiarity with some space techniques and to practice satellite tracking. Second, it will test a unique experiment — a magnetic attitude stabilization system (MASS). Design features of MASS were described last month²; how to receive telemetered data on the system's performance is told in a following article, this month. Third, Australis-Oscar, through its ten-meter transmitter, will provide an exciting opportunity to gain new propagation data, and allow participation by amateurs not equipped for v.h.f. reception.

The Propagation Experiment

Carrying a ten-meter transmitter, Australis-Oscar 5 will allow interesting observation of its h.f. signal during this period of relatively high solar activity. Because of the minimal effect of the ionosphere on two-meter signals, Australis' v.h.f. beacon will serve as a basis of comparison. What is hoped to be found, is how the propagation of the two-meter signal differs from the ten-meter signal. With your help, data will be gathered from widely varying amateur ground stations in various locations around the world. The data will be analyzed and the results published at a later date.

* Assistant Secretary, ARRL.

¹ Klein and Tynan, "AMSAT, The Radio Amateur Satellite Corporation" *QST*, June, 1969, pg. 54.

² Belair and Howard, "Australis-Oscar, Its Design, Construction and Operation" *QST*, July, 1969, pg. 58.


What For?

Certainly, Australis can contribute little to what is already known about the propagation of terrestrial ten-meter signals about the globe. However, the satellite will indicate the behavior of these h.f. signals when originated in space — such as would be from an amateur ten-meter repeater-satellite. Amsat member K2QBW suggests that this band could benefit from such a satellite. For much of the sun spot cycle, it is not open for long-distance communication. On the other hand, many amateurs have equipment capable of use on ten meters. A repeater-satellite would thus facilitate reliable long-distance communications in our widest h.f. band.

Contribution of data on unusual propagation will be an additional function of Australis-Oscar. Among these phenomena is antipodal propagation, wherein a weak signal is heard when the satellite is on the opposite side of the earth from the receiving station.³ Ionospheric skip, black-outs, or even long-delay echoes⁴ would be particularly interesting observations, suggests K2QBW.

What To Do?

If you are presently equipped to receive on either ten or two meters, or both, you're well on your way to participating in the Australis-Oscar experiment. Information on what equipment is best suited is given in the following article, this month. An article on when to listen will appear in a subsequent issue.

Amateurs participating in the propagation experiment are requested to supply Amsat with reports of their efforts. Each and every attempt to hear the satellite, whether successful or not, should be reported. Since your data will be computer processed, it is requested that your reports follow the format of the "Telemetry Coding Form" shown on page 71. If you are not reporting telemetry information, leave the "telemetry" columns blank and complete the rest of the form according to the instructions in the text. Your reports will help make the Australis-Oscar 5 experiment a success! 

³ Soifer, "Antipodal Reception of Oscar Signals" *QST*, November, 1968, pg. 32.

⁴ Villard, Graf, and Lomasney, "Long-Delayed Echoes" *QST*, May, 1969, pg. 38.

Obtaining Data From Australis-Oscar 5

BY DAVID T. BELLAIR,* VK3ZFB AND STEPHEN E. HOWARD*

AUSTRALIS-Oscar 5 will transmit telemetry continuously on a frequency of 144.050 MHz. In addition, it will transmit on a frequency of 29.450 MHz. when this transmitter has been commanded on. It is presently planned that the ten-meter transmitter will be operated on weekends only.

All tracking stations are requested to obtain telemetry data from either transmitter whenever possible, since telemetry data reception and reduction is one of the major experiments connected with this project.

Equipment Considerations

The following provides an outline of the minimum equipment considered necessary to receive telemetry from Australis-Oscar 5.

The two-meter receiving antenna should have a gain of at least 10 db. It is desirable that it be circularly polarized to reduce fading caused by changes in satellite attitude and Faraday rotation. One suitable antenna is a crossed Yagi (two Yagi antennas pointing in the same direction, one with vertical and the other with horizontal polarization, one being connected through an extra quarter wavelength of cable, giving a 90-degree phase shift between the two driven elements). Another suitable antenna is a helix, such as the one described in *QST* for November, 1965.¹ To receive good signals while the satellite is at high elevations the antenna should be steerable in elevation as well as in azimuth. If attempting measurements of the satellite spin rate using polarization as an indication, a horizontally or vertically polarized antenna should be used rather than a circularly polarized one.

For reception of the h.f. telemetry, a pair of crossed, horizontal dipoles, mounted one quarter wavelength above ground, will give a reasonably good omni-directional, circularly polarized pattern, and should provide adequate signal strength from the satellite's 250 milliwatt ten-meter transmitter. A linearly polarized antenna can be used to receive the h.f. signal but fading will occur because of both satellite spin and ionospheric Faraday rotation. It may be difficult, because of Faraday rotation, to determine the satellite spin using the h.f. signal, unless the operator is somehow capable of separating the two effects.

To obtain a good signal-to-noise ratio from the two-meter transmitter, the v.h.f. converter

* Project Australis, Union House, University of Melbourne, Parkville, Victoria, Australia 3052.

¹ DeMaw, "The Basic Helical Beam," *QST*, November, 1965, pg. 20.

should have a noise figure of about 4 db. Most h.f. receivers should be adequate to receive the ten-meter transmitter although some older receivers may require the addition of a pre-amplifier. Both transmitters are amplitude modulated, with maximum modulated frequencies of 2000 Hz., so that receivers should have i.f. bandwidths of about 4000 Hz. Except for initial acquisition of the signal, a b.f.o. should not be used, as the telemetry information and the beat note could be confused.

Telemetry Format

Most of the information required about the satellite is derived from the audio telemetry, which has eight sequential channels. Each channel is transmitted for about 6½ seconds and the whole cycle lasts approximately 52 seconds. The *HI* sequence consists of a 1.6-second tone followed by a 1.6-second *HI* which is then repeated once again. The *HI* is transmitted not as MCW but as a.f.s.k. That is, the tones do not key on and off, but switch between two tones of different frequencies. The *HI* channel contains no telemetry information.

The *HI* channel is followed by seven tones, each about 6½ seconds long and each sending information about one of the telemetry functions. By measuring the audio frequency and using the calibration graph for that function, the quantity concerned can be determined. During telemetry decoding, the time should be watched carefully, as the frequencies of two adjacent channels may be similar and the transition from one to the next may not be apparent.

The sequence of the telemetry channels is given in Table 1. This table also lists the figure which contains the calibration graph appropriate to each function.

TABLE I
Telemetry Channels

| Channel Number | Function | Calibration in Fig. |
|----------------|-----------------------------|---------------------|
| 0 | <i>HI</i> in Morse code | not applicable |
| 1 | Total battery current drain | 1 |
| 2 | X axis horizon sensor | not applicable |
| 3 | Battery voltage | 2 |
| 4 | Y axis horizon sensor | not applicable |
| 5 | Internal temperature | 3 |
| 6 | Z axis horizon sensor | not applicable |
| 7 | Skin temperature | 3 |

| AUSTRALIS — OSCAR 5 | | | | | | | | | | | | | | TELEMETRY CODING FORM | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---------------------|---|---|---|--------------|---|-------|---|-----|----|-----------------|-----|-----|-----|-----------------------|----|-----|-----|----------------|-----|----|----|----|-----|-----|-----|-----------|----|----|----|-----|-----|-----|-----|----|----|----|----|------|-----|------|------|----|----|----------|----|------|--|
| CALL | | | | ORBIT NUMBER | | MONTH | | DAY | | VHF TRANSMITTER | | | | | | | | HF TRANSMITTER | | | | | | | | TELEMETRY | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | AOS | | | | LOS | | | | R | | | | S | | | | AOS | | | | LOS | | | | R | | | | S | | | | HI | | VOLT-AGE | | TEMP | |
| | | | | | | | | | | HR | MIN | SEC | MIN | SEC | HR | MIN | SEC | MIN | SEC | R | S | HR | MIN | SEC | MIN | SEC | R | S | HR | MIN | SEC | MIN | SEC | R | S | HI | LO | VOLT | AGE | TEMP | TEMP | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | | |
| VR | 3 | A | T | M | 0 | 0 | 5 | 0 | 7 | 1 | 6 | 1 | 2 | 3 | 3 | 2 | 5 | 4 | 5 | 0 | 3 | 4 | 7 | 1 | 2 | 2 | 7 | 4 | 5 | 5 | 7 | 1 | 0 | 5 | 8 | A | 6 | 5 | 1 | 7 | 5 | 3 | 2 | 9 | | | |
| COMMENTS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

What It Means

One convenient method for decoding the telemetry is to use Lissajous figures.² The received audio signal is applied to the vertical input of an oscilloscope and a sine wave from a calibrated audio oscillator is applied to the horizontal input. The frequency of the audio oscillator is adjusted until a stationary ellipse is seen, indicating that both frequencies are the same. Another method can be used if the oscilloscope timebase has been calibrated. A set number of cycles is displayed and the period of each cycle determined, and hence the frequency. If the timebase is free-running, as little sync as possible should be used to avoid changing the timebase calibration.

If an oscilloscope is not available, the frequencies of the received telemetry and of the audio oscillator can be matched by ear. Even with poor signal-to-noise ratios this method gives results accurate to within about 10 Hz. at 2000 Hz.

Rather than using an audio oscillator, a piano or other musical instrument can be used. This method probably yields better accuracy than those previously described. Confusion of octaves should be carefully avoided, however. Lastly, if the signal-to-noise ratio is good, the best method is to use a direct-reading frequency meter or digital counter if one is available.

Since difficulty may be experienced in comparing the telemetry tone frequency with an audio oscillator or musical instrument in the approximately $6\frac{1}{2}$ seconds in which each sample is transmitted, it may be desirable to record the entire satellite pass on a tape recorder. The speed accuracy of the recorder should be 5% or better, however, or the measurements will be seriously in error. Some means of calibrating the tape recording is advisable in any case. It should be pointed out that inaccurate results are worse than none at all — an accuracy of at least ten percent is needed for meaningful telemetry data.

Telemetry Coding Form

To enable the telemetry reports to be evaluated by computer, all responses must be in the same form. Therefore, tracking stations are requested

to enter their observations on the special telemetry coding form, shown above.³ Participating observers may construct their own forms from the figure or may obtain forms free of charge from Amsat, P.O. Box 27, Washington, D. C. 20044. Please indicate the number of forms desired and include a self-addressed stamped envelope or IRC with your request.

Having decoded the telemetry for a pass, please select those results which you think are the most reliable. This will often mean rejecting wildly inconsistent results which may arise when the telemetry is decoded directly, rather than from a tape recording. Where a large number of consistent results are obtained, all should be entered on the telemetry coding form, since this is an ideal indication of the reliability of the information.

The readability and strength of the received signal will be used for the propagation experiments, and in deciding the weight given to the decoded telemetry, so please be sure to complete these columns.

Please write clearly, with only one character in each column. Use more than one line if needed to indicate additional comments.

All dates and times *must* be in *GMT*.

The following information is necessary:

- call sign of tracking station (if no call sign, write ZZ1, followed by the operator's initials)
- orbit number
- month and day
- time of acquisition of signal (AOS) and loss of signal (LOS) and readability and strength for each transmitter. Note that no hour column exists for LOS. If LOS occurs after the next hour simply enter the minutes and seconds in the appropriate column (for example 05-53)
- HI keyer operation: the letter A for normal and F for failure, which should be described on a separate sheet
- battery current drain in milliamperes from Figure 1
- battery voltage in volts from Figure 2

² Radio Amateur's Handbook, 1969, pg. 562.

³ A typical pass coded — all systems operating normally.

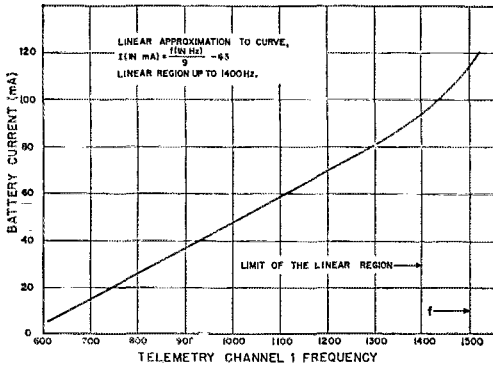


Fig. 1—Frequency in Hertz vs. battery current.

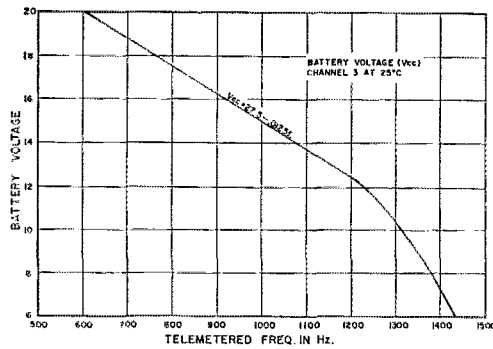


Fig. 2—Frequency vs. battery voltage (channel 3).

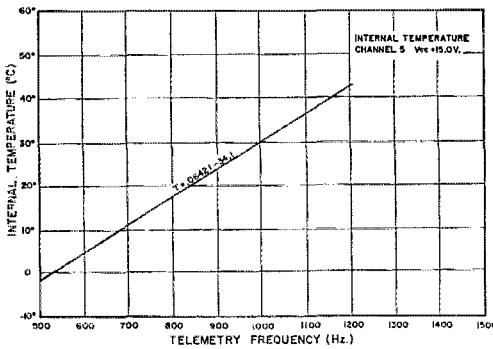


Fig. 3a—Frequency vs. internal temperature (channel 5).

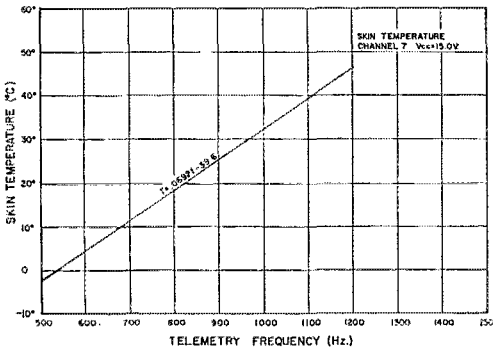


Fig. 3b—Frequency vs. skin temperature (channel 7).

(h) internal temperature in degrees C. from Figure 3

(i) skin temperature in degrees C. from Figure 3

All data entered on these sheets will be stored in a computer at Melbourne University. The form is in fact a replica of a computer card.

Reports on horizon sensor data should be treated differently. Since we are concerned only with either "light" or "dark," the actual frequency of the sound is of no interest. Each change in frequency corresponds to a transition of the field of view of a sensor between different states of illumination. The length of the higher frequency (bright) periods, depends on the spin rate, and on the nature of the traverse across the bright source. For example, a short period could correspond to a single sweep across a short chord, or to a much faster sweep across a near diameter of the earth's disc. The sun and moon will also appear as bright sources against the dark background of space. However, they subtend such small solid angles at the satellite that the sensors will rarely sweep across them. Both would produce short high-pitched signals in the appropriate telemetry channels (Nos. 2, 4, or 6).

Now because the package may be rotating about three axes simultaneously, the spin rate on any single channel may not sound regular, except over a very long time. It is impossible to determine the spin rate directly. In fact it is a job for a computer, but this would require the recording of several telemetry cycles at various times. As far as individual operators are concerned, it is only expected that they comment on the length of the sweeps across the earth. In this case, "fast" might be about one second; four seconds would be "slow." An average statement for each of the three axes is necessary. Since computers do not take kindly to scientific information expressed in these terms, no columns have been provided on the telemetry form. A few words could be fitted in at the bottom of the sheet.

If you did not decode the telemetry but are interested in sending in signal reports that can be used for propagation experiments, leave the "telemetry" columns blank and complete the rest of the telemetry form. Also, if you listened for the satellite at the proper time but did not hear it, still send in a telemetry form, but place zeroes in the "readability" and "strength" columns. Valid negative reports are equally as important as positive ones for the propagation experiment described elsewhere in this issue.

Stations tracking Australis-Oscar 5 are requested to supply the following information on the reverse of the Telemetry coding form:

- (a) name and postal address of operator
- (b) call sign or station identification, and class of license (if applicable)
- (c) station latitude, longitude, altitude and other geographical details that might affect reception

(Continued on page 82)

Happenings of the Month

ELECTION NOTICE

To All Full Members of The American Radio Relay League Residing in the Atlantic, Canadian, Dakota, Delta, Great Lakes, Midwest, Pacific and Southeastern Divisions:

An election is about to be held in each of the above-mentioned divisions to choose both a director and a vice-director for the 1970-1971 term. These elections constitute an important part of the machinery of self-government of ARRL. They provide the constitutional opportunity for members to put the direction of their association in the hands of representatives of their own choosing. The election procedures are specified in the By-Laws. A copy of the Articles of Association and By-Laws will be mailed to any member upon request.

Nomination is by petition, which must reach the Headquarters by noon of September 20. Nominating petitions are hereby solicited. Ten or more Full Members of the League residing in any one of the above-named divisions may join in nominating any eligible Full Member residing in that division as a candidate for director therefrom, or as a candidate for vice-director therefrom. No person may simultaneously be a candidate for both offices; if petitions are received naming the same candidate for both offices, his nomination will be deemed for director only and his nomination for vice-director will be void. Inasmuch as all the powers of the director are transferred to the vice-director in the event of the director's resignation or death or inability to perform his duties, it is of as great importance to name a candidate for vice-director as it is for director. The following form for nomination is suggested:

*Executive Committee
The American Radio Relay League
Newington, Conn. 06111*

We, the undersigned Full Members of the ARRL residing in the.....Division, hereby nominate.....of..... as a candidate for director; and we also nominate..... of..... as a candidate for vice-director; from this division for the 1970-1971 term.

(Name Call City Zip Date)

The signers must be Full Members in good standing. The nominee must be the holder of at least a General Class amateur license, or a Canadian Advanced Amateur Certificate, must be at least 21 years of age, and must have been licensed and a Full Member of the League for a continuous term of at least four years at the time of his election. No

person is eligible who is commercially engaged in the manufacture, sale or rental of radio apparatus capable of being used in radio communications, is commercially or governmentally engaged in frequency allocation planning or implementation, or is commercially engaged in the publication of radio literature intended in whole or in part for consumption by radio amateurs.

All such petitions must be filed at the headquarters office of the League in Newington, Conn., by noon EDST of the 20th day of September, 1969. There is no limit to the number of petitions that may be filed on behalf of a given candidate but no member shall append his signature to more than one petition for the office of director and one petition for the office of vice-director. To be valid, a petition must have the signature of at least ten Full Members in good standing; that is to say, ten or more Full Members must join in executing a single document; a candidate is not nominated by one petition bearing six valid signatures and another bearing four. Petitioners are urged to have an ample number of signatures since nominators are occasionally found not to be Full Members in good standing. It is not necessary that a petition name candidates both for director and for vice-director but members are urged to interest themselves equally in the two offices.

League members are classified as Full Members and Associate Members. Only those possessing Full Membership may nominate candidates or stand as candidates; members holding Associate Membership are not eligible to either function.

Voting by ballots mailed to each Full Member will take place between October 8 and November 20, except that if on September 20 only one eligible



The New England Amateur of the Year award went to Arthur Ericson, W1NF, for his service as an eager member of the ARRL Intruder Watch. W1NF has been a member of the Intruder Watch from the very beginning, nearly four years ago, and has turned in an exceptional number of reports on intruders in the amateur bands. Division Director Robert York Chapman, W1QV, "did the honors" during the convention at Boston. (W1IME photo).

candidate has been nominated, he will be declared elected.

Present directors and vice-directors for these divisions are: *Atlantic*: Gilbert L. Crossley, W3YA and Harry A. McConaghy, W3EPC. *Canadian*: Noel B. Eaton, VE3CJ and Colin C. Dumbrille, VE2BK. *Dakota*: Charles G. Compton, W0BUO and John M. Maus, W0MBD. *Delta*: Philip P. Spencer, W5LDH/W5LXX and Max Arnold, W4WHN. *Great Lakes*: Alban A. Michel, W8WC and Charles C. Miller, W8JSU. *Midwest*: Sumner H. Foster, W0GQ and Ralph V. Anderson, K0NL. *Pacific*: J. A. Doc Gmelin, W6ZRJ and G. Donald Eberlein, W6YHM. *Southeastern*: Charles J. Bolvin, W4LVV and Albert L. Hamel, K4SJJH.

Full Members are urged to take the initiative and to file nominating petitions immediately.

For the Board of Directors:

July 1, 1969

JOHN HUNTOON
Secretary

some of the periods, the desired communications would be possible by the use of lower frequencies. Inasmuch as 7.0-7.1 MHz. has been allocated for exclusive use of the Amateur Radio Service on a world-wide basis, there are no reasons why the proposed amendment of Section 97.95(b) (2) should not be adopted. In fact, the League believes that the lifting of the present restriction on use of the band will be welcomed by radio amateurs throughout the world.

Respectfully submitted,
THE AMERICAN RADIO RELAY LEAGUE,
INCORPORATED

June 10, 1969

BY ROBERT M. BOOTH, JR.
Its General Counsel

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D. C. 20554

LEAGUE SUPPORTS RULEMAKING PROPOSALS

The League has registered with FCC its support of 7 MHz. maritime mobile operation (Docket 18506), A-1 emission at the low end of 144 MHz. for weak signal work such as moon-bounce or satellite communications, and RTTY at the low end of 28 MHz. (the latter two, both Docket 18508). The filings were ordered by the Board of Directors at its meeting in May. The texts follow:

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D. C. 20554

In the Matter of

Amendment of Section 97.95 (b) (2) of the Amateur Radio Service Rules concerning mobile operation

Docket No. 18506
RM-981

To: The Commission

COMMENTS IN SUPPORT OF PROPOSED RULE MAKING

The American Radio Relay League, Incorporated, by its General Counsel, submits the following comments in support of the proposed amendment of Section 97.95(b) (2) of the Commission's Rules and Regulations, to permit United States amateurs, when outside the jurisdiction of a foreign government, to operate world-wide in the 7.0-7.1 MHz. band.

At the present time, United States amateurs, when outside the jurisdiction of a foreign government, may operate in the 7.0-7.1 MHz. only when in Region 2, the Western Hemisphere, even though the 7.0-7.1 MHz. band is allocated world-wide exclusively to the Amateur Radio Service by the Geneva Radio Regulations.

Maritime and aeronautical mobile amateur operation has increased most significantly over the past few years. The ever changing propagation characteristics of the h.f. frequencies are well understood. There are substantial periods of time when frequencies above 14 MHz., the only frequencies now available world-wide to United States amateurs operating maritime or aeronautical mobile, are not suitable for desired communications. During

In the Matter of

Amendment of Section 97.61 (a) of the Commission's Rules concerning frequencies and emissions in the Amateur Radio Service

Docket No. 18508
RM-886
RM-950

To: The Commission

COMMENTS IN SUPPORT OF PROPOSED RULE MAKING

The American Radio Relay League, Incorporated, by its General Counsel, respectfully submits the following comments in support of the proposed amendments of Section 97.61(a) of the Commission's Rules and Regulations which would (1) shift the band in which only A1 emission may be employed from 147.9-148.0 MHz. to 144.0-144.1 MHz. (2)

OVERSEAS AND ABSENTEE BALLOTS

All ARRL members who are licensed by FCC or DOC but are temporarily resident outside the U.S. or Canada are now eligible for Full Membership. These members overseas who arrange to be listed as Full Members in an appropriate division prior to September 20 will be able to vote this year where elections are being held.

Even within the U.S., Full Members temporarily resident outside the ARRL division they consider home may now notify the Secretary prior to September 20, giving the current QST address and the reason why another division is considered home (e.g., holding an amateur call appropriate to the division). So if your home division is the Atlantic, Canadian, Dakota, Delta, Great Lakes, Midwest, Pacific or Southeastern, but your QST goes elsewhere because of a different residence, please let the Secretary know, as soon as possible but no later than September 20, so you'll receive a ballot for your home division.

Behind the Diamond



Let's start a rumor—we'll run this picture, see? Several of the members will say: "Burl Ives is *too* a ham; I saw his picture in *QST*!"

Actually, our candid camera caught **John R. Griggs, W6KW**, while he was reading a motion during the 1969 Board meeting. John has represented the amateurs of the Southwestern Division on the Board for eight-plus years—1949 through 1954 and 1967 to the present. He lives in Granada Hills (San Fernando), California and works as an electrical engineer for LPL Technical Services, Inc. Currently, LPL has

Number 17 in a Series

him designing multiplex entertainment systems for the DC-10 airbus at McDonnell-Douglas Aircraft Corporation, on a contract arrangement; he also works on intercom equipment for AWACS aircraft.

John is past chairman of the San Diego Council of Amateur Radio Clubs; past chairman, Southern California Chapter, Quarter Century Wireless Association, past president of the San Diego Amateur Radio Club, past vice president of the Inglewood Amateur Radio Club, a Chapter Life Member of ARRL, and liaison director for the new VHF Repeater Advisory Committee (see page 62, March *QST*). Way back, before the office of SCM was created, he was ARRL's "City Manager" for San Diego. First licensed in 1922, he used the calls 6CDV, 6CGG, BEZE and 6FYZ before getting W6KW in 1930. His wife Roxanna also is licensed—K6BLO.

One of Director Griggs' strong interests is in public and membership relations, reflected in his three years' consecutive service on the Board's Public Relations Committee. John practices what he preaches, too, by making sure his constituents know how he stands on the issues—on more than a dozen occasions in the past three years, the minutes have read: "Mr. Griggs requested to be recorded as voting in favor" (or "opposed," on other occasions).

permit A0, A2, A3, A4, A5, F0, F1, F2, F3 and F5 emissions in the 144.1–148.0 MHz. band, and (3) permit F1 emissions in the 28.0–28.5 MHz. band. Each of the proposed amendments was requested by the League in petitions for rule making submitted on November 17, 1965, and April 8, 1966.

Amateur propagation studies and long distance communications in the very high frequency (v.h.f.) portion of the spectrum usually are conducted by use of A1 emission. The signals are susceptible to interference because of their very low strength. The 1959 Geneva Radio Regulations assigned the 144.0–146.0 MHz. band exclusively to the Amateur Radio Service on a world-wide basis, and the 146.0–148.0 MHz. band exclusively to the Amateur Radio Service in Regions 2 and 3 and to the fixed and mobile services in Region 1. The 1963 Geneva Extraordinary Administrative Conference specifically authorized amateur satellite operation in the 144.0–146.0 MHz. band and removed from that band all reservations which had been noted in the 1959 Regulations.

Four amateur satellites have been placed in orbit to date, OSCAR I, II, III and IV. The Australis—OSCAR V is expected to be launched in the near future. Other amateur radio satellites are in various stages of planning and construction. Unfortunately, the present 147.9–148.0 MHz. band set aside for A1 emission cannot be used in Region 1. However, the proposed 144.0–144.1 MHz. band may be used world-wide. Canada already has set aside 144.0–144.1 MHz. for A1 only operation. The Amateur

Radio Service throughout the world will benefit by adoption of the proposed amendment.

In addition to the reservation of 147.9–148.0 MHz. for A1 emission, Section 97.61(a) of the Rules now permits A0, A2, A3, A4, F0, F1, F2, F3, F4 and F5 operation in the 144.0–147.9 MHz. band. A shift of the A1 band to 144.0–144.1 MHz. will require the shift of the other permissible emissions to the remaining portion of the band. Of course, A1 emission will continue to be permissible throughout the entire 144.0–148.0 MHz. band.

For reasons not apparent from the history of F1 (radio teleprinter) authorizations, such emission is not permitted in the exclusive telegraphy (A1) portion of the 28 MHz. band even though it is authorized in the exclusive telegraphy portions of the other high frequency (h.f.) amateur bands. The 28 MHz. band is most useful during certain periods for long distance communication, even with low power. Even though F1 emission now is authorized in the 29.0–29.7 MHz. band, the proposed shift of F1 emission to the 28.0–28.5 MHz. band will make the F1 authorizations compatible in all h.f. bands.

The Commission is respectfully requested to amend Section 97.61(a) as proposed in the notice of proposed rule making.

Respectfully submitted,

THE AMERICAN RADIO RELAY LEAGUE,
June 10, 1969
INCORPORATED
BY ROBERT M. BOOTH, JR.
Its General Counsel

SCIENCE CENTER GETS ARRL GRANT

Continuing the ARRL support for "space age" activities by hams (which dates back even before Project Oscar to the Geophysical Year), the League has made a grant of \$1500 to the Talcott Mountain Science Center for Student Involvement and the Talcott Mountain UHF Society. The funds will be used to install a 20-foot dish antenna on a motorized mount and otherwise help to equip WA110X, the Society station, for moonbounce and amateur satellite tracking; the aim is to be ready for Oscar V in the autumn. The grant fulfills a 1967 Board motion to establish a space communications facility at or near League headquarters, for which \$1500 was set aside.

The Science Center, perched on Talcott Mountain in Avon, Connecticut, aims to enrich the science programs of the school districts in north central Connecticut which contribute to its support. The UHF Society, associated with the center, is an ARRL affiliated radio club, numbering among its members several hq. staff members.

THE GRIDLEY (W4GJO) CASE

The million-dollar lawsuit by a neighbor against W4GJO claiming nuisance from TVI has been reported upon briefly in *QST* for April 1969, and since has been the subject of questions at almost every ham gathering. A brief report upon the current status of the case is appropriate.

W4GJO's neighbor employed a transistorized preamplifier mounted near the top of a tall mast or tower so as to receive TV stations far beyond their normal service area. The front end of the preamp was tuned by the elements of the TV receiving antenna. Under certain conditions, TVI was caused even when W4GJO was operating "barefoot" without a power amplifier on h.f. frequencies. The TVI Committee and the FCC's Field Engineering Bureau determined that most, if not all, of the interference occurred only when the preamp was in the circuit, and recommended corrective measures including filters. Instead of adopting the recommendation, the neighbor filed suit in the Circuit Court of

Florida in October 1968 alleging the maintenance of a nuisance and seeking (1) an injunction to prohibit using the station and (2) one million dollars in damages.

The neighbor also embarked upon a campaign to "stamp out" amateur radio by placing derogatory comments in certain of his business advertisements and making available auto bumper stickers critical of amateur radio. W4GJO promptly obtained an injunction prohibiting harassment of W4GJO and his wife.

Upon motion of W4GJO, the case was transferred to the United States District Court at Tampa, Florida, because W4GJO's license has been issued by an agency of the Federal Government. Later, the neighbor sought to have the case returned to the state court. W4GJO opposed. The United States District Court has not yet ruled upon the various motions and pleadings on the question of which, if either, of the Courts has jurisdiction.

In the meantime, W4GJO thought it best to move. Before the move, he had filed a suit for injunction and damages alleging harassment by his former neighbor. That case is to come to trial in the state court in the near future.

Predictions in lawsuits always are risky. At this time, however, W4GJO's chances of prevailing in both suits seem excellent.

The League's General Counsel, W3PS, has been in communication with W4GJO's attorney from the very outset. Future developments will be reported periodically.

AMATEUR RADIO WEEKS AGAIN

Amateur Radio Week again was observed in Florida June 15-21, 1969. The proclamation by Governor Claude K. Kirk, Jr., highlighted the giving of "time, talent and energies to provide emergency communications whenever and wherever needed. . . ." It also covered advancement of the art, international goodwill, the rehabilitation of the handicapped and message-handling for servicemen and explorers.

In Washington State, Governor Daniel J. Evans proclaimed September 1-7, 1969 as Amateur Radio Week, coinciding with Founders

WHO THE DEVIL IS WHO?

16th in a Series of Call Conversion Charts

Here are additional calls of amateurs taking advantage of new rules which allow Extra Class licensees licensed 25 years ago or longer to acquire two-letter calls. If you should be listed here, let us know by post card right away.

| <i>Now</i> | <i>Was</i> | <i>Now</i> | <i>Was</i> | <i>Now</i> | <i>Was</i> | <i>Now</i> | <i>Was</i> |
|------------|------------|------------|------------|------------|------------|------------|------------|
| W1NG | W1VXJ | K4KI | W4ZXR | K6PH | WB6EAM | W8JO | W8HBJ |
| W1NT | WA1JBK | K4KW | W4JH* | K6PI | WA6HPG | W8JQ | W8RXY |
| W1NU | W1OJR | W5KI | W5HHE | K6PO | W6LCU | W8DW | W8IWX |
| K2AK | W2LLQ | K6MT | W6ZRW | K6PP | WA6AOD | W6CV | W8HKA |
| W2FF | K2DCN | K6NB | WA6UNF | W7MG | W7AWD | W6JB | W8TKR |
| W2WQ | WA2JHD | K6NL | W6EGA | W7RC | K7MSP | W6KK | W8UPL |
| W3YL | W3K0I | K6OX | W6AIS | W8JD | W8JQG | W6KW | W8LVA |
| K4IB | K4RXG | K6FG | WB6MCM | W8TF | W8CXN | | |

*Correction from Dec.

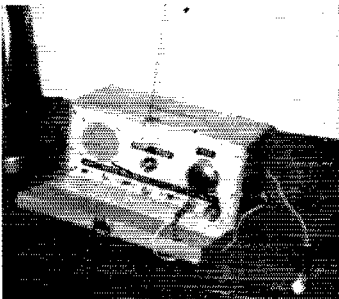
Week of ARRL, which honors Hiram Percy Maxim's birth on September 2.

The hamfest at International Peace Garden, North Dakota/Manitoba on July 12-13 prompted a declaration of the 12th to 18th as North Dakota Amateur Radio Week by Governor William L. Guy. The governor mentions scientific development, military communications, and natural disaster communications as achievements of the amateur service.

Bayonne, New Jersey, is a hundred years old, and part of its celebration includes amateur radio week September 12 to 21. A special centennial certificate will be sent to any amateur working a station in that city during that week; your QSL first, to the station you worked in care of WA2FUI, 62 Avenue B, Bayonne, N. J. 06002. Suggested frequencies are 60 kHz. inside the low edge of 80, 40, 20 and 15 meter phone or c.w. bands, plus 145.9 a.m. and 146.94 wideband f.m.

QST

Strays



Here is a photo of W9PSU's version of the "Connecticut Bond Box" which appeared in August 1968 QST, and in the 1969 ARRL *Radio Amateur's Handbook*. Bill has tailored his model of the 2-meter solid-state transceiver to CAP needs at Eagle River, Wis. Instead of mounting the case in an upright manner, as was done with the QST version, he uses the unit as shown. This permits under-dash mounting in the L4 aircraft. The lid of the box then serves as a tray. Bill added a headphone jack to the transceiver because ambient noise in the plane made copying weak signals with the loudspeaker somewhat difficult. At least two more of these units are being built by Bill's group. He reports good results from the transmitter p.a. stage despite a transistor substitution. He's using a 55-cent 2N5188 in place of the 2N3512 (\$1.08) used in the QST model.—WICER



Stack your equipment, cut the appropriate holes in perforated hardboard, add a frame, hang the shack clock and you have a neat and attractive operating console. This is the work of Bill E. Smith, W7SNY.



"A 500-Watt F.M. and C.W. Transmitter for 220 MHz." produced a month of May Cover Plaque victory for Richard B. Stevens, W1QWJ (center). New England Division Director Robert York Chapman, W1QV, makes the award while Hampden County ARA prexy Chester R. Kalis, K1LDT, beams approval. (WILL photo).



A recent ceremony in Memphis (Tenn.) honored the Memphis Eye Bank Net operators. Shown in the photograph receiving his recognition from Mrs. Sue Summer, the Memphis Eye Bank Secretary, is Frank Cassen, W4WBK. Other Eye Bank Net operators honored were WB4EQH and WA4YHO.



Correspondence From Members-

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

ASK DX TO QSY?

¶ Hiss! To the inconsiderate @!*\$ who ask a DX station to QSY to another band, e.g. for 5BDXCC. Rah for our side when the DX replies, "I work that band regularly. Tonight I'm on this band!" — *Tom Kloos, K8DHT, Hinckley, Ohio.*

EDITORIAL?

¶ Should *QST* have an editorial page? This is the ultimate issue that W6HAU indirectly raised in "Correspondence" (June, '69). After listening to you preach from your editorial pulpit on every matter under the sun, I ask why? Why are you on that pulpit? And just what responsibilities do you have to enjoy that privilege?

Unlike other ham-oriented magazines, *QST* is the major communication link between the ARRL and its members. It is, in fact, the log of the ARRL. For this reason the opinionated editorial page forms a quasi-official position for the entire League.

What gives the editor the right to use this communication medium as a platform for attempting to influence ARRL membership by presenting only one point of view? To say that "Correspondence" provides a counterbalancing survey of opinion is both insufficient and avoiding the question. Letters are usually limited to one specific issue; editorials provide a continuing and consistent expression of a single point of view.

As long as *QST* is determined to espouse disputable opinions to the League, it has a responsibility to provide equal presentation of a considerably different viewpoint. ARRL members should not be expected to look elsewhere to hear another approach toward controversial subjects. Not all hams can nor should be expected to fit into one mold of amateur opinion.

"It seems to us . . ." you say. But who is "us"? Is "us" the entire Board of Directors, all the ARRL officers — the names of whom conveniently appear opposite the editorial page? Or isn't "us" simply a few amateurs with an inordinate amount of influential power both over the League and the image the ARRL projects to non-League amateurs? — *Robert Podofinski, WB2MPE, Irvington, N. J.*

MORSE!

¶ While I congratulate Paul Traverse on his knowledge of American Morse signals (May *QST* Correspondence) and I realize that we already use didahdidah (American Morse comma and International Morse A-umlaut), I would avoid dahdahdahdit (American Morse exclamation point) because it is already the International Morse O-umlaut. I nominate the signal didahdahdahdit (JE) which now has no established significance I know of except in Japanese Kata Kana code. It is also the dual of our excellent maid-of-all-work dahdididididah (BT). For best effect I recommend that didahdahdahdit be keyed di-dah-dahh-dahhh-dit. — *Richard Loveland, WA3LAK, Philadelphia, Pa.*

¶ When the original U. S. Radio Law was enacted in 1912, the International or Continental group of character formations was established as the official code to be used for all radio telegraph communication, world-wide. The designation Continental code was derived from its prior use on the land telegraph lines of Continental Europe.

At that time this code did include the characters which now form the comma but which then were interpreted to mean an exclamation point . . . "dah dah dit dit dah dah." Some years later and apparently for no logical reason, a number of changes were made in the Continental code structure. What is now the period was then a comma; the period had been 'dit dit-dit dit-dit dit'. The exclamation point was eliminated and the characters formerly comprising it, became the comma as of now. To this day, the reason for such changes continues to mystify us who were pioneer wireless telegraph amateurs in 1912 and even prior thereto. [The period was changed because the old symbol produced III on printers — Editor]

Inasmuch as a comma is a seldom used punctuation in amateur radio telegraph communication, those of us who were active amateurs in earlier days have simply seen fit to ignore the comma and revert to the 'dah dah dit dit dah dah' to represent an exclamation, as it was originally designated.

As pointed out by Mr. Traverse, the exclamation point is a very useful character with which to emphasize a remark and we find it most convenient, so used. — *Howard S. Pyle, W7OE, Mercer Island, Washington.*

¶ I agree that the Morse exclamation point is the best solution.

Also, how about promoting the use of the simpler Phillips Code words, such as hvb for have been; hsb has been; wb will be; enh enough, etc.

Many of these are self explanatory and do not have to be learned.

It would certainly save a great deal of time on the c.w. bands. — *Ralph W. Johnson, W6PMH, Saint Helena, California.*

TECHNICIANS ON TEN

¶ For a long time it has seemed to me that the Technicians are the forgotten people of ham radio in the band frequency shuffle. I believe that a large percentage of techs are home brew builders and tinkerers, and that they should be encouraged to maintain their interest and curiosity in ham radio for the good of all radio. One way to do this would be to allow them to use a small portion of the upper end of the large 10-meter band so that they could participate in more reliable DX conditions.

By the end of this year when more of the lower end of 6 meters is allocated to Advanced and Extra Class license holders, everyone else using this band will be forced closer to TV channel 2. That will cause more TVI complaints and I don't believe anyone needs more of that!

The Techs have to pass a theory test which is similar to the General and they are competent and able to handle their equipment properly.

It would be nice to hear some discussion and see some action on this suggestion. I know that ARRL petitioned the FCC to keep the entire 6-meter band open for all classes but was turned down. However, the idea of Techs using a portion of 10 meters was not laid before them. — *R. L. Gardner, WB6VN, Riverside, Calif.*

[Editor's Note: See Minute 14, page 78, July QST for formal Board action.]

❑ I would like to disagree with a recent request to the FCC made by the Board of Directors at its annual meeting. The request is for Technician privileges on 29.5 to 29.7 MHz. of the 10-meter band. It seems to me that this is just the opposite of incentive licensing which the ARRL strongly stands behind. As of late the only ones getting any special frequencies allocated to them are the ones who get out and work for it. A good friend of mind and I recently passed our Advance Class exam with little or no trouble. The whole thing, which is fifty questions, took us about thirty-five minutes to complete. Thanks to the ARRL License Manual, I think the exam was even simpler than the Novice exam. In this day and age you don't get something for nothing, so I say let every operator, young or old, work his or her way up the ranks as all of us have done in the past. Being licensed just short of one year I am awaiting my Advanced ticket to come back and I have every expectation to go all the way for Extra Class when the waiting period is up. — *Phil McMillan, WA9ZAK, Galva, Illinois.*

❑ I have been talking with hams in this area about trying to get part of the 10-meter band allocated to the Technician Class for their use. It seems like a great idea and would sure help a lot in giving the Techs some more much needed working area.

Will you please add one more vote to this project as it certainly seems to be a well worthwhile move. — *Victor J. Carlson, WN8BUZ, Warren, Michigan.*

❑ I have been watching the developments of the incentive licensing program, along with other fellow amateurs. As a Technician I ask: Why not give us a chance at bettering ourselves? What would be the harm in allowing us to use at least part of one of the high frequency bands for c.w. practice? Anyone who has ever used the v.h.f. bands knows that inexpensive commercial gear for the v.h.f. bands has no provision for c.w. work. Also, these bands, for some reason or another, do not seem to be very well suited for c.w. work.

I am at least one of several Techs who is interested in bettering himself. As it works out I am probably a victim of circumstance. When I received my Novice license I had to wait six months to purchase a rig. Now I have three hundred dollars in a six meter rig and accessories, and would not like to let it sit and collect dust while I go back to the Novice position! Why not give us a chance? — *Thomas W. Herrick, WA9VJW, Roanoke, Illinois.*

MORE QST REMARKS

❑ In your Editor's Note under June's "Irregardless" item you split the infinitive 'to needle' right through the gizzard by the insertion of the adverb 'politely'! That ain't good grammar out in these here Missouri parts!

Boo-boos to date; Greenberg — 1; Editor — 1.

Nit-pickingly yours, — *John M. Collins, W0TEK, St. Louis, Mo.*

❑ Referring to the article, Get Off My Frequency, page 94 of May QST, this article drives home the point that each of us have the same right to the frequency as the other guy.

Fighting the QRM was a way of life with me. In my many tries for the Code Proficiency stickers, it taught me a good lesson that has stayed with me. When I am in QSO I stick it out! Adjust your receiver as best as you can and it generally always comes through. I am happy to be a member of that QRM fighting Fraternization Society. — *William Riley Clark, K5III, Houston, Texas.*

❑ As an introduction, may I state that I have held a General Class license since 1952, have been a League member for the past four years, and am currently active on the amateur bands.

I am writing to you regarding a bill which is now pending in Congress, S.J. Res. 27, which would allow aliens who have declared their intention of becoming United States citizens to obtain amateur radio operator and station licenses.

No doubt you are quite familiar with the facts surrounding this matter, so I will not dwell on them here. Suffice to say that the law, in my opinion at least, needs updating in view of the situation which exists under reciprocal licensing. Amateurs who don't stay may operate while here; those who do stay must wait five years!

I noted that this matter was given a little spot of space on page 65 of March QST. I believe that you should give it more treatment and even endorse S.J. Res 27 if at all possible. The League has not been noted for silence in matters concerning amateur radio and I feel that it should be heard at this time. The licensing of aliens who have decided to join us permanently seems like a wonderful way of swelling our ranks! — *Thomas W. Donohoe, W2NJS/WA2BC1, New York, N. Y.*

VISITING HQ

❑ Our visit to League Hq. by eight individuals of the Capeway Radio Club and also some from the Middlesex Amateur Radio Club, both of Massachusetts, certainly was gratifying.

The most pronounced remark: "If only all members and non-members could see how far \$6.50 a year goes and can do for all ham radio, there would be less moaning on the air." — *George Chant, W1RGH, Brookline, Mass.*

[Editor's Note: The League Headquarters building is open to visitors Monday through Friday, 8:30 a.m. to 4 p.m. EDT, without appointment or at other times by writing for arrangements.]

FLOWERS

❑ In renewing my membership, I consider the League to be the most important and the most influential driving force in amateur radio today. It is my opinion that if it were not for your efforts in our behalf, many of the privileges that we enjoy would only be dreams. Of all the magazines that are available to the amateur today, I sincerely feel that QST is by far the best. — *Robert C. Brock, K9OSC, Milwaukee, Wis.*

QST

**SWITCH
TO SAFETY!**



I.A.R.U. 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

RADIO SPORTS FEDERATION OF THE USSR

The following is a summary of a report on Soviet amateur radio, distributed at the recent IARU Region 1 Conference in Brussels:

"January 25th, 1925 is the birthday of Soviet amateur radio when Feodor Lbov from Gorky established the first radio contact with Mesopotamia on his amateur station R1FL.

"For the past 44 years amateur radio and radio sport in the USSR were practiced on a large scale. In 1925 *Amateur Radio* magazine had 30,000 copies, but *Radio* magazine has now 1,000,000 copies in 1969.

"The *Radio Sport Federation of the USSR* has 114,000 members. There are 720 radio clubs, about 36,000 radio circles at schools, institutes, factories, plants, collective farms, 16,100 stations

(among them 9000 collective stations) operating in the USSR. In only 1968, the Soviet amateurs had over 3,500,000 contacts. In 1968 the QSL-cards exchange totalled 2,500,000.

"For the last 10 years amateur radio has received an especially wide spread of interest: s.w. and u.h.f. contests, RTTY contests, combined radio contests and "fox hunting" (transmitter hunting).

"Amateur radio is included into the National sporting classification together with such sports as soccer, hockey, volleyball, basketball, etc. The best radio sportsmen are awarded the title: 'Master of Sport of the USSR International Class.'

"Every year the USSR Championships in 5 categories of radio sport are held. The champions are awarded the Gold, Silver and Bronze medals. In the National pioneer camp named after V. I. Lenin in Artek (Crimea), the championships among young amateurs (12-15 years) are held. "In 1968 there were held 17,890 different radio contests with the participation of 360,000 operators. The RTTY contests were most popular. The 'fox hunting' contest attracted 15,000 persons (3560 women included).

"During past years the international contacts of Soviet amateurs has considerably increased. C.w. operators and 'fox hunters' participate actively in the majority of International contests.

"Many foreign amateurs are in possession of the diplomas of the *Radio Sport Federation of the USSR*: R-150-S, W-1000, R-6-K, R-100-0, R-15-R, "Cosmos." Every year, hundreds of amateurs of the world participate in the traditional international contest held by the Central Radio Club of the USSR, "CQ-M."

"The names of the Soviet operators Vladimir Semenov, UA9DN; Vladimir Goncharsky, UB5-WF; Georgy Roumiantsev, UA1DZ; 'fox hunters' three times European Champion, Anatoly Grechikhin, UA3TZ; Genij Solodkov; c.w. operators, Karl Kallemaa, UR2BU; Vaitas Shimonis, UP2ON; and, many others are well known throughout the world.

"Designing equipment is quite popular among the Soviet amateurs. Different exhibitions of amateur-designers are held annually in the regions and republics of the Soviet Union. In 1968 there were 58 radio exhibitions with 16,200 different radio electronic devices displayed. 400,000 persons attended the exhibitions. 460 best exhibits of the local displays were shown at



6 Июнь 1968

РАДИО

Простые и сложные схемы • Вопросы и ответы •
 Радиотехника в школе • Радиотехника в
 труде • Энергетический радиостанция • Техно-
 логия радиотехники • Радиолюбительская
 техника • Радиолюбительские выставки • Радио
 любительские организации СССР и зарубежных стран

Hidden transmitter contests called "fox hunts" are very popular among Soviet amateurs. Here, an amateur hot on the trail of the "fox," is pictured on the cover of the magazine *Radio*.



The entire VS6 amateur population is shown in this photograph! The occasion was the 1969 annual dinner of the Hong Kong Amateur Radio Transmitting Society. (Photo via VS6AA.)

the Twenty-first National Exhibition of Amateur designers. The Exhibition was hosted by the Ministry of Communication of the USSR, Ministry of Radio Industry of the USSR, Ministry of Electronic Industry of the USSR, National Exhibition of Industry and Agriculture, and the *Radio Sport Federation of the USSR*. In 1963 the Soviet amateur designer, Doctor of Medicine, Ivan Akulinchev was awarded the Columbus Medal for the implementation of electronics into medicine."

FRENCH ANTENNAS PROTECTED

French amateurs have solved the problem of gaining permission to erect an amateur antenna when living in an apartment. Through the work of the *Reseau des Emetteurs Francais* by R. Brochut, F9VR, a law was passed by the National Assembly which forbids the proprietor of an apartment building from opposing the installation of amateur antennas!

The following is an extract of the exposition by F9VR which was published as the reasons for the law:

"Banded together since 1925 in a national association, the *Reseau des Emetteurs Francais*, an association recognized as a public service, amateurs have lent their cooperation and assistance voluntarily. Under certain circumstances, they may very well be the *only ones* able to transmit the messages on which human lives depend. For example, they gave their services during the catastrophes at Frejus and Agadir; two thousand calls were retransmitted by their means between Agadir and France, there being absolutely no other means of liaison. The "Emergency" Network created by the *REF*, which involves for such purpose, all the amateurs voluntarily, was recognized by the Disaster Relief Organization as the organization with which it cooperates each time that the authorities make an appeal.

"The French radio amateurs also assure a real educational interest by arousing in young people an interest in pursuing the vocation of electronics. The *REF* has set up or encouraged during the last four years, some one-hundred youth groups throughout France. This action motivated its recognition by the Secretariat of State for Youth and Sports on July 6th of 1964. The *REF* has been recognized since 1946 as preparation for military service by the Ministry of the Army.

"Finally we cite the participation of the French radio amateurs in the interest of scientific research; it was radio amateurs, one French and one American, who demonstrated the possibility of using short waves through the first link across the Atlantic in 1923. National and international scientific organizations have called on radio amateurs both as standby and voluntary observers. Those from France are distinguished in the study of and the propagating of waves in space; three radio amateur satellites built in the United States have been launched and are the origin of absorbing experiments and observations. France is the holder of many "first" liaisons on very high frequencies and of global records."

NOTES

Sweden and the United States have concluded a reciprocal operating agreement. The U.S. now has 41 such agreements with other countries of the world; a complete list appears on the adjacent page in this column.

In June *QST*, Thailand was erroneously omitted from the "DX Restrictions" list. It remains illegal to work HS stations. See complete list on the next page.

The Department of Transport, amateur licensing authority in Canada has changed names. It is now called the Department of Communications.

On the occasion of the 25th anniversary of the liberation of the Polish People's Republic, the Polish Postal authorities have given special permission to amateurs to sign the prefix 3Z from July 22, 1969 to July 22, 1970.

DX OPERATING NOTES

Reciprocal Operating

(**Bold face** indicates changes since last list.)

United States Reciprocal Operating Agreements currently exist *only* with: Argentina, Australia, Austria, Barbados, Belgium, Bolivia, Canada, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Finland, France, Germany, Guyana, Honduras, India, Indonesia, Ireland, Israel, Kuwait, Luxembourg, Monaco, Netherlands, Netherlands Antilles, New Zealand, Nicaragua, Norway, Panama, Paraguay, Peru, Portugal, Sierra Leone, Surinam, Sweden, Switzerland, Trinidad and Tobago, United Kingdom and Venezuela. Several other foreign countries grant FCC licenses amateur radio operating privileges on a courtesy basis; write headquarters for details.

Canada has reciprocity with: Bermuda, France, Germany, Israel, Luxembourg, the Netherlands, Nicaragua, Norway, Senegal, Switzerland, United Kingdom, U.S. and Venezuela.

Third-Party Restrictions

Messages and other communications — and then only if not important enough to justify use of the regular international communications facilities — may be handled by U.S. radio amateurs on behalf of third parties *only* with amateurs in the following countries: Argentina, Barbados (only U.S. stations/: 8P) Bolivia, Brazil, Canada, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Greenland (XP calls only), Haiti, Honduras, Israel, Liberia, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay and Venezuela. Permissible prefixes: CE CM CO CP CX EL HC HH HI HK HP HR LU OA PY TI VE VO W or K/SP XE XP YN YS YV ZP 4X and 4Z. Canadian hams may handle these same type third-party messages with amateurs in Bolivia, Chile, Costa Rica, El Salvador, Honduras, Israel, Mexico, Peru, U.S. and Venezuela. Permissible prefixes are: CE CP HR KOA TI W XE YS YV and 4Z.

DX Restrictions

U.S. amateurs licenses are warned that international communications are limited by the following notifications of foreign countries made to the ITU under the provisions in Article 41 of the Geneva (1959) conference.

Cambodia, Thailand and Vietnam forbid radio communication between their amateur stations and such of other countries. U.S. amateurs should not work HS XU XV or 3WS. Canadian amateurs may not communicate with Cambodia, Laos, Thailand, Vietnam and Jordan. Prefixes to be avoided are HS JY XU XV XWS and 3WS.

Years ago, W9AST, W9GUX and Andy I were inseparable buddies. Subsequently, V passed away. Later, Andy purchased the ham from the widow. Recently, W9GUX gave J youngest son the Novice exam. His new WN9AST! The first QSO . . . with W9GUX as it was many years ago between W9AS W9GUX.

The Post Office Department promises faster service with the new Zip codes. Use yours where you write League Headquarters. Use ours, too 06111.



In the States, 160 Meters has one prophet, and his is Stewart Perry, W1BB. A special award recognizing Stew's tireless efforts is here presented by Robert Chapman, W1QV, New England Division director.

Obtaining Data From Australis — Oscar 5

(Continued from page 72)

- (d) brief description of v.h.f. equipment such as antenna (type, gain, height and mounting), preamplifier, converter and receiver
- (e) brief description of h.f. equipment such as antenna (type, gain, height and mounting), type of receiver
- (f) brief description of method used to determine the telemetry.

Send amended information whenever a major change is made in your equipment, together with the date of the change.

Reports from North and South America should be sent to Amsat P.O. Box 27, Washington, 20044; reports from Europe or Africa go to Browning, G2AOX, 47 Brampton Grove, Hemel Hempstead, London N.W. 4, England. Reports from the rest of the world go directly to Project Australis (Telemetry) Union House, University of Melbourne, Parkville, Victoria, Australia, 3052.

Those filing valid reports of reception of Australis-Oscar 5 will be sent an attractive certificate of appreciation worthy of hanging in any ham's home.



YL news and views

CONDUCTED BY LOUISE RAMREY MOREAU,* WB6BBO

17th Annual Mid-West YL Convention

A CONVENTION is memories. It is memories from the first committee meeting when the suggestions start, and the basic outline is roughed out. As the plans begin to take shape they are governed by: "Oh we can't do that, remember they used it at . . . ?" or, "As I recall no club has ever used that theme. . . ." It is the memories of other conventions that are the lure that brings people back each time, and those with whom we have shared our experiences, because they were unable to attend, are attracted because of those memories.

For the past 17 years the Mid-West YL Convention has created countless memories for a great many women. This annual affair was started for the ladies who are amateur radio operators in the central area of the country, with the main participation being from Ohio, Indiana, Illinois, Michigan, and Wisconsin. Each May these gals gather to meet with those whom they have met in the many YL nets during the year. Ontario is a part of the central area of the continent, and this year the Ontario Trilliums invited us to cross the line into Canada to be their guests. So for the first time in the 17-year history of these conventions we were the recipients of

*YL Editor QST, Please send all news notes to WB6BBO's home address; 1036 East Boston St, Altadena, Calif. 91001.



Saturday night Banquet. Bert Titmarsh, VE3FPJ, guest speaker.

the warmth and hospitality of our Canadian neighbors.

For those 55 women who attended the memories will include representation from IARC, HAWK, TASYL, BUCKEYE BELLES, PENNJERSEY YLS, WAYLARC and YLRC/LA in the United States, and the TOTS, Sparkettes, and CLARA in Canada, and of course YLRL, and the YLISSB.

We will remember the unique and inspiring invocations from Sister Mary Cletus, WA0JIE, at each of the gatherings; the intimate eat-and-chatter of the small groups at each table; and



17th Annual Mid-West YL Convention, Toronto, Ontario.



Saturday luncheon, head table: Left to right VE3CLT, VE3GJH, VE1AKO, VE3FUR, VE4ST, VE3BBO, VE3GSW, VE3ASZ.



Outstanding Service to Radio Award presented VE3GNN, to Jack Foxall, VE3APN, for his assistance teaching radio to the blind.



VE3BBO, Doris Cody. Hard-working chairman of the Mid-West YL convention. Licensed in 1963, Doris enjoys rag chewing, DX, holds membership in TOT, CLARA, YLRL, ARRL, and is an associate member and assistant treasurer of NIBS. Her dream is to earn more certificates, now that convention is history.

those favors unlike any we have received before. The pajama party that became a YLRL "Howdy Days" with no log to submit, no score to total, just YL meeting YL in the friendliness of the hospitality room for as long as we could keep our eyes open. There are the memories of Saturday with shopping sprees for those who wanted to take home souvenirs, and tours of the city conducted by the OMs who loaned their cars and their time to show us Toronto, in spite of the clouds and drizzle.

It is a memory of the OMs suddenly appearing for the banquet, and the presentation of awards for the selfless giving of time and skill in the service to others. To Jean and Dave Evans, VE3DGG, and VE3BAR in recognition of their assistance to the blind operators. To Jack Foxall, VE3APN, the Outstanding Service Award, for his great contribution of teaching radio to the

blind. The citations for each of these awards exemplifies the definition of Public Service — act of kindness, or assistance to others. There that moment when the hardworking chairman VE3BBO "lost her cool" when she was presented a gift for the tremendous effort she had put into this convention.

It was Highland Flings, and a "Mod" music group, it was VE3BII, Jan, taking us on a music tour of Canada from the Atlantic to the Pacific and into "the night that was 40 below," of Yukon. It was prizes for *everybody* who came and souvenirs, and the gracious hospitality of YLs from Canada that was as wonderful, as wide as VE-land itself.

For those of us who were fortunate enough to cross the line there was one added benefit that to now only our VE women have enjoyed. Those three brief days when we went on the air from the club station, or operated our own equipment with the DOT license, and talked to the gang in our home towns, all of us were proud and that too, is something special to remember.

YLRL Harmonics Directory Issues

Members of YLRL will find a "new look" in the coming Directory Issue of *Harmonics*. This year's usual format has been changed from the limited listing of call, name, and address, to a more personalized form with a little more detail about each member. This is the result of a questionnaire that was in the May-June issue of *Harmonics*, and the result will give the members a "Who's Who" of YLRL.

Copies will be issued to the membership on request and will be sent to new members as long as the supply lasts.

1969 MINOW Net officers

The MINOW net announces the officers for 1969 are:

| | |
|---------------------------------|-----------------------|
| President | Jessie Brabb, K7TWQ |
| Vice-president | Ethel Devish, W7WLL |
| Secretary-Treasurer | Joan Gallaher, WA7BII |
| Permanent Certificate Custodian | Freida Raymond, K7E |



MINOW Net members who attended the 1969 summer picnic are left to right: front row: WA7KHB, W7IXR. Back row: K7UBC, WA7LOQ, K7RAM, W7FDE, WA7BDD, K7PVG.



OMs of MINOW Net members attending the picnic were. Front row, left to right: WA7GCW, K7RAO, K7PVF, W7FPP, WN7JLX. Back row: W7ZCE, WA7BDC.

The net, which is an on-the-air club covering Montana, Idaho, Nevada, Oregon, and Washington, meets each Friday on 3.913 MHz., at 1600 GMT, and later that day on 14.313 MHz. at 1830 GMT. Both sessions of the net welcome any YL who would like to participate.

DXCC The Hard Way — 100% YL

In this era of high power, and beams, and s.s.b., we tend to forget that it is quite possible to chase DX with less than 100 watts, and an end-fed antenna with DXCC as the result. If one person can do it it is Howy, W2QHHI. Not only does he hold DXCC made in the usual fashion, but he recently submitted the confirmation of contacts with YLs in 103 different countries! There is no existing certificate issued by either ARRL or by YLRL to acknowledge this particular achievement, unfortunately.

It is believed that W2QHHI is the first operator to make DXCC-YL. "YL News and Views" offers congratulations to him. By the way, he recently received a sticker for YLCC-1600!

Pam Rathmell, WA1FSI/ DJØUT

Walk into the examing room with sweaty hands, and a head whirling with facts, and take the Extra-Class test. Float out on Cloud 9 because you have passed and find that the OM was so sure you would that he spent your hour of agony having a special pin made reading "WA1FSI — Extra Class." That's what happened to Pam.

Both she and the OM, Jack, WA1FSH/DJØUS, were licensed in December 1965. While still in the United States she became very interested in traffic work, and got her feet wet first in the Eastern Massachusetts Novice Net. Later, she became affiliated with the Eastern Mass c.w. Net, but even though she had "graduated" to EMN, Pam had a soft spot for the Novice who was struggling with the strict rules and foreign language of traffic operation, and continued as NCS on the Novice Net.

The trouble with NTS operation is that it is like eating peanuts and the traffic people keep wanting more and more, as Pam found out when she was keeping 19 skeds in NTS as either liaison to another net, or as NCS. Before she left for West Germany she was active in one or both these capacities on the

Novice Net, EMN, 1RN, and EAN. But with all that activity she has never made BPL, due mainly to her preference for net control assignments. While Pam does enjoy DX and rag chewing, her real love is traffic. Or, as she puts it "There is nothing so satisfying as having the job of directing a smoothly working team and getting the traffic cleared in record time."

A member of ARRL, Rooster Net, EMNN, EMN, 1RN, EAN, as well as Wellesley ARS, and President of AROA, before she went to Germany, she holds RCC, CP-25, ORS, and that very special Amateur Extra Class License. She keeps regular skeds on 20-meter fone with friends in the U.S.A. using, of course her DJØUT call.



Pam Rathmell, WA1FSI/DJØUT.

Strays

Feedback

The announcement of the proposed YL c.w. net in June "YL News and Views" should have identified WA4BVD as Carrie Lynch, not Carol.

The reference to Miss Sugita, listed as Japan's only YL in 1934, shows her call as J21X. The correct call should be J2IX.



Nate Hallenstein, W1JMA, retired FCC Engineer-In-Charge at Boston, receives a silver pitcher from FEMARA, delivered by Bill Grenfell, W4GF who is Chief, Rules and Standards Branch, Amateur and Citizens Radio Division, FCC. The ceremony took place during the 1969 New England Division Convention at Boston, of which FEMARA is sponsor. (W1IME photo).



For its participation in the Illinois Sesquicentennial celebration during 1968, the American Radio Relay League received a citation from the Governor of Illinois, the Hon. Samuel H. Shapiro. Ed Metzger, W9PRN (left), vice director from ARRL's Central Division, passes the award on to President Robert W. Denniston, WØDX, while Ed's "boss," Director Phil Haller, W9HPG, looks on.

The famous old New Ocean House (sic!) at Swampscott, Massachusetts, burned to the ground on May 8, 1969, just two weeks before the New England Division Convention. In that short time, the convention committee moved the whole show over to the Statler Hilton in Boston, and caused it to run off smoothly. In appreciation, New England Division Director Robert York Chapman, W1QV (center), presented special citations to (from left) Eli Nannis, W1HKG, Mac McCormack, W1KCO, Gene Hastings, W1VRK and Don Poulin, W1MXC.



The March Cover Plaque award went to George Schleicher, W9NLT, for his article, "Phone Patching — Legitimately." Phil Haller, W9HPG, director from the Central Division, congratulates the author. (W9QKE photo).



The February QST story, "A Transmitting Converter for 50 MHz.," won the Cover Plaque award for its author, H. Gordon Douglas, W8PMK (right). Presentation was by the Great Lakes Division Director Alban A. Michel, W8WC.





CONDUCTED BY BILL SMITH,* K4AYO

Beginning Moonbounce—101

EACH month we receive letters from prospective moonbouncers inquiring for reference material, and hints how to begin their e.m.e. project. In this column for January, February and March 1968 appeared a three-part series by K6MYC, designed especially to answer the most common questions. For those who do not have these issues, we'll paraphrase some of the highlights this month, but suggest you obtain the originals from a friend, or ARRL Headquarters at the nominal fee of 75 cents each.

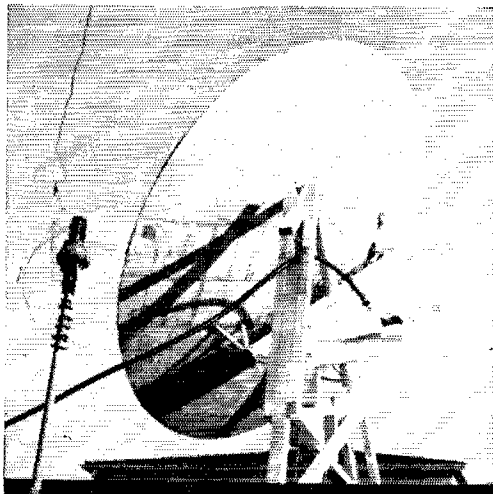
Basically, this is what is required: 500 watts or more of transmitter output, the best possible receiver front end, a bigger antenna than most of us will ever erect, the means of aiming the array at the moon, and much perseverance. All, but the latter, may be store-bought, if you're so inclined.

Lets look at each. The transmitter power is easily acquired at 144 MHz., the most popular e.m.e. band, 220 MHz., where apparently there is no active e.m.e. work, and at 432 MHz. 1296 and up are progressively more difficult. There are numerous transistors capable of achieving the necessary noise figure at 144, many in the one dollar price range. The picture doesn't change too much at 432; at 1296 the device will cost 10 dollars or more.

The antenna, its type, size and aiming, may be considered together. Success has been had with collinears, Yagis, rhombics and dishes, or parabolic reflectors. The most popular, because it is tolerant of less-than-optimum amateur construction techniques, is the collinear. K6MYC designed, and later discussed in the April, 1967 edition of this column, a modification of a commercially available collinear. The modified version of that antenna is now on sale. At 2 meters, it is probably the best available commercial antenna.

Both SM7BAE and ZL1AZR, who together hold the world's 144-MHz. e.m.e. record, use multiple-Yagi arrays. Another promising 2-meter Yagi array was described by Oliver Swan at the recent West Coast V.H.F. Conference. In tests at K6MYC, a four-bay array of these Yagis, spaced 80 inches both horizontal and vertical, recovered the same amount of e.m.e. signal from K9MQS as did a 40-element collinear array. Physically the collinear array is about three times as large as the Yagi array. Details of this antenna will appear soon in *QST*.

*Send reports and correspondence to Bill Smith K4AYO, ARRL, 225 Main St., Newington, Conn. 06111.



Mounted on the roof of his Los Angeles home, this is the homemade dish of WB6IOM. He used this dish to successfully work G3LTF and establish a new 1296-MHz. moonbounce record. The 16-foot diameter dish consumed 450 square feet of sheet aluminum and 70 pounds of epoxy to bond the aluminum sheets. (WB6IOM photo)

Rhombics, used with much success by VK3-ATN and K9MQS, are capable of developing gain in excess of 30 db. over isotropic. Their disadvantages are physical size (several hundred feet in length) and fixed direction, except in the case of VK3ATN who varied the direction a few degrees by a pulley and track arrangement. Rhombics are not feasible at the average city amateur location.

The parabolic reflector, more commonly known as a "dish," is essentially a low-efficiency antenna, something in the order of 35 percent. In addition, because of its physical size, especially at 144 and 432, it is not practical for the backyard e.m.e. enthusiast. However, at 1296 and higher, good gain can be developed from a modest size dish. A picture of WB6IOM's 16-foot dish, used in establishing the world's e.m.e. distance record on 1296, appears elsewhere in this column.

Even more important is how you aim the array. It matters not how much gain the array has if it can not be aimed at the moon. Three systems are available; fixed position, partially steerable (polar mount), and fully steerable. A fixed-position array is the simplest to build. You have only to determine the place in space where the moon will travel through the array's pattern at a given time, and fix the array in that

position. This method, however, limits the time each month the moon will pass through the antenna's pattern, and who you can work because of matching the "window." The window is a mutual place in space where antennas at both stations are pointed at the moon simultaneously.

The partially steerable, or polar mount, antenna is especially suitable for e.m.e. work. It needs to be set only once daily for declination (the angle in degrees north or south of the celestial Equator, or elevation angle) and then rotated in azimuth (horizontal plane) to track the moon. The moon travels across the sky at approximately 15 degrees per hour.

A fully steerable array, in both azimuth and elevation (az-el mount), is more flexible for use on other propagation modes, but is difficult mechanically to construct and calibrate for e.m.e. purposes. This is the most desirable type for satellite work.

All right, we've thrown out some facts; what do they boil down to? For the e.m.e. neophyte I'd suggest the following, and you e.m.e. greybeards may sit back and stroke them. Try 144 MHz., there is more activity, and technically 2 meters is more easily achievable. Construct a collinear array of at least 160 elements. That puts you into the 20-db. gain e.m.e. ballpark. Mount the array in a fixed position, taking into consideration who you wish to schedule. The mount may be modified at a later date to a polar configuration, after you become more familiar with e.m.e. techniques.

Much of this discussion may be directly applied to satellite programs, hopefully to soon again grace the amateur horizon through the Amsat and Nostar projects. E.m.e. and satellite work is within the grasp of many of us. As K9MQS recently said, "if I can work e.m.e., anyone can." What Dick said is true — if you have the perseverance to put the system together, and stay with it until it works. You still can't buy that!

— • • • —

Here is the first installment of the f.m. and repeater news mentioned in QST last month on page 92. With your help this monthly section will present a lively account of info on new repeaters, operating news, "how-to-do-it" items, etc. If you have a contribution, we'd like to hear from you!

First Aeronautical Amateur Radio Repeater

Most amateurs interested in f.m. activity on the v.h.f. bands have at one time or another thought of setting up a repeater station. The main objective is to locate the repeater in the best possible v.h.f. location, for the primary purpose of extending the reliable range of mobile and low-powered portable stations.

In addition to location, other factors enter the picture. Equal transmitting and receiving range is

important. This usually requires that effective antennas be used, mounted in such positions as to prevent desensitization of the receiver by the transmitted signal. Some sort of high-Q filter arrangement is often needed to assure this. Last, but not least, if we are to foot our own bills, we must do all these things without using too much power.

Early this year, when the Buffalo Amateur Radio Repeater Association was asked to participate in the Rochester Hamfest, this looked like a fine opportunity to have some fun, and to publicize our f.m. activity. We planned to set up a repeater, and man a booth to show off our mode of operation. Then K2ISO came up with an exciting idea: why not fly the repeater in an aircraft. We decided to try it, so K2GUG headed up the technical crew, while K2ISO started work on the cavities for use in the duplexer system, and made his aircraft available.

The points mentioned above take on special meaning in connection with an airborne repeater, and there are the additional considerations of size and weight. There is not much room in a light plane (Cessna 180) for either equipment or antennas, so one antenna would have to do. A W-wave whip was mounted just ahead of the rudder, and the "magic ring" duplexer system was installed.¹ The repeater used the receiver and exciter stages of a GE TPL. A homebuilt preamplifier with a pair of 2N4416 FETs, used ahead of the receiver, brought its sensitivity to about 0.28 μ v. for 20-db. quieting. The power amplifier ran about 15 watts output. The entire system was transistorized, for minimum size and power drain. The "cream on the cake" was an automatic call-signer, all transistors and flip-flops.

The system was flown several times before the big day, and at 10 A.M. May 10, the little blue-and-white Cessna took off from Perry-Warsaw Airport. Soon mobiles on their way to the Hamfest were in contact all over the Western New York area, through K2ISO/ aeronautical mobile, repeater. Stations as much as 450 miles apart, running relatively low power, were able to talk to each other, and the day was a fantastic success. Not many of the big crowd at the Rochester Hamfest now need to be told what a repeater can do!

The success of the effort just goes to prove that when a good team works together a big job can be made relatively easy. Many contributed to the effort, including K2ISO, pilot; WB2QDA alternate pilot; K2GUG, operator; and hard workers W2EUP, WA2WVK, K2ZVD, WA2HKS, and WA2MSV.

If anyone needs a mobile repeater, even in an aircraft, call us in Buffalo. Maybe we can help! — K2GUG

Recommendations of the ARRL Advisory Committee on V.H.F. Repeaters

Prior to the Annual ARRL Board Meeting in May, the chairman of the Advisory Committee on V.H.F. Repeaters, Taylor S. Shreve, W0CXW, had received detailed comments and recommendations from most of the Committee members, and from clubs and individuals over a wide area. These ideas he summarized in a detailed report to ARRL Director John R. Griggs, W6KW, the Board's ex-officio member of the Advisory Committee.

This report recommended standardization of language used in any new FCC regulations governing amateur repeaters, to agree, wherever practicable, with that already used in the rules relating to commercial repeater practice. This would include

¹ Boelke, "Hybrid Loops: Magic Rings for Repeaters," *F.M.*, Vol. 2 No. 6.

additions to Part 97.3 of the regulations defining amateur base station, operational fixed relay station, fixed control station, mobile relay station, open repeater, closed repeater and manual repeater.

Under Part 97.43 of the regulations, waiving of the requirements for an operator on duty, continuous monitoring and detailed logging would be requested. That portion requiring control on 220 MHz. or higher would be waived for mobile stations but not for fixed control and relay stations. The use of continuous subtones (75 to 200-Hz. range), single-tone bursts and/or multiple-tone devices for the controls required for remote operation of repeaters would be authorized.

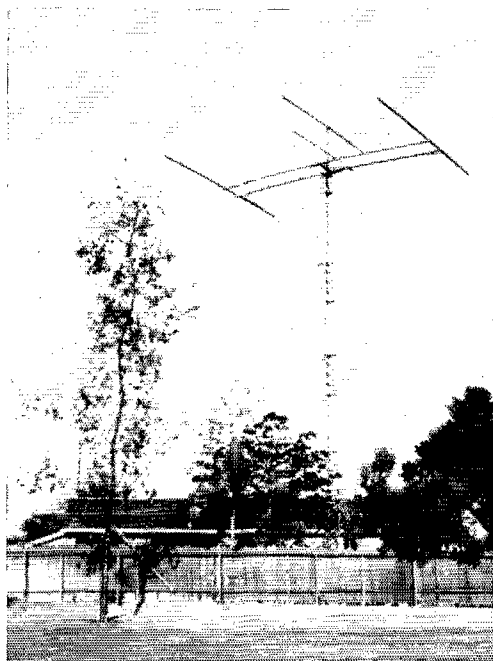
Under Part 97.87, identification by automatic or manual means, using voice or telegraphy would be authorized, in accordance with the 10-minute rule. More frequent identification would be permitted if the licensee wishes. The licensee would be held accountable for proper identification of the repeater for any operation in which he is directly responsible. Users of the repeater would be responsible for identification and logging of their transmissions, and would include in their logs data as to the unattended facility used.

The unattended repeater would require a facilities maintenance log, which would include all customary logging procedure for amateur stations, date and time of any adjustments or changes, and the name, call and license grade of any amateur performing the maintenance. This log would be retained in the station to which it pertains.

It was further recommended that ARRL Headquarters establish a detailed file on v.h.f. and u.h.f. repeaters, with helpful information on frequencies, modes and other facts relating to repeater operation to be published in QST. A study of operating methods, with a view to improving the overall effectiveness of repeater operation by amateurs was recommended. — *W1HDQ*

50-MHz. WAS

With sporadic-E skip peaking this time of year, most 6-meter men are checking their states-worked records in anticipation of making that long-sought



We've all heard it, here is where it comes from. That is the potent 50-MHz. signal of W6ABN. The vertically polarized 9-element Yagis are built on 30-foot booms and spaced 34 feet apart, 66 feet high. The two horizontal antennas are a 7-element 21 foot 6-meter Yagi, and a 4-element 10-meter Yagi. Stan says the vertical array gives consistent 1 to 2 S-unit reports over the 7-element Yagi on f-layer openings.

WAS. If you're one of the rare lucky ones to knock off his last remaining state on 6 this summer, here is how you apply for the special ARRL wallpaper that commemorates your achievement.

First, you must have properly made-out QSLs from each of the 50 states. Be sure that they indicate 50-MHz. two-way communication. Cards from Alaska and Hawaii must indicate contacts made since these two became states, and they must not be marked over or altered in any way. Contrary to widely-help opinion, cards do not have to carry a postmark.

The 50 cards should be mailed to ARRL Headquarters, with a covering note enclosed calling attention to the fact that a 50-MHz. award is being applied for. The volume of WAS applications is very large, and your prized 6-meter cards may bring you only a routine WAS Award if you don't emphasize the 50-MHz. angle.

Though our WAS box shows awards issued for 48 and 49 states, these are no longer issued. You must have all 50. 50-state certificates are not issued to holders of 48- or 49-state awards, but if you have a 48-state certificate and you work your 49th or 50th, let us know and we'll add the necessary asterisks to your listing.

Michigan V.H.F. Conference

For the past fourteen years the Western Michigan University Departments of Physics and Engineering Technology has sponsored this conference. The 1969 edition is scheduled for October 4, in Kalamazoo.

50 MHz. WAS

| | | | |
|------------|------------|------------|------------|
| 1 W8ZJB | 22 W53FW** | 43 W6ABN* | 64 W7ACD |
| 2 W8BJV | 23 W0ORE | 44 VE3AET | 65 K6PYH* |
| 3 W0CJS | 24 W9ALU | 45 W9JFP | 66 W4HOB |
| 4 W5AJG | 25 W8CMS* | 46 W9QIN | 67 K6JJA |
| 5 W9ZHL | 26 W0MVG | 47 W0WVN | 68 K6KNQ** |
| 6 W9OCA | 27 W0CNM | 48 K9ETD | 69 W9QWT* |
| 7 W6OB | 28 W1VNH | 49 W0FKY | 70 W6EDC** |
| 8 W0INI | 29 W0OLY | 50 W8LPD | 71 K6VLM** |
| 9 W1HDQ | 30 W7BEA | 51 W0ZTV | 72 K6GOX** |
| 10 W5MJD | 31 K0GQG | 52 W6CGC | 73 W0EDM |
| 11 W2IDZ | 32 W7FFE | 53 W2RGV | 74 W9JCI** |
| 12 W1LLL | 33 W0PFP | 54 W1DEI | 75 W0LLU** |
| 13 W0DZM | 34 W6BJI** | 55 WIHOY | 76 W7RT** |
| 14 W6HVW | 35 W2MEU | 56 W6ANN | 77 W7RDY** |
| 15 W9WKB | 36 W1CLS | 57 W1SUZ | 78 W6KIN** |
| 16 W0SMJ | 37 W6PUZ* | 58 W1AEP* | 79 W6OKR** |
| 17 W6OGW | 38 W7LL | 59 W5LFH | 80 K6GMX** |
| 18 W7ERA | 39 W0DDX | 60 W6NLZ** | 81 W7DYD** |
| 19 W30JU | 40 W0DO | 61 W7MAH | 82 K6ZEE** |
| 20 W6TMI** | 41 K9DXT | 62 W8ESP | 83 K6HCP** |
| 21 K6EDX | 42 W6BAZ | 63 W2BYM | 84 K6YLM** |
| | | | 85 K6GVM** |
| | | | 86 K7BAG** |

| * 49 states | ** 50 states | | | | |
|-------------|--------------|-----------|-----------|----------|---|
| VE7CN | 45 EI2W | 37 LU3DCA | 27 SM5CHE | 20 | |
| KL7AUV | 44 CO2SZ | 36 LU3EX | 27 LA7Y | 20 | |
| VE1EF | 42 ZS3C | 32 ZE2JV | 26 VQ2PL | 18 | |
| VE4HS | 41 SM6ANR | 30 LU9MA | 26 JA8AO | 18 | |
| XE1GE | 39 CO2ZX | 30 CO2LD | 25 JA8BU | 17 | |
| VE2AOM | 38 SM7ZN | 29 CT1CO | 24 JA1AAT | 17 | |
| KH8UK | 37 PZ1AE | 28 CO6WW | 21 JA1AUH | 16 | |
| | | SM6BIT | 28 LA9T | 21 VP5FP | 7 |

The day-long program includes a seminar on two-meter f.m. repeaters and individual discussion groups on each v.h.f. band.

Further information may be obtained from Professor Glade Wilcox, W9UHF/8; Western Michigan University; Kalamazoo, Michigan 49001.

(We are pleased to make announcements of coming v.h.f. conferences, but need about three months advance notification for publication. We also appreciate receiving pictures and a brief report on the conference once it is completed.)

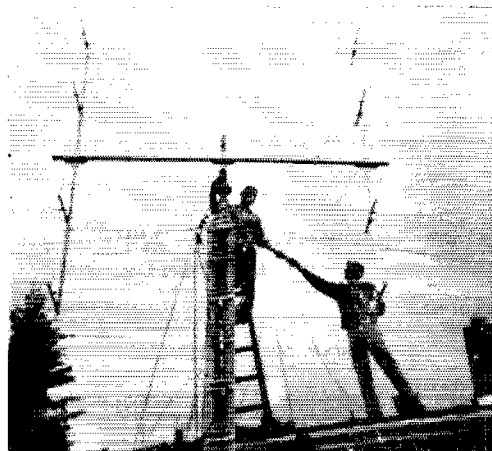
The Central States V.H.F. Conference will be held in Boulder, Colo., Aug. 15, 16, and 17. This should be the best one ever. Details from W0EYE.

OVS and Operating News

50-MHz. sporadic-*E* doesn't seem on a par with the past few summers, but there has been frequent multi-hop. I have yet, however, to receive a report of *E*s at 144 MHz. this season.

We'll begin with May 24, which appears to have been the first good opening. WA8YHN, Ohio, found solid signals from Florida to Texas. He worked 14 states. From Mobile, Alabama, WA4s VUT, WEX, ZJT, OSR and WB4IPT worked ZF1DT, Grand Cayman. WA3JDT, Pa., worked from Maine to California. In Nevada, K7ZOK says he worked double-hop from New Jersey to Florida. W6YKM reports working all call areas except W1. Fred says that during May, 1968 he worked *E*s on 23 days — this year on only 6 days. Fred runs 1 kw. and an 11-element 47 foot long Yagi up 100 feet. Sam, W5WAX, in Oklahoma, says the *E*-layer m.u.f. was at 100 MHz. about 2130Z. Oklahoma and Kansas stations reported working LU3EX and LU6EAM Argentina, around that time *E*₂-to-*E*s hookup.

May 25 was also productive. W5WAX reports *E*s to all U. S. call areas and VE2 through VE7. Sam was responsible for that big contest signal from WA5NOB/5, Arkansas. W6YKS says he worked 5 new states on multi-hop to the East Coast. WA8YHN reports contacts with California, Nebraska and Florida for a good all-around opening. K7ZOK says the 25th was a repeat of the 24th. WA1DPX, Mass., worked as far west as K0SYL, reported widely worked in Nebraska.



2 meters is fast becoming popular in the Pacific Northwest. In British Columbia, VE7BQH, on the ladder, and VE7-BBG, on the roof, are popular. Both run kilowatts and are available for schedules.

The sole 26th report comes from K7ZOK, Nev. Hal says the band was spotty, but he had VE2AIO, and W6s on *E*-backscatter.

May 27 was the day. WA1DPX, Mass., worked K7BBO, K7VHU, K7TVO, K7KHU and WA7 in Washington and Oregon on multi-hop. WA3J Pa., worked numerous midwestern stations on gle-hop and also noted some aurora pre WA1DFL, Mass., reports working Minnesota, Iowa and Washington. VE6AHE says the band opened on the 27th and stayed open for three days. He took K4AYO to task for not hearing him call Florida station. I'm as sorry as you, K4 VE6AHE has a 4-1000A final and monitors 50 MHz. about 10 hours each day.

This particular opening was one of the best sessions I've ever heard. From Miami, WB4B WB4KUN and K4AYO worked North Dakota W0GNS and VE5s GG and U.S. These were VE5s first contacts into Florida. The opening lasted nearly 8 hours. W8CVQ, Michigan, worked VE5GG and W7JRG, Montana.

On May 29, WA1DPX worked only two states but they happened to be K7GWE and K7 Oregon! June 9 was another good day from Miami. A four-hour evening session netted contacts VE2AIO and most all states east of the Mississippi except those in New England. KL7GLL, Sitka, Alaska says this was his first day of *E*s. Gene worked Washington and Oregon. He says he worked W7GUH's 50th state on 50 MHz. No report received from W7GUH, however.

On the 10th, Gene noted his first multi-hop from Alaska. He worked numerous W6s and along the West Coast. KL7GLL is crystal-controlled on 50.125.

There will be many excellent June contest openings for 50 MHz. The band opened for six hours evening of June 14 in almost every area of the West. The next day was more spotty, but most states represented and there was multi-hop between the coasts. I wouldn't be surprised to learn that some worked 48 states during the weekend. At least states were workable from Miami.

On the 19th, multi-hop was present to California from Florida for two hours. WB4BND worked W5KHT/6, Bob Cooper of KY4FU fame. Bob he will be moving to Fayetteville, Arkansas before long. W5ARR says WA7FLB, Arizona, and others worked KL7GLL this same evening. NE1L Mexico City, was worked June 21 by WB4B WB4KUN, K4BUW and K4AYO, Miami. NE1CK, has a Swan 250, SB-110 and 6-element Yagi at 100 feet plus. Bob says he is also preparing a 4-bay array for 144 MHz.

The June 21 opening which NE1CK kicked developed into one of the best this season. By 2200 the band was open between the coasts with working from New England to Florida. Stations the midwest could select which coast they wanted to work — and turn the beam.

The m.u.f. reached at least 170 MHz. from southern California, and in Miami, skip from as close as 400 miles was heard around 2330Z. WIHOY/ was worked from the Los Angeles and Miami area. And, in a contact with K4AYO, W0EKB said he had copied KL7GLL in Omaha the evening of June 18 and 19, but could not raise a contact.

The June 21-22 opening lasted more than 9 hours. I'm sure we'll have more on this one next month.

Now these random notes. HI8XDS in the Dominican Republic says his friend Neil, HI8XCT, worked ZL1QP and VE7RL. HI8XDS has his backlog of QSL cards just about caught up. They were del-

at the printers. Speaking of QSLs, those sent out by K5HVC for his June contest contacts as XE2XN are real collectors' items. XE2XN, who was K5HVC's host, furnished the cloth and wood bark cards at a cost of nearly 50 cents each! K5HVC ran up some 600 contacts in 52 sections signing XE2XN for a fine showing, and a new country for many. Thanks, Bert, and to XE2XN.

Geoff, VE2AIO, says KZ5KN is reportedly active on s.s.b. from the Canal Zone. From Casper, Wyoming, W7LVU says he is active on both six and two. K7MWC, Seattle, reports the formation of a RTTY in net Pacific Northwest on 50.3 MHz. W6YKS and K6HXY are both active on RTTY. W6YKS has built a single 4X150 amplifier for 50 MHz. c.w. He says it can be easily built. How about a picture and the schematic, John?

Ronald, WA8LOW, Cincinnati, reports having worked all fifty states since June 1 of last year, except Hawaii — and he heard KH6 on at least one occasion. In addition to confirming 49 states, he also worked 12 countries. His transmitter runs 180 watts, the antenna is an 11-element Yagi at 65 feet.

WA6HXW, Harley, reached 14 countries worked by contacting ZK1AA on May 3. Cook Island was heard on the West Coast as late as mid May.

VE2DFO/VE2 scored nearly 17,000 points in the June contest with 210 contacts in 45 sections. Don says the score is 3000 points better than any previous Canadian score in that contest. I'd also bet there will be fine Canadian scores from VE2AIO, VE2RM, VE3CUA and VE3FIB.

Several OVS appointees have written asking why I haven't used their reports. It appears that in some cases the reports may have been forwarded by the SCM. This is a slow channel to the column. If your report has dated news, it may make QST a month sooner if you send a copy, or a digest of the news directly to me at Headquarters. The OVS reports reach me slowly and operating news given in them may be too old to make interesting column material.

144 MHz. reporting has picked up some. Tropo conditions are also on the upswing. K1HTV, Connecticut, reports several openings during May, the best on the 23rd when Rich worked WA4HPY and WB4HEW in Greenville, North Carolina. The 4s were running 10-watt rigs. WB4HEW reports the same opening, adding he also worked Rhode Island, New York, New Jersey, Pennsylvania, Delaware, Maryland and Virginia. W4OMW, also Greenville, says WA4HPY had 19 contacts in 6 states and DX up to 500 miles with a 10 watt and 6-element Yagi. Thanks, W4OMW, for your lengthy report.

K3JOM, Maryland, also noted the May 24 opening, working north into New England and south to Dixie. He says conditions were above normal for 7 days around that date. A similar report comes from K4GGL, operator of W1MX at Massachusetts' MIT.

Meteor scatter (m.s.) will be in fine style as this is read, peaking for the summer season during the August Perseids. We note that K0MQS, Iowa, has strengthened his hold on the number 2 national spot for 2 meter states worked. Dick added his 44th, Nevada's K7RKH.

I have a prediction to make. That being, we will have the first 2-meter WAS before the end of next year. I believe K0MQS will do so by virtue of moon-bounce contacts with Alaska and Hawaii. Dick is already scheduling KL7DTH, Alaska, with some success, and he has a good schedule prospect in Hawaii. K0MQS has reduced the number of wires



Alfred Tardaguila, CX9AJ, is a popular South American catch on 50 MHz. CX9AJ's 30-watt 6146 and 3-element Yagi was widely worked this past spring from the southern U.S.

in his rhombic array from eight to two. The "smaller" antenna should produce as much gain and have a more beneficial pattern — all according to a computer.

KL7DTH is making a new c.m.e. array to use in place of his rhombic. He is building eight 24-foot Yagis. VK3ATN has been working on various projects for reception of U. S. space probes including the first manned lunar-landing.

K6MYC says the success of K0MQS, and others, has caused K6HCP to blow the dust off his rig. W6GHV and others are reported making e.m.e. noises.

W7ZC writes from Utah that he will accept 2-meter schedules for his kw. Mid, who has been on the air since 1919, says K0MQS, W5ORH and others assisted in his 144 project. W7ZC has three states worked so far, a good start from Utah!

Brownie, W3HB, says he can't do 25 w.p.m. the way he used to, but then he continues to add to his states totals. Brownie says he is at age 73 — and holding. He is the father of W1JSM, who is looking forward to renewed 2 meter activity from New Hampshire.

How about more two-meter reports?

220-MHz. interest apparently has fallen off again, but perhaps the August Perseids meteor shower will produce some activity, and contacts like last year. In Oklahoma, W5ORH has completed a pair of 4CX300s final and 16-element array. Jay will accept schedules. And that is *all* the 220 news this month.

432-MHz. has been doing its thing — handing out new states and call area leaders. At Richmond, Virginia, W4FJ has tied 432 national leader W5RCI at 19 states worked each. Ted's 18th state was WA1JTK, New Hampshire, followed by K2RTH/8, in West Virginia during the June contest. Ted predicts several stations will have more than 20 states worked on 432 before year's end.

Ted is being pushed hard in his own backyard. Fellow Virginian, K4QIF, worked the same two stations to bring his 432 totals to 17.

W8PT, now K4GL in South Carolina and going strong on 50 through 432 MHz., has been dethroned as 8th call area leader, a position Jack held for many years. Turning the trick is K8DEO, Cedarville, Ohio. Don has been a 432 devotee of the first order, picking off W0DRL, Kansas, on May 25th for state number 15. The contact had some unusual aspects. The Kansas signal appeared suddenly, was very strong, and showed only moderate fading. Don says he doubts that the signal was tropo propagated. Other 432 signals, from Illinois stations, were of normal daily strength and u.h.f. television showed nothing unusual. Sounds as though it may have been ducting. Then during the June contest, Don added number 16, West Virginia. He worked both W8VA/8 and K2RTH/8. K8DEO runs a kw. and a pair of 22-element Yagis up 70 feet.

Bill Lewis, W8HVX, has moved into the 13 states worked bracket. A May 20 contact with W3UJG, Maryland, was responsible. W8HVX heard pings on W3UJG's signal. Bill wonders if it was meteors. How about lightning enhancement, Bill? W8HVX wants 432 meteor scatter schedules during the August Perseids.

A new listing this month is W4HJZ, North Carolina. Carl enters with 6 states worked, best DX of 560 miles. Carl says he would like schedules within 600 miles of Raleigh. Why just 600 miles, Carl?

In New England, two more stations have been added to the states boxes. K1HTV, Connecticut, enters with ten worked. He had 7 going into the contest, but added W1DC/1, Maine; W1MX/1, Vermont, and W3CCX/3, Pennsylvania. Rich runs 150 watts and a 16-element collinear. The other station is WA1JTK, who has provided many with their 432 New Hampshire contact. Jim has 9 states running a measured 3 watts and an array of four 11-element Tilton Yagis. He is working on an additional 44-element bay and will soon have 88 element at 60 feet. WA1JTK offers schedules. Write to him at 36 Langholm Drive; Nashua, N. H. 03060. His telephone number is 603-888-2530.

Bob, K9AQP/1, Massachusetts is nearing a box listing. He has 7 states worked, including K4QIF in Virginia.

Also in the Northeast, W1HDQ says K2VDK and WA2FGK have purchased an abandoned microwave tower near Somerville, N. J.

1296 and Up shows much progress. I didn't have a report from WB6IOM at deadline regarding his May 24 e.m.e. test on 1296, but a letter from K4QIF tells of copying the California signal solid for nearly an hour. Rusty, K4QIF, received the signal 4 to 10 db. out of the noise on a 10-foot dish. Rusty says he made no attempt to work WB6IOM because he doesn't believe Peter's coding system constitutes a contact. Rusty says a Morse code c.w. contact could have easily been made.

G3LTF, whom WB6IOM worked on April 27 for the e.m.e. record, also commented on Peter's May 24 test. G3LTF's 15-foot dish captured WB6IOM's signal for 2 hours, 7 to 10 db. out of the noise in a 100 Hz. filter. No attempt was made to work WB6IOM. The receiving equipment was operated by G3ORL and G3VPK. G3LTF offers 1296 e.m.e. schedules and says he should work anyone who can hear their own echoes. He is also attempting to arrange schedules with W1FZJ/KP4 on 432 e.m.e.

Elsewhere on 1296, WA9HUV, Elmhurst, Illinois reports working W9JIY, Indianapolis, 180 miles.

220- and 420-MHz. STANDINGS

| 220 MHz. | | | 420 MHz. | | |
|-------------|---|------|------------|---|------|
| W1HDQ...13 | 5 | 450 | W42EUS...9 | 4 | 260 |
| K1JLX...12 | 4 | 600 | K2YCO...8 | 6 | 550 |
| K1BFA...8 | 3 | 225 | W2SEU...6 | 4 | 320 |
| | | | W8RTE...1 | 7 | 585 |
| | | | W3UJG...4 | 4 | 400 |
| K2CBA...17 | 5 | 1090 | K3IUV...9 | 4 | 310 |
| W2DWJ...15 | 5 | 740 | | | |
| K2DNR...13 | 5 | 600 | W4FJ...19 | 7 | 995 |
| W2SEU...12 | 5 | 325 | K4QIF...17 | 6 | 1065 |
| K2RTH...11 | 3 | 300 | W4JEQ...12 | 3 | 550 |
| W2CRS...10 | 4 | 440 | K4NTD...8 | 2 | 835 |
| | | | W4HJZ...6 | 3 | 560 |
| W3UJG...14 | 5 | 460 | K4GL...5 | 2 | — |
| W3RUE...10 | 5 | 480 | K4VHH...5 | 1 | 450 |
| K3IUV...10 | 4 | 310 | | | |
| K4IXC...3 | 2 | 1090 | W5RCI...19 | 6 | 980 |
| K4GL...2 | 2 | — | W5ORH...12 | 4 | 700 |
| | | | W5AJG...7 | 3 | 1010 |
| W5RCI...10 | 5 | 910 | W5UKQ...6 | 2 | 590 |
| W5AIG...3 | 2 | 1050 | W5AWK...3 | 2 | 222 |
| W5LO...2 | 2 | 660 | W6DQJ...4 | 2 | 360 |
| W6WSQ...4 | 4 | 945 | | | |
| K7ICW...4 | 2 | 250 | K7ICW...4 | 2 | 225 |
| W7JRG...2 | 2 | 959 | W7JRG...2 | 2 | 420 |
| W8PT...11 | 6 | 660 | | | |
| W0EYE...8 | 4 | 910 | K8DEO...16 | 6 | 625 |
| VE3AIB...7 | 4 | 450 | K8REG...14 | 6 | 625 |
| | | | W8MNT...13 | 7 | 600 |
| | | | W8HVX...13 | 6 | 495 |
| | | | W8RQI...10 | 6 | 425 |
| | | | W8VHG...7 | 5 | 415 |
| | | | W8FWF...7 | 4 | 450 |
| K1BFA...10 | 4 | 470 | | | |
| W1QVF...10 | 5 | 400 | W9WCD...17 | 7 | 825 |
| K1JLX...10 | 4 | 460 | W9HUV...16 | 7 | 780 |
| K1HTV...10 | 4 | 400 | W9AAG...12 | 4 | 600 |
| W1HDQ...10 | 4 | 250 | K9AAJ...12 | 5 | 425 |
| WA1JTK...9 | 3 | 490 | W9ANKT...9 | 3 | 400 |
| | | | W9JTY...8 | 4 | 500 |
| K2UYH...15 | 6 | 718 | | | |
| K2ACQ...13 | 8 | 880 | W0DRL...17 | 5 | 1065 |
| W2BLV...13 | 5 | 500 | W0LCN...6 | 3 | 688 |
| K2CBA...12 | 4 | 280 | W0EYE...6 | 2 | 425 |
| WA2EMB...12 | 6 | 720 | | | |
| W2CLL...12 | 6 | 693 | VE2HW...3 | 3 | 750 |
| W2DWJ...11 | 4 | 330 | VE3EZC...7 | 5 | 510 |
| K2YCO...9 | 6 | 525 | VE3AIB...5 | 4 | 450 |

W9JIY had just replaced his 64-element collinear with a 7-foot dish.

High school student, WB2VQK, has a complete 1296 crystal-controlled station working, 200 watts and a 6-foot converted TV dish 41 feet high. He says WA2VTR aided him, but made him do all his own work. WB2VQK also says WB2WVY will soon complete a similar setup.

On 2300 MHz., W3GKP and W4HHK continue their e.m.e. experiments as reported in last month's QST. Surely they will complete the first 2.3 GHz. e.m.e. contact before year's end. W4HHK kept personal touch on the flight of Apollo X. Paul received the 2287 MHz. beacon and subcarrier signals with good strength as the astronauts circled the moon.

W3GKP is presently at work developing a 2300-MHz. parametric amplifier using a MA4537 diode. Bill is getting 15 to 20 db. gain from the device.

Bill Byrd, WA4HGN, Buena Vista, Tennessee has completed a 10-foot trailer-mounted "portable" 2300-MHz. dish. On May 31 he hitched it behind his car and drove to Pilot Knob, Tennessee. There he worked W4HHK over a 117-mile path. W4HHK, using an 18-foot dish copied Bill's signal up to 30 db. above the noise. Bill has selected another mountaintop site some 250 miles from W4HHK. Object, a new 2.3 GHz. record coming up!

Late News

In response to requests from amateurs, WOI-FM will transmit continuous test messages during the Perseids meteor shower on the morning of August 12, 1969 from midnight until 6:00 A.M. CDT on a frequency of 90.1 MHz. The station will acknowledge reception reports, quoting the ID, sent to Donald D. Forsling, Iowa State University, WOI-FM, Ames, Iowa 50010.

QST

How's DX?

CONDUCTED BY ROD NEWKIRK,* W9BRD

Who?

Who first ate an oyster? A pizza? And did the chicken or the egg first make the scene? These bafflers are similar to a puzzle we bring up this month: Who was the first guy — *somebody* had to break the ice — to learn and use the Morse code by ear?

Most of us are familiar with the fact that S.F.B. Morse conceived his invention in the form of automatic or almost automatic sending and receiving devices, rudimentary teleprinter equipments. There were no telegraphers around when Samuel started stringing wires. Indeed, that anybody could or would master the code by ear and key to any useful degree was an unrecognized possibility.

In a few exciting years, however, telegraphy developed essentially into a manual art. Telegraphers, most of them informally taught, quickly commanded respectable skilled-labor wages. These hardy DX hounds promptly displaced such courier communications as the Pony Express and flourished far and wide while the tricky gadgetry visualized by Mr. Morse and his rivals returned again and again to the drawing board or languished in court under patent litigation.

Obviously there had to be a starting point for this new departure, some superpioneer operator among the pioneers. Did the first conqueror of the code grit his teeth and set out to do it, or did his talent develop by accident? Just who was he, this First Brass-pounder? OM Morse himself? *Dots and Dashes*, organ of the Morse Telegraph Club, Inc., turns up the likely answer. We'll train the "How's" spotlight on a real communications trailblazer next month. . . .

*7862-B West Lawrence Ave., Chicago, Ill. 60656.

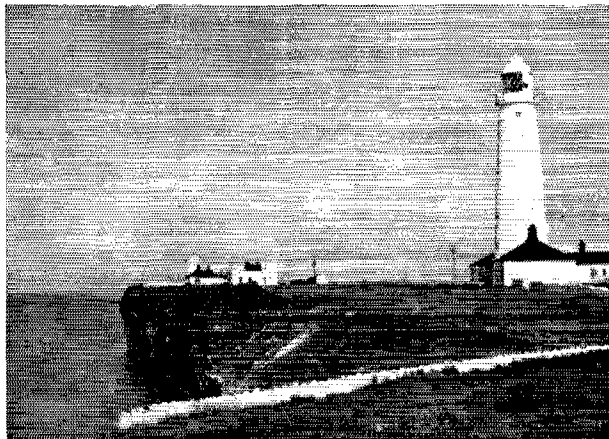
What:

Much DX documentary ground to cover now after letting Jeeves take over with a slide program last month. Summer prop conditions panned out pretty well after a shaky start. Even 21 MHz. remains reasonably productive, and it's time we took a core sample of recent DX drillings by 15-meter faithfuls. As usual, numbers in parentheses represent kiloHertz values above the lower band edge, 21,000 kHz. In this case, and unparenthesized digits for Greenwich Mean Time whole hours. Something like this. . . .

15 phone, milked eagerly by "How's" reporters Ws 1BGD/2 2DY 2LJF 2VOZ 3HNK 3PN 4UF 4YOK 5BZK 8BQV 8YGR 9LNQ. Ks 1UHY 5YUR 6FWP, Was 1FHU 1IDP 1JKZ 2BHH 9MQJ 9SQY 9TFM 9URY, WB2DZZ and P. Kilroy, displays the audio of A2CAH (253) 20, AP2MR (280) 10, CEs 3BE 3PT (368) 23, 4AJ 6CA (320) 22, 6EM (400) 1, 6GV (300) 0, 8AE (293) 0, 9AE (445) 2, CNSHL (378) 14-16, CPs 1HV (410) 21, 1HV 5BK 5CS (400) 2, 6FP (380) 20-21, CRs 4BC 4BJ (330) 23, 6BX (339) 21, 6CA (304) 22, 6FF 21, 6GA (301) 21, 6GM (254) 21, 6HQ 6JA 6JW (288) 21, 6KT 6KY 6LF 6LG 22, 6LK (305) 21, 6LV 6AN (270) 21, 7BB 7HY 17, 7IC (244) 17, 7IK (272) 13, 7JV 7NS, CTs 2AP 2AR 2AT (380) 22, 3AO (128) 18, Cxs 1JM 1, 5AF (380) 23, 7BF 9BA (340) 1, DJ2B/YB6 (295) 16, DLISU/YB6 17, DUs 1FR (335) 13-20, 1HR, (258) 14, 7ER (320) 16, EAs 3JO (200) 18, 6AR (250) 10, 6BJ 6BK (320) 20-21, 8AY 21, 8ET (254) 20, 8EY (265) 21, 8FP (266) 17, 9AQ (280) 16, EIs 3AI (237) 21, 6AX 7BB 9N, ELs 2AG (370) 17, 2AS (300), 2AZ 21, 2BA 2BD 2BI 2BJ (337) 16, 2J (315) 17, 2V (370) 14, 8F (175) 14, 8C 8H 9B/2 (280) 18, 9C (342) 21, EP2BK (320) 16, ETs REL (250) 21, USA (320) 0, F9UC/YC (280) 11-12, FG7s TG TH TI (280) 12, XL (327) 16, FL8DG (252) 11, F08s BV CG, FR7Z (271) 15, GC2LU (320) 15, GD3RFK, HB6s AFM GJ (287) 17, HCs 1AO (286) 22, 1GI (400) 19, 1JL (300) 19, 1TH 1WZ 2HM (262) 16, 2OA 0, 3MI 4BS 8RS (300) 23, 9LV (368) 2, HIs 3ELJ (298), 8LA (356) 18, Hks 3BAS 3BLD 17, 3BAH 7BMO (298), 8AI (340) 17, 6BKX (307) 17, HPIXPX 2, HIRs ASM (410) 18, 2VTA, no-worked HIs 1AF (334) 16-17, 3DR (292) 16, 3RF (315) 18, 3RM (288) 15, HV3SJ (300) 17, IS1s LJO (293) 19, RUA (320) 16, SCB (287), ITIPZA, JAs 1KHY 1WSK (241) 23, 3FA 3L VP (288) 2, 3NZI 6CC 7EHU (241) 23, 9JK (232) 23, 9UR/9, JHIs BJ DDE GTW, K2JJG/YB6 (300), KAs 2LS 8YD (335) 0, KCs 4USM (335) 23, 4USN (303) 23, 6JC (320) 13, KG4s DO (308) 1-2, DP, KH6s AHQ BZ 23, EDR 0, GPM I-3, SF (352) 2, KL7s EFY WAH 0, KM6CE (345) 6JT (305) 1, 6UA 0, 8EA 14, KS6CO (318) 0, KV4s AN (296) 22, GI EN FZ (307) 17, KW6A (400) 5, KX6s GF 4, GS (325) 14, KZ5s FK 15, NF, LAs 7RE 9DK (290) 13, 9AF (269) 18, 9AS (284), LU 5ABG/m 8DKA, LX1s RG (311), SD (265) 19, SK (300) 17, LZ2KKZ (295) 17, MP4s BDS (355) 15, BEU BGW (333) 14, BHH (344) 18, TAF (366) 15, TOE 13, TCF TCT (258) 17, TCZ

GW3UUZ's scenic pad, your QTH of the Month, is a 180-foot lighthouse atop 100-foot cliffs near Cardiff. Known to on-the-air pals as "Andy the Lamp," GW3UUZ has an elaborate wire antenna slung about this shorescape. He likes lower bands, especially 160-meter transatlantic work, with an HQ-170 and homespun sender.

(Photo via W1BB)





Barbados suddenly gets hard to work when the gang shuts down for an occasional hamfest. At this one we meet (front, left to right) 8P6BB, visitor VE3GMT, 8P6CB; (rear) 8P6s AF AZ AY BX CE AH and AU. 8P6s AY-BB and AH-CP make up OM-XYL DX duos.

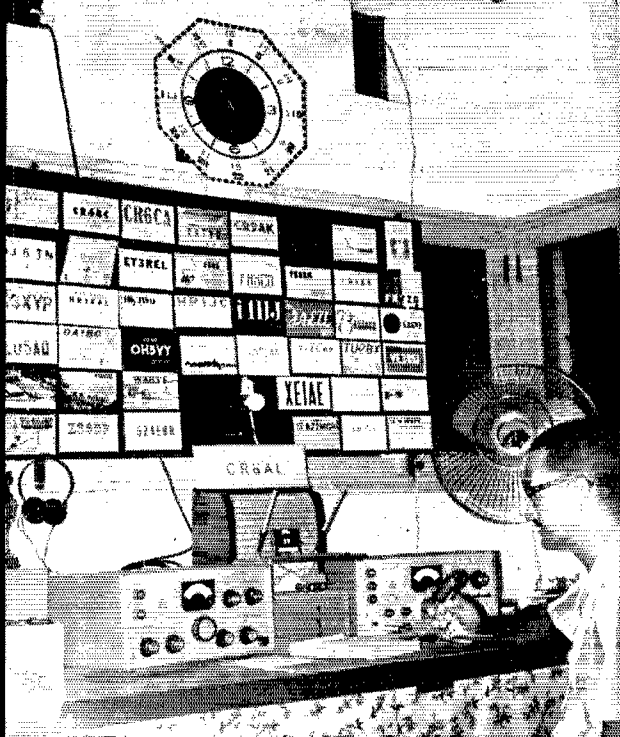
(310) 12, OAs 1A 4, 4BQ (325) 22, 4XE 3, 5AU/3 (355) 2, SV (340) 21, 9G (325) 23, OD5s AT (203) 18, BZ (330) 14, CL (260) 5, FB (270) 6, OEs 2SJL 5LX (303) 18, 5R1 8AH, OK2s ABU (287) 17, KZ (298) 14, OX3LP 16, OYs 2A (403) 15, 9LV, PJs 1CU 14, 2CA 7JC, Pys 3AFH 9HL (280) and others, PZIs BK BX (210) 20, CF CK DH, SK3BP 17, SL6BH, SFs 4CQQ (300) 16, 6AAT (320) 18, 8AR 20, SVs 1AE (338) 14, 1AN 16, 9WA (265) 5, 9WE (258) 19, 9VN (255) 17, 9WV, TAs 1RT 10, 3AB (250) 4, 3BL 15, 9F2s WLIH (410) 15, WJL (311) 17, TG7BD, TIs AD 15, CB (357) 22, STI (343) 15, TJs AQ (340) 19, QO (320) 22, TN8BK (214) 15, TR8AG (286) 20-21, TU2s AX (325) 21, AZ (268) 20, BB (268) 20, BD CF 22, UAs 2KBD (281) 15, 9AB (257) 18, 9VC, UB5s WI 14, WJ 14, UJ8AJ (285) 19, UP2s KAB KPI UO2s KDZ NW (320) 16-17, UW9AF (312) 13-14, UY5XS (285) 21-22, VK9s RY (386) 12, XI (309) 15, WD 11, VOICX (325) 21, VP2s 2AA (270) 21, 2DAJ (297) 22, 2GAI 2GBL (252) 21, 2GBZ (287) 23, 2MA (287) 1, 2ME (271) 72, 2MF (320) 20, 2MK (298) 17, 2MO (317) 19, 5CB (345) 0, 7DL (280) 23, 8HO 0, 8KD (320) 19, VQ9s EP 1 (277) 20, MK, VRGTC (340) 28, VSs 5FH (280) 15-17, 6AL (365) 12-18, 9MB (274) 17-19, VU2s AFW 18, JW (267) 17, KX (260) 13, W6BCT/4X4, XE1s AY (227) LLS 22, S5Y (340) 18, WS 1, XPLA, XW8s AX (291) 18-19, BZ CS (350) 8, YAls AR (331) 17, HD (310) 13, SG (271) 16, YBs 1AK (348) 17, 1BM (355) 17-18, 9AR (266) 17, YN1s GE 22, GLB/4 20, MT, YOBB (288) 5, YU, 2NFJ 3BY (302) 13, 3OV (240) 6, YSIRE (340) 13, YVs 1SA (305) 21, 4UA (360) 21, 6BR 16, ZCAK (323) 22, ZDs 8CC (320) 21, 8DG (360), 8JL (285) 21, 8Z (285) 22, 9BL (270) 20, ZEs 1CY (341) 17, ZKL (360) 20, ZFIs DT (347) 17, EP 16, GC (258) 21, ZEs 1AFO 3RK 21, ZPs 5DY (267) 22, 8CB (263) 3, ZSs 1ANT 17 of Antarctica, 3HX (325) 18, 3S (360) 17, 457BP (297) 19, 4X4s BL (298) 21, HF FQ (307) 22, SO (223) 5, RQ/am (261) 16, UF

(285) 15-16, VB (292) 21, YM (300) 15, 4ZAHG (396) 17, 5As 1TN 4TE 5TH (282) 18, 5H3s JR (340) 21-22, KL (327) 19, KJ (275) 17-20, 5Ls 2BJ 9VAT (325) 17, 5N2s ABI AAU (318) 21, AAX (394) 15, 5R8AN 19, 5Z4s ERR (282) 21, KK (340) 21, KZ (187) 18, KO (340) 21, LP (303) 19, LQ (351) 18-20, LS LW (282) 21, LY (380) 21, 6W8AL 0, 6Ys BR 22, ET (294) 18-19, 7P8AR (275) 20, 7Q7s AM (267) PBD WW (278) 18, 7Z3AB (380) 20-21, 8P6s AE AY, 8RIG 23, 9E3USA (275) 21, 9G1s BF (344) 14, DY FV 22, GD FG (320) 22, GL (310) 3, KM, 9H1s BA BL (273) 15, M (235) 2, 9J2s DT 18, RA (311) 16, RF (377) 5, VB (260) 0-2, 9K2s BG (270) 3, BV (285) 16, 9L1XZ (273) 18, 9M2s BD RO (360) 16-19, KL (279) 16-17, KR (219) 14, 9N1MM (310) 9, 9O5s DG (300) 19, FD (191) 17, PT 22, RB (300) 20, PI (270) 20, 9U5s BB (357) 16, CB (303) 23, CR (290) 17-22, DS (312) 21, HI (314) 17-22, RS (285) 13, 9V1s NR (295) 14, OL (238) 16, PA (354) 19, 9X5s AA (260) 18, FT (310) 18-19, IH (264) 20, 9Y4s CR (290) 1 and D.X. Quantity may be off its peak but the quality's still in there.

15 c.w. is a can of DX worms, judging from dispatches filed by Ws 1BGD/21EGM 2LJF3BBO 3HMR 3HKN 3KNG 4YOK 7BE 8BQV 8YGR, Ks 5MHG/6 5YUR 6TWT 9EUV, WAs 1FHU 1JKZ 1KEB 2APG 2DQE 2FOR 3GVV 3JRY 5SOX 7BOA 8VBY 8YXE 8SQY, WBs 2DZZ 2RNL 2UOO 4GTI 4IHL, VETBST and ILER which mention keying by AP2AR, CEs 1AV (28) 23, 2DI (64) 23, 21N 2FN 2QD (85) 23, 2QG (30), 2ZW 3AG (35) 20, 3CB (67) 22, 3TP (39) 20, 8EZ 8AA (20) 18, CM1AR, CN8s CF (60) 20, MI (50) 18, COs 2BB (38) 23, 2BM 2KG (40) 17, 2KW 4 (4) 21, 5FS (96) 23, 6AH (25), CPs 2BH (26) 23, 6FN (33) 22, CRs 4BA 4BB 6AI (20) 16-18, 6AL (35) 20, 6CA (60) 18, 6ET (46) 22, 6GO (63) 23, 6IK (69) 19, 6IF (80) 20, 6KB (30) 18, 7AP 7BN (30) 19, 7CN (35) 15, 7HC 7HU 7HV 7IZ (80) 15-16, 7Ts 2AC (67) 19, 3AS (28) 19, CAs 1JM 3BH (55) 22, 3LN (30), 4CO (100) 23, 4DE 7AF 8AA 8V SCZ (21) 22, 9BT (100) 21, 23, DMs 2ADC (28) 12, 2ADJ (14) 16, 2AFQ 2AMM (22), 2AUD 2BYM (22), 3LOG (15) 16, 3VGO 15, 3WSO (33), 4CF (26), 4WJG, DU1s TR (30) 0, UP, DX1AAV, EAs 1KA 2HW 4HD 6BD 8BD (30) 16-17, 8BB 8CL (17) 17, 8BD (100) 13, 8EO (37) 14, 8EY (30) 15, 8FE (46) 19, 8FF (23) 17, 8FO (48) 21, 8GP (78) 18, 9AQ (21) 19, 9DD (34) 17, 9Es 6BS (51) 16, 6GN (62) 11, 9AR (75), 9BT (25) 15, 9J (26) 18, EL2s AE (60) 16, AZ (51) 21, B D (5) 0, NJ Y 18, ET3-USA (52) 13-14, FVN/FG (53) 15, FG7s TG (54) 18, XN (60) 19, FK8BN (34) 27, FL8MD (35) 13-15, F08s AB (40) 22, BJ (65) 16, BO (27) 18, FR7s ZD (38) 15, ZV 17, GCs 3FEW 18, 4L 18, GD3AM, HAs 1SB 1VA 3CF 5F 5VA 5KDQ 6KNB 6NC 8KCC 8KCP 8KPC 8KUX 8UH 8VA 9KOB 9KOL, HBs AFM (53) 16, GJ (43) 21, thirty-four HB9s, HCs 1JQ (76) 14, 2AM (75) 19, 2HM (70) 21, 2RZ 1WA (66) 21, HHLD (24) 18, HHJMP (85) 21, HIs 1AVK (30) 22, HLPs 3RQ (40) 21, 4ALE (30), 6B 15-19, 7GM (60), 8L9s FQ (45) 23, US UV (20) 8, HMs 1AY XV5 (53) 16, 1DH (20), 4FA (47) 23, 5CL (60) 0, 6E (50) 0, HP, LAC LAGE (47) 15, LKHG 17, 9WC/mm, HR4ET, HZLB (27) 13, IS1s ATZ 0, BDO (50) 20, REAI 18, 4TIAQ 21, 4As 1AA 1AJE 1AOA 1CSL 1CXN 1DDZ 1DTO 1HMM 1JEG 1JQG 1NUH 1OXA 1PKO 1KVT 1LOE 1LWI 1LXE 1MIN 1NUR 1OCA 1PPV 1PPO 1QQG 1QGL 1QIB 1RSU 1RYA 1SKE 1SKX 1SNA 1TST 1UWE 1VX 1XOD 1XUY 1YHA 1YXV 2AYW 2BVS 2DFG 2EEY 2EMP 2HHP 2IHF 2JKV 2MVO 2NDQ 2NPS 2WZ 2XOW 2LC 2WB 2IOD 3BKC 3CNQ 3DXD 3FA 3FMU 3HD 3IBG 3IXL 3IYV 3IG 3KVV 3NKH 3NZI 3YBM 3YSM 4DZ 4GZU 5BIF 5CBP 5OAF 5BXJ 6BZJ 6EFR 6FFV 6FQY 6GAI 6YAE 7AZZ 7BZO 7CGL 7FQZ 7FS 8AQX 8AYN 8BUX 8DQV 8EKY 8JO 9P8K 9PAS 9ADY 9BDY 9CHL 9CUV 9DCT 9EY 9YAK 9YAN, JH1s ABA AY KT BCS CRF CXQ BYB FLR BUQ GMP HNIHTQ AYLQ KRV LGZ most 15-18, JT1s AC (35) 17, AK (40) 17, KAF 16, KA2NY, KCs 4USB (35) 23, 4USM 2, 6CT (17) 4, K6Gs AAAY (31) 15, PAE, KH6s AX (20) 18, CD (47) 8, GOL 20, GMP 2, GPQ GOB (30) 22, GQW 2, TD 1, KL7s AKH DLQ (30) 23, KP4s BBN NY, KR8s 6DI (30) 12, 6NR (30) 14, 6NT (15) 13, 6SX (75) 13, 6TA (43) 11, 8DE (28) 18, 8EA (30) 10, 8FO (63) 16, 8GB (71) 18, KS6CX (31) 2, KV4s AM (25) 22, CI (22) 10, FD 20, GA (63) 21, KZ2s NC 20, SF (40) 15, EK (20) 13, LAs 1KM 1OA (28) 23, 1OL 2 2YE 5UF 7WH (24) 20, 7Y 8FK (60) 13, 8AD (57) 17, LG5LC (35) 14, LUs 1BB 1DH 1EVG (66) 21, 4ECO 6ABX 8DKA 8DQ 8FHB, LXIRG (35) 12, LZs 1KPG (66) 16, 1KPQ 1KPW 1KSZ 2KJZ 2KPD 22, 2RF (24) 15, MP4s BGX (28) 16, MBK (48) 13, MBX (14) 19, TCE, OAs 3ED 4DX (40) 20, 4KT (23) 17, 4PF (21) 4, 4UO (44), OD5s ED (60) 21, EJ (22) 15, BZ (75) 10, LX (15) 0-1, OEs 1MKA (70) 16, 3SGA 18, 5LX (98) 17, 5PWL (19) 13,



KV4AM (W3ZQ) is one of the more active among that proliferating DX breed, the Indies-hoppers. Here's his VP2MQ set-up, an April DXcursion to VP2MW's Montserrat diggings. (Photo via W1CW)



CR8AI does his best to un-rarity Timor with an FL-100B on 15 and 20 sideband. The gracious tenacity with which Luiz handles pile-ups and the language barrier is in the highest tradition of the DX game. (Photo via W3s FWD and ICQ)

FM7WD's QSLing ----- HK7UL, whose W/K QSOs are confirmed through W7VRO, wants a QSL tender for the remainder of his contacts ----- Plenty "QSLers of the Month" this trip: AP2MR, CR8AI, C7ILN, DJ5WO, DU1MR, FG7XT, G3ZGMH, G3SSR, GJ3NWW, HC1TH, HI8XRM, HL9TS, HR2HHP, ITIAGA, JX5CI, KA9AA, KC6BY, KG6SB, KJ6CF, KS6CX, KV4BY, KW6EJ, LA0AD, OX3UD, PJ5 7VL 8AA, PY0EP, SV0WM, TA5 1RF 2E 3AB, TL8GL, UF6CX, UO5DN, VKs 2BRJ/9 2QK 8AV 0KJ, VP5 2GBG 7NA 8KL, VQ8s CCR CDB, WB2NCS/VP9, YU3CV, ZD8Z, ZSs 2MI 3LU, 3A0EF, 487DA, 5A3TX, 5H3KJ, 7P8AR, 8PBUB, 8R1G, 9H1s BA BN, 9V1OX, 9X5AA, 9Y4s DS and KK, together with QSL managers Ws 1YRC 2CTN 3HNK 4BRE 4ECI 4WS 5RBO 6CUF 7PHO, Ks 2BUI 2KTR 4ADU 4HJE 5AWR 9CSM 9GZK 9KLR 0PTY, Ws 2RSX 3HUP 3IKK 4UOE 5GFS 9RAT, WBs 2UKP 4EIX 0ALM, VEs 2DCY 3ABG 3ACD 3DLC 3GNM 4OX, 9FRM, DJ4SK, PY1MB and ZS06B, all saluted in dispatches from "How's" correspondents Ws 3ICQ 5IB 8EAY 9EXE, Ks 3GKU 8DHT 8TRF, WAs 1JKZ 2BHU 8YXE 9ZCP and VE3GLG for especially snappy QSL shipments ----- 'Alp! The following italicized brethren seek hints on hunting down QSLs from holdouts mentioned: *W5VYB*, *CN2BK* of '58, *FF8AP* '57, *PZ1AE* '58, *TF2WCK* '57, *VPs 2GW 4TM* both '57, *ZD3E* '59; *W9EXE*, *VK9BB*, *9K2QX*, *9U5EP*, *9V1PD*; *WA6KGP*, *VQ9B*; and *WA8YXE*, *9U5CR*. Any news or clues? ----- WAS 2VLG and 9VBG volunteer their services as QSL managers for overseas DX ops in need ----- Inside out with the mailbag, Jeeves, for the month's helping of individual QTH recommendations, bearing in mind that each datum is necessarily neither "official", complete nor accurate:

for direct response. I hope to arrange for a manager shortly because I'll soon have to choose between making QSOs or QSLs. ----- "From July 22, 1969, to July 22, 1970, Polish amateurs may use the 3Z prefix," goes a dispatch from PZK in Warsaw. We presume call area indicators and suffixes will stay the same, such as 3Z9AI for SP9AI. The switch commemorates a state anniversary ----- "W/Ks are pretty good about s.a.e. but follow VEs leave much to be desired," muses VE3CAA, QSL tender for DL5ZG ----- W3MQR disclaims CT2 QSL arrangements ----- "Order of mailing EA6ITU cards is s.a.s.e. first, then bureaus, then all remaining contacts," writes W3MR. "W4UR is handling QSLs for c.w. QSOs, W3ASK is taking care of his own contacts, and I'm doing the others. Due to the heavy work load at ITU headquarters there's been delay - apologies to the gang." ----- GC8HT tells of his new address, P.O. Box 100, St. Peter Port, Guernsey, C.I., but says W/Ks can still QSL via W6UNP ----- "As of May 10, 1969, I'm managing OY9LV's QSLs," declares W3HNK, also busy pushing pasteboards for CT1s MZ TZ UD and UE ----- DX News-Sheet hears that Andorra, long the employer of Brazil's PX label, may be issuing C3-prefixed calls ere long. The same periodical suggests QSLing LX1FT, product of a bunch of DXcursing DJ-DK-DLs, to the home address of the operator handling your QSO.

HEREABOUTS—"Help! I was QSL manager for HL OX5AN (WB6TLT) in 1966-'67," exclaims K1QCC. "I'm now being loaded down with requests for confirmations of recent OX5AN QSOs, the call having been reassigned about a year ago. If the new OX5AN wants these missent cards he should contact me." ----- West Coast DX Bulletin has estimates of a 300-per-cent increase in business at some QSL bureaus since ARRL's Five-Band DXCC program hit the fan. K6CF, who handles one fourth of Sixland's bureau exchanges, fought through 55 lbs. of cards in May alone ----- Our best wishes go to LeRoy Waite of NNRC's amateur section and his own SWL/QSL Bureau for a fast and thorough recovery from a sudden serious illness. Roy has been one of our hobby's most loyal friends for years and years. His writings are curtailed for now but he's still managing his s.w.l. bureau at the address regularly appearing in our "Where" credits paragraph ----- WA3ATX points out that K9GZK still handles QSLs for VP7NA guest operators ----- K9CSM, tending cards for several juicy, directs your attention to his recent change of address as recorded in the latest *Callbook*. ----- SONRA's VO1BL tells ARRL Assistant Secretary WIUED that VO1BSJ, Boy Scout Jamboree secretary active at Mackinsons' in late July, will ship special commemorative QSLs to all contacts ----- No log receipts, so W3GJY cancels his agreement to handle

- CE8AE, Casilla 25D, Puntas Arenas, Chile
- CE8AE, Det. 517, APO, New York, N. Y., 09877
- CR6IK (via W8CNL; see text)
- DLACE, V. J. Smith (W4CJD), Det. 4, 601st TCS, APO, New York, N. Y., 09036
- DL5KE, Hq. Co., 93rd Sig. Bn., APO, New York, N. Y., 09175
- DL6AU, H. Stoteknuel, 47 Berlinerstr., 4933 Blomberg, W. Germany
- DU1ZAN, P.O. Box 805, Manila, P. I.
- EL2BJ-5L2BJ (via WA3HUP)
- FG7EB-FM7EB-FY7EB (to VE2AFC)
- HB9VXO-HB0VXO (to DLACE)
- HK6BOG, J. Toro, Box 388, Manizales, Colombia
- HL9VX (via W4ZKI; see text)
- KC6ES, E. Sugiyan, Koror, Palau Is., W. Carolines, 96940
- MP4s HGW BGX BGY (via K9CSM)
- OK2ABU, Box 50, Zdar, Czechoslovakia
- OY9LV (via W3HNK; see text)
- PA9HX, V. Hoof van Huijsduijnen, Willem de Zwijgerlaan 97, The Hague, Netherlands
- PJ9VR, Box 692, Curacao, N. A.
- SU1MA, A. Attia, Box 840, Cairo, Egypt, U. A. R.
- TF2WLW, Box 109, 932nd AC&W Sqn., FPO, New York, N. Y., 09571
- VK9BS (via W3HNK; see text)
- VP2s KK LZ VI (via W3EVW)
- VP2MA, P.O. Box 74, Plymouth, Montserrat, W. I.
- VORAM, St. Antoine Sugar Estate, Poudre d'Or, Mauritius
- VR2FT, L. Higginbotham, P.O. Box 3722, Samabula, Fiji Is.
- VS6AA (via K8UDJ; see text)
- W3AWU/YB6, 3030 Marshall Rd., Pittsburgh, Penna., 15214
- WB2NCS/VP9, G. Dorsey, Comm. Div., NavSta, Bermuda, FPO, New York, N. Y., 09560
- YB2AJ, Box 2127, Djakarta, Indonesia
- YB8AAD (via K9CSM)
- YB9AB, P.O. Box 2127, Djakarta, Indonesia
- YS1RBE, R. Brandon, P.O. Box 687, San Salvador, El Salvador
- YV3OW, Box 41, Acaragua, Venezuela
- ZL2BGJ, G. Ashton, 6 Roys Rd., Plimmerton, Wellington, N. Z.
- ZP5HJ, Baptist Hospital, Casilla 1171, Asuncion, Paraguay
- 4X4RO (via VE4AE; see text)
- ex-5W1AZ (to ZL2BGJ; see text)
- 7Z3AB (via W5NOP; see text)
- ex-8R1S (to 5H3MA via W9JVF)
- 9H1A, Villa Gloria, TA'Xbiex Terr., TA'Xbiex, Malta
- 9K2As CA CB CC (via K9CSM)
- 9M2FR, RIMV Ofc., Raub, Dahang, Malaysia
- 9M6s HM TF (via K6ZIF)
- 9V1s OI OX (via K9CSM)

DJ2JB/YB (via DARC)
DL5ZG (via VE3CAA)
DL7NS/OH0 (via DL7MQ)
DL7NX/OH0 (to DL7NX)
EA0DEG (via URE)
ex-EL2Z (to PA9HX)
FR7ZL/t (to FR7ZL)
GB0DCF (via G3KQB)
GB2UM (via G3VUM)
GB3SUA (via RSGB)
GC8HT (see text)
GD3GMH (via GW3NWW)
HB0AFM (to HB9AFM)
HB0GJ/t (to HB9GJ)
HK0WO (via HK3VA)
HM1AY/XV5 (via KARL)
HS1KA (via PA0RR)
HS2JR (via DJ1RR)
JX3NM (via NRRL)
JX5CI (via W2CTN)
K4A/KC4 (via WA4WIP)
KX6EQ/KC6 (to KX6EQ)

KX6FN/KC6 (to KX6FN)
LA5ID/g/mm (via NRRL)
OX5AN (see text)
PY0RE (via PY1HX)
SM5AA/OH0 (to SM5AA)
ex-SV0WM (via K9CSM)
TA1RF (to DJ4SK)
VF2WLS (via WA5RTB)
VK0KB (via W1A)
VP2GBL (via W4YHB)
VP2VT (to VE2AFC)
VP9BK (via VE2DCY)
VQ8GBD (to VQ3CD)
Y09/A/D (via W1ECI)
ZD8JL (via W9JVF)
ZF1DT (via WB4BND)
ZL5AB (via NZART)
ZS1ANT (via Z58N)
1N2A (via W4VPD)
3A0EF (to F9RM)
5H3MA (via W9JVF)

band from W9VDA. Thus the more Test QSOs accumulated, the more QTC are available to parlay into additional points. **Scoring:** Multiply combined QSO and QTC points collected on all bands by the combined numbers of multipliers collected on all bands, the latter deriving from DARC's Worked-All-Europe Countries List — CT1 CT2, Germany, Spain, EA6, EI F FC G GD GI, Scotland, Shetlands, GW HA, Switzerland, Liechtenstein, HV I IS IT, Norway, Bear Island, JW JX LX LZ, San Marino, OI OH OI OK ON OY OZ, Holland, Andorra, Sweden, SP, Greece, Rhodes, Crete, European Turkey, TF UA UV UY UW/UZI-6 UB/UT/UY5 UC UN UO UP UQ UR, Franz Josef Land, YO YU ZA ZB1 3A and 9H1. Entries go to W. Skudlarek, DJ6QT, An der Klostermauer 3, D-6471 Hirzenhain, W. Germany, postmarked no later than September 15, 1969 (c.w.) or October 15, 1969 (phone). Top Test performances in many regions will be rewarded with testimonials of merit. **Note:** Work no more than 36 of the 48 available hours each week end, and divide the 12 hours not used into no more than three rest periods. East Germany's c.w.-only WADM Contest comes off October 18th-19th, specs due here later. Iceland briefing thanks to TF2WLW (WA0GQI): "Completed my first week on the air and will spend considerable time in the contests. After operating W3MSK and WA6NKC in DX activities it's great to be on the DX end. TF2s can't use 80 meters at present but are permitted 7-7.1, 11-14.35, 21-21.45 and 28-29.7 MHz. My antenna plans call for a two-element quad on 10 through 20, a trap ground-plane on 40 through 10, a phased array for the States on 40, a dipole and Marconi on 80. Had ideas for a Yagi on 7 MHz, but wind and ice here would be too rough. My rig is an HW-100 with SB-640 v.f.o., already good for 75 countries and 25 states. Looks as though the Pacific will be difficult from this spot, no VKs or ZLs heard as yet, but Asia and Gus come through great." Djs 4WG 9MH and DL4CE (W4CJD) expect to sign HB0VXO in Liechtenstein on the 6th-12th of this month. Watch c.w. spots thirty kHz above the low edges, plus 3795, 7195, 14,230, 21,330 and 28,530 kHz. on sideband. G4RJ's daughter vacationed pleasantly with W8YGR and family this spring. Jack and Bert became fast friends via 20 and 40 c.w. before Rowena was born. S.a.e. plus IRCs will get you info on Cannon Chase Amateur Radio Society's WAB (Worked All Britain) certification from proprietor G3ABG. Working 300 of 3960 British "areas" in 30 of the 98 U.K. counties since 1945 is a minimum objective. W3MR hints, "Most future International Telecommunications Union sessions are scheduled for Geneva so look for more 4U1TU activity. ITU operation from India next year is a possibility." LA0AF's four watts pour into W3PN on 15 sideband. Henry finds him still readable at the 10-30 milliwatt level. GB2HRI, commemorative station at the Prince of Wales invitation last month, was manned on several bands by Gws 2HFR 3IEQ 3NWW 3OXU 3VBX 5YB and G3WET. WA1FHU says HA5DM needs only Maine to wrap up his fancy fifty. "I'm now active as GM5AMX at Dunoon on 10 through 80 with a TR-4, dipoles and a beam," announces WB2LDU. "There are about six GM5s on the air." "The 4L3A active in the c.w. portion of the recent Russian DX test operated from Abkhaz in UF6-land," enlightens Cyrillic student K3CUI. DL4ER plans DXcursions to HB0, LX and 3A this season. G4RS is net control for the Royal Signals club net on 21,375 kHz. at 1330 GMT, Sundays. Member W3RX assures, "Joiners are welcomed and all continents participate." More from the Continent culled from clubs' literature: ARI, P.O. Box 336, 80100 Naples, Italy, is the source of a new Naples certification of notable interest to collectors. SV0WN's new linear delivers Crete credits to far corners near 14,225 kHz. at 0330 GMT or so. JW8MI anticipates a year's Spitzbergen stay with a sideband/c.w. kilowatt on 10 through 80 especially 14,050 and 14,195 kHz.

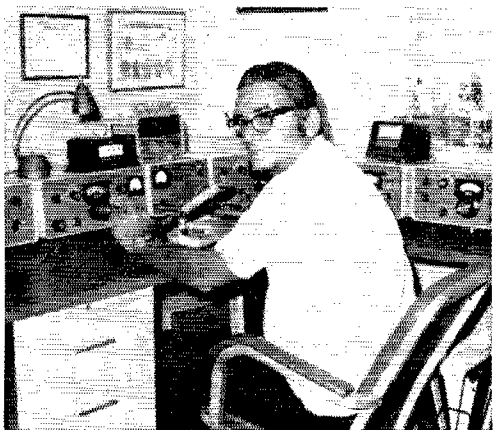
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ASIA—JARL (Japan) invites world-wide participation in its 10th All-Asian DX Contest from 1000 GMT August 30th to 1600 the 31st wherein non-Asians work Asians on 1.8 through 28 MHz. Non-Asians will work Asians on c.w. only exchanging serials consisting of RST plus the operator's age. (YLs are permitted to substitute two zeroes for the latter figure.) Final score derives from total contacts multiplied by total band-countries worked. Single and multiband categories are available but only single-operator activity is permitted. Score one point per contact and use the ARRL Countries List to figure your Asian multipliers. Entries must arrive at the JARL Contest Committee, P.O. Box 377, Tokyo Central, Japan, no later than December 28, 1969. In October there's a KR6 contest on the 18th-19th and an OI5 DX affair on the 4th-12th—details later. "It's been fun being EP3AM and it is with great regret I have to QRT," writes Uncle Sam's former ambassador to Iran. W3MFV understands Armin will shoulder duties as our envoy to Japan. TAIHY, writing W5QXP, says Turkey's nationals have been attracted to the sport in number. Among the most active are TAs 11B with a 753 rig, 1KT and 1RT (brother and sister) using an HW-32, 1MGP with 200 homespun watts, and

We 1BGD/2 1CW 1YYM 5QXP 9EXE 9JVF, Ks 3GKU 4AYO, WA5 LJKZ 3BHJ 5PPZ 8YXE 9ZCP, WB4EPJ, WN2GMC, VE3s CDF/W9 GLG, Columbus Amateur Radio Association *C.A.R. Scope* (WBZCQ), DARC's DX-MB (DL3RK), *DX News-Sheet* (G. Watts, 62 Bellmore Rd., Norwich, New York (KA2LE)), International short wave League Nor. 72 T., (England), Far East Auxiliary Radio League Monitor (A. Miller, 62 Warwick Ln., Selly Oak, Birmingham 20, England), Long Island DX Association *DX Bulletin* (W2GKZ), Newark News Radio Club *Bulletin* (L. Waite, 39 Hannum St., Ballston Spa, N. Y., 12020), North Eastern DX Association *DX Bulletin* (KIIMP), Northern California DX Club *DXer* (Box 808, Menlo Park, Calif. 94025), Southern California DX Club *Bulletin* (WA6GLD), Utah DX Association *Bulletin* (K7DEQ), *UBA's On the Air* (OVN 4D 5VA), *VEIRON's DXpress* (PA4s FX LOU TO VID WWP) and West Coast *DX Bulletin* (WA6AUD) are responsible for that roundup and much of the chatter to follow. Care to help?

Whence:

EUROPE—DARC (Germany) invites amateurs throughout the world to participate in its WAE DX Contest, No. 15 in the series, scheduled for c.w. from zero GMT August 9th to 2400 the 10th, and phone on September 13th-14th, same times. Non-Europeans will trade RST001, RST002, etc. (no "T" on voice, natch) with Europeans once per band at one point per QSO (2 points per 3.5-MHz. QSO). Additional points are yours by sending "QTC" (QSO reports) to European stations at one point per QTC. Each QTC consists of (1) time in GMT, (1) station call, and (3) QSO number of any previous WAE Test contact. For example, W9VDA raises DJ9YL and earns a contact point thereby; W9VDA previously worked G3LUV at 1207 GMT for G3LUV's 90th Test QSO. So, in addition to the QSO point for his serial swap with DJ9YL, another point goes to W9VDA if he successfully transmits "1207/G3LUV/096" to DJ9YL. W9VDA can work DJ9YL later on the same band only for sending more QTC. Over the entire Test period each QTC can be sent to Europe by W9VDA but once, and DJ9YL can accept no more than 10 QTC per



KP4RK, top Puerto Rico DX hound, is Mr. Ham Radio down his way. Jose's club activities and associated literary contributions are widely known and appreciated.

3EA with an HW-16. The TA1 call area is European Turkey, you know, but Halit can pop over to Asia in fifteen minutes. KAUCQ-W8KFKY notes that Ankara's TA2E likes spots 27 kHz inside the low edges, 1.8 through 28 MHz, code only. From VE4AE we hear "4XRQ operates primarily aeronautical mobile from a Boeing 720 while flying for EL AL. Oboe prefers frequencies near 21,250 kHz. "I intend to put Korea into upcoming DX contests," asserts HL9VX (WA4MSU). YAZHWI, who assigns a serial for each QSO, gave No. 2231 to WA1PHU. Laci also says UD6BW welcomes skeds for 5B-DXCC on 3501 kHz. New or renewed Far East Auxiliary Radio League memberships are claimed by KA5 ZAB (WA9EHD), 2BB (K9ILW), 2CW (W90DF), 2HT (K9VAH), 2OM (K6ASX), 2RM (W5QQQ), 5LI (WA6LIL), 8CG (K7JES), 9JS (WA5VNE) and 9RR (W8SAZF).

AFRICA—"5R8AN" is at Tananarive on a two-year stint for NASA," discloses K4LE. "He uses a KWM-2 and tri-band beam." W3HNK observes, "EL2B1 lost his quad in a Monrovia windstorm and is using a three-element Yagi temporarily." Former EL2Z, now PA9HX, expects to receive his own permanent PA9 tag shortly. "3V8AC operates 10 or 15 meters at 1700-1830 GMT, 20 meters around 0530, expecting to leave Tunisia by the end of the year," states W8ROF. WA9PRE/2 hears that 9Z2XZ plans more action on lower frequencies with more power and refined antennae. African oddments via periodicals of aforementioned clubs and groups: CT1KD should be back at CR3KD by next month. A projected meteorological installation on Bouvet isle next year or next could knock another rare one down to Easter's status. South Atlantic raftmobile LI2B is reported slightly audible around 14,217 and 14,234 kHz. ZD5V may be visiting California this month. Bandede cay, Wizard reef, Farquhar Aldabra, Glorioso, Geyser reef, Juan de Nova, the Comoros, Zanzibar and other nifties are menaced by restless W4BPD after productive Des Roches, Bertaut reef, and Etoile cay visits. Gus bucked island fever, rough weather and persistent gear problems in the early stages of his current tour.

OCEANIA—The Gilberts picture courtesy VR1Q: "I commenced operation from Tarawa March 19th and will be here for two years. My last activity was as ZL1AL/Kermadecs, 1966-'67. I'll be set up properly soon, primarily for 20-meter operation to the States, with a 350 donated by my good friend WA3ATP. VR1Q is also active here, and VR1L radiates from Ocean island." CR8AI is port superintendent at Dili," affirms W3ICQ. "Luiz and family will be in Timor for two years before their return to CR4-land." VE3CIP/W9 says 9M6s HM and TT keep Sabah available near 14,230 kHz. at 1500 GMT. K6ZIF, 14,235 kHz. at 1430, might grease the slot for you. VK8AF (W5ONL) meets VK8s AG AV AZ CI DM KK ZKA and ZSJ at Darwin Radio Club confabs. According to WN2DRS, VK3XB enjoys calling 21-MHz. Novices with his single-sideband sender. Really turns 'em on. Neighbor VK3AZY works W6OA on 15-meter c.w. solidly with less than a watt input at each end. Pacific pointers courtesy the clubs press: No ordinary marine mobile, IICL/mm has a Cygnat and balloon-slung wire aboard a rubber boat en route Tahiti from Peru. VR4EZ should be back at Ioniara early this

month. . . . ZL1AKI/am is said to appear on 3705 kHz while circling the globe in his miniplane.

HEREABOUTS—Caribbean capers are just the thing these days, and WB4MKU writes, "I'll probably concentrate on 75 meters during my trip through Central America, HK YV 9Y4 VP2 KP4 VP5 and VP7 beginning early this month." K9RHN warns of a tentative 10-kiloQSO 5B-DXCC program from PJ8MM come October. "Have my Anguilla license and await word from Dominica and Haiti," says KV4FZ (W9VXO), lately prominent as VP2s KK LZ and VI. Watch Herb's smoke on 1827, 3502, 7002, 14,195, 21,305 and 28,550 kHz. Anguilla's Boy Scouts received an HW-100 and accessories through the efforts of JA1DM, PJ7s JC VL VE3CUS and W9IGW. "This hoped that authorities will issue a special Anguilla call for PJ7VL to use while working with the Scouts on their radio project. W4GDS with QST v.h.f. scribe K4AYO rattled off 1400 ZF1DT QSOs on 3.8 through 50 MHz. in May. "Plan to return for more fun this month," vows Bill. K9GCE investigates the possibility of fostering an international DX convention at Sint Maarten next April. W9-DXCC's 17th annual banquet meeting erupts September 20th in Chicago with an action-packed program. Rush inquiries to W9-DXCC, 3104 Harrison St., Glenview, Ill. W3HNK reported KV4EY hospitalized at New York in June, condition serious. W7IEU will activate several rare Washington counties for the overseas gang early next month on c.w., 60 kHz. inside the low edges of 10 through 80 meters. WA4ZUU feels that W9DY's Gus Machine simplifies c.w. too much for phone guys. It can't copy for 'em, though, Russ. "I'm working 14,245-14,255 kHz. beginning 2300 GMT week days," specifies HH9DL. "Eighty per cent of my recent most rare c.w. contacts should be credited to my Extra privileges," figures WB1X/2. WB6VVS finds his new Advanced ticket DXcellent, too, and will sit for his Extra this summer. SM5BOE visited W3CES this spring. He's Scandinavian linguist for Vatican Radio. "Listening pays off," guarantees K8TRF, dimly viewing so much CQ-DXing on 20. "Would like to attend the next DXHPDS meeting," remarks K8UDJ. (Consider your grieving loved ones, Chas.) WA5MYR, formerly W9BNU-W9BNU, wants to see 100-country-per-band certifications made available as 5B-DXCC stepping stones. Such worthy ideas always depend on administrative feasibilities, of course. NCDXC charter members W6s BUY DUB EJA and TT are still going strong after 23 years of DXteibing club doings. W6s AM DZZ and JKJ run 1-2-3 among the organization's 5B-DXCC fans. Grab W7YBX quick for attendance details on the Northwest DX Convention scheduled for the 2nd-3rd of this month in Seattle. Western Washington DX Club will be host. T18WPE desires to hear from ambitious parties interested in a joint Cocos isle (T19) venture at the earliest. W8ZCQ of the CARAscope's DX department thinks maybe WWV should have its Ouija board tubes checked. Guess the north Atlantic path is often only "N6" when other paths are wide open, or vice versa. Anyway, DX men will continue to make their own highly accurate instantaneous propagation evaluations of any path at any time, "U1" or "W2" notwithstanding. QST

VE/W Contest Announcement

(Continued from page 65)

| | | |
|-----------------------|-----|------|
| Alberta | VE6 | ALTA |
| British Columbia | VE7 | BC |
| Yukon | VE8 | YUK |
| Northwest Territories | VE8 | NWT |

6) Scoring: Count two points for each completed exchange. Incomplete contacts do not count. Final score equals QSO points x sections.

7) Reporting: Follow the sample log shown below. Check sheets are required for every entry consisting of 100 or more QSOs. ANY LOG OMITTING CROSS-CHECK SHEETS OR A SUMMARY SHEET WILL NOT BE CONSIDERED FOR COMPETITIVE QST LISTING OR AWARDS. Such logs will be counted as check logs and processed accordingly. Entries must be postmarked no later than October 31. All entries become the property of the committee and none can be returned. Participants are encouraged to submit station photos and comments.

8) Awards: Certificates will be awarded to the highest scoring c.w. and phone entry in each section. Certificates for high scoring multi-operator entries will be issued only when there are at least three entries per section. Phone and c.w. scores will be listed separately. A trophy will be issued to the high scoring Canadian and to the high scoring U.S. entry.

9) Mailing: Please make sure that your call and section are on each page, and especially on the top left-hand corner of your envelope. Maillog to: VE/W Committee (VE2BGJ and VE2DCW), 676 Wiseman Ave., Outremont, Quebec, Canada. QST

Strays

The Puget Sound Council of ARC will issue a Governor's Certificate to qualify amateurs during Washington State Amateur Radio Week, September 1 through 7. The certificate, signed by Governor Daniel J. Evans, will be sent to out-of-state hams who contact ten Washington State hams, and in-state hams who contact twenty other Washington hams during the above period. Send list of stations worked, their QTH, and dates of the contacts to: The Puget Sound Council of ARC, Drawer A, McChord AFB, Washington 98438.

Operating News

GEORGE HART, WINJM,
Communications Manager

ELLEN WHITE, WIYYM,
Deputy Comms. Mgr.

Administration: LILLIAN M. SALTER, WIZJE

DXCC: ROBERT L. WHITE, WICW
Contests: ROBERT HILL, WIARR

Training Aids: GERALD PINARD
Public Service: WILLIAM O. REICHERT, WA9HHH

The Dead Band. Question: When is a dead band not necessarily a dead band? Answer: When everyone is listening to find out if anything can be heard. How often have you listened on 15, 10, 6 or 2 meters and, not hearing anything, concluded that the band is dead, or at least "nobody on" and turned off your receiver? Plenty of times, we'll bet. If everybody listens and nobody transmits, all the bands will be "dead" all the time.

There are usually commercial stations adjacent to 15 (and sometimes not so much adjacent as inside the band!) which can be used as beacons, and sometimes this is also true on 10, but on 6 or 2 the band might be wide open for one kind of propagation or another without anybody knowing it — unless somebody says something. So, say something! Not just a "Hello test, W1 So-and-so testing," but call a CQ. If no answer, try it again, and again, before you give up and conclude that there is no one in range of your signal.

For at least a couple of hours each day, WIAW's code practice and bulletins can be used in some areas of the country to determine the extent to which the band is open. See the WIAW operating schedule (p. 103) for details. Before long, WIAW will be serving as a beacon on 6

and 2 meters during extended hours, but at the moment of writing this is still in the planning stages. Right now, listen on 50.02 and 145.6 Mc. from 0130-0230, 1300-1400 and 2330-2400 GMT (and get yourself some code practice while you're at it!) and at 0000 and 0400 for c.w. bulletins. Also, listen on 50.12 and 145.6 Mc. at 0100 and 0330 GMT for phone bulletins.

But if you don't hear anything, say something, make your presence known, before you give up.

Roger the Dodger. The World War II JAN phonetic alphabet may have been a bust as far as the theoretical precepts of understandability were concerned, but it sure did get a lot of use and hung on far into peacetime even among those who hated the associations and memories it brought. Even today we still use "Roger" as the signal meaning that something was "received." You never heard anyone say "Robert" when ARRL was pushing its own alphabet, and you scarcely (if ever) hear anyone say "Romeo" now. It was and still is "Roger" and its variations of "Roger Wilco," "Roger Dodger" or even (aaargh!) "Roger Roger Roger and a Dodger Dodger" occasionally on 75.

Of course the use of R on c.w. dates back before "Roger" on voice. R on c.w. and "Roger"

OPERATING EVENTS (Dates in GMT) ARRL-IARU-Affiliated Club-Operating Events

| August | September | October |
|---|--|---|
| 2-3 Illinois QSO Party (p. 111, July QST). Md.-D.C. QSO Party (p. 110, July QST). | 4 Qualifying Run, W6OWP 6-8 Washington State QSO Party (p. 124, this issue). | 1 Qualifying Run, W6OWP 4-5 VK/ZL, phone 4-6 RTTY Medallion SS |
| 2-4 Missouri QSO Party (p. 122, July QST). | 11 Qualifying Run, WIAW 13 Frequency Measuring Test (p. 100, this issue). | 4-12 Lebanese DX Contest 11-12 CD Party, phone* VK/ZL, c.w. |
| 5 Qualifying Run, W6OWP | 13-14 VHF QSO Party (p. 59, this issue). | 15-16 YL/AP, c.w. |
| 9-10 WAE, c.w. (p. 97, this issue). | 13-14 WAE, phone (p. 97, this issue). | 17 Qualifying Run, WIAW |
| 13 Qualifying Run, WIAW | 22 High-Speed Code Test | 18-19 GD Party, c.w.* KR6 Contest WADM |
| 16-17 New Jersey QSO Party (p. 114, this issue). Indiana QSO Party (p. 106, this issue). | 24-26 YL "Howdy Days" 27-28 VE/W Contest (p. 65, this issue). | * League Officials and Communications Dept. appointees, only. |
| 23-24 South Carolina QSO Party (p. 130, this issue). | | Nov. 8-9 SS, phone 15-16 SS, c.w. |
| 30-31 All Asian DX Contest (p. 97, this issue). | | |

NOTE: Possible W6OWP Qualifying Run "alternate" (same times and frequencies) is W6ZRJ.

on voice means "received," and that's *all* it means. It does not mean "I agree," "yes," "right," "I will comply"—or even "I understand." It means only that you have received correctly and completely the transmission just made. It is not the answer to a question. It is perhaps the most misused procedure signal in the amateur lexicon.

The above should be enough, but unfortunately many amateurs continue the misuse of this letter and phonetic equivalent. The standard comeback to a station you are in contact with is R on c.w., "roger" on phone, but all too often this is followed by indication that not all was received—thus, a contradiction. You received it all, but you missed his handle, his QTH and your report.

It is quite common on phone to answer "Roger" when someone asks you a question; don't be surprised if the questioner stands by waiting for the answer, because "Roger" is just the acknowledgement that you received the question. On the other hand it is not unusual that both participants interpret the signal incorrectly and everything is fine. Fine, that is, except for one thing—pollution of language arising from acceptance of incorrectness.

But wait a minute—did we say R means *only* "received"? It also means "routine," as a message precedence. Even here it is misused, in this case as a part of the message number.

WA6PUL states the case for R and "roger" very succinctly. "An amateur," he says, "is automatically set up mentally to be an auto-



Meet Your SCM

Michigan SCM Joe Pontek, K8HKM, paid Headquarters a welcome visit in mid-June of this year. In fact, here's a shot of him operating the WIAW "visitor's console!" Joe has been licensed since mid-1957, with considerable past and present activity in the Central Michigan Amateur Radio Club, the Greater Lansing DX Group and the Michigan Council of Amateur Radio Clubs. He enjoys just about all phases of amateur radio on 80 through 2 meters, particularly low-frequency operation. (He has WAS and WAC for 40-meter c.w. only.) His station gear includes a T-4XB with 4-1000A/3-1000Z Linear, dipoles on 80 and 40 and a 2-element quad for 20-15-10. Joe says amateur radio doesn't permit much time for other hobbies but he does enjoy water skiing, swimming and ice skating. K8HKM is a Technical Representative for Xerox, has an understanding wife and two daughters under 4. (Photo by WTUED.)

FREQUENCY MEASURING TEST SEPTEMBER 13

ARRL invites every amateur to try his hand at frequency measuring when WIAW transmits signals for this purpose starting at 0130 GMT, Sept. 13. **CAUTION:** Note that since the date is given in Greenwich Mean Time the early run falls on the evening previous to the date given by local time. *Example:* In converting, 0130 GMT Sept. 13 becomes 2130 EDST Sept. 12. The signals will consist of dashes interspersed with station identification. These will follow a general message sent to help listeners to locate the signals before the measurement transmission starts. The approximate frequencies used will be 3557, 7089 and 14,068 kHz. About 4½ minutes will be allowed for measuring each frequency, with long dashes for measurement starting about 0136. It is suggested that frequencies be measured *in the order listed*. Transmission will be found within 5 or 10 kHz. of the suggested frequencies.

At 0430 GMT, September 13 WIAW will transmit a second series of signals for the Frequency Measuring Test. Approximate frequencies will be 3568, 7088 and 14,091 kHz.

Individual reports on results will be sent **only to ARRL Official Observers** who take part and submit entries. When the average accuracy reported shows error of less than 71.43 parts per million, or falls between 71.43 and 357.15 parts per million, participants will become eligible for appointment by SCMs as Class I or

Class II OOs respectively. ARRL Frequency Measuring Tests are used to aid qualification of ARRL members as Class I and Class II observers. Present observers not demonstrating the requisite average accuracy will be reclassified appropriately until they demonstrate the above-stated minimum required accuracy. Class I and Class II OOs must participate in at least two FMTs each year to hold appointments. SCMs (see listing page 6) invite applications for Class III and IV observer posts, good receiving equipment being the main requirement. All observers must make use of cooperative notices, reporting activity monthly through SCMs, to warrant continued holding of appointment.

Although OOs **only** will receive individual reports, any amateur may submit reports for *QST* Honor Roll listing.

Any amateur may submit measurements on one or all frequencies listed above. No entry consisting of a single measurement will be eligible for *QST* listing of top results. Listing will be based on overall *average* accuracy, as compared with readings made by a professional lab. If you're troubled by GMT, send for Operating Aid 10.

WIAW will transmit the official readings for the Sept. 13 FMT via a special bulletin (on or about September 25). Thus, for OOs to qualify for an official written report, results must be received at ARRL Hq. no later than September 24.

BRASS POUNDERS LEAGUE

Winners of BPL Certificate for May Traffic:

| Call | Orig. | Recd. | Del. | Total | |
|---------|-------|-------|------|-------|------|
| K6BPI | 6282 | 1855 | 1876 | 179 | 9992 |
| K5TBY | 2 | 1336 | 1312 | 4 | 2654 |
| K5BNH | 11 | 1257 | 1327 | 80 | 2475 |
| W3CUL | 147 | 1090 | 1071 | 61 | 2369 |
| K9ONK | 153 | 794 | 782 | 19 | 1748 |
| W3CUL/4 | 96 | 594 | 521 | 53 | 1264 |
| W1OJM | 4 | 605 | 603 | 2 | 1214 |
| W8AUP1 | 31 | 561 | 541 | 13 | 1146 |
| W6GYH | 31 | 503 | 484 | 5 | 1023 |
| W6RSY | 1 | 491 | 315 | 165 | 909 |
| W9JYO | 559 | 193 | 169 | 24 | 945 |
| W8BETX | 182 | 367 | 345 | 19 | 913 |
| KH6GHZ | 416 | 238 | 104 | 126 | 884 |
| W3VR | 91 | 394 | 382 | 4 | 871 |
| K3NSN | 201 | 432 | 165 | 60 | 858 |
| W4ASCK | 28 | 412 | 384 | 5 | 829 |
| W4LIG | 26 | 390 | 370 | 25 | 811 |
| W0LES | 0 | 377 | 377 | 0 | 754 |
| W4GLWE | 16 | 359 | 244 | 131 | 750 |
| W82WFJ | 28 | 344 | 190 | 154 | 716 |
| W3EML | 53 | 389 | 293 | 1 | 716 |
| W8UHF | 3 | 368 | 327 | 28 | 716 |
| W0DQN | 26 | 315 | 314 | 1 | 656 |
| W9PWH | 14 | 315 | 309 | 4 | 642 |
| K8LNE | 11 | 329 | 287 | 13 | 640 |
| K9PZX | 7 | 288 | 280 | 2 | 577 |
| K7EQZ | 18 | 279 | 248 | 23 | 568 |
| W43KEW | 115 | 246 | 127 | 64 | 552 |
| W48QQ | 25 | 249 | 250 | 7 | 531 |
| W48WZF | 4 | 262 | 254 | 8 | 528 |
| W4ZBAN | 18 | 253 | 210 | 40 | 521 |
| W9CXY | 7 | 256 | 251 | 5 | 519 |
| W4ADYL | 12 | 254 | 243 | 8 | 517 |
| W3MFX | 99 | 242 | 150 | 14 | 305 |

| Late Reports: | WAZUWA (Apr.) | 50 | 1270 | 1202 | 4 | 2526 |
|---------------|---------------|----|------|------|---|------|
|---------------|---------------|----|------|------|---|------|

BPL for 100 or more originations-plus deliveries

| | | |
|------------|------------|-------------------|
| K9NBH 281 | WA9QQQ 128 | W9EQO 108 |
| WA5KIV 253 | W1FXL 123 | WB8UTC/4 105 |
| W4AM 238 | W9ICU 120 | W4EUV 103 |
| W5JSM 201 | W2OP 111 | W4BDL 102 |
| W6MLF 166 | W43IUV 111 | W4ZEDU 100 |
| WA9TUM 139 | W3TFN 111 | Late Reports: |
| W4SDWL 132 | W46BYZ 107 | WA9MZW (Apr.) 166 |

More-Than-One-Operator-Stations

WA4ECY 368

BPL Medallions (see July, 1968 *QST*, p. 99) have been awarded to the following amateurs since last month's listings: WA3IHW, WA3JWF, K8LJL, WA9AKR, W9HOT.

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 origination and delivery points of 100 or more for any calendar month. All messages must be handed on amateur frequencies within 48 hours of receipt in standard ARRL form.

and New York City-Long Island. Starting with the next *QST* election announcement (Oct. *QST*), all candidates will be required to meet the two-year membership requirements, whether or not the announcement is a repeat. — *WINJM*

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, in good standing, are required on each petition. No member shall sign more than one petition.

Each candidate for Section Communications Manager must meet the following requirements prior to deadline date listed below: (1) Holder of amateur Conditional Class license or higher. (2) A licensed amateur for at least two years immediately prior to nomination. (3) An ARRL full member for at least two years immediately prior to nomination. Petitions must be received on or before 4:30 P.M. 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 and station call of the candidate and signers should be included with the petition. It is advisable that eight or ten full-member signatures be obtained, since on checking names against Headquarters files, with no time to return invalid petitions for additions, a petition may be found invalid by reasons of expiring memberships, individual signers uncertain or ignorant of their memberships status, etc.

Elections will take place immediately after the closing dates specified for receipt of nominating petitions. The ballots mailed from Headquarters to full members will list in alphabetical sequence names of all eligible candidates.

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 St., Newington, Conn. 06111

We, the undersigned full members of the

..... ARRL Section of the

Division, hereby nominate

as candidate for Section Communications Manager for this Section for the next two-year-term of office.

You are urged to take the initiative and file nominating petitions immediately.

— *George Hart, WINJM, Communications Manager*

| Section | Closing Date | SCM | Present Term Ends |
|-----------------------------|----------------|-----------------------|-------------------|
| Delaware | Aug. 11, 1969 | John L. Penrod | Oct. 10, 1969 |
| Manitoba | Aug. 11, 1969 | John Thomas | Oct. 10, 1969 |
| Virginia | Aug. 11, 1969 | H. J. Hopkins | Oct. 11, 1969 |
| Rhode Island | Aug. 11, 1969 | John E. Johnson | Oct. 12, 1969 |
| Indiana | Aug. 11, 1969 | William C. Johnson | Oct. 14, 1969 |
| Vermont | Aug. 11, 1969 | E. Reginald Murray | Oct. 17, 1969 |
| Santa Barbara | Sept. 2, 1969 | Cecil D. Hinson | Aug. 10, 1968 |
| East Bay | Sept. 2, 1969 | Richard Wilson | Feb. 10, 1969 |
| Canal Zone | Sept. 10, 1969 | Russell L. Oberholzer | Nov. 10, 1969 |
| Hawaii | Sept. 10, 1969 | Lee R. Wical | Nov. 11, 1969 |
| Eastern Florida | Sept. 10, 1969 | Wm. G. Blasingame | Resigned |
| Wisconsin | Oct. 10, 1969 | Kenneth A. Ebner | Dec. 10, 1969 |
| Oklahoma | Oct. 10, 1969 | Cecil C. Cash | Dec. 11, 1969 |
| Ontario | Oct. 10, 1969 | Roy A. White | Dec. 12, 1969 |
| Illinois | Oct. 10, 1969 | Edmond A. Metzger | Dec. 15, 1969 |
| Western Florida | Oct. 10, 1969 | Frank M. Butler, Jr. | Dec. 15, 1969 |
| New York City & Long Island | Oct. 10, 1969 | Blaine S. Johnson | Jan. 2, 1970 |

ELECTION RESULTS

Valid petitions nominating a single candidate as Section Manager were filed by members in the following Sections, completing their election in accordance with regular League policy, each term of office starting on the date given.

| | | |
|-------------|-------------------------------|---------------|
| West Indies | Jose Medina Hernandez, KP4CO | May 1, 1969 |
| New Mexico | James R. Prime, D.V.M., W5NUI | May 9, 1969 |
| W. Mass. | Percy C. Noble, W1BYR | Aug. 11, 1969 |
| Kansas | Robert M. Summers, K0BFX | Aug. 18, 1969 |

didact and many, if not most, have achieved licensure by this means. It is hoped that intelligence of this level will eliminate, at least partially, the dreary repetition of this term on the air."

SCM Membership. Effective with all SCM elections called subsequent to May 3, the date of the termination of the recent Board Meeting, SCM candidates are required to have been an ARRL full member for two years immediately preceding nomination. Elections which were called prior to that date still take the one-year rule.

Since copy for the June issue of *QST* was prepared prior to the Board Meeting, all elections called in that issue (p. 101) take the one year rule. Elections called in this issue (see next column) except those which are repeats of June *QST* calls, all take the two-year rule.

Confusing? Sorry about that. To be specific, of the elections called on this page, only the following take the two-year rule: Wisconsin, Oklahoma, Ontario, Illinois, Western Florida,

DXCC Notes

Announcement is hereby made of the deletion of Iñi from the ARRL Countries List. Only contacts made before May 13, 1969 will be creditable toward the Iñi listing. Contacts with stations located in the former Spanish territory of Iñi made after that date will be counted toward the Morocco listing. This deletion will affect Honor Roll totals as of Aug. 1, 1969. Therefore, Honor Roll submissions for the month of Sept. 1969 will be based on deleted totals of 312 CW/F and 311 Phone.



5BDXCC Plaques Ready!

Here's what you'll be getting (after qualifying for 5BDXCC, that is!). This handsome 9"×10" plaque (7 colors) carries an engraved plate (noting serial number, call and date of issuance). See October 1968 QST (page 110) for rules for this brand-new award. Are you ready for the low-frequency bands this season?



DX CENTURY CLUB AWARDS



From May 1, through May 31, 1969, DXCC certificates based on contacts with 100-or-more countries have been issued by the ARRL Headquarters to the Amateurs listed below.

New Members

| | | | | | |
|----------------|----------------|-----------------|----------------|----------------|----------------|
| 5H3KJ.....216 | WA5LFD.....118 | K6DYQ.....108 | PJ2ARI.....104 | IICFF.....100 | W4PGW.....100 |
| DJ8FC.....207 | K3TZY.....115 | JA2FCJ.....107 | F8A.....103 | K3RCM.....100 | W4HLE.....100 |
| JA2JKV.....205 | WA1HNR.....115 | WA8WAMH.....107 | K2QBW.....103 | K6TWT.....100 | W84CV.....100 |
| JA3DGC.....172 | JA2HNP.....114 | DJ3OB.....106 | WA8CUV.....103 | K7AOZ.....100 | W8BRZB.....100 |
| K6CNV.....166 | SM0DYE.....114 | G3BRK.....106 | JA2UJ.....102 | WALJTM.....100 | W8KTG.....100 |
| PO8BV.....163 | K6NL.....113 | K8MG.....106 | WA2BFL.....102 | W2DUN.....100 | W8MJE.....100 |
| VE5XJ.....163 | WB2QFV.....110 | WA0UFS.....106 | LZRF.....101 | W2RPZ.....100 | WA8NXL.....100 |
| WB6FRD.....134 | WA8BC.....110 | VE3CP.....105 | WA1FBL.....101 | W3HMQ.....100 | |
| WB2WMQ.....120 | DL9UM.....109 | G3EJA.....104 | I1BPD.....100 | W4OF.....100 | |

Radiotelephone

| | | | | | |
|----------------|----------------|-----------------|-----------------|----------------|----------------|
| PY3APH.....232 | DJ5GI.....144 | K4PHY/-.....108 | W8AKM.....108 | HA5BY.....103 | K4VSR.....100 |
| OE3WVB.....210 | DL6TZ.....143 | YV5.....115 | K1AJQ.....107 | YV1YK.....103 | K5MYM.....100 |
| WB6ISL.....208 | G3IUD.....127 | K4OCE.....112 | W4DJT.....107 | W1TIV.....102 | LA2BK.....100 |
| WA3HUP.....200 | W4TN.....122 | V86AJ.....110 | WA8WAMH.....107 | HK3AZX.....101 | WB4JCV.....100 |
| 5H3KJ.....193 | W8EM.....122 | DJ4VW.....109 | DL9UM.....106 | KA2LS.....101 | W5VBH.....100 |
| XE1OOL.....171 | K2UNY.....121 | WB28UG.....109 | DL6GT.....105 | KH6KID.....101 | W46FQ.....100 |
| JA2JKV.....150 | WB2WMQ.....120 | 6Y5AH.....109 | JA3DGC.....104 | W6DOD.....101 | W8KTG.....100 |

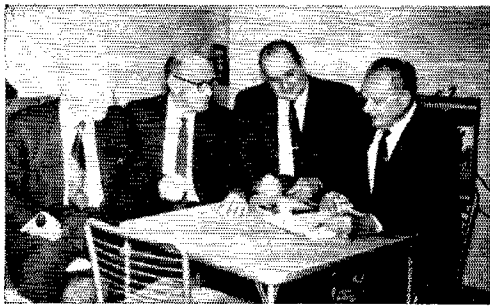
Endorsements

Endorsements issued for confirmations credited from May 1, 1969 through May 31, 1969 are listed below. Endorsement listings through the 300 level are given in increments of 20, above the 300 level they are given in increments of 5. The totals shown do not necessarily represent the exact credits given but only that the participant has reached the endorsement group indicated.

| | | | | | | | | |
|------------|------------|------------|------------|------------|------------|---------|------------|--------|
| 340 | W6ZFJ | PY7YS | K4HJE | WA6OIU | 180 | K4YXJ | K6BTT | HA5BY |
| Y2CK | ZS6LW | W4CEB | WB2UKP | | 11AUM | W2UJ | VF4AE | HB9AHL |
| | | VE6TP | W5MUG | 200 | KH6GLU | W4HY | WB2NDI | K1JMH |
| 335 | 315 | | W5RU | DL7AY | SM6CUK | W6DR | WA4EPM | K2MFY |
| W2CR | W1DGJ | 300 | WA9IVL | K1OBT | WA6THG | W6NTQ | WA5RTG | LA4VG |
| | WB2FSW | K3UZY | WA6CPX | KP4BJM | WB6SAZ | W6GC | W6ARG | VE6ARG |
| 330 | WB2HXD | K4ID | | VE3CDP/ | W9DE | W6JNM | W6JNM | W2KFB |
| W5FFW | W6VUW | W2QK | 240 | W9 | ZL2VN | WA8VFK | WA2WGS | WA2WGS |
| W7ADS | W9GB | | G2TA | W2II | | WA9TBA | WB2OUZ | WB2OUZ |
| W7CMO | | 280 | W8DX | W3HTW | 160 | DL1ND | WA9VIZ | W3CRE |
| | | W3PZV | | WA3GTX | G3JFF | DL7JY/- | YU1SF | W3NJK |
| 325 | W5FT | WA3ATP | | WA3IKK | HA5AW | W6 | | WA6JVD |
| W4JDR | | W0PAH | 220 | W4AOU | HC1TH | K4RTA | | W7FF |
| | | | K4CIA | W7GGO | I1POS | K4TTA | 120 | W9MRX |
| 320 | DJ0KQ | 260 | W3AES | W0AY | K4RTA | K5GUZ | DL5AO | WA9RAT |
| W5KTW | K2KER | G3JEC | | | | | | |

Radiotelephone

| | | | | | | | | |
|------------|------------|------------|------------|------------|------------|------------|--------|------------|
| 340 | 315 | 300 | K4HJE | W8VHY | 200 | W3MDJ | W6NTQ | WA8YBB |
| PY2CK | W1DGJ | F3DJ | WA3ATP | YV5CIL | DJ9JX | W6BRMZ | W7MSI | |
| | | K2KER | VE6TP | | OA4BS | 6W8DY | | 120 |
| 330 | 310 | 280 | W3EWW | | VE6DR | | | CR6HF |
| PA8HBO | KP4CK | K3UZY | YV4QG | 220 | W1FDL | | | HC1TH |
| W4PDL | PA0EEM | PA0EEM | | G2TA | W6KOE | 160 | | K7AXF |
| | WB2FSW | VE40X | 240 | K2GPL | WA9IVL | 11AUM | K4RTA | LA4VG |
| 325 | W6VUW | WA5LOB | FG7XL | VE4AS | ZL1AAS | K6JTO | KH6GLU | W1DWQ |
| VE3QA | W7ADS | W9DNE | K4RQZ | W2EYB | | VE3CDP/ | W9 | W2WNW |
| W1MMV | | | VE3EVU | WB2RLK | | W9 | KZ5FN | W6KG |
| | | 305 | WA2PQG | WB2UKP | 180 | VE3CZC | W2EV | WA6VSF |
| 320 | W2FGD | 260 | WA2OJD | WA6OIU | K6YUI | WA3IKK | W5WU | W7FF |
| ZS6LW | WB2HXD | IT1GAI | W5KTW | YV4UA | W3AES | W4AEL | W5BURS | WA8PWF |
| | | | | | | | WA8VFK | W9KRU |



Director Roy Albright, W5EYB, met with SCMs in Houston, Texas, on April 12. Attending (L-R) were Gene Harrison, W5LR, SCM No. Texas, Cecil Cash, W5PML, SCM Oklahoma, Jerry Sears, W5AIR, SCM So. Texas and West Gulf Director W5EYB.

W6OWP (W6ZRJ, alternate) will transmit a qualifying run on 3590 and 7129 kHz. 0400 GMT August 5. (In converting, 0400 GMT August 5 becomes 2100 PDST August 4.)

Code Practice

W1AW transmits daily code practice according to the following schedule. For practice purposes, the order of words in each line may be reversed during the 5-13 w.p.m. transmissions. (Each tape carries a checking reference.)

| Speeds | Local times/days | GMT times/days |
|-----------------------|--|----------------|
| 10, 13, 15 | 7:30 P.M. EDST daily 4:30 P.M. PDST | 2330 daily |
| 5, 7½, 10, 13, 20, 25 | 9:30 P.M. EDST S n TTh 6:30 P.M. PDST / Sat | 0130 MWFSn |
| " | 9:00 A.M. EDST MWF 6:00 A.M. PDST | 1300 MWF |
| 35, 30, 25, 20, 15 | 9:30 P.M. EDST MWF 6:30 P.M. PDST | 0130 TThSat |
| " | 9:00 A.M. EDST TTh 6:00 A.M. PDST | 1300 TTh |

ARRL CODE PROFICIENCY PROGRAM

Qualifying Runs

Any person can apply for an ARRL code proficiency award. Neither League membership nor an amateur license is required. Send copies of all qualifying runs to ARRL, for grading, stating the call of the station you copied. If you qualify at one of the six speeds transmitted (10-35 w.p.m.) you will receive a certificate. If your initial qualification is for a speed below 35 w.p.m., you may try later for endorsement stickers. Each month the ARRL Activities Calendar notes the qualifying run dates for W1AW and W6OWP (W6ZRJ, alternate) for the coming 3-month period.

W1AW will transmit a qualifying run on all listed c.w. frequencies at 0130 GMT August 13. (In converting, 0130 GMT August 13 becomes 2130 EDST August 12.)

The 0130 GMT practice is omitted four times a year on designated nights when Frequency Measuring Tests are made in this period. To permit improving 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 GMT dates and texts to be sent in the 0130 GMT practice on the following dates:

- Date Subject of practice text from June QST
 Aug. 11: *It Seems to Us*, p. 9
 Aug. 21: *The Mainline . . . Demodulator*, p. 24
 Aug. 29: *Clean Up Your Harmonics!*, p. 32
 Sept. 9: *Amateur Radio Public Service*, p. 68

- Date Subject of practice text from *Understanding Amateur Radio*, First Edition
 Sept. 10: *Velocity Factor*, p. 109
 Sept. 12: *Parallel-Conductor Line*, p. 109

W1AW SCHEDULE, AUGUST 1969

The ARRL Maxim Memorial Station welcomes visitors. Operating-visiting hours are Monday through Friday 1 P.M.-1 A.M. EDST, Saturday 7 P.M.-2:30 A.M. EDST and Sunday 3 P.M.-10:30 P.M. EDST. The station address is 225 Main Street, Newington, Conn., about 7 miles south of Hartford. A map showing local street detail will be sent upon request.

| | Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|------------------------|--|--------------------|---------------------|-------------------------|------------------------|--------------------|----------|
| 0000 | ← C.W.-OBS ¹ → | | | | | | |
| 0020-0030 ⁴ | | | 3.700 ⁶ | 14.020 | 14.020 | 7.150 ⁶ | 14.020 |
| 0030 | | | 3.700 ⁶ | 14.100 | 14.100 | 7.150 ⁶ | 14.100 |
| 0100 | ← Phone-OBS ² → | | | | | | |
| 0105-0130 ⁴ | | | 3.820 | 50.120 | 145.600 | 1.820 | 21.270 |
| 0130 | ← CODE PRACTICE DAILY ¹ (35-15 w.p.m. TTh Sat), (5-25 w.p.m. MWFSn) → | | | | | | |
| 0230-0300 ⁴ | | | 3.555 | | 1.805 | | 3.555 |
| 0300 | RTTY-OBS ³ | | | | RTTY-OBS ³ | | |
| 0310-0330 ⁴ | | | 3.625 | 14.095 | 7.095 | 14.095 | 3.625 |
| 0330 | Phone-OBS ² | | | | Phone-OBS ² | | |
| 0335-0400 ⁴ | | | 7.220 | 3.820 | 7.220 | 3.820 | 7.220 |
| 0400 | CW-OBS ¹ | | | | C.W.-OBS ¹ | | |
| 0420-0430 | | | 3.700 ⁶ | 7.020 | 3.945 | 7.150 ⁶ | 3.520 |
| 0430-0500 | | | 3.700 ⁶ | 7.080 | 3.945 | 7.150 ⁶ | 3.555 |
| 1300 | ← CODE PRACTICE ¹ (5-25 w.p.m. MWF), (35-15 w.p.m. TTh) → | | | | | | |
| 1700-1800 | | 21/28 ⁵ | 21/28 ⁵ | 21/28 ⁵ | 21/28 ⁵ | 21/28 ⁵ | |
| 1900-2000 | | 14.280 | 7.255 | 14.280 | 7.255 | 14.280 | |
| 2000-2100 | | 14.100 | 14.280 | 14.095 | 21/28 ⁵ | 7.080 | |
| 2200-2300 | | 21/28 ⁵ | 21.100 ⁶ | 21/28 ⁵ | 7.255 | 14.280 | |
| 2300-2330 | | | | RTTY OBS ^{3,7} | | | |
| 2330 | ← CODE PRACTICE DAILY ¹ 10-13-15 w.p.m. → | | | | | | |

¹ C.W. OBS (bulletins, 18 w.p.m.) and the code practice on 1.805, 3.52, 7.02, 14.02, 21.02, 28.02, 50.02, and 145.6 MHz.

² Phone OBS (bulletins) 1.82, 3.82, 7.22, 14.22, 21.27, 28.52, 50.12, and 145.6 MHz.

³ RTTY OBS (bulletins) 3.625, 7.095, 14.095, 21.095 and 29.015 MHz.

⁴ Starting time approximate. Operating period follows conclusion of bulletin or code practice.

⁵ Operation will be on one of the following frequencies: 21.02, 21.08, 21.27, 21.41, 28.02 or 28.52 MHz.

⁶ W1AW will listen in the Novice segments for Novices, on the band indicated, transmitting on the frequency shown.

⁷ Bulletins sent with 170-Hertz shift, repeated with 850-Hertz shift.

Maintenance Staff; W1s QIS WPR, K6OSO. *Times-days in GMT. Operating frequencies are approximate.

• 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, John L. Penrod, K3NYG—SEC/PAM: W3DKX. RM: W3EEB. Come on down to Harrington Aug. 17 for the Delaware Hamfest. W3GTZ reports four new Novices. WN3LIE, WN3LUL, WN3MCC and WN3MGR. WA3KFR, who has just received his General, did excellent in the SS and Novice Roundup. New officers of the U. of Delaware ARC are WA3GSM, pres.; WA3GQY, vice-pres.; WA3GKI, trustee; K3-VWQ, secy.-treas. WA3DUM boosted his signal level by moving to a new QTH. W3ZNF attended the New England Division ARRL Convention. Want to raise your e.w. speed for that Extra Class license? Checking into the MDD or MDDS e.w. traffic nets is an excellent way to accomplish this. Check with W3TRC or W3EEB for details. Net control stations of the Delaware nets: When you are Net Control, please send W3DEKX the number of check-ins and traffic handled. Net reports: DTMN, QNI 27, QTC 2; K3ECPN, QNI 33. Traffic: W3EEB 61, W3DKX 40, W3TRC 12, WA3HWC 7, WA3GAY 4, WDUM 2, K3NYG 2, WA3GSM 1.

EASTERN PENNSYLVANIA—SCM, George S. Van Dyke, Jr., W3HK—SEC: W3ICC. RMs: W3EML, K3-MYO, W3MPX, K3SLG. PAMs: WA3GLI, K3MYS, W3LF. PAM: W3FGQ. OBS reports were received from W3GD, WA3AFI, WA3HDI, WA3INC, WA3EEC, WA3-HGX and W3CBH; OVS reports from WA3FCZ, WA3-FEC, K3VAX, W3FGQ, K3WEU, WA3HDI, W3CL, WA3HIT and WA3HGX; OO reports from WA3IUU, W3KEK, W3NNC, K3WEU, K3HNP.

| Net | Freq. | Operates | QNI | QTC | RM/PAM |
|----------|--------|----------------|-----------|-----|------------|
| EPA | 3610 | Daily | 6:45 P.M. | 302 | 380 W3MPX |
| PTTN | 3610 | Daily | 6:00 P.M. | 280 | 169 W3MPX |
| ENTN | 3740 | Mon.-Wed.-Fri. | 7:15 P.M. | 97 | 74 WA3IUU |
| EPAEP&TN | 3917 | Daily | 6:00 P.M. | 449 | 282 WA3GLI |
| QTC | 7240 | Mon.-Fri. | 2:00 P.M. | 171 | 63 WA3AOJ |
| PFN | 3960 | Mon.-Fri. | 5:30 P.M. | 484 | 371 K3SLG |
| VHF (6) | 145.35 | Mon.-Fri. | 7:00 P.M. | 104 | 99 W3FGQ |
| VHF (2) | 50.25 | Mon.-Fri. | 8:00 P.M. | 79 | 32 W3FGQ |

The ENTN will operate daily throughout the summer. Recent FMT results are: W3EFF 0.3 p.p.m., K3EMA 76.2, WA3FBP 4.0, W3JET 7.0. WA3KKB reports the Hazelton High School ARC put on a drive for traffic and bagged 400 messages. WA3JWL got a Heath-kit phone patch for his birthday. W3CUL and W3VR are now back in 3-Land. W3EML is keeping busy with TCC. W3MPX now is operational on RTTY. WA3INC is a real workhorse on EPA. K3MVO reports QRN is up but doesn't bother his traffic total. K3WEU is off to Canada again this summer. The Penn Jersey YL Club was active during Field Day. WA3HDI reports a new club, the Tri County AR Society (TriCARS) with WA3JH, pres.; WA3GAP, vice-pres.; WA3HDI, trustee, K3WAJ asked to be relieved from the PAM job so we now have WA3GLI as the PAM for EPAEP&TN. The R.F. Hill ARC used W3AI on FD. W3CL is off the sick list and back to work. W3ID reports the station at IRC was completed and then moved out; the company needed the space. W3ICC still is looking for ECs. If your county doesn't have one how about volunteering for the job? A business meeting was held for EPA representatives at the QTH of K3WEU. K3HNP has suggested a plan for OO coordination. He will be in touch with all OOs for details. Don't forget, get all that outside antenna work done during the nice weather. Safe vacationing. Traffic: (May) W3CUL 2369, W3VR 871, K3NSN 858, W3EML 716, W3MPX 505, WA3INC 347, K3MVO 230, WA3IUU 226, K3PSO 219, WA3EXW 175, W3FGQ

166, WA3IHV 131, WA3IZ 110, WA3BSV 100, W3HK 99, K3WEU 95, WA3LAK 73, WA3AOJ 69, WA3AFI 60, K3-HNP 57, W3JSX 57, WA3ATQ 52, WA3JWF 48, WA3JXN 41, K3OIO 37, WA3HDI 36, W3NNL 34, K3WAJ 32, WA3HIT 30, W3FPC 29, WA3GUK 23, W3OY 22, WA3-GLI 18, W3HNC 18, W3VAP 18, WA3JKB 17, WA3JWL 17, WA3KEY 14, K3PIE 14, W3BUR 13, WA3EEC 13, WA3GAP 13, W3CPH 12, W3VA 11, WA3JKO 9, WA3-JZB 8, WA3HGX 7, WA3ICV 7, W3OML 7, WA3KKM 6, K3KTH 6, K3KKO 4, K3NPC 4, WA3IAZ 3, W3-ADE 2, WA3BJQ 2, W3CL 2, W3BNR 1, W3EU 1, WA3-FCZ 1, K3FOB 1, W3ID 1, W3KEK 1, W3YPP 1. (Apr.) K3PIE 12. (Mar.) K3PIE 17.

MARYLAND-DISTRICT OF COLUMBIA—SCM, John Mumholland, K3LFD—SEC: W3LDD.

| Net | Freq. | Time | Days | Sess. | QTC | QNI | Mgr. |
|-------|---------|-------|---------|-------|-----|------|------------|
| MDD | 3643 | 2300Z | Daily | | | | W0UCE/3-RM |
| MDDS | 3643 | 0030Z | Daily | 27 | 37 | 5.4 | W3CBG/RM |
| MDCTN | 3920 | 2200Z | STPS | 18 | 115 | 18.6 | W3ATQ/PAM |
| MEPN | 3920 | 2200Z | MWF | 21 | 67 | 20.2 | K3IAG |
| | | 1700Z | SS | | | | |
| MSTN | 50.400 | 000Z | M | 4 | 20 | 9.75 | WA3EOP |
| MTMTN | 145.206 | 0100Z | T-S | 25 | 66 | 9.5 | W3IPW |
| CVTN | 145.620 | 0200Z | M-Th-Sa | | | | WA3JPI |

Appointments: K3STU as OO, W3ATQ as PAM/MDCTN, W0UCE/3 as RM/MDD. Club news: ARRL has approved affiliation of the Springbrook High School ARC, the National Institute of Health ARC and the Radio Amateur Satellite Corporation. Congratulations! Any clubs desiring to co-sponsor a hamfest with the Chesapeake ARC next year should contact WA3GAU, in Towson. K3IYJ and W3HWZ keep the SCM supplied with FAR news. AMSAT is testing an Australian Oscar at Goddard Space Flight Center. Goddard ARC elected WA3FUM as act. mgr. and reelected other officers. W3FA and W3CDQ were guest operators at NSS for Armed Forces Day. W3GEB reports his 5-band inverted "V" homebrewed out of TV-rotor cable is working. F.B. W3ECP reports W3JUE is now W3GFE. WA3-UIA is now WA3MMI. K3KWX has joined the USAF and W3CWU is now stationed in Germany. K3STU/OO is designing improvements to his equipment for displaying signals and measuring frequencies. W3ZSR still is debugging his rig. WA3KEW and W3TN made the BPL. WA3AJR has rejoined the host of 2-meter operators in MDC. Eric, 9-year-old brother of WA3KNJ, has passed the Novice exam. How about that! WN3MJP is making good progress on WAS with his HW-16 and hopes to have an HW-100 soon. W3GKP and K3JOM are keeping the SCM posted with OVS reports. We regret to announce that W3NUM became a Silent Key May 22. Traffic: WA3KEW 552, W3TN 236, W3ATQ 198, W0-UCB/3 166, WA3HSU 147, W3DYA 117, K3GZK 107, WN3KAA 103, WA3LCC 96, WA3IAQ 88, K3LFD 77, WA3JLR 71, K3OAE 71, WA3GUI 67, W3LQV 66, W3-ROV 53, W3CBG 52, WA3TYS 47, WA3HEN 43, W3FA 39, W3GEB 20, W3ECP 19, WA3ERL 16, K3TBD 16, K3JOM 11, W3ZSR 4, WA3GGO 2.

SOUTHERN NEW JERSEY—SCM, Edward G. Raser, W2ZT—Assst. SCM: Charles E. Travers, W2YPZ. SEC: W3LVW. RMs: WA3BLV, WA3KIP. PAMs: WA2-IUV, W2ZL, W2ZL, our SCM, is confined to the Helene Puhl Hospital in Trenton, N.J., and is making progress. Our very best wishes for a speedy recovery. W2BLM is engaged in Boy Scout work and at the recent Camporee at Washington Crossing State Park in N.J. operated portable. It is nice to see W2ORS on the active list again. Congratulations are in order for achievement by the following net members: W2EWS received his Advanced rating. WA2BKE, is now a General Class operator. WA2ZIF, a June graduate of the Ewing H.S., is a Technician Class operator and planning to go for the General as is W2IPE, Harry's classmate. WA2TAF is new assistant to W2PEV, net mgr. of the NJPTN. W2VMQ has a new job that will eventually locate him in the Princeton area. W2MNM, a recent graduate of Haddonfield Memorial H.S. with honors, will enter Princeton U. in the fall. W2QLF, a former net member, has been appointed to the United States Air Force Academy Class of 1973 as a Presidential appointee. W2BHH has received special commendation from ARRL as an Official Observer for extreme accuracy in frequency

measurement. WB2DRG, high man in May, is doing outstanding work in promoting the FNTN, which meets Tue., Thurs. and Sat. at 5 p.m. EDT on 7190 kc. Listen in and give Randy and his asst. mgr., WB2GDY, as much support as possible. Traffic: (May) WB2DRG 161, W2PU 93, WA2ABY 72, W2YPZ 65, WB2VEJ 61, K2SHE 23, W2ORS 17, W2BLM 13, W2J1 12, WA9PRE/2 12, W2DNF 9, W2CDZ 4, K2MBW 4, W2ZQ 3. (Apr.) WB2VMQ 26, W2BLM 14, WB2FSX 10, W2CDZ 4.

date on your license. You also are reminded that even though you pass the examination for the higher class of license you cannot operate on the preferred frequencies unless the actual upgraded license is on hand. Traffic: K3ZNP 179, WA3IPU 152, W3LOS 144, W3KUN 127, W3GJY 38, K3SMB 22, K3HCT 8, K3SJJN 6, K3TEZ/3 5, W3BWU 4, WA3HSI 3, W3IDO 2.

CENTRAL DIVISION

WESTERN NEW YORK—SCM, Richard M. Pitzeruse, K2KTK—Asst. SCM: Rudy W. Ehrhardt, W2-PVL SEC: W2RUF, PAM: WB2VSL, RM: K2KIR, W2FR, W2MTA, W2RUF. The list of section nets appears in June QST. WA2CAL is a new OBS. Renewals: WB2SMD as ORS, WB2VQH and K2LWR as OOs. K2-TXB as OVS. WA2PZD is off to college again for his final 3 months of undergrad work. WB2YEE has applied for OPS. K2TXB, W2GBK, WA2UVO and WA2-ERY are building a moonbounce station hopefully to be QRV by mid-summer. K2YAH has a new 33-ft. tower beautifully adorned by a new TA-33. WB2NZA returns to Northeastern University. WB2VGF reports antenna trouble after cutting down the tree supporting one end of the dipole. His new HW-100 now feeds a vertical. W2RQF is now operating from his camp in Moravia. K2TXB is back on 2 meters in style with 800 watts of c.w. and s.s.b. feeding 15 elements at 110 feet. Congrats to the Rome Amateur Radio Club, whose members are 100% ARRL! The Western New York Hamfest in Rochester was bigger and better than ever. Chairman WA2-KND and crew are to be admired and complimented. WIHDQ, of ARRL, won the "Ham of the Year" award at Rochester while the RARA "Ham of the Year" went to W2UTH. New Extra Class licensee K2RIP was chosen as Ham of the Year by the NCARC. The NCARC went caravan style and visited the AWA museum. WB2-VVZ has 11 elements up on 2 and 6 on 6 and reports several openings on both bands. Jim sports a new HW-17A transceiver. The Rome guys held their usual Ham Family Day June 1. Three new ARRL affiliated clubs are the IBM Owego ARC, Fayetteville-Manlius High School ARC and the Chenango Valley ARA. K2SPO sold one entire station but lost no time in getting back on the air. WA2CAL does an excellent job as NCS on NYPON, tells W2PVI. NYS reports 431 cleared in Apr. with 463 check-ins. WB2UDU now signs GM5AMX with the U.S. Navy and is active on 7010 week nights. He can also be found on 14,318- and 21,350-kc. s.s.b. week ends. WA2EKW plans an SB-10 for his DX-100. OOs W2RHP and K2LGD did very well in the May FMT. WA2DHS received a new ESS certificate. After missing 2 months running, W2OEF has the BPL machine going again. Traffic: (May) W2OEF 388, WA2CAL 329, W2RHP 224, W2MTA 198, W2RUF 185, W2SMD 112, K2RYH 89, WB2VND 66, W2VZF 54, WB2WGF 46, K2UIR 30, K2IMI 24, W2PRY 23, WA2BEX 18, K2OPV 18, W2-RQF 18, WB2ZDK 18, WA2EFKW 10, WA2GLA 10, K2-KTK 8, W2PVI 8, WB2YEE 7, WA2PZD 3, WA2SU 2, WB2NZA 2. (Apr.) WA2ILE 46. (Mar.) W2FR 286.

ILLINOIS—SCM, Edmond A. Metzger, W9PRN—SEC: W9RYU. PAMs: WA9CCP and WA9PDL (v.h.f.). Cook County EC: W9HPG. Net reports:

| Net | Freq. | Times | Days | T/c. |
|---------|------------|-------|-----------|-----------|
| IEN | 3940 kc. | 1400Z | Sun. | no report |
| ILN | 3760 kc. | 0100Z | Daily | 246 |
| NGPN | 3915 kc. | 1300Z | Mon.-Sat. | 209 |
| NCPN | 3915 kc. | 1800Z | Mon.-Sat. | |
| HL PON | 3915 kc. | 2245Z | Mon.-Fri. | |
| HL PON | 3915 kc. | 1430Z | Mon.-Fri. | 412 |
| HL PON | 145.5 Mc. | 0200Z | M.W.F. | 34 |
| TNT Net | 145.35 Mc. | 0300Z | Sun.-Fri. | no report |

W9HRY reports that the 9RN traffic count for May was 726, and W9NWK reports that 461 pieces of traffic were passed by the Interstate Single Sideband Net. W9NWK, W9JGB and K9AVQ are keeping regular schedules with KH6GQA (ex-W9FB1). New officers of the Radio Amateur Megacycles Society are W9DY, pres.; WA9VOL, vice-pres.; W9NIX, secy.; WA9KHR, treas. WA9SDT's new QTH for the next four years will be the United States Air Force. Our sympathy to the family and friends of W9QIT, who recently passed away. W9INF gave a program covering the space project from Mercury to Apollo at the last Wheaton Community Radio Amateur Club meeting. WA9ZSY has been upgraded to General, WA9VLP to General and Advanced, WN9ZXJ to General and WN9BEK is a new Novice. The Deerfield High School ARC has erected its antenna and will be on the air soon. WA9QBM has a new HXL-1 linear. A new Novice in the Palestine area is WN9BLB. WB9ALS and WN9BLS are moving to Alabama. New calls in the Clinton area are WN9BKY, WN9BIP, WN9BIQ, WN9-BLR and WN9BIS. W9LOQ/9, W9EFI/9 and K9DQU/9 operated stations at three Motorola plants on June 23 for an Amateur Radio Nite display. Anyone in the Sears Roebuck organization interested in setting up a net, please contact W9LNO. W9ENO is now an Extra Class licensee. K9WMP, K9RAS, W9QXO, W9JUV/K9OSO, K9IFE, W9WYB, W9HPG, W9GFF/W9DY, K9CZU and K9DQU were participants in the latest ARRL FMT. K9CZX has a new QTH, crank-up tower and quad. K9DOW is home again after being discharged from the service and a stint in Vietnam. K9YTF graduated from the University of Kentucky. WB9ATQ has a new jr. operator. WB9AZZ is a new call in the Dekalb area. WA9TXW is mobile with an HW-22. W9RMI, and WA9KVJ have built up TR-108s for 2 meters. WN9BHX and WN9BHY are graduates from the Big Thunder Amateur Radio Club's code class. WA9VYV and WB9-AKT passed the General Class exams. WA9RKB, and Cheryl Adams were married on June 15. K9GRO is now stationed in Vietnam. K9GOY is back from his tour of duty in Germany. The 12th Annual Six Meter Club of Chicago Hamfest will be held at Frankfort, Ill., Sun., Aug. 3. WA9TUM and K9NBH are RPL recipients for the month of May. Traffic: (May) WA9TUM 399, W9-O7D 304, K9NBH 233, WA9AKR 252, W9NQG 191, W9JXV 82, WA9LDC 78, WA9QBM 77, W9DQ 75, WA9BRQ 73, W9HGT 68, WA9WNH 58, WA9ZYF 51, WA9OXT 38, W9PRN 36, WA9NZF 30, W9LUD 17, WA9UXF 12, W9LNO 10, K9HSK 8, WA9SFB 8, K9-TXJ 8, WA9LHU 5, K9RAS 5. (Apr.) WA9LHU 8.

WESTERN PENNSYLVANIA—SCM, John F. Wojtkiewicz, W3GJY—SEC: W3KPF, PAM: W3WFR, RMs: WA3AKH, W3KUN, W3MPB, W3NEM. Traffic Nets: WPA, 0000 GMT 3555 kc. daily. Net hamfest? It's the Brass Pounders & Modulators at St. Clair Beach Aug. 3. W3QNI collects antique radio gear. W3OMY has confirmed 26 states on 2 meters. W5QKF, a vice-pres. of the ARRL was entertained at a luncheon by W3WFR, W3-BYS and W3CES. WA3LDZ attended a civil defense management course. W3IDO participated in Armed Forces Day activities. WA3JEM joined Navy MARS. New officers of the Radio Association of Erie are K3-VLP, pres.; K3HSM, vice-pres.; W3BRB, secy.; WN3-MAU, treas. WA3JDT reports hearing 21 states on 6 meters from Maine to California during ship openings in May. WA3JBN received his CP-20 and WA3 awards. New Novices at Lower Burrol are WN3MAD, WN3MAE and WN3MDX. Welcome to the amateur fraternity, fellows. K3OTY experiments with RTTY. Because of the pressure of personal business K3UTQ has resigned as pres. of the Etna Radio Club. K3HZI will finish up his term. The following made it "big" at the Breeze Shooters Annual Hamfest: K3DMF, a Drake TXB transmitter, K3YIG, a Drake R4B receiver, WA3LKI, a Cliff Dweller, K3YCI, a quad beam, W3KGF, a Hustler antenna, W3KSI, W3KZF and W3YA are all recuperating from illness. W3LCI was upgraded to Amateur Extra, K3ZVB from Technician to General Class. K3WVP/WA3IXO is an engineer at WPIT, Pittsburgh. Radio club secretaries are reminded that their club bulletins are always welcome and activities of their club members get their calls in this column. Individual activities and accomplishments cannot be revealed in this column unless you send in the information. During the hot summer months we are prone to relax and "keep cool." However, take a few minutes out to check the expiration

NORTH DAKOTA—SCM, Harold L. Sheets, W0DM—SEC: WA0AYL, OBS: K0SPH, PAM: W0CAQ, RM: WA0RSR, WA0AIN is on the air at Rugby with a temporary antenna. W0EFJ and WA0MND hooked on the camper and took off to visit W6HWN, ex-W0PHH, and family in California for a few weeks. Our congrats to graduates WA0RWK (YL), WA0OAT and WA0-LZD. W0ECX has returned from wintering in Florida. K0SPH reports a nice visit in Kansas and Iowa. WA0-HUD still is pounding away on TEN with WA0OVV and W0BF backing him up. WA0QVW attended the National Science Fair in Ft. Worth. W0DM wound up the stage crew work with an Appreciation Dinner. WB2-LZJ, ex-W0CEJ, formerly stationed at GFAB, sends the following info to those desiring code speed for the Amateur Extra Class: Freq. 7030 kc., Time 0200-0300 GMT and longer if interest enough. Days Mon.-Fri. (Sun.-Thurs. evenings), Speed 22 w.p.m. (ID and Info at 11 w.p.m.). W0BF has been making use of that frequency meter on the ARRL frequency run.

| Net | Sess. | Check-ins | Tfc. | Time | Days | Mgr. |
|----------|-------|-----------|------|------------|------|--------|
| ND RACES | 19 | 357 | 153 | 2330Z | M-F | K0SPH |
| PON | 13 | 178 | 14 | 2230Z | St. | WA0LUD |
| ND CW | 20 | 42 | 0 | 1500-2230Z | Sun. | WA0RSR |

K0SPH reports: K0PYZ is back home again and on the air and feeling pretty well. The Bismarck Area Radio Club elected WAOVTF, pres.; WA0TOF, vice-pres.; W0BF, sev.-treas.; WA0MSJ and WA0RSR, co-activities chairmen. The Red River Radio Amateurs, Inc. has been reactivated with the following officers: K0QYD, pres.; W0DNJ, vice-pres.; W0CAQ, sev.; W0SFA, treas.; W0ZZZ, trustee; K0SEP, public relations. The club call is W0LLO and present membership is about 20. Traffic: WA0HUD 79, W0NIV 51, K0SPH 29, WA0JPT 14, W0DM 12, W0BF 9, WA0TBR 7, W0WWL 6.

SOUTH DAKOTA—SCM, Seward P. Holt, K0TXW—SEC: WA0CPX, RM: W0TFP, PAM: WA0CWW. Net managers: W0HOJ, WA0LLG, WA0OYT and WA0PNB. W0IT reports a real good time on his trip to Italy. Two hours was spent at HV38J visiting Brother Ed, one of two operators of the Jesuits VRS. WA0AYO was appointed ORS and has the station all set up. WA0CPX has started the summer session at SDU, where he operates portable. W0DJO passed the Advanced Class test at Sioux Falls. Net reports: Morning Net, QNI 341, QTC 49, 13 informals, Noon Net, QNI 360, QTC 50, 43 informals, Late Session Phone Net, QNI 188, QTC 70, 122 informals. Traffic: WA0PNB 120, W0IG 28, K0AIE 27, W0HOJ 26, W0DJO 4, W0FJZ 3.

DELTA DIVISION

ARKANSAS—SCM, Robert D. Scheffer, WA5IIS—SEC: W5PBZ, PAM: WA5PPD, RM: W5NND. Amateurs from South Arkansas, including WA5TLS and K5YWL, relayed pledges for the United Cerebral Palsy Telethon. Russellville now has 8 stations on 145.05 Mc. and several on 50.5 Mc. W5TJR reports good DX on 8 meters. Welcome to new Novices W5NYOM, W5YON, W5YOB and W5YOS in Camden, and W5YMW in Little Rock. W5SMU and W5TIZ hold a licensing class at the School for the Blind which resulted in several new Novices. W5RIT and XYL W5UGD are active on the YL ISSB system. Net reports for May:

| Net | Time | Freq. | Tfc. | QNS | Time | Mgr. |
|-------|-------|-------|------|-----|------|--------|
| OZK | 0000Z | 3.790 | 22 | 185 | 554 | W5NND |
| RN | 2330Z | 3.995 | 53 | 449 | 376 | WA5PPD |
| APN | 1100Z | 3.937 | 17 | 114 | 1323 | W5VFW |
| PON | 2130Z | 3.925 | 99 | 429 | | W5EUF |
| Teage | 2230Z | 3.995 | 24 | 265 | 429 | WA5QMQ |

Traffic: WA5TLS 85, WA5TJB 65, WA5QMO 44, K5AJM 36, WA5KEF 23, W5ELF 17, K5EDH 16, WA5PKO 16, WA5SKE 13, W5ALJO 12, WA5LYA 6, WA5SJJ 5, W5-CFA 4, W5RIT 2.

LOUISIANA—SCM, J. Allen Swanson, Jr., W5PM—SEC: W5OB, RM: K5ANS/5, V.H.F. PAMs: WA5DXA, W5UQR. There has been no change in your SEC. Bob just dropped his old call, W5BUK, for the latest in two-letter calls! I am happy to report to you that in spite of a lot of fishing, fixing up busted sets and putting up with a ham wife, W5FMO now proudly waves an Extra! The Jefferson ARC recently held a steak picnic, so says W5MXO, W5S YOY, YOX, YOV, YOR, YOC and YTS are all now up. Monroe wave, W5YOB and W5YQC are son-and-father team with "Dad" being 68 years old. W5CEZ has Army Zone meetings in West-Lake, Shreveport and Metairie. Don't forget the hamfest in Alexandria Aug. 2 and 3 at Harold Miller Park. See you there. Sorry this column is so short this month but am off on a vacation up East to visit my daughter and grandchildren. Traffic: W5ATJ 210, W5MXO 410, W5CEZ 105, W5WBZ 19, WA5QVN 15, W5EA 14, W5JYA 1.

MISSISSIPPI—SCM, Clifton C. Comfort, WA5KEY—SEC: WA5JWD, RM: W5JDF, PAM: W5JHS. Our sympathy to W5HZQ on the loss of his XYL, WA5PPS is recovering from a heart attack. Glad to have ex-K4TSM, now W5RJJ, in Mississippi. WA5SUE is converting an APX6 to 1296 Mc. Congrats to WA5SKI on his BS degree in math. W5YUO reports that a busted thumb is harder on c.w. than buck fever! WA5OHQ still is "thinking about" cleaning up his shack. WA5KEY's XYL cleaned his up! WA5FII says his rig changed frequency every time he turns his back. OO WA5WJP brought his average to 2 parts per million in the recent FMT. W5BW's new rig works fine on c.w. but has quit on s.s.b. W5WZ just received a QSL card date

1950! The pictures of Gov. Williams signing the Proclamation for Amateur Radio Week in Miss. June 22-23 with WA5FII, ARW chairman; WA5KEY, SCM; WA5JWD, SEC; and W5VTF, representing the GCSBN, have not come through yet. WA5LXC still is without a generator for FD.

| | | | | | |
|---|-----------|-------|-------|--------|----------|
| MSB | 7900 kc. | 9015Z | Daily | WA5SIM | Net Mgr. |
| GCSBN | 3925 kc. | 730Z | Daily | W5JHS | Net Mgr. |
| RACES | 3987.5 k. | 1345Z | Sun. | W5IJS | Rot |
| Traffic: WA5FII 52, WA5SKI 41, WA5LXC 24, K4RIN/5 17, K5MYP 13, WA5SEG 9. | | | | | |

TENNESSEE—SCM, Harry A. Phillips, K4HCT—SEC: W4WJH, PAMs: W4PFP, WA4YBT, WA4EWW, WB4HMA, RM: WB4GSS.

| Net | Freq. | Days | Times | Sess. | QNI | QTC | Mgr. |
|------|-------|--------|-------|-------|------|-----|--------|
| TSSB | 3980 | M-Sat. | 2330Z | 27 | 1199 | 170 | WA4YBT |
| TPN | 3980 | M-Sat. | 1145 | 31 | 1353 | 87 | W4PFP |
| | | Sun. | 1300 | | | | |
| ETPN | 3980 | M-F | 1040 | 22 | 527 | 50 | WA4FWW |
| TCN | 3980 | Thurs. | 0100 | 4 | 36 | | W4TFV |
| TPON | 3980 | Sun. | 2330 | 4 | 143 | 46 | K4RTA |
| TTN | 3980 | Daily | 2100 | 31 | 322 | 187 | WB4HMA |
| TN | 3635 | Daily | 0000 | 31 | 207 | 86 | WB4GSS |
| TSN | 3635 | M-W-F | 2300 | 13 | 48 | 15 | WB4GSS |

The Memphis Hamfest will be held Aug. 23-24 at the Fairgrounds Women's Building. The Bristol ARC, Kingsport ARC and Delta ARC operated message centers over the Memorial Day week end. Yours truly, K4RCT, finally got over the measles. OPS WB4EHD has a new monitor scope. WN4LWK has been experimenting with antennas. W4UVP still gets to some of the Tennessee Club meetings, as he did in Oak Ridge in May. Thanks to those who are working in the Intruder Watch. K4NRV, of Memphis, got a Transceiver at the Humboldt Hamfest and loaned it to W4WRK, who was off the air because of lightning. Traffic: W4OGG 271, W4AM 238, WB4CSS 211, K4'T 195, WP4JFT 155, WB4-DJP 128, W4SQE 101, W4WRK 96, WP4HBB 93, WB4-JDD 59, WA4GLS 52, WB4ANX 48, WB4HY 48, K4-MOT 47, WA4CRU 45, WA4UAZ 37, K4COT 36, W4-NEC 31, WB4HMA 29, WB4HLH 25, W4PEP 22, W4LHE 20, WB4GTI 19, WA4VWV 19, WA4CGK 13, WB4EHD 13, W4YEM 13, W4TYV 12, W4WJH 12, WA4EWW 10, WB4DYJ 7, WB4EHK 7, WB4FUR 7, W4VJ 4, WA4-HGN 3.

INDIANA—SCM, William C. Johnson, W9BUQ—Asst. SCM: Mrs. M. Roberta Kroulik, K9IVG. SEC: W9BUQ.

| Nets | Freq. | Time | Tfc. | Mgr. |
|-----------------|-------|----------------|-----------|------------|
| IFN | 3910 | 1330Z Daily | 2300Z M-F | 227 K9IVG |
| ISN | 3910 | 0000Z Daily | 2130Z M-S | 479 K9CRS |
| | | | 2300Z S-S | |
| QIN | 3656 | 0100Z Daily | | 194 WA9FDQ |
| Ind. PON | 3910 | 1245Z Sun. | | 33 K9EYF |
| Ind. PON V.H.F. | 50.7 | 0200Z-M-Thurs. | | 115 WA9NLE |

INDIANA QSO PARTY

August 16-17, 1969

All radio amateurs are invited to participate in the Indiana QSO Party sponsored by the Lake County Amateur Radio Club. The QSO Party starts at 2300 GMT Saturday August 16, and ends at 2300 GMT Sunday August 17. The same station may be worked on each band and mode for QSO points. Novice and Technician class entries are encouraged. Exchange QSO number, RS(T) and county for Indiana stations; state, province or country for others. Score one point per QSO. Indiana stations multiply by states, provinces and non-WVVE countries; others by Indiana counties (maximum of 92). Indiana stations may contact other Indiana stations for QSO points and one state "multiplier". Suggested frequencies: c.w. 3535 3745 7040 7155 14085 21120 and 28070 kHz; phone 3912 7620 14285 21320 and 28820 kHz; v.h.f. 50.1-50.5, 145-147 MHz. Certificates will be awarded top stations in each state, province and country. Certificates to top stations in each Indiana county. Separate certificates to high scoring Novice and Technician entries. Plaques will be awarded the top Indiana and outside stations. Mailing deadline for logs is September 15, 1969 (enclose an s.a.s.e. for results). Send entries to Olen O. Coulter, K9KFM, 319 N. Colorado, Hobart, Indiana 46342.

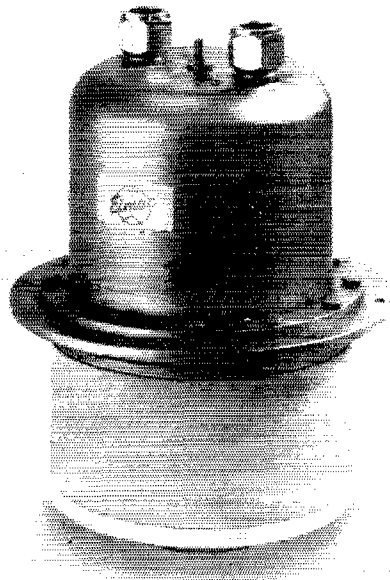
Beneath this calm exterior lurks... Supertetrode!

Eimac's sensational new water cooled 50 and 100 kW tetrodes are the world's finest for high power applications. They're ideal for transmitters in HF, FM and broadcast bands; for over-the-horizon radar, distributed amplifiers, high energy physics and high power voltage regulation.

Both tetrodes feature transconductance double anything even we've been able to offer. They have greatly reduced cathode lead inductance and a unique re-entrant anode, permitting a shorter stem and lower input capacitance. Feedback capacitance also is much lower, simplifying tube neutralization and eliminating

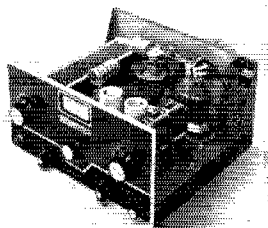
any need for a neutralization circuit. In both tubes the screen base is designed to serve as an electrostatic shield.

These tubes have 4 to 5 dB higher gain than comparable tetrodes, yet are very compact. The 4CW50,000E (50 kW model) weighs only 35 pounds. It has 310 pF input capacitance, 52 pF C_{out} and 0.6 pF feedback capacitance. The 4CW100,000E weighs 50 pounds, has 349 pF C_{in} , 60 pF C_{out} and 0.8 pF C_f . For data and application assistance contact your nearest Varian/Eimac distributor or ask Information Operator for Varian Electron Tube and Device Group.





**Two will get you
two thousand.**



2000 watts PEP input to a pair of Eimac high- μ power triodes is yours... continuous, 24 hours a day, day in and day out. No intermittent "30 seconds key-down" ratings here!

Swan chose two heavy duty 3-500Z Eimac power triodes for their new Linear Amplifier because these rugged, low cost power grid tubes are ideal for cathode-driven grounded-grid service, providing a power gain of up to 20 in linear service.

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With deep regret this column reports W9RCB, of South Bend, as a Silent Key. W9PMT, mgr. of the Hoosier V.H.F. Net, reports May traffic as 102. W9FII, using a Swan 250, worked 7 Calif. on 50.120 Mc. W9ZHD is back from W2-Land. His call was WB2AIB. The Delaware ARC, Inc., nominated K9IVG for the Honor Award for Outstanding Achievement in Amateur Radio Operation at the Dayton Hamvention. K3TGX and WA5VCB, operating portable 9 from Benton County on May 4-5 using a kite for the antenna, got a 5X9 report from all 10 U.S. call areas. WA9AQZ is running 8B-101, 8B-640, 4-811 GG with Bico 717 keyer into an inverted "V" antenna. New ECs are K9YBZ Marion County, WA9VRV Marshall County, K9LSB Allen County. OOs reporting on May 10th FAIT are K9GEL, K9MAM, W9UC and K9WGN/W9USL 52.525 is the frequency being used in Marion County for the Weather Alert. There are 41 counties that do not have an EC at present. Don't forget when a disaster does happen it's too late to prepare. Traffic in Indiana is doing very well at present, although the time change did make us lose a few stations. QIN Honor Roll: W9VHY 25, WA9KAG 25, K9DHC 20, WA9MTY 18, W9QLW 17, K9HVV 16, W9-JBQ 15. Amateur radio exists because of the service it renders. BPL certificates went to W9JYO, K9FZX, W9-FWH, W9ICU, W9EQO and WA9QOQ Traffic: W9JYO 945, W9FWH 642, K9FZX 577, W9HRY 403, W9ICU 371, K9IVG 249, W9EQO 244, WA9QOQ 287, K9SFM 93, W9-QLW 85, W9JBQ 75, K9CZY 74, W9WGN 67, W9BUC 62, K9CRS 59, WA9VZM 48, W9CAMT 44, K9EFY 39, K9VHY 36, WA9TJS 30, W9UEM 26, K9IGY 24, W9-YYX 23, WA9KOH 22, WA9OHX 20, K9YBM 20, K9-RVQ 18, K9LLK 14, W9LJ 14, WA9QEQ 14, WA9RNT 14, WA9BHG 13, WA9AXP 12, W9RTH 12, W9SNQ 12, W9FJL 11, W9PMT 10, WA9LHG 9, WA9OAD 8, K9FUJ 7, W9DOK 5, WA9BVL 3, W9HWR 1.

WISCONSIN—SCM, Kenneth A. Ebneter, K9GSC—SEC: W9NGT. PAMs: K9DBR, WA9IZK, W9LVC, W9NRP, WA9QNI and W9AYK. RMIs: K9KSA and W9DND.

| Nets | Freq. | Time | Days | QNI | QTC | Mgr. |
|-------|------------|-------|-------------|------|-----|--------|
| BWN | 3985 kc. | 1245Z | Mon.-Sat. | 375 | 193 | W9AYK |
| BEN | 3985 kc. | 1700Z | Daily | | | W9LVC |
| W8BN | 3985 kc. | 2200Z | Daily | 1294 | 279 | WA9QNI |
| WIN | 3682 kc. | 0030Z | Daily | 199 | 151 | W9DND |
| W8SN | 3780 kc. | 2330Z | Daily | 181 | 51 | K9KSA |
| WRN | 3620 kc. | 0030Z | Sun. (RTTY) | 12 | 0 | K9GSC |
| SW2RN | 145.35 Mc. | 0130Z | Daily | 180 | 27 | WA9IZK |
| SWRN | 50.4 Mc. | 0200Z | Mon.-Sat. | | | K9DBR |

A net certificate went to WA9UNN for BWN. WA9NBU renewed as OPS. A BPL certificate for May was earned by W9CXV. K9KSA passed the Extra Class exam. K9-OSC led the OO for May with 50 notices sent. FMT results: W9KCR 97.0 and K9GDF 35.1 p.p.m. error. New officers for W9YT are WA9POU, pres.; WA9TPV, vice-pres.; K9FWF, secy.-treas.; W9MLO, station engineer. Elections are coming up for SCM. Be sure to nominate the candidate of your choice. News is short this month. Please send your news to the SCM each month. Traffic: W9CXV 519, K9CPM 199, WA9QKP 126, W9ESJ 124, WA9QNI 102, W9AOKR 99, W9DXV 91, WA9TXN 83, K9TBY 56, K9PHI 48, K9KSA 46, W9AYK 45, WA9PKM 45, WA9THP 33, W9KRO 28, W9BCH 27, K9-JPS 25, K9GSC 23, W9DM 20, W9RTP 18, W9IRZ 6, WA9SAB 4, K9GDF 3, WA9UNN 3, K9OSC 1.

DAKOTA DIVISION

MINNESOTA—SCM, Larry J. Shima, W9PAN—SEC: WA9MZV. PAMs: WA9MMV, WA9OEJ, WA9-HRM, K9GYO, V.H.F. PAM: WA9DWM. RMIs: WA9-IAW, WA9RRA, W9 QSL Bureau: W9DMA.

| Section Nets | Freq. (Mc.) | Time (GMT) | Days |
|-----------------|-------------|------------|---------------|
| MSPN (noon) | 3.945 | 1705Z | Mon.-Sat. |
| MSPN (noon) | 3.945 | 1400Z | Sun. holidays |
| MSPN (evening) | 3.945 | 2315Z | Daily |
| MSN | 3.685 | 2330Z | Daily |
| MJN | 3.685 | 0000Z | Tue.-Sun. |
| MSTN | 50.400 | 0330Z | Daily |
| Minn RTTY | 3.620 | 0100Z | Sun. |
| Minn AREC (ECs) | 3.912 | 2200Z | Sun. |
| PICO | 3.934 | 1800Z | Sat., Sun. |
| SCM INFO Net | 3.945 | 2130Z | Sat. |

The St. Cloud Hamfest will be held Aug. 10. WA9NTM demonstrated a weather predictor machine at the International Science Fair in Texas. W9BE has a new 80-ft. tower. K9MVF has added a TR-4 to the shack. WA9-OEJ is a new A-1 Operator certificate holder. W9PAN received a DXCC certificate. The SCM will sponsor a

Minnesota Amateur of the Year Award. Nominations along with appropriate comments should be sent to the SCM no later than Nov. 1. Three signatures will be required on the nominating letter. A committee of 5 will select the recipient. The following appointments were issued: OO class 4: W9HP, K7BOY/0, WA9MKB; OO class 3: W9AII, OPS: K9MVF, W9AII, OBS: WA9MMV. Appointments endorsed: WA9OEJ and WA9EQZ as OPSs. EC appointments (new): WA9OEF-Watonwan, K9GFE, LeSuer, WA9AVE, Polk, WA9-LAC-Swift, WA9RWT, Carver, WA9PMM-Wascea, W9DFP-Pennington, WA9ONS-Wright, W9GTX-Douglas, WA9OEL-Koochiching, K9BXT-Houston, WA9PSI-Rice, WA9NQH-Chippewa, WA9MQJ-Wash-ington, W9KUI-Goodhue, WA9RQO-Fillmore, K9-IKU-Cottonwood, W9MZR-Nobles, WA9DWM-VHF Statewide. ECs endorsed: W9AZR-Mower, W9LUP-Ottertail, K9SXP-Beltrami, WA9DAS-Mahomen, W9FFX-Kanaber, Traffic: (May) WA9THI 281, WA9-TQT 174, K9MVF 153, WA9VAS 152, WA9OEJ 143, K9ZRD 137, WA9RA 122, W9PAN 90, WA9MIV 75, WA9LAW 61, W9ZFH 59, W9FHI 43, WA9TGM 40, K9FLT 38, W9BUC 35, WA9HRM 34, W9IYP 33, WA9ODB 27, WA9VEB 26, W9ATO 19, K9ORK 19, WA9RKY 18, W9AIF 14, W9KNR 13, WA9PZY 13, WA9JPR 12, W9OYAH 11, WA9NQH 10, WA9CJU 9, K9JTA 9, W9RYM 9, W9KLG 8, W9UMX 6, WA9-VKP 6, K9ZVG 6, WA9EQ 5, WA9JRA 5, WA9RKF 5, WA9URV 5, WA9PMM 4, WA9PSI 2, WA9VDG 1. (Apr.) WA9MZW 231, W9IYP 31, WA9HRM 30, WA9-NQH 15, W9ZHN 14, K9JTA 7.

GREAT LAKES DIVISION

KENTUCKY—SCM, George S. Wilson, III, W4OYI. SEC: W4VYS. Appointed: W4OTP as OVS, WB4FLA as OBS, WB4EOR and K4YCB as OPSs. Endorsed: WA4AGH as PAM-KTN, WA4IBG and K4JOP as OPSs. BPL: WA4DYL.

| Net | QNI | QTC | Net | QNI | QTC |
|------|-----|-----|-------|-----|-----|
| KRN | 363 | 30 | KYN | 394 | 562 |
| MKPN | 409 | 99 | FCATN | 152 | 71 |
| KTN | 817 | 190 | | | |

W4YOK and his XYL, WN4IIF, have a new home in Owensboro. Both were featured in June QST. W4ISF is at USN Ordinance at Louisville. Owensboro hams assisted the Explorer Scout Canoe Derby in its two-day race down the Ohio River. This is the fifth straight year for their participation in this event. Kentucky still shows an upswing in traffic and number of active appointees. It is distressing, however, to never receive monthly reports from a few OTs. Since these appointments recognize present service rather than reward past service, I will regretfully decline to reappoint a few of my friends who regularly fail to report their continuing efforts. Otherwise, the meaning of appointment is cheapened. Traffic: (May) WA4DYL 517, WA4VUE 422, WB4KPE 352, WB4HTS 205, WB4FLA 177, W4BAZ 148, W4UK 107, W4OYI 100, K4MAN 85, WA4AGH 64, WB4HQW 61, W4OTP 58, WA4MXD 52, K4TRT 52, WB4EOR 42, WB4FDK 40, K4MPT 40, WA4WWT 39, K4KJP 36, WA4GHQ 22, WB4IOU 20, K4EUM 18, WA4BRC 15, W4SZB 15, WB4KER 14, WB4EQY 13, K4VDO 13, WB4-GCV 12, W4IWX 11, WB4HFY 10, K4AVX 9, K4YCB 9, WA4MEX 6, WB4HTN 5, WA4GMA 2, W4ISF 2, WB4LKP 1. (Apr. WA4WSW 74, W4CID 50, W4BTA 17. Total traffic 2935 (last year 1151); total reports 40 (last year 25).

MICHIGAN—SCM, Joseph L. Pontek, K8HKM—Asst. SCM: Rodger C. Phillips, WA8LWK. SEC: W8MPD. RMIs: W8FWQ, W8RTN, WA8GR, K8KMC, W8GAI. PAMs: K8GOU, K8FED, V.H.F. PAMs: W8CVQ, W8-YAN. Appointments: W8DQL, WA8LYX, K8HLR and WA8ZJM as ORS; K8GOU and WA8ZPH as OPSs; W8RWK and K8CJQ as ECs; W8ZGF as OO; W8SH, K8HXW and K8UDJ as OVSs. Silent Keys: W8AVL, W8BTL, W8DTE, W8LEU.

| Net | Freq. | Time | Days | QNI | QTC | Sess. | Mgr. |
|---------|-------|------|--------|-----|-----|-------|--------|
| BR/MEN | 3930 | 2230 | M-F | 912 | 179 | 26 | K8LNE |
| W8SB | 3935 | 0000 | Daily | 828 | 117 | 29 | K8WRJ |
| QMN | 3663 | 2300 | Daily | 801 | 352 | 90 | W8FWQ |
| PON-DAY | 3935 | 1600 | Daily | 519 | 412 | 28 | K8LNE |
| M6MTN | 50.7 | 0000 | M-Sat. | 261 | 36 | 24 | WA8LRC |
| UPEN | 3920 | 2230 | Daily | 222 | 22 | 31 | W8RUCD |
| PON-CW | 3645 | 0000 | M-Sat. | 116 | 27 | 27 | VE3DPO |

I see EC reports are on the increase. Keep up the good work. W8NOH and W8SH have been working good DX on 6 meters. W8DHP had an antenna party. The S.W. Mich. 2-Meter Net is in its 17th year of operation. Nice
(Continued on page 112)

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|--|---|---|--|---|---|--|---|--|--|--|---|--|--|--|--|---|--|
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|--|---|---|--|---|---|--|---|--|--|--|---|--|--|--|--|---|--|

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Q-8

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| Balance | Monthly Payment |
|--------------------|-----------------|
| Up to \$300.00 | \$10.00 |
| \$300.01 to 340.00 | 11 |
| 340.01 to 370.00 | 12 |
| 370.01 to 400.00 | 13 |
| 400.01 to 430.00 | 14 |
| 430.01 to 460.00 | 15 |
| 460.01 to 490.00 | 16 |
| 490.01 to 520.00 | 17 |
| 520.01 to 550.00 | 18 |
| 550.01 to 580.00 | 19 |
| 580.01 to 610.00 | 20 |
| 610.01 to 640.00 | 21 |
| 640.01 to 670.00 | 22 |
| 670.01 to 700.00 | 23 |
| 700.01 to 730.00 | 24 |
| 730.01 to 760.00 | 25 |
| 760.01 to 790.00 | 26 |
| 790.01 to 850.00 | 28 |
| 850.01 to 910.00 | 30 |
| 910.01 to 970.00 | 32 |

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(Continued from page 109)

record, gang. W8JTQ has a new amplifier going on QMN. WA8WCZ has been doing some healthy DXing on 20 and 15. Says his new keyer does it? Who caught his mustache in the PTT switch? WA8WZF is the new editor of the Mich.-PON rag. The SVARA moved its meeting night to the 3rd Mon. of the month. The Second Annual Mich. QSO Party was a big success. Looks like K8UDJ, W8SH, K8ZY, K8HKM and WA8ZDT finished in that order. K9TQR/8 took 1st multi-op. Wish someone would beat UDJ, as he was c.w. trophy winner last year and WA8MGO was phone winner. WA8QCW and his NYL have a new daughter. Say, gang, we need some good, regular liaisons between nets, phone and c.w. Anyone want to organize it? K8ETU is pres. and W8CRP secy. of the Michigan Council of ARC. Check and see if your club is a member. New officers of the EARL are WA8GDT, WA8GLK, WA8FF, WA8ZWX, K8SGL, WA8FCL, WA8VI and K8LIB. WA8SCQ received an Honor Award from the Dayton ARA. Congrats, Chuck. New officers are K8LNE, mgr.; K8ACO, asst. mgr.; W8FJU, secy.-treas. W8OWG now is WOMML. New Extra Class licensees: W8WUD, W8ZDF. Advanced Class: WA8MIV, WA8TDY. K8JED went West for a vacation. WA8ZJM is going to the BSA Jamboree. You folks have my mailman mad with the overload. Let's see him scream! Traffic: (May) K8LNE 640, WA8WZF 528, K8-KMQ 340, K8ZJU 213, W8JTQ 154, W8NOH 135, W8MIO 109, W8IZ 95, K8HLR 89, WA8VGQ 72, WA8PH 69, WA8LXY 62, W8ACW 48, WA8NLC 47, W8RTN 43, W8GAI 41, WA8QGI 39, K8HKM 38, W8TUC 36, K8GOU 28, W8YAN 27, W8ZBT 27, W8MID 26, W8BDEK 21, K8JED 21, WA8ZPH 19, WA8MGM 18, W8FTA 12, W8TBP 11, K8CKD 9, WA8UPB 8, WA8IAQ 7, W8FWQ 6, W8FX 6, WA8MCF 6, W8BANR 5, W8SFW 5, WA8WGM 5, W8SH 4, W8MCS 4, W8AEZ 3, W8AAM 2, W8SCW 2, K8UDJ 2. (Apr.) WA8ZPH 28, WA8TDY 3.

OHIO—SCM, Richard A. Egbert, W8ETU—Asst. SCM; Roger Barnett, K8DDG. SEC: W8OUU, RM: W8-IML. PAM: K8UBK, V.H.F. PAM: WA8ADU. May net reports:

| Net | QMI | QTC | Sess. | Freq. | Time | Mgr. |
|---------|------|------|-------|--------|--------------|--------|
| OSBSN | 1877 | 1396 | 73 | 3972.5 | 1430 & 2245Z | K8UBK |
| BN | 543 | 408 | 62 | 358J | 2300 & 0200Z | W8IMI |
| 06MtrN | 435 | 64 | 47 | 50.61 | 0100Z | WA8ADU |
| | | | | 50.16 | 0100Z | |
| OSN | 146 | 55 | 29 | 3580 | 2225Z | WA8VNU |
| Apricot | 186 | 242 | 31 | 50.1 | 0100Z | K8ONA |

BPL certificates for May traffic go to WA8UPI, WA8-ETX, W8UPH and WA8DWL. Net certificates for 06-MtrN participation go to WA8YHN, WA8VVP, WA8JSW, WA8WJR, W8BAHY, WA8JJD, WA8ZTU, WA8JEH, WA8LUL, WA8VWH, K8UOZ, WA8WQT, K8TQK, K8-IOW, K8CKY, K8DDG, WA8MTS, WA8NED and W8-CXV. Apricot Net Manager K8ONA reports that members WA8QFK, WA8PPK, K8ONA, WA8LIP, WA8VSY, K9CMV and W88AZH received Public Service awards for activities during a local emergency. Trafficler WA8-AJW is working during the school vacation at Cedar Rapids. We regret to report the passing of W8DVM, K8GDV and ex-8FS. W8ARW is busy cranking up the Darke Co. AREC to full steam. Belmont Co. EC W8BQ and WA8ZNC are putting together a new AREC net. Van Wert Co. EC K8PBE is working all over town with a 2-meter f.m. one-watter and a whip antenna. WA8AYS, W8LEV, W8WEG and WA8YOW of the Lima Area RC appeared on an hour-long TV program "News Forum." The Canton Chapter of the QCWA held its dinner meeting in New Philadelphia. K8RXD is reported to be visiting in Italy. The WA8MHOs are celebrating the arrival of a new jr. operator. W8JH reports completion of his "License Plate" WAS. All except Ky. and N.J., which don't issue call plates, took 3000 contacts and two years. The Dayton ARA graduated 13 from the Novice rule class. It was my pleasure to speak at the May dinner meeting of the Cleveland Chapter of the QCWA. The audience represented something more than 1000 years of hamming. Don't forget the Ohio Council of Amateur Radio Clubs meeting on Oct. 18. All clubs should be represented. Contact W8OUU for details. The Lancaster and Fairfield Co. ARC put on a fine hamfest this year after several years' absence. Ohio Six-Meter Net Mgr. WA8ADU held a net meeting at the hamfest and passed out net certificates. WA8YHN reports numerous 6-meter openings during May. May appointments: W8DPU as OO, W8GNL as OPS and OVS. Welcome to the newly-affiliated Miami County ARC and Radio Club of Explorer Post 285. New Ohio State University RC officers are WA8YUB, pres.; W8CRX, vice-pres.; WA8-FKD, secy.; WA8VVM, treas. Hope to see many of you at the numerous summer hamfests. Traffic: (May) WA8-UPI 1146, WA8ETX 918, W8UPH 716, WA8DWL 291,

WA8ETW 218, W8GRT 204, W8IMI 165, W88CHW 164, W8OCU 157, W8BAKU 145, WA8ZTV 129, WA8ULF 103, W8GVX 94, K8UBK 92, WA8VNU 91, W8PMJ 85, W8-SUS 80, W8MOK 79, W8QZK 75, W8UX 72, WA8QKF 65, W8BLLP 65, WA8OCG 62, K8RPF 60, WA8YIB 57, W8OEE 56, K8ONA 56, W8GOE 52, WA8GRR 52, W8LRE 51, W8LT 48, W8ASSED 48, W8GRG 47, WA8ADU 47, WA8DUL 43, WA8PPK 43, W8DAE 41, WA8MHO 37, WA8ZGC 34, WA8CXV 29, WA8YHN 28, K8DDG 26, W8QXQ 26, WA8UTX 25, WA8SH 24, WA8AJZ 21, W8-FGD 21, W8NAL 21, W8ETU 19, W8GNL 18, W8JD 18, W8JH 18, WA8NOQ 18, WA8XI 17, W8AJEJ 16, K8-ZBL 16, WA8ZNC 16, W88DSV 15, W8LAG 13, W8-VVH 12, WA8FX 9, W8TV 9, WA8WJR 9, WA8ZJF 8, WA8YUB 7, W8ARW 6, K8BYR 6, WA8LAM 5, W8-RQO 5, K8RND 5, WA8TJZ 4, WA8UX 4, K8CKY 3, W8IO 3, K8WZI 2, W8NCEH 1, W8GDQ 1, W8JBP 1, W8LZE 1. (Apr.) WA8ULF 111, W8JD 6, WA8RQO 6, K8EKG 5.

HUDSON DIVISION

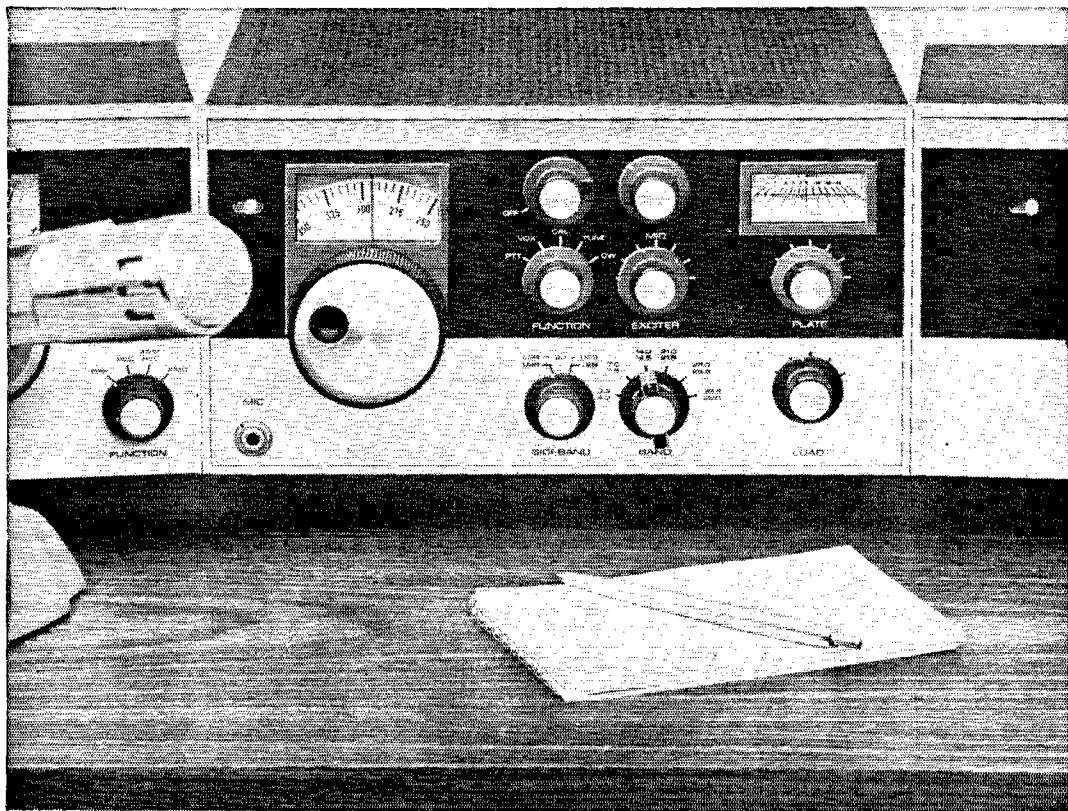
EASTERN NEW YORK—SCM, Graham G. Berry K2SJM—Asst. SCM/RM: Ruth E. Rice, WA2VYS. SEC: W2KGC. PAM: WB2VJB, V.H.F. PAM: WB2YQU. Section nets: NYS on 3675 kc. nightly at 2300Z and 0300Z; ESS nightly on 3590 kc. at 2300Z; NYSPT&EN on 3925 nightly at 2300Z. Appointments and renewals: W2YPN now OBS: W2YRP as OO: WA2VYS as ORS/OPS/Asst. SCM. Westchester Cy AREC now lists 30 net members on the Mon.-Wed.-Fri. net on 3925 and welcomes out-of-county liaison with other groups. On the club circuit; The May meeting of the Albany Club had the SCM, EC, PAM and V.H.F. PAM all present. The Communications Club of New Rochelle heard VK1ZAR/W2 talk on down-under hamming in May. Westchester Cy ARA's new officers are WB2MOL, pres.; WA2F, vice-pres.; WB2NOJ, secy.; W2WDDH, treas.; W2CJ, W2CFU, W2RP, W2KFB and W2AH, directors. New officers/directors of the Schenectady ARA are K2EJL, pres.; K2-HYD, vice-pres.; WB2ROT, treas.; K2DLD, secy.; W2PV, W2PKY, WB2NWL and W2CVR, directors; W2-TV, station trustee. Officers of the Colonic High Club in Albany are WA2HVH, pres.; WA2GSB, vice-pres.; WN2HUK, secy.-treas.; WN2JBW, operations mgr.; WA2GRG, chief engineer, WN2FJA, RTTY mgr. for club station WA2DNR, starting its 12th year of operation. Station activities: WB2FGS won an exchange grant for overseas study in the fall. WA2FIQ and WA9FBI are operating from KH6, Las Vegas and San Francisco, during their summer vacation. WB2RBG reports hearing all 10 U.S. areas on 6, plus KP4 and ZFI on May 23 and 24 and all 10 again May 27-28. WA2FOR received an ESS net certificate in May. WB2YQU added Nebraska to his state total of 5/26 on 6. W2QFR has a 100% record for 3 years for his RTTY OB schedules on 80 and 20. WA2OEG and K2SJM made a quick trip to California. WA2VEG now is +120 on the DXCC list. Remember to send club news letters to K2IES for the new Hudson Council News letter use and to the SCM and Asst. SCM for this column. Don't miss the NYSPT&EN Picnic Aug. 16 at Chenango State Park. Traffic: (May) W2EAT 249, WA2VYS 155, W2ODC 58, WA2UB 26, WA2VYT 24, W2URP 18, W2ANV 16, K2SJM 13, WB2RBG 10, WB2-VJB 6, WA2FOR 2. (Apr.) WA2BUF 14, K2HNW 6.

NEW YORK CITY AND LONG ISLAND—SCM, Blaine S. Johnson, K2IDB—Assist. SCM: Fred J. Brunjes, K2DGI. SEC: K2OVN. PAM: W2EW.

| | | | | |
|-----------|-----------|------------------|--------|------|
| NLI* | 3630 kc. | 1915/2200 Nighth | K2UAT | RM |
| NLIVH* | 145.8 Mc. | 830 MTWTF | WB2ROF | PAM |
| NLIPhone* | 3925 kc. | 1800 Daily | WA2IWA | PAM |
| Clear Hse | 3925 kc. | 1100 Daily | WA2GPT | Mgr. |
| Mic Farad | 3925 kc. | 1300 Pt.Sun. | K2IRG | Mgr. |
| East Vn | 3685 kc. | 0001 Nighthly | K2URG | Mgr. |
| All Vn | 3925 kc. | 1300 Sun. | K2AAS | Mgr. |
| NYSPTEN | 3925 kc. | 1800 Daily | K2SFO | Mgr. |

*Section nets. All times above are local.

The new station call of the Massapequa Radio Club has turned out to be WA2JUM, according to WB2NLAL. We were sorry to learn of the passing of W2BN back in the early part of May. W2BN, who was first licensed in 1929, was active in the QCWA, the New York Radio Club and was a past-pres. of the Radio Club of Brooklyn. He will be missed by his many friends in those organizations. Congratulations to WA2HBP who has received his Advanced Class license. WA2RUI has received the call AFB2RUI in AF MARS. Well, WB2RQF hasn't made it out to the new QTH yet, but W2EWF has arrived! If you were to go looking around 47 Fulton Blvd., Commack, you would find trail signs of the Bushwick Kid (W2EW) himself. K2UEB/M and K8GKB/M mobilized back to L.I.



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This is *the* rig. The one they all want. And now you understand why. Makes you want to go home and throw rocks at your own outfit.

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GALAXY ELECTRONICS

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from the New England Convention within five miles of each other. Since K3GKB and passengers WA2QMC and W6OLO belong to NASTAR, much of the conversation had to do with moon bouncing, repeaters, Project Moonray, etc., except when the outnumbered K2UBG was able to swing it back to traffic. WB2WFFJ's malfunctioning function switch also chopped off a piece of his May traffic total as it did in April, but he allows as how he has licked now! It was reported that W2RSC broke one large terminal digit on his favorite foot while tripping lightly up the stairs. WB2CUP is serving with the Army over in Germany. Traffic: (May) WB2VVFJ 716, W2GKI 220, K2UBG 139, K2AAS 116, WB2RQF 87, WA2RUI 72, WA2HBP 40, WA2LJS 22, WB2PJH 20, WA2BRF 13, W2EC 13, W2PF 10, W2DBQ 6, WA2GLR 5, WB2NLM 4. (Apr.) WA2UWA 2526.

NORTHERN NEW JERSEY—SCM, Louis J. Amoroso, W2ZZZ—RM: WB2RKK, PAMs: W2PEV, K2KQD, WA2KZF and WA2TBS.

| Net | Freq. | Time | Days | Sess. | QNI | Tfc. | Mgr. |
|--------|-------------|------------|--------|-------|-----|------|--------|
| NJN | 3695 kc. | 7:00 p.m. | Dy | | | | WA2BLY |
| NJN | 3695 kc. | 10:00 p.m. | Dy | | | | WA2BLY |
| NJSN | 3740 kc. | 8:00 p.m. | Dy | 16 | 71 | 39 | WB2RKK |
| NJEPTN | 3950 kc. | 6:00 p.m. | M-Sat. | 31 | 569 | 366 | W2PEV |
| NJPON | 3930 kc. | 6:00 p.m. | Sun. | 4 | 83 | 37 | WA2TEK |
| NJAN | 50,425 kc. | 8:00 p.m. | M-F | 22 | 220 | 55 | WA2KZF |
| PVETN | 145,710 kc. | 7:30 p.m. | Dy | 31 | 156 | 272 | K2KQD |
| ECTN | 145,700 kc. | 9:00 p.m. | Dy. | 31 | 201 | 123 | WA1TBS |

New appointments: WB2NYK as OO WA2BAN and WA2HSJ as ORSs and WB2YPQ as OBS. WA2TAF is the new asst. mgr. for the NJEPTN, WN2IWH is a new ham in Clifton. His four-week total is 30 states with the 2NT, WN2JSH is a new ham in W. Long Branch and is on 40, WN2JFX is new in Dumont and his station consists of the DX-40 and SX-120, WN2KBA is new in Linden. WN2IQA is using an HW-16 and joined the ARRL. Welcome to ham radio, gang, W2NCY added the 30L1 to his shack. WA2BAN joined Army MARS, W2CU, W3CU and W6CU are brothers who offer a special QSL for working all three. WA2ATO is looking for a 40-meter two-element beam. K2BRI and WA2CCF took part in the May FMT. W2TFM is the new N.J. Army MARS State Director. WB2VFX is working 15-meter DX. WN2IQF has a new TA-32 Jr. WB2HEO and WA2HPM received General Class licenses; K2IEF received Extra. WB2DRJ has 94 confirmed for DXCC. WB2RKK participated in the Georgia, Michigan and Ohio QSO Parties; also Armed Forces Day activities. W2ZZZ worked all 4 stations. WA2BCT worked No. 100 for DXCC. WB2GTV received his Advanced Class license. WB2QOQ/1 is mobilizing on 6 in W1-Land looking for N.J. QSOs. WN2IHV passed the General Class exam. W2PEV has the mobile rig in the new car. W2TP put up a 40-meter beam. W2CVW's new project is the QSL problem for the 5-Band DXCC. WB2VLC is the new trustee for K2DEL. W2CU has a 54-ft. tower and quad ordered. WB2EYC is trustee for the Carteret HSRC. WA2BCT is the new net mgr. for the East Coast Teenage Net, which operates on 7240 kc. at 5 p.m. Mon. through Fri. WB2GTV is using a TR-4 and a TA-33. Have fun in the N.J. QSO Party. Send in your logs. They are needed for checking. Traffic: (May) WA2BAN 521, WB2RKK 379, K2KQD 209, WB2FEH 203, WA2TBS 190, WA2EUI 185, K2DEL 145, WB2DDQ 130, WB2NSV 118, WA2BAU 111, WA2FRZ 109, WB2YPQ 83, WB2WNZ 75, W2PEV 72, WA2BLY 64, WB2HEO 50, WA2CAI 49, W2CVW 46, K2OQJ 46, WA2GIE 37, W2ZZZ 37, WA2BCT 35, WB2YXJ 35, WN2FVH 33, WA2TNA 31, WB2WID 31, WA2NJB 26, WA2CCF 25, WA2GLI 24, WB2BCS 23, W2OV 18, K2ZFF 18, W2CU 15, WA2KZF 13, WB2NSH 10, K2PBP 10, W2FWZ 8, WA2ATO 6, WA2TAF 4, WB2DRJ 2. (Apr.) WA2CAI 31, WB2BCS 15, W2DRV 9, W2CU 3, WB2GHM 3.

MIDWEST DIVISION

IOWA—SCM, Wayne L. Johnson, K0MHX—SEC: K0LVB, PAM: W0PZO, RM: W0LGG, OBSs: W0LCX, WA0MIT. Another c.w. and traffic man, W0SCA, has joined Silent Keys. Three clubs have become affiliated with ARRL: The Storm Lake ARC, WA0PPW, pres.; Sudlow Jr. High ARC, Davenport. WN0TIO pres.; Klick & Chatter ARC, Spencer. WN0VRJ pres. A recent Extra Class license is W0IFX and K0DBW got his Advanced Class. WA0OTQ is enjoying a new T4XB-R4B. Jim is going RTTY also in the near future. WA0OTE reports 161 confirmed with 177 worked. W0KB has a new 70-ft. self-supporting tower with a TH6DXX on top. W0BIT built an HW-12A for his local c.d. Bring your appointment certificates to the Marshalltown Hamfest for renewal. See you there Aug. 17.

TENTH NEW JERSEY QSO PARTY

August 16-17, 1969

The Englewood Amateur Radio Association, Inc., invites all amateurs the world over to take part in the tenth New Jersey QSO Party.

Rules: 1) The time of the contest is from 1900 GMT Saturday August 16 to 0600 GMT Sunday August 17 and from 1200-2300 GMT August 17. 2) Phone and c.w. are considered the same contest. A station may be contacted once on each band. Phone and c.w. are considered separate bands. New Jersey stations may work other New Jersey stations. 3) General call is "CQ New Jersey" or "CQ NJ". New Jersey stations are requested to identify themselves by signing "DE NJ" on c.w. and "New Jersey calling" on phone. Suggested frequencies are: 1810 3555 3740 3930 7060 7275 14075 14285 21100 21375 28800 kHz., 50-50.5 and 144-146 MHz. Suggest phone activity on the even hours. 4) Exchanges consist of QSO number, RS(T), and QTH (ARRL Section or country). N.J. stations will send county for their QTH. 5) Scoring: Out-of-state stations multiply number of complete contacts with N.J. stations times the number of New Jersey counties worked (maximum of 21). New Jersey stations: W-KVE-VO QSOs count as 1 point; DX stations (including KP4, KH6 and KL7) count as 3 points; multiply total points times the number of ARRL sections (including NNJ and SNJ), maximum of 74. 6) Certificates will be awarded to the first place station in each N.J. county, ARRL section, and country. In addition, a second place certificate will be awarded when four or more logs are received. Novice and Technician certificates will also be awarded. 7) Logs must also show GMT date and time, band, and emission, and be received not later than September 13, 1969. The first contact for each claimed multiplier must be indicated and numbered and if possible, a check list attached. Multi-operator entries should be so noted and calls of all operators listed. Logs and comments should be sent to Englewood Amateur Radio Association, Inc., 303 Tenafly Road, Englewood, New Jersey 07631. A size #10 s.a.s.c. should be included for results. 8) Stations planning active participation in New Jersey are requested to advise the EARA by August 2nd of your intentions so that we may plan for full coverage from all counties.

| Net | Freq. | Day | GMT | QNI | QTC | Mgr. |
|----------|-------|--------|------|------|-----|--------|
| Iowa 75 | 3970 | M-Sat. | 1730 | 1401 | 227 | W0PZO |
| Iowa 160 | 1815 | Daily | 0000 | 875 | 5 | K0TDO |
| Iowa 88B | 3970 | M-Sat. | 2300 | | | W0YLS |
| PON | 3915 | Tu-Th | 2330 | | | WA0YI |
| PON-CW | 3697 | Fr-F | 2330 | | | WA0DYV |
| TLCN | 3560 | Daily | 2330 | 211 | 102 | K0AZJ |

Traffic: (May) W0LXC 429, W0KB 303, WA0OTQ 205, W0UPX 168, W0LGG 71, K0JCI 67, W0PZO 66, K0AZJ 50, K0TDO 15, WA0MIT 12, WA0JUT 11, W0BW 7, WA0OTE 6, WA0VDC 5, W0RJZ 4, WA0VDP 4, WA0RUF 3. (Apr.) K0RRW 7, W0DMX 6, K0EXN 2.

KANSAS—SCM, Robert M. Summers, K0BXF—SEC: K0EMB, PAM: K0JMF, RM: K0MRI, V.H.F. PAMs: WA0CCW, WA0LSH. May net reports:

| | | | | | | |
|------|--------|----------|----------|--------|---------|---------|
| QKS | Daily | 3610 kc. | 1900 CDT | K0MRI | QNI 212 | QTC 146 |
| KWN | M-Sat. | 3920 | 1800 | WA0LLC | QNI 620 | QTC 72 |
| KPN | M-W-F | 3920 | 0645 | K0JMF | QNI 171 | QTC 21 |
| | Sun. | " | 0800 | " | " | " |
| KSNB | M-Sat. | 3920 | 1830 | K0JMF | QNI 562 | QTC 153 |

WA0IYX, of Manhattan, is moving to Maryland. The need for more Official Observers is high on your SCM list. Ham TV is a project of W0SPF. Des now has his slow-scan TV converter completed. The WARC, Wichita, proudly boasts 9 new Novices from a recent Novice class. Instructors were WA0UTT, WA0PGI, WA0SFI and WA0SFI. Eighteen people completed the class. A recent release from K0LPE, chairman of the Raymond E. Baker Memorial Trophy for the Kansas Amateur of the Year, named K0JMF, of Topeka, as this year's winner. The award will be made at the Kansas-Nebraska Radio Club Hamfest at Concordia Aug. 3. Vacation skeds sure are playing havoc with most all the ham activity recently in Kansas. Reports were few and

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The Heathkit HW-17A is really a separate receiver & transmitter on one chassis (only the power supply and audio output/modulator are common). Covers 143.2 to 148.2 MHz . . . ideal for MARS & CAP ops. The solid-state dual conversation superhet receiver with a prebuilt, prealigned FET tuner has 100 kHz calibration, ANL, squelch and 1 uV sensitivity. Selectivity is 27 kHz @ 6 dB down. A front-panel meter monitors received signal strength and relative power

output. The 3-position front-panel switch has a "Spot" position for finding transmit frequency, a Receive/Transmit position and a Battery-Saver position that cuts current drain way down during those long periods of mobile monitoring. A space-saving 3 x 5" speaker is built in.

On the transmitting end is a hybrid tube-transistor circuit with a 25-30 watt input and a healthy 8-10 watts AM output. Modulation is automatically limited to less than 100%. A front-panel selector switch chooses any of four crystal frequencies or an external VFO (the Heathkit HG-10B at \$39.95* is ideal). Tune up is quick and easy.

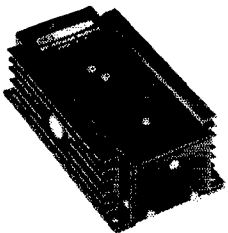
The HW-17A goes together in about 20 hours with circuit board construction & measures a slim 14 1/2" W x 6 1/2" H x 8 1/2" D with everything in place. Ceramic PTT mike included. Start having one rig in two different places . . . order your HW-17A now.

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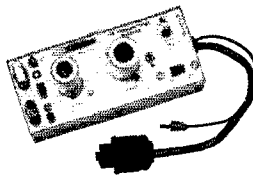
Kit HWA-17-1, 5 lbs. \$24.95*



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AM-221

very slow in coming in. Net activity appears to be down but July should be better. Zone 1, 10 and 15 AREC nets show totals of 94 check-ins on the low bands and Zone 1, 2 meters lists 71 check-ins. Traffic: WA0THQ 453, W0HI 342, W0LNH 128, K0RKF 102, K0MRI 99, K0JMF 96, WA0LBB 57, WA0LTC 52, W0BGX 49, W0GJC 48, WA0SEV 31, K0EMB 25, K0GI 24, WA0OWH 11, K0GZP 8, WA0OZP 8, K0UVH 8, WA0JOG 3.

MISSOURI—SCM, Robert J. Peavler, W0BV—SEC: W0BUL. Appointments renewed: W0BUL as OPS and OBS, W0OOD as RM, WA0FKD as ORS, WA0PUL is now Extra Class at age 17. New Advanced Class licenses: WA0PFU, WA0PUP and WA0UVM. The Kansas City Amateur Radio Club conducting code classes for Novices every Wed. night. The Ruskin High School Amateur Radio Club (WA0TKV) has added teletype, SB-200 linear and SB-620 spectrum monitor for club station. St. Louis Amateur Radio Club members participating in Sweepstakes were W0SDW (top man), WA0CNS, WA0EFR, W0UCK, K0TOV, K0GXZ and WA0EBS. The Ritenour Senior High Amateur Radio Club (WA0JBY) has two new Novices, WN0WTB and WN0WMZ, a YL. The club has a new HW-16. W0OOD reports visits from W0JKF and K0JPJ who was recently married, and his XYL, WA0DGG is now operating a MARS station in Vietnam. W0BUL reports that DX is beginning to disappear now that he has his linear working again. WN0WOW is working a remarkable amount of DX. Net reports:

| Net | Freq. | GMT | Days | Sess. | QNI | QTC | Mgr. |
|------------|-------|-------|-----------|-------|-----|-----|--------|
| MEN | 3885 | 2230Z | M-W-F | 13 | 175 | 17 | W0BUL |
| MNN | 7063 | 1800Z | M-Sat. | 24 | 71 | 14 | W0OOD |
| MON (Apr.) | 3585 | 0100Z | Daily | 26 | 170 | 171 | K0AEM |
| MON (May) | 3585 | 0000Z | Daily | 31 | 208 | 152 | K0AEM |
| MoSSB | 3963 | 2300Z | M-Sat. | 25 | 764 | 189 | W0TRO |
| MoPON | 3933 | 2200Z | M-Sat. | 27 | 201 | 21 | WA0TAA |
| SMN | 3585 | 2100Z | Sun. | 4 | 9 | 4 | W0OOD |
| PHD (Apr.) | 50.45 | 0030Z | Tue.(GMT) | 4 | 95 | 6 | WA0KUH |
| RACES | 50.55 | 0100Z | Tue.(GMT) | | | | |

Traffic: (May) K0ONK 1748, WA0HTN 196, K0AEM 129, W0OOD 84, W0BV 51, W0BUL 27, WA0FMD 19, W0RTO 10. (Apr.) K0AEM 94, WA0KUH 27, W0BVL 10.

NEBRASKA—SCM, V. A. Cashon, K0OAL—SEC: K0ODF. Despite the bad weather, the Pine Ridge ARC had a successful picnic June 1 inside the Central Building at Chadron State Park. W0NTK was the winner of the trophy for the transmitter hunt. W0BPM transmits Official Bulletins Mon. through Wed. on 3525 kc. at 9 p.m. CST. The Tri-State ARC and W. Nebr. Tech. ARC Picnics are scheduled for Aug. New Novice: WN0YHM of Rushville.

| Net | Freq. | GMT | Days | QNI | QTC | Mgr. |
|--------|-------|------|--------|------|-----|--------|
| NEB I | 3590 | 0000 | Daily | 40 | 3 | WA0FGV |
| NSN I | 3982 | 0030 | Daily | 806 | 53 | WA0LOY |
| NEB II | 3590 | 0300 | Daily | 57 | 29 | WA0HWR |
| NMN | 3982 | 1230 | Daily | 1158 | 68 | WA0JUF |
| WMN | 3950 | 1300 | M-Sat. | 534 | 19 | W0NIK |
| AREC | 3982 | 1330 | Sun. | 162 | | W0IRZ |
| CHN | 3982 | 1730 | Daily | 1110 | 155 | WA0GHZ |
| NSN II | 3982 | 2330 | Daily | 929 | 48 | WA0LOY |

Traffic: (May) W0LOD 184, WA0HWR 54, K0JTW 54, WA0QEX 52, K0JFN 47, WA0IBB 40, W0FQB 30, WA0JTU 28, K0AIE 27, W0HTA 26, WA0FGV 24, WA0XID 24, WA0PCC 23, W0GEG 15, K0ODF 14, WA0BOK 12, WA0GHZ 12, WA0JHJ 12, WA0QQX 12, W0BFV 11, W0AGK 10, WA0TET 10, W0NIK 9, K0FRU 8, K0SFA 8, WA0UJ 7, W0RJA 7, K0DGW 6, K0FCH 6, WA0GJV 6, K0JPP 5, K0HNT 4, WA0IBL 4, WA0LOY 4, K0UDW 4, WA0EEL 3, W0VEA 3, W0WZR 3, WA0NYM 2, K0OAL 2, WA0PIF 2. (Apr.) WA0TET 8.

NEW ENGLAND DIVISION

CONNECTICUT—SCM, John McNassor, W1GVT—RM: WA1HSN. PAM: W1YBH, V.H.F. PAM: K1SXF. May activity report:

| Net | Freq. | Days | Time | Sess. | QNI | QTC |
|-------|--------|----------|-----------|-------|-----|-----|
| CN | 3640 | Daily | 1845 | 31 | 320 | 286 |
| CPN | 3380 | M-S 1800 | Sun. 1000 | 31 | 520 | 206 |
| VHF 2 | 145.98 | M-S | 2200 | 22 | 87 | 19 |
| VHF 6 | 50.6 | M-S | 2100 | 22 | 185 | 29 |

High QNI: CN—WA1HEW, W1EJI and WA1HOL. CPN—K1SXF 30, W1GVT 27, W1LUH 26, K1BSB, WA1HEW, WA1GF and W1YBH 25; W1NCP 24; WA1HOL 18; WA1JMR 16. In completing work as SEC, W1PRT

greatly sent another *PI CONN Bulletin* to all ECs. It's greatly appreciated and typical of his sincere interest in promoting EC work. We will miss his efforts. The ARRL Convention in Boston provided many excellent lectures, demonstrations and meetings. The committee proved its ability by a smooth change from a QTH unfortunately burned out to another that became a red-hot success. Repeater W1BNF is active on 2-meter f.m. Any others active here? WA1FNJ is working DX on the low end of 80 meters. WA1JQC has a new phone patch. W1BDI is vacationing in Maine and W1WEE in Florida. With sorrow we add the call of W1MGF to the list of Silent Keys. The N.E. Teen-Age Net is active at 7 p.m. on 3905. San Diego, Calif., hosts Connecticut Week Oct. 20-26 during the 200th Anniversary Celebration. There will be an award to the Connecticut amateur with the most San Diego contacts. Congratulations to: K1VTM, WA1JMO and WA1JQA on Advanced Class; WN1LIZ on Novice Class; WA1IGF on May BPL; WA1HOL on WAC. Happy vacation to all! Traffic: WA1IGF 311, WA1HEW 293, WA1HSN 216, W1WCG 180, WA1HOL 136, W1EJ 121, W1AW 117, W1EFW 101, W1GVT 79, K1SXF 76, WA1KMR 75, W1LUH 46, WA1HLP 31, WA1NRP 26, WA1JGA 26, W1YBH 24, WA1JMO 15, W1BNB 13, W8CWE/1 13, WA1GWS 12, W1OBR 10, K1MBA 9, W1QV 9, W1BDI 8, K1TKS 7, W1CUC 6, W1CTI 5, K1YGS 5, WA1DIU 4.

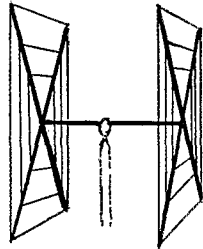
EASTERN MASSACHUSETTS—SCM, Frank L. Baker, Jr., W1ALP—Another fine New England Division Convention was held in Boston at which Director W1QV presented WIHKG, W1VRK, W1MXX, W1KCO and W1BB with Certificates of Merit. Congrats to WINF as the "Ham of the Year." SEC WA1OG received reports from K1s ZUP, DZG, WA1s DXI, J1X and W1RPF. Wis AYG, BGW and VAH took part in the May FMT. W1SDM is a Silent Key. EMN reports 30 sessions, 236 QNIs, 173 traffic in Apr.; 33 sessions, 183 QNIs, 163 traffic in May. New YLs: WN1LBF Fall River, WN1LBD Somerset, WA1LCK Reading. WA1LB is going to retire. WA1JEK and K1ZMP passed the Advanced Class exam. W1OFK is working in Plymouth. K1SBX is on his way to Alaska, W1RST/W2LX are moving to Rye, N.Y., and then to Conn. W1FAY, ex-W4VPU, now is in Norton. W9FPT, W2EUV, K3IGA and VE7AUA are working in Norwood. K1HNN is pres. of the Norwood RC. The South Shore RC held its Annual Ladies Night with a banquet. WN1LAM has an NC-300 and a Triband quad for 15. W1BVG has a TA-33 antenna. K1IBR built a 2-meter a.m. and f.m. transceiver. W1KHV is building 1-kw. linear. WA1CRA has a new tower. WA1DHM is going to Portugal and the Azores. New officers of the Whitman RC are K1TZC, pres.; WA1DUZ, vice-pres.; WA1IVN, secy.; WA1HII, treas.; K1UMP, W1DKD, WA1s PSD and EFR, dir.; The New England Emergency Phone Net had 4 sessions, 70 QNIs, 5 traffic. W1AOG has resigned as manager. K1JRE is half-way to DXCC. K1WVW is in both nets on 6. K1CLM is very busy with the Intruder Watch. K1DZG says they have a new radio room at c.d. headquarters. W1LE mans the C.D. 2-meter station at Dartmouth. WA1JMR is building an IC kever. W1FJN is the new call of K2GLQ, who is an ORS. WA1JLX, EC/RO, has a net on 6 meters. WA1JGG says he is jungle mobile in Vietnam and has Advanced Class. W4ULR, ex-W1FWS, is secy. of the Beaches Amateur RS in Neptune Beach, Fla. W1NT is the new call of ex-WA1JBK. The 6-Meter Cross Band Net reports 18 sessions, 93 QNIs, 7 traffic. WA3TR/1 leaves M.I.T. with 42 confirmed states. K1JRE/1 and W1BUF are new ORS; K1KTH is a new OO. Appointments endorsed: K1DZG, WN1BVV, K1HNN as ECs; WA1s DEC and DED as OPS; WA1s DRs and GXC as ORSs. The Eastern Mass. 2-Meter Net reports 22 sessions, 190 QNIs, 172 traffic. WN1LX is K1ESG's father. WA1BVV is on RTTY on 6. The T9 Radio Club met at W1S7's QTH. W1LPC came up for the banquet. K4GGI/1 says W1MX went up on Mt. Equinox, Vt., for the VHF QHO Party. WA1DFL worked K1TYO in Washington on 6. New officers of the Mass. of the NAHC are WA1DFL, pres.; WA1EZA, vice-pres.; W1DKD, secy.-treas.; W1DOM, awards custodian; K1WRO, W1LES, W1DFR, trustees. WA1KOR has a new preamplifier designed by W2AZL for 2. W1OJM made the RPL again. K1QDR and W1EUF fixed up their HQ110A-v.h.f.s and HQ170A-v.h.f.s. The Massasoit ARA had KH6J at a meeting. W0PAN visited at the Apr. meeting. W1BY spoke at the Chelmsford ARA. New calls: WN1s LGY, LGZ, LHA. The Yankee RC held its banquet. The Capeway RC met at K1IPB's QTH. W1LYV says he has retired from the Coast Guard. Traffic: (May) W1OJM 1214, WA1EY 406, W1PEX 334, WA1FAD 246, WA1BL 232, K1ESG 223, K1PR 98, W1BUF 82, WA1GXC 72, W1CTR 49, W1HKJ 41, WA1JL 40, WA1DPX 36, WA1RY 33, WA1ES 30, WA1FE 30, W1NUP 29, W1AOG 21, WA1DEC 20, W1DOM 18, K1LCC 17, W1DAL 16, WA1DED 14, K1OKE 11, K1JRE/1 10, K1WVW 8, K1CLM 3, K1DZG 2, W1LE 1. (Apr.) W1HKJ 53, WA1RY 15, WA1JMR 8.

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Elements: A full wavelength driven element and reflector for each band.

Frequencies: 14-14.4 Mc.; 21-21.45 Mc., 28-29.7 Mc.

Dimensions: About 16' square.

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Operation Mode: All.

SWR: 1.05:1 at resonance.

Boom: 10' x 1 1/4" OD, 18 gauge steel, double plated, gold color.

Beam Mount: Square aluminum alloy plate, with four steel U-bolt assemblies. Will support 100 lbs.; universal polarization.

Radiating elements: Aluminum wire, tempered and plated, .064" diameter.

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Radiator Terminals: Cinch-Jones two-terminal fittings.

Feedline: (not furnished) Single 52 ohm coaxial cable.

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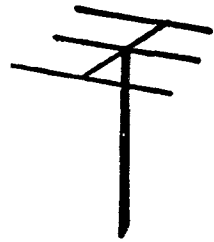
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| | | | |
|-------------------|------|-------------------|-----------|
| 2 E1 20 | \$19 | 4 E1 10 | \$18 |
| 3 E1 20 | 25* | 7 E1 10 | 32* |
| 4 E1 20 | 32* | 4 E1 6 | 18 |
| 2 E1 15 | 15 | 8 E1 6 | 28* |
| 3 E1 15 | 19 | 12 E1 2 | 25* |
| 4 E1 15 | 25* | | *20' boom |
| 5 E1 15 | 28* | | |

ALL-BAND VERTICALS

"All band vertical!" asked one skeptic. "Twenty meters is murder these days. Let's see you make a contact on twenty meter phone with low power!" So K4KXR switched to twenty, using a V80 antenna and 35 watts AM. Here is a small portion of the stations he worked: VE3FAZ, T12FGS, W5KYJ, W1WOZ, W2ODH, WA3DJT, WB2FCB, W2YHH, VE3FOB, WA8CZE, K1SYB, K2RDJ, K1MVV, K8HGY, K3UTL, W8QJC, WA2LVE, YS1MAM, WASATS, K2PGS, W2QJP, W4JWJ, K2PSK, WA8CGA, WB2KWY, W2IWJ, VE3KT. Moral: It's the antenna that counts!

FLASH! Switched to 15 c.w. and worked KZ5IKN, KZ5OWN, HC1LC, PY5ASN, FG7XT, XE21, KP4AQL, SM5BGK, G2AOB, YV5CKL, OZ4H, and over a thousand other stations!

| | |
|------------------------------------|---------|
| V40 vertical for 40, 20, 15, | |
| 10, 6 meters | \$14.95 |
| V80 vertical for 80, 75, 40, | |
| 20, 15, 10, 6 meters | \$16.95 |
| V160 vertical for 160, 80, 75, | |
| 40, 20, 15, 10, 6 meters | \$18.95 |

GOTHAM, 1805 Purdy Ave, Miami Beach, Fla. 33139

MAINE—SCM, Peter E. Sterling, KITEV—SEC: K1CLF. RM: W1BJG. PAM: W1KLG. We want to thank KIDYG for doing such an FB job during his term of office. KIMTJ is in the Navy stationed in Italy and active from I1DFA. W1KLO is a new General in the Portland area. K1GAX is the new Asst. Director for the Maine section. New Novices in Maine are W1NLDZ, W1NLDX, W1NLDY, W1NLDQ, W1NLCN, W1N1LBR, W1N1LBS, W1N1LAC, W1N1KXV, W1N1KXF, W1N1KVF, W1N1KVY and W1N1KSZ. W1FQW is on s.s.b. with a new HW-100. W1UTD was working out FB on 6 meters with a new homebrew quad. W1AE is back from Florida and active on 75 meters. The Sea Gull Net needs net contacts. Any volunteers? K1DYG reports: The Sea Gull Net meets Mon. through Sat. on 3940 kc. at 1700. The Pine Tree Net meets daily on 3596 kc. c.w. at 1900. W1FCM is getting active again with the close of school for another term. He has been very active in the student affairs. Traffic: (May) W1NND 42, KITEV 4. (Apr.) K1CAG/1 303.

NEW HAMPSHIRE—SCM, Donald Morgan, K1QES—SEC: K1RSC. RM: K1BCS. PAM: K1AQP. Welcome to the following: W1As LDV, LCV, LBL, W1Ns LAV, LAF, LAH, LAE, LBU, LCB, LHX, LHY, LZL, LIA. Ten towns and cities are represented by new licensees. K1RSC has added an HW-12 mobile and it sounds fine. Much activity is noted in the Nashua Mike & Key Club, the Manchester Radio Club and the Bow Radio Club. The Concord Brasspounders seems to be lagging after many years of active service. Your SCM plans on meeting with as many clubs as possible. It is with regret that we report the passing of K1HFW and K1DPT, both of Manchester. They will be missed by all who knew them. How about a Northern New England QSO Party, combining Maine, New Hampshire and Vermont? Let me hear your ideas and suggestions. The GSPN reports 915 check-ins and 140 traffic. Where are the other net reports? Aren't there others operating? Traffic: W1A1H 243, K1BCS 124, K1PQV 47, K1RSC 19, W1AJTM 7, K1QES 7.

RHODE ISLAND—SCM, John E. Johnson, K1AAV—SEC: K1LH. RM: W1BTW. PAM: W1TXL. V.H.F. PAM: K1TPK. R1SPN report: 31 sessions, 482 QNI, 148 traffic. Most of the clubs in Rhode Island were active on Field Day. W1OP actively participated. W1AQ was on at its usual location at North Central Airport with some new antennas. W1SYE was located at the park in Newport. W1JFF is very active with emergency work in Newport and reports an active interest in it by several new hams. With the advent of summer several hams become inactive and the SCM would appreciate it if you would keep in contact with your clubs and continue to report any activity. The SCM also has applications for appointments and would like to hear from you. Traffic: W1TXL 355, W1YKQ 175, K1QVF 69, K1QFD 61, WB2-HPW/1 38, W1BLC 36, K1TPK 22, W1BTV 12.

VERMONT—SCM, E. Reginald Murray, K1MPN—

| Net | Freq. | Time | Days | QNI | QTC | N. Mgr. |
|----------|----------|-------|------|-----|-----|----------|
| Gr. Mt. | 3855 | 2130Z | M-S | 193 | 26 | W1WMC |
| Vt. Fone | 3855 | 1330Z | Sun. | 94 | — | W1AEDI |
| Vt. NH | 3685 | 2230Z | M-F | — | — | K1UZD |
| VTCD | 3990 3/4 | 1400Z | Sun. | 32 | 3 | W1AG |
| Carrier | 3945 | 1300Z | M-F | — | — | W1KKD |
| VTPQ | 3909 | 2200Z | Sun. | 59 | 21 | K1BQB |
| VTSB | 3909 | 2130Z | M-S | 703 | 92 | KL7DVP/1 |
| | | 1230Z | Sun. | | | |

W1BEB, Montpelier's first amateur, is a Silent Key. W1MEP deserves applause for the new crop of amateurs licensed in his area. Welcome to new Novices W1LED (Rutland), W1NLDT (Winoski), W1N1LDR (Waterbury), W1N1LCO (Bennington), W1N1LAV (S. Burlington). Congrats to W1KXZ (Tunbridge), W1ALCH (Bennington), W1ALCI (Bennington), W1ALDB (S. Burlington). Don't forget the Inter Field Day Aug. 16-17 at Green Lantern Inn, Charlotte, Vt. Traffic: K1BQB 414, W1FRT 41, W1AGS 21, K1MPN 9.

WESTERN MASSACHUSETTS—SCM, Norman P. Forest, W1STR—RM: W1DVV (W. Mass. C.W. Net on 3560 kc. daily at 7 p.m.) reports attendance was up slightly in May. (180 QNIs vs. 173 for Apr.). Coverage was good with W1HI continuing to hold down the Worcester and surrounding area. It was nice to hear K1AEC occasionally and W1DWA from Hinsdale. A severe storm on the evening of May 29 kept W1KK from carrying NCS as scheduled because of a power failure. K1WZY was in the hospital for surgery but is now back and doing well. K1LJV is at the Cape for the summer. K1KNQ wrote from Japan while on a month-long world tour to report operation from 4U1TY, HV3-SJ, AP2AD and AP2NQ. He reports K1KDP putting in a good signal all over the world. W1HRF had an ex-

ceptional signal at 4U1TU. The CMARAI now has W1LA. pres.; W1KAX, vice-pres.; W1AFDP, secy.; K1RNG, treas. The HCRAI's new officers are K1ANF, pres.; W1LS, vice-pres.; W1DNB, secy.; K1EFH, treas. HCRAI certificate No. 74 recently was issued to W1QJ. Yours truly will spend the summer at Rensselaer after which a new program in physics will be introduced at Technical H.S. Because of this and other pressures I will not be able to run for reelection. I wish to thank all who helped me carry on this activity. Traffic: W1HI 150, W1DVV 74, W1BVR 50, W1STR 45, K1LJV 36, W1KK 33, W1IC 30.

NORTHWESTERN DIVISION

IDAHO—SCM, Donald A. Crisp, W7ZNN—SEC: K7THX. The FARM Net convenes at 0200 GMT on 3935 kc. week days. The RACES Net convenes at 1415 GMT on 8991 kc. week days. K7OQZ is recovering from appendicitis operation complications. WA7GTU, mobiling near Salt Lake City, came across a bad one-car accident and called W7JSS, who called the police and for an ambulance. The Gem State Club plans several outings this summer in the mountains. The club will resume regular meetings in Sept. W7FIS averaged 25.4 parts per million in the ARRL Frequency Measuring Test. WA7-HOX received an Advanced Class license. W7BDD is recovering from a heart attack. WA7FFZ has moved to a permanent location in Lewiston. K7ZSW has moved in Boise. WA7CJE is sporting a new SB-101. FARM Net report: 21 sessions, 524 check-ins, 402 traffic handled. Traffic: K7KEX 212, W7ZNN 129, WA7BDD 102, W7-GHT 73, W7YON 32, W7AXL 25, W7Y 17, K7CSL 2.

MONTANA—SCM, Joseph A. D'Arcy, W7TYN—SEC: W7RZY. PAM: W7ROE.

| Section Nets | Freq. | Time | Days | QNI | QTC |
|-----------------|-------|----------|------|-----|-----|
| Montana Traffic | 3910 | 0100 GMT | M-F | 538 | 70 |
| Montana PON | 3950 | 0345 GMT | D | 439 | 178 |
| Montana Section | 3950 | 1700 GMT | Sun. | 21 | 6 |

Appointments: W7WVL as Deer Lodge County EC. W7OIO is out of the hospital after a short illness. K7-PWY has moved to Vashon, Wash., with the Postal Department. W1TZR and W7WWS will manage the PON in the state. The Butte Club handled a great volume of traffic during a public demonstration of amateur radio at a local shopping center. K7SLK, at Anaconda, has won an award for the handicapped from the American Legion. Don, sightless, is a D.J. for a local broadcast station. Traffic: W1TZR 96, K7EGJ 36.

OREGON—SCM, Dale T. Justice, K7WWR/WA7KTV—RM: W7ZFH. PAM: K7RQZ. Section net reports: W7ZFH reports for the OSN for May, sessions 22, check-ins 91, traffic 42. K7YQM reports for the AREC Net, sessions 31, check-ins 873, traffic 43, contacts 102, maximum number of counties 23. K7IFG reports for the BSN, sessions 60, check-ins 887, traffic 137. W7DCC reports for the Portland 2-Meter AREC Net, sessions 22, check-ins 320, traffic 7. K7YIA reports for the Salem 2-Meter AREC Net, sessions 31, check-ins 387, traffic 10. Net activity is very high and it is nice to see so much fine reporting from the net managers. W7FTN handled 428 phone patches on his MARS circuits in May. W7HLF joined Air Force MARS. WA7JMD has been NCS for the Beaver State Net and more active on 80 meters. W7ASH closed up school in French Glen. W7ZFH spent some time in the hospital. Your SCM visited the Grants Pass area for a meeting of the Southern Oregon Radio Club, and had a very good time, as well as helping the club members to better understand how the ARRL works. The Rogue Valley Amateur Radio Club of Central Point has received its affiliation. Traffic: K7RQZ 568, W7FIS 118, K7IFG 84, W7ZFH 78, W7KIU 75, K7OUF 59, W7JAU 30, W7-CPK 29, W7BNS 23, K7WWR 27, K7YQM 26, K7USZ 20, W7HKV 16, W7HLF 15, W7MLJ 11, K7ADR 7.

WASHINGTON—SCM, Harry W. Lewis, W7JWJ—SEC: W7UWT. Asst. SEC: K7WTG. PAM: WA7DZL. V.H.F. PAM: K7MWC. RM: W7GYE. Yakima, Bremerton and Wenatche have just completed their annual hamfests, along with the State Hamfest at Tacoma. The Spokane Dial Twisters and the Bellingham TVI Net held banquets in early June. The QCWA held its annual convention in Vancouver, Canada, with wonderful hospitality being shown by the VE stations. Look for traffic now from Farragut, Idaho, and the Boy Scout Jamboree. Traffic also will be coming from the Shrine Convention in Seattle. W7AXT is receiving traffic from servicemen coming into Bremerton, and the BEARS club is receiving traffic from the local airport. The University of Washington ARC is now an official

(Continued on page 124)

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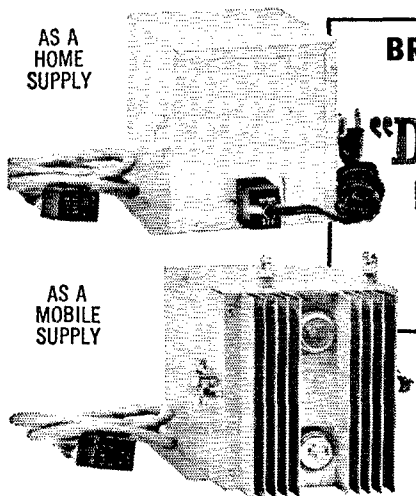
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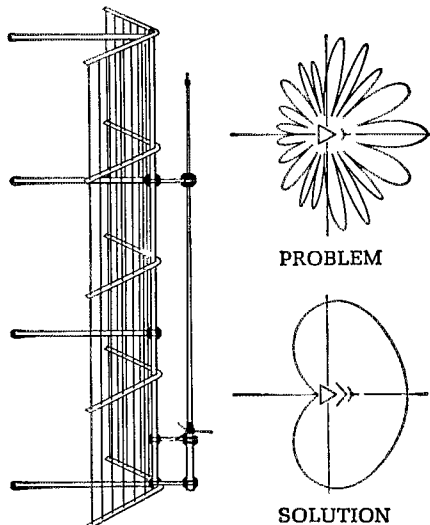
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Silent Keys

It is with deep regret that we record the passing of these amateurs:

- W1AMJ, Peter J. Miller, Prospect, Conn.
 ex-W1BCM, Joseph V. Ruseckas, South Boston, Mass.
 W1BEB, Ralph Harris, Montpelier, Vermont.
 W1BEC, Walter A. Rossmel, Springfield, Mass.
 W1BOK, Elwood Stevens, Farmington, Maine.
 K1DPT, Arthur Lablanc, Manchester, N. H.
 WA1EHC, Bernard W. Krupp, Norwood, Mass.
 W1FSF, G. W. Lawson, Sr., Medford, Mass.
 K1HFV, Eldridge Gaudet, Manchester, N. H.
 W1HKP, Elmer L. Dobbins, West Jonesport, Maine.
 K1HOW, Frank D. Ursone, Norfolk, Conn.
 W1IYO, Francis T. Rogers, Milford, Conn.
 WA1KAN, ex-WB4BII, Warren White, Jr., Lynn, Mass.
 W1MGG, Charles F. Yung, Litchfield, Conn.
 W1MVC, Robert C. Jones, Naugatuck, Conn.
 W1SDM, Ashley B. Thomas, Medford, Mass.
 K1UOX, William L. Flaherty, Burlington, Mass.
 W1WIA, Robert Carothers, Alstead, N. H.
 K1YDS, Sister Jeanne, Newport, Vermont.
 K1ZJK, Cleo H. Wright, Middleton, Mass.
 K2ANB, A. G. Ostermann, Lyndhurst, New Jersey.
 K2APW, Marion R. Sylvester, Lowville, N. Y.
 W2BN, Albert Reiss, New York, N. Y.
 W2BTV, George Tebolt, West Hurley, N. Y.
 WB2CEE, Eugene R. Stantz, Schenectady, N. Y.
 WB2EWB, Barry R. Bausch, Elmont, N. Y.
 K2GBY, Norman H. Ast, West Seneca, N. Y.
 WB2LDV, Geoffrey D. Elg, Sparta, N. J.
 W2LA, ex-W2PKR, Walter A. Knoop, N. Caldwell, N. J.
 K3LEE, Anthony Ciavarella, Shenandoah, Penna.
 W2PSE, John G. White, Riverdale, N. Y.
 K2QNH, Manuel Gomer, Hartsdale, N. Y.
 W2RGX, Clifton W. Holeton, Carney's Point, N. J.
 W2TCJ, Murray H. Eisenberg, Commack, N. Y.
 W2TDU, J. H. Woodward, New Egypt, N. J.
 K2TRV, Irving A. Fletcher, Roselle, N. J.
 K3FPV, Dr. Joseph T. Kelter, Reading, Penna.
 W3FZS, Michael George, Nanty-Glo, Penna.
 K3GLO, Ernest L. Riordan, Philadelphia, Penna.
 W3PH, Ralph E. Humes, Havertown, Penna.
 K3SGI, Alfred Maryland, Glen Burnie, Md.
 W3VWJ, George Van Maldeghem, Beaver, Penna.
 W3WBX, Richard G. Ballou, York, Penna.
 W4AEN, George D. Bruns, Charlotte, N. C.
 W4AVH, Lewis E. Sides, Albemarle, N. C.
 WB4CIR, William O. Batchelor, Walnut Grove, Ga.
 W4EC, Guy E. Pigford, Wilmington, N. C.
 W4EDP, James R. Bonnell, Miami, Florida.
 K4FJT, Grady B. Ricks, Memphis, Tenn.
 W4GDT, ex-W0LKE, George Sizemore, Cape Coral, Florida.
 W4HOY, Henry C. O'Dell, Norfolk, Virginia.
 W4JCE, Hugh H. Waesche, Hardy, Virginia.
 K4JYC, Perry J. Muller, Macon, Georgia.
 WB4KMN, Kelvin J. Schneider, Rockledge, Fla.
 W4KRY, Hobart T. Withers, Sr., Somerset, Ky.
 W4PUD, William D. Haase, Greensboro, N. C.
 W4TBS, Bobbie J. Williams, Jackson, Tenn.
 W4TO, J. E. Joyner, Atlanta, Georgia.
 WA4VJQ, Fred Hilliard, St. Petersburg, Florida.
 W4YX, Horace D. Butterworth, Miami, Florida.
 K4ZHO, Elmer S. Goble, Inez, Kentucky.
 WA5ASH, Ira L. Maserang, Haltom City, Texas.
 K5DRS, Carl W. Lewis, Odessa, Texas.
 W5EC, Earl R. Peters, Little Rock, Ark.
 W5JZT, Charles V. Shearer, Las Vegas, N. M.
 W5KYR, Charley R. Heal, Borger, Texas.
 K5MMZ, Herbert D. Grove, Bellaire, Texas.
 W5QWT, Robert M. Gardner, Oklahoma City, Okla.
 K5QWZ, Robert H. Pearce, Oklahoma City, Okla.
 K5VFC, Ames Davis, Jr. San Antonio, Texas.
 W5WB, Thaddeous A. Reville, Amarillo, Texas.
 K5WPN, Weldon A. R. Scott, Long Beach, Miss.
 K6DAW, William B. Perkins, Long Beach, Calif.

(Continued on page 182)

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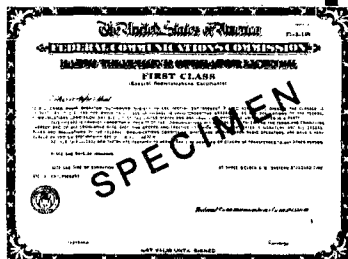
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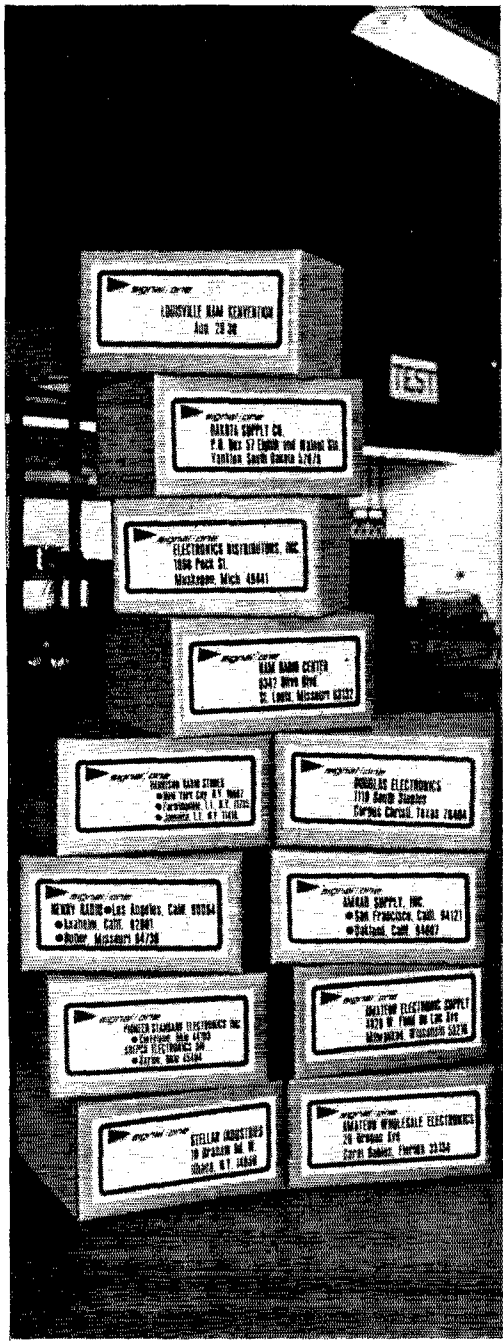
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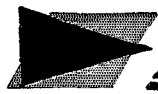
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(Continued from page 120)

- ex-W6DIK, Alfred Dahlstrum, Whittier, Calif.
W6EPO, Axel S. Johnson, El Cajon, Calif.
K6GKG, A. J. Scuttish, Pacific Grove, Calif.
W6HSA, George Spindler, San Francisco, Calif.
W6ICU, Marion F. Doss, Martinez, Calif.
W6NZ, Sydney Fass, Berkeley, Calif.
W6OCP, Wallace Jackson, La Canada, Calif.
W6ROP, Ben F. Myers, Palos Verdes Peninsula, Calif.
W6RRJ, Loren H. Rabe, Chula Vista, Calif.
W6RZO, C. Carl Miller, Castro Valley, Calif.
W6SLS, Robert V. McGinnis, Oroville, Calif.
W6SRJ, Donald R. McCoy, North Hollywood, Calif.
W6TET, Alan B. Mayer, Santa Monica, Calif.
W6VIO, Jack P. Blindbury, San Gabriel, Calif.
W6WQH, Fred D. Boyer, Pomona, Calif.
WB6YAQ, Carl D. Price, Tulare, Calif.
W7ABG, Harold M. Radke, Seattle, Wash.
W7GWT, Charles A. Brasket, Portland, Oregon.
W7IFG, Robert G. Bailey, Lewiston, Idaho.
K7IHA, Ralph W. Houston, Corvallis, Montana.
K7TAP, Harold H. Mackie, Columbia Falls, Montana.
K7UPH, Robert R. North, Billings, Montana.
K7ZJZ, Stearns K. Gordon, Long Beach, Wash.
ex-8FS, Robert W. Fetzer, Canton, Ohio.
W8AVL, Harry I. Ostrom, Southfield, Mich.
W8BBH, Dana A. Young, Columbus, Ohio.
W8BTL, Albert Labz, South Haven, Michigan.
W8FQI, C. W. Wellman, Bluefield, W. Va.
W8FTZ, William K. Marvin, Euclid, Ohio.
W8HNU, Joseph S. Brooks, Detroit, Michigan.
W8HSL, Howard D. Wren, Middletown, Ohio.
W8IDL, Francis K. Amond, Frankfort, Mich.
W8LWT, Dr. George A. Boon, Oak Harbor, Ohio.
W8OFN, Howard Camburn, Lyons, Ohio.
W8UDY, Elmer A. Stastny, Willoughby, Ohio.
K9CAE, Ralph E. Reinertson, Owen, Wis.
W9CSH, Angel Vallina, Kokomo, Ind.
W9EBX, Fred DeZonia, Jr., Belleville, Ill.
W9FQQ, Francis P. Manon, Sterling, Ill.
W9LUQ, Earl M. Jenkins, Fond du Lac, Wis.
K9LYX, George R. Fivecoate, Kokomo, Ind.
W9NRT, Charles King, Beloit, Wis.
W9QFJ, Stanley Lloyd Sadler, Madison, Wis.
W9QIT, Carroll Neltner, Elmhurst, Ill.
W9RCB, Earl Beringer, South Bend, Ind.
W9RDG, Richard E. Finney, Terre Haute, Ind.
K9UIV, Wilber L. Cox, Anderson, Ind.
W9USG, Gustav Overback, Rothschild, Wis.
W9SVBK, K. O. Hennefert, Michigan City, Ind.
K9VGT, Richard R. Binks, Lombard, Ill.
W9A9VE, Fred E. Kurtz, Indianapolis, Ind.
K8AFT, Stephen H. Link, Baudette, Minn.
W8DE, Alfred H. Dangerfield, Joplin, Mo.
W8DMZ, Clarence Kraus, Kansas City, Kansas.
W8DTR, Henry Metcalf, Cassville, Missouri.
W8FSZ, Russell T. Huggins, Hannibal, Mo.
K8KKV, John F. Zimmer, Lincoln, Nebraska.
W8SCA, Dr. A. J. Ploog, Lincoln, Iowa.
VE1NA, Murray Barry, Mahone Bay, Lunenburg, N. S.
VE1XK, Gordon D. Purdy, Truro, N. S.
V01CR, Rt. Rev. Mons. J. F. Kirwan, Searston, Newfoundland.
VE3BE, S. J. Demert, Toronto, Ont.
VE3FHS, H. E. Lee, Ridgeway, Ont.
VE3MJ, Jack Beardall, Chatham, Ont.
VE3BGZ, J. G. Gladman, Brampton, Ont.
VE3OL, C. Howarth, St. Catharines, Ont.
VE4AN, George Brockie, Portage La Prairie, Man.
VE7CAD, Wally Bricker, North Vancouver, B. C.
W87EJ, Percy Jones, South Burnaby, B. C.
CX1CA, Roman Mir, Montevideo, Uruguay.
DJ5AA, Gunter Ebert, Steinenbronn, West Germany.
G2DFX, T. J. Evans, Oxford, England.
PA0FAK, F. A. W. Kouwenberg, Eindhoven, Netherlands.
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- USB, LSB, CW and AM Modes of operation
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- Solid State throughout
- Lightweight—Compact
- Withstands severe shock and vibration
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- Size and weight: Combined Transceiver and Battery Pack: 3 5/8" (9.20 cm) H x 12 5/8" (32.06 cm) L x 16 7/8" (42.86 cm). Wt. RF-1400 and RF-1401—16 lbs. (7.3 kg), Wt. RF-1400 and RF-1402—18 1/2 lbs. (8.4 kg).

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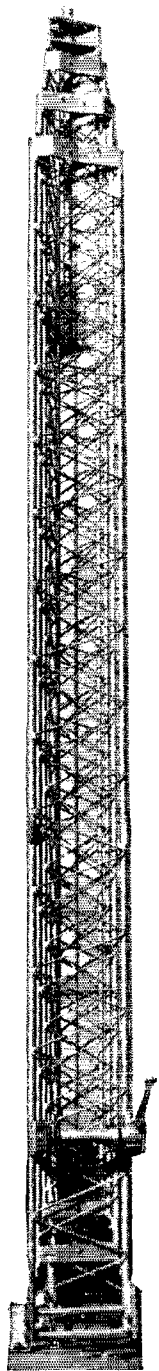
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(Continued from page 118)

ARRL affiliated club, OO K7LET vacationed in Hawaii during June. K7VNI traveled down into California. OHS W7AIB has returned from vacation in Nevada. W7BUN and family are now in Japan for a month's vacation. W7IEU is preparing to travel mobile through several counties during Washington State Amateur Radio Week early in Sept. OVS W7JEG, is now working on a 420-Mc. transceiver and reports 6-meter openings. K7TVO has worked KLFNT, on 50 Mc. and V.H.F. PAM K7MIWC reports Spanish speaking stations being heard on 50 Mc. Bill is working on a repeater for AF MARS and U.H.F. equipment for 300 Mc for the Apollo 11 moon shot. He also is building a solid state RTTY converter with monitor scope. OVS K7BBO has a new 100-w.p.in. RTTY printer and he reports several 6-meter band openings with 135 East Coast stations being worked, along with XE2RH. W7FNA engaged in the Frequency Measuring Test and with 10 measurements averaged an error of 1 parts per million.

Nets: AREC 3930 kc. Sun. 1800Z QNI 38 QTC 12 Sess. 4
 NTN 3970 kc. Daily 1930Z QNI 891 QTC 623 Sess. 31
 NSN 3700 kc. Daily 0300Z QNI 285 QTC 95 Sess. 31
 WSN 3590 kc. Daily 0245Z QNI 275 QTC 231 Sess. 31
 WARTS 3970 kc. Daily 0200Z QNI 188 QTC 1302 Sess. 30

Traffic: W7DZX 403, W7PI 350, W7AXT 234, W7JEY 111, K7CTP 105, WA7DZL 102, W7BQ 88, W7MCW 56, W7JVJ 54, W7GYF 42, WA7JEB 38, K7KPA 38, WA7-ACQ 34, W7GVC 33, W7USO 33, W7BTB 31, W7APS 30, W7BUN 18, WA7EDQ 18, W7AIR 14, W7UW 14, K7LRD 11, W7UWT 11, K7BBO 10, W7HSJ 10, K7THG 8, WA7-KJA 5, W7IEU 4, K7GZI 3.

WASHINGTON STATE QSO PARTY

Sept. 6-8, 1969

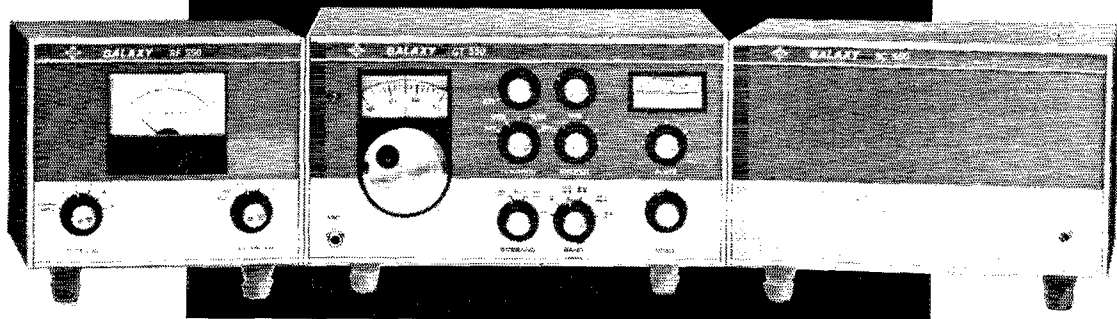
The fourth annual Washington State QSO Party sponsored by the Boeing Employees' Amateur Radio Society, K7NWS, will be on the final weekend of the Washington State Amateur Radio Week, and will start at 2300 GMT September 6, and end at 0500 GMT September 8, 1969. All amateurs are invited to participate.

All bands may be used, c.w. and phone (phone classified as both a.m. and s.s.b.). Stations may be worked once each band and each mode. Washington stations score one point for each contact (including contacts with other Washington stations). All others score two points for each contact with a Washington station. Washington stations multiply total QSO points by total of different states, Canadian Provinces and other foreign countries worked. All others multiply total QSO points by the total of different Washington counties worked. Washington stations send QSO number, RS(T) and county. All others send QSO number, RS(T) and state, province or country. General call "CQ WASH". Washington c.w. stations should identify themselves by signing de (call) WASH K. Phone say "Washington calling". Certificates will be awarded to the highest scoring station in each state province, country and Washington county. Worked Five BEARS certificates are also available to anyone working five club members before, during or after the QSO Party. Working club station, K7NWS, will provide gold seal endorsement sticker for either certificate. Suggested frequencies; c.w. 3560 7060 14060 21060 28100; a.m. 3990 7260 14230 21310 28600, s.s.b. 3960 7220 14290 21290 28700, Novices 3735 7175 21110. Logs must show dates, times in GMT, stations worked, exchanges sent and received, bands and modes used, and scores claimed. Each entry must include a signed statement that the decisions of the contest committee will be accepted as final. No logs can be returned. Log sheets and scores must be postmarked no later than October 4, 1969 and sent to: Boeing Employee's Amateur Radio Society in care of Contest Chairman Willis Propst, K7RSB, 18415 38th Avenue South, Seattle, Washington 98188.

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| RV-550, | Standard Remote VFO provides dual frequency control for GT-550 only | \$ 75.00 |
| RF-550, | 3000/400 watt Wattmeter/Antenna Selector (Available after April 1) | \$ 69.00 |
| SC-550, | Standard Speaker Console, 5 x 7 speaker 8 ohm, (AC-400 will mount inside) | \$ 25.00 |

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of the East Bay section is me, WB6DHH. My address is on page 6 of June QST, and I hope to soon take away the little star and make it real SCM rather than just "acting." W6CBF reports being active in the May FMT. Clyde also worked all the Armed Forces stations during the recent Armed Forces Day activities. How many others worked all the stations or were working one of the stations? WB6VEW is now active in the Northern California Net after a nice eyeball QSO at the Oakland Radio Club meeting early this year. W6-IPW reports that traffic has been rather light this month. Gene can boast a new Heath v.f.o. and says that the unit is built like a gold brick. I guess that means it's good. WA6DIL reports that he was able to help out in an emergency when a mobile he was talking with got involved in an auto accident. W6GU and W6-QEN both have been on vacation. W6LAMZ got back from vacation in time to pass the Extra Class exam and now is awaiting the arrival of his new two-letter call. A thought on public relations: Help local law enforcement officials this Halloween with some form of emergency communications. A real need in our ham bands is the promotion of the Intruder Watch. This service will help keep the ham bands for the hams. Contact either the League or myself if you are interested in serving in this capacity. Also look at the May QST for further information. W6LKE purchased a new SBE-34 and sold his used SBE-33 to K6IMV who occasionally can be found on s.s.b. WB6TJR graduated from high school recently and our best wishes go with him. Traffic: W6IPW 347, WA6DIL 222, WB6VEW 3, WB6DHH 2.

HAWAII—SCM, Lee R. Wical, KH6BZF—SEC: KH6-GHZ. PAM: W4UAF/KH6. RM: KH6AD. V.H.F. PAM: KH6EEM. QSL Mgr.: KH6DQ. RACES Nets: (40, 10, 6 and 2 meters). Coordinate with KH6AIN.

| Nets | Freq.(Mc.) | Time(GMT) | Days |
|-------------------------------|------------|-----------|---------------|
| Friendly Net. | 7.290 | 2030Z | M-F |
| Pacific Interisland Net | 14.320 | 0830Z | M-W-F |
| Boy Scout Ham Radio Net | 21.360 | 1800Z | Sat. |
| S.E. Asia Net | 14.320 | 1200Z | All |
| Marianas Islands Net | 3.850 | 0830Z | 2, 3, 4, Tue. |
| Gecko Net (Marianas Is.) | 14.240 | 0930Z | Tue. + Thurs. |
| Pacific DX Net | 14.270 | 0700Z | Tue. + Thurs. |
| Marine Corps Net | 21.380 | 1900Z | All |
| Confusion Net (Phone Patches) | 21.400 | 0200Z | All |

Plan to be at the Southwestern Division Convention Oct. 17-19 at the Hilton Inn in Sacramento, Calif. Information may be obtained by writing 1969 ARRL S.W. Div. Convention, P.O. Box 1469, San Diego, Calif. 92112. KH6BX spent several weeks in Queens Hospital. KH6I/M was worked as he drove over the Continental Divide on his way home. KH6GKT's XYI presented him with a 7 lb. 14 oz. baby girl. KH6ABQ and KH6AFN were recently on the Mainland for a vacation. KH6QR was on 40 meters with a strong signal. Seen on Oahu: K7JCA/KH6 and K7ZSD, both operating out of Wakawao, Maui. KH6GKV and K5LTH/KH6 both passed their Advanced Class exam recently. KH6-GHZ recently worked 9V1CT in Singapore. KH6GQB and KH6GQW lead the way with the 2-meter DX Tip-off net. KH6RS/KF6 the Maui ARS reported FD activity from Hookipa Park. KH6GQP was equipment mgr.; KH6GGX was antenna chairman and KH6EXR was on the Kau Kau scene. Traffic: KH6GHZ 884, KH6-BZF 10, KH6GQW 6, W4UAF/KH6 2.

NEVADA—SCM, Leonard M. Norman, W7PBV—SEC: WA7BEU. Las Vegas F.M. Repeater Club officers are K7TDQ, pres.; W7FJN, vice-pres.; W7VYG, secy.; W7EBP, treas.; W7RBV, Engr. chairman. K7ICW attended the V.H.F. meeting in Fresno. K7RKH is operating portable 6. W7TFV has been scheduling many DX as well as stateside stations needing a Nevada contact. WA7BEU is rebuilding a model 28 typewriter. K7ZOK has been busy on 6 s.s.b. Plan now to take part in Nevada's first QSO Party. Details later. W7CSB is visiting in KL7-Land. W7YRY is rebuilding a model 14 reperforator. SNARS 2-Meter f.m. activity is growing in the Reno area. W7THH has been kept busy because of increased mining activity in our Silver State. The Sierra Hamfest will be held at Bowers Mansion, Sat., Aug. 30. Plan to attend. It is midway between Reno and Carson City. W7PRM has designed a kite to combat the desert elements.

SACRAMENTO VALLEY—SCM, John F. Minke, III, WA6JDT—ECs: K6RHW, W6SMU, WA6TQJ. RMs: W6LNZ, W8VDA/6. ORSs: W6LNZ, WB6QZZ, WA6RBD, K6RPN, W8VDA/6, W6VUZ, K6YZU. OPSs: WB6BAG, K6IKV, WB6MAE, WB6VSC, W6VUZ, WB6-WJO. OBSs: WB6MAE, W6NKR, WB6PEQ, WB6WJO, WB6ZJV. OOs: K6GG, W6KDJ. OVSs: WA6CXB, W6-DOR, WA6FWU, W6DGO.

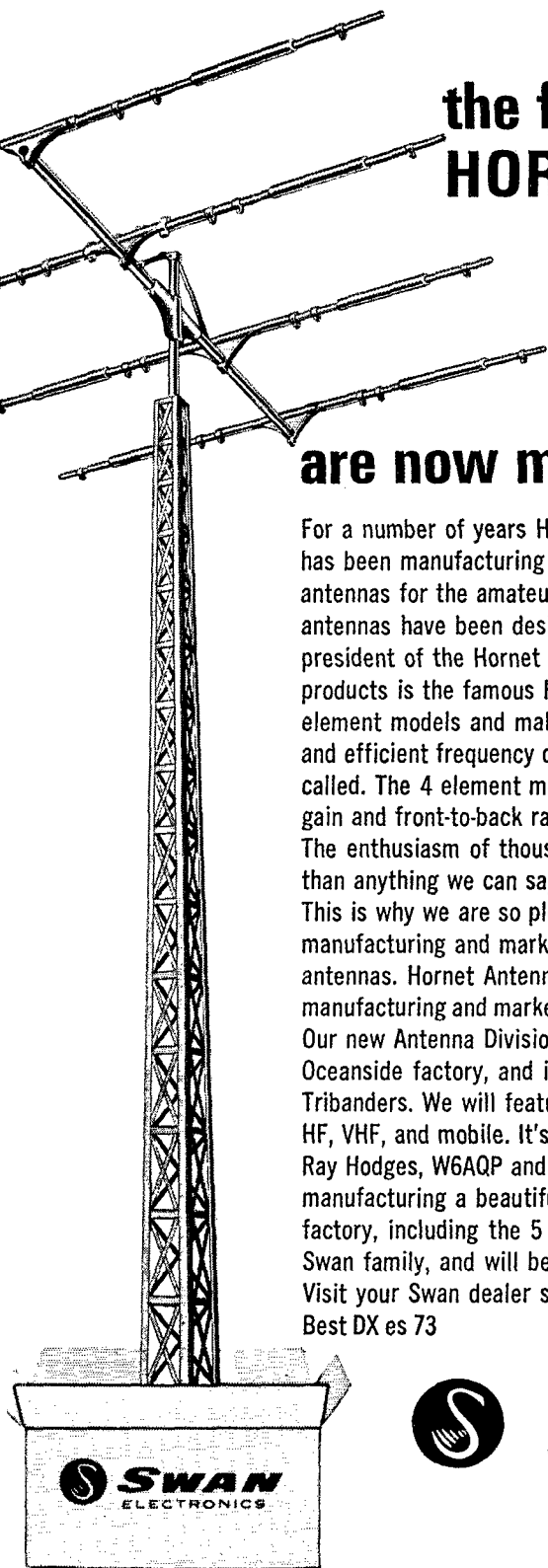
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For a number of years Hornet Antenna Products of Duncan, Oklahoma has been manufacturing a line of high quality, high performance antennas for the amateur bands as well as for other services. These antennas have been designed and manufactured by Jack Guest, W5AJZ, president of the Hornet company. Probably the best known of his products is the famous Hornet Tribander, made in both 3 and 4 element models and making use of Jack's patented, extremely rugged and efficient frequency dividers, or "traps" as they are commonly called. The 4 element model TB-1000-4 will equal or exceed the power gain and front-to-back ratio of any other trap beam built on a 24 foot boom. The enthusiasm of thousands of Hornet owners proves this better than anything we can say.

This is why we are so pleased to announce that Swan is now manufacturing and marketing the Hornet line of amateur band antennas. Hornet Antenna Products in Duncan, Oklahoma will continue manufacturing and marketing their line of Citizen's Band Antennas. Our new Antenna Division is a 10,000 square foot addition to our Oceanside factory, and is now in production on the Swan-Hornet Tribanders. We will feature a complete line of antenna products for HF, VHF, and mobile. It's a double pleasure to also announce that Ray Hodges, W6AQP and Fred Schnell, W6OZF, who have been manufacturing a beautiful line of mobile antennas at their Los Angeles factory, including the 5 band Swantennas, have recently joined the Swan family, and will be in charge of antenna production. Visit your Swan dealer soon, or write for further details.

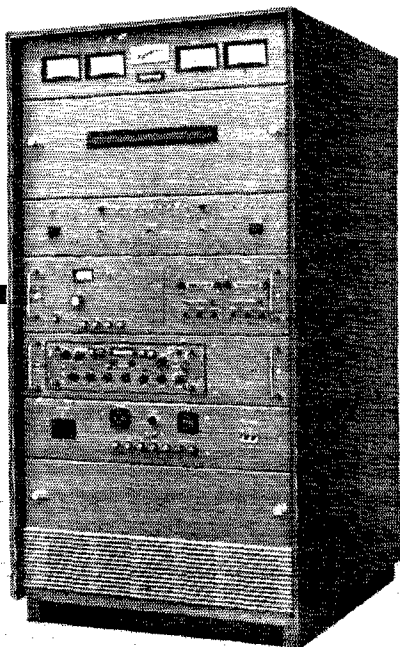
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1.6 — 26 MHz (OPTIONAL)
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The NEW HFT-10K also provides a new low for acoustic and white noise output levels; full front accessibility for fast maintenance; full operator visibility of overload settings; and peak reading output meter available as an option.

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| Net | Freq. | Time | Days | Mgr. |
|----------------|------------|-------|-------|--------|
| NCN | 3630 kc. | 0200Z | Daily | WA6LFA |
| NCN/2 | 3630 kc. | 0330Z | Daily | WB6WGR |
| WCARS | 7255 kc. | ? | Daily | ? |
| Yolo County CD | 145.68 Mc. | 0200Z | Tue. | WA6TQJ |

The California QSO Party will be held the first week end in Oct. Those of you interested in contests please participate; you will have a ball. The Yolo County e.d. bunch provided communications for the Dixon May Fair. Members of the RAIMS who didn't attend the Memorial Day week end campout in Yosemite provided communications for the parade in North Highlands. WB6WJO complains that the YLs in his "group" learned the code in one night and one of them is ready for the Novice test. Now you guys, if a YL can learn the code in one night, you certainly can get your speed up to 20 for the Amateur Extra. K6GG reports that the Glenn Co. RACES group has formed a club. If you worked VK9AM in New Guinea, that was WB6AUF, from Sacramento. Traffic: (May) W8VDA/6 70, WA6TQJ 25, WA6RBD 20, WB6WJO 18, WB6ZJV 18, WB6MAE 18, W6LNZ 11, W6VUZ 4, WA6JDT 2. (Apr.) WA6TQJ 20, WA6JDT 1.

SAN FRANCISCO—SCM. Hugh Cassidy, WA6AUD—SEC: W6WLV, WA6BYZ made the BPL again in May. W6KVQ has moved to Navarro. Many from the San Francisco section were seen at the Pacific Division Convention. New AREC members in San Francisco are WA6CFC and W6EYN. WB6JQP has been home between trips and doing some traffic-handling. W6EAJ has a new 1/2-wave 160-meter antenna. K6KEYV headed the crew for the Marine Radio Club Field Day effort at the old Tiburon Net Depot. WB6CIE put up a tower with the aid of a group of volunteers. K6MHO is a recent acquisition to the Marin scene. W6GPB says he is giving up the struggle and looking for new interests. The Tri-County Net, meeting at 3920 kc. at 10 A.M. Sun., has expanded into adjacent counties and across the state line into Oregon. W6DXA is convalescing after a stay in the hospital. WB6UJO has acquired some 2-meter gear. In a contact from the Seychelles, Gus Browning advised W6PFS that his signal was the strongest out of 6-Land. WN6ZUC, Josephine S. Clarke, was one of the top ten in the 1969 Novice Roundup and a Division winner to boot. WA6JUV was the section winner in the V.H.F. Contest this spring. WA6NOZ is checking into the Mission Trail Net. K6SRM and WA6NOZ, from the Valley of the Moon Radio Club, attended at the May meeting of the Petaluma Club. The Petaluma Amateur Radio Club received a citation from the Boy Scouts of America for its efforts in sponsoring a post of Explorer Scouts. W6PZE and WB6FLT are the club's pres. and secy., respectively. The Valley of the Moon Club is thinking of some sort of summer activity to get all the radio clubs in the area together for a social event. W6FVK has left the area and moved south again. W6KUF has ideas about getting up a directional antenna and going after DX again. Traffic: WA6BYZ 20, W6BWW 26, WB6JQP 23, WA6AUD 16, W6CYO 4, K6TWTJ 1.

SAN JOAQUIN VALLEY—SCM. Ralph Saroyan, W6JPU—The Delta Amateur Radio Club supplied communications for a Cross-Country Horse Run. Five stations with a net control were set up with good success. The Annual V.H.F. get-together was held in Fresno May 24 with 85 in attendance. W6JUK, W6QQA, W6DPD, WB6HIL, WB6NSZ, WA6SOL, W6KGF, WB6DNG, W6TZJ, K6MIO and W6BFI were among those attending. K6IFL is operating on 75-meter s.s.b. The Central California Single-Side Band Assn. held its Annual Barbecue at the QTH of WA6EDQ with 40 in attendance. WA6BVR and WA6JZP made contact between Kerman and Fresno on 420 Mc, and this is believed to be a "first." WA6BVR has a 420-Mc. repeater operating with about six hams using it. W6IPC is adding new gear to his hamshack, and still is handling traffic on PAN, TCC, RN6 and MARS. K6APE passed the Advanced Class license test. W6LRV has a new quad antenna. WB6YCK has a new receiver. WB6DTJ has a Clegg 22-r. W6JUK is running a kw. on 2 meters with good results. W6ZYR is chasing DX on 20 meters. WB6RLR is on 2-meters f.m. Traffic: WA6SCE 178, W6IPC 137, K6KOL 100.

SANTA CLARA VALLEY—SCM. Albert F. Gaetano, W6VZT—SEC: W6VZE. RM: WA6LFA. W6CBX had an opportunity to operate NPG, the big Navy transmitter, on Armed Forces Day. W6AUC has been running a lot of phone patches for people to Hawaii, Alaska and Argentina. W6RFF will be much more active now that his college studies have ended for the summer. He also will get some running time on his new exciter. W6ASH is gradually getting more active and

This can be your **"Big Break"**
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**"There must be
a better way
to make
a living!"**



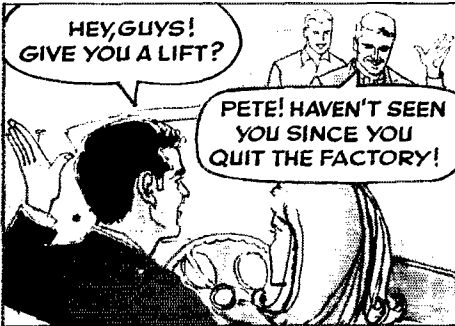
ANOTHER WEEK ON
THIS CRUMMY JOB!
AND WHAT HAVE I
GOT TO SHOW FOR
IT?

MUST BE A
BETTER WAY TO
MAKE A LIVING
THAN THIS...



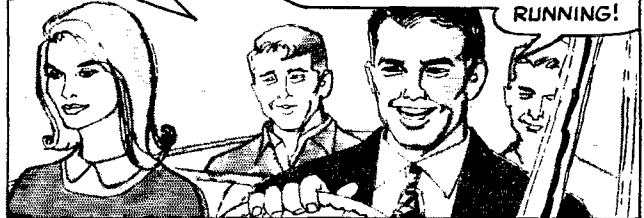
HEY, GUYS!
GIVE YOU A LIFT?

PETE! HAVEN'T SEEN
YOU SINCE YOU
QUIT THE FACTORY!



SOME CAR! YOU MUST
BE DOING ALRIGHT
FOR YOURSELF, PETE!

YOU BET! I'M IN ELECTRONICS NOW!
ALL THIS NEW GEAR YOU READ
ABOUT IN THE PAPERS - I'M ONE
OF THE GUYS WHO KEEP IT
RUNNING!



SOUNDS GREAT!
BUT HOW'D YOU
BREAK IN?

EASIER THAN YOU MIGHT THINK!
I LEARNED EVERYTHING I NEEDED
TO KNOW IN MY SPARE TIME, AT
HOME... WITH
CIE!



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YOU NEED
COLLEGE?

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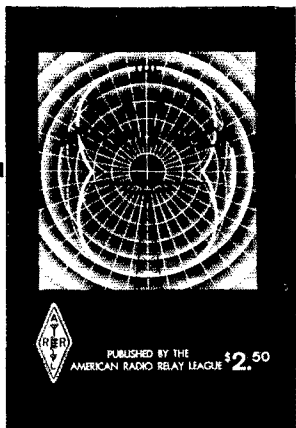
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probably will be back in full swing before long. Director Gmelin has been very active in going to the various club meetings in the area to keep the hams up on Headquarters information. This takes a great deal of Doc's time and he should be commended for it. WB6ZSE attended the Fresno Hamfest and won the YL C.W. Contest. Congratulations, Linda, WA6LFA reports that, although traffic on NCN has been slow, everything is running smooth and efficient. Members of the West Valley Club installed a new rotor motor on their tower at the club station. WN6JYK passed the General Class test. W6GIH demonstrated a solid state code typewriter machine at the June meeting of the Foothills ARS. Apparently the mail delivery to Los Gatos takes a day longer than one plans so if you will mail your station activity reports in a day or so earlier I can get the information in the report. I mailed the report on the 7th of the month. In general most reports indicate slow traffic during the month of May. Traffic: W6RSY 999, W6YBV 272, W6DYX 246, WA6LFA 230, W6DEF 73, W6VZE 63, W6VZT 52, W6AUC 48, WB6ZSE 29, W6ASH 8, W6RFF 8, W6ZRJ 7, W6BPT 2.

ROANOKE DIVISION

NORTH CAROLINA—SCM, Calvin M. Dempsey, WA4UQC—Asst. SCM: James O. Pullman, W4VTR. SEC: WA4LWE. RM: W4IRE. PAM: W4AJT, V.H.F. PAM: W4HJZ. We welcome the Raleigh Radio Amateur Radio Society, Inc. of Raleigh, and the Brightleaf Amateur Radio Club, Greenville, as newly-affiliated ARRL clubs. K4CIA participated in the April QSO Party and reported a good contest. Our OOs, W4FDV and W4EPY, are active and sending in reports. WA4UQC has his 4-1000A linear on the air.

| Net | Freq. | Time | Days | QTC | Mgr. |
|--------|----------|-------|-------|-----|--------|
| THEN | 3923 kc. | 0030Z | Daily | 150 | WA4VNV |
| NCN(E) | 3573 kc. | 2330Z | Daily | 114 | W4IRE |
| NC SSB | 3938 kc. | 0030Z | Daily | 9 | WA4KWC |
| Apr. | | | | | |
| NCN(E) | 3573 kc. | 2330Z | Daily | 82 | W4IRE |
| NCN(L) | 3573 kc. | 0300Z | Daily | 49 | WA4CFN |

Traffic: (May) W4EVN 400, W4FDV 121, K4VBC 87, WA4GMC 43, WA4VNV 40, K4EO 32, WA9JSX/4 22, WA4AKX 21, WB4HGT 21, K4YCL 16, WA4UQC 15, WB4HHH 12, WA4KWC 11, W4VTR 11, K8TGA/4 6. (Apr.) W4FDV 41, WB4GHK 30, K4TTN 14.

SOUTH CAROLINA QSO PARTY

August 23-24, 1969

All amateurs are invited to participate in the third South Carolina QSO Party, sponsored by the Low Country Amateur Radio Club, Inc. of North Charleston, S. C.

Rules: 1) Contacts will be made during the periods from 1800 GMT on August 23 to 0300 GMT August 24, and 1200 GMT August 24 to 0300 GMT August 25. Full or part time operation is permitted. 2) All bands, all modes and the same station may be worked on different bands and different modes for extra points. 3) The general call will be CQ SC and for S.C. stations "CQ de S.C." 4) Exchange QSO number, report and state, province or country. South Carolina stations give county for QTH. 5) Score one point for each contact and multiply by the number of different S. C. counties worked. S. C. stations multiply by states, provinces or countries. 6) Certificates will go to the first place winner in each state, province or country and the first three winners in S. C. 7) Suggested frequencies, plus or minus: 1820 3550 3950 7040 7240 14250 21070 and 21270. 8) Logs showing date, time, band, mode, and location of station worked with claimed score, to be mailed no later than Sept. 15, 1969 and sent to: Contest Chairman, LCARC Inc., P. O. Box 5026, N. Charleston, S. C. 29406.

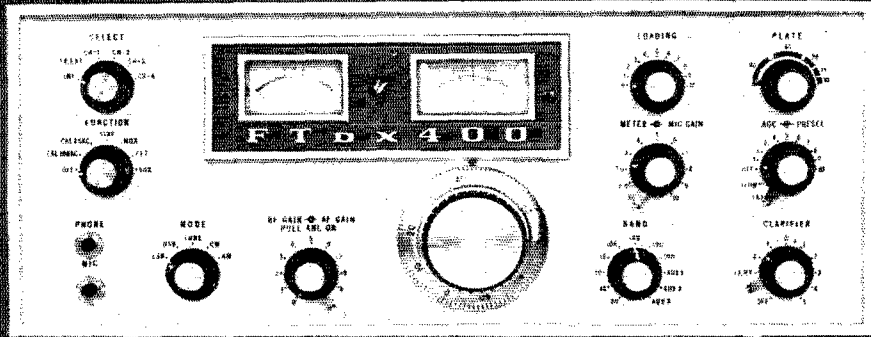
SOUTH CAROLINA—SCM, Charles N. Wright, W4PED—SEC: WA4ECJ. PAM: W4VFO. RM: K4BSS/4

| | | | |
|--------|----------|-------------------------|---------------|
| SCPN | 3930 kc. | 0830 and 2530 EDST Sun. | 12 Noon Daily |
| SCN | 3795 kc. | 2245Z and 0200Z Daily | May Tfc. 33 |
| SCSSBN | 3915 kc. | 2300Z Daily | May Tfc. 88 |

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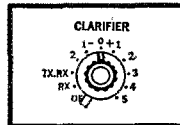
Conservatively rated at 500 watts PEP on all bands 80 through 10 the FT dx 400 combines high power with the hottest receiving section of any transceiver available today. In a few short months the Yaesu FT dx 400 has become the pace setter in the amateur field.

FEATURES: Built-in power supply • Built-in VOX • Built-in dual calibrators (25 and 100 KHz) • Built-in Clarifier (off-set tuning) • All crystals furnished 80 through the complete 10 meter band • Provision for 4 crystal-controlled channels within the amateur bands • Provision for 3 additional receive bands • Break-in CW with sidetone • Automatic dual acting noise limiter • and a sharp 2.3 KHz Crystal lattice filter with an optimum SSB shape factor of 1.66 to 1.

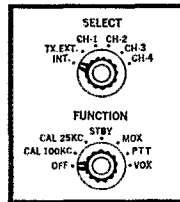
Design features include double conversion system for both transmit and receive functions resulting in, drift free operation, high sensitivity and image rejection • Switch selected metering • The FT dx 400 utilizes 18 tubes and 42 silicon semi-conductors in hybrid circuits designed to optimize the natural advantages of both tubes and transistors • Planetary gear tuning dial cover 500 KHz in 1 KHz increments • Glass-epoxy circuit boards • Final amplifier uses the popular 6KD6 tubes.

This imported desk top transceiver is beautifully styled with non-specular chrome front panel, back lighted dials, and heavy steel cabinet finished in functional blue-gray. The low cost, matching SP-400 Speaker is all that is needed to complete that professional station look.

SPECIFICATIONS: Maximum input: 500 W PEP SSB, 440 W CW, 125 W AM. **Sensitivity:** 0.5 uv, S/N 20 db. **Selectivity:** 2.3 KHz (6 db down), 3.7 KHz (55 db down). **Carrier suppression:** more than 40 db down. **Sideband suppression:** more than 50 db down at 1 KHz. **Frequency range:** 3.5 to 4, 7 to 7.5, 14 to 14.5, 21 to 21.5, 28 to 30 (megahertz). **Frequency stability:** Less than 100 Hz drift in any 30 minute period after warm up.

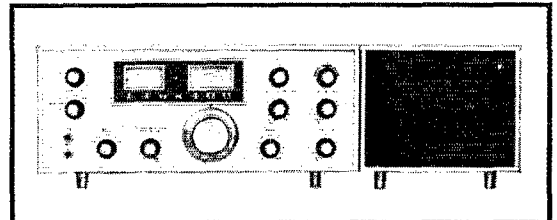


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FUNCTION CONTROL — Selects crystal calibration marker frequency and desired transmit mode of operation.



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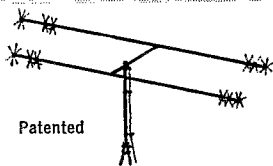
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Model B-24
Net \$59.95

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|------------------|-------------------|
| Bands | 6-10-15-20 Meters |
| Power Rating | 2000 Watts P.E.P. |
| El. Length | 11' |
| Turn. Radius | 7' |
| Total Weight | 11 lbs. |
| Single Feed Line | 52 ohm |
| SWR at Resonance | 1.5 to 1.0 max. |

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Needs no ground plane radials. Full electrical 1/2 wave on each band. Excellent quality construction. Mount with inexpensive TV hardware. Patented.

| | |
|------------------|-------------------|
| Power Rating | 2000 Watts P.E.P. |
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LUTOC and his XYL were guests of the Spartanburg Club May 20. In Anderson, W4PST is s.s.b. with a new Galactic WA4ZPM has a new SR-150, WA40TC has a new s.s.b. rig, K4RSL is mobile and fixed with an SBE-34. WB4EOC is on 2 with a new all-transistor rig and W4ZJI is patiently awaiting a new Health s.s.b. rig. Twenty-four S.C. hams attended the ARRL discussion and dinner meeting with W4KFC and WA4CY in Columbia on May 31. Vic and Phil also had a large number of "eye-bull" QSOs at the Columbia Hamfest the following day. The Spartanburg gang again won the transmitter building contest at the Columbia doings. If your club news isn't represented here, it's because no one sent it in. Get those club secretaries on the ball! Traffic: (May) W4PED 66, W4NTO 45, WB4DUU 17, W4FVV 15, W4BJE 9, W4JA 2. (Apr.) K4BSS/4 109.

VIRGINIA—SCM, H. J. Hopkins, W4SEJ—SEC; K4LMB, RMs: WA4EUJ, K4MLC, PAM, W4OKN, Norfolk AREC is having good luck with 8-meter f.m. equipment. WB4DRB is one of several young squirt netters who will be off to college this fall. WB4FDT is collecting old issues of the *Va. Ham*. He is especially interested in those issues from any time during the "fifties." K4IEF again is active from Rocky Mount and is looking forward to the Extra Class. SEVWA, a Tidewater area club, has been assigned the call WB4M2T. W4KFC continues his frequent director jaunts to various division functions, and W4JUJ still participates in myriad contests in spite of recent hospitalization. Most all section nets are suffering badly for lack of coverage in the Tidewater area. Norfolk-Portsmouth-Virginia Beach readers, please respond. Net frequencies: 3880, 3935 nightly. VFN formerly met on 3860 but may have changed during the summer. Traffic: (May) W4SQJ 531, K4KNP 239, W4UQ 238, W4NLC 200, WA4EUL 159, WB4CVY 152, WB4FDT 134, W4RHA 120, K4KDJ 109, WB4DRB 107, WB4DOY 82, K4TSJ 50, K4FSS 49, W4ZM 42, WA4JF 35, W4YZC 31, K4MLC 27, W4ZYT 27, WB4GTS 25, W4OKN 24, WA4PBG 24, K4JM 23, W4THV 19, WA4NJG 17, W4KX 12, W4TE 12, K4GR 9, W4KFC 8, K4LMB 7, W4WBC 5, W4MK 4, WB4GDO 3, K4PQL 3, W4OP 2, W4SEJ 2. (Apr.) W4NLC 271, K4LMB 9, W4GEG 4, W4DM 2.

WEST VIRGINIA—SCM, Donald B. Morris, W8JM—SEC; W8EV, RMs: K8TPF, K8MYU, PAMs: K8CHW, W8IYD, Net mgr. c.w.: W8SQO, Phone: W8YOF, The Novice C.W. Net now meets on 3708 and 3730. WB8BGG is a new ORS. W8DUV spoke at the Novice Graduation Dinner of the Greenbrier Valley ARC at Lewisburg. New amateurs are WN8DMR, WN8DRS, WN8DRR, WN8DMQ, WN8DMS, WN8DML, AREC roster, Greenbrier County area: WA8AVZ, W8FFC, W8AKM, W8VII, W8PFB, W8TRW, WN8ZJR, W8AVV and W8OXI. I regret to report the passing of C. W. Wellman, W8PQL, New ECs: K8MYV, Taylor Co., and W8HRQ, Pleasant Co. WA8CPY, former ORS, now operates KR6GF on Okinawa and skeds W8IYD, Sun, on 14 Mc. W8DAR is moving to Florida. Watch for W8WVA at the State ARRL Convention Jackson's Mill, July 5 and 6. Buckhannon ARC publishes a fine newsletter with W8WVM as editor. WN8CPK and W8AKM received WAC and DXCC. K8QYG is a new member of the DXCC. The Kanawha ARC wins the Field Day Award presented by the State Radio Council. W1UED represents ARRL at the Roanoke Division Convention, Huntington, Oct. 11 and 12. WVN C.W. Net: 43 sessions, 238 stations, 100 messages. WVN Phone Net: 31 sessions, 590 stations, 109 messages. Traffic: WA8RQB 174, WA8POS 170, W8SQO 126, WA8NDY 102, W8HZA 75, K8MYV 68, W8CKX 50, WA8WIX 47, WA8WCK 40, WA8YOF 37, WA8YSB 28, W8JM 25, WA8YHH 22, K8MYU 17, W8DUV 15, W8RYCC 5, WA8ZNH 5, W8AEN 3, WA8JA 3, K8QEW 3, W4LFW 2, WB8AQE 1, W8KWL 1, K8QYG 1, K8RLC 1, W8WEJ 1, K8ZDY 1.

ROCKY MOUNTAIN DIVISION

COLORADO—SCM, Charles M. Cotterell, W0SIN—Asst. SCM; K0TIV, SEC: WA0HLQ, RM: W0LRN, PAM: W0CXW, V.H.F. PAM: (Denver area), WA0LJK, W0LRW scored 14.7 parts per million in the recent FMT. W0WYX is putting up his third tower this year, 116 feet with MARS assistance. The wind took 2 down. He also can have a 2-meter amateur repeater on it. W0DQN reports a fine mobile trip. W0BWJ is vacationing in DL-Land. W0CBI is a new OPS. W4UDS has a new 10/15-meter quad, K0UYF, WA0HLA and K0CNV were mobile at the Horsetooth reservoir search with many fixed stations assisting. K0SPR had 12 AREC members on drill in May. The SCM, RM and Denver EC K0FLQ attended the PPRAA meeting in Colorado Springs. I would like invitations to more such meetings in the state. OO K0HWB mailed 19 ad-

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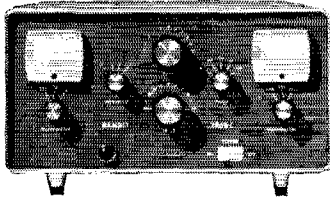
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visory notices and received one nice reply. EC reports were received from WA0WJ, WA0HLA, WA0KAQ, WA0QFY and W0WGC. DU station W0ANA has closed for the summer. W0OWP renewed appointment as OPS. An OVS report was received from WA0SJK. During the 6-meter opening May 19-25 W2s and VE3s were coming into Denver. WA0LIK may start a c.w. net on 6. The Hi-Noon Net reports QNI 916, QTC 109, total time 1149. The CEPN Net reports QNI 128, QTC 39, no time. Columbine reports QNI 1088, QTC 143, time 1705 minutes, 26 sessions. Traffic: W0IES 754, W0DON 856, K0MINQ 315, K0JSP 111, W0LRN 45, W0WYX 44, W0LRW 34, W4MXU 33, K0ECR 22, W0SIN 18, K0SPR 15, WA0QFY 14, W0BWI 10, WA0PGM 10, W0CBI 6, K0FLQ 4, W0UAT 4, W0LCE 2, W4UDS 2, WA0KQ 1.

NEW MEXICO—SCM, James R. Prine, W5NUI—The New Mexico C.W. Net, 3760 kc., has moved to 0230Z in order to increase participation. The Road Runner Net and NMN continue to provide outlets for Naval Training Center messages. This is a most commendable public service. WA5UJY has achieved Advanced Class and has an h.f. rig in the pick up for summer vacation. WA5JNC is nearing completion of a new digital frequency counter. Preventative maintenance by W5NUI on an old 2-meter rig disclosed some 130-Mc. output which was corrected without advice from FCC. When was the last time you made a thorough check of your equipment? Traffic: WA5UJY 89, K5MAT 57, W5DMG 48, WA5FJK 38, W5NON 31, WA5JXU 20, WA5JNC 17, W5NUI 11, WA5MIY 8, W5PNY 8.

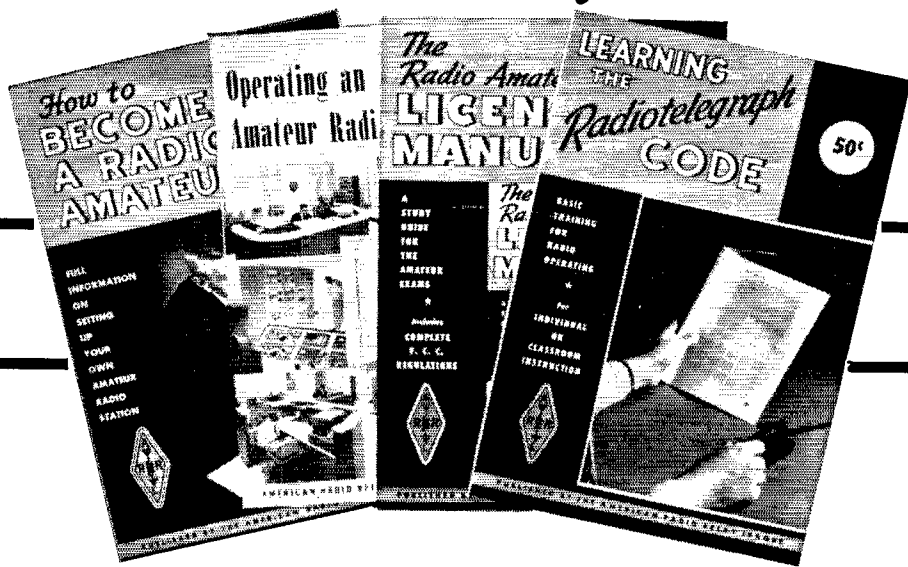
UTAH—SCM, Thomas H. Miller, W7QWH—SEC: W7WKF. RM: W7OCX, WA7HHE and WA7GTL have earned net certificates for their participation on the Beehive Utah Net. Net control stations are needed for BUN. If you are interested, contact W7OCX or the SCM. Several hams in the Salt Lake City area again helped provide communications for the annual Friendship Cruise on the Green and Colorado Rivers. W7OCX was awarded the first gold seal for his Utah Counties award, confirming contact for all 29 counties in the state. John beat WA7HSW by 20 minutes in the QSO for the last county. Cards confirming the QSO arrived the same day and were postmarked at the same time. WA7HSW earned No. 2 and WA7HCQ earned No. 3 with a QSO 13 minutes after WA7HSW. Negotiations are under way to pool the resources of the two present v.h.f. groups into a single organization. W7UP was operated at Promontory Point, the site of the Golden Spike celebration. Traffic: (May) W7EM 78, W7OCX 72, WA7BME 26. (Apr.) WA7BME 36.

WYOMING—SCM, Wayne M. Moore, W7COL—SEC: K7NQQ. RM: K7KSA, PAMS; W7TZK, K7SLM, OBS; K7SLM, K7NQQ, W7SDA, K7TAQ, WA7HA. Nets: Pony Express, Sun. at 0800 on 3920; VO, daily at 0130 GMT on 3610; Jackalope, Mon. through Sat. at 1315 on 7260; Wx Net, Mon. through Sat. at 0630 on 3920. New appointment: WA7IFC of Jackson as EC. W7NNX has now retired so has plenty of time for hamming. K7LOH is spending the summer in New Mexico. K7HAW has a new s.b. transmitter. WA7EGK was instrumental in assisting in a very serious accident in Southern Wyoming in April. He used his 2-meter mobile to very good advantage. Sorry that your SEC and myself could not make the hamfest as we were requested to attend the convention, but hope to attend a meeting in your area soon and brief you on anything new that came from there. Traffic: K7NQQ 269, W7SDA 82, K7VWA 23, W7NKR 27, K7QJW 13, WA7BDI 10, W7ABO 6, K7ABO 6, K7BTE 4.

SOUTHEASTERN DIVISION

ALABAMA—SCM, Donald W. Bonner, W4WLG—SEC: K4KJD. RM: K4BSK, PAM: WA4EEC. Hope the net activity will be picking up now that the vacation period is almost over. K4UMD is back with us after an operation at the VA Hospital in Memphis. The AENR Net had several tornado watches at the Huntsville weather station and e.d. office this summer. It offers the only emergency communication link between these two important points. WB4IEY and WB4ITM are experimenting now with slow-scan TV. W4WLG and WB4IEY are new on RTTY. WB4LYE has a new Drake 2B. WN4KSL has a new HW-16 transceiver! WN4NCT is a new Novice in Athens and WB4LTT, WB4DZK and K4PJP are on 2 meters now. The North Alabama Hamfest will be held in Decatur Aug. 16 and 17. Also new on 2 meters are W4PEP, WB4MCR, W4WOF and K4IKR. We regret the passing of Raymond Bows, W4GDU; Olin Lawson, W4BTB, and Daniel

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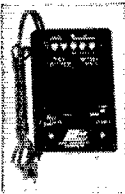
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Brook. WA4OSR is a new OO. WA4JSM has a new TR-3. PA0PDO is a new member of the HARC and is working DX back home! WA4EXB and the group around Macon County are doing a fine job in traffic and emergency communications. Many of them have mobile and portable capabilities. Traffic: WA4YEK 186, WA4EXB 140, WB4EKJ 142, K4BSK 122, W4HFU 104, WN4EDJ 104, WA4FYO 75, K4AOZ 70, WB4JMH 53, WA4GGD 46, WN4MIN 43, WN4KSL 39, WA4ROP 31, K4KJD 15, W4WLG 12, WN4IAL 11, W4DGH 8, K4WHW 8, WB4EY 5, WB4BLX 3, WB4KSM 2, W4MIKU 2.

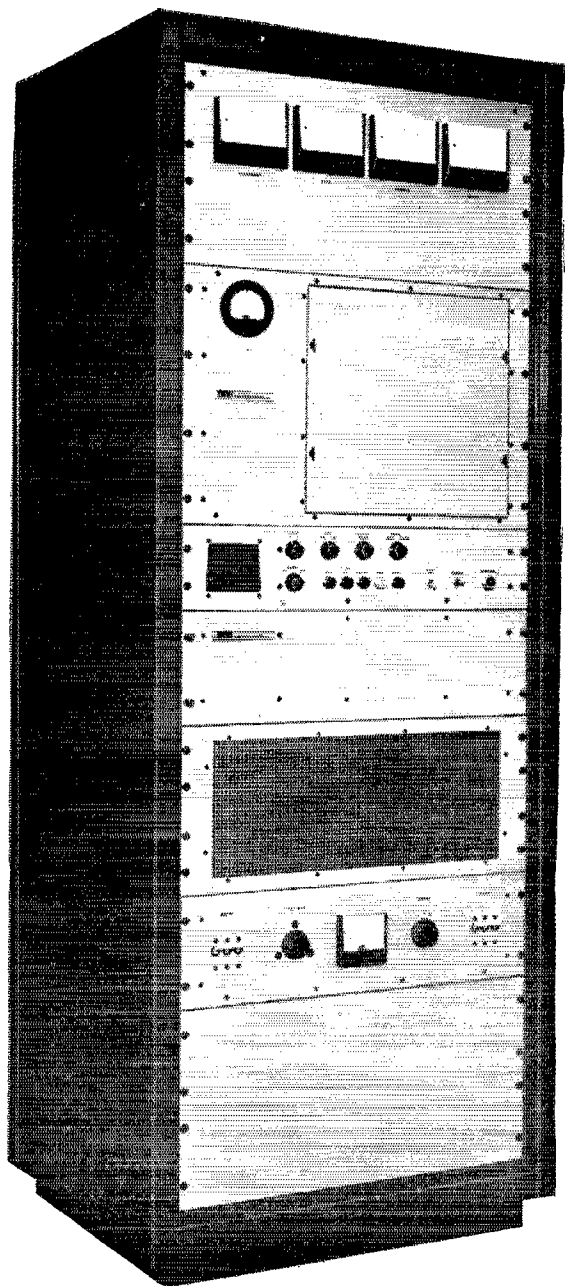
EASTERN FLORIDA—Acting SCM, Ronald J. Locke, W4YXP—SEC: W4YTT, Asst. SEC: W4SMK. RMs: K4EHY, W4RWM, PAM 75M; W4OGX, PAM 40M; W4SDR, V.H.F. PAM: W4ABMC. Official Bulletin reports were received from K4DAX, K4LPS, W4OGX and W4EYU. I would like to take this opportunity to welcome two new ECs in the area: W4NEC is the new boss in Duval County while W4BNE holds forth in Hillsborough. Congratulations to both of you. W4FP has resigned as Asst. SEC for Eastern Florida. Tom did a great job and we certainly will miss him. W4SMK has taken over the job and I'm sure Ken will keep up the good work. K4IEY now has a new 50-ft. tower up and is awaiting his rotor and coax before attacking 20-meter s.s.b. WB4FLW has taken the 2nd class commercial exam and is eagerly awaiting the results. W4YNM reports that the RACES plan for Columbia County has been submitted for approval. This group of amateurs has really made progress in the last few months. It seems that the GATOR Net has suffered with "skip" problems lately. Maybe the band will soon settle down for them. WB4IYW has recovered from his illness and taken a nice vacation. W4FWI is a patient in Cedars of Lebanon Hospital with a heart attack. Hurry back, Vance. NOFARS has, as far as we know, the first amateur mobile television in the country, operating on 432 Mc. and working in conjunction with the state and county e.d. This will be a valuable addition to the RACES program in Florida. W4IQT and WB4GCM are the masterminds on the project. Traffic: W3CUL/4 1264, WA4SCK 829, WA4-FGH 235, W4EFW 162, WB4HJV 161, W4FPC 125, W4SDR 122, WA4JHJ 121, K4EHY 116, WB4IER 82, WB4EPD 74, K4DAX 72, K4LEC 70, WA4HED 68, WB4ADL 58, WA4RGW 53, W4SMK 51, K4IEY 41, WA4NBE 38, WA4CTQ 37, K4LPS 37, W4DFU 33, W4ZAK 29, K4SJH 26, W4NGR 23, W4TJM 22, W4LK 21, W4YTT 19, W4SOM 18, W4OGX 15, W4ILE 13, W4EYU 11, K4EBE 10, WB4DSP/4 8, W7OX/4 8, WB4FLW 6, W4VQP 6, WB4JNI 4, W4YNM 1.

GEORGIA—SCM, Howard I. Schonher, W4RZL—SEC: WA4WQU, RM: W4FDN, PAMs: K4HQI, W4YDN. K4HQI held up getting on for lack of a power supply for the Heath SB-101. He reports 144 Mc. erratic during May with possible activity indicated by TV activity. W4YDN is planning a technical net. K4KWT is back on Look for him on 3975. WA4VWV, WB4FCE, W4FOG and W4YDN visited with WA4WQU, WB6UTC/4 is county hunting. W4YDN now has a private pilot's license and made his first emergency instrument landing. W4LRR has a four-element 6-meter beam. WA4BYD sent in a negative report. Nice picture in QST, Carrie. WB4JRK is a new OBS. W4HYW and WA4GXZ earned Certificates of Merit. WA4RS is collecting old issues of QST. The Georgia Single Sideband Net reports 959 check-ins with 203 messages while the Georgia State Net handled 224 messages with 323 check-ins. W4YDN replaces W4KRE as secy. of the Ga. S.S.B. Assn. WB4FCE has a new ground system. W4OHA is working for emergency communications system in his area. Traffic: (May) WB6UTC/4 216, WA4RAV 150, W4NSO 145, W4TYE 99, W4CZN 88, WA4GXZ 71, W4FDN 70, WA4UQQ 70, W4PIM 55, W4YDN 41, WB4HLX 22, W4DDY 11, W4RZL 10, W4OHA 6. (Apr.) W4TYE 7.

WESTERN FLORIDA—SCM, Frank M. Butler, Jr., W4RKH—SEC: W4IKB, PAM-V.H.F.: K4NMZ, RM: K4UBR, RM-RTTY: W4WEB. Nets:

| Net | Freq. | Time | Days | Sess. | QNI | QTC |
|------|----------|------------|-------|-------|-----|-----|
| WFPN | 3957 kc. | 2200Z | Daily | 31 | — | — |
| QFN | 3651 kc. | 2230/0200Z | | 62 | 363 | 285 |

Newly-licensed hams include WN4MWX Pensacola, WB4NEU Fort Walton and WN4MYE Panama City. Pensacola: K4LAN now edits the QFN Bulletin as well as the FFARA Newsletter. Corry Field ARC expanded its traffic operation and keeps many skeds daily, including USS Lexington and USS Observation Island. Pres. is VE3FRE/W4. Fort Walton: The Play-ground ARC was reorganized with K4UBR, pres.;



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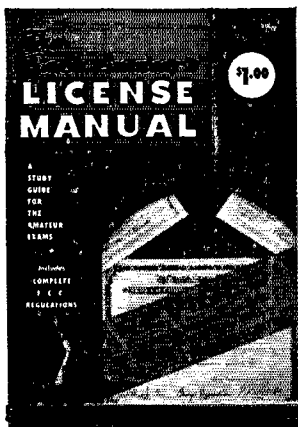
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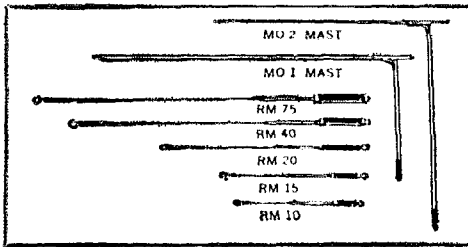
W4SMH, vice-pres.; W4UXW, secy.-treas. Membership is open to any ham in the area; meetings are held the last Thurs. of each month. We were saddened to learn of the death in Vietnam of Lt. John Lakin, USMC, ex-KN4SFP, son of W4MMW. Chipley: The WFPN Picnic attracted a good crowd, despite the bad weather. W44AYX, W4MQQ, W44EQQ, WB4DVM, W4KCA and WB4EQU were given Section Net certificates for their long service as NCSs. W4MQQ will be the new net mgr. when W44AYX leaves. Apalachicola: K4BDY is now EC for Franklin County. Tallahassee: FSU has an active club now with its own call, W44ZUP. W4FR joined the Silent Keys, as did W4GDU of Montgomery. Traffic: (May) W44ECY 489, K4LVN 139, 8R1Y/W4 108, W4IKB 38, W4KCA 32, W4RKH 26, WB4LXK 14, W44EQQ 12, K4DOT 2. (Apr.) W4KCA 10.

SOUTHWESTERN DIVISION

ARIZONA—SCM, Gary M. Hamman, W7CAF—PAM: W7UXZ. SEC: K7GPZ, RM: K7NHL. Those interested in emergency communications who are not already active with RACES or AREC should contact the EC in their county or the SEC, K7GPZ, 5733 N. 41st Pl., Phoenix 85013, for further information. More participation from around the state is needed for the Bring 'Em Back Alive program during major holiday week ends. During Labor Day week end contact W7IO/7 at the AAA building in Phoenix on 3.878, 7.278, or 146.94 Mc. with any information that would be helpful to motorists. Those who can operate at AAA, call Scotty, K7KCB, IN Scottsdale at 945-0458. The next Southwestern Division ARRL Convention will be held in San Diego Oct. 17-19. Write your SCM for details. W4KTT, mobile on 2-meter f.m., contacted K7VOR, who reported a fire which resulted in the saving of a ranch house. K7YWZ is working DX again but from his new QTH. K7IVU is not operating from Prescott. K7RDH is active again at a new QTH with a beam 110-ft. high on a Phoenix apartment building. W47FD has a four-element quad in operation at a height of 55 feet. Arizona Post Office Net members had a nice picnic at the QTH of W7TPL near Camp Verde. W7UXZ averaged 0.1 parts per million error in the FMT. Can anybody beat that? Copper State Net handled 158 QTCs. Traffic: (May) W7GEP 331, K7NHL 149, W47TF 31, W7DLF 22, W7OUE 19, K7RDH 19, W7SBZ 19, W7CAF 17, W7LLO 17, W47GAE 16, W7UXZ 16, W47EQC 15, W7JMQ 12, W7OIF 12, W47FEG 11, K7JTC 6, W7WGW 2. (Apr.) W47TSP 61.

LOS ANGELES—SCM, Harvey D. D. Hetland, WA6KZI—Asst. SCM: Don Etheredge, K6UMV, WA6EPX is busy putting on ATV demonstrations and reports increasing ATV interest in the section. WA6DZR is redoing the 40-meter mobile antenna and W6AM reports 5-band mobile, both c.w. and s.s.b. K6ASK and W6OEO are relocated in new QTHs. The UCLA ARC, W6YRA, was active in FD. WA6TWS advises the Ramona RC will offer code and theory in the fall. New Marina RC officers are WA6OWM, pres.; K6ARB, vice-pres.; WA6RIO, secy. The Monterey Park ARC Picnic is set for Sept. 21. Contact W6IDF for information. WB6UHF and W6INH are new ORSS. W6FD is a new Extra Class licensee. W6CYH took in the ARRL National Convention. K6CDW misses the lack of incoming traffic from TCC circuits. W6RCV entertained guest JA2BLG. W6RW is in and out of town with work. K6QPH is active with the K8BPC group. W6MLZ has been appointed a member of the President's Committee for Employment of the Handicapped. EC W46IXG reports 31 AREC/RACES members received Public Service awards for their efforts during the Jan. floods. WB6KGG is building a keyer. K6VNX is finishing a new SR-401. WB6WEY is hard at it with a new amplifier. Silent Keys include W6DSC and K6ZPW. ITT ARC station, WB6LKB, is on the air and active. A new net active in California is the Western Public Service System on 3952 kc, during the evening hours with a West CARS format and roll call at 7:30 P.M. local. K6HV reports many phone patches for servicemen. The W6IN Society handled parade communications for the San Fernando Fiesta Parade with fine support from the Metro Net and LACARO members. May openings on the v.h.f. bands carried through the June V.H.F. Contest with good activity being noted. A detailed list of So. Cal. radio clubs is now available on request from the La. SCM. At the moment there is no SEC and the functions of the SEC are being handled by the SCM. Persons interested in AREC activities, please drop a note especially if you might undertake the establishment of an AREC in your area. The SCM's address is on page 6 QST. Director W6KW must submit proposals for the agenda of the Nov. 1 ARRL Board Meeting by Oct. 22. Be sure your thoughts and those of your radio club reach him prior to that date. Los Angeles section amateurs can

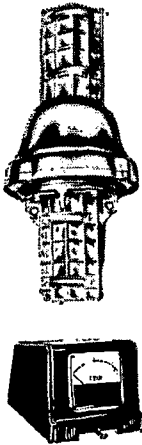
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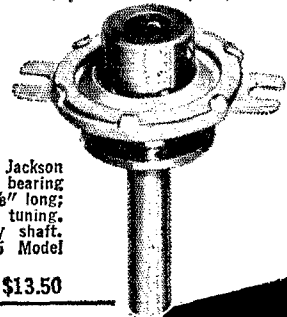
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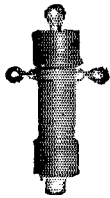
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receive free copies of the section's bulletin *Didi-dum-dum-didi* in exchange for monthly activity reports mailed to the SCM. This bulletin is prepared by the SCM and his assistant and provides detailed, current information on section doings. Bulletin exchanges with radio clubs are welcomed. The next La. Council of Radio Clubs meeting is Sept. 18. Section traffic reports for May:

| Net | Freq. | Time | QNI | QTI | Mar. |
|-----------|-----------|--------|-----|-----|-------|
| Metro Net | 50.85 Mc. | 8 P.M. | 410 | 202 | WB6ZL |

Traffic: (May) W6GYH 1023, WA6LWE 750, WB6BBC 347, W6MLF 312, W6GOU 238, W6PKA 144, W6QAI 117, WA8TW 86, W6HUJ 62, K6CDW 61, W6BZY 58, W6FJT 48, W6BHI 46, W6DQX 42, W6EPX 38, W6AIN 36, W6PQH 24, W6BHG 17, W6JPH 16, WB6KKG 15, W6INH 13, WB6UHF 13, K6CL 12, W6DGH 10, WB6WEY 9, WB6WDS 7, WB6GGL 5, WA6KZI 3, W6OEO 2, K9ZMS 2, K6ASK 1, (Apr.) WB6ZLP 43.

ORANGE—SCM, Roy R. Maxson, W6DEY—WA6, MPR recently received a MARS Certificate of Achievement from Brigadier General John E. Frizen, USAF, acting for the commander, for his outstanding work in handling personnel phone patches to Vietnam. ORS K6OT took first place for California in the Louisiana QSG Party. Our popular Orange section ham, Andy Devine, WB6RER, was one of the speakers at the recent, well-attended WCARS Breakfast in Lakewood. The Orange City hams can thank K6JX, W6WVI and WA6MPR for their efforts in organizing the fight against a local antenna height-restriction ordinance. ORS WA6ROF is operating Wed. nights from AFC6YXN MARS station at Antennetics Radio Club, handling phone patch traffic to Southeast Asia. OO WA6JZZ took part in the recent FMT. W8ELW6 advises the summer traffic slow-down is starting early. Traffic: WA6ROJ 125, W6WRJ 37, W8ELW6 35, K6OT 3, W6BUK 2.

SAN DIEGO—Acting SCM, Richard E. Leffler WA6COE—SEC: WA6KHN. SCM will keep the SD section bulletin board at Western Radio up to date. Look for section news: clubs, OBS skeds, appointments to net and stations, bulletins, convention news. Section news: SEC reports 100 AREC members now. Hote Hilton is secured for the convention in October. WA6TAD, chairman, still needs help. We are soon to report W8EPO as a Silent Key. Clubs: The Annual Palomar ARC Picnic will be held Aug. 2 at Live Oak Park starting at 10 A.M. The club's county directory is out. Look for it. The V.H.F. Club announces its f.m. frequency is now 146.85. The ARC-E Cajon has its WAMO award going. Contact any member for details. The DX Club reports VK3GN is expected at its Aug. or Sept. meeting. Operations: WB6KS (now GPS) needs operators for K6SD, the convention and 200th station. K6EQN is with 11th Naval Dist MARS. WA6HQM is now District HF Net Manager with Navy MARS. W6SK mobilized 15,000 miles this summer. New Extras are K6YRF, W6NUK, WA6LBF. Contact WA6KHN if you wish to build a station & receive satellite weather pictures. K6BPI, K6YRF, WB6IMN, WB6UNB are OBSS. Be sure to vote in the coming election for San Diego SCM. Traffic: (May) K6BPT 9992, W6BGF 402, W6VNO 395, K6HAV 15, K6YRF 6, WA6COE 5. (Apr.) K6HAV 45.

SANTA BARBARA—SCM, Cecil D. Hinson, WA6OKT—SEC: K6GV. RM: W6LJ. W6HW has his HW-10 completed and on the air. K6AAK has a new SR-40 on the air, and plans to move it to the cabin at Bas Lake. K6GV is now operating 2-meter f.m. mobile. W6KZO is off the air while he makes the move from Santa Barbara to San Luis Obispo. The Simi Valle ARC made its usual Field Day trip to Reyes Peak. WA6CPM/WA6ORA has taken part in two recent FMT with average errors of 3.3 p.p.m. and 2.4 p.p.m. In addition the FMT and OO activities. Don soon will have a Model 19 TTY going. WA6DEI has been working with quad and Delta loop antennas on 20 meters in addition to his duties as ORS in the San Luis Obispo area. The Camarillo ARC held its installation of officers recently at a local restaurant. WN6ZWM interrupts his studies for the General Class license with a trip to Honduras to hunt butterflies. WB6BWZ has an f.m. unit which will be heard soon on v.h.f. In addition Matt has an AK-1 a.f.s.k. unit under construction for v.h.f. RTTY. Sounds like he can work v.h.f. in all modes. Traffic: WA6DEI 158.

WEST GULF DIVISION

NORTHERN TEXAS—SCM, L. E. Harrison, W5LI—Asst. SCM: Gene Pool, W5NFO. SEC: W5JSM. PAM: W5BOO. RM: W5QZ. The Key City Radio Club (Abilene), plus 8 dedicated members and one XYL

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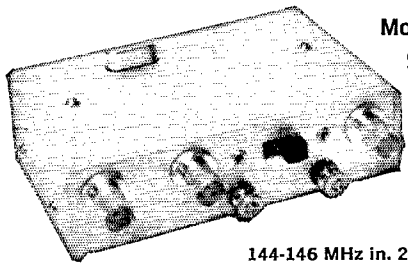
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sponsored one of the best hambores held in West Texas in a long time, with 127 attending. The "TT" Club of Dallas sent a delegation to Abilene to determine "how you do it" come Sept. W5YNT and Brandenburg have big things planned. Take Exit 23 on North Central Dallas past the Ramada Inn then look for antennas. Director Albright will attend the second directors' meeting in Nov. so get your recommendations to him by Oct. 22. *Ignition Notes*, the CapRock Club newsletter, received honorable mention and a special award by ARNS. W5AJ is now EC for Gray County. Be on the lookout for a new film appearing on all networks for the story on ham radio. Arthur narrates and Barry Goldwater participates, so watch your TV. Many clubs in NoTexas are conducting Novice classes. See you at Amarillo for sure. The Dallas Club presented DX personality O8AE at its June meeting. FMT reports are now rolling in. The long-awaited North Texas Administrative Net may be factual soon. W5FPX, in Longview, has resigned as EC. The Arlington CD plan came through and it is a real pleasure to read such a well-thought-out plan. W5IFH, Pasadena, wants RTTY information and I'll comply. W5AKIV has been appointed OO. OO W5QPX reports 36 observations with no fifth district people listed. Our SEC had 23 ECs reporting, plus 8 Asst. ECs. The Lake Texoma Hamorama is set for the week end of Nov. 14-15-16. Net certificates are available upon request. The following ECs have been cancelled: W5HBD, K5RZN, W5SIN, W5PMY. New appointees include K5OIF, W5KRZ, W5KOW, W5PYL, W5DXT, W5JPM and W5AQY. We need reports of ham activities in Corsicana, Groesbeck, Athens, Tyler, Sulphur Springs, Mineola, Jacksonville, Carthage, Greenville, Mt. Pleasant, Greenville, Ennis, Terrell, Longview and Marshall. Traffic: (May) K5BNH 2475, W5AKIV 304, W5JSM 238, W5QGZ 201, W5REF 124, W5PPF 114, W5HYV 54, W5FCX 51, W5QWA 13, W5EVS 16, W5PBN 7. (Apr.) W5PBN 20.

OKLAHOMA - SCM, Cecil C. Cash, W5PML - Asst. SCM: W. L. (Smoky) Stover, K5OVP. SEC: W5AFSN. RM: W5QMJ. PAMS: W5MFX, K5TEY, W5JGU and K5ZCJ. Your SCM made a week-end trip to Vinita to a meeting of the NORA Club and was received and treated royally. The NORA Club now has its all-band vertical mounted on top of the County Court House at the EOC. W5QAC is sporting a new SB-101; also WAQCTL/5 got notice that his SB-101 is at the post office to be picked up. Watch your "S" meters, for Jerry already has his SB-200 wired and smoke tested. W5VAQ has been in the hospital but is out and doing fine now. W5JJ lost his antenna pole in one of our Oklahoma blows recently. W5TKC, son of W5JJ, departed recently for duty in Korea. K5TEY has a big smoke generator on now (pair of home-brewed 813s). All Oklahoma phone nets on 75 meters will move to one common frequency (3915 kc.) with the change back to Central Standard Time, the last Sun. in Oct. This should become a very common hangout frequently whereby any one looking for a contact into Oklahoma should be able to stir up a smoke signal QSO there. Presently the nets are: 01Z (c.w.), 3882.5 kc., Mon. through Sat. at 1900 local time and SNZ (slow speed) same days at 2145. Phone nets, 7290 Traffic Net, daily 1500Z to 1700Z and 1900Z to 2100Z. OPEN, 3915 kc. 0800C Sun. OPON, 1700C daily on 3920 kc. and STN 1730C on 3855 kc. daily. Traffic: K5TEYB 2654, W5IMO 127, W5PML 72, W5MFX 49, W5SEC 36, K5OOV 27, W5QBF 20, W5FSN 15, W5KFT 14, W5LWD 14, K5SWL 14, W5FKL 12, K4OCX 10, W5RYM 9, W5NZM 7, K5WPP 5.

CANADIAN DIVISION

ALBERTA - SCM/SEC, Don Sutherland, VE6FK - PAM: VE6ADS. ECs: VE6SS, VE6AFQ, VE6AWM, VE6XC. ORSs: VE6ATG, VE6ATH. OPSs: VE6ATH, VE6SS, VE6AFQ, VE6HM, OOS: VE6HM, VE6TY, OVS: VE6MX. Congratulations to VE6KF, retiring pres. of the NARC, on his appointment as ARRL Asst. Dir. for Alberta. VE6ADX once again proved that his station on top of Sulphur Mountain is indispensable to the BEBA campaigns. The cooperation from VE6ADX is terrific. VE6ALX also has conducted some good 2-meter experiments from this same station at the 7500-ft. level. The Border Radio Club sponsored a very enjoyable family picnic at Writing on Stone Park. VE6TG is now a grocer and butcher. Welcome back to Calgary, VE6PL and WA5OHH. The APSN needs some c.w. stations for liaison work with Regional Net Seven. VE6HM continues to make an outstanding show in the FMTs. VE6AWW is the new editor-publisher of the *Alberta Amateur*. Lee will appreciate all contributions. Please mail all items to Box 715, Claresholm, Alberta, by the seventh of the month. Traffic: VE6FK 17, VE6ADS 5, VE6XC 5, VE6SS 4, VE6FS 2.

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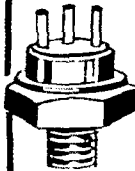
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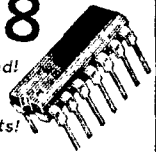


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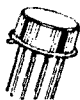


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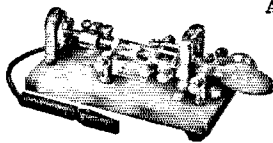
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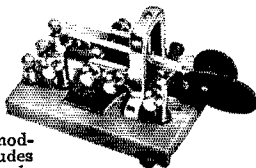
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VHF COMMUNICATIONS

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BRITISH COLUMBIA—SCM, H. E. Savage, VE7FB—VE7KY's hospital report is not good and he will be confined for many months. Cards and letters may be sent to his QTH. VE7BZQ and VE7AXB are new amateurs from the Vancouver ARC. VE7AFN has graduated from UBC and received his BA. VE7BJT has bought his own house and is busy setting up the shack. VE7AKB is now VE7FW. There are so many new calls with old names it is hard to know who is who. The BCARA and CNIB have formed a council for the blind and are working hard in setting up an HW-12, etc., for the B.C. blind amateurs. This project has been going for years in Ontario. The RCFN needs a Route Manager as VE7BLS has resigned. There seems to be a fall-off of news. Must be summer. Traffic: (May) VE7ASY 45, VE7LL 25, VE7AC 16, VE7SE 14. (Apr.) VE7BJT 32, VE7FQ 14.

MANITOBA—SCM, John Thomas Stacey, VE4JT—The Winnipeg ARC provided communication via 2-meter f.m. for the various checkpoints during the recent "Miles for Millions" walkathon in Winnipeg. VE4LG has the big 813 rig back on the air and is concentrating on traffic-handling. VE4MK and VE4ER are active on 2-meter RTTY. VE4AP has decided to go QRT for an indefinite period of time. VE4FQ is filling in as MTN manager while VE4EI is working in Plin Plon for the summer. The Phone Net meets nightly on 3760 at 1900 and the C.W. Net (MTN) on 3615 at 1845. All times local. VE4NE continues to devote most of his operating time to traffic nets. It would be very much appreciated if you would drop me a line to let me know what you are doing and, by means of this column, the rest of the section. Traffic net reports: Phone, sessions, 31, QNI 501, QTC 10. MTN, sessions 29, QNI 80, QTC 25. Traffic: VE4RO 27, VE4FQ 22, VE4YC 9, VE4JA 8, VE4XN 8, VE4QJ 7, VE4NE 6, VE4EF 4, VE4OC 4, VE4WT 4, VE4RB 3, VE4RL 3.

MARITIME—SCM, William J. Gillis, VE1NR—SEC: VE1EJ. Reports from New Brunswick indicate that the North Shore RC will be reactivated with support from Newcastle, Bathurst, Dalhousie and Campbellton. New executives of SONRA: VO1FZ, pres.; VO1FX, vice-pres.; VE1JH, serv.; VO1CX, treas.; and VO1s AF, HV, FW, directors. Congrats to SONRA on its fine publication, *The Newfoundland Amateur*. The Dartmouth Club has been assigned the call VE1CG for the period of the Canada Games, which are being held in Halifax and Dartmouth during Aug. Regrettably we note the passing of VE1VX. Don't forget the convention Labor Day week end in Dartmouth. APN report: QNI 301, QTC 69, sessions 61. Traffic: VE1AUD 76, VE1AMR 73, VE1RO 44.

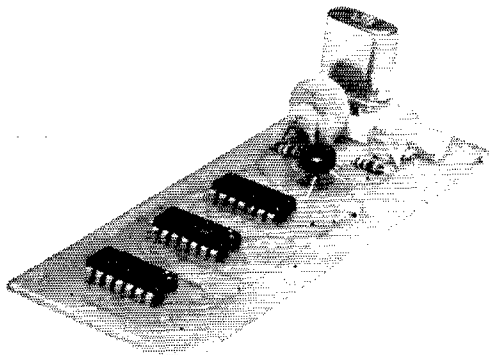
ONTARIO—SCM, Roy A. White, VE3BUX—Asst. National AREC Coordinator: VE3YC, SEC: VE3EWD. PAMs: VE3AKQ, VE3BLZ, RMs: VE3GI, VE3DPO. Effective June 1 VE3EWD, of Windsor, became the new SEC for Ontario. VE3GK tells me the "CARTG" will sponsor the 9th World-Wide RTTY Medallion Sweepstakes October 4, 5 and 6. The Ottawa Valley Mobile Radio Club reports that no less than 37,000 persons started the 40-mile hike in the "Miles For Millions" walk last month. Hats off to VE3DMU and his many helpers who looked after the communications. VE3AHU is promoting the idea of Nov. 10th week being declared "Amateur Radio Week" in Ontario. No less than nine licensed radio amateurs work at CKLW in Windsor. Have you heard the wolf-whistling Myna bird on 20 meters from the shack of VE6CT? I like the item in the May bulletin of the Quinte ARC which reads, "Thanks to all the multitude of non-contributors of news this month. It makes it so much easier for the editor when he doesn't have to write anything!" Sincere sympathy to the families of VE3BGZ and VE3BE, who became Silent Keys in May. VE3SZ advises that the Pembroke ARC 2-meter f.m. repeater on Mount Patrick is now in operation; 148.340 "in" and 147.060 "out." VE3DOB is running the Muskeg Swap Club replacing VE3CXB, who has moved to Belleville. Congrats to VE3NO and VE3ETM, who are sponsoring blind would-be amateurs. Dryden ARC tips us off to listen on 28.550 Mc. for 4X4RQ operating from a Boeing 707 on the New York-Tel Aviv run. VE3ERU tells me he had a contact on 75 with CYR who was running 35 milliwatts. One is in Windsor and the other in Peterboro. VE3AKQ still is looking for OPN Controllers. Traffic: (May) VE3GI 299, VE3DBG 100, VE3ERU 99, VE3CYR 91, VE3NO 34, VE3GCE 29, VE3VD 10, VE3EWD 8. (Apr.) VE3CYR 169, VE3GHO 16.

QUEBEC—SCM, J. W. Ihey, VE2OJ—SEC: VE2ALE. RM: VE2DR. Western Quebec V.H.F./U.H.F. RC. VE2RM, is a newly-affiliated ARRL club with VE2BU, pres.; VE2JO, vice-pres.; VE2ADE, secy.; and VE2AVP.

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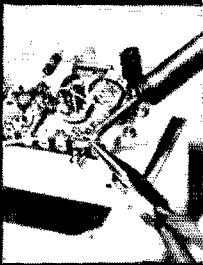
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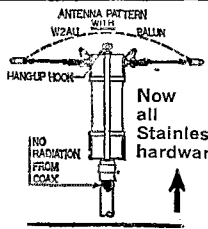
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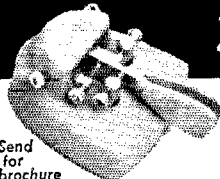
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treas. The Laurentian DX Club looks forward to much new activity come fall. VE2BV leaves us to become a VE3-Land operator. VE2DEK finds the nations' capital a better place than environs. VE2EC was missed in our last report, the first time in umpteen years. Sorry, Charles. VE2DDW does a nice job as NCS for RTQ. VE2MX is a very energetic 2-meter stalwart and keeps things in Hull, Ottawa and Montreal humming. VE2AYP has a well-engineered homebrew frequency counter on 144 Mc. aimed at counting within cycles or portions thereof. The season's end meeting of the MARC featured an operating forum. VE2BXS leaves us for VE3-Land. VE2AFJ, net manager, advises that QFN operates each night at 2245 GMT with VE2ADR, VE2BPT, VE2ASU, VE2BTZ, VE2AA and VE2LD as control stations. RPO, on 3.780 Mc., will take traffic from all modes to the Quebec section. Le concours "VE2" organisé par RAQI a remporté un franc succès; les participants en c.w. étaient cependant peu nombreux et on prévoit des améliorations pour l'an prochain. VE2-DI est maintenant actif sur le 75 mètres s.s.b. VE2ADR a vendu son Galazy et opère maintenant avec un HW-12. Parmi les nouveaux amateurs, soulignons: VE-2ANN, VE2AEP et VE2XF, anciennement K2DDK. Félicitations aux amateurs de Montréal qui ont enfin fait revivre le club VE2DN. Traffic: (May) VE2DR 50, VE2UN 35, VE2OJ 28, VE2ADE 21, VE2BRD 20, VE2CP 15, VE2EC 15, VE2AJD 6, VE2ALE 5. (Apr.) VE2BRD 58, VE2EC 15.

SASKATCHEWAN—SCM, Gordon C. Pearce, VE5HP SEC: VESCU, ECs: VE5DO, VE5BO, VE5TL, VE5NX, VE5RJ, OOs: VE5HQ, VE5KE, OBS: VE5HQ, PAM: VE5PZ, OVSs: VE5CU, VE5US, OPS: VE5US, ORS: VE5GL, RM: VE5PX. Walkathons held at Moose Jaw, Regina, Saskatoon, Prince Albert, Melfort and other centers gave local amateurs an opportunity to prove their worth. The Regina two-meter repeater is proving itself effective. The bands have been generally acceptable with 75 and 40 meters very noisy at times, and the higher frequencies dead and hopping alternately. The flood threat, which served to give many of the amateurs an opportunity to practice on preparedness, is over. Cyclonic winds and heavy rains were common during early June. Melfort, Star City, Watson and other central and northeastern parts of the province were hit. VE5AB reports a building demolished in Star City and VE5YR of Watson reports his three-element beam is now 2 1/2 elements. The Saskatoon Club is to be commended concerning its participation in the first Western Canada Wheel-chair games of the Paraplegic Association. VE5LG and VE5RJ were honored for their part in the effort. The Saskatoon Club also assisted in a scout rally held by the Saskatoon Region Boy Scouts of Canada. Traffic: VE5GL 33, VE5KZ 21, VE5PX 15, VE5SC 9, VE5JK 3, VE5YR 3, VE5EQ 2, VE5FX 2, VE5PZ 2, VE5RE 2, VE5KI 1, VE5MX 1.

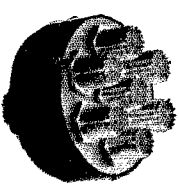
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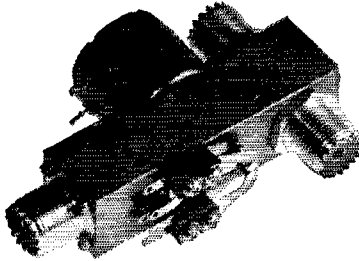
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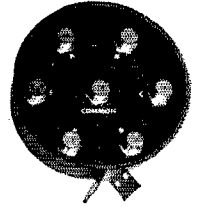
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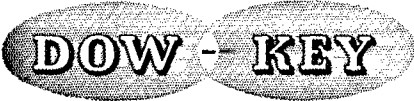


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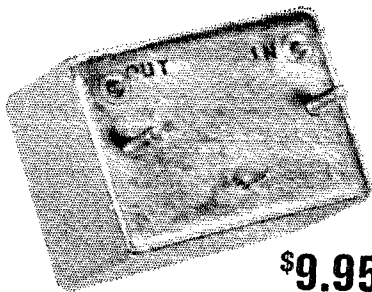
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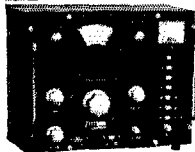
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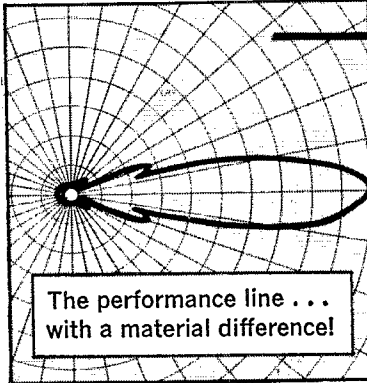
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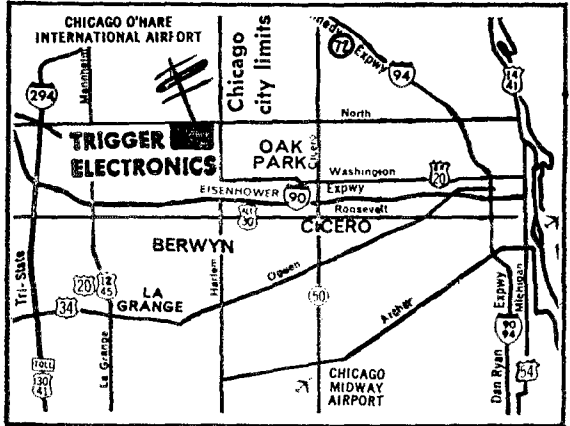
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TRIGGER Electronics
7361 NORTH AVE. • RIVER FOREST, ILLINOIS 60305
(WEST SUBURBAN CHICAGO)



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 35¢ 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 10¢ per word will apply to advertising which, in our judgment, 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 10¢ rate. Address and signatures are charged for, except there is no charge for zip code, which is essential, your 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 35¢ 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 one ad in one issue.

(9) Due to the tightness of production schedules, cancellation of a Ham-Ad already accepted cannot be guaranteed beyond the deadline note 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 entries or the grade or character of the products or services advertised.

W.A.R.A. 12th Annual Hamfest Sunday, August 24, 1969, at Newton Falls Community Center, Newton Falls, Ohio. Take Ohio Turnpike to Exit 14 and ask for map to Hamfest. General program will apply. Swap & Shop, etc. For further information, write W8VTD, Box 809, Warren, Ohio 44482.

PEORIA Hamfest: September 21, Peoria, Illinois. Same place as last year. For full details, see September issue of QST, Hamfest Calendar, Advice Registration \$1.50. Write: Ferrel Lytle, W9HDE, 419 Stonegate Road, Peoria, Illinois 61614.

ROCHESTER, N.Y. is again Hamfest, VHF meet and flea market headquarters for bargains in northeast, May 16, 1970. Write WNY Hamfest, Box 1388, Rochester, N.Y. 14603.

LOUISVILLE Ham Convention and Great Lakes Division ARRL Convention at Stouffer's Louisville Inn on 1st in downtown Louisville, Kentucky. The date—August 29th and 30th. Forums, exhibits, flea market. Contests and banquet. Many surprises, featuring the new Signal/One CX7. Shop the best selection of new and used equipment and bring your surplus for the flea market. Make it a family day at the Convention. For further information write: Ken Venton, 648 South 4th St., Louisville, Kentucky 40202. Fred Gleason, WA4LMD, Comm. Member.

DALLAS Area Ham-Swanfest. Texas Instruments Activity Center, Sunday September 14, 1969, 9 to 5. Register now! \$2.00 per person. John Zagrodnick, 3823 Antiqua Dr., Dallas, Texas 75234.

R. L. DRAKE CO. Notice: come say hello to the fellows from the R. L. Drake Company at the following conventions: Amarillo, Texas, West Gulf Div. ARRL, August 16-17; San Diego, California, Southwestern Div. ARRL, October 17-19; Las Vegas, Nevada, SARGO convention, Jan. 7-11, 1970. The R. L. Drake Company will be closed for summer vacation on Thursday, July 3, and will re-open on Monday, July 21.

14th Annual Hamfest by Four York County Clubs again sponsored at Adams County Fair Grounds, 4 miles north of Abbottstown, Penna; August 31, 1969, rain or shine. Registration begins at 0900 hrs. Talk-ins 50.62 and 145.62 Mc. for the mobiles. York County "Hams" were pleased with FM interest last year. This year greater emphasis is being put on the FM swap and sell session. Talk-ins on 82.525 MHz and 146.34—146.76—146.95 MHz. Plenty of eats, drinks, transmitter hunt, auction. For XYL's free Bingo. For info, write K3POR, Leroy Frey, 170 S. Albemarle Street, York, Penna. 17403—Keystone VHF Club.

A.W.A. National Amateur Radio Historical Conference, Oct. 3, 4, and 5th. East Greenwich, Rhode Island. A weekend of nostalgic memories! Spark transmitters. Crystal sets. Hartley oscillators and Regenerative Receivers. Everyone welcome! Write W2OY.

"SEE your picture and a thumbnail sketch of your life in wireless along with many of your old buddies" in Spark (Gap Times magazine published by the Old Old Timers Club. Charter membership is offered to all pre-World War I operators, regular membership to any operator licensed 40 years or more ago. Be a recognized pioneer, join the Old Old Timers by writing the Secretary W5ZC, Bert E. Gamble, 402 Beck Building, Shreveport, Louisiana 71101.

QSL'S?? SWL'S?? America's finest!! Personalized made-to-order!! Samples 25 cents. Deluxe 35 cents. Religious 25¢ (refund). Sakkers, W8DED, Box 218, Holland, Michigan 49423.

C. FRITZ-QSLs that you're proud to send, bring great returns! Samples 25¢ deductible. Box 1684, Scottsdale, Arizona 85252.

QSLs, Second to none. Same day serv'ce. Samples airmail 25¢. Ray, K7HLR, 25 South Terrace Drive, Clearfield, UT 84015.

QSLs "Brownie" W3CJL, 3111 Lehigh, Allentown, Penna 18103. Samples 10¢. Catalog 25¢.

QSLA. With all this competition, you've gotta have something different. Try us. Samples 10¢. Alkanpark, Box 5494, Minneapolis, Minn. 55408.

QSLs stamp and call brings samples. Eddie Scott, W3CS, Fairplay, Md. 21733.

QSLs Free samples, attractive designs. Fast return, W7L Press, Box 2387, Eugene, Oregon 98402.

QSLs-SMS. Samples 25¢. Malco Press, Box 375, M. Toledo, Ohio 43601.

DELUXE QSLs Petty, W2HAZ, P.O. Box 5237, Trenton, N.J. 08638. Samples. 10¢.

10¢ Brings free samples, Harry R. Sims, 3227 Missouri Av. St. Louis, Mo. 63118.

RUBBER Stamps \$1.25 includes tax and postage. Clin Radio, W2UD0, 32 Cumberland Ave., Verona, N.J. 07044.

3-LINE engraved badge, any color \$1.25. Special rates clubs. Fallert's Engraving, 121 N.C. St., Hamilton, Oh 45013.

QSLs, Free samples, rubber stamps, address labels, stationery. Quality with service. R. A. Larsen Press, Box 45, Fairport, N.Y. 14450.

QSLs by K1FF: \$2.00 for 100. Others at reasonable prices. Samples 25¢ (deductible). K1FF QSLs, Box 33, Melrose, Mass. 02177.

QSL, SWL cards that are different. Quality Card stock, Samples 10¢. Home Print, 2416 Elmo Ave., Hamilton, Oh 45015.

QSLs, Radio Press, 15008 Orchid Ave., Poway, Calif. 92066.

CREATIVE QSL Cards. Personal attention. Imaginative ne designs. Send 25¢. Receive catalog, samples, and 50¢ refund coupon. Wilkins Printing, Box 787-1, Atascadero, Calif. 93426.

QSLs SWLs Under \$2.00, samples dime. Garra, 4 Mahoning St., Lehighton, Penna. 18235.

QSL 300 for \$4.35, samples 10¢ W9SKR, George Vesel, Rte. #1, 100 Wilson Road, Ingleside, Ill. 60041.

QSL cards Finest quality. Economical prices. Fast service. Free samples. Little Print Shop, Drawer 9848, Austin, Tex. 78757.

QSLs-100 3-color glossy \$3.50; silver globe on front; repro form on back. Free samples. Rnsprint, Box 7575, Kansas City, Mo. 64116.

QSLs SWLs. WPE. Samples 15¢ in adv. Nicholas & Scrintery, P.O. Box 11184, Phoenix, Ariz. 85017.

RUBBER Stamps, 3-line address \$1.50. J. P. Maguire Corp pay 448 Proctor Avenue, Revere, Massachusetts 02151.

QSLs, samples 10¢. Fred Leyden, WINZJ, 454 Proctor Ave Revere, Massachusetts 02151.

RUBBER Stamps. Return mail delivery, postpaid. Basic price \$1.00 first line 60¢ each additional line. Request type sheet. Fulton Rubber Stamps, Route 216-A, Fulton, Maryland 20759.

PHOTOSTAMPS. Free information. Willar Specialty Raymond Ave., South Yarmouth, Mass. 02664.

QSLs. Neat, quick, 10¢. Filmcrafters, Box 304, Martin's Ferry Ohio 43935.

QSLs Kromkote glossy 2 & 3 colors, attractive, distinctive. Choice of colors, one hundred—\$3.00 up. Sample 15¢. Are for Call-D-Cals. K2VOB Press, 457 Chancellor Ave., Newark N.J. 07112.

3-D QSLs—The modern concept that makes all others of fashioned. Samples 25¢ (refundable). 3-D QSL, Co., Monson Mass. 01057.

EMBOSSED QSL's. Free Samples, with cut catalog 25 cent Ace Printing Service, 6901 Clark Ave., Cleveland, Ohio 44110.

ORIGINAL EZ-IN double holders display, 20 cards each plastic, 3 for \$1.00 or 10 for \$3.00 prepaid and guarantee. Free samples to Dealers or Clubs, Tepabco, John K4NM Box 1987, Gallatin, Tenn. 37066.

LOW PRICED QSLs! Free samples! K.L.L. Press, Box 25 Martinsville, N.J. 08836.

QSLs, SWLs, XYL-OMS. Sample assortment, 25¢. All 11 fabulous designs of the late Warren Rogers, KOAAB. Patte son Printing Co., 961 Arcade St., St. Paul, Minnesota 55110.

QSLs 3-color glossy 100, \$4.50. Rutgers Vari-Typing Service Free samples. Thomas St., Riegel Ridge, Milford, N.J. 08844.

RUBBER Stamps, badges, nameplates. Fast accurate deliver Request price info and style charts from Fulton Rubb Stamps, Route 216-A, Fulton, Maryland 20759.

PICTURE QSL cards of your shack, etc. from your photo wrap. 50¢ \$12.00 1000 \$15.25. Also unusual non-picture designs. Generous sample pack, 20¢. Half pound of samples 50 Kaufs, 4154 Fifth St., Philadelphia, 19140.

FREE to Novices, Generals, all hams! Immediate information including photo, showing most exquisite way yet to display and protect your QSL collection. Contains free offer. You be impressed. Practical Products. Box 1365, Pittsfield, Ma 01201.

QSLs, Second to none. Same-day Service! Samples airmail 25¢. Ray, K7HLR, 25 South Terrace Drive, Clearfield Utah 84015.

RUBBER Stamps, 2 for \$1.00. E. Mac, Box 8151, Rochester, N.Y. 14617.

QSLs: Kromkote, 100/\$2.50 up. Buy best for less. Samples, 10¢. Mills Printing, P.O. Box 1004, Lima, Ohio 45802.

QSLs, Operating aids. Quality-fast. Reasonably priced. Free samples. LJ Publications, Box 982, Lynwood, Calif. 90262.

CANADIANS! The best selection of new and used gear in stock at all times. Drake, Swan, Yaesu, Hy-Gain and others. It will pay you to check our deals. The Ham Shack, 1566A Avenue Road, Toronto 12, Ontario (Tel: 416-789-1239).

CANADIANS! NCX5 and NCX4 power supply "as is" (Just returned from National factory overhaul and looks like new!). Still sitting in cartons and waiting to go on the air. Price is seven hundred bucks. George Burnside, RR No. 1, Angus, Ont. P., Canada.

SELL: Model 15 printer, table, Collins 32V1, 30K1. SASE pls for list. VE3AJY, 555 Princess, Woodstock, Ont., Canada.

WANTED: Drake 2 LF low-frequency converter, VE3SP, 79 Briarwood Crescent, Hamilton 40, Ontario, Canada.

INVITATION: New York Radio Club invites New York Area hams and SWLS to its regular monthly meetings, the second Monday of each month at the Hotel George Washington, Lexington Ave. and 23rd St. at 8 PM W2ATT, New York Radio Club.

WELCOME To Maritime Mobile service net, 14313 KHZ, daily 2130Z. Amateur Radio's service to the Fleet. Vic Barry RDC USS Corry, DD817 FPO, N.Y., N.Y. 0950.

QCWA—Quarter Century Wireless Association is a non-profit organization founded 1947. Any amateur radio operator licensed 25 or more years is eligible for membership. Write for information, A. J. Gironda, W2JE, 1417 Stonybrook Ave., Mamaroneck, N.Y. 10453.

MICHIGAN Hams! Amateur supplies, standard brands. Store hours 0800 to 1730 Monday through Saturday. Roy J. Purchase, W8RP, Purchase Radio Supply, 327 E. Hoover St., Ann Arbor, Michigan 48104. Tel. Normandy 8-8262.

PROP Pitch rotar, WW2, small, excellent, \$45.00. Link, 1081 Aron St., Cocoa, Fla. 32922.

WANTED: Military and commercial laboratory test equipment. Electronicraft, Box 13, Binghamton, N.Y. 13902.

SIX Meter Club of Chicago, Inc. 12th Annual Hamfest, Sunday, August 3, 1969. "Picnic Grove" on U.S. #45, in Frankfort, Illinois, \$1.50 in advance; \$2.00 at gate. Val Hellwig, W9WY, 3420 S. 60th Ct., Cicero, Illinois 60650.

HAMFESTERS Radio Club, Chicago, Illinois, proudly announces its 33th Annual Midwestern Hamfest, Sunday, August 10th at Santa Fe Park, 91st & Wolf Road, SW of Chicago. The Hamfest features manufacturer and distributor exhibits swappers row, awards, clowns and games for the children, and activities for the YXL. Featuring the Swan 500C with AC, PS, the Hamfest climaxes "Illinois Amateur Radio Week" August 3rd thru 10th. For info and tickets, write Tom Ondricka, WN9YZW, 6609 South Kedvale, Chicago, Illinois 60629.

NOVICE Crystals: 40-15M \$1.33, 80M \$1.83. Free list. Nat Stinnette, Umattila, Fla. 32784.

NORTHERN California hams: best deals, new and reconditioned equipment. Write, call or stop for free estimate. The Wireless Shop, 1305 Tennessee, Vallejo, Calif. 94590. Tel: 707-643-2797.

HAM Transformers rewound, Jess. W4CLJ, 411 Gumby Ave., Orlando, Florida 32801.

SELL swap and buy ancient radio set and parts magazines. Lavery, 118 N. Wycomb, Landsdowne, Penna.

DUMMY Loads, 1 KW, all-band, \$7.95; wired, \$12.95. Ham Kits, P.O. Box 175, Cranford, N.J. 07016.

POLICE Fire Radio Dispatcher directories! Exclusive official directories: Call signs, frequencies of local, county, state agencies. National. For all VHF fans, CD, AREC, RACES, MARS, VFD's. Catalog for stamp. Communications, Box 56-T, Commack, N.Y. 11725.

WANTED: Military, commercial, surplus, airborne, ground, transmitters, receivers, test-sets, especially Collins Airborne. We pay cash, and freight. Ritco Electronics, Box 156-Q567, Annandale, Va. Phone: 703-560-5480 collect.

WANTED: 2 to 12 304TL tubes, Callanan. W9AU, 625 West Jackson Blvd., Chicago, Ill. 60606. (Note new address, fellows)

MANUALS for surplus electronics. List 15¢. S. Consalvo, 4905 Roanne Drive, Washington, D.C. 20021.

HAM'S Spanish-English manual \$3.00 Ppd., Gabriel, K4BZY, 1329 N.E. 4th Ave., Fort Lauderdale, Florida 33304.

WANTED: For personal collections; How to Become a Radio Amateur, Edition 9; The Radio Amateurs License Manual, Editions, 11, 12, W1CUT, 18 Mohawk Dr., Unionville, Conn. 06085.

TUBES, test equipment, transmitters or receivers. Any and all types bought for cash or trade on new or used ham gear. Air Ground Electronics, 64 Grand Place, Kearny, New Jersey 08032.

QST's Wanted: December 1915 to December 1916. Any unreasonable price! Needed for personal collection. Ted Dames, W2KUW, 308 Hickory Street, Arlington, New Jersey.

FOR Sale: SB-101 and SB-200. Wanted, kits to wire. Heath preferred, 12% of cost, some in stock. Professionally wired. Lan Richter, K3SUN, 131 Florence Drive, Harrisburg, Penna. 17112.

WE buy all types of tubes for cash, especially Eimac, subject to our test. Maritime International Co., Box 516, Hempstead, N.Y. 11551.

CASH Paid for your unused Tubes and good Ham and Commercial equipment. Send list to Barry, W2LNI, Barry Electronics, 512 Broadway, N.Y., N.Y. 10012. Tel: (212) 925-7000.

TORHDS, 88 mh unscsd, \$7/\$2.50. Postpaid. Humphrey, WA6FKN, Box 34, Dixon, Calif.

WANTED: Tubes and all aircraft and ground radios. Units like 17L, 51X, 618T or S. R388, R390, GRC. Any 51 series Collins unit. Test equipment, everything. URM, ARM, GRM, etc. Best offer paid, 22 years of fair dealing. Ted Dames Co., 308 Hickory St., Arlington, New Jersey 07032.

INTERESTING Sample copy free. Write: "The Ham Trader," Sycamore, Illinois 60178.

RTTY gear for sale. List issued monthly, 88 or 44 Mny to rotary, five for \$2.50 postpaid. Elliott Buchanan & Assoc., Inc. Buck, W6VPC, 1067 Mandana Blvd., Oakland, Calif. 94610.

1000 PIV @ 1.5 amp. epoxy diodes include diode bypass, caps and bridging resistors, 10 for \$3.75. Postpaid USA. With diode purchase, 125 Mf. at 350 volt electrolytic capacitors, 50¢ each. Postpaid USA no limit. East Coast Electronics, 123 St. Boniface Rd., Checktowaga, N.Y. 14225.

WE'RE Trying to complete our collection for Callbooks at Headquarters. Anyone have extra copies of Government Callbooks 1922-1925 and Radio Amateur Callbooks 1928-1934, ARRL, 225 Main St., Newington, Conn. 06111.

TELETYPE Wanted: Models 28,32,33,35. Receivers R-390A, R-388. Cash, or trade for amateur equipment. Alltronics-Howard Co., Box 19, Boston, Mass. 02101. Tel: a.c. 617-742-0048.

WANT: Early issues pioneer wireless magazines for W4AA Historical Library. Wayne Nelson, Concord, N.C. 28025.

DAH-DITTER Keyer. Integrated circuit electronic keyer. Fully self-completing on both Dit and Dah with automatic spacing. Built-in SC pwr. supply, reed relay output, with sidetone monitor and speaker. Completely assembled and tested. Only \$34.95. Dealer inquiries invited. Send your order to M & M Electronics, 6835 Sunnybrook, N.E., Atlanta, Georgia 30238.

TELETYPE Wanted—M28 typing units, any condx, keyboard perforators—reperforators, cast aluminum ID bases, all unused parts. Sell, too, Tytronics, Box 8873, Ft. Lauderdale, Fla. 33110.

TEST Equipment wanted: Any equipment made by Jewlett-Packard, Tektronix, General Radio, Stoddart, Measurements, Bonton. Also Military types with WRM-O, USM-O, TS-O, SG-O and similar nomenclatures. Waveguide and coaxial components also needed. Please send accurate description to Tucker Electronics Company, Box 1050, Garland, Texas 75040. R389, R390, R390A, 51J4, 75A4, 75S3A, NC101X, HR050TI, HR060TI, SP600, KWM-1, KWM-2, 62S1, 312B5, HA-2, and others. List for SASE. W2ADD.

SELL trade or buy Call Books, handbooks, magazines, and old radio sets and parts. Ery Rasmussen, 164 Lowell, Redwood City, California 94062.

SAVE. On all makes of new and used equipment. Write or call Bob Grimes, 89 Aspen Road, Swampscott, Massachusetts, 617-598-2530 for the gear u want at the prices u want to pay.

AMATEUR Paradise Vacation: Livingstone Lodge, Mascoma Lake, Enfield, N.H., Cosy cabin for two weekly, \$55.00. Swimming, Fishing, boats, sports, fireplaces, Dartmouth Golf, Tennis, Hot showers, light housekeeping. Children half. Lake Shore Camp sites, Literature. Al O. Livingstone, W2OPN.

WANTED: An opportunity to quote your ham needs. 30 years a ham gear dealer. Collins, Signal One, Drake, Swan and all others. Also \$25,000.00 inventory used gear. Request list. Chuck, W8UCG, Electronic Distributors, 1960 Peck, Muskegon, Mich. 49441.

COILS: Want old plug in type coils. 150W, 500W, 100 w, fixed center link; all bands: Cash: K60B, 2007 17th, Bakersfield, California 93301.

10 Meter amateur band linear R.F. amplifiers for base or mobile use. Base units: "Hornet"-200 watts PEP output-\$104.95; "Raid"-400 watts PEP output-\$149.95; "Maverick"-800 watts PEP input \$244.95. Mobile: "Scorpion"-200 watts PEP output-\$99.95; "Bandit II"-up to 500 watts PEP output-\$169.95. Electronic relay switching. All units designed for transceiver operation. State drive power when ordering. Dealer inquiries invited. D & A MANUFACTURING Co., 1217 Avenue C., Scottsbluff, Nebraska 69361.

SELL: Brand new YAESU FT-DX-400 transceiver and FL-DX-2000 linear, W8AO, 2912 Riverview Boulevard, Silver Lake, Ohio 44224.

3000 V @ 3mf brand new GE Pyrano oil capacitors, \$3.00 each. Can mail, 3-lbs. each shipping weight. FOB P. Wandelt, RD #1, Unadilla, New York 113849.

SWAN 500, 117XC, 484X, TH3A-mk3, accessories, excellent condition, \$600 complete; student, will sell separately. WA3-EYM, 347 East 37th, Erie, Pennsylvania 16504.

FILTER-Condensers: Acrovox oil-filled 100 mfd. @ 3000vdc condensers, \$30.00 each. Basil J. Weaver, 1821-C Ave. M, Lubbock, Texas 79401.

WANTED: Early wireless receivers and transmitters prior to 1926 for private collection. Jack Swanson, W5PMM, RFD #1, Box 399, Covington, Louisiana 70433.

INTEGRATED Circuits: new medium power TRL IC's in epoxy TO-5 packages: 900 buffers, 914 gates, 60¢ each; 93 J-K flipflop, 90¢ each. Add 15¢ handling and postage. HAL, Box 365, Urbana, Illinois 61801.

PL-172 tube or equivalent in good used condition wanted at reasonable price. Write F. G. Ruhl, K2BLI, 57 Drum Hill Drive, Summit, N.J. 06901.

HEATH AA-121 80w amplifier, AJ-13 tuner AA-32 amplifier, Package only, \$210 shipped. R. Wanat, 443 Atlas Dr., Madison, Alabama 35758.

TRANSFORMERS rewound, Jess. W4CLJ, 411 Gumby, Orlando, Fla. 32801.

GREENE—Center of dipole insulator with or without balun. Free flyer. O. Watson Greene, Box 423, Wakefield, R. I. 02880.

WANTED for cash—Singleband Engineers SB3-DCP Inverter and W-72 interconnecting cable—WODVZ, Box 475, Ottumwa, Iowa.

DRAKE TR4 with AC and DC supplies, and cables Turner J454X desk mic and Mobilers CM boom mic \$500.00. Pre-paid USA WITWY, P.O. Box K, Falmouth, Mass. 02541.

SB-34 with book and microphone, excellent condition. \$250.00 or best offer. Gerald E. Crawford, K7UPJ, 342 Spear Drive, Ft. Bragg, N.C. 28307.

TELEPHONE Dialers (2)—Presto-dial Automatically stores 36 telephone numbers and at push of button dials any one. Works on rotary or touchtone. Never used, at \$119. Gonset 6 meter linear (826's) \$79. Topaz C10WGD mobile power supply \$30. F.O.B. Richard M. Jacobs, WA9A1Y; 4941 Tracy, KCMO 64110.

SELL: Hallcrafters SR-150, A.C. and D.C. supplies with mobile mount, \$335.00, 75A4, mint, 2 filters, \$375, M. H. Klapp, W2EQV, 25 Gladwish Road, Delmar, N.Y. 12054. Tel. a.c. (518)-439-9531.

WANTED: QST copies in good condition 1920, 1921, 1922 and August of 1958 to complete personal 50-year collection. Rex Bassett, W4OS, Box 4163, Fort Lauderdale, Florida.

KWM-2, Waters Q-Multiplier, 516F-2 supply, built-in speaker. WA2UHV, Roslyn, L.I., N.Y. Tel: Days (516) 1V1-9844, Evenings (516)MA1-2629.

PREPARE for FCC exams! You need Posi-Check, now with addenda to cover latest FCC questions. Multiple choice questions, diagrams, explained answers, IBM sheets for self-testing. Same form as FCC exams. New price—General Class \$3.50. Advanced Class \$3.75. Extra Class \$4.00. Each complete for a specific exam. Basic questions duplicated if they apply. Third class postage, prepaid. Add 32 cents per copy for first class mail, 64 cents for air mail. Send check, or money order, to Posi-Check P.O. Box 3564, Urbandale Station, Des Moines, Iowa 50322. Addenda available separately for each class to previous purchasers covering new questions. Send 50 cents per copy in coins or stamps.

SELL Heathkit HX-30 6 meter SSB transmitter \$125.00. Heathkit HA-20 6 meter Linear Amplifier \$75.00. National NC-303 receiver \$200.00. Ameco 6 and 2 meter converters \$20.00 each. 833-A tubes \$20.00, 803 tubes and sockets \$7.50, printed circuit boards with 10 or more transistors and 30 or more diodes and resistors and capacitors 75¢. K8VEK, Box 385, Wayland, Mich. 49348.

FOR Sale: Eight month old Swan 350c with matching AC supply model 117-xc \$450. Also 14ayO vertical ant. \$20. Frederick Kraiger, 5 Reese Parkway, Fredonia, N.Y. 14063. Tel: 879-1370. Must sell.

I.C.'s factory-fresh Fairchild UL914, 70/, 3 for \$2.00, Motorola MC790P dual flip-flop \$1.75, 3 for \$5.00. Add 15¢ for postage. Logic Components, Box 224, New Canaan, Conn. 06840.

QSTs 1930-1968. Some years complete. Write your needs or SASE for list, 25¢ each, plus postage. Also list of QST "Radio" "Audio Engineering" ARRL and West Coast Handbooks. E. Halton, W1QWU, Providence College, Providence, R.I. 01918.

COLLINS 30-L-1, in mint condx. \$325.00. K1HNO, Stewart S. Mitchell, 104 Tea Ticket Path, Tea Ticket, Mass. 02536.

VE-R-R-Y in-ter-est-ing sample sent free. W0 Bargains Galore. 1949 Van Reek Lane, St. Louis, Mo. 63131.

TOROIDs, Unceasd 8R or 44 mhy. 5 for \$1.50 ppd. M. Weinschenker, K3DPI, Box 353, Irwin, Penna. 15642.

TELETYPE Wanted: Models 28, 32, 33, 35. Receivers R-390A, R-388. Cash or trade for amateur equipment. Alltronics-Howard Co., Box 19, Boston, Mass. 02101. Tel: a.c. (617)-742-0048.

40 Year run of QSTs for sale: 1926-1966. Only 3 issues missing! Gud condx. Best offer takes. F.O.B. Walla Walla Valley Radio Club, P.O. Box 321, Walla Walla, Washington 99362.

INTEGRATED Circuits: new medium power RTL IC's in epoxy TO-5 packages; 900 buffers, 914 gates, 60¢ each; 923 J-K flipflops, 90¢ each. Add 15¢ for handling and postage. HAL, Box 365, Urbana, Illinois 61801.

WANTED: An opportunity to quote your ham needs, 30 years a ham gear dealer, Collins, Drake, Swan and all others. Also \$25,000 inventory of used gear! Request list! Chuck, W8UCG, Electronic Distributors, 1960 Peck, Muskegon, Michigan 49441.

WRI-S Used gear has trial-terms-guarantee. KWM1, \$249.95; HW-12, \$89.95; Swan 250, \$249.95; TR-3 \$329.95; Galaxy V, \$229.95; RK-11, \$279.95; Galaxy 400, \$139.95; SBE-34, \$299.95; MA, \$319.95; Invader 200, \$249.95; HQ-180AC, \$349.95; CE-100V, \$259.95; AF-68, \$49.95. Many more. Free "Blue Book" List. WRL, Box 919, Council Bluffs, Iowa 51501.

V.H.F. 6&2 Johnson Thunderbolt. Excellent condition. Extra set of new finals included. \$340.00 firm. F.O.B. Bellows Falls, Vt. K1VNE, Tom, 802-463-4209.

HEATH HW32A, AC supply, mike, \$145. NC-300, \$135, 5" scope, Dumont 208B \$40. All with manuals, 6" rack cabinet \$35. KW power supply, 4KV CT, 500 mls \$75. Rack and supply \$110. Les Kalmus, K2SHL, 10 Bull Run, West Nyack, N.Y. 10994.

SELL: Heath RX1 "Mohawk", TX1 "Apache", SB-10 SSB add'l, spkr, relay, mike—complete station \$225. PC62b & 2 mtr xvr 12 & 110 pwr, vfo, \$115. NC300 + 6-2 mtr xvrts, calib. FB \$170. 2 el 4 mtr beam + tribander + 30ft self-standing twr \$100. 4 el 6 mtr beam + 6 el 2 mtr beam + rotator + 30 ft mast \$40. Carl, W6RXC, 213-283-5296.

FOR Sale: Heavy duty Rohm 70 ft. fold-over tower. Can reduce 10L increments if desired. Complete with Ham-N and aluminum meter wide spaced Teflex beam—\$300. Worth much more. Reason QTH change. A Young, W3GKM; 5122 East Durham Road, Ellicott City, Maryland 21043 (Phone) 301-737-6972.

MINT DX-40, VF-1, 8 Xtals—\$50; Knight RF Generator—\$15; Etico 706 Oscillator—\$5; Transistor AM car radio and antenna—\$15; 50' RG 8/U Foam Coax w/connectors—\$5; TV 1000 LP filter—\$10; Superior 10B Powerstat—\$7; Simpson Meters, 0-100 uADC 3/4" SQ, 0-500 MADC 3/4" RD—\$12 each; DK-60 G2C 115 VAC Relay—\$15; Amphelco 321-01064, 2 DEDT, 26 VDC BNC BNC—\$15; New 100 CFM Muffin Fan—\$12; 12 A 300 VDC Silicon Rectifier Bridge—\$10. You pay postage. WA9VGE, Richard Donley, 130 Sunny Slopes Drive, Bloomington, Indiana, 47401. 812-332-5569.

SB-34 Mint condition SB2 mike SB2MB Mobile Mount all cables, instruction book, repacked in original carton ready to go all \$275. K2HAM, Swedgal, 2111 Albemarle Road, Brooklyn, New York 11226.

SELL: Collins S-Line, 1 year old, mint condition, used very little, cash only: 75S-3B, 32S-3, 30L-1, 312B-4, 516F2 complete with cables and instruction manuals, \$1,695.00 or will sell separate. SB610 scope \$75.00, SB20 Scanzalyzer \$100.00. K8TSH, Richard H. Pierce, 2165 Demington Road, Cleveland Hts, Ohio, 44106.

FOR Sale: HQ 215 Rec. with C.W. filter \$400.00. 14-117 Swan 500 Mobile P.S. \$50.00. RCA Mark 8 C.B. Transceiver \$50.00, 4-Mobile Houster Ant's 40, 20, 15 and 10 meter \$30.00. U pay shipping. James Stafford, 478 Oriole Avenue, Phila., Pa. 19128.

SELL HW12A, mobile speaker, PTT microphone, manuals. Excellent condition. Never used mobile, \$89. P. Richmond, 300 Audubon Pkwy., Syracuse, N.Y. 13224.

SELL: HP560A digital printers—\$100; UCS400 with turning head—\$30; new 4-1000A—\$40; digital counters—\$41; SASE brings list—WA4RGL.

SELL: SBE model 33 with mike, good condition \$195.00. Heath HR-10D with speaker and crystal calibrator \$60.00. Heath DX-60B with mike \$60.00. Both used less than fifty hours, mint condition. All for \$300.00 Frank Anderson Jr., 307—Second Avenue, Troy, Alabama, 36081, WB4IXA.

WANTED: 32S-1, 75S-3, 75S-1 or 75S-3B. Perfect condx with serial numbers. John A. Rilling, Dependent Mail Sec., APO S.F. 96301.

SWAN 250 with A.C. power supply, 6 El. 6 M beam, excellent cond. \$300.00. Lil Lu Lu 6 M + mtr \$60.00. Ameco 6 M convy, power supply \$30.00. Local pickup only. Dennis Scott—K8CBN, 14430 Park Avenue, Livonia, Michigan 48154 (427-3407)

HEATHKIT: DX-60B, HR-10B, HG-10B, HS-24, GH-12. All in excellent cond. All for \$175. WASTYX, 1013 Gorgas Circle, Ft. Sam Houston, Texas 78234.

HAMMARLUND HQ-200, matching speaker; new. Sacrifice \$200.00. Frank, 15 Hawkins Drive, Northport, N.Y. (516)-611-9253.

SB-100 Heath Transceiver. Built in speaker \$325.00. W8QUR, 3023 Emmick, Toledo, Ohio 4360.

SELL Hallcrafters S.K. 140 complete with speaker \$325.00 W8QUR, 3023 Emmick, Toledo, Ohio 43606.

SELL Hallcrafters S.X. 140 complete with speaker diagrams, instructions, crystal, Excellent condition \$700. H. W. Sparks, Rt. 1, Box 61-C, Redgranite, Wis. 54970.

ANTIQUE gear collectors. Cleaning shack. SASE for list. Example old Riders manuals from Vol. 2 Grebe, Arwater, Kent battery radios. W7JYJ, 499 Paradise Drive, Moscow, Idaho 83843.

FOR Sale: Heathkit HX-10 "Marauder" and mic. Exclnt. Cond. \$175.00; Hallcrafters Sk-110 \$50.00. Must sell. Doug Barnes, K8VXS, 2513 Risdale, Lansing, Mich. 48910. Tel: 517-882-5409.

SELL: Knight T-60 xmtg rd condx \$35. Brand new Shure 444T mike with preamp \$25. Want: Heath HA-14 linear. Gil WB2DKZ, 225 West 232 Street, Bronx, N.Y. 10463.

FOR Sale: Collins 7553 revr. late model, mint cond. \$400. S.N. 13884. Heathkit HW22A 40 meter transceiver HP13 power supply new vfo, 68 \$145. WB6R, RT 16555 Hamlin Street, San Luis, California 91406, phone 213-781-1746.

COLLEGE Expenses. Will accept any reasonable offer for the following: Swan 500 and AC supply; Hallcrafters SR-160; new 500' roll of RG-59/U foam coax; Tom Frenaye, W6B6KL, 617 Purdue, Claremont, California, 91711.

SELL: Heath SB-400 25 hrs. use \$250; Heath Twoer & X150; National NC-183D, sificr Omult, speaker cabinet \$150; Heath 0-8 scope \$30; kits professional wiring, all mint condition with manuals. Ship express collect all or part. Ed Zent W7KUB 2809 E. 9th St. Cheyenne, Wyo. 82001.

LOW Loss VHF-UHF 50 ohm coax RG 322U. Perfect for 144, 420 or 1296 MHz. Prodelin Spirofoam type 53-875. Two new 150 ft. lengths in original packing and one used 150 ft. length. (usual selling price \$1.25/ft.) Take 50¢/ft. or will trade for good scope or hi-fi. W0NIZ, Rte 5, Box 761, Golden, Colo. 80401.

TECHNICAL Writers and Editors needed. Free-lance, various electronics topics. Send resume. Electronic Writers and Editors, Inc. P.O. Box 504, New Hyde Park, N.Y. 11040.

WANTED: Valiant II and SSB adapter, 6N2 transmitter, N2 converter, VFO, Ranger II. Lesson course on electronics, 214 x 3/2, 4 x 5 speed graf. John Waskowitz, 541 Marcy Avenue, Brooklyn, N.Y. 11206.

COLLINS 32S-3, 75S-3B, 312B-3, 516F-2, and all necessary instruction manuals. No scratches, no malfunctions—absolutely mint condx. Not even dusty. SB-200 like same, but lacking metal cabinet assembly. Teflex 15M317 in perfect condition. Ham-M rotor with perfectly functioning motor and indicator. All equipment purchased new in February 1969. Need money for school and board in California. Ambition changed plans to keep equipment. I must require \$1500 for complete sale of above. Also have much junk tubes, 40 meter folded dipole with balun, 10 meter folded beam, 6 meter converter, tower etc. Please come and see my station for yourself. T. R. Sessions, Jr. 207 Meetze Ave., Lexington, South Carolina Tel. (a.c.) 803-359-4372. Mail: P.O. Box 278, 29072 zip.

REPAIR and calibration service. Write before shipping. Pan Tronics, Inc., 6608 Edsall Road, Alexandria, Virginia 22312.

COMPLETE SSB Station. Cosmophonic transceiver, Heath calibrator, mike, spkr, Heath KL-1, 2 KW P.E.P. linear, all power supplies, fused distribution, antenna tuners, coax ant. s.w. and relay, monitorscope, Match-Master bridge, all in cabinet x 17 1/2 with writing shelf; \$950. TTY: Tuck Electronics crystal-control trans. and rcvr converter, Model 19 Teletype, both for \$400; VHF: HA-2 transverter with Ameco preamp, HA-6, common power supply, Hy-Gain 28 and 64B beams, TR-44 rotor, cables and relays. \$350.00. W. R. Woodward, W2ROY, 27 Charwait Pl., Hawthorne, N.J. 07506.

ONE Complete set of parts for KW power supply; one 600 watt, Modulation xformer; four 100TH's; two 4-400A's; two 872A's, one vacuum variable capacitor; one 80-10 meter pi-net inductor; two 5-v, 2-amp filament xfmr's. D. Rasmussen, WA2STB, 16 McCana St., Iton, N.Y. 13357.

HAMMARLUND Station: HQ-180-C triple conversion receiver, \$200.00; HX-50 transmitter, \$200.00; Heath HA-10 kilowatt linear, \$150.00; Heath HT-441 wide-band oscilloscope, \$50.00; Leo Nelson, WA0TIB, 2706 River Shore Drive, Moorhead, Minn. 56560.

WANTED: W.R.L. Meteor D.S.B transmitter, audio (octave) filters, G.R. 1232-A tuned amp, Null Bridge, sound-level meters, Hewlett-Packard oscillators, WA4HI, 1361 Pinebrook Dr., Clearwater, Fla. 33515.

SELL: CE-20A Exciter, in excnt cond. with QT-1 and VFO, \$150.00; HO-145X rcvr. very gud. \$135.00. New Heath phone patch, \$20.00 and SWR bridge, \$10. Craig Ehlers, 904 Rose, Redwood City, Calif. 94063.

SELL: Collins 175S-3 S/N-13526, like new. \$390 or your best offer. Dan Liebrecht, WA2CRD, 3950 Blackstone Ave., Bronx, N.Y. 10471. Tel: K19-4409.

"HOSS TRADER" Ed Moory says that if you don't buy your Ham Gear from him, you might pay too much! Shop around for your best price and then call the "Hoss" before you buy! New equipment; factory warranty; Swan 350-C, \$329.00; early Model Swan 500C, \$399; FTDX-400, \$489.00; National VX-501 VFO, \$119.00. Do first readable written offer will be refused on New Galaxy GT-550 and power supply! try me! New Rohm 50 ft. foldover tower, prepaid, \$188.00; New Mosley Classic 33 and Demo Ham-Motor, \$209.00. Used equipment: HO-170A, \$179.00; Drake 2-A, \$139.00; "Mint" 75A-4, \$339.00; TR-4, \$439.00; T4-XB, \$359.00; R4-B, \$349.00; Ham-M rotor, \$88.00; Hallicrafters HT-33-117, HT-44 and supply, \$179.00; Galaxy GT-570, \$369.00; Swan Cymet, \$369.00. Ed Moory, Wholesale Radio Co., Box 506, DeWitt, Arkansas 72042. Tel: a.c. (501)-946-2820.

SELL: SX-101A, in excnt condx, both mechanically and electrically, must sell this receiver please, no trades! A real bargain! Mike Prust, 514 North Washington, St. Peter, Minn. 56082.

TOWER, Tri-Ex Model H-354 for sale, 60 feet with extension, in perfect condition; \$175.00, freight prepaid, W1MZB.

SACRIFICE, Military service: Collins 75A-3 SSB modifications, \$175; Hallicrafters HT-32, mint, \$200; Tektronix 514AD, mint, \$300; Hewlett-Packard 710B power supply and 400A VTVM, \$20. Albert Klappenberger, 6616 Dorwood Road, Baltimore, Maryland 21207.

DRAKE 2B with 7BQ, excnt condx, \$185.00; Heath Ham-Scan HO-13, \$50.00, E. M. White, WA2JDW, 848 Broad St., Shrewsbury, N.J. 07701.

COMDEL CSP-11 speech professor, \$50.00. Like new condx. Rav Hibbs, W3WO, 123 Lakeside Dr., Greenbelt, Md. 20770.

HW-12, complete with HP-13 supply and RM-75's receiver antenna, \$110. Robert Smith, K4YZT, 1120 Maryland Ave., Care May, N.J. 08204.

DRAKE 2B, 2BQ, Q-Multiplier and 37 foot tower. Make an offer. R. B. Coble, 5504 Mountain View, San Bernardino, Calif. 92407.

LAMPKIN 105B with 450 Harmonic Generator, factory recalibrated March 1969; \$135.00. F.o.b. W9OEQ, RR #2, Mokena, Illinois 60448.

TOROID Coils 88 mh uncased postpaid, \$52.00. LaVon Zachry, P. O. Box 845, Arole Valley, Calif. 92307.

SELL: HT-32A, SX-101A, HO-110A, Eico 773. All are in mint condx. WA2BZF, 323 Fulton Street, Elizabeth, N.J. 07206. Tel: a.c. (201)-355-5536.

SELL: Complete ham shack; NCX-3, NCX-A supply, both in mint condx; mike, bukr, Hy-Gain fu size 70-meter, 3-El, Ham-Swan SWR meter, link box, etc. Everything goes for \$300. Send for list. W9GSC, 3423 Lewis Lane, Owensboro, Kentucky 42301.

COLLEGE: Must sell HT-44, SB-300, 14AVO, SWR bridge, manuals, all are in FB shape, \$425.00 takes all, I to ship, Mike Cole, 805 S. Stewart, Freeport, Ill. 61032.

DRAKE TR-4, MS-4, AC-3, MM-1, \$500, 814-887-5511. Terry D. Palmer, 213 Main, Smerthorpe, Penna. 16749.

HALLICRAFTERS SX-130, for sale, in mint condition, 9 months young, Asking \$140.00 or your best offer, Bruce Ellestad, 408 Via Media, Palos Verdes, California 90274.

SWAN 400 transceiver with SW-4D and SW-410 VFO's; Model 22 adaptor, 117-C power supply. Updated with latest filter and tank circuit. Built-in CW monitor, \$400. Also Hallicrafters T-O kever, Model HA-1 with Vibro-Kever, \$60.00. SASE for info. W7HMS.

SELL: SX-101A rcvr, \$189, I to pay shipping. Bob Willskey, 204 W. Charles, Champaign, Illinois 61820.

HEATH SB-401, SW-300 with 3 crystal filters, \$390.00 for pair; Heath Ham-Scan, phone patch, \$60 for pair; TA-33 Jr beam, TR-44 rotor, \$75.00 for pair. All in new condx. Total use covers only 2 pages in log-book, Eicono PA-400 linear, \$40.00, Norman Berg, 8710, Claremont N.E., Albuquerque, N.M. 87112.

GOOD 4CX1000A's, \$30 each; 4CX1000A tube socket and deflector, \$5; 4X150A's, good, \$10 each; sockets, \$2 each. Various filament transformers for above type tubes. Prop pitch motor, panel mount control, less external servo, \$20. Ship tubes, might the other items. WA0TFD, Lacher, 53 Oklahoma Ave. S.W., Cedar Rapids, Iowa 52404. Tel: (a.c.) 319-363-8436.

WANTED: Back issues of IRE/IEEE Professional Group Transactions and Convention records. Will pay cash or have numerous duplicates available for trade. Please send list and price wanted or write for my list of numbers needed. W4YHD, 6800 Hamshire Road, McLean, Va. 22101.

APACHE TX-1, factory reconditioned, \$125; SB-10 SSB Adaptor, mint condx, \$75; Eico 720 transmitter, \$40; 722 VFO, \$25; Vibroplex Champion, \$13; Drake loss-pass filter, \$5. Scotty, WA2DFI, 112 Walworth Avenue, Scarsdale, N.Y. 10583. Tel: a.c. (914)-472-3148.

SELL: SB-610, like new condx; Hy-Gain 12AVO trap vertical, 10-15-20 meters, new. Both for \$65.00. You pay shipping. K4FHG, 2001 Thomas Ave., Anniston, Ala. 36201.

COLLINS R-390 rcvr, \$749.00. Other ham gear at the prices you want to pay. Free monthly flyer. Riverside Amateur Radio Supply, 5463 Mission Blvd., Rubidoux, Calif. 92509. Tel: a.c. (714)-682-1711.

SELL: Marauder HX-10, \$135.00; Henry Radio K2 Linear, \$25.00; Swan 400 Transceiver, \$275.00; Swan 405H VFO, \$60.00; Swantenna, \$20; d.c. power supply, \$65.00. All equipment in excellent condition, with manuals. Will ship prepaid Continental USA upon receipt of first money order or certified check. R. Santosuosso, 1302 Alta Vista Drive, Vista, California 92083.

WILL Trade beautiful 1 KW-AM 80-10 meter transmitter 4-400A final, 4-250A modulator, Glass windows or final, modulator, and the meter panel, 36 in. cabinet on casters, Johnson Ranger, D-104 mike. Will trade all this for Gibson Banjo, Martin Guitar or Gibson Mandolin. Please send pix of instruments. J. C. Chandler, W4ICZ, Box 5, Alexander, N.C. 28701. Tel: a.c. (704)-683-2896.

SELL Exceptional NCX-5 and NCX-A supply/speaker, factory-converted to Mark II and overhauled four months ago. is in prime electrical and mechanical condition, good appearance, with all manuals and in service bulletins. Has never been mobile. \$400. Also sell: Ranger II, with manual, \$145.00. Excnt condx. Allyn H. Fisher, W1CON, 6 Washington St., Norwood, Mass. 02062.

DRAKE T4XB/R4B, in absolute mint condx. Used by little. With factory cartons, manuals and guarantees, \$650.00. MN4, used but perfect condx, \$55.00. WRI 2000 PEP linear with contained power supply, \$235. Heath HD-15 phone patch, \$18.00. Les Miller, WA3IKD, 939 Rounfourt Road, Philadelphia, Penna. 19150. Tel: a.c. (215)-CH7-7943.

COUNTER, integrated circuit, 15MHz. Article in December Ham Radio. In excnt condx, \$200. Bert Kelley, 2307 So. Clark Ave., Tampa, Fla. 33609.

HEATHKIT DX-60 transmitter for sale. Only two hours on the air. Has been professionally checked. Will ship, \$70.00. Albert BeVier, 104 West Central, Bluffton, Indiana 46714.

STATION For sale: HT-37, NC-270, D-104, Kever, Trans Match, All in excellent condition. Charles Burger, WB2HZY, 125 Clove Road, New Rochelle, N.Y. 10804.

FOR Sale: Complete Clegg Thor-6 w/d.s. mod. and 5 xals: \$275.00. You pay shipping. WA3ITM, "Dave", 2733 Covington, Bethlehem, Penna. 18017. Tel: a.c. (215)-868-9067.

FREE sample copy Long Island DX Assn. Bulletin. Latest DX news. Business size SASE to K2QOU, Box 94, Massapequa Park, N.Y. 11762.

SELL: Drake 2NT, \$85.00; NC-300 w/cal. and spkr, \$125.00; NC-121 \$30; KC-635 d.c. osc., \$55.00 All FB, WA3JYI, 709 Mendell Place, New Castle, Delaware 19720. Tel: (a.c.) 302-328-5085.

WANTED: Manufacturer to build and market new type mobile antenna, not the one in July 1968 QST. Useful 2.5-30 MHz, marine, mobile and aircraft use, 300 mph speed rating, 2 kw dc power rating, 18" high, K1KLM, William S. Bridges, Bishop Dr., Orange, Connecticut 06477.

DRAKE R4B/MS4, \$325 (new in April); Heath DX60B, \$55; HG-10, \$25 (new in March); Hustler 4BTV, new, \$25; Heath HM-15 SWR meter, new, \$12. WA2DZV, Tel: a.c. (701)-462-4837.

BEST Offer: HO-100A w/clock, speaker, Knight T-60, Rohm VFO, manuals. Antenna relay. In gud condx. Bob, WA2GMD, 8 Hollis Place, Huntington Station, L.I., N.Y. 11745. Tel: a.c. (516)-HA1-9286.

JOHNSON Viking 500 receiver. Advise condx and price. Will consider pick-up within 150 mile radius. Carmody K2BZC, RD 3, Canandaigua, N.Y. 14424.

SFLL: NCX-3, a.c. and d.c. supplies. Hustler with all coils, all accessories, \$200. WB2FVD, 6 Pin Oak Lane, White Plains, N.Y. 10606.

SELL: Heath HW-100 rcvr. clean, perfect condition. Homebrew a.c. supply. First \$215.00 takes. Fuchik, WA5NGP, 1808 Oregon, Baytown, Texas 77520. Tel. a.c. (713)-427-6041.

MUST SELL: Drake 2B, reconditioned, in excellent condition; \$160.00. John Gerbold, WA0RJB, 105 South Parkway, Columbus, Nebraska 68601.

COLLINS: 75S-3 (Serial #10668) 2.1-0.5 filters. In mint condx; \$425.00. NCX-3 NCX-A mint condx, \$230.00. Will deliver within 100 miles radius. K9OSC, 3704 South 67th St., Milwaukee, Wisconsin 53214. Tel: a.c. (414)-774-4923.

HT-41 Linear, \$125.00; Heath Apache with SB-10, \$139.00; WRL six two meter transmitter, \$69.00; Johnson Matchbox with SWR, \$55.00; NC-155, \$100.00. CF-20A with VFO, \$115.00. W55BY, 5000 Hall, Amarillo, Texas 79109.

WANTED: HRO-60 coils, except A,B,C,D,E and F; also two coils for modification; broken or in bad shape OK. K3AQH, Bailey, 326 Hoffnagle St., Philadelphia, Penna. 19111.

LAFAYETTE HE-45B, 6-meter transceiver, in good condition—3 crystals, a.c./d.c. power cords, mobile mount, schematic, mike. Best offer over \$50.00. Barry Cohen, WB2KFH, 61 Capt. Shankey Drive, Garnerville, N.Y. 10923.

WANTED: SX-115. E. Molloy, 2532 Bristol, Holland, Penna. 18966.

JOHNSON Viking Ranger transmitter/exciter, 75 watts c.w., 65 watts a.m., 60-10 meters, crystals or VFO excellent cond. \$90. W9N9AYH, 9245 Keating, Skokie, Illinois 60076. Tel: a.c. (312)-674-7099.

NOVICE: 2-meter 522 and p/s, \$23.00. Ameco converter, \$19.00; Elmac PMR-6 double conv. rcvr. \$19.00; Globe 75-watt r.g. \$23.00. S-el, 2-meter beam, \$8.00. L. Wecker, 1660 Ne. 170th St., N. Miami Beach, Fla. 33162.

MAINLINE TT/L-2 filters per May-June QST. J-J Electronics, Canterbury, Conn. 06331.

ESTATE OF W8TUX: NCX-5 Mark II transceiver and NCX-A amplifier and speaker, \$500.00; Heath SB-200 linear amp/splitter, \$222.00; Heath SB-610 signal monitor, \$74.95; unused Mosley Classic TA-33 and Cornell Dubilier TR-44 rotor, \$175.00; Electro-Voice #638 mike, \$25.00. Excellent condx. Mrs. Allen Salter, Porcupine Mt. Gift Shop, Highway M-64, 5 1/2 miles west of Ontonagon, Michigan (on the way to Porcupine Mt. State Park).

HW-32, \$60.00 complete, HP-13, \$40.00. SWR bridge, bumper mount, Vibroxel bug, \$5.00 each. WASERC, 154 Ronald Boulevard, Lafayette, Louisiana 70501.

COLLEGE Forces sale: HT-37 SSB xmt, mint condx w/444 mike; Dow-Key relay; key, bug and Ameco CPO/CW Monitor; \$175.00 or your best offer. Carl Stecker, 1531 Deer Path, Moun't inside, N.J. 07092. SASE, pls.

WANTED: 2 mtr. FM eqmpt. Send list and prices. SASE, pls. Chuck Dean, K1QQX, c/o ARRL, 225 Main, Newington, Conn. 05111.

DISCOUNTS! New displayed items: Galaxy GT550, \$385; TR4, \$499; TAXB, \$399; R4B, \$385; L4B, \$650; Swan 350C, \$469; Mkr II, \$589; 500C (used), \$399; Hy-Gain TH6DXX, \$399; Ham-M, \$99; TR-44, \$89; AR2R, \$29. Prices F.O.B. L. A. Amateur Radio Supply, 24214 Crenshaw Blvd., Torrance, Calif. 90505. Midwest: Evansville Amateur Radio Supply, 1311 N. Fulton, Evansville, Indiana 47712.

SELL Drake: TR4, AC4, RV4, MN4, DC4. Hustler mobile whip, 15 and 40 M coils, all for \$650.00 G. Taylor, 1112 Fernside Dr., Franklin Square, L.I., N.Y. 11010. Tel: a.c. (516)-F14-4347.

SWAN 500, 117XC p.s., little used, and in A-1 condx: \$400. WA1FEO, Box 44, Hyannis, Mass. 02601.

CRYSTALS Airmailed from mid-america to all states, possessions, Canada: MARS, Marine, SSB, Nets. All bands Novice .05%, 1.50. Custom finished etch stabilized FT-243 .01%, all frequencies 3500-8600 Kilocycles \$1.90, (five or more this range \$1.75), (nets ten same frequency \$1.45), 1700-3499 and 3601-30,000 \$2.95, overtones above 10,000, 10,001-13,500 fundamentals \$2.95. Add 50¢ each for .005% Add 75¢ for HC-6/u hermetic; miniatures above 2000, 450-460 Kilocycles: FT-243 \$2.95. Singles, groups for ARRL-QST, Handbook, SSB Manual. Be specific. Free order-bulletin. Crystals since 1933. Airmailing 10¢/crystal, surface 6¢. C-W Crystals, Marshfield, Missouri 65706.

SELL: Heath DX-60A, in exclnt condx, \$55. Johnson Matchbox, Model 250-23 like new condx: \$35.00. Robert Martin, P.O. Box 288, Umatilla, Fla. 32784.

SELLING OUT: Heathkit SB-100 and a.c./p.s., \$250; Electro-Voice 664 with stand, unused, \$40; Shure Bros. 440SL p.t.t. stand, \$13.00; Superex headphones, \$13.00; Heathkit HM-15 SWR meter, \$13.00; Waters 34 SPDT antenna switch, \$6.00; Mosley TA-33-JP, and AR-22, \$35.00; Lafayette 991-9082 photoelectric relay, \$13; 200 ft. RG-59-U, \$.88; assorted extras. Sry, will not ship antenna nor transceiver. Send first certified, bank check, or m.o. WB2AUB, Philip Bernstein, 72 Morewood Oaks, Port Washington, N.Y. 11050. Tel: a.c. (516)-767-8078.

DAVCO DR-30 Receiver and power supply. Latest model, in good condition, shipped: \$200; SB-34 Transceiver, Serial No. 174694, an excellent unit, complete with crystal calibrator, CW Codar and microphone. Shipped prepaid, \$210. K. Hardman, W2DV, 33 Laurel Place, Upper Montclair, N.J. 07043.

HEATHKIT GW-14A, 23 channel transceiver, \$75.00; SX-117, speaker, \$225.00; CB-200 1 near, \$195.00; TH6DX Tribander, \$85.00; Tristao CZ-454-FS tower, erecting fixture, \$280.00; both like new condx; Ham M rotator, \$75.00; Tri-Ex 60 ft. crank-up tower, \$125.00. W4MVC, 14 Bernice Dr., Freehold, N. J. 07728.

COLLINS 5113/R388 w/SSB, \$395.00; 75A4 w/Collins noise-blanker, \$375; Gonset 250W 2M linear, 125; Amplex 6M k.w. linear, \$95; trade VHE-2HF gear, list SASE. W4API, Box 4095, Arlington, Va. 22204.

DRAKE 2B Receiver, \$180.00; Clegg 99'er 6M transceiver, \$90.00. Both are in excellent condition. In service, must sell. John Fishback, BOQ, Box 1111, L.G. Hanscom Field, Bedford, Mass. 01730.

SELL: Collins 3253.7553, 30L1, 312B4, 516F2, Heath SB610 scope, All in exclnt condx: \$1375. Call Henry a.c. 201-227-9090 after 5 PM or weekends, Blakeley, Deerhaven Road, Mahwah, N.J. 07430.

WANTED: Johnson Thunderbolt amplifier 80-10 meters. Give complete description and price in your first letter. K4VUQ, 486 Hollyhill Drive, Lexington, Kentucky 40503.

QSTS 1/1930, 5/1961 (missing 3 and 6/1950 and 7/1956; 3 damaged. Best reasonable offer, plus freight. SASE for reply. W5BQA, 2106 Penland, Benton, Arkansas 72015.

SPIDERS for boomless quads. Hellare welded aluminum, Al's Antenna Accessories, 1339 South Washington Street, Kennewick, Washington 99336.

BROOKLYN, N.Y. Cummings Brothers Post, American Legion Ham Auction held in May was a success. Thanks to those who came and who gave and who helped. Barry, Lincoln Savings, Airex, Eico, Harrison, Sonar, Arrow, Metro, East Brooklyn Savings, Gem, Radio Shack, Ave D, Radio, Advance, Lafayette, Heath-kit, Mavair Radio, Anell Electric, YLs, XYLs Legionnaires, WA2HOD, WA2RDB, K2BDO, WA2ICT, WA2BR, W2LOMM, W2BZUK, W2-ORP, WB2LSC, WB2UJX. Look for us in the fall. For the Post Commander, WB2VJX.

SACRIFICE: DX-60A, relay \$65.00; SX-111, Hammarlund S-200 speaker, \$140.00. Manuals, Will ship. WA6PGY, 47 Dapplegray, Rolling Hills, Calif. 90274.

TOROIDS 88 of 44 mhy. Center-tapped, not potted, 5/8" 200 postaid. Model 32KSR latest type page-printer, excellent, little used condition, \$200, or your best offer. Trade? FRXD-14 typing reperfector—TD combo \$25.00; Deskfax, #6500 facsimile transceiver, \$20; brand new Clegg 66'er, \$160.00; Drake 2B and 2BQ receiver, \$175.00; 1/16" reperft. tape, \$3/box/10. 8&W 5100SB Sideband adapter, \$50. WANTED: Ham-M rotator, xtal for H.W. with oven. Stamp for list. Van W2DLT, 3022 Passaic Ave., Stirling, N.J. 07980.

COMPLETE 3KW SSB transmitter, Johnson Thunderbolt, Central Electronics 10A, modified BC-458 VFO, \$280. offer. QST: 1942-1959, \$3.00 per year; 1960-1968 \$2 per year. Bound Proceedings of IRE 1946, 1947, \$4 per year. W3DKK, 341 Sharon Drive, Pittsburgh, Penna. 15221.

COLLINS S-Line 75S-1 rec. with 500 cycle filter and 32S-1 xmt with 516F2 power supply, in exclnt condx, \$850.00. W2STG, 24 Cambell Drive, Dix Hills, L.I. N.Y. 11746. Tel: a.c. 516-543-6373.

COLLINS KWM-2 with Waters Rejection Tuning. In exclnt condx. \$595.00. With Collins noise blanker installed: \$645.00. Tel: a.c. 515-277-3484. George, W0UDZ, 1030—20th St., West Des Moines, Iowa 50265.

PERFECT Novice station: Lafayette KT-320, \$39.00; Heath Q-1 Q-Multiplier, \$5.00; DX-20 w/spare final and 5 xtals, \$25.00; all are in exclnt condx w/manuals. f.o.b. Skokie, Ill. Leonard Fagan, W9N9AR (Gen'l. to be), 8218 Springfield, Skokie, Ill. 60076. Tel: ORS-14556.

CHICKEN Regs prohibit my Pacific M/M, N CX-3, HP-23, 14AVQ, 454C, etc. \$160. Joe, "893 Days", WA2TCE, tel: 201-262-5978. #737 Asbury St., New Milford, New Jersey 07646.

WANTED: Collins J1J4, condition unimportant. Court Hawley, W0EL, P.O. Box 151, Anamosa, Iowa 52005.

ANTENNAS and Propagation: IRE/IEEE Group Transac-tions, 48 issues, \$12.00 plus postage. Also, "Aerospace", RFI, Communications available. Art Beahr, W6UGK/3, 8719 Oxwell Lane, Laurel, Md. 20810.

HT-37, in vy gud condx: \$165.00 or best offer. John Permen 18101 San Juan, Detroit, Michigan, 48221.

BECKMAN Electronic Frequency counters 6146; transistorized, operates to 25 MHz, \$750.00. Other units available Parts. Sundtek, 131 Allen Ave., Springfield, Oregon 97477.

SELL: Heath GR-64 receiver and GD-125 Q-Multiplier. Both \$50 or first best offer. Gary Blum, 11172 Karen Dr. Potomac, Md. 20854.

SELL: Hallicrafters Receiver SX-101A, has excellent ham band features, performance and condx: \$150.00. WB6VVN, Bleil, 1619 W. Main St., Visalia, Calif. 93277. Tel: a.c. 209-732-6054.

HALLICRAFTERS SR-2000, 2 Kw transceiver, with P-2000 power supply (110-220) and HA-20, dual receive external V.F.O. \$1000. AN/FGC-1 RTTY dual diversity converter, with manual and spare fuses, cut down to fit \$100. Pick-up only on both items. R.Naldi Photo Service, P.O. Box 11112, Newington, Conn. 06111.

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QUICK Sale: Exclnt NC-303, \$180; HD-20 calibrator, \$5.00. Apache, \$75.00; f.o.b. Manuals included. Wanted SB-101, Stuart Oserman, 8452 Avers, Skokie, Illinois 60076. Tel: 312-674-9839.

QSTS 1930 to 1968 average 25¢. SASE for inventory, plus years of CQ. Johnson 250W Matchbox, \$30; Navigator, \$40. Rowe, W1AQW/WA3JPK, Hillside Road, RD #1 Mechanicsburg, Penna. 17055.

HALLICRAFTERS SR-150 with PS-150, AC supply, in original cartons, with book, never mobile: \$325.00; CV-89 teletype converter, with book and test cables, in gud condx: \$200.00. Jimmy Davis, 702 Eleanor Houston, Texas 77009.

FOR Sale or trade: two Podoln 6 ft. aluminum disc reflectors. W9RZL, Jack Holt, Iuka, Ill. 62849.

HX-20 and HR-20, 10 thr. 80, SSB xmt and revr. Manuals, \$145.00. W4KAS, 250 West Lakeview, Pensacola, Florida 32501. Tel: a.c. (904)-432-3747.

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WANT: Johnson Matchbox W0FGZ, 5333 Waterman Place, St. Louis, Mo. 6342.

HT-41 Hallicrafters Linear amplifier, 1200 watts P.E.P. for sale. Brand new tubes (pair 7094) included. In excellent condx. Price: \$200. Will ship collect. Write to Vincent Srofi, K1JHX, 648 East Street, New Britain, Conn. 06051.

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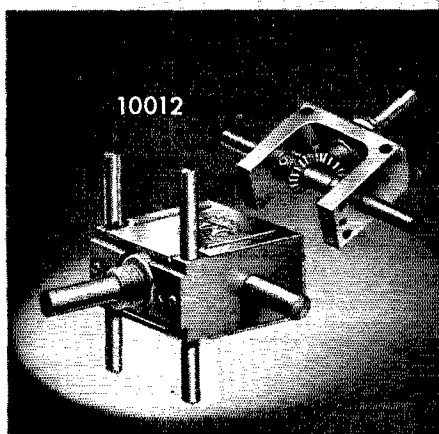
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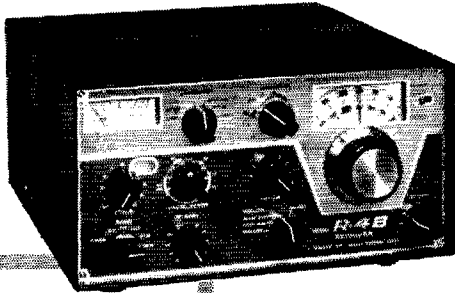
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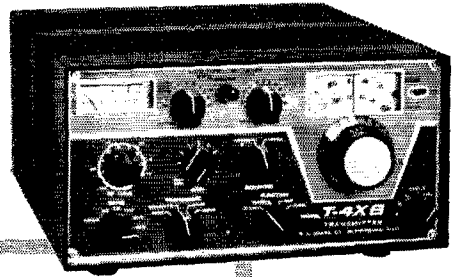


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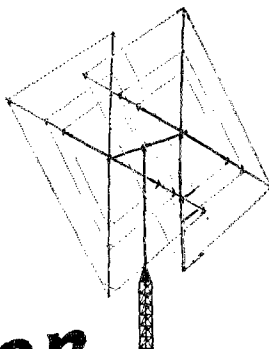
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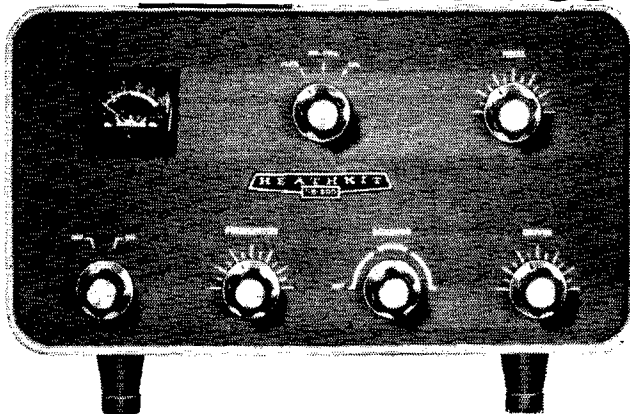
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This One Accessory Adds "2" to Your Heathkit SB-Series Rig for only \$179.95*

- Provides complete 2-meter capability for SB-101, SB-110A, HW-100 and the SB-301/401 combination
- USB, LSB & CW operation • 144 to 148 MHz coverage • 130 watts PEP input ... 50 watts PEP output • Highly sensitive receiver • Fast, easy tuning
- No cable switching • Handsome SB-Series styling

Now, in answer to many requests, Heath has a fast, low cost way to put you on two meters ... without having to buy a whole new rig. If you own an SB-101, SB-110A, HW-100 or the SB-301/401 combo, you're almost there. Here are the details on how to get on "2" — the SB-500 way.

Here's How It Works. In the receive mode, the SB-500 takes an incoming 2-meter signal and heterodynes it to either 6 or 10 meters, where the low band gear handles it in the usual way. On transmit, a 28 or 50 MHz driver output is heterodyned to 2-meters, amplified and coupled to the output.

Here's What It Delivers. When used with any of the gear above, the SB-500 2-Meter Transverter gives you complete 2-meter SSB or CW transceive operation from 144 to 148 MHz. A pair of inexpensive 6146's in a push-pull AB₁ circuit deliver a husky 50 watts output into a 50 ohm nonreactive load. Final plate voltages are derived from the driving unit, but all other operating voltages come from a built-in power supply — no extra supply to buy. Receiver sensitivity is 0.2 uV for a 10 dB S+N/N ratio ... that means solid copy QSO's. A front panel on-off switch places the SB-500 into operation or allows the low band gear to operate straight through to an antenna or drive a linear ... a combination of complete rear apron jacks and internal relay switching eliminates troublesome cable changing. Reliable relay-controlled T/R switching too. Tuning is fast and easy, and a built-in meter

monitors either final plate current or relative power. ALC voltage is supplied to the driver to aid in preventing over-driving and distorted signals. A built-in 1 MHz crystal calibrator is also included.

Solid, Stable Construction. The sensitive receiver and oscillator go together on well planned circuit boards. To insure stability and make adjustment more exact, the transmitter and power supply components are ruggedly chassis mounted. The SB-500 comes complete with all interconnecting cables too. Start enjoying the QRM-free world of 2-meters today ... with the new Heathkit SB-500 ... another hot one from the hams at Heath.

Kit SB-500, 19 lbs. \$179.95*

SB-500 SPECIFICATIONS — RECEIVER: Sensitivity: 0.2 microvolt for 10 dB signal-plus-noise to noise ratio for SSB operation. **Spurious Response:** All are below 0.1 microvolt equivalent signal input, except at 145.310 MHz (50 MHz IF only). **Antenna Input Impedance:** 50 ohm unbalanced. **TRANSMITTER:** DC Power Input: 130 watts PEP. **Power Output:** 50 watts (50% duty cycle). **Output Impedance:** 50 ohm with less than 2:1 SWR. **GENERAL:** Frequency Range: Any 2 MHz segment between 144 & 148 MHz into 50 MHz or 28 MHz tuned IF. **Mode of Operation:** SSB or CW only. **Power Requirements:** (1) 120/240 VAC, 50/60 Hz at 82 watts (internal). (2) 700 to 800 VDC at 200 mA (from driving unit). **Fuse:** 3/4 ampere slow-blow for 120 VAC (formerly 3AG); 1/2 ampere slow-blow for 240 VAC. **Front Panel Controls:** Meter-calibrate switch, final tuning, off-on (function) switch, preselector, final loading, driver tuning. **Chassis Controls:** Relative power adjust & bias adjust. **Rear Apron Connectors:** RF output, ALC, linear relay, relay, drive, power plug, low f receiver, low f antenna, fuseholder. **Tube Complement:** 6CB6 transmitter mixer, 6CB6 crystal calibrator, 6DS4 receiver RF amplifier, 6DS4 receiver mixer, 12GN7 transmitter RF amplifier, (2) 6146 final amplifiers, (types 6146A or 6146B may be directly substituted), 7059 heterodyne oscillator-amplifier, 8156 RF driver, OA2 voltage regulator. **Diode Complement:** 5 silicon diodes, 750 mA, 500 PIV; 3 in power supply, 2 in ALC, 1 Germanium diode, IN191; REL PWR. **Cabinet Dimensions:** 12 1/4" W x 7-15/16" H x 13" D. **Overall Dimensions:** 12 1/4" W x 7-15/16" H x 14" D including knobs and feet. **Net Weight:** 14 1/2 lbs.



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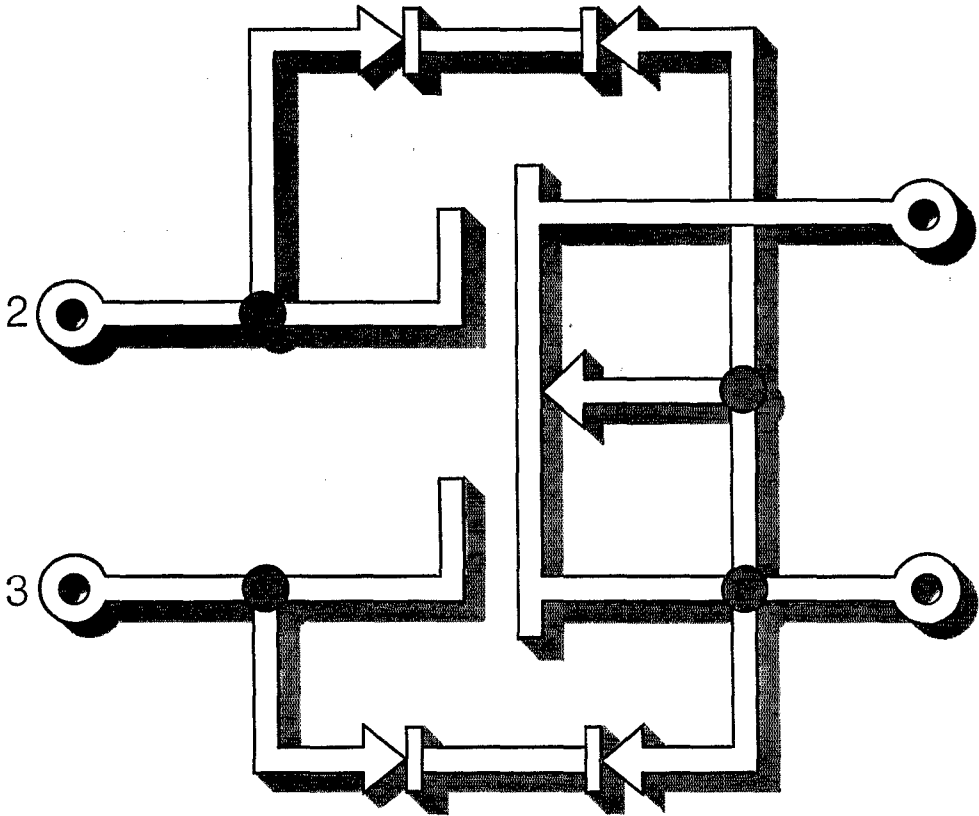
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- in-circuit transients.

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