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JUNE 69

VOLUME THREE NUMBER SIX

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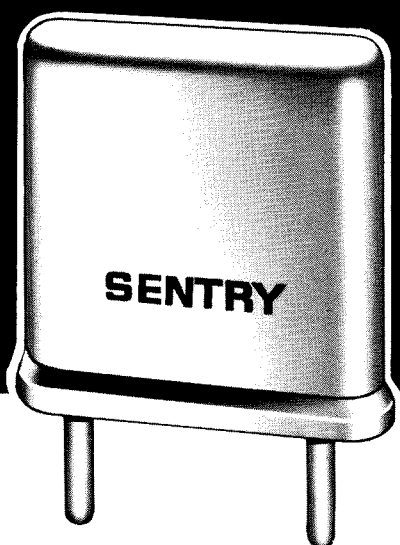

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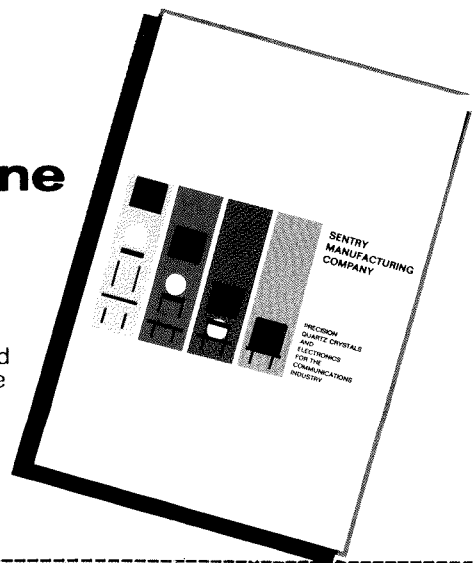

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FM

JUNE 69

Volume 3 Number 6

Cover Photo: Fords, New Jersey is the location of this 136' self-supporting tower at the QTH of Bob Pederson, K2IEZ and Edna Pederson, WA2RHL. There are 14 amateur antennas, Low, High and 450. Concealed on the far side is a Prodelin OMNI-6 "Big Stick" and another Big Stick on the very top. This was the original location for many years of the New Jersey Repeater. The lower 450 mc. beam is for control. The two horizontal antennas are for point to point links. FAA required obstruction painting but tower is 14' shy of lighting requirements in this area.

Subscription Price – $5.00 12 issues
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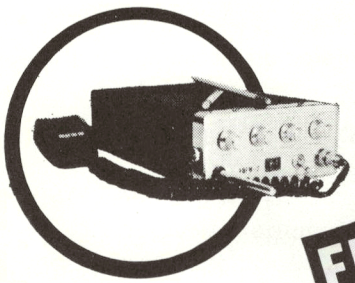

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*See details next page

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Each month, FM Magazine will publish a notice as to how many subscriptions have been sold by the leading contender — this as an incentive to others who are trailing by only a few subscriptions. (Be sure to keep an accurate account of your status for your own records, in the event that some of the mail gets lost between your city and Grosse Pointe.)

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Michael
Van Den Branden

editorial

What is FM's biggest problem? In one word the answer is SUCCESS! We have just popped all of our buttons and you have caught us with our pants down. The growth of **FM** as a result of the April issue has thrust our entire part-time operation into a 24 hour, 7 day week, orbit.

A deluge of mail has greeted me daily for the last three months. The bags contained praises of the journal and checks for back issues, renewals and new subscriptions. I can almost feel how Hugh Heffner must have felt after his first issue of "Play Boy" hit the news-stands.

With this almost instant success we found ourselves up a creek without a paddle you might say. Our little basement office, shared with my FM gear, test bench and general work shop was bulging at the seams. Therefore, new quarters were set up with sufficient office staff to handle the work load to get our next issue out.

As it was, the April issue was delayed in production because of hold-ups on getting the synthesizer article together and the four color process picture of the transceiver took three weeks alone. Well, you have received the fifth issue and here is another, so things are getting ship-shape around here.

What will evolve in the future is yet to be discovered. However, I am sure we will be better equipped to handle whatever developes after surviving these severe labor pains in our birth into the the big time-

I would like to personally thank everyone who wrote in and all those who telephoned. I am just sorry that it was impossible to answer your letters, however, every request was followed through. Would you, our readers, do me one favor? Keep your letters coming – on what you like and dislike about our publication; any radio problems you might have. Also, please show the book to your friends because the bigger **FM** gets the more you get for your subscription.

We thank you and appreciate your support.

WA8UTB

PAGE 7 IS MISSING

FROM SOURCE

PAGE 8 IS MISSING

FROM SOURCE

Ken Sessions, Jr.

editorial

When a management mixup at the Sahara Hotel on the first day of the SAROC thing left me roomless, Art Housholder *(Spectronics, Inc.)* graciously offered to share his quarters. I accepted, of course, not only because of the free rent, but because Art is a potential advertiser and I was anxious, too, for the opportunity to expound on the merits of advertising in *FM*.

Art told me Spectronics does not advertise regularly because they have no large single-item stocks. If they were to advertise pocket-type Handie-Talkies, for example, they'd receive orders for hundreds — though there may be but five or six in stock. The consequence, he said, would be that he'd have to return money and write letters to probably ninety percent of his prospective clients.

To be quite frank, I was skeptical about this explanation, and asked him to give me some examples of prices. He did. He went through the Motorola dreambook, page by page, quoting unrealistically low prices on practically every sheet. Probably as a means whereby I might trap him later, I took notes. Handie-Talkie mikes, $5; tone decoders, $15; ni-cad batteries, $10; Motrac parts at fractions of their original costs. I told him I was interested in building up a solid-state repeater and wanted some real low prices on all-transistor strips. "Repeaters," he said mystically. "That's the name of the game." He looked me square in the eye, and added, "You just tell me exactly what you want and I'll deliver."

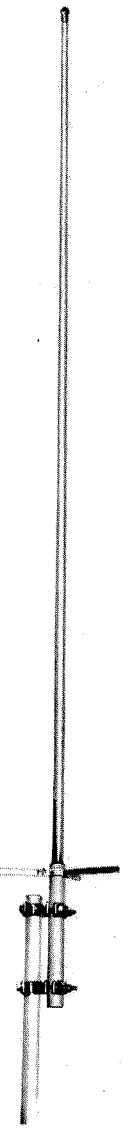
When I got back to California, I began looking at those notes. The prices seemed too low to be real, so I thought I'd call this big talker's bluff. I made out a check to cover all the most ridiculously priced items he'd quoted, and mailed it off. I was dumbstruck when the merchandise came in the mail about a week later. *He'd made good on all his promises!*

Since then, I've had the occasion to buy a number of other trinkets unavailable elsewhere, including such exotic gear as a 450 MHz Motrac, several high-band "brick" Handie-Talkies, and an assorted assemblage of late-model transmitter and receiver strips. But NOT ONE of the items I'd purchased had been advertised; I merely picked up the phone and voiced my orders. If Art doesn't have it, he gets it!

This little dissertation may sound like a free ad, but it isn't meant to. It's simply that I was supremely pleased with the merchandise and the service. The HT's, for example, weren't sold as "new." But there were no smudges, no scratches, no signs of use or wear on any of the units. They came modestly labeled "used," but as far as I could tell, no one had even so much as turned on any of the switches.

The all-transistor repeater I'm building is well under way, and I'm grateful to Art Housholder and Spectronics for making it possible. I won't argue with Art about the name of the game. I'll just say I like the way Spectronics plays it!

Retuning Prodelin's BIG STICK



*by Wayne Wicks**

OMNI-DIRECTIONAL **Base Station** **144-174 MHz** antennas are constructed of a number of collinear elements fed in phase. A protective fiberglass housing encapsulates the elements. A separate 18 inch flexible jumper assembly is supplied with each antenna with a type N input unless otherwise specified.

There are many antennas available to FM'ers. One of the best for all-around performance is the Prodelin *Omni-6*, commonly known as the *Big Stick*. This antenna consists of five half-waves in phase and will offer some 6 dB omnidirectional gain. Prodelin's popular Omni-6 also offers a fantastic capture area due to the fact that the entire antenna is an active element and almost 20 feet in length (for the 150 MHz version).

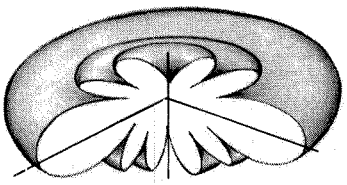
I worked on one of these Big Sticks for about a week that was cut to 152.27 MHz, a local hack frequency. The trick to making this antenna work on the amateur FM channels is explained in this article.

I know of people who have tried to retune these antennas and have come up with capacitive dummy loads. An article in a previous *FM* edition, for example, describes how to reduce the operating frequency by wrapping foil strips at strategic points on the antenna shaft.[1]

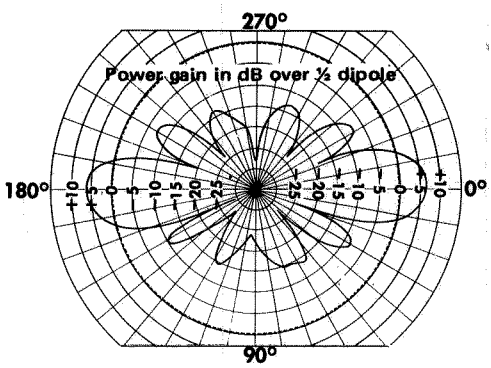
One of the secrets to retuning is not to use aluminum foil strips of the same width due to the fact that the antenna body is tapered. The foil strips capacitively load the phasing and radiating sections.

Due to the tapering of the antenna, the amount of capacitance exhibited by the foil will have to be different at the base than at the top because the spacing of the elements in a capacitor along with the surface area determine the capacity of the device of which value is inversely proportional to the distance between the elements. This simply means, in reference to the antenna, the foil strips will have to be wider at the base than at the top to exhibit the same capacitance to properly tune each section.

RADIATION PATTERN
(Isometric)



VERTICAL RADIATION PATTERN
(Measured)
(Top of Tower)



1 **Lowering the Frequency on Commercial Omni Gain Antennas,** Van Fields W2OQI, **FM,** June 1968.

The best way to start out is to acquire two six-foot wooden stepladders. With the antenna resting on the top steps, the antenna will rest about one wavelength above ground and will show little or no reaction with it. Another item that you will need is a Jones *Micromatch,* Bird *Thru-Line,* or other high quality bridge.

Connect the bridge at the base of the antenna and to a transmitter operating on the frequency at which you wish to resonate the antenna. Monitor the bridge in the reflected power position and take a strip of foil 2 inches in width and 6 inches long and wrap it around the base. Start sliding the foil towards the top of the antenna until a dip in reflected power is noticed. Mark this spot with a piece of masking tape or the like. Continue on until the next dip is found and mark it. Continue doing this until the top end of the antenna is reached. After doing this you will have eight tape markers.

After the antenna is marked out, cut eight foil strips (to be your capacitive loads). The first strip will be 4 inches wide by 6 inches long. The next strip will be 3¾ inches wide by 6 inches long. Cut the six remaining strips, reducing the width each time by ¼ inch — the eighth strip should be 2 inches wide. All the strips should be 6 inches long. When all the foil strips are cut, apply transmitter power and monitor the vswr.

Starting with the 4-inch foil strip, wrap it around the antenna over the first marker starting from the base. Wrap the 3¾-inch strip around the antenna over the second marker from the

*The author holds amateur license WA2KEC. His address is 82 East Halley Lane, Central Islip, N.Y. 11722.

base. Continue on until all the markers have been covered (the last one will be the narrowest of the foil strips).

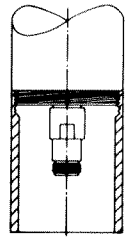
When all the strips have been applied, the vswr should be close to 1:1. Should there still be any traces of reflected power, determine if there is too much or too little foil. Start with the first foil strip from the base and squeeze it together a little. If the reflected power decreases, continue compressing all the strips a little at a time until no reflected power is indicated.

Should *more* foil be required, cut eight new strips ¼ inch wider than the previous strips. Remove the old strips (but leave the markers). Reapply the new strips and recheck the vswr. When all the proper strips are on the antenna, and no reflected power is shown, start the final sealing. Use a good stretchable electrical tape to wrap the foil sections. Make sure all the foil strips are completely covered. After the tape has been put on all eight sections, spray them with a plastic lacquer to prevent moisture from penetrating.

One word of warning: When installing the antenna, make sure your support is very strong because of the high wind resistance and whipping action.

WA2KEC

Type N Female



OMNI-6
5.8 dB Power Gain
(6.0 dB Directive Gain)

SPECIFICATIONS

ELECTRICAL

Frequency range*	144-174 MHz
Power gain (over ½ wave dipole)	5.8 dB
Directive gain	6.0 dB
Bandwidth VSWR 1.5:1	±0.5%
VSWR 2.0:1	±1.0%
Nominal input impedance	50 ohms
Maximum power input	500 watts
Vertical beamwidth	18°

Direct ground through ball tip
Type N female unless otherwise specified

MECHANICAL

Antenna housing	Fiberglass
Ground plane rods	18" long
Support tube (Hot dipped galvanized steel)	2-3/8" dia. x 24" lg.
Rated wind velocity	100 mph
Weight	30 lbs.
Overall length	21 ft.

*Note: Exact frequency must be specified.

THE POWER-QUADRUPLER OMNI

*by Robert D. Shriner**

The design of the antenna described in this article came to light several years back; hence, I can lay no claim for its origin. Also, articles describing antennas of this type are by no means in short supply; however, improvements to the basic design, in the form of structural and mechanical modifications, make the antenna configuration worthy of new consideration.

The antenna consists basically of seven half-wave coaxial elements fed by a quarter-wave impedance matching element, and terminated with a quarter-wave section connected to a 19-inch whip. (In theory, of course, the antenna can have any odd multiple of half-wave sections, each adding gain and compressing the radiation angle.) The resulting antenna exhibits an omnidirectional, vertically polarized pattern and is extremely rugged when properly constructed, making it ideal for repeater applications.

Antennas of the type described here have been in use by the Pueblo repeater (WAØSNO) for over a year, with a coverage range that is nothing short of fabulous. The Pueblo receive antenna was constructed with 21 elements; the transmit, with 7 elements. The deployment heights are 500 and 400 feet, respectively. Contacts with mobiles up to 150 miles apart are not at all uncommon.

The antenna is prepared by cutting the desired number of sections to length from a low-loss 50Ω coaxial cable such as foam-filled RG-8/U. Cutting to exact length, and keeping all coaxial pieces uniform in length may prove a bit difficult. If the sections are prepared as shown in Figs. 1 and 2, a tubing cutter will simplify the operation.

If the dimensions in the sketches seem squirrely, you're probably forgetting that half-wavelengths along a conductor are not the same as those of free space. The velocity factor of most popular 50Ω coaxial types is 66%; thus, the individual lengths will be 66% of a free-space half wavelength.

Figure 3 shows a typical joint connection. I found it advisable to fashion a set of clamps to hold the elements in alignment during the soldering process. Four clothespins fastened to a flat board will do nicely. A turn or two of fine-gage copper wire around the ends of the coaxial sections will hold them in place while soldering.

To strengthen and weatherproof the joints, try wrapping a little fiber-glass cloth around the joint. Impregnate the

*Author holds amateur license WAØUZO; his mail address is Box 966, Pueblo, Colo. 81002.

connection with resin, and slide a piece of ¾-inch-diameter by 3-inch-long heat-shrinkable tubing over the joint. Shrink the tubing carefully over the moist fiber

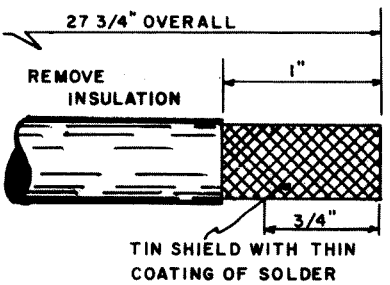


FIG. 1

glass; then, when the resin hardens, the joint will be fully as strong as the coax itself. With a little practice, you'll find you can make very neat-appearing and structurally sound joints every time.

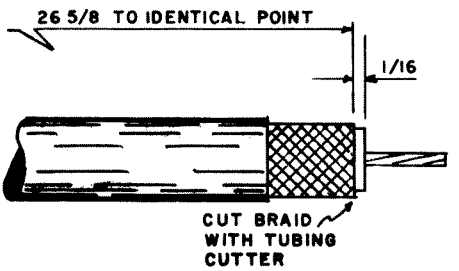


FIG. 2

Prepare the termination of the antenna as shown in Fig. 4 (and 4a). The easiest way to do this is to take a hunk of coax about 4 feet long, strip the outer insulation off, and slide the inner dielectric and conductor out of the shield. Cut off about 15 inches of the inner conductor and flare out the wires as shown in Fig. 4a, then cut the wires so they stick out about 1/16 inch past the insulator and slide it back into the shield. Smooth the shield down over the prepared piece and allow the short wires to protrude through the shield. Solder the wires to the shield to make a short circuit at this point. Dress the balance of the shield out and finish to the dimensions shown.

Prepare the impedance matching stub as shown in Fig. 5, and file a mark in the tinned area (13-5/16 inches from the end).

Now comes the big trick! Obtain about 75 feet of ⅜-inch white braided polyethylene rope (available at marine dealers). Tape a wood dowel (¼ inch diameter by 2 inches long) to the top end of the antenna. Start about 10 feet from one end of the rope and slip the wood dowel inside the rope. Then carefully work the dowel up inside the rope, pulling the antenna with it. Keep pushing the antenna in until the base (the point where the radials will attach) is about 1 foot inside the rope.

Prepare a brass ring as shown in Fig. 6. Equally around the perimeter of the 1½-inch I.D. ring, drill eight holes and tap for 10-32 mating.

The radials can be fashioned from brass or aluminum rod. Cut four of them to a length that is slightly in excess of a free-space quarter wavelength. Thread one end of each radial to match the threads of the brass ring, then place a locknut about an inch from the end of

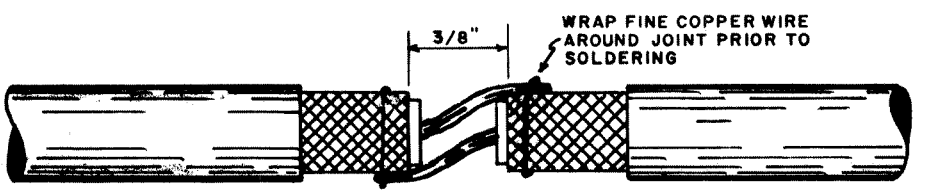


FIG. 3

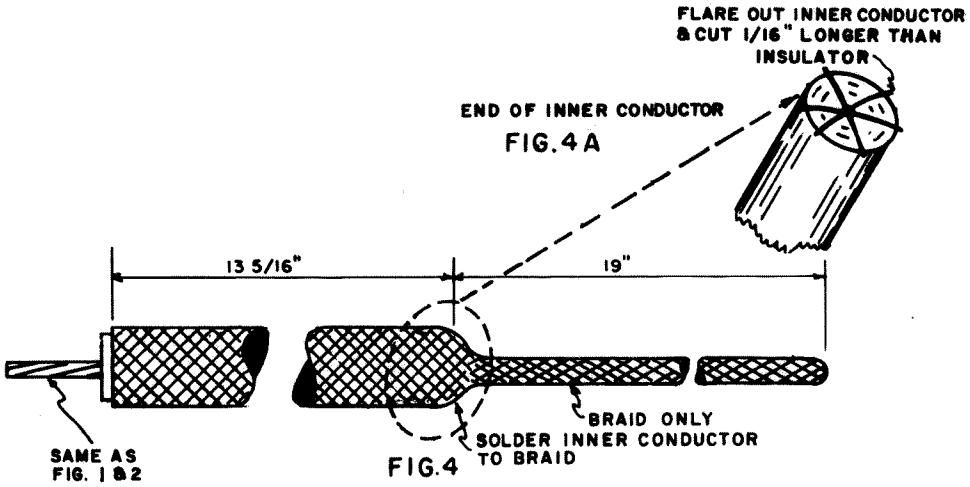


FIG. 4

the threads as shown Fig. 7. Put a 30-degree bend in each radial at the same point near the threads.

Slide the brass ring down over the rope (and antenna) to point A of Fig. 5. (This will be the terminal point shown at the base of the antenna of Fig. 8.) Insert four brass 10-32 × 1-inch machine screws in the ring and part the rope strands to allow the screws to bear against the braid of the coax exactly where it was previously marked with the file. Have a helper spread the rope so that you can reach in with a soldering gun and solder the screws to the braid. Cut off the heads of the screws flush with the brass ring and solder. Smooth the rope down over the antenna and apply a heavy coat of liquid silicone rubber between the antenna and the brass ring. This will reinforce the joint as well as weatherproof it.

Attach the four radials so that they will droop when the antenna is placed vertically. Neither the length of the radials nor the angle of droop is critical to the performance of the antenna. The values given are nominal.

The excess rope, extending from both ends of the completed antenna, will be used to suspend the creation alongside a tower. Clamp two metal braces or pipes so that they extend perpendicularly to the tower, and so that the ends are at least a quarter wavelength from the tower. Suspend the antenna between the

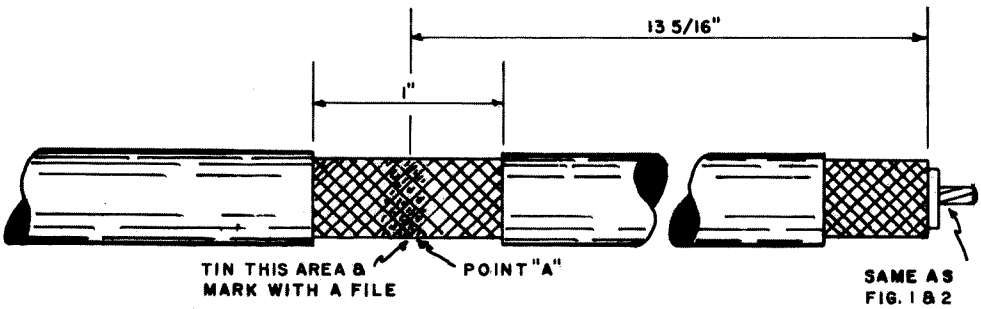
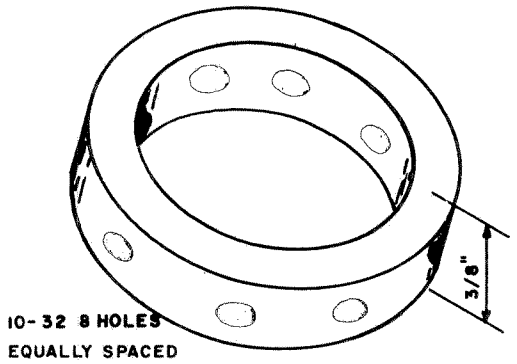


FIG. 5



BRASS RING 2" OD 1 1/2" ID

FIG. 6

two clamps and cut off excess rope. It is a good idea to use a heavy coil spring at the upper attach point so the rope can be made taut without compromising flexibility. The spring arrangement also builds in plenty of stretch capability.

To use the antenna as a free-standing type, insert it into a fiber-glass pole. One source of supply for fiber-glass poles is a discarded commercial antenna (damaged by lightning, gashed by rough handling, etc.). These antennas, you will find, are filled with beeswax (or a similar nonhardening compound). With the application of a little heat, the wax will liquefy and pour out. To heat the wax without damaging the antenna, connect a low-voltage (1½ volts or so) transformer to each end of the old antenna conductor. As the wire temperature begins to increase, the wax exudes uniformly along the entire length of the pole.

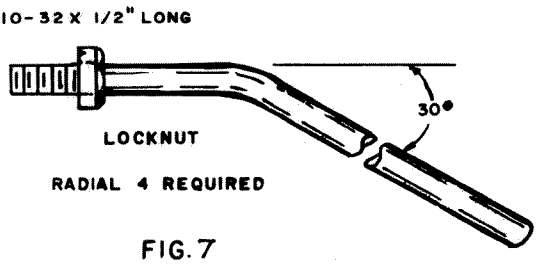


FIG. 7

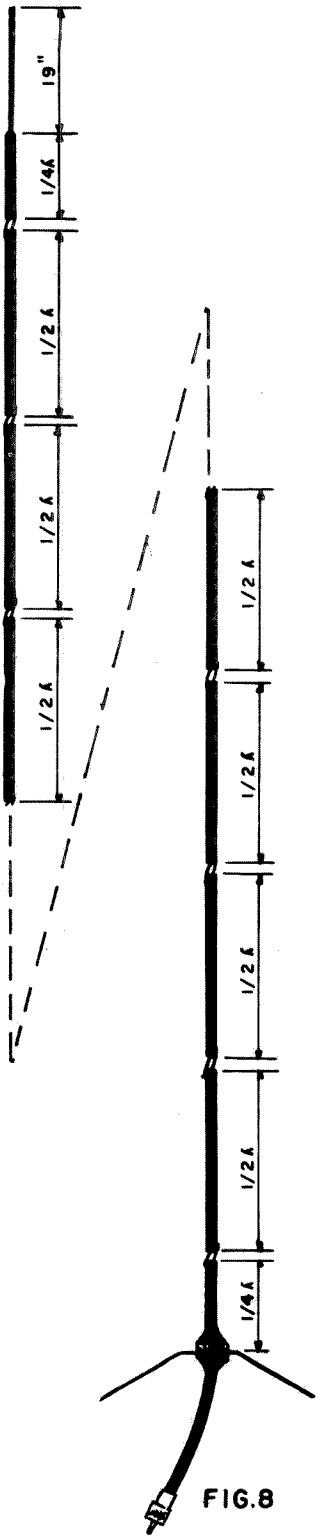


FIG. 8

THE SEWERPIPE ANTENNA

*by P. J. Ferrell**

The perhaps unfortunate name for this otherwise superb antenna derives from the fact that the chromium-plated brass tubing used as a matching section (normally obtained along with some funny looks from your friendly local plumbing supply house) was originally manufactured for quite another purpose.

It all starts with the J antenna, the evaluation of which is illustrated Fig. 1. The J consists of a balanced quarter-wave matching stub feeding an unbalanced load as shown in Fig. 1c. But since balanced stubs work best with balanced loads as in Fig. 1a, some means of compensation must be provided to make the J workable.

Because of the unbalanced load on the matching section of a J antenna, the currents in the matching section are no longer equal and opposite, so the matching section radiates also. The resulting imbalance also couples rf currents to the supporting structure and the feedline, distorting the radiation pattern and making the antenna difficult to match.

The step from the J to the *sewerpipe* arrangement is simple. Use an unbalanced coaxial matching section for the unbalanced half-wave load. Adjusting the antenna's impedance to 50Ω is easily accomplished as shown in Fig. 2.

Chrome-plated brass pipe of 1½ inches diameter is recommended for the matching section. If ordinary brass tubing is used, then a brass plug for the bottom can be turned to fit the tubing. Mechanical details are dependent upon the materials available, and will be left to the ingenuity of the builder. Dimensions are not critical, but things should fit together tightly. The inside depth of the matching section should be about 19 inches. Keep the plastic cap (Fig. 2a) thin and use low-loss dielectric material, as this is a high voltage point. The internal feed assembly is physically similar to the gamma match used for unbalanced feed

*The author holds a BSEE as well as first-class commercial and amateur Extra licenses.

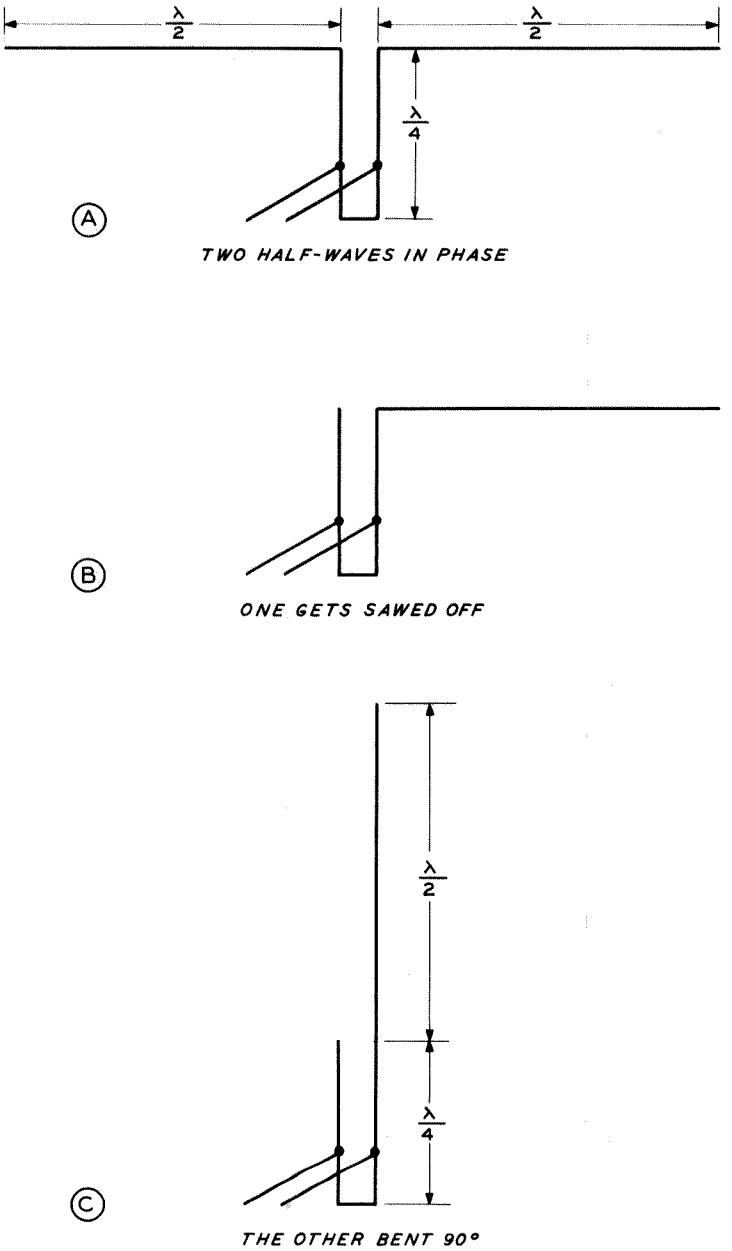


Fig. 1 Evolution of the J antenna

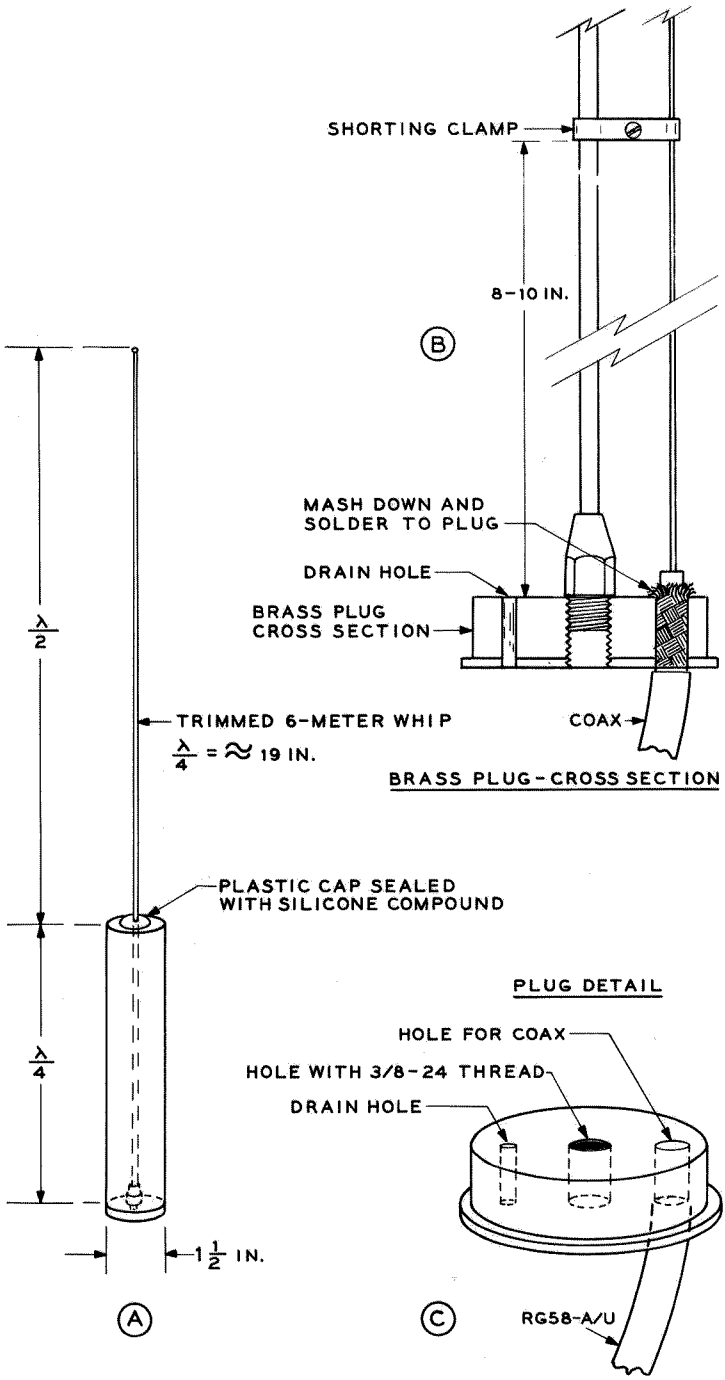


Fig. 2. The Sewerpipe Antenna

of a yagi antenna (omitting the series capacitor, of course). A clamp (Fig. 2b) completes the connection from the off-center coax to the center conductor. The height of this clamp and the center-to-center spacing of the off-center member are varied to obtain a perfect match to 50Ω.

An interesting variation on the original sewerpipe antenna was developed by Prof. D. K. Reynolds (K7DBA) of the University of Washington. A different feed technique is employed, as illustrated in Fig. 3; the result is an ideal antenna for base station use. Antennas of this type are in use at Byrd VLF Substation, Longwire, Antarctica, home of the 21-mile dipole. There they use 146.76 MHz VHF/FM for both on-site and station-to-station communications.

Semirigid coax is used, and the 60Ω section is made by removing alternate half-inch sections of the dielectric inside the coax for about 16 inches. This raises the characteristic impedance from 50 to about 60Ω. The original version is more suitable for mobile use, however, because of it's greater rigidity and mechanical strength.

Patterns taken at the University's antenna range show an almost perfect free-space dipole pattern. The measured gain over an isotropic antenna was 1.62 dB as compared with the theoretical value of 1.64 dB for an ideal dipole antenna. These antennas are unbelievably well decoupled from their supporting structure and are therefore a breeze to match. The only significant current is on the antenna itself.

Since no claim is made for extra gain, then where is the claimed improvement over other antennas? Basically, it is in the reduced angle of radiation. Practically speaking, most mobile antennas at two meters — whether quarter-, or five-eighths wavelength—have about the same

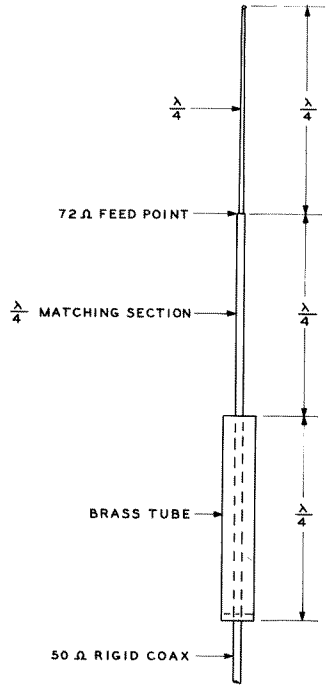


Fig. 3
Reynolds Modified Sewerpipe Antenna

gain toward the horizon; moreover, they all suffer to some extent *finite ground-plane* effects, which act to lift the angle of maximum radiation intensity above the horizon. Thus the secret of the sewerpipe antenna's performance is it's straight-out angle of radiation.

If you live in an area well covered by an accessible repeater and don't stray much, the quarter-wave whip may be just right for you. But if you need long-range capability for your mobile, give the sewerpipe a try. They have been widely used in the Pacific Northwest since 1961. The sewerpipe is ignored by all CB'ers (unlike a five-eighths-wave whip), but seems to disturb the 75-meter mobile operators for some reason. Could be they think it's a new chrome-plated loading coil.

W7PUG

IM Reviews the telco handicom

The Handicom is a hand-held Japanese-made two-frequency transceiver distributed in the United States by Telco, a California firm. The unit supplied to us for review was factory-crystaled to operate through the local repeater, transmitting on 146.82 and receiving on 146.70 MHz.

BASIC FEATURES

According to Telco, the Handicom sells for $259.95, it is FCC type-approved, and the sales price includes such extras as one set of crystals, a 12V nickel-cadmium battery pack (made up of penlight cells), battery charger, detachable whip antenna, leather carrying case, a plug-in earphone, and a built-in battery charge indicator. The manufacturer's specification sheet rated the transmitter at 1.6W output and claimed a receiver sensitivity of 0.5 μV for 20 dB of quieting.

OVERALL APPEARANCE

The Handicom is about the size of a Motorola HT 200 — small enough to be held easily in one hand, but not quite small enough to be called pocket-size. The physical appearance is not particularly impressive. The case, made of plastic, tends to give the exterior of the unit a cheap CB look. Unlike the Motorola HT, with its molded one-piece construction of heavy-gage high-impact plastic, the Handicom is of thin, two-piece construction. The plastic finish is glassy smooth — almost toylike by comparison with Motorola. (The unit is pictured in Fig. 1.)

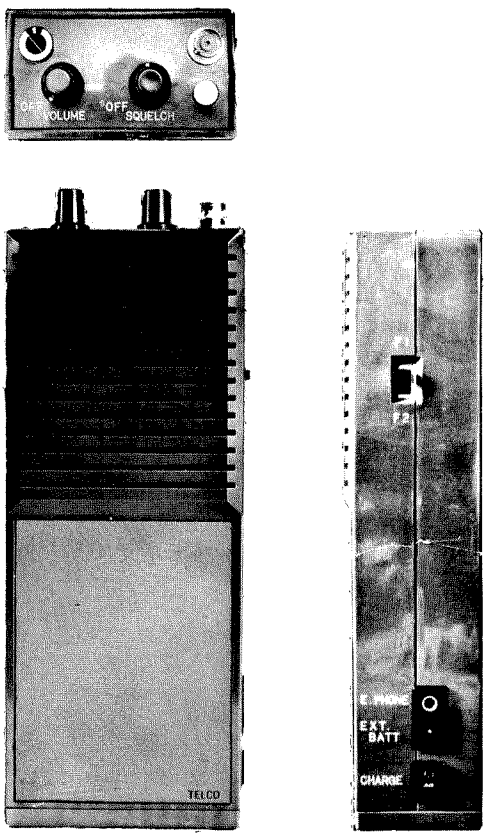


Fig. 1. Handicom layout; top, front, side

The cheapness tends to end with the case, however. From here on, things start looking up.

INTERNAL CONSTRUCTION

The bottom plate is removed (two screws) to get access to the battery pack

or to service the unit. Then the back of the case may be detached by removing three other screws. When the back is lifted, the case separates into two halves, as shown in Fig. 2. The front half contains the mike—speaker, battery pack, and connector receptacles. The back half contains the epoxy—glass circuit board. Removal of additional screws disconnects the circuit board from the case, exposing both sides of the board for viewing and servicing.

The circuit layout is precisely the way it *should* be. Circuit interaction is precluded by careful use of shielding walls between stages, as shown in Fig. 3. Components are not crammed in, as with so many other miniature units; they are orderly spaced to allow servicing by any competent technician.

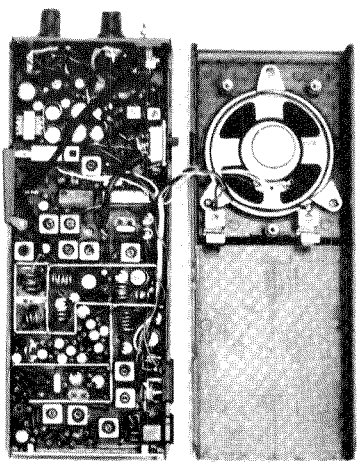


Fig. 2. Fabrication detail

Another attractive feature is the oscillator layout. Both transmit crystals and both receive crystals are of the miniature plug-in type: they can be removed or replaced without special tools or a soldering iron. This is in contrast to the Motorola HT, which employs crystals of the same basic size, but with long leads which must be soldered into place.

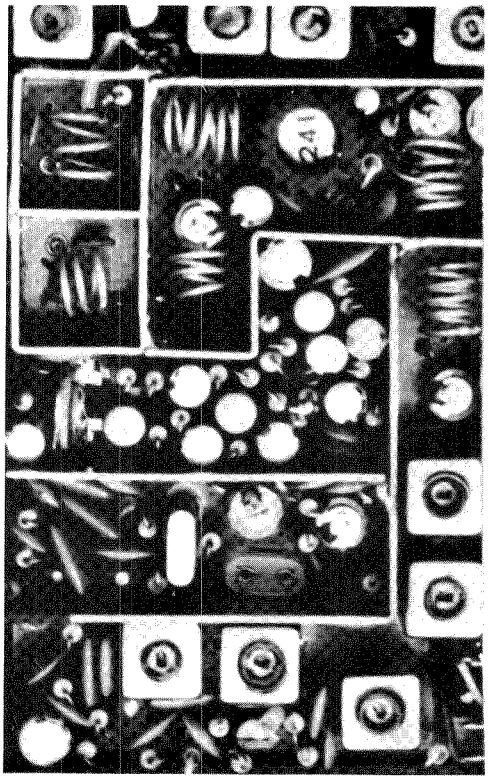


Fig. 3. Shielding detail on PC board

Each crystal of the Handicom is placed adjacent to a microminiature frequency trimmer. Thus, if a nearby frequency other than the original two is required, it is only a matter of replacing the appropriate plug-in crystals, and trimming the capacitor slightly to zero onto the channel.

RECEIVER PERFORMANCE

As shown by the schematic diagram of Fig. 4, the receiver employs a standard squelch circuit, whereby a noise amplifier transistor cuts off the output audio until a signal appears. Squelch action appears very good and does not seriously degrade receiver sensitivity at full squelch. (This may seem insignificant to someone who has not used Japanese-made units before.

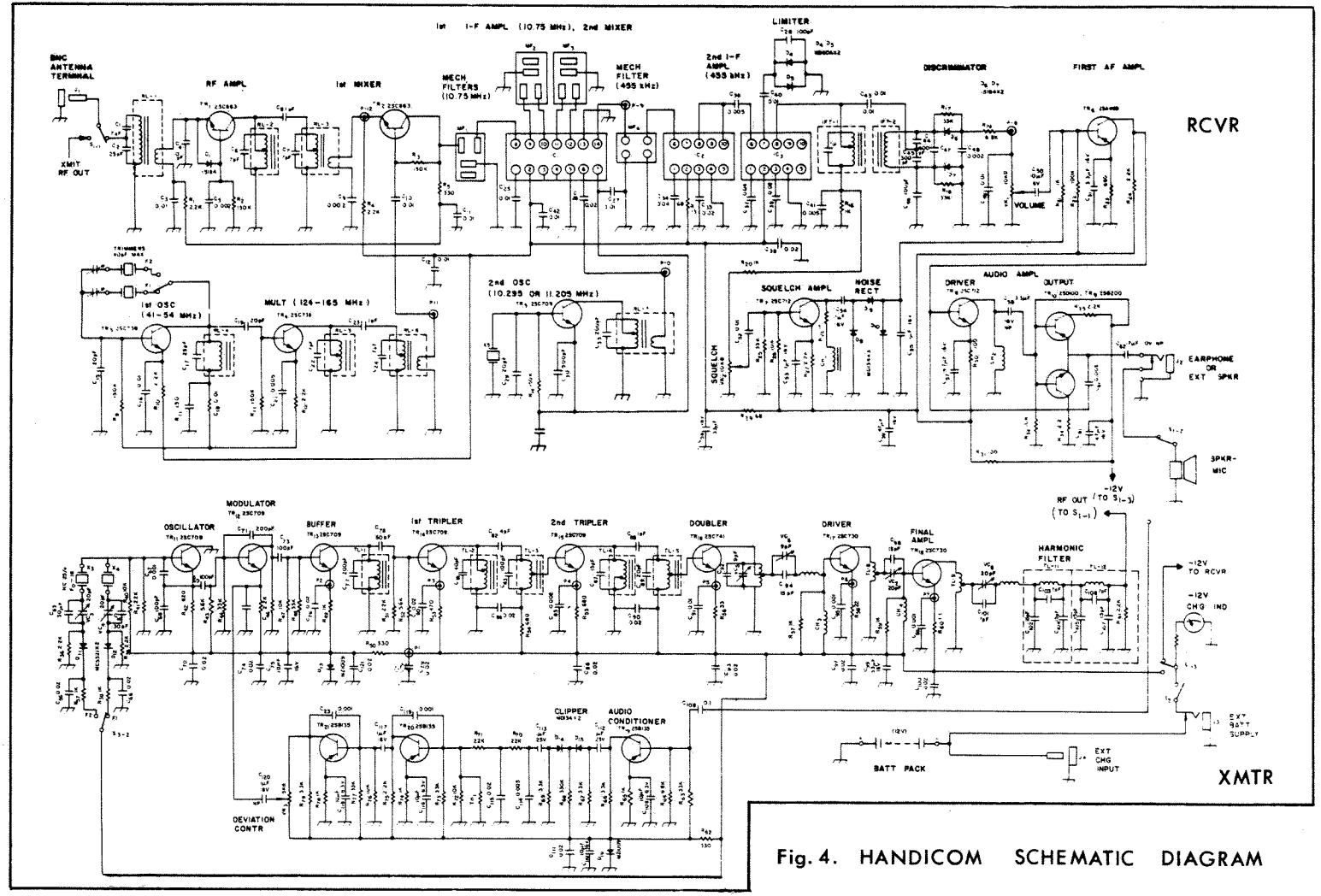


Fig. 4. HANDICOM SCHEMATIC DIAGRAM

but to those of us who *have*, it is a very refreshing improvement indeed.)

The audio characteristics tended to exhibit a slight (almost imperceptible, but we have to be nitpickers) change when the squelch was rotated from full-opened to full-closed. In the full-closed position (tight squelch), the receiver audio appeared to have fewer highs than unsquelched signals. In the unit tested, this did not degrade the audio quality or speech intelligibility at all, however. At full volume, the audio output power is one-half watt, slightly distorted. At 3 dB down (250 mW, still too loud for comfort), there was no noticeable distortion. The audio intelligibility was remarkably good.

A microvolt generator was connected to the unit for the sensitivity test. (The Handicom has a built-in BNC connector as an antenna terminal, which simplifies such hookups.) We connected an ac voltmeter across the speaker terminals, opened the receiver squelch, and turned the audio gain up until the meter registered zero decibels.

With the generator adjusted to produce a signal on 146.70 MHz, the output of the generator was increased until the voltmeter indicated −20 dB, at which point the generator was producing a 0.4 μV signal! Since this sensitivity figure (0.4 μV for 20 dB of quieting) was actually better than that claimed by the manufacturer, the Handicom was retested with another generator (same make, different model); the results were the same in both cases.

No selectivity tests were made. The manufacturer claims an adjacent-channel selectivity of better than 70 dB, which seems a reasonable figure, considering the fact that the unit was type-approved by the FCC.

The manufacturer claims a frequency stability of 0.002% or less for the temperature range of −30 to +60°C. The unit under test was checked out with a Gertsch Model FM-9 at ambient (76°F), and it proved to be within 200 Hz of 146.70 MHz. Since the specified 0.002% figure was not an outlandish claim, no attempt was made to verify it under the specified temperature extremes. (Remember, at 146.70 MHz, an error of 0.002% would be almost 3 kHz.)

The overall performance of the receiver (and transmitter, too, for that matter) was a little too good to be real. So two local technicians (Richard Shyer, WB6BRC, and Dick Bremer, WB6DNX, volunteered to subject the Handicom to a comprehensive series of "shakedown" tests. Most of their tests duplicated those we had already conducted, and their results did not vary. But they added a check for susceptibility to off-channel radiation. To accomplish this, they coupled the signal generator to the Handicom's antenna terminal and cranked the generator output to maximum. Then they slowly swept the 150 MHz spectrum with the generator while monitoring the Handicom receiver. Twice, the two reported, the Handicom responded to the off-frequency input.

A separate check was made for selectivity. A strong signal was produced at 60 kHz above and below the operating frequency of 146.70 MHz, while the receiver squelch was set close to its operating threshold. The squelch would not open, even with the signal generator increased to its maximum output.

In spite of the Handicom's superior selectivity, its general susceptibility to electromagnetic interference makes it inadvisable to consider converting the unit to a repeater.

TRANSMITTER PERFORMANCE

The transmitter output power, checked with a Bird Thru-Line wattmeter, was exactly 1.6W. The voltage standing-wave ratio of the antenna was as close to 1:1 as was measurably practicable, indicating that the measured power was a true record of the transmitter's performance.

The modulation audio seemed to be a bit too low for our local wideband repeater, so it was increased by adjusting the Handicom's deviation control. (See transmitter schematic, Fig. 4.) Since the Handicom was ostensibly a wideband unit, we decided to check the audio limiting bandwidth at maximum deviation. With the deviation control set at maximum (fully clockwise), a very loud voice input caused limiting at slightly more than ±15 kHz, but an average voice caused modulation at an average peak of ±12 kHz.

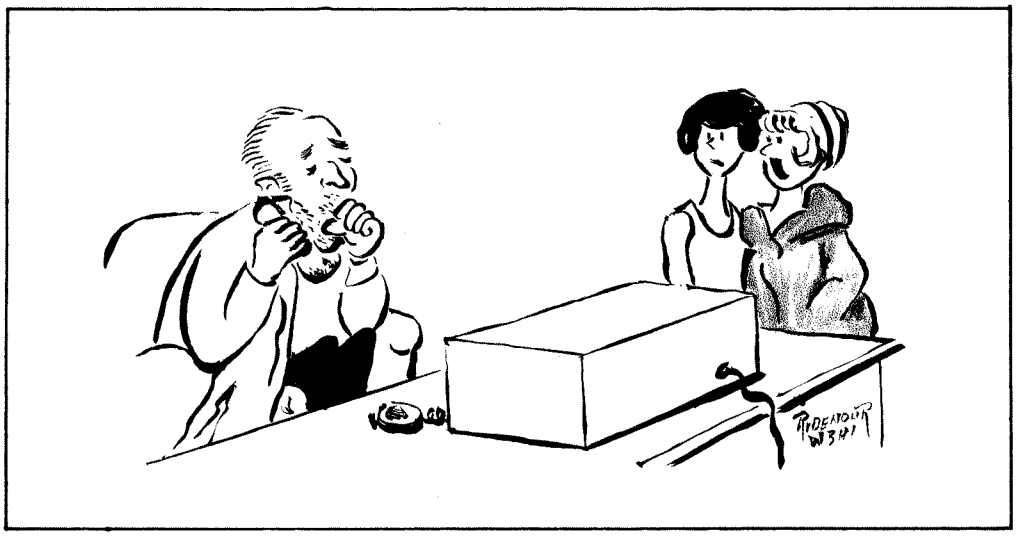
The audio quality of the transmitted signal was exceptionally good. A number of on-the-air comparative checks were made with Motorola, RCA, and Handicom used sequentially at the point of transmission. Reports were surprisingly favorable for Handicom, which uses a miniature speaker to double as a microphone in the transmit mode.

CONCLUSION

All in all, if physical attractiveness is discounted as a criterion, the Handicom seems to be a remarkably good buy. A particularly nice feature is the built-in microminiature meter that gives a direct and constant indication of the battery's state of charge. A telescopic antenna would have been a nice feature (rather than the flexible one-piece whip supplied with the unit), but the advantages of the unit's BNC connector tend to compensate for this lack.

If we were to suggest modifications for improvement, they would not be in the realm of performance, because the Handicom seems already unexcelled here. But an extension push-to-talk mike—speaker combination would be a terrific feature. Of course it would mean the incorporation of a relay inside the chassis, but we tend to think the extra cost involved would be allayed somewhat by the extra sales that such a feature would net. (A push-to-talk microphone connected to a belt-slung transceiver is a godsend at a convention, when the hand-carrying of a walkie-talkie can become a real inconvenience.)

And of course the case could stand to be less chintzy-looking (to borrow a Waynegreenism). Even so, for a given price, we'd rather see an expensive transceiver in a cheap case than a cheap transceiver in a classy chassy.



"How long has it been since he blew his final?"

FM: THE LOGICAL LOCAL EMERGENCY SYSTEM

*by George H. Goldstone**

Amateur radio has worn the laurels of public service for many decades. Looking at these laurels more closely, we find that they are wearing thin in spots; and as a matter of fact, they may no longer fit. Have you examined our capability lately?

Most amateur radio emergency work centers in two areas: (1) furnishing local communication at the scene of a disaster, natural or otherwise; and (2) furnishing communications between individuals and organizations inside the actual emergency area (and concerned individuals outside the area of emergency). The latter class of communications is accurately termed *agony traffic* when it relates to messages concerning the welfare of individuals. This discussion pertains only to *local* communications; the *agony traffic* problem can be discussed separately.

The natural disaster most commonly calling for amateur radio communications would be a flood, sleet or hail storm, or tornado. In our own locality, the incidence of tornados is not inconsequential; several suburbs — and even a small part of the downtown area — have felt the impact and horrible power of tornados. On two of these occasions, when the AREC net was going strong (supposedly well-organized), a few of us listened in on 10 meters — and what did we hear? A superabundance of QRN!

When tornado alerts have been called, listening on 75 meters brings in more of the same. And experience indicates that tornados and and really severe electrical storms (with concomitant QRN) are fellow travelers. The answer, we believe, is two-meter FM.

But the advantage in FM readability is not the only reason for choosing FM for emergency use. Nearly all FM equipment in the hands of amateurs is crystal-controlled, both for receiving and transmitting. The establishment of a definite *emergency net frequency* on a two-meter FM channel means that equipment owners will be on-frequency and ready to go by simply turning the rig on. No problem of tuneup or trying to zero in on a net control operator who can't come within 10 kHz of the assigned spot! Yes, in this one respect the equipment used is similar to CB equipment—but the *crystal control* characteristic is the sole reason why the CB watch operation on channel 9 has been so successful! We can certainly profit by their example.

This brings us to the newest and most compelling reason for two-meter FM: the development of FM repeaters. By placement of one or more repeaters on the perimeter of a metropolitan area, FM mobiles (and even pocket-sized walkie-talkies) can utilize the power and antenna capabilities of the repeater. Communications from the area of a disaster can thus be *relayed* to the destination, or put on RTTY circuits, or phone-patched, all as the case may require.The need for amateurs to participate in emergency communication plans is more necessary than ever before if our use of *all* amateur frequencies is to be justified in the public interest. Rather than recall fondly the successes of cw communications in the floods of 1936, or the tireless 10 meter AM nets of the late 1940's, we should be building a workable FM system in 1969.

W8AP

*The author is an active amateur (W8AP) and an attorney at law. He is a partner in the law firm "Weldy, Goldstone & Boila," Northland Towers West, Southfield, Michigan 48075.

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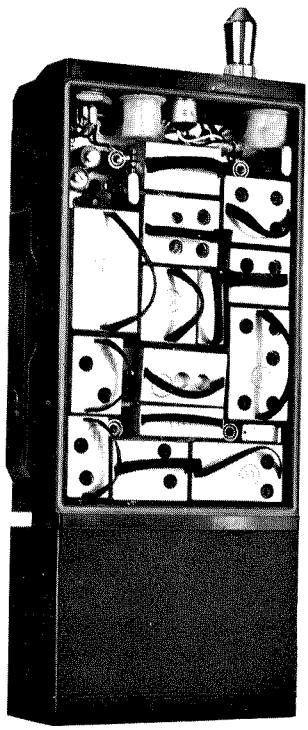

Rear View, with Cover Removed, Exposing Printed Circuit Board with Plug-in Block Modules

Radiomarine Corporation is introducing the models WT-301 and WT-101 Radiomarine FM portable. Both are complete receiver-transmitter units, fully compatible with all VHF-FM two-way Radio Communications systems. Weighing just 30 ounces with battery, these extremely rugged, completely waterproof radios operate anywhere to provide "men on foot" with immediate and direct voice contact with base stations, mobile units, and other portable transceivers. PBC (plug-in Block Circuit) modules provide maximum reliability in operation, plus minimum maintenance down time. Frequency Ranges are 30-50 MHz with the model WT-101 and 132-174 MHz with the WT-301 model. Both units have rechargeable NKI-CAD batteries and RF output is rated at 2.2 watts. Available in narrow or wide band with a receiver sensitivity of better than 0.5 microvolts at 20dB quieting. Standard Options include: External mike-speaker; continuous tone squelch; up to five channel, transmit and receive; VOX operation; Choice of antennas, telescopic, flexible whip or railroad spiral; and a leather carrying case. 100 percent American parts. For more information circle number 32 on the Reader Service Card or contact Radiomarine Corporation – A subsidiary of Electronic Assistance Corporation, 20 Bridge Ave., Red Bank. N.J. 07701.

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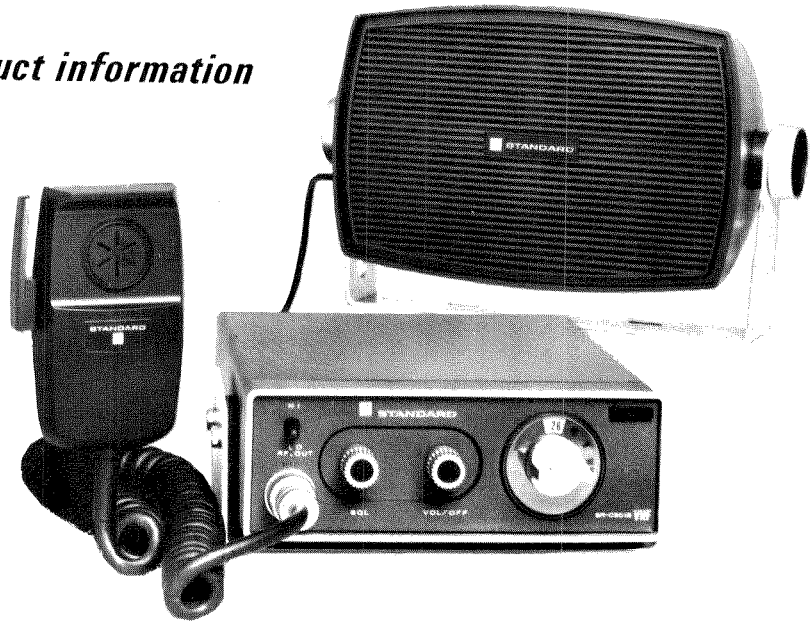
product information



Standard Communications presents its new VHF/FM Marine Radiophone. The model SR-C801S operates from 156 to 162 MHz with 12 channel operation with better than 0.5, uV at 20 dB and 5 watts output power. Besides 12 volt operation there is a AC power supply available for 110 volt operation – model number SR-C12/120 AC and a 25 watt power amplifier. For more information contact, Standard Communications Corp., 1934 South Cotner Ave., Los Angeles, Calif. 90025 or circle number 34 on your Reader Service Card.

* * *

HAM RADIO INCENTIVE LICENSING GUIDE

By Bert Simon, W2UUN

Since the advent of the FCC Incentive License rules and regulations a need arose for a complete new License Manual. This book covers Amateur Radio from the Code, Types of Licenses, The Incentive Program, a complete study guide, the Novice Test, the Tech/ Cond./ General Test, the Advanced Test and the Extra Test.

It is a must for both the newcomer and the experienced desiring to upgrade their licenses. Bert did a real fine job on this one – 160 pages. Price $3.95. Published by Tab Books, Blue Ridge Summit, Pennsylvania. Order from – FM Bookshelf, P.O. Box 5203, Detroit, Michigan 48236.

* * *

AUDIO SYSTEMS HANDBOOK

By Norman H. Crowhurst

This brand new handbook is a reference and guide to audio system design, both for the Engineer and Technician. It covers home entertainment, commercial sound and studio installations. Where necessary it is boiled down to simple terms where theory is essential to an adequate presentation.

It covers amplifiers, dB, impedances, levels and insertion gain. Also equalizers, mixers, filters, distribution system, speakers and microphones. It also contains much information which will aid in locating troubles. 192 Pages, 10 Chapters. Price: $7.95 Hardbound; $4.95 Paperbound. Published by Tab Books, Blue Ridge Summit, Pennsylvania. Order from – FM Bookshelf, P.O. Box 5203, Detroit, Michigan 48236.

* * *

product information

Raytheon introduced the Direction Finding Radio that combines navigation aid with recreational radio. Francine Butler checks out the new Raytheon portable that picks up marine and aviation beacons, conventional marine band, new VHF FM marine weather advisories, as well as FM broadcast bands. Rotatable ferrite antenna with compass rose is mounted on top of multipurpose radio which operates from its own self-contained batteries. For more infomation circle number 35 on your Reader Service Card or contact: Raytheon Company, Lexington, Mass.

* * *

Sonar presents the models FR-103 (150-175 MHz) and FR-106 (25-50 MHz) VHF-FM monitor receivers. The units operate on two crystal controlled channels or the broadcast band. Made of all solid-state components, it only weighs 11 ozs. For more information circle number 36 on the Reader Service Card or contact Sonar Radio Corporation, 73 Wortman Avenue, Brooklyn, N.Y. 11207.

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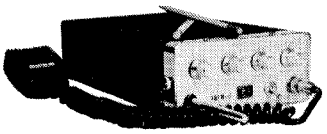
product information



Varitronics, Incorporated, marketing agent for Inove Communications Equipment Corporation, has now made available a 110 Volt AC Power Supply for the FDFM-2, two meter FM transceivers. Also available shortly will be a power Amplifier. Circle number 88 on the Reader Service Card for information or write: Varitronics, Inc., 3835 N. 32nd Street, Suite 6, Phoenix, Arizona 85018.

* * *

A new addition to the Hy-Gain "Envoy" line of mobile antennas has been announced by W. J. D. Bradford, sales manager for Commercial-Industrial Products. The new antenna is a 5/8 wave coil-matched mobile antenna for the 406-470 MHz band. It provides 3 dB gain. The base matched design eliminates the phasing coil in the whip and allows the use of a very short inconspicuous whip (approx. 15").
Designated the Model 795, it features the well known Envoy base mount for quick and durable mounting. Fits any hole (round or not) from 3/8" to 3/4" dia. For further information contact W.J.D. Bradford, Sales Mgr. for Commercial-Industrial Products. Hy-Gain Electronics Corp., P.O. Box 868, Lincoln, Nebraska 68501 or circle number 40 on the Reader Service Card.

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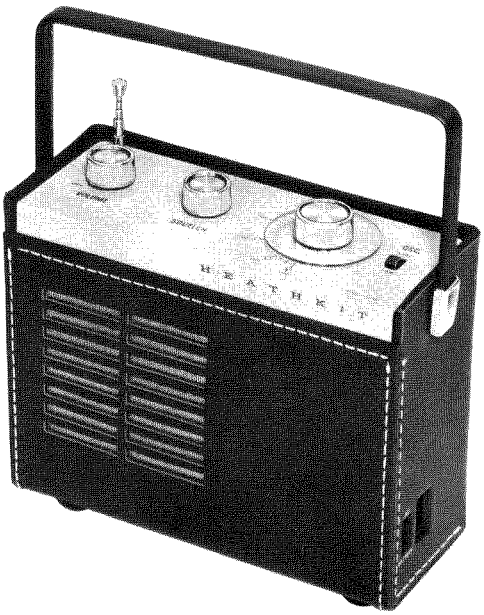
product information



New from Heathkit is the GR-88 VHF-FM Monitor Receiver. The New Monitor Receiver lets you hear both narrow and wide band FM signals between 154-174 MHz — ideal for monitoring Weather Bureau broadcasts, Marine channels, fire and police calls, commercial Radio Service, etc. It weighs less than four pounds and has all solid-state circuitry. Sensitivity is 1.5 uV for 20 dB of quieting and it has crystal control of one channel and vernier tuning. For more information on this new kit circle number 33 or contact Earl Broihier, Heath Company, Benton Harbor, Michigan .

* * *

104 EASY TRANSISTOR PROJECTS YOU CAN BUILD
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This is truly a book for the beginner or technician who learns by doing. 104 complete projects to build, explained fully plus Transistor and Diode Substitution Section.
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WORKING WITH SEMICONDUCTORS
By Al Saunders

A new practical guide to semiconductor circuit operation and application; a must for technicians working with solid-state equipment. The book goes into detail on how and why things work, backed up by large, clear illustrations. A clear-cut explanation of simple junction diodes, N and P type semiconductors, and PNP and NPN transistors.
The later chapters continue to give a complete text on putting things together with actual, practical circuits. Excellent for study and reference. 224 pages, 15 chapters. Price: $7.95 hardbound; $4.95 paperbound. Published by: Tab Books, Blue Ridge Summit, Pennsylvania. Order from: FM Bookshelf, P.O. Box 5203, Detroit, Michigan 48236.

* * *

product information

A new family of additions to the "Envoy" Mobile Antenna line has been introduced by Hy-Gain Electronics Corporation. These new gain antennas have all the Envoy features and are fitted with special adapter bases to replace ¼ wave ships furnished with GE/RCA or MOTOROLA MOUNTS. Nine new models cover all the replacement conditions for the Envoy models 765 and 764. The Envoy 765 is a 5 dB gain mobile antenna covering 450-470 MHz and the Envoy 764 is a 3 dB gain mobile antenna covering 150-170 MHZ. For further information contact W.J.D. Bradford, Sales Mgr., Commercial-Industrial Products. Hy-Gain Electronics Corporation, P.O. Box 868, Lincoln, Nebraska 68501 or circle number 31 on the Reader Service Card.

* * *

Topeka FM Engineering now manufactures a MOS Field Effect Transistor Preamplifier that operates from 144 to 150 MHz. It is available in either a kit for $6.50 or completely wired for $10.95. It is rated in excess of 17 dB gain at 3 dB noise figure and it operates from any good DC source 6 to 15 volts. The 3-3/4 x 1-3/8 x 3/4 glass epoxy printed circuit board also comes with matching Input and Output RF amplifiers for 50 MHz and 450 MHz. For more information contact: Topeka FM Engineering, 3501 Croco Road, Topeka, Kansas 66605 or circle number 37 on the Reader Service Card.

* * *

"THE OSCILLOSCOPE" By George Zwick is a new handbook explaining scope operation, taking a beginner to the most intricates uses, The book covers basic wave forms (DC, sine, pulse, trapezoid and sawtooth) detailing their characteristics and how to interpret them. Scope operation is detailed from the CRT to the power supply. Of special interest are the many experiments in the last chapter. 256 pages. Price: $7.95 hardcover; $4.95 paperback. Published by Tab Books, Blue Ridge Summit, Pennsylvania. Order from — FM Bookshelf, P.O. Box 5203, Detroit, Michigan 48236. An extremely valuable reference and guide for those now using scopes, and those who would like to begin.

* * *

product information

Heathkit is considering manufacturing a transistorized VHF-FM unit for the two meter amateur. The unit would be similar to the model MWW-18 VHF FM Marine Radio-telephone which will be available in late summer of this year. Power output will be 25 watts across six operating channels. The removable plug-in control head, 4½"W x 3½"H x 3¼"D) allows remote control of the radio when used with the accessory extension cable. The unit measures 3¾"H x 11½"W x 13½"D. Styled in white wrinkle finish with chrome, black and blue accents. It features modular, plug-in type circuit boards for quick servicing and the heavily plated chassis and die cast, chrome plated panel can take any kind of demands often made on mobile gear. If you have an interest in this product, then contact Earl Broihier, Heath Company, Benton Harbor, Michigan or circle number 39 on the Reader Service Card.

* * *

KN Electronics has announced a new five channel scanner, model CS-2 which automatically scans from two to five channels on your FM receiver. The unit also has indicator lamps to show the channel in use and uses six transistors and 4 integrated circuits. There are two models available; a 6.3 VAC for $29.95; and a VDC for $27.95. For more information circle number 38 on the Reader Service Card or order from KN Electronics, 107 Moosewood Ave., Avon Lake, Ohio, 44012.

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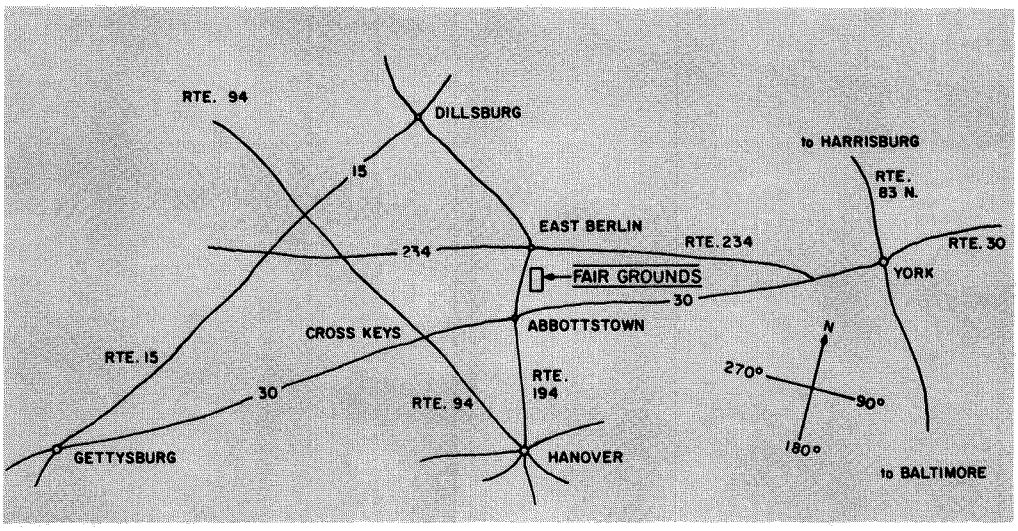
This year we are pleased to announce that we have Gorden Pugh W1JTB/W2GHR, Bob Pederson K2IEZ, and Michael Van Den Branden WA8UTB, Publisher of FM magazine, who will conduct a question and answer session at the Hamfest. They will also speak at a dinner meeting after the Hamfest at Christopher's Restaurant. All interested persons are invited to attend.

Last year our FM Swap and Sell activity was a great success, and we expect "bigger and better" things this year.

TALK IN FREQUENCIES.....52.525MHz
146.94MHz (remoted via 450)
146.34-146.76MHz (repeater)

AUG. 31st
RAIN OR SHINE



NOTE: Ample accommodations for Basket Lunch. Refreshments available including Hamburgs, Hot Dogs, Coffee, Soft Drinks, Baked Potatoes. Cake Sale, etc., etc.

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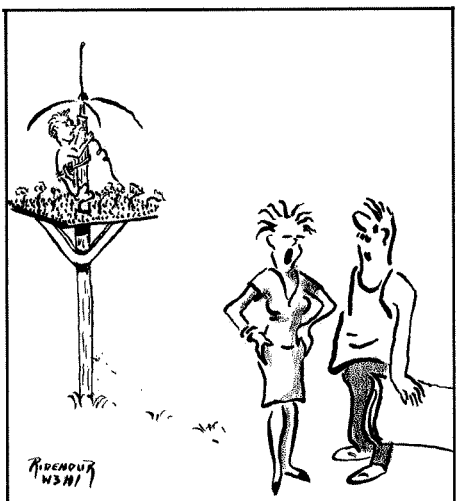
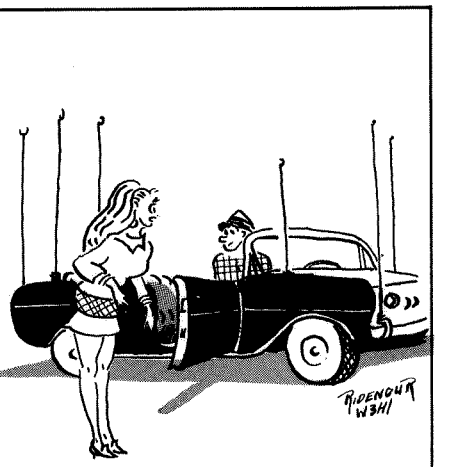
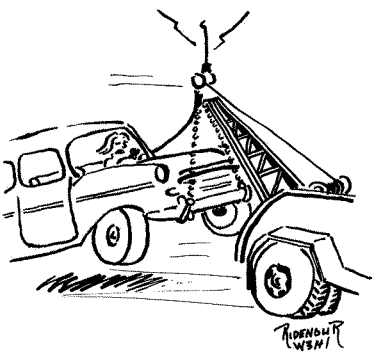


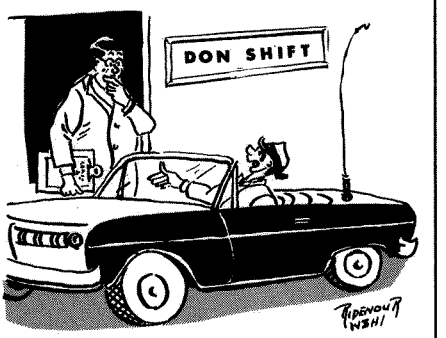
"He says it's a ground plane."



"Couldn't we put the antennas down too?"



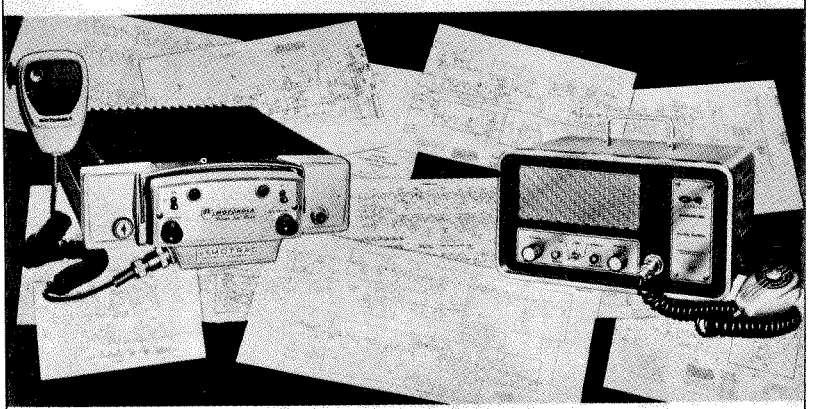
"That's right - My mobile antenna's on a tower now."



"Build one of those synthesizers into this rig-- I'll be back at five O'clock."

A Howard W. Sams PHOTOFACT PUBLICATION

communications equipment schematic manual



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This book presents principles and practices of tuning, aligning, and troubleshooting modern FM two-way radios. Actual circuits are shown and analyzed in such a manner that even individuals with little knowledge of transmitters and dual-conversion receivers can understand.

Dealing solely with radios operating in the 145- to 170-mc regions, *Communications Equipment Schematic Manual* gives detailed explanations, in block-diagram analyses, of the fundamental concepts of typical two-way transmitters and receivers. The content assumes no prior knowledge of radio transmission and reception technology as applied to the business services. Even if you do have a working knowledge of the principles and practices of modern two-way FM radio, you will find this book an excellent refresher, in addition to serving as a working service and reference manual.

Although tube-type radios are still in use, this book deals primarily with transistorized versions. Manufacturers are constantly changing over to semiconductors as the answer to more compact equipment and increased reliability. Therefore, if you aren't too familiar with transistor techniques as used in wide and narrow bandpass amplifiers, limiters, and speech amplifiers, here is a good opportunity to study them.

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MOTOROLA TLN 6030A – digital base station control unit and mobile control head complete for ham mobile phone patch with manuals and reed. $200. Motorola T1001A (Bird #43) thruline wattmeter new condition with quick connect UHF Patch cable with 2 elements; 2-30MHz/100 watt; 25-60 MHz/250 watts $115. Homebrew Motorola test set with pencil drawn schematic will test all models with phone plug or 11 pin socket, cables included. $40. Motorola (Army) VRC-19 Receiver, hi-band, tuned on channel JR mobile telephone/power 115VAC, butchered DC pack, rest of receiver original with special rack plug included. $20. William R. Hooper, Box 195, Holden, Mass. 01520.

GE BASE – Prog line rack mounted base station $150. with lo-band chassis or $175. with hi-band chassis, 4 freq decks $15. Motorola: 2 freq front end P-8404A for Sensicron A Receiver $25, 41V Base Station 2 freq. on 52-525; $75. 41V hi-band rear mount $35. Bob Coburn R.F.D.-2 Tinkham Lane, Londonderry, N.H. 03053.

BASE TRANSMITTER–hi-band, rack mount, transistorized to driver, final 4CV250R, made by collins, complete with power supply, metering FM mod., 110 vac, 60 cy. $90. One Motorola pack set P33, 5 watt with DC & dry Batt. Supply, tuned to 146. 34 & 94; $50. One prog. line mobile, hi-band, 30 watt, NB, $85 complete. Cavities for 2 meters made to order with or without FET front end, write for quotes. H.W. Pfeiffer, 52 Scotch Pine Dr., Voorheesville, N.Y. – K2LEQ

RCA SENIOR VOLTHOMYST WV97 – less probe – $20. ea., GE TPL 100 watt dual channel with all accessories and cables on 146.94 with manual $425. John Gubernard K2LSX, 220 Mt. Vernon Pl., Apt. 6A, Newark, N.J. 07106.

MOS-FET PREAMP – hi-band, 16 db gain; $10.95 (kit – $6.50) Special kit adds Xmtr. Osc. 3 & 4 to H23DCN/DEN HT., wired – $29.50. Bases: RCA MI 31244 – 450 MHz, $99.50. L44AAB – BY, $99.50. D43GGB with transistor mike, $139.50. GE 4ET 1E1, 2 freq. w/blower, no cabinets,$89.50. Mobile with accessories: T44AAV, $44.50. FMTRU 80D, $39.50. CMU 15A, $34.50. T43G & GGV, $89.50. 2 freq. xmit, $94.50. T53GAD, 60 watt, $109.50. U43GGT, 2 freq., $149.50, Handi-Talkie, H23AAM, $52.50. Satisfaction Guaranteed, Quantity discount will be given any order of two or more units. TOPEKA FM ENGINEERING, 3501 Croco Rd., Topeka, KS., 66605. Phone (913) 233-7580.

FM 5000 – International Crystal Co. freq. and deviation meters. Good $100. Fair $60. Oscillators for above, with International crystals on your commercial channel, new $8.00. Used $5.00. I.F. $8.00. Subtract 25% for ten or more. Carrying case holding 18 oscillators $10. Free with any order of 18 or more oscillators. James W. Holloway, 2027 Harton Rd., San Diego, California 92123.

GE 250W BASE – 52.525 Ex. Cond. $175, GE Remote dispatching unit, 117v, $20. Motorola 80D, 12v, 52.525, Ex. Cond. Control Mike, Ant., $55. Link Type 2210-ED2, 150 MHz, 6v comp. $25. 2SCR-300A 40-48 MHz FM Walkie-Talkies, $25. ea-W. Akerly, WA8QHI, 12 E. Douglas St., Bangor, Michigan 49013.

FOR SALE

AUTOMATIC TELEPHONE DIALER – stores 36 telephone numbers. Put lever opposite name, push button. Dials pre-set telephone numbers automatically. $119.50. SINGLE AUTOMATIC DIALER for any single number $59.95 – actuated by push button or remote relay control. INTERNATIONAL DIVERSIFICATION, INC., 4941 Tracy, Kansas City, Missouri 64110. (Free brochures).

MILITARY SURPLUS – directory of surplus military, commercial test gear, four volumes, 1,500 postpaid, Telecommunications Services, Box 4117, Alexandria, Va. 22303.

MOTOROLA – T44A-6 $40 ea. T44AAV $45. J44AAB, L44AAB with PL $125 ea. T1131A $275., D41GGV-20 $40 ea. Quick Call equipment with reeds, all transistor TLN6185-6 decoders $45. ea. Tube type decoders $10 ea. Hang-ups $1.50 ea. Tube type encoders $50 ea. Single tone P-9301A encoders $5 ea. P-9303 decoders $25 ea. Tube type PL encoders $15 ea. Permakay filters TFN6013AW, K9341, TU194 & TU406 $3.50 ea. RCA & GE 6/12v xtal ovens $2 ea. Motorola 2 freq. 12v ovens $4 ea. New Sonar VHF Sentry receivers with xtal supplied $35 ea. complete. International & Sentry crystals available for 146.460, .70, .880, .90, .94 in many Motorola & some GE types. TX $3 wa., Rx $5 ea., 150 & 450 MHz TX strips, OSC. decks and power supplies are also available. Sorry we do not ship. Illinois Communications Co., Inc. 10347 S. Oxford Ave., Chicago Ridge, Illinois 60415 (312) 445-0364, 423-0364.

MEASURMENTS 8OR – SIG. generator, good cond. $200. Measurments 8OR, Sig. Gen., Late model, excellent cond. $295. Autophone, Inc., 1410 Orme Ave., Los Angeles, Ca. 90023.

MOTOROLA T43GGV, – 12 volt mobile with all accessories, on 146.94 or .34-.76 narrow band, $125. Richard Beatie, WA-4ZYU, 1904-114 Ave., Tampa, Fla. 33612.

GE PROG LINE – 30 watt, hi-band, transistor supply, no accessories $90. Bob Coburn, RFD - 2 Tinkham Lane, Londonderry, N.H. 03053.

RCA CMV-3E1 – 12 volt, 60 w, lo-band, crystaled on 52.525 MHz. TS/323 UR freq. meter; LM freq. meter; Gonset G-150; RTTY; Model 19 & TD, Kleinschmidt TT-4A/TG, VC-89A/URA converter, TDA-2 distortion znalzyer, TS-2B/TG test set. S.R. Rosenquest, 1301 Clearfield Drive, Austin Texas 78758.

BIRD 43 – New Panel meters for Bird 43 Line Sections $15; Related gear S.A.S.E. W4API, Box 4095, Arlington, Va. 22204.

P33AAM – Motorola 5 watt Handie-Talkie P33AAM, preamp on receiver. Ready to go on 146.940 MHz. With batteries, like new, $100. D.J. Goodmah, WA8UIT, 3305. De-Sota Ave., Cleveland Heights, OH. 44118.

U43GGT – Motorola T-Power, Nice Shape, over 40 watts out, 2 freq. transmit, with control head, cables, mike and speaker, only $175. Farnsworth base, 8 watts out, dirty but tuned up and operating on 2 meter FM, on $35. Farnsworth base, 12 watts out, clean, real nice unit, $65. Both Farnsworth units are 2 freq. transmit and receive, and are tuned up on .34-.94. John R. Hall WB2UHK, RFD 1, Hornell, N.J. 14843. Phone (607) 342-5818, All units F.O.B.

80D – Motorola with transistor power supply, 4 freq. Send and receive, multi-channel monitoring, with all cables and accessories. Professionally done, no outboards or sub-assemblies. With crystals for 146.94, 147.3 and 147.5 MHz. – $195. James Scott, W9CWH, 706 N. Elmhurst Ave., Mt. Prospect, Illinois 60056.

½ KW AMPLIFIER – Homebrew, with two 4 x150's in tuned plated lines, 8 watts will drive it on the FM freqs. Complete with tubes. No power supply, only $75. Will ship with deposit, write W9JFP Vic Weissbrodt, 4912 West Hoyt Pl., Milwaukee, Wisconsin 53216.

WANTED

GE TPL – or Prog-Line, hi-band equipment, Lampkin FM deviator meter & freq. meter, S.R. Rosenquest, 1301 Clearfield Drive, Austin, Texas 78758.

GE AC SUPPLY – High power base supply, with blower, similar to 4EP4A3. For use with lo-band repeater. Richard Ahrens, W3WJC; 3404 Reading Crest Ave., Reading, PA. 19605. (215) 929-3466.

ELECTRONICS TECHNICIAN – FCC Licensed. To maintain, install, and check out marine electronic equipment on and for yachts, industrial equipment, FM, VHF communications; transistor experience required. Must be a self-starter and professional in attitude and performance. This is a year-round position for an established, growing, communications-oriented company. Send in a short resume or call collect. All replies strictly confidential. RAD-COM, 122 Library Lane, Mamaroneck, N.J. (914) 698-6800.

REPLACEMENT BATTERIES – need cells for the P33 Series Motorola. The older metal cased and the newer plastic cased cells. John Gubernard, K2LSX, 220 Mt. Vernon Pl., Apt. 6A, Newark, N.J. 07106.

SCHEMATIC – Manual or information leading to same for: COMCO AN/VRC-33A or CY-2108A/VRC-33 mobile radios. Uses 13 tube type 400 RAB receiver, 8 tube transmitter strip and vibrator power supply. All correspondence will be answered. J.R. Vander Maaten, 2181 – 65th Ave., Sacramento, CA. 95822. (916) 421-1873.

GE PROGRESS LINE – Hi-band, 4 free decks, both AC and transistorized supplies for med and high power. J.E. Young, 58 Hetcheltown Rd., Scotia, N.Y. 12302.

MOTOROLA PORTABLE – Hi-band or lo-band portable. Also have heath DX40 to swap for FM gear. John R. Hall, WB2UHK, RFD 1, Hornell, New York 14843. Phone-(607) 342-5818.

MOTOROLA MOTRAC or **GE MASTR** or **TPL** lo-band unit (to cover the 36-42 MHz split). Will consider unit with or without accessories, operating or not, but do want a unit with PL or reed-type tone squelch. GE TPL 30, 60, or 100 watt transmitter and power supply capable of covering 36-42 MHz split. Want Motorola PT-200 style handie-talkie (450 MHz) with PL. Want Motorola TU-217 "Vibrasender", code YZ (82.5 Hz) or code ZA (94.8 Hz) and TU-333 "Vibrasponder", code YZ or ZA. Alfred A. De Figio, Box 524, Republic, Pennsylvania 15475. Phone (412) 785-6320.

RCA MODEL CX-9A 915 KHz I-F Alignment oscillator. Gerry Baldauf, 175 Wernersville Blvd., Wernersville, PA. 19565.

MOTOROLA DISPATCHER – 8 watt, hi-band, T-power transceiver. State price and condition. All replies answered. Jack Molnar, WA3ETD, 111 S. Allen St., #45, State College, PA. 16801.

MOTOROLA TU-112, AC POWER SUPPLY. L 44AAB Motorola desk top base station. Also best deal for info on how to use Touch-Tone loop around & blue box multi-frequency. Robert Young, 319 Wyatt Rd., Harrisburg, PA. 17104.

DUPLEXER, for 440 & 446 MHz. Robert Young, 319 Wyatt Rd., Harrisburg, PA. 17104.

MOTOROLA P8501A, Portable test set manual, also osc. decks P8465 for Motorola FMTRU 80D transmitters. George B. Meserole, WA2UCP, 647 – 88th Street Brooklyn, New York 11228.

GE PROGRESS LINE – 12 volt power supply, lo-band, also Motorola PK Filter SK9035A. Contact: Edward Mattheis, WA8MWS, Box 164, Bridgeport, Mich. 48772.

HANDI-TALKIE or Packset operating on 146.940, hi or low power. Looking for trade-let me know what you need. Prefer local deal. Al Klein, 214 E. Mineola Ave., Valley Stream, N.Y. Phone (516) 825-0384.

INDUSTRIAL PS-150 two way radio packset information. Need crystal, battery and IF info. Also crystal information on LINK transmitter 1872 and rcvr 1873. Warren, 9017 – 8th Ave., S.W., Seattle WN. 98106.

WANTED Continued

BIRD #43 – Wattmeter, two Motorola H23 DEN hi-band portables, U51GGT lo-band with PL. FM signal generator. State price and condition. W.B. Kincaid, WA4YND, 210 Graeme Drive, Nashville, TN 37214.

GE BASE – Progress line late model 100 watt base station, one (1) lo-band 52.525 MHz, one (1) hi-band 146.940 MHz. Send your price and phone number to: Paul W. Cox, K4LLX, Drawer 160, Asheboro, N.C. 27203.

GE PHONE UNITS – 5 Channel telephone units, Progress UHF units, lo-band progress. VHF Progress mastr, Motrac, late TPL-Motorola or GE 11-Channel units, or any parts or strips to the above. Top wholesale prices paid. Call Bill Miller – (213) 263-4112 or write Autophone, Inc. 1410 Orme Ave., Los Angeles, CA. 90023.

BACK ISSUES – Need issues of FM prior to and including July 1968, George E. Missbach, 3330 Peachtree Rd., N.W. Atlanta, G.A. 30326.

SERVICE EXTENSION CABLE – Type 1474787 for Westinghouse Model FE Railroad base station, or connectors to make same. John Becker, K9WEH – 2435 Birchwood Lane, Willmette, Illinois 60091.

UHF PROG. LINE STRIPS – Richard Beatie, WA4ZYU, 1904 – 114th Avenue, Tampa, Florida 33612.

COMCO 580, 680, 582, 682 GEAR. Complete with head and cables. If reasonably priced and not stripped. Contact: R. Knowles, 146 S. Main St., Freeport, N.Y. 11520.

INSTRUCTION MANUAL, for L44AAB consisting of TU112 power supply, TA 147-TX, and TU193-RX or Zeroxed Schematic of TU112 power supply. Please reply to: Robert Young, 319 Wyatt Rd., Harrisburg, Pennsylvania 17104.

455 KHz PERMAKAY FILTER – used in the W8BCI Two-Meter FM Handie-Talkie. See Dec. '67 **'FM'** or June '62 QST, Page 37. Need two units. Paul Frankle, 215 Stewart Hall, Angola, Ind. 46703.

MOTOROLA HT-200, Series Handi-Talkie. (H23DCN) 150-170 MHz. 2-freq. preferred but will consider single freq. model. Also interested in low band and 450 versions of the above with "PL". Also looking for single tone encoders and decoders (transistorized) such as "Reach", "Dynacoustic", etc. K3AUD, Alfred A. De Figio, Box 524, Republic, Penn. 15475. Phone – (412) 785-6320.

BENDIX MRT-10 (lo-band) – need info and schematics. Also tips on converting the above to 6 meters. Bob Spain, RD 2, Box 532, Blackwood, N. J. 08012.

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events

NORTH ALABAMA HAMFEST – August 17, 1969 at the John C. Calhoun State Technical and Junior College near Decatur, Alabama. Contact: William L. Matthews, P.O. Box 9, Decatur, Alabama.

S. W. MICHIGAN VHF PICNIC – The Annual S.W. Michigan VHF Picnic will be held August 3, 1969 at the Allegan County Park. 13th year with approximately 600 from the Great Lakes in attendance. For more information, write: Walter Akerly, Jr., WA8QHI. Bangor, Michigan 49013.

35TH ANNIVERSARY HAMFEST – Hamfests Radio Club of Chicago, Illinois will present their 35th Anniversary Hamfest on Sunday, August 10, 1969 at Santa Fe Park, 91st and Wolf Road, Willow Springs, Ill., Southwest of Chicago. For info contact: Joseph W. Paradyla, WA9IWU, 5701 South California Ave., Chicago, Ill. 60629.

WIMU HAMFEST – Wyoming, Idaho, Montana and Utah Hamfest. 37th Running. Being held at the Mack's Inn Idaho, 23 miles south of Yellowstone, Montana. August 1, 2, & 3. Contact the President of the South Eastern Idaho FM Radio Association, Robert W. MacGregor, K7UAE for information.

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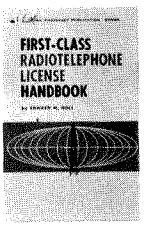

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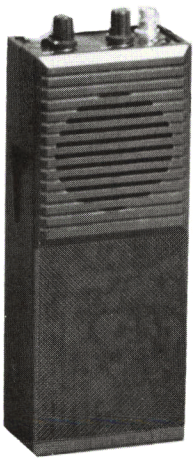

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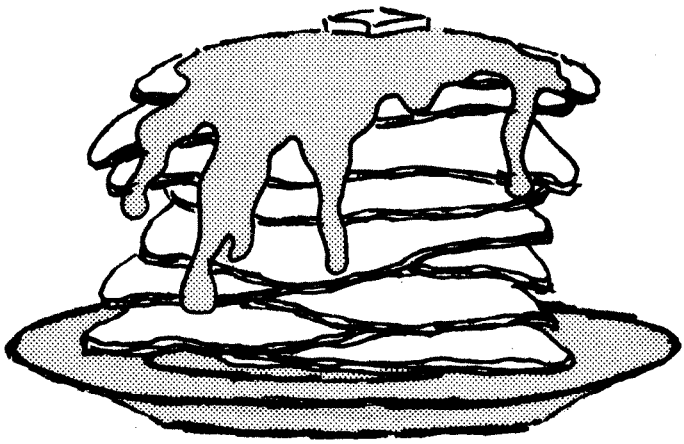

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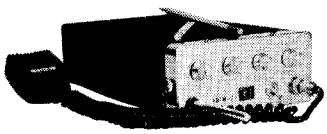

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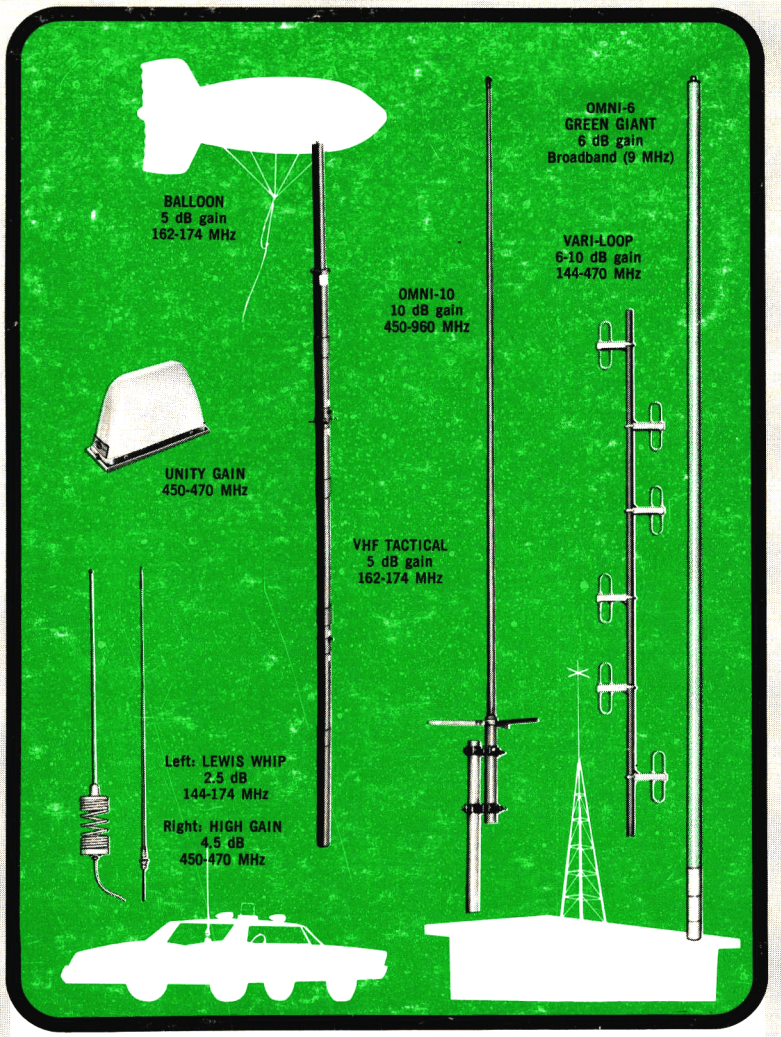

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