A HOWARD W. SAMS PUBLICATION

MAY, 1968/75¢

PF Reporter®

PHCTOFACT

the magazine of electronic servicing

SPECIAL ANTENNA ISSUE

Antenna Systems Component Guide p. 73

REMEMBER TO ASK—
"WHAT ELSE NEEDS FIXING?"

The name of the game was hide and seek.

The good color picture hides. The viewer looks for it. And sometimes it takes quite a while to find. The good sound drifts, and between rotor and tuning dial the search for a perfect stereo balance begins again.

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CDE's famous heavy-duty Bell Rotor gives you high repeatability and no antenna drift. It's an all-solid-state, silent operation. The Autorotor system's precision is within 1° and combining it with pushbutton electronic control, not mechanical control, makes it today's most advanced rotor.

CDE took another step forward in the Autorotor control design. They had William Snaith, of Loewy-Snaith, world famous designers, create the Autorotor console. He made it attractive. Made it so you can place it on a table top or shelf without it being an eyesore.

This is the story you can tell your customers to sell the top-of-the-line in rotors. The latest advance from the quality house of rotors — Cornell-Dubilier.

For complete information on new Autorotor write:

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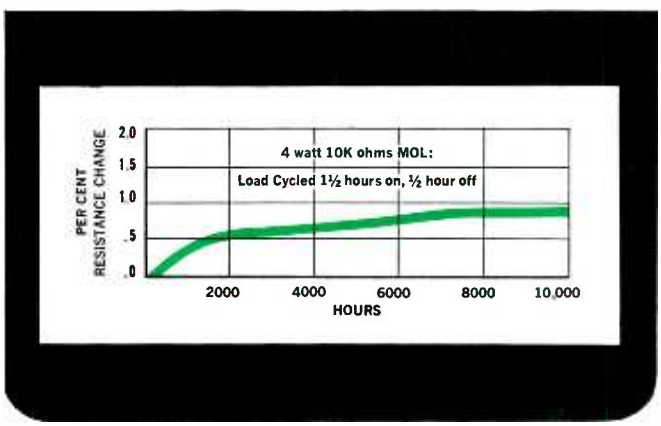
Be sure to ask: "What else needs fixing?"

Circle 1 on literature card

MALLORY **Tips for Technicians**

"Trading up" resistors prevents call-backs



Typical stability test data: 10,000-hour load cycling test. Average resistance change is less than 1%!

Color television sets contain some potential trouble spots for fixed resistors. Sudden overloads or short-outs of a tube, diode or transistor, or leakage in a by-pass capacitor may cause enough current surge in a carbon resistor to cause it to open or to suddenly increase in value. You wind up with a strange set of symptoms that take a lot of point-to-point testing to unscramble.

EXAMPLE: Suppose a tube or capacitor shorts out. This may cause excessive current drain on the power supply which may affect a resistor in the bleeder network. This resistor may increase in value which would then reduce voltage in subsequent circuits. When this happens, a number of controls must be re-adjusted. By replacing the resistor with a Mallory MOL, the set is brought back to normal operation and the MOL construction virtually precludes this type of difficulty happening in the future.

Granted, resistors don't fail as often as other components. But when it happens, you can take out a simple insurance policy against call-backs by replacing faulty carbon resistors with Mallory MOL's. For just a few pennies more, you're putting a world of extra life and stability in a critical part of the circuit.

In a nutshell, MOL's are metal oxide film resistors with stability comparable to wire-wounds, but far lower in cost. They can stand brief overloads of several times rated wattage without damage. Humidity and vibration don't bother them. They're non-inductive up to 250 mc, so you can use them in rf and if sections without a worry. As for stability, we've run them on load cycle tests up to 10,000 hours and resistance values hold steady within 1%! No wonder every major TV manufacturer is using them.

MOL resistors are usually a bit larger than carbon types, so you may have to bend a few leads to fit them in. They come in 2, 3, 4, 5 and 7 watt sizes (which is more than you'll need in most carbon resistor replacements), in resistance values up to 500K.

Your Mallory distributor stocks MOL's in the values you'll need. And he has an up-to-date cross-reference list which shows you the Mallory part numbers to specify for popular TV sets, by manufacturer and chassis number. See him, or write to Mallory Distributor Products Company, a division of P. R. Mallory & Co. Inc., Indianapolis, Indiana 46206.

DON'T FORGET TO ASK 'EM—*"What else needs fixing?"*

Circle 2 on literature card

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PF Reporter

PHOTOFACT

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ABOUT THE COVER

The service technician on our cover this month is indeed the proverbial "man who built a better mouse trap." His philosophy: "It's hard to dispute what the eye sees." For more about this man, turn to the article beginning on page 4 of this *Special Antenna Issue.*

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YOU DON'T NEED TO MAKE MORE SERVICE CALLS TO DO MORE BUSINESS

JUST ASK, "WHAT ELSE NEEDS FIXING?" ON EVERY SERVICE CALL YOU MAKE

A test program initiated by the Electronic Industries Association in a large mid-west area proved the point. Participating service dealers enjoyed a 7½% bounce in business. There's magic in asking!

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A LOOK AT SUCCESS

Proficiency, ambition, and perseverance are a few of the attributes normally associated with success. One that is often overlooked is imagination. Its value is pointed out in this portrait of a successful service technician.

by J. W. Phipps

We've heard of a number of "tried and proven" approaches to selling a TV antenna, but this month's cover photo illustrates one that is pretty hard to top. The originator of the idea is John E. Crum, a self-employed service technician operating in the Indianapolis area.

Fig. 1. Climbing to top of truck involves three large steps.

John, a veteran of fourteen years in the electronic servicing industry (twelve of these self-employed) never did like long-winded sales pitches, preferring the "I'll show you" approach rather than the "Let me tell you about it" pitch. As a natural course, he has carried this philosophy over into his color TV and TV antenna sales techniques.

Demonstration of a color TV, either in the showroom or the customer's home, is not a novel nor a difficult feat. However, demonstrating an antenna system is another matter. One approach is to install a representative antenna system in the showroom, but this limits the potential customers to those who actually visit the store or shop. John reasoned that the only alternative to this method is to take the antenna system to the customer. And this is exactly what he has done.

The Rig

Selecting the right "set of wheels" for his mobile demonstration antenna did not pose a problem; John decided to employ the cab-over-engine, panel-type, service truck he was already using.

Since the base section of the mast is the only part of the antenna system that is inside the truck, the ad-

dition of the TV antenna does not interfere or detract from the normal usage of the truck. Also, the relatively low profile of the truck, together with a conveniently placed hinge on the rear door, makes climbing to the top of the truck a matter of three large steps upward, as illustrated in Fig. 1. (John says it helps him keep in shape.)

The mast portion of the system consists of five 10′ hollow steel sections that range in diameter from the 2¼″ base section to the 1½″ top section. The graduated diameters permit the mast sections to telescope into one another when not in use. Each 10′ mast section has been shortened to 7½′, so that in the "travel position" the antenna is no more than 3½′ above the roof of the truck. The base of the mast is bolted to a swivel mount that, in turn, is securely anchored to the floor of the truck (Fig. 2). The swivel base permits manual rotation of the entire mast, rotator, and antenna to allow calibration of the rotator to the setting of the rotator-control assembly. The hole in the roof through which the bottom mast section extends is "capped" with a funnel-shaped sleeve that fits snuggly around the mast section to prevent water from running down the outside of the pipe into the truck.

For added support, and to prevent the mast from bending the hole larger, a ¾″ plywood sleeve has been installed beneath the rubber cap, as illustrated in Fig. 3.

To handle the added weight of someone standing on it, the roof has been beefed up with additional wood beams extending across the inside top of the truck, as shown in Figs. 2 and 4.

When fully extended, the mast places the antenna approximately

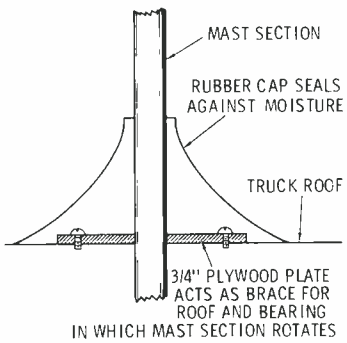

Fig. 3. Plywood sleeve reinforces roof section around mast.

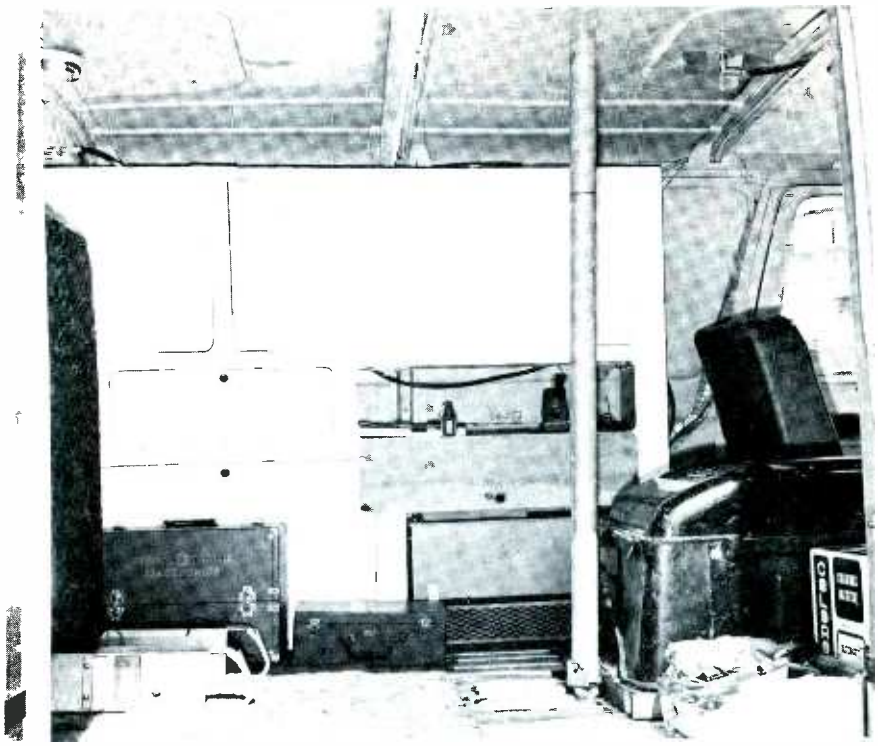

Fig. 2. Interior view of truck shows swivel mounting for mast base.

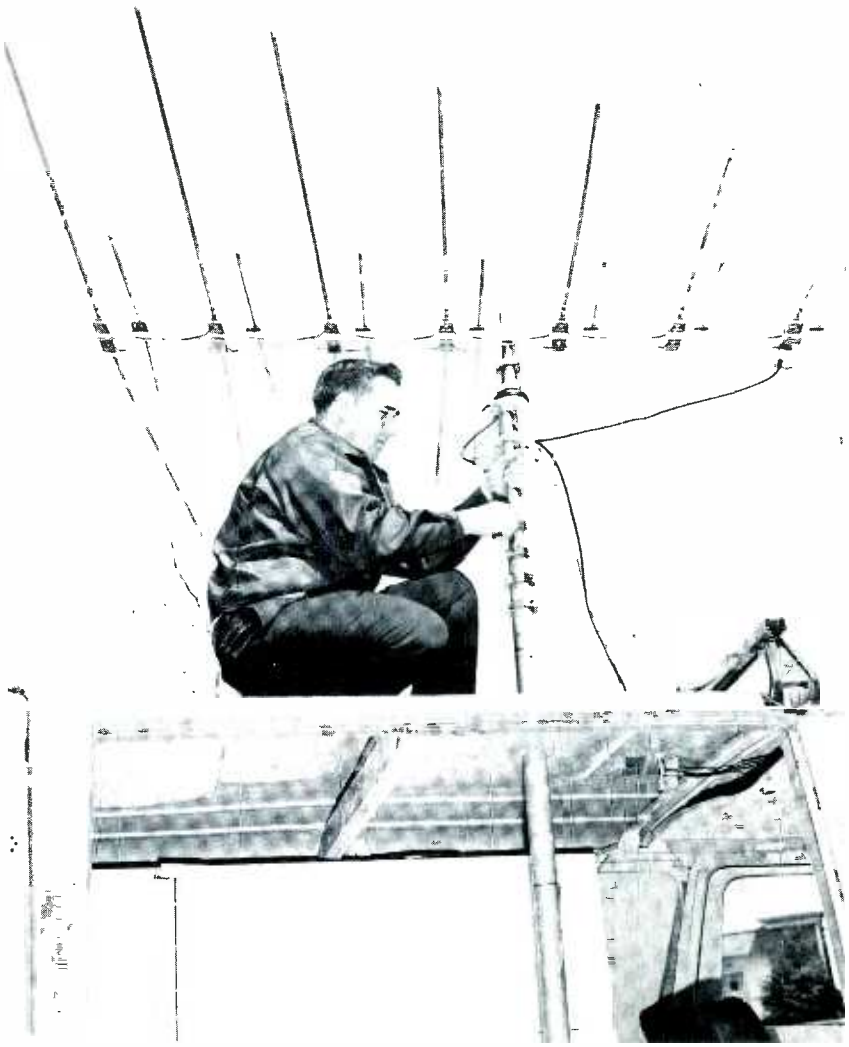

Fig. 4. Close-up of antenna, rotator, and mast assembly.

45′ above the ground (the floor of the truck is 22″ above the ground, which, along with the short rotator mast, accounts for part of the height.) However, John says that he seldom needs to extend the antenna higher than 35′ for good reception.

Mounted atop the mast section is a rotator capable of swinging an antenna in a 360° arc (Fig. 4.) The antenna John normally uses with the system is an eleven-element, 300-ohm TV/FM unit with a built-in balun. Occasionally, for deep-fringe demonstrations, he switches to a fifteen-element unit that provides the increased gain needed for such areas.

Two separate cables are employed with the system: One is a 75-ohm coax for the antenna; the other is a four-wire (two-pair) cable for the rotator. As shown in Figs. 4 and 5, the 75-ohm coax is connected to a balun mounted on the antenna proper and runs alone from the balun to the rotator, where it is joined with the rotator cable. A 1½′ loop of coax is left between the rotator and antenna to provide enough slack for complete rotation of the antenna. A 50′ run of cable connects the rotator and antenna to the storage reel located on the top rear of the truck (Fig. 6). While the actual distance from the point where the mast enters the roof and the storage reel is less than 5′, the added cable is needed when the mast is extended to its maximum length. As shown in Figs. 5 and 6, the rotator cable is terminated at the storage reel in a jack-type connection, while the antenna coax uses a coaxial connector. Both cables are wound around the storage reel when not in use, and are connected as shown in Fig. 6 only after the desired amount of cable is reeled off the storage reel.

The basic construction of the storage reel can be seen in Figs. 5 and 6, so there is no need to go into detail. However, the take-up motor for the reel is unique. Actually, the "motor" is a generator from a '58 Chevy. To set the desired speed and torque of the motor, John experimented with various sizes of resistance (R1 in Fig. 7) placed between the field winding and ground. A relatively slow speed was desired, but yet enough torque was

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MFT-2	41.25 mc Sound 45.75 mc Video	3GK5	5LJ8	Series 450 MA
MFT-3	41.25 mc Sound 45.75 mc Video	2GK5	5CG8	Series 600 MA

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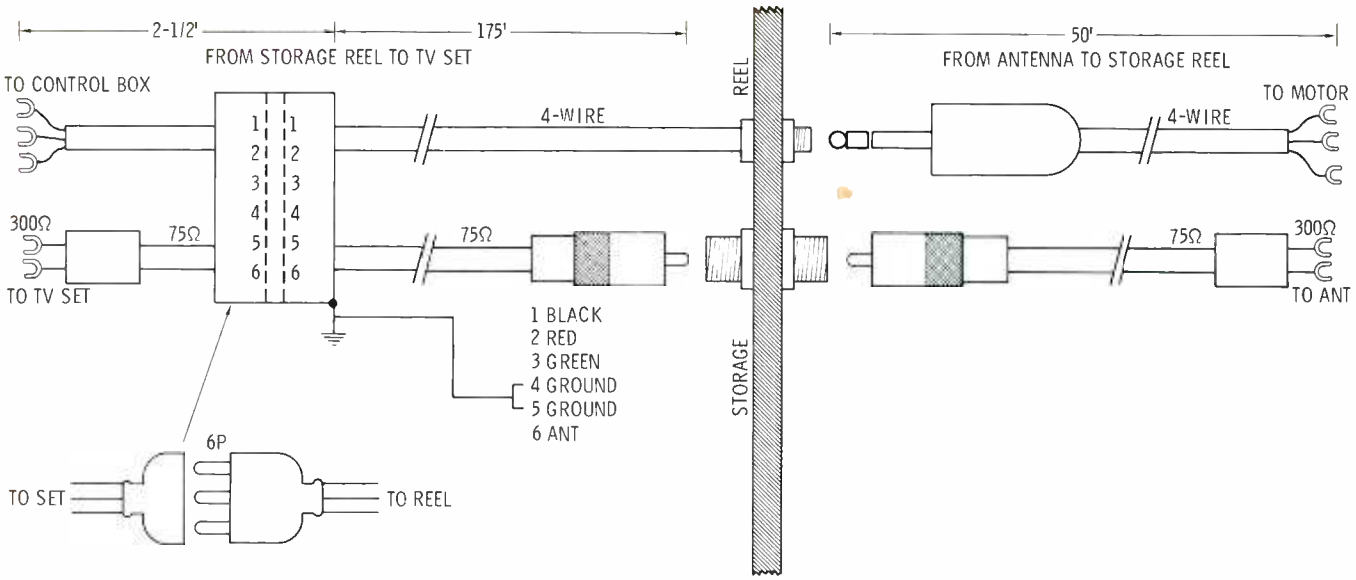


Fig. 5. Illustration showing cable, storage reel, and cable connector arrangement.

needed to provide the power to pull up to 200′ of rotator cable and antenna coax. John finally settled on a 100-ohm resistor. When additional cable is added to the reel, the torque of the motor can be increased by reducing the size of R1, or even, if necessary, shorting the field terminal to ground. At present, John controls the motor through a switch located near the storage reel; however, in the future he plans to install a foot switch on the rear bumper.

"The System Sells Itself"

Much of John's service work involves warranty calls for seven retail outlets in the Indianapolis area. In addition, he also performs color setups for these same retail outlets. All billing is done on a per-call basis, with the service charge determined by John. He also handles service calls from private parties; however, lately, because of the time element, he has been limiting such calls to color servicing.

Many of John's antenna sales evolve from color setup calls. As John states, "A great number of people who purchase color sets do so with the preconceived idea that the picture will be as good in their home as it is in the showroom. They have no idea whatsoever concerning antenna requirements, etc. In fact, most of them naturally assume that, because rabbit ears provided a satisfactory picture on their old black-and-white receiver, the same ears can be used with equal success on the new color set they are buying.

"Of course, once the set is delivered to the home and is properly set up using rabbit ears, the customer is confronted with a color picture that does not even come close to matching the clear, well-defined color picture displayed by the showroom receiver. Fringing, smearing, and any number of other "poor-antenna" symptoms may be present. This is where the mobile antenna system does its own selling.

"After the customer has had a chance to view the picture quality produced using rabbit ears (or, in some cases, their old, inadequate, outside antenna originally designed for only black and white), I ask him (or her) if he has 5 minutes to spare for a simple demonstration. If he says yes—and they almost al-

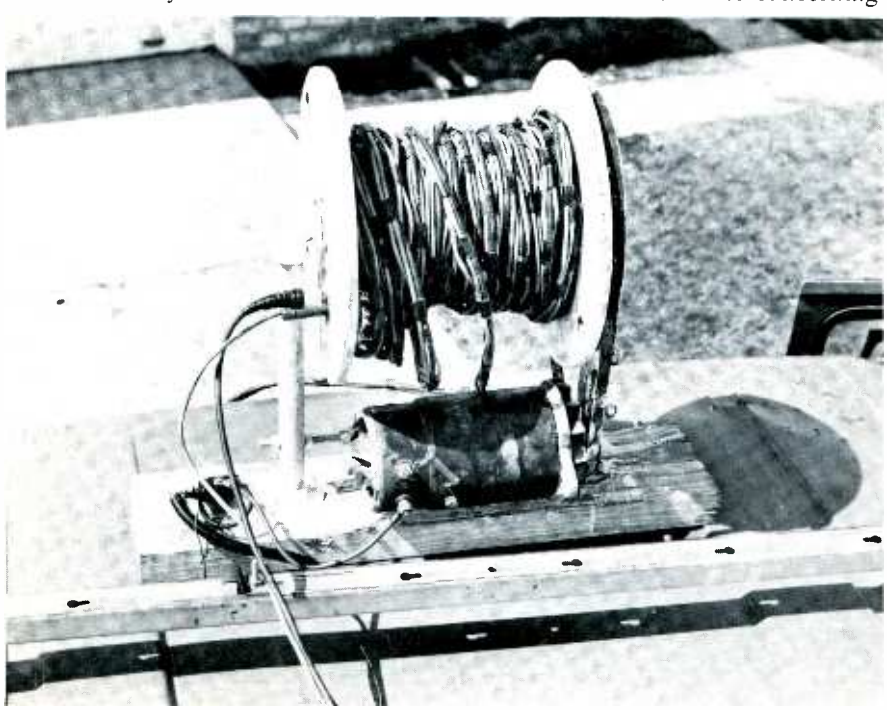


Fig. 6. Storage reel uses a '58 Chevy generator for take-up motor.

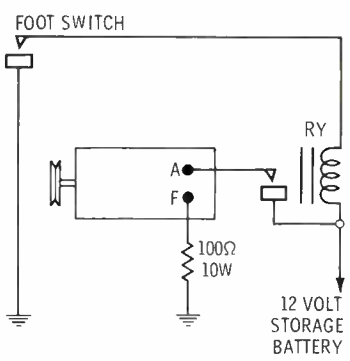


Fig. 7. Motor control circuitry.

Fig. 8. Pulling the cable from the storage reel.

Fig. 9. Elevating the antenna, one section at a time.

ways do—I show him that a good antenna system can transform his poor-quality color picture into the one he expected to receive when he bought the set."

Once John has the go-ahead from the customer, little more than 5 minutes elapses before he has the mobile antenna system connected to the set. Setting up the system involves the following steps: First, John pulls enough cable from the storage reel to reach from the truck to the TV receiver (Fig. 8). As he pulls the cable from the reel, he coils it up in his hand. Then, he "plays out" the cable as he walks from the truck to the house; when he reaches the house, he drops the remaining cable on the porch or inside the door. In this way, the cable that will actually be in the house is kept clean. Next, he returns to the truck, climbs atop it, and quickly raises the antenna masts to the desired height, one section at a time as shown in Fig. 9. Each section is secured in position by tightening a set screw on a clamping ring around the mast section. Once the mast is extended, the rotator and antenna cables are connected to their respective house cables via the storage reel, as shown in Fig. 6. Before returning to the house, John makes sure the antenna is facing directly north to match the setting of the rotator control unit. (In other words, the rotator and rotator-control unit are synchronized.)

John returns to the house carrying the rotator-control unit, a balun coil to match the set to the 75-ohm coax, and a short cable assembly to connect the rotator-control unit and television to their respective cables via a Jones plug. Fig. 5 provides an illustrated drawing of the cable assembly, and Fig. 10 is a photograph of the actual installation.

Once the cables are connected, and the rotator unit is plugged into a wall socket, the mobile antenna system is ready to provide first-hand proof of what a good antenna system can do for the picture on any color receiver. When the potential buyer can actually see evidence of the product's worth, few words are needed. However, there are a few additional selling points that may not be immediately evident to the customer. For instance: The physical design of a rotator-control unit does not detract from the beauty of the set and, in addition, does not take up as much space as the rabbit ears. John makes these points by comparing the two units as shown in Fig. 11.

Of course, the primary selling point for the system is the improved picture quality. While pointing out this advantage, John provides the customer with a brief, nontechnical description of the system's operation, showing how the picture is improved when the antenna is pointed in the right direction, etc., (Fig. 12).

At this point (only 10 to 15 minutes have elapsed since John asked if he could demonstrate the unit), the customer begins to ask questions about the price, warranty, how soon it can be installed, etc.

Since he carries on the truck the necessary parts and tools for a com-

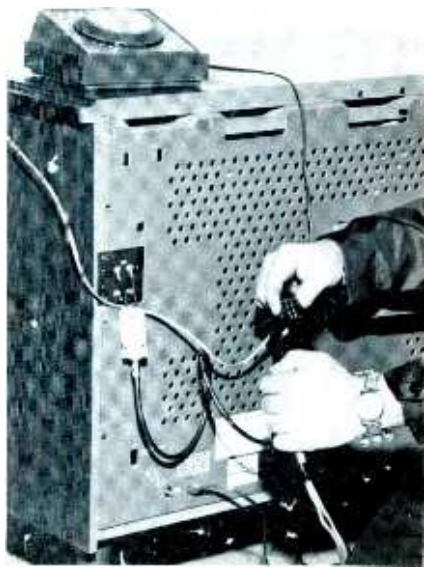


Fig. 10. Cable connections to receiver and antenna control unit.

Fig. 11. Comparing the rabbit ears and control unit.

Fig. 12 Explaining the operation of the system.

plete system, John is able to provide immediate installation if the customer is willing. Two out of ten sales are immediate installations, and one out of ten takes a day or two to think it over before giving him the go-ahead. Thus, John sells 30% of his direct contacts and, in addition, realizes another 10% from referrals.

All pricing is done on a package basis. Careful buying and pricing allows John a profit margin that is more than adequate to allow "dickering" when absolutely necessary.

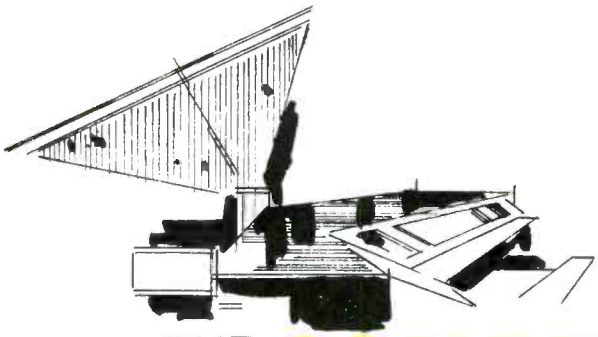
"You've Got To Sell Yourself"

John's approach to selling antenna systems is only one example of a progressive, forward-looking serviceman who realizes that everything he does reflects his professional integrity and ability. As John puts it, "You've got to sell yourself as well as the product and your ability to service it. In fact, many of the factors that seem far removed from the actual mechanics of repairing a set influence your customers' opinion of your professional ability. And what the public thinks of your ability and integrity is what determines your success today and tomorrow."

John does more than just talk about professional pride and integrity—he works at it every day. His personal appearance—clean uniform, white shirt, and usually a tie—portray self-pride and thoroughness, while his bearing and manner uphold the impression generated by his image. There are many other areas where a bit of extra effort makes the difference. For instance, the mobile telephone in his truck allows John to phone to the next customer between service calls (Fig. 13), giving the customer his exact time of arrival. John says, "This may seem like a lot of extra expense and trouble to some technicians, but to the customer it means courtesy and a few extra minutes to straighten up before a visitor arrives."

These little extras, along with the use of such sales devices as a mobile antenna system, have added up to success for John Crum. ▲

Fig. 13. The mobile telephone and two-way FM unit save time.



THE ELECTRONIC SCANNER

Radiation Survey Completed

The **Public Health Service** recently released the findings of its survey of 1124 color TV receivers in the Washington, D.C. area. Of the sample, 856 sets emitted "no measurable levels of X-radiation". However, 66 of the sets did have radiation in excess of recommended levels. These sets were all correctable by reduction of high voltage, replacement of tubes, or both. Sixteen of the sets with excessive radiation were found to be operating at 29 kv or higher.

Several other findings of the survey are worth mentioning. Line voltages measured in the surveyed homes varied from a low of 107 volts to a high of 129 volts. This would indicate that manufacturer's instructions concerning high-voltage adjustments should be closely followed. Nearly all manufacturers recommend different high-voltage settings according to the line voltage applied. Perhaps a voltage-adjustable transformer would be in order during these adjustments.

The most startling finding (to us) was the fact that, of the 66 sets which emitted excessive radiation, 24 had been serviced within 2 months prior to the survey. The average high-voltage reading of these 24 sets was 27.5 kv.

IESA Annual Meeting

A good time was had by all at the recent annual meeting of The **Indiana Electronic Service Association.** After an all-day business session, a banquet and dance was held. Morriss Finneburgh of Finco was the principal speaker at the banquet. Earlier in the day, Mr. Finneburgh had given a speech before a Chamber of Commerce meeting on the east coast, and then he flew to Fort Wayne, Indiana to address the IESA.

Following a party, which we understand lasted into the wee hours, IESA got back down to business and held their elections. Ed Reich of Indianapolis was elected president for the coming year, with vice-

time to live like normal human beings, will improve their facilities and function with more precision—these will be our most critical needs for some time to come. If this ideal, though perfectly logical condition, ever materialized I would like to be involved in arranging a manufacturer's dinner financed by us (no strings).

"The above relationship, fanciful as it may seem to many, could become a reality if you really believe strongly enough. Of course, a prospective manufacturer may hesitate to accept a courtesy trip on a ship with holes in it, so consider this a call for all hands on deck. Let's build a ship capable of weathering any storm, great enough to accommodate all dealers large or small, with such dignity as to attract guests from every phase of our industry."

Mergers & Expansions

Initial discussions relative to the acquisition of **Aerovox** by **Essex Wire Corporation,** have been announced by Walter F. Probst, chairman of the board and chief executive officer of Essex, and W. Myron Owen, Aerovox chairman of the board and president.

The transaction, subject to investigation and approval of the final form of agreement by the boards of both companies, involves the tax-free exchange of Aerovox stock for a new series of Essex Convertible Preferred Stock, with the usual exchange details.

presidencies going to Robert Drake, James Smith, and William Slickman.

A President's Editorial

Bob Lewis, president of TSA (Television Service Association) Michigan, recently published an editorial in their State association paper, *TSA News*. Though we don't entirely agree, it certainly is a message worth hearing. Here are some excerpts:

"Why should we, as small dealers, based on a long-standing lack of communications with the manufacturer, look upon him as something gigantic and capable of crushing us at any moment? Sure, he bought all the fancy dinners, conducted the fabulous trips, passed out the glittering premiums, furnished all the pretty signs (with his name on them), but never forget it—there were plenty of strings.

"Now the situation is different, for the manufacturer as well as us. He has his quality control problems, and we both have a very critical personnel problem.

"I think it's time that the manufacturer sat down with us on equal terms, showing proper respect and rationalizing our unique and vital positions as the only real public relations line—and certainly the ones to solve the mounting public clamor on poor quality in consumer products.

"It is a quite simple deduction that the service industry, properly paid, respected, and possessed of

Radio Watch Observes Anniversary

At the end of its first year, the Community Radio Watch program sponsored by the Communications Division of **Motorola, Inc.** has become America's largest and most widespread plan for encouraging citizen cooperation in the fight against crime.

Beginning with Cincinnati at the end of 1966, Community Radio Watch has been formally adopted by nearly 500 American cities and towns. Half the cities with population over 100,000 have enrolled in this crime-busting program, including Cleveland, Detroit, Long Beach, Philadelphia, San Francisco, and Washington, D.C. The program now reaches from Seattle, Washington to Miami, Florida and from Old Town, Maine to Honolulu, Hawaii.

Each locality enlists the cooperation of individuals and companies with two-way radio equipped vehicles, asking each driver to act as additional "eyes and ears" for the police. Drivers of trucks, buses, taxicabs, and other vehicles use their two-way radios to report crimes in progress, suspicious characters, dangerous situations such as gang gatherings, civil disorders, fires, accidents, and other emergency situations to their dispatchers. The dispatchers in turn relay the calls by telephone to the appropriate local authority: police, fire department, ambulance squad, and so on. ▲

Sidney L. Olson, President of **Olson Electronics,** reports his firm has merged with **Teledyne.** The merger was accomplished through an exchange of Olson and Teledyne stock.

Mr. Olson emphasized that relations with trade suppliers would not be changed in any way as a result of the merger. He also said the growth of the Company would be accelerated through new store openings and acquisitions.

Pearce-Simpson announced agreement in principle on a proposed merger with **Gladding Corporation,** South Otselic, New York, subject to certain conditions, including approval by shareholders.

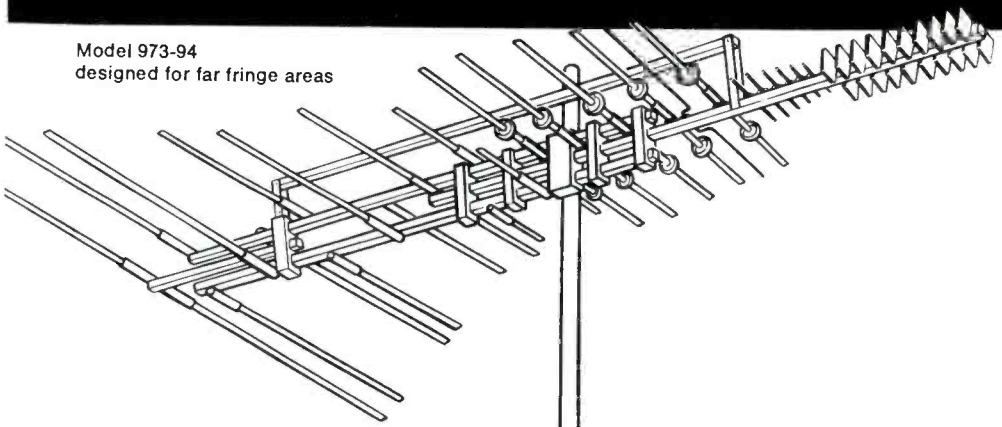
Antenna Sales Notes

In spite of the fact that most TV markets in the United States still have no UHF channels, 82-channel antennas are beginning to outsell VHF-only antennas, according to Harvey R. Brandt, Director of Marketing for **Gavin Instruments.**

Gavin, a major manufacturer of outdoor home TV antennas, reports that during January 1968, for the first time, sales of UHF/VHF antennas outstripped VHF-only antenna sales. "While I have no definite figures on this," said Mr. Brandt, "indications are that the entire antenna industry is very close to the cross-over point, it it has not already been reached."

The best TV deserves the best antenna!

Install a Zenith Quality-Engineered Antenna!



Model 973-94
designed for far fringe areas

Exciting Surprises
for You—
and Your Family!
Fun for all!
Get the details
at your Zenith
Distributor's
Parts Department.

These features help a Zenith outdoor antenna provide the superior reception that makes for satisfied customers:

- Capacitor coupled cap-electronic VHF dipoles.
- Tapered UHF grid driver.
- Staggered square UHF directors.
- Low-impedance, triple boom construction.

You can choose from twelve all-new Zenith VHF/UHF/FM or VHF/FM antennas. All are gold color alodized aluminum for better conductivity, greater corrosion resistance and longer service.

Ask your Zenith distributor for a *free* technical manual. He has charted the reception characteristics of your area, so he can recommend the best antenna for each installation.

FIFTIETH ANNIVERSARY 1918 50 1968 50 YEARS OF LEADERSHIP THROUGH QUALITY

BEST YEAR YET TO SELL THE BEST

ZENITH®

The quality goes in before the name goes on

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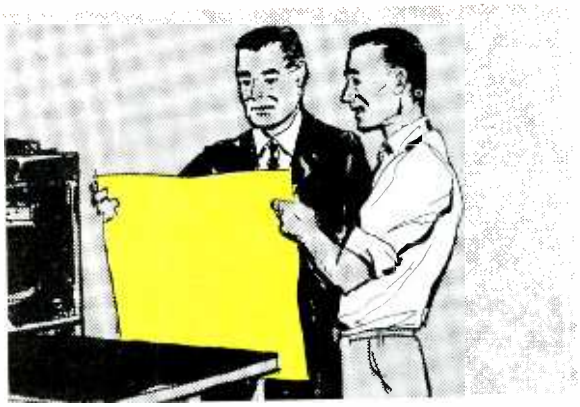
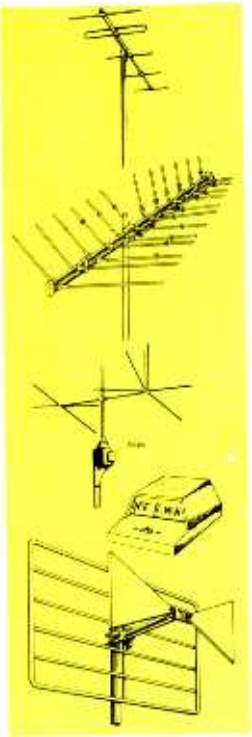


ANTENNA SYSTEMS

The wide variety of components available today make it possible to design an effective antenna system to meet any set of conditions.

by Lon Cantor



Suddenly, in the year 1968, antenna systems have become a very important part of the American home. This is due to several reasons. First, Americans are spending more and more time in front of their TV sets. Whether or not program quality has improved is a moot question. The fact is that we now spend the bulk of our non-working, awake time watching TV. And leisure time has increased to the point that U.S. homes are used more for TV viewing than any other activity except sleeping.

UHF and Color TV have each played a part of luring the American public back to TV. Since passage of the all-channel law in 1964, UHF channels have been going on the air at an amazing rate. A new UHF channel, with its promise of increased program variety, always heightens a community's TV consciousness. The coming of age of color TV has focused attention on TV screens and added another dimension to viewing.

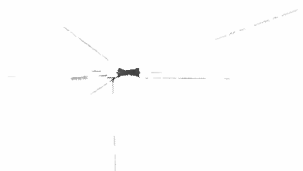


Fig. 1. Conical antenna for VHF.

At the same time that Americans have increased their TV viewing time, they are also spending more time listening to FM radio. The superb sound reproduction of FM stereo has made the FM receiver the most popular Hi-Fi component sold today. It seems that when we aren't sleeping or watching TV, we are probably listening to FM stereo.

All of which brings us back to the concept of home antenna systems. Color TV, UHF, and FM stereo all have one thing in common: They are hard to receive. People who got by with indoor antennas for monochrome VHF TV and monophonic FM, often find that they need outdoor antennas for color, UHF and FM stereo. And people who used outdoor antennas find that they need bigger and better units to pull in the wealth of entertainment signals now being broadcast.

This article will cover the criteria for choosing the right antenna for each installation; the types of antennas available for VHF, UHF and FM; and simple home antenna systems.

Selecting The Antenna

The antenna you choose for a specific installation depends upon a number of factors:

1. What channels do you want to receive?
2. Where are the channels located, and how strong are their signals?
3. What kind of interference is present?
4. How many sets will the antenna serve?

VHF Antennas

In the old days when only black-and-white was telecast, flying V and conicals (See Fig. 1) were very popular. These antennas are broadband and economical. They are not suitable for color, however, because they are not well matched to 300-ohm loads. This mismatch results in waves that are seen on the TV screen as color smears.

For a long time, Yagis were the most popular antenna for suburban and fringe areas. The Yagi is not only well matched to 300-ohm loads, but also provides high gain.

The concept of gain is not difficult to understand. We simply compare all antennas with a half-wave, folded dipole (see Fig. 2.). By itself, the half-wave dipole picks up signals from the front and the rear,

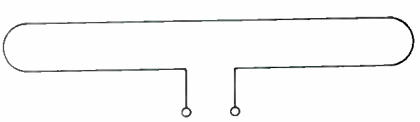
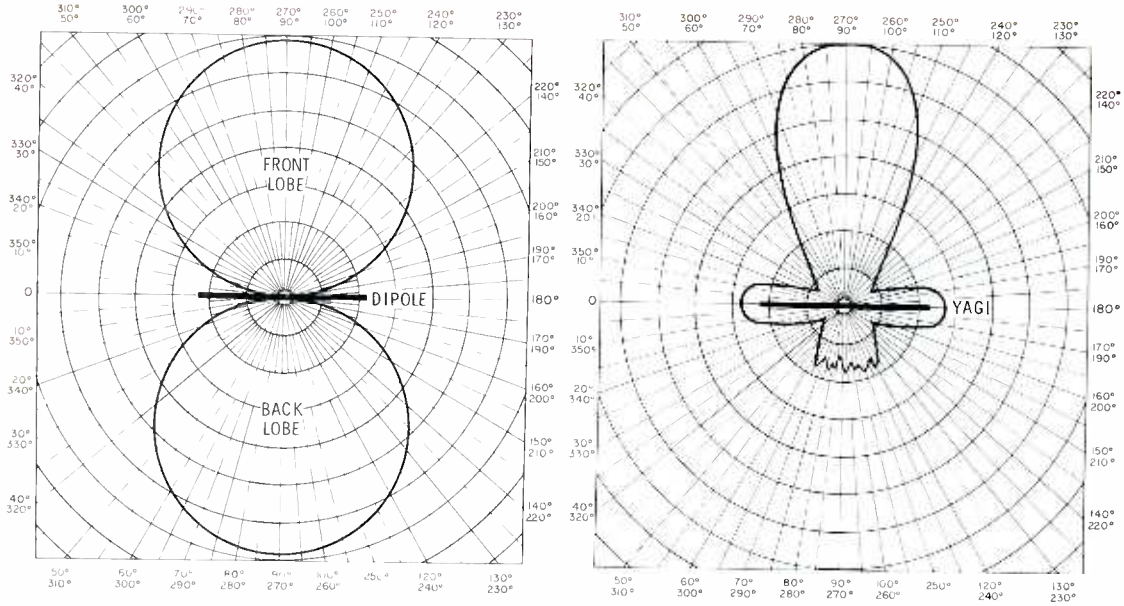


Fig. 2. A half-wave, folded dipole.



A. Dipole.

B. Yagi.

Fig. 3. Polar plots of typical antennas.

but not from the sides, as shown in Fig. 3A.

Normally, the back lobe is not only useless, but also undesireable. We can minimize the back lobe, increase pick-up in the forward direction, and narrow the forward lobe by adding antenna elements. The Yagi uses a combination of directors and reflectors. The directors focus the incoming signal on the dipole, and the reflectors reflect the signal back into the dipole. The result is a polar pattern like that shown in Fig. 3B. Not only is more signal picked up, but ghosts (from directions other than the one toward which the Yagi is aimed) are rejected.

The difference between the amount of signal picked up at a given location by a dipole and that picked up by the Yagi is the gain of the Yagi. For example, if the dipole picks up 500 microvolts and the Yagi picks up 1000 microvolts, the gain is said to be 6dB (6dB equals a voltage gain of 2).

Yagis were king of the reception world until color TV started to become popular. Then, it was discovered that the response of many Yagis (especially area specials) was not flat enough for good color reception. All antennas, of course, are sensitive to frequency. Most Yagis are deliberately designed to provide higher gain on the high channels than they do on the low channels to compensate for propagation differences.

It is essential, however, that the frequency response be flat within any given channel. A tilted response causes no problem on black-and-white TV, but it can play havoc with color; the color signals are shifted in phase, changing their hues. For best color reception, the response should be flat within $\pm$ 0.5 dB per channel.

One answer to flat frequency response is the log-periodic antenna, (Fig. 4). The log-periodic, as the name implies, uses elements spaced logarithmically. The elements are graduated in size, from short elements to large. Generally speaking, two or three elements resonate for each frequency.

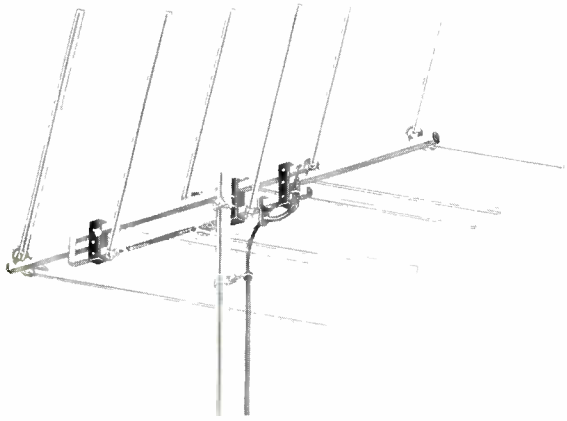


Fig. 4. V-type log-periodic antenna.

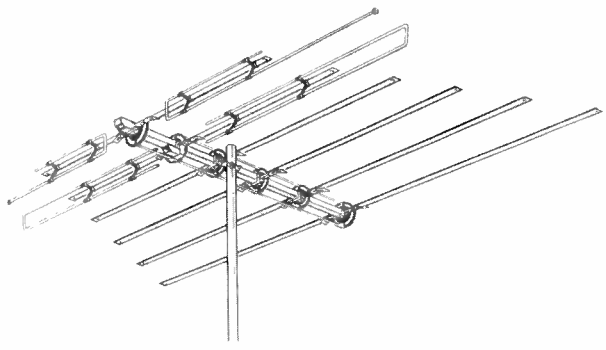


Fig. 5. Spaced-element log-periodic.

In its pure form, the VHF log-periodic would be very long and ungainly. Therefore, all log-periodic antenna manufacturers design the antenna so that certain elements do double duty. An element resonates simultaneously in the full or half-wavelength mode for one frequency and in the 3/2 wavelength mode for another frequency. Using this device, manufacturers have been able to pack a reasonable amount of gain into a log-periodic with boom length comparable to a Yagi.

However, resonance in the 3/2 wavelength mode does create a problem. The polar pattern of a 3/2 wavelength antenna exhibits some very undesirable side lobes. To solve this problem, manufacturers either "V" the antenna elements as in Fig. 4 or choose the spacing very carefully, as shown in Fig. 5. Both techniques minimize side lobes.

The log-periodic was definitely flatter in frequency response than the conventional Yagi, however, it was not as sensitive. Dollar-for-dollar, size-for-size, or number-of-elements for number-of-elements, you get considerably more gain with a Yagi. Still, flatness is usually more important than gain, and the log-periodic has gained wide acceptance because of this.

Recently, a new type of antenna has been introduced. It is claimed that the new V-Yagi design combines the gain of a Yagi with the flatness of a log-periodic.

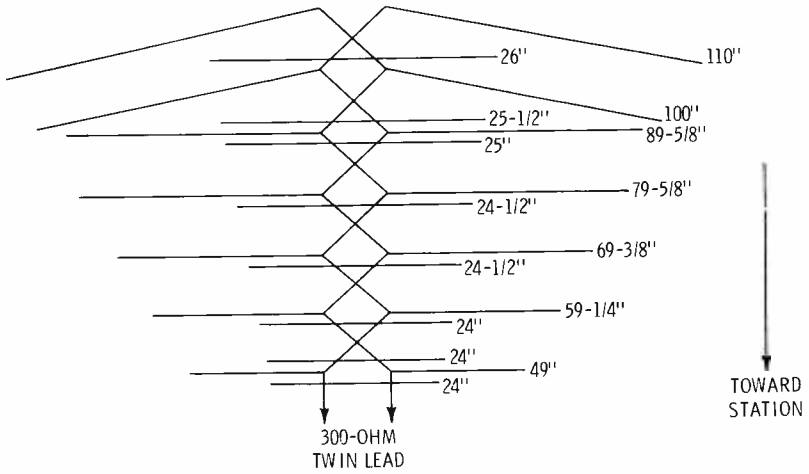


Fig. 6. V-type Yagi antenna.

Fig. 6 illustrates the principle of V-Yagi operation. The driven elements are from 49" to 110" in length. For each VHF frequency, there is a specific element whose length comes closest to the resonant length. For channel 2, the 89⅝" element absorbs the greatest signal power. In fact, the antenna shown provides 4.6 dB gain on channel 2. With the 89⅝" element removed, the gain would be −8.6 dB. However, adjacent elements also pick up significant amounts of signal, especially the 100" element.

Like the log-periodic, the V-Yagi operates in the 3/2 wavelength mode for some high-band VHF channels. For example, the 79⅝" element is cut for full wavelength resonance at channel 7 and the 3/2 wavelength mode at channel 9. To eliminate side lobes caused by 3/2 wavelength operation, the last two elements are swept forward in a V shape.

In addition to driven elements, the V-Yagi design also includes parasitic directors and reflectors, ranging in size from 24" to 26". These parasites provide little gain on low-band channels, but they improve high-band gain significantly.

In metropolitan areas, gain is no problem. If anything, there is too much signal. However, gain and directivity generally go hand-in-hand. And directivity is especially important in the city. Fig. 7 shows why.

The signal reflected from the tall building arrives at the antenna a little later than the direct signal. The result is a ghost or a smear, displaced slightly to the right. This ghost may be faint enough to be unnoticed on a b-w receiver, but in color it really stands out. Color ghosts actually introduce new, unwanted colors on the screen, and the eye is very sensitive to color changes.

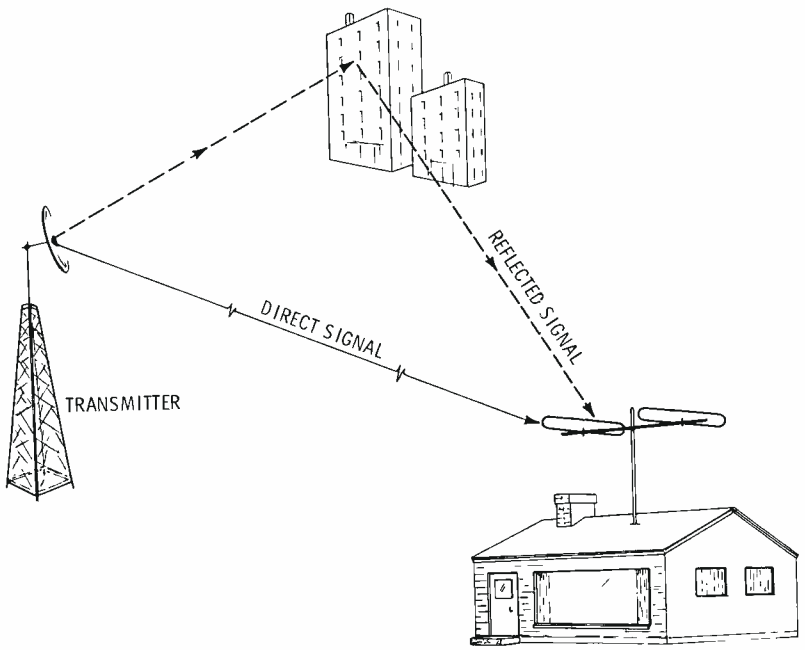


Fig. 7. Reflected signal causes ghost.

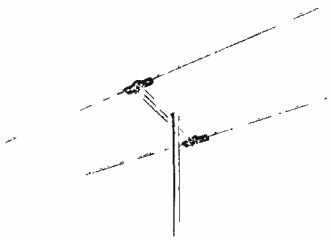


Fig. 8. Simple metropolitan antenna.

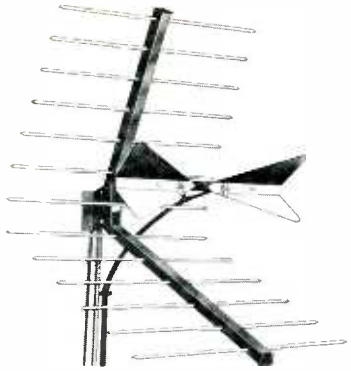


Fig. 9. UHF corner reflector.

You could use a high-gain, suburban-type antenna to eliminate city ghosts, but that would be like shooting ducks with a cannon. New metropolitan antennas such as that shown in Fig. 8 provide no gain (or a slightly negative gain). However, the two elements are phased so that signals from the front of the antenna add, while signals from the back cancel. Thus, side and back lobes are minimized.

UHF Antennas

Thus far, we've discussed only VHF antennas. Let us now consider U's. UHF stations are permitted to radiate three times as much output power as VHF stations, but they still can't send signals as far. Because of propagation factors, VHF signals can be picked up at almost twice the distance of UHF signals.

UHF, however, has several things in its favor. First, because wavelengths are so much shorter, antenna elements are also shorter. It is practical, therefore, to build exotic, multi-element UHF antennas capable of providing very high gain.

Second, UHF is more free from man-made interference than VHF. Thus, when you are within a reasonable distance of a UHF transmitter, you're likely to get superior picture quality.

Fig. 10. Typical all-channel antenna.

There are a wide variety of UHF antennas available, including Yagis and log-periodics. Because of the size factor, reflectors are also quite common in UHF antennas.

Bow-tie antennas with corner reflectors, such as that shown in Fig. 9, not only provide high gain, but excellent vertical capture area. This factor is vitally important at UHF, since a foot or two of height can make a tremendous difference in the amount of signal pickup. It would be impractical to build a VHF antenna of this type, because the antenna would be much too large to handle.

In addition to the corner reflector, there are a wide variety of other reflector-type UHF antennas, and all provide excellent reception. Some maufacturers make add-on kits for converting VHF-only antennas into 82-channel installations.

FM Antennas

FM stereo is related to monophonic FM in much the same way as color TV is related to monochrome. Like color, FM stereo requires an extra carrier that is detected in phase. By FCC regulation, an FM station can radiate no more power for FM stereo than for monophonic programs. In FM stereo two basic frequencies are involved, the stereo sum (left + right) and the stereo difference (left − right). The effective signal-to-noise ratio of an FM stereo broadcast fed into an FM stereo tuner is a full 20 dB worse than if the whole thing had been done

Fig. 11. Accessory divides incoming signal into VHF, UHF, and FM outputs.

in monophonic. All of this points up the fact that to receive stereo reception comparable to your monophonic reception, you need an antenna with about twice as much gain (6 dB).

Also, as in color TV, multi-path distortion problems are magnified by FM stereo. Reflected signals generally arrive out of phase, reducing the signal-to-noise ratio. The listener hears hash, squawks, and a reduction in the stereo separation. This is why many Hi-Fi enthusiasts have discarded their indoor loops of wire in favor of outdoor FM antennas. To get good FM reception, you need a Yagi or a log-periodic that is high in gain and very directive.

All Purpose Antennas

It would seem desirable that all of a home's reception requirements be put into a single antenna. Fig. 10 shows just such an antenna—designed for color, but performing well on black-and-white; pulling in both UHF and VHF channels; and doing a good job on FM stereo.

This type of all-purpose antenna is available from a number of manufacturers. Most combination antennas compromise in one area or another, so check the specifications carefully. Make sure the one you

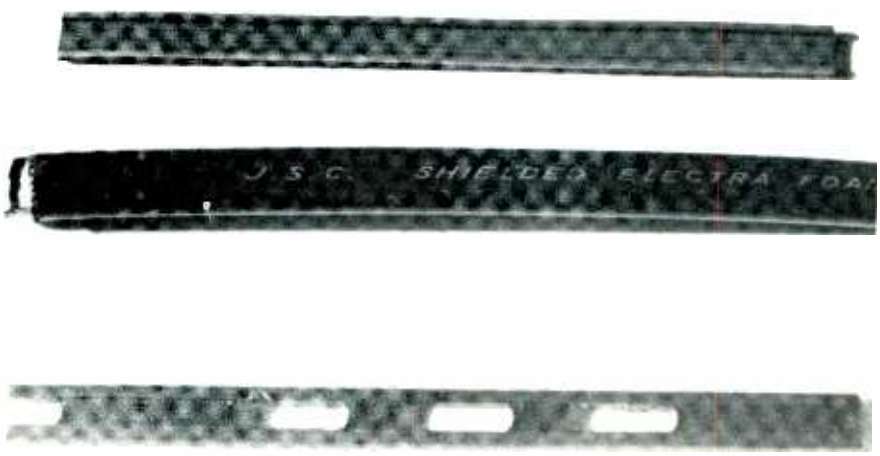


Fig. 12. Three types of lead-in.

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- Sharp directivity eliminates color ghosts
- Flat response (±1 dB per channel) for optimum color fidelity
- Exclusive bi-modal director system for extra gain
- Compact parasitic array permits quick installation

Paralog 300 Plus snaps together in short order and stays together.

New snap-on transformer (optional) converts Paralog 300 Plus to 75-ohm Coloraxial performance.

Combines low loss and unexcelled impedance match with quick, easy installation. Just snap it on the boom, push into contact with lead bolts, and screw down. New weatherproof connector . . . no cable fitting needed. Simply strip the cable, push into the transformer, and tighten.

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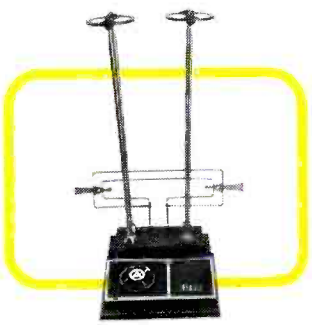
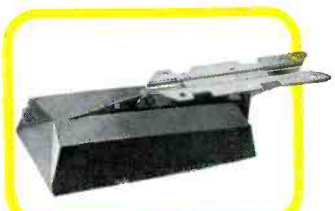
Paralog 300 Plus comes in 7 VIP models, for metropolitan to deep fringe areas, with list prices ranging from $15.95 to $79.95.

So pull in more profits with the VHF antenna that packs the most pull around. In signal reception. In customer reception. The Jerrold Paralog 300 Plus Antenna. See your Jerrold Distributor today or write Jerrold Electronics Corporation, Distributor Sales Division, P.O. Box A, Philadelphia, Pa. 19105.

**Model STO-82 also available with "F" fitting.*


Indoor antennas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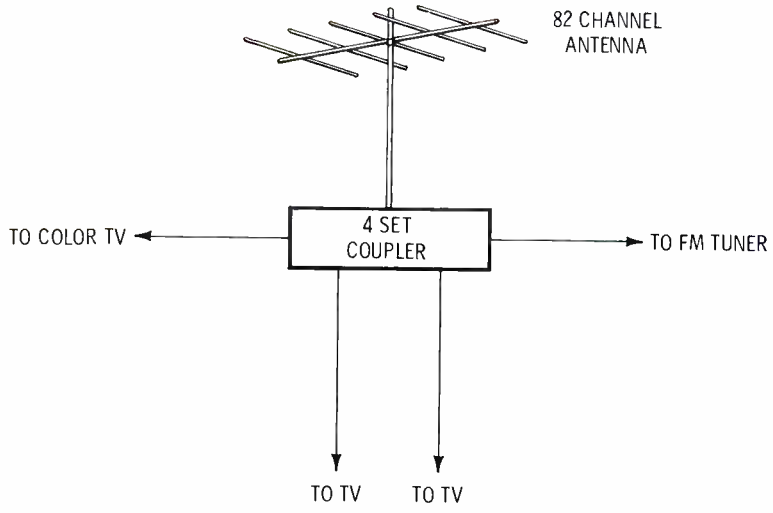


Fig. 13. 4-set coupler splits signal.

install will perform well on the desired frequencies.

Many installers use 82-channel antennas, even in VHF-only areas. This makes the systems they install relatively obsolescence-proof. No matter what new channels or FM stations come on the air, the all-channel antenna is capable of receiving it.

The early 82-channel antennas were simply a UHF Yagi or log-periodic stuck onto the front of a VHF antenna. Now, however, designs are made more efficient by integrating UHF and VHF elements so that they work together.

Signal Splitters

Today's TV sets have separate inputs for both UHF and VHF. However, the signal from an all-channel antenna is carried to the set over a single downlead. Fig. 11 shows a typical signal splitter, which provides separate outputs for UHF, VHF, and FM. Such splitters are often supplied free with an 82-channel antenna, but many make no provision for FM.

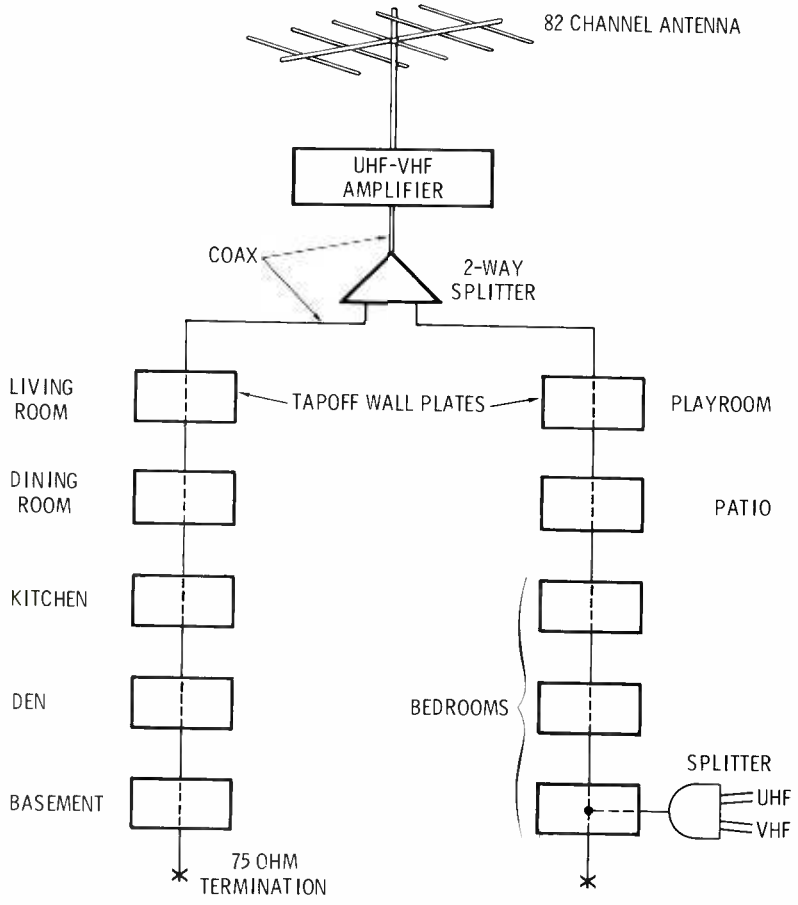


Fig. 14. Small master antenna (MATV) system.

Lead-In Wires

Two basic types of lead-in are commonly used in antenna systems, twin lead and coax. Twin lead is more common, but coax has gained in popularity since the advent of color. Coax has the advantage of being shielded. Therefore, it can be run anywhere—near electrical wiring, or through metal ducts—with no adverse effects on the signal. Also, coax keeps out interference.

The disadvantages of coax are that it has a different impedance than most antennas, and losses are high. Most home antennas and TV sets have 300-ohm impedance, while coax usually has a characteristic of 50 or 72 ohms. To use coax, matching transformers at the antenna and at the TV set are required. (72-ohm antennas are available from some manufacturers.)

Twin lead has been used for a long time and is still favored by many installers. Fig. 12 shows three varieties of twin lead: (top to bottom) flat, shielded foam-filled, and perforated. The best twin leads are rugged and moisture resistant. Shielded twin lead provides many of the advantages of coax, while perforated twin lead provides lower loss. Many twin leads burn readily, but some are flame retardant, and many installers consider this to be a very important characteristic. Don't skimp on twin lead quality. Remember, the transmission line is the only link between the antenna and the receiver. Cheap twin lead will crack and deteriorate within a few years.

The prime advantage of twin lead is low loss. If the installation includes UHF, losses through coax may be prohibitively high. The disadvantage of twin lead is that it must be run with great care. Proximity to any metal—even metal standoff insulators or staples—can

change the impedance and cause standing waves. Standing waves, as mentioned previously, show up on a TV screen as color smears.

Rotators

With the development of high-gain antennas, the need for rotators has increased considerably. Older type antennas had wide forward lobes. Thus, they were able to pick up channels over a fairly wide angle. Directivity, however, is directly proportional to gain. The higher the gain, the narrower the lobe.

Rotators are required for all-channel antennas, provided all channels are not telecast from the same direction. They can add significantly to the cost of the installation, and they can complicate multi-set systems; however, rotators do provide pinpoint orientation.

The only substitute for a rotator is two or more antennas aimed in different directions. If two antennas will do the job, and they can be mounted far enough apart to prevent interaction, this is an excellent solution. However, if more than two directions are involved, a rotator is usually the only practical answer.

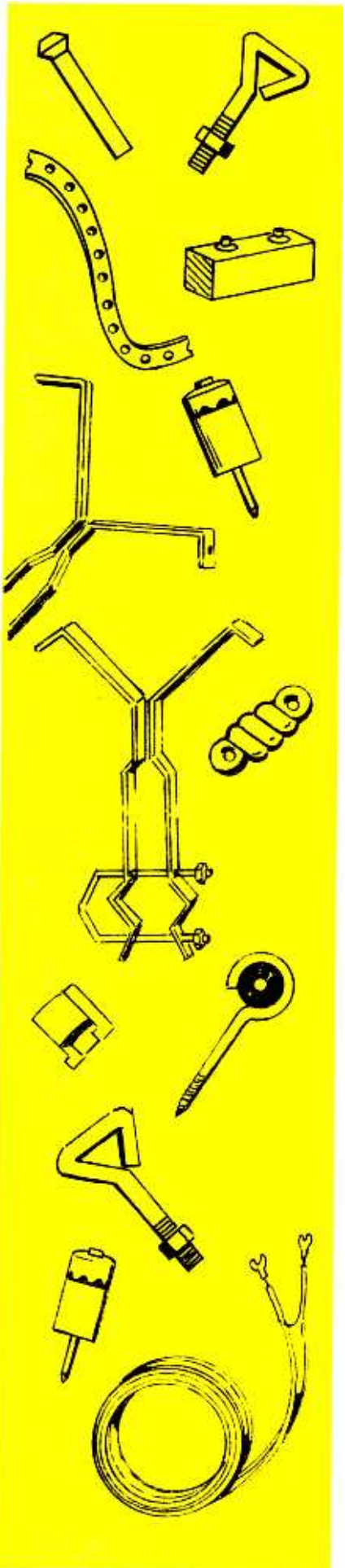
Multi-Set Systems

Most Americans today own two or more TV sets. It seems reasonable, therefore, to use one antenna to serve every set in the house.

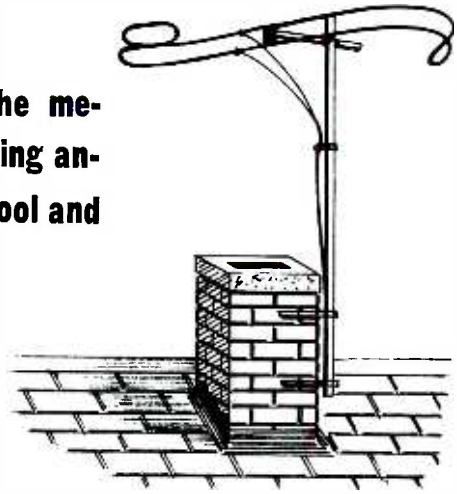
Fig. 13 shows the simplest way to do this, using a multi-set coupler. This coupler can be either 300-ohm, as shown in Fig. 11, or a 75-ohm unit.

In a weak signal area, a mast-mounted preamplifier can be used before the coupler. The preamplifier not only overcomes the losses caused by the coupler, but improves the system signal-to-noise ratio.

For many people, a four-set coupler is not enough. They want a TV antenna outlet in every room so that they can plug in a portable TV or FM stereo receiver anywhere in the house. This need can best be served by a profession home TV system such as that shown in Fig. 14. With a complete antenna system like this, the home is truly equipped to be an electronic entertainment center. ▲



INSTALLING ANTENNA SYSTEMS



A brief description of the mechanics involved in installing antennas, including special tool and material requirements.

by Ellsworth Ladyman

When installing an antenna system, there is one very important thing to remember: The customer is not buying an antenna, he is buying better reception. To attain better reception, the new system will have to provide an improvement over the old system. Improved reception by installing a new antenna is not automatic. A haphazard installation of even the best equipment on the market can result in lowered, rather than increased, signal strength.

Special Tools

There are a number of tools not normally found in an electronic technician's tool kit, that, although not absolutely necessary, will make a job go a lot smoother. Here are a few:

Compass

Provides a starting point for orientation procedures. Through the use of a compass you can point the antenna directly at the station. Then, if necessary, the antenna may be slightly turned to take every advantage of signal fluctuation.

Bit Extension

It will sometimes be necessary to drill a number of holes through walls as much as 12" thick. A drill bit of that length will have a tendency to snap if uneven pressure is applied. An extension provides much more strength.

Field Strength Meter

In difficult installations (fringe or ghosty areas) the field strength meter will help a lot in identifying main signals (as opposed to reflected signals), and also measure the signal strength. It can be used to prove or disprove the efficiency of the installation, and to isolate trouble by tracing the signal path from the antenna through the distribution system to the receiver.

Angle Drive Mechanism

If you have never layed on your stomach in an attic, or on your back in a crawl-space, trying to punch a hole through a pair of 2 x 4's at an angle, you probably won't appreciate a flexible angle drive tool. But the first time you try that little operation, you will purchase one.

Roof Pitch

You should have as many different colors of roof pitch as are available. It is absolutely necessary that you leave no possible chance of a roof leak. Damage from one leaking roof can consume the profits of many installations.

Patching Mortar

A small bag of ready-mix type mortar should be carried to seal holes in brick or cement.

Wood Filler

It is also necessary that you seal all holes in wood or frame.

Antenna Mounts

The type of mount used is usually dictated by the physical location, and personal preference by the customer.

Chimney Mount. (Fig. 1)

This is one of the most widely used mounts, its popularity stemming from ease of installation. A close inspection of the chimney should be made before installing the mount. Loose mortar, cracks, or other evidence of deterioration should be noted and brought to the customer's attention. In extreme cases, it may be necessary to point the chimney or have a stonemason effect the repair. You should proceed with the installation only when you are assured the chimney will withstand the added load. The actual mechanics of installing the mount are simple, and are usually covered by manufacturer's instructions packed with the hardware.

Roof Mount

If it has been decided that the antenna is to be mounted on the roof, and a tower is not to be used, some means must be provided to hold the base of the mast stationary. This base mounting can be a peak mount (Fig. 2), flat mount (Fig. 3), or of other physical characteristics. The type chosen will be determined both by mast height and location on the roof. For mast heights of 5′ to 10′, any of the lightweight, less expensive units will be satisfactory. For mast heights in excess of 10′, heavier units offering a more secure "foothold" should be used. The heavier mount should always be used in areas with a history of violent seasonal storms. Regardless of type chosen, the mechanics involved in installation are identical. Lag screws should be used in attaching the mount to the roof. They should be long enough to penetrate roofing material and roof decking, and bite deep enough into a rafter to provide a good strong connection.

Side Mounting Brackets

This type of mount works very well in older type homes. The low, sprawling construction, and wide roof overhang in the newer ranch styles precludes the use of side mounting brackets. Installation of side mounting brackets is simple, (Fig. 4) but the brackets must extend far enough to allow the mast to clear any existing roof overhang. Fig. 5 illustrates brackets for medium overhang.

The mounting brackets must be secured through the siding and into the wall studs of frame homes. Do not depend on the comparatively light and somewhat brittle wood siding to provide support for the mast and antenna, plus any accessories (rotors, amplifiers, etc.) that might be added. For stone or brick construction, drill holes in the mortar (use a ¼″ drill and carbide-tip bit), mount screw anchors in the holes, then secure the brackets firmly with lag screws.

Towers

Another method of antenna mounting is through the use of towers. Towers can be as short as 18″ (as in Fig. 6), or as tall as 100′, and the base of the tower can be mounted on a roof (same procedure as for other roof mounts) or on the ground. When the tower base is mounted at ground level, a cement footing should be poured to provide a base. Thickness of the footing will depend on the height of the tower. In general, the higher the tower, the more support the cement must provide. Tower installations are in the minority, due in part to cost and in part to requirements. In most of the urban areas of the nation, a good antenna properly installed, equipped with rotor, and extending approximately 5′ to 10′ above the average roof, will provide excellent reception. However, in many areas antenna height is of primary concern, and in these locales a tower installation may be best.

Masts

Masts normally used for FM and TV reception are either 5′ or 10′ in length. Telescopic types are available that extend from 10′ to 40′ in 10′ increments. Masts are available in varying degrees of weight; the type used should be selected according to height and support requirements. As you would expect, the longer the mast, the stronger it should be. Even if a 5′ mast is being used, and a heavy antenna and accessory equipment (rotors and amplifiers) are mounted, the stronger mast will be required.

Transmission Line

There are three widely used types of lead-in. Selection of the specific

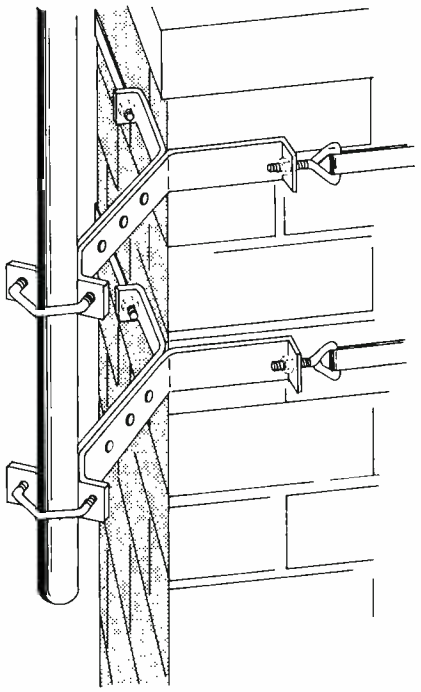


Fig. 1. Chimney mount is simple method of installation.

type best suited for a given installation is important. Selection of the proper lead-in should be made only after comparing the lead-in characteristics with the requirements of the reception anticipated, and climatic conditions inherent to the area. Further information about lead-in can be found in the article entitled "Facts about Lead-In" in this issue.

Running the Lead-In

You will probably never come across any two installations that can be done in the same way. Homes differ, people differ, and your own ideas change, but you can set up a few general rules that will prevent loss of time during installation, and

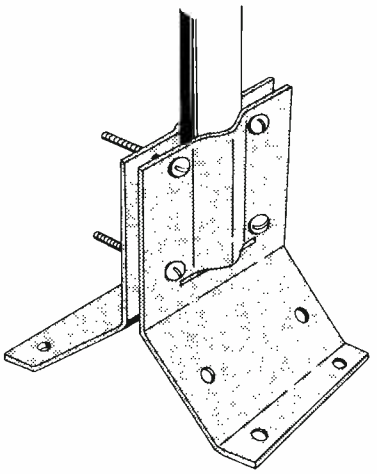


Fig. 2. Typical peak mount.

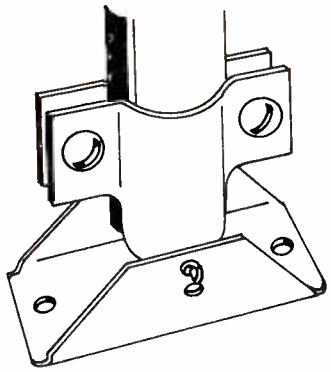


Fig. 3. Flat mount is adjustable.

perhaps avoid a call-back.

1. Make firm electrical and mechanical connections at the antenna terminals. Use connectors; do *not* chance a wire-wrap type connection.
2. Use the proper type stand-offs. These will vary (See Fig. 7), depending on type of roofiing material, type of transmission line used, and projections or overhangs you have to dress over.
3. Use enough stand-offs. Place mast stand-offs every 5′, and roof stand-offs every 4′ to 6′. Adequate stand-offs prevent damage to transmission line and "fluttery" reception.
4. Dress line over eaves, gutters, and drain pipes; do not allow the lead-in to touch or rest against anything. (Shielded lines excepted.)
5. If the installation is to include a rotor, allow enough slack in the lead-in for antenna rotation.
6. Make entry into the house as follows:
   A. If entry is through a brick wall, use a power drill (¼″ or ½″) and a carbide-tip bit. Remember, this hole must be filled and water tight after installing the lead-in, so make it big enough, but not oversized. When you drill through the exterior wall, you still have to drill through the air space and the inside wall. A bit extension can be used to continue the hole from the outside; if an extension is not available, a method must be devised to locate the point at which you will drill from the inside out. A long awl or pick will do this very well. Place the point of the pick in the center of the exterior hole, rap sharply with a hammer, and the pick will protrude on the inside.
   B. If entry is through wood siding, the same method as outlined in Step 6A will be used, substituting a steel bit for the carbide tip. The same precaution about hole size should be followed. After running the lead-in into structure, fill all holes. Use plastic wood for holes in wood siding, and patching mortar for holes in brick or stone walls.
7. Whether you made entry to the structure at the attic or the crawl-space, the next step is to run the lead-in to the point of entry near the receiver. If in a crawl space, attach the lead-in to the bottom of the floor joints; in an attic, run the lead-in across the top of the ceiling joists, and secure it in place with insulated staples or tacks.
8. The next step is to locate the position where the lead-in terminates; it can terminate in a wall directly behind a receiver, in a utility room at a distribution box, or in a two- or four-set coupler in the crawl-space or attic. If a coupler is installed at this point, further runs along floor or ceiling joints must be made to the various points of entry to the final terminations.
9. Running the lead-in down inside an interior wall to an outlet connection can present a multitude of problems. The best method for becoming proficient at this is through experience. Some special tools you will find useful for this are:
   A. Right angle drill drive for your power drill.
   B. Drill extenders.
   C. Electrician's fish-tape.
10. When the lead-in is run through an interior wall, always terminate in a wall connector. Several types are available, and you should be able to match the decor of most homes. Stripping the lead-in and making a direct connection to the receiver input terminals may be adequate, but it won't help your "word of mouth" advertising a bit.

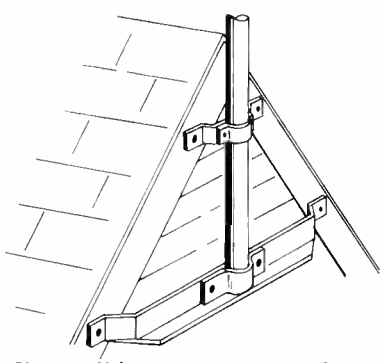


Fig. 4. Side mount is versatile.

Installing Antenna

The following is a typical step-by-step procedure for the installation of an antenna, using a 5′ mast, base or foot mount, guy wires, rotor, and feeding four receivers through a four-set coupler.

1. Attach the rotator near the top edge of the main mast.
2. Attach a length of from 2′ to 4′ of mast to the rotator.
3. Affix antenna to the top of the mast projecting from the rotator.
4. Mount a guy wire ring just below the bottom of the rotator.
5. Install the base mount on the roof. Be sure the retaining screws are imbedded in roof rafters.
6. Install guy wire anchors (screw eyes). These should be 120° apart in a circle around the antenna base. Make sure the anchors are going into rafters. Decking just won't hold under extreme weather conditions.
7. Attach stand-offs for rotor cable and lead-in. Orient the stand-offs for maximum separation of rotor wire and lead-in.
8. Attach the rotor cable to the rotator terminals, and the lead-in wire to the antenna terminals. Allow enough slack in each line to insure 360 degress rotation, then route the rotor and lead-in cables through the mast stand-offs.

Fig. 8. Pulling the cable from the storage reel.

Fig. 9. Elevating the antenna, one section at a time.

ways do—I show him that a good antenna system can transform his poor-quality color picture into the one he expected to receive when he bought the set."

Once John has the go-ahead from the customer, little more than 5 minutes elapses before he has the mobile antenna system connected to the set. Setting up the system involves the following steps: First, John pulls enough cable from the storage reel to reach from the truck to the TV receiver (Fig. 8). As he pulls the cable from the reel, he coils it up in his hand. Then, he "plays out" the cable as he walks from the truck to the house; when he reaches the house, he drops the remaining cable on the porch or inside the door. In this way, the cable that will actually be in the house is kept clean. Next, he returns to the truck, climbs atop it, and quickly raises the antenna masts to the desired height, one section at a time as shown in Fig. 9. Each section is secured in position by tightening a set screw on a clamping ring around the mast section. Once the mast is extended, the rotator and antenna cables are connected to their respective house cables via the storage reel, as shown in Fig. 6. Before returning to the house, John makes sure the antenna is facing directly north to match the setting of the rotator control unit. (In other words, the rotator and rotator-control unit are synchronized.)

John returns to the house carrying the rotator-control unit, a balun coil to match the set to the 75-ohm coax, and a short cable assembly to connect the rotator-control unit and television to their respective cables via a Jones plug. Fig. 5 provides an illustrated drawing of the cable assembly, and Fig. 10 is a photograph of the actual installation.

Once the cables are connected, and the rotator unit is plugged into a wall socket, the mobile antenna system is ready to provide first-hand proof of what a good antenna system can do for the picture on any color receiver. When the potential buyer can actually see evidence of the product's worth, few words are needed. However, there are a few additional selling points that may not be immediately evident to the customer. For instance: The physical design of a rotator-control unit does not detract from the beauty of the set and, in addition, does not take up as much space as the rabbit ears. John makes these points by comparing the two units as shown in Fig. 11.

Of course, the primary selling point for the system is the improved picture quality. While pointing out this advantage, John provides the customer with a brief, nontechnical description of the system's operation, showing how the picture is improved when the antenna is pointed in the right direction, etc., (Fig. 12).

At this point (only 10 to 15 minutes have elapsed since John asked if he could demonstrate the unit), the customer begins to ask questions about the price, warranty, how soon it can be installed, etc.

Since he carries on the truck the necessary parts and tools for a com-

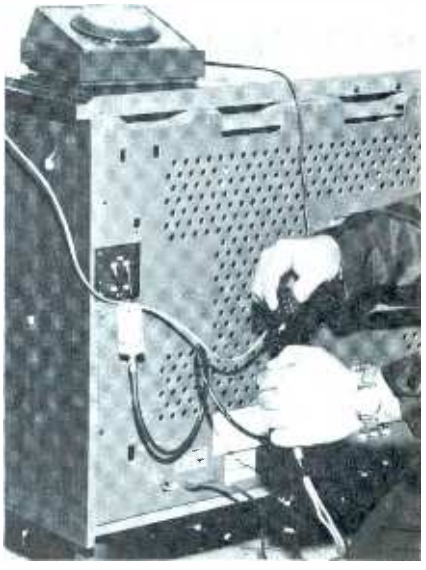


Fig. 10. Cable connections to receiver and antenna control unit.

Fig. 11. Comparing the rabbit ears and control unit.

Fig. 12 Explaining the operation of the system.

plete system, John is able to provide immediate installation if the customer is willing. Two out of ten sales are immediate installations, and one out of ten takes a day or two to think it over before giving him the go-ahead. Thus, John sells 30% of his direct contacts and, in addition, realizes another 10% from referrals.

All pricing is done on a package basis. Careful buying and pricing allows John a profit margin that is more than adequate to allow "dickering" when absolutely necessary.

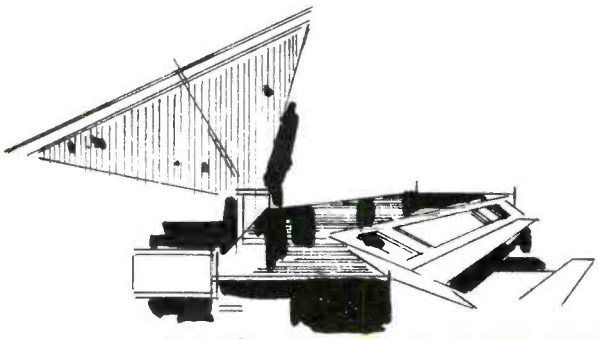
"You've Got To Sell Yourself"

John's approach to selling antenna systems is only one example of a progressive, forward-looking serviceman who realizes that everything he does reflects his professional integrity and ability. As John puts it, "You've got to sell yourself as well as the product and your ability to service it. In fact, many of the factors that seem far removed from the actual mechanics of repairing a set influence your customers' opinion of your professional ability. And what the public thinks of your ability and integrity is what determines your success today and tomorrow."

John does more than just talk about professional pride and integrity—he works at it every day. His personal appearance—clean uniform, white shirt, and usually a tie—portray self-pride and thoroughness, while his bearing and manner uphold the impression generated by his image. There are many other areas where a bit of extra effort makes the difference. For instance, the mobile telephone in his truck allows John to phone to the next customer between service calls (Fig. 13), giving the customer his exact time of arrival. John says, "This may seem like a lot of extra expense and trouble to some technicians, but to the customer it means courtesy and a few extra minutes to straighten up before a visitor arrives."

These little extras, along with the use of such sales devices as a mobile antenna system, have added up to success for John Crum. ▲

Fig. 13. The mobile telephone and two-way FM unit save time.



THE ELECTRONIC SCANNER

Radiation Survey Completed

The **Public Health Service** recently released the findings of its survey of 1124 color TV receivers in the Washington, D.C. area. Of the sample, 856 sets emitted "no measurable levels of X-radiation". However, 66 of the sets did have radiation in excess of recommended levels. These sets were all correctable by reduction of high voltage, replacement of tubes, or both. Sixteen of the sets with excessive radiation were found to be operating at 29 kv or higher.

Several other findings of the survey are worth mentioning. Line voltages measured in the surveyed homes varied from a low of 107 volts to a high of 129 volts. This would indicate that manufacturer's instructions concerning high-voltage adjustments should be closely followed. Nearly all manufacturers recommend different high-voltage settings according to the line voltage applied. Perhaps a voltage-adjustable transformer would be in order during these adjustments.

The most startling finding (to us) was the fact that, of the 66 sets which emitted excessive radiation, 24 had been serviced within 2 months prior to the survey. The average high-voltage reading of these 24 sets was 27.5 kv.

IESA Annual Meeting

A good time was had by all at the recent annual meeting of The **Indiana Electronic Service Association.** After an all-day business session, a banquet and dance was held. Morriss Finneburgh of Finco was the principal speaker at the banquet. Earlier in the day, Mr. Finneburgh had given a speech before a Chamber of Commerce meeting on the east coast, and then he flew to Fort Wayne, Indiana to address the IESA.

Following a party, which we understand lasted into the wee hours, IESA got back down to business and held their elections. Ed Reich of Indianapolis was elected president for the coming year, with vice-

time to live like normal human beings, will improve their facilities and function with more precision—these will be our most critical needs for some time to come. If this ideal, though perfectly logical condition, ever materialized I would like to be involved in arranging a manufacturer's dinner financed by us (no strings).

"The above relationship, fanciful as it may seem to many, could become a reality if you really believe strongly enough. Of course, a prospective manufacturer may hesitate to accept a courtesy trip on a ship with holes in it, so consider this a call for all hands on deck. Let's build a ship capable of weathering any storm, great enough to accommodate all dealers large or small, with such dignity as to attract guests from every phase of our industry."

Mergers & Expansions

Initial discussions relative to the acquisition of **Aerovox** by **Essex Wire Corporation,** have been announced by Walter F. Probst, chairman of the board and chief executive officer of Essex, and W. Myron Owen, Aerovox chairman of the board and president.

The transaction, subject to investigation and approval of the final form of agreement by the boards of both companies, involves the tax-free exchange of Aerovox stock for a new series of Essex Convertible Preferred Stock, with the usual exchange details.

presidencies going to Robert Drake, James Smith, and William Slickman.

A President's Editorial

Bob Lewis, president of TSA (Television Service Association) Michigan, recently published an editorial in their State association paper, *TSA News*. Though we don't entirely agree, it certainly is a message worth hearing. Here are some excerpts:

"Why should we, as small dealers, based on a long-standing lack of communications with the manufacturer, look upon him as something gigantic and capable of crushing us at any moment? Sure, he bought all the fancy dinners, conducted the fabulous trips, passed out the glittering premiums, furnished all the pretty signs (with his name on them), but never forget it—there were plenty of strings.

"Now the situation is different, for the manufacturer as well as us. He has his quality control problems, and we both have a very critical personnel problem.

"I think it's time that the manufacturer sat down with us on equal terms, showing proper respect and rationalizing our unique and vital positions as the only real public relations line—and certainly the ones to solve the mounting public clamor on poor quality in consumer products.

"It is a quite simple deduction that the service industry, properly paid, respected, and possessed of

Radio Watch Observes Anniversary

At the end of its first year, the Community Radio Watch program sponsored by the Communications Division of **Motorola, Inc.** has become America's largest and most widespread plan for encouraging citizen cooperation in the fight against crime.

Beginning with Cincinnati at the end of 1966, Community Radio Watch has been formally adopted by nearly 500 American cities and towns. Half the cities with population over 100,000 have enrolled in this crime-busting program, including Cleveland, Detroit, Long Beach, Philadelphia, San Francisco, and Washington, D.C. The program now reaches from Seattle, Washington to Miami, Florida and from Old Town, Maine to Honolulu, Hawaii.

Each locality enlists the cooperation of individuals and companies with two-way radio equipped vehicles, asking each driver to act as additional "eyes and ears" for the police. Drivers of trucks, buses, taxicabs, and other vehicles use their two-way radios to report crimes in progress, suspicious characters, dangerous situations such as gang gatherings, civil disorders, fires, accidents, and other emergency situations to their dispatchers. The dispatchers in turn relay the calls by telephone to the appropriate local authority: police, fire department, ambulance squad, and so on. ▲

Sidney L. Olson, President of **Olson Electronics,** reports his firm has merged with **Teledyne.** The merger was accomplished through an exchange of Olson and Teledyne stock.

Mr. Olson emphasized that relations with trade suppliers would not be changed in any way as a result of the merger. He also said the growth of the Company would be accelerated through new store openings and acquisitions.

Pearce-Simpson announced agreement in principle on a proposed merger with **Gladding Corporation,** South Otselic, New York, subject to certain conditions, including approval by shareholders.

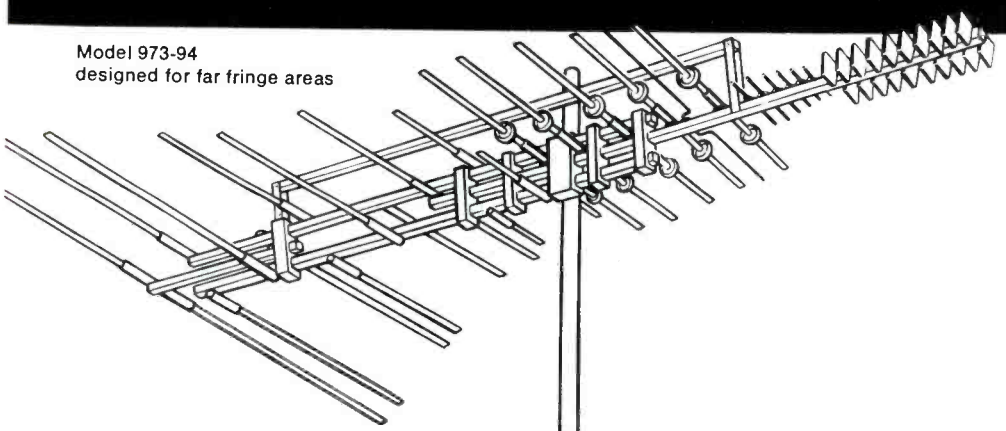
Antenna Sales Notes

In spite of the fact that most TV markets in the United States still have no UHF channels, 82-channel antennas are beginning to outsell VHF-only antennas, according to Harvey R. Brandt, Director of Marketing for **Gavin Instruments.**

Gavin, a major manufacturer of outdoor home TV antennas, reports that during January 1968, for the first time, sales of UHF/VHF antennas outstripped VHF-only antenna sales. "While I have no definite figures on this," said Mr. Brandt, "indications are that the entire antenna industry is very close to the cross-over point, it it has not already been reached."

The best TV deserves the best antenna!

Install a Zenith Quality-Engineered Antenna!



Model 973-94
designed for far fringe areas

Exciting Surprises
for You—
and Your Family!
Fun for all!
Get the details
at your Zenith
Distributor's
Parts Department.

These features help a Zenith outdoor antenna provide the superior reception that makes for satisfied customers:

- Capacitor coupled cap-electronic VHF dipoles.
- Tapered UHF grid driver.
- Staggered square UHF directors.
- Low-impedance, triple boom construction.

You can choose from twelve all-new Zenith VHF/UHF/FM or VHF/FM antennas. All are gold color alodized aluminum for better conductivity, greater corrosion resistance and longer service.

Ask your Zenith distributor for a *free* technical manual. He has charted the reception characteristics of your area, so he can recommend the best antenna for each installation.

FIFTIETH ANNIVERSARY 50 1918 1968 50 YEARS OF LEADERSHIP THROUGH QUALITY

BEST YEAR YET TO SELL THE BEST

ZENITH®

The quality goes in before the name goes on

Circle 8 on literature card

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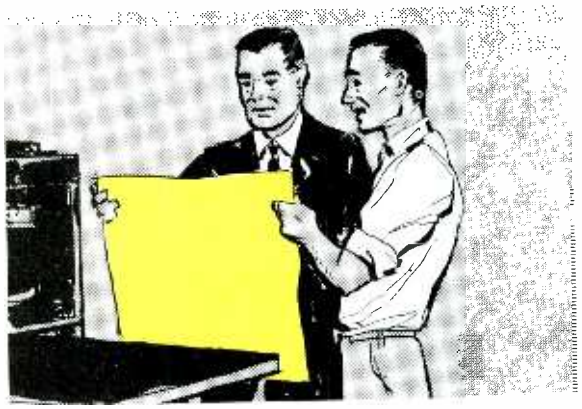
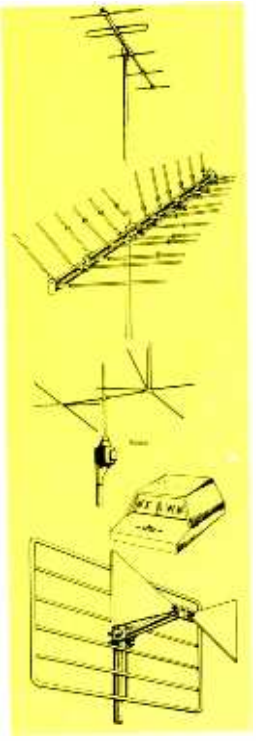


ANTENNA SYSTEMS

The wide variety of components available today make it possible to design an effective antenna system to meet any set of conditions.

by Lon Cantor



Suddenly, in the year 1968, antenna systems have become a very important part of the American home. This is due to several reasons. First, Americans are spending more and more time in front of their TV sets. Whether or not program quality has improved is a moot question. The fact is that we now spend the bulk of our non-working, awake time watching TV. And leisure time has increased to the point that U.S. homes are used more for TV viewing than any other activity except sleeping.

UHF and Color TV have each played a part of luring the American public back to TV. Since passage of the all-channel law in 1964, UHF channels have been going on the air at an amazing rate. A new UHF channel, with its promise of increased program variety, always heightens a community's TV consciousness. The coming of age of color TV has focused attention on TV screens and added another dimension to viewing.

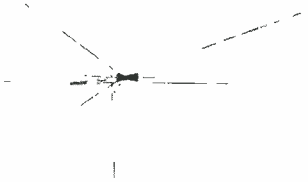


Fig. 1. Conical antenna for VHF.

At the same time that Americans have increased their TV viewing time, they are also spending more time listening to FM radio. The superb sound reproduction of FM stereo has made the FM receiver the most popular Hi-Fi component sold today. It seems that when we aren't sleeping or watching TV, we are probably listening to FM stereo.

All of which brings us back to the concept of home antenna systems. Color TV, UHF, and FM stereo all have one thing in common: They are hard to receive. People who got by with indoor antennas for monochrome VHF TV and monophonic FM, often find that they need outdoor antennas for color, UHF and FM stereo. And people who used outdoor antennas find that they need bigger and better units to pull in the wealth of entertainment signals now being broadcast.

This article will cover the criteria for choosing the right antenna for each installation; the types of antennas available for VHF, UHF and FM; and simple home antenna systems.

Selecting The Antenna

The antenna you choose for a specific installation depends upon a number of factors:

1. What channels do you want to receive?
2. Where are the channels located, and how strong are their signals?
3. What kind of interference is present?
4. How many sets will the antenna serve?

VHF Antennas

In the old days when only black-and-white was telecast, flying V and conicals (See Fig. 1) were very popular. These antennas are broadband and economical. They are not suitable for color, however, because they are not well matched to 300-ohm loads. This mismatch results in waves that are seen on the TV screen as color smears.

For a long time, Yagis were the most popular antenna for suburban and fringe areas. The Yagi is not only well matched to 300-ohm loads, but also provides high gain.

The concept of gain is not difficult to understand. We simply compare all antennas with a half-wave, folded dipole (see Fig. 2.). By itself, the half-wave dipole picks up signals from the front and the rear,

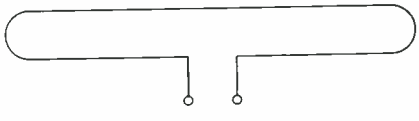
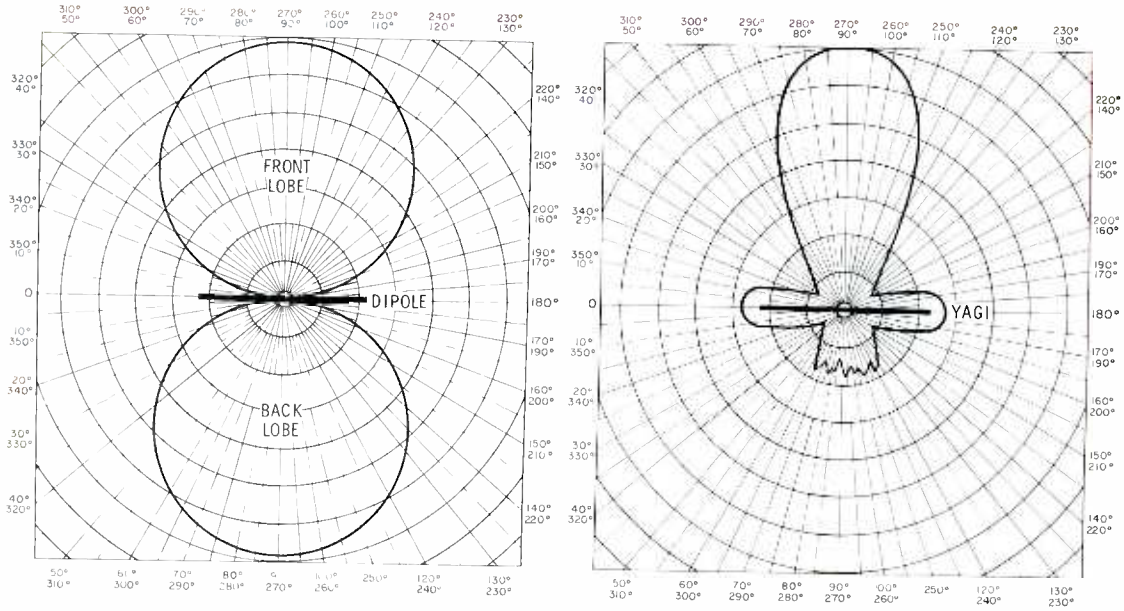


Fig. 2. A half-wave, folded dipole.



A. Dipole.

B. Yagi.

Fig. 3. Polar plots of typical antennas.

but not from the sides, as shown in Fig. 3A.

Normally, the back lobe is not only useless, but also undesireable. We can minimize the back lobe, increase pick-up in the forward direction, and narrow the forward lobe by adding antenna elements. The Yagi uses a combination of directors and reflectors. The directors focus the incoming signal on the dipole, and the reflectors reflect the signal back into the dipole. The result is a polar pattern like that shown in Fig. 3B. Not only is more signal picked up, but ghosts (from directions other than the one toward which the Yagi is aimed) are rejected.

The difference between the amount of signal picked up at a given location by a dipole and that picked up by the Yagi is the gain of the Yagi. For example, if the dipole picks up 500 microvolts and the Yagi picks up 1000 microvolts, the gain is said to be 6dB (6dB equals a voltage gain of 2).

Yagis were king of the reception world until color TV started to become popular. Then, it was discovered that the response of many Yagis (especially area specials) was not flat enough for good color reception. All antennas, of course, are sensitive to frequency. Most Yagis are deliberately designed to provide higher gain on the high channels than they do on the low channels to compensate for propagation differences.

It is essential, however, that the frequency response be flat within any given channel. A tilted response causes no problem on black-and-white TV, but it can play havoc with color; the color signals are shifted in phase, changing their hues. For best color reception, the response should be flat within $\pm$ 0.5 dB per channel.

One answer to flat frequency response is the log-periodic antenna, (Fig. 4). The log-periodic, as the name implies, uses elements spaced logarithmically. The elements are graduated in size, from short elements to large. Generally speaking, two or three elements resonate for each frequency.

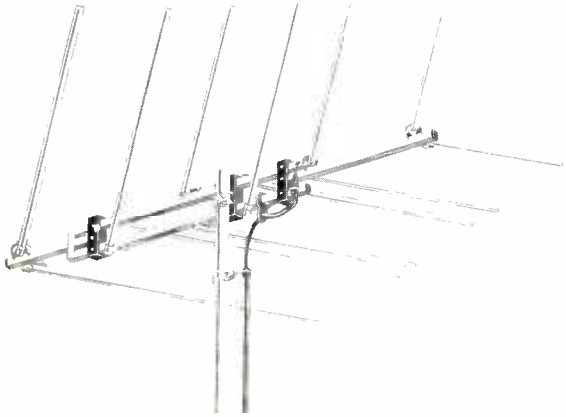


Fig. 4. V-type log-periodic antenna.

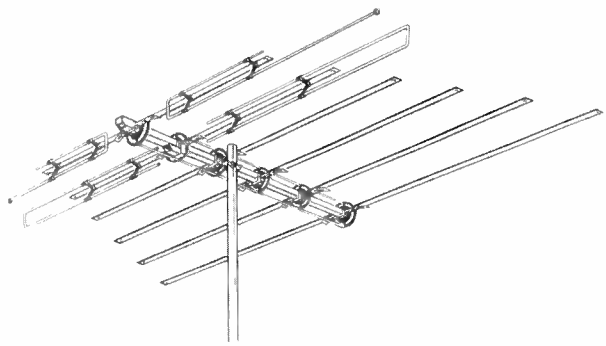


Fig. 5. Spaced-element log-periodic.

In its pure form, the VHF log-periodic would be very long and ungainly. Therefore, all log-periodic antenna manufacturers design the antenna so that certain elements do double duty. An element resonates simultaneously in the full or half-wavelength mode for one frequency and in the 3/2 wavelength mode for another frequency. Using this device, manufacturers have been able to pack a reasonable amount of gain into a log-periodic with boom length comparable to a Yagi.

However, resonance in the 3/2 wavelength mode does create a problem. The polar pattern of a 3/2 wavelength antenna exhibits some very undesirable side lobes. To solve this problem, manufacturers either "V" the antenna elements as in Fig. 4 or choose the spacing very carefully, as shown in Fig. 5. Both techniques minimize side lobes.

The log-periodic was definitely flatter in frequency response than the conventional Yagi, however, it was not as sensitive. Dollar-for-dollar, size-for-size, or number-of-elements for number-of-elements, you get considerably more gain with a Yagi. Still, flatness is usually more important than gain, and the log-periodic has gained wide acceptance because of this.

Recently, a new type of antenna has been introduced. It is claimed that the new V-Yagi design combines the gain of a Yagi with the flatness of a log-periodic.

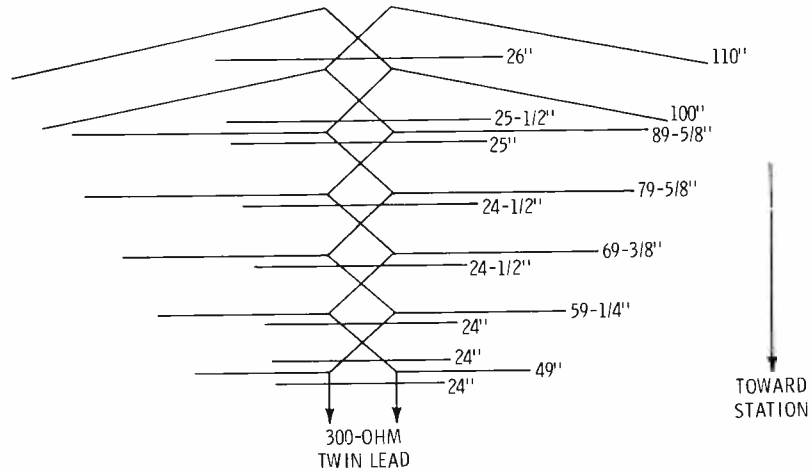


Fig. 6. V-type Yagi antenna.

Fig. 6 illustrates the principle of V-Yagi operation. The driven elements are from 49" to 110" in length. For each VHF frequency, there is a specific element whose length comes closest to the resonant length. For channel 2, the 89⅝" element absorbs the greatest signal power. In fact, the antenna shown provides 4.6 dB gain on channel 2. With the 89⅝" element removed, the gain would be −8.6 dB. However, adjacent elements also pick up significant amounts of signal, especially the 100" element.

Like the log-periodic, the V-Yagi operates in the 3/2 wavelength mode for some high-band VHF channels. For example, the 79⅝" element is cut for full wavelength resonance at channel 7 and the 3/2 wavelength mode at channel 9. To eliminate side lobes caused by 3/2 wavelength operation, the last two elements are swept forward in a V shape.

In addition to driven elements, the V-Yagi design also includes parasitic directors and reflectors, ranging in size from 24" to 26". These parasites provide little gain on low-band channels, but they improve high-band gain significantly.

In metropolitan areas, gain is no problem. If anything, there is too much signal. However, gain and directivity generally go hand-in-hand. And directivity is especially important in the city. Fig. 7 shows why.

The signal reflected from the tall building arrives at the antenna a little later than the direct signal. The result is a ghost or a smear, displaced slightly to the right. This ghost may be faint enough to be unnoticed on a b-w receiver, but in color it really stands out. Color ghosts actually introduce new, unwanted colors on the screen, and the eye is very sensitive to color changes.

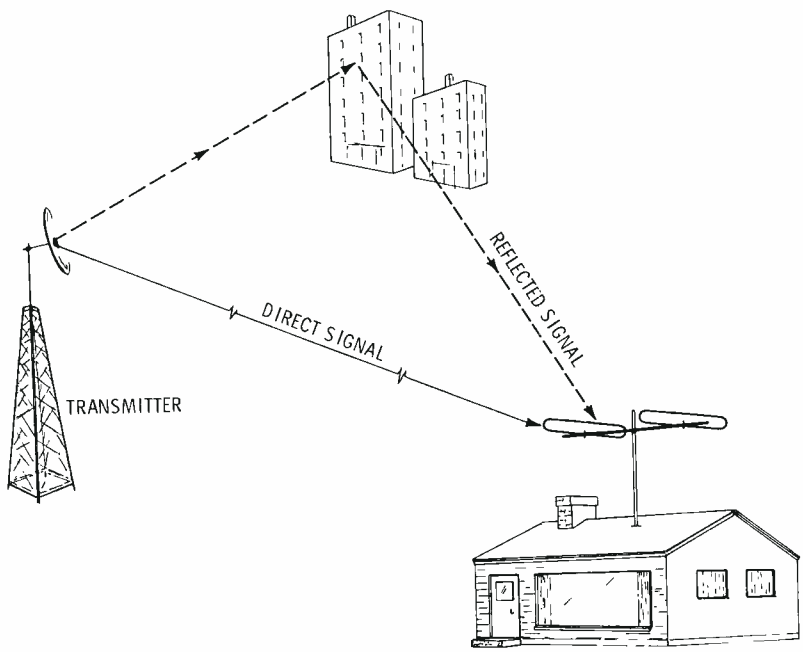


Fig. 7. Reflected signal causes ghost.

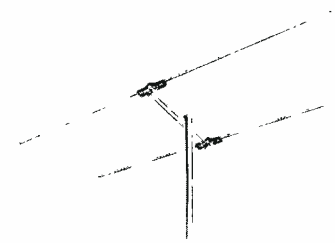


Fig. 8. Simple metropolitan antenna.

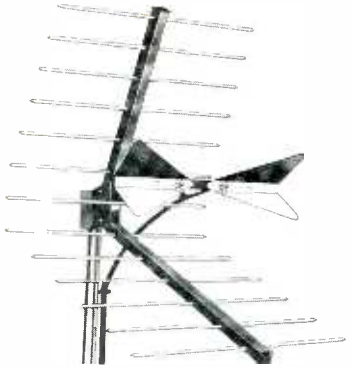


Fig. 9. UHF corner reflector.

You could use a high-gain, suburban-type antenna to eliminate city ghosts, but that would be like shooting ducks with a cannon. New metropolitan antennas such as that shown in Fig. 8 provide no gain (or a slightly negative gain). However, the two elements are phased so that signals from the front of the antenna add, while signals from the back cancel. Thus, side and back lobes are minimized.

UHF Antennas

Thus far, we've discussed only VHF antennas. Let us now consider U's. UHF stations are permitted to radiate three times as much output power as VHF stations, but they still can't send signals as far. Because of propagation factors, VHF signals can be picked up at almost twice the distance of UHF signals.

UHF, however, has several things in its favor. First, because wavelengths are so much shorter, antenna elements are also shorter. It is practical, therefore, to build exotic, multi-element UHF antennas capable of providing very high gain.

Second, UHF is more free from man-made interference than VHF. Thus, when you are within a reasonable distance of a UHF transmitter, you're likely to get superior picture quality.

Fig. 10. Typical all-channel antenna.

There are a wide variety of UHF antennas available, including Yagis and log-periodics. Because of the size factor, reflectors are also quite common in UHF antennas.

Bow-tie antennas with corner reflectors, such as that shown in Fig. 9, not only provide high gain, but excellent vertical capture area. This factor is vitally important at UHF, since a foot or two of height can make a tremendous difference in the amount of signal pickup. It would be impractical to build a VHF antenna of this type, because the antenna would be much too large to handle.

In addition to the corner reflector, there are a wide variety of other reflector-type UHF antennas, and all provide excellent reception. Some maufacturers make add-on kits for converting VHF-only antennas into 82-channel installations.

FM Antennas

FM stereo is related to monophonic FM in much the same way as color TV is related to monochrome. Like color, FM stereo requires an extra carrier that is detected in phase. By FCC regulation, an FM station can radiate no more power for FM stereo than for monophonic programs. In FM stereo two basic frequencies are involved, the stereo sum (left + right) and the stereo difference (left − right). The effective signal-to-noise ratio of an FM stereo broadcast fed into an FM stereo tuner is a full 20 dB worse than if the whole thing had been done

Fig. 11. Accessory divides incoming signal into VHF, UHF, and FM outputs.

in monophonic. All of this points up the fact that to receive stereo reception comparable to your monophonic reception, you need an antenna with about twice as much gain (6 dB).

Also, as in color TV, multi-path distortion problems are magnified by FM stereo. Reflected signals generally arrive out of phase, reducing the signal-to-noise ratio. The listener hears hash, squawks, and a reduction in the stereo separation. This is why many Hi-Fi enthusiasts have discarded their indoor loops of wire in favor of outdoor FM antennas. To get good FM reception, you need a Yagi or a log-periodic that is high in gain and very directive.

All Purpose Antennas

It would seem desirable that all of a home's reception requirements be put into a single antenna. Fig. 10 shows just such an antenna—designed for color, but performing well on black-and-white; pulling in both UHF and VHF channels; and doing a good job on FM stereo.

This type of all-purpose antenna is available from a number of manufacturers. Most combination antennas compromise in one area or another, so check the specifications carefully. Make sure the one you

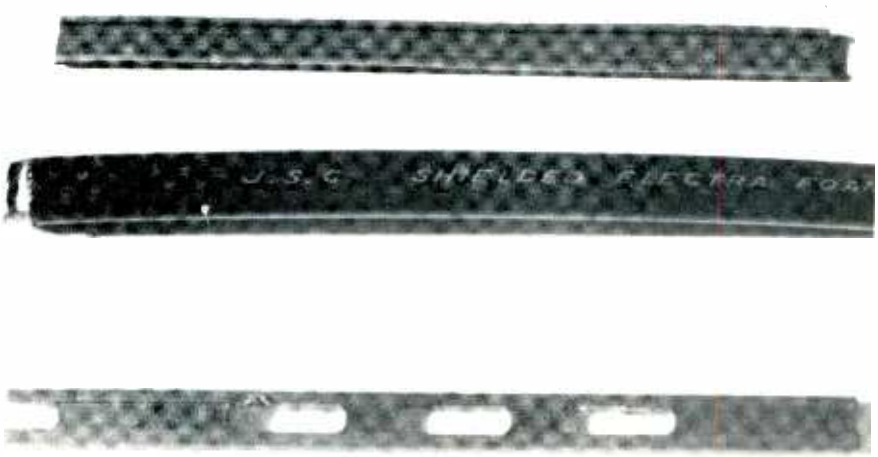
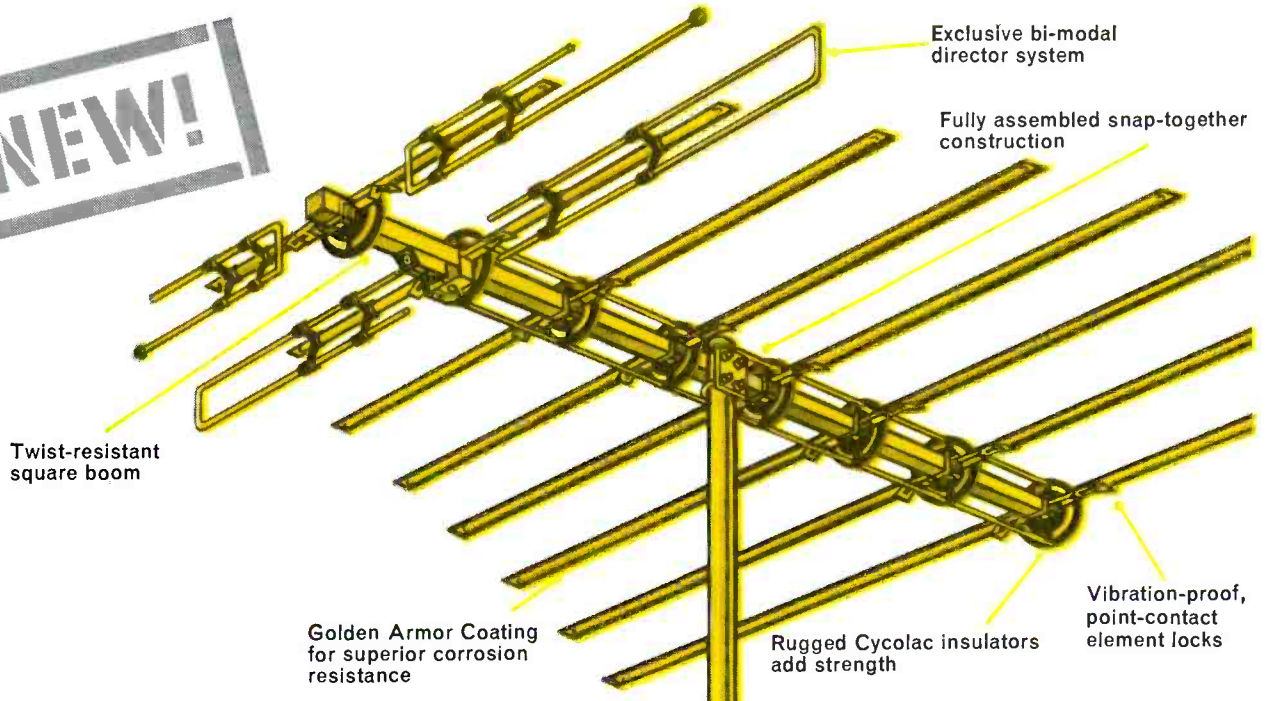


Fig. 12. Three types of lead-in.

NEW!



Meet the snappiest 300-ohm convertible around

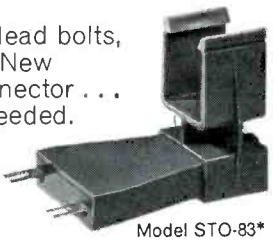
The New Jerrold Paralog 300 Plus Antenna. Developed from and incorporating the finest features of the famous Paralog Plus series. And where conditions require the superior performance of a Coloraxial 75-ohm installation the change can be made in a snap . . . with a snap-on transformer. The results are superb.

- Sharp directivity eliminates color ghosts
- Flat response (±1 dB per channel) for optimum color fidelity
- Exclusive bi-modal director system for extra gain
- Compact parasitic array permits quick installation

Paralog 300 Plus snaps together in short order and stays together.

New snap-on transformer (optional) converts Paralog 300 Plus to 75-ohm Coloraxial performance.

Combines low loss and unexcelled impedance match with quick, easy installation. Just snap it on the boom, push into contact with lead bolts, and screw down. New weatherproof connector . . . no cable fitting needed. Simply strip the cable, push into the transformer, and tighten.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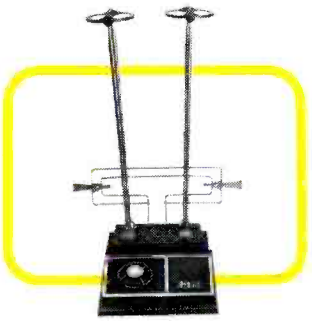
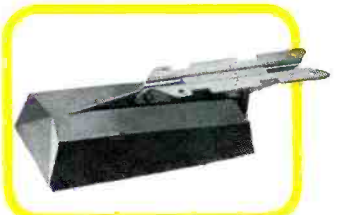
Paralog 300 Plus comes in 7 VIP models, for metropolitan to deep fringe areas, with list prices ranging from $15.95 to $79.95.

So pull in more profits with the VHF antenna that packs the most pull around. In signal reception. In customer reception. The Jerrold Paralog 300 Plus Antenna. See your Jerrold Distributor today or write Jerrold Electronics Corporation, Distributor Sales Division, P.O. Box A, Philadelphia, Pa. 19105.

**Model STO-82 also available with "F" fitting.*


Indoor antennas


Home preamplifiers


Distribution equipment

JERROLD

Focusing on one thing... better reception

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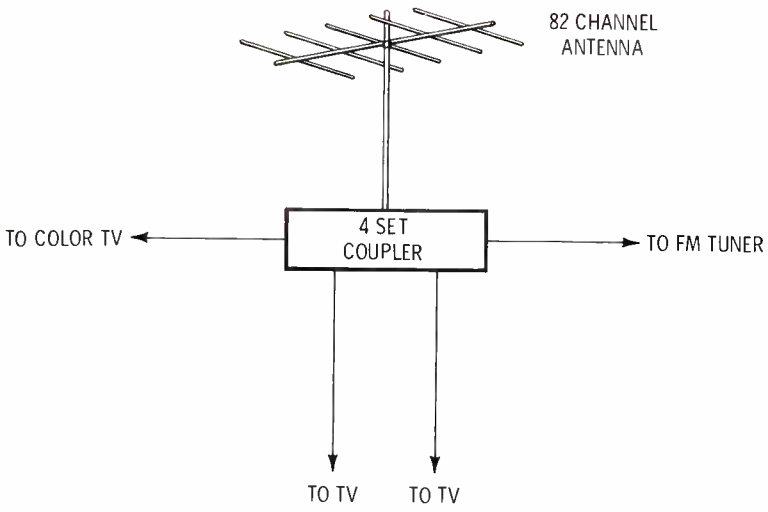


Fig. 13. 4-set coupler splits signal.

install will perform well on the desired frequencies.

Many installers use 82-channel antennas, even in VHF-only areas. This makes the systems they install relatively obsolescence-proof. No matter what new channels or FM stations come on the air, the all-channel antenna is capable of receiving it.

The early 82-channel antennas were simply a UHF Yagi or log-periodic stuck onto the front of a VHF antenna. Now, however, designs are made more efficient by integrating UHF and VHF elements so that they work together.

Signal Splitters

Today's TV sets have separate inputs for both UHF and VHF. However, the signal from an all-channel antenna is carried to the set over a single downlead. Fig. 11 shows a typical signal splitter, which provides separate outputs for UHF, VHF, and FM. Such splitters are often supplied free with an 82-channel antenna, but many make no provision for FM.

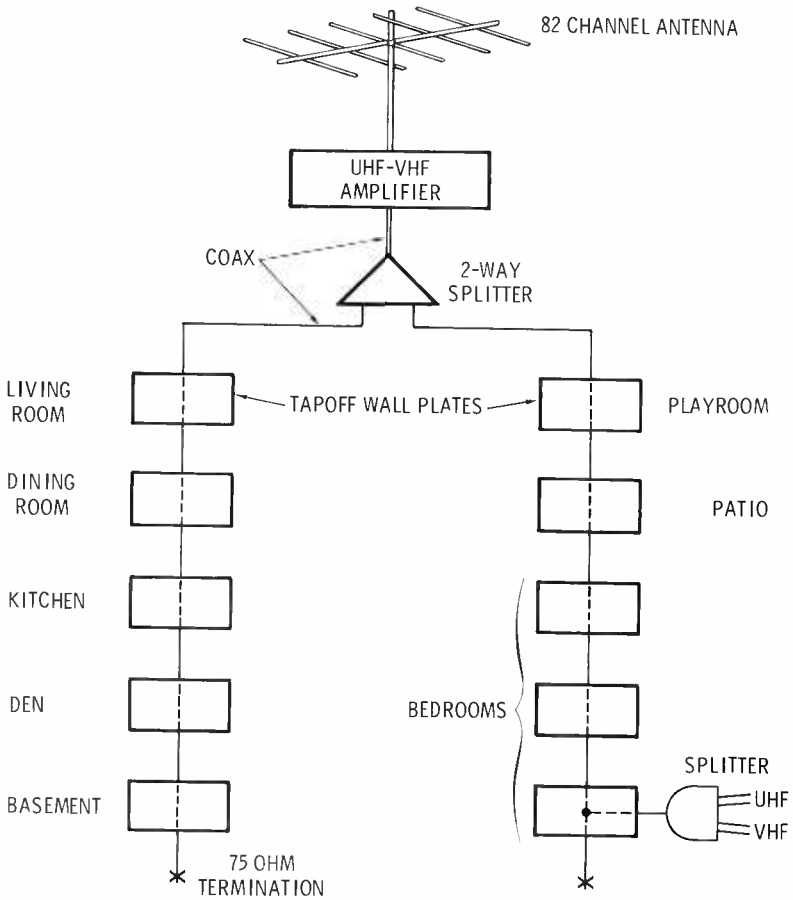


Fig. 14. Small master antenna (MATV) system.

Lead-In Wires

Two basic types of lead-in are commonly used in antenna systems, twin lead and coax. Twin lead is more common, but coax has gained in popularity since the advent of color. Coax has the advantage of being shielded. Therefore, it can be run anywhere—near electrical wiring, or through metal ducts—with no adverse effects on the signal. Also, coax keeps out interference.

The disadvantages of coax are that it has a different impedance than most antennas, and losses are high. Most home antennas and TV sets have 300-ohm impedance, while coax usually has a characteristic of 50 or 72 ohms. To use coax, matching transformers at the antenna and at the TV set are required. (72-ohm antennas are available from some manufacturers.)

Twin lead has been used for a long time and is still favored by many installers. Fig. 12 shows three varieties of twin lead: (top to bottom) flat, shielded foam-filled, and perforated. The best twin leads are rugged and moisture resistant. Shielded twin lead provides many of the advantages of coax, while perforated twin lead provides lower loss. Many twin leads burn readily, but some are flame retardant, and many installers consider this to be a very important characteristic. Don't skimp on twin lead quality. Remember, the transmission line is the only link between the antenna and the receiver. Cheap twin lead will crack and deteriorate within a few years.

The prime advantage of twin lead is low loss. If the installation includes UHF, losses through coax may be prohibitively high. The disadvantage of twin lead is that it must be run with great care. Proximity to any metal—even metal standoff insulators or staples—can

change the impedance and cause standing waves. Standing waves, as mentioned previously, show up on a TV screen as color smears.

Rotators

With the development of high-gain antennas, the need for rotators has increased considerably. Older type antennas had wide forward lobes. Thus, they were able to pick up channels over a fairly wide angle. Directivity, however, is directly proportional to gain. The higher the gain, the narrower the lobe.

Rotators are required for all-channel antennas, provided all channels are not telecast from the same direction. They can add significantly to the cost of the installation, and they can complicate multi-set systems; however, rotators do provide pinpoint orientation.

The only substitute for a rotator is two or more antennas aimed in different directions. If two antennas will do the job, and they can be mounted far enough apart to prevent interaction, this is an excellent solution. However, if more than two directions are involved, a rotator is usually the only practical answer.

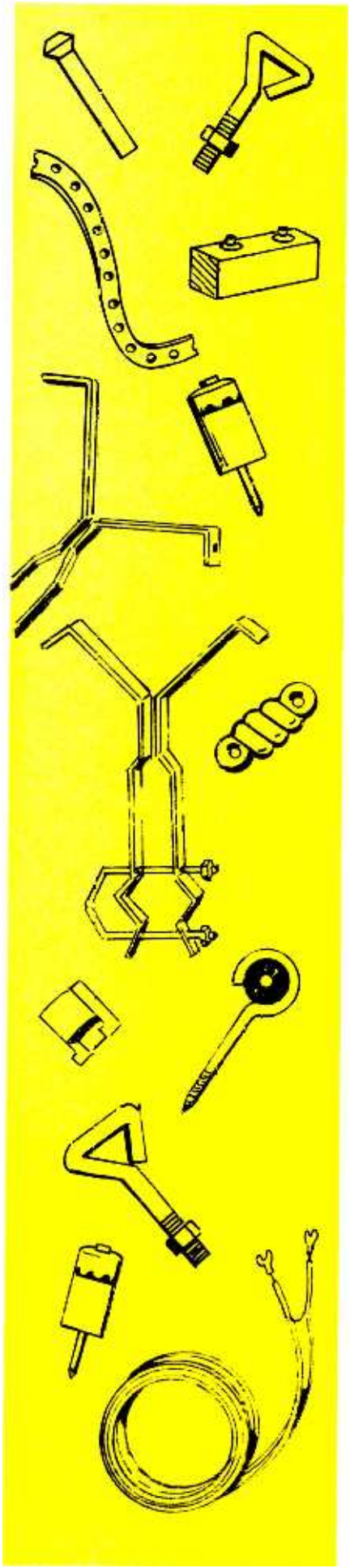
Multi-Set Systems

Most Americans today own two or more TV sets. It seems reasonable, therefore, to use one antenna to serve every set in the house.

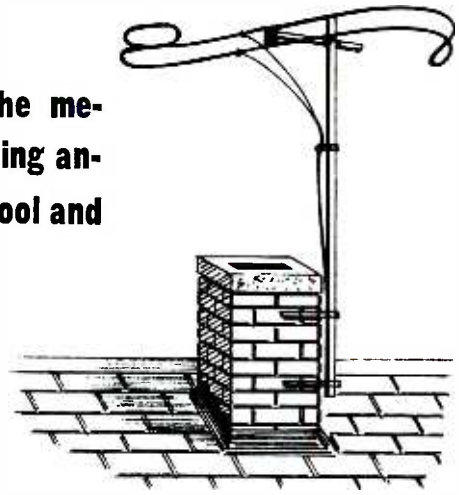
Fig. 13 shows the simplest way to do this, using a multi-set coupler. This coupler can be either 300-ohm, as shown in Fig. 11, or a 75-ohm unit.

In a weak signal area, a mast-mounted preamplifier can be used before the coupler. The preamplifier not only overcomes the losses caused by the coupler, but improves the system signal-to-noise ratio.

For many people, a four-set coupler is not enough. They want a TV antenna outlet in every room so that they can plug in a portable TV or FM stereo receiver anywhere in the house. This need can best be served by a profession home TV system such as that shown in Fig. 14. With a complete antenna system like this, the home is truly equipped to be an electronic entertainment center. ▲



INSTALLING ANTENNA SYSTEMS



A brief description of the mechanics involved in installing antennas, including special tool and material requirements.

by Ellsworth Ladyman

When installing an antenna system, there is one very important thing to remember: The customer is not buying an antenna, he is buying better reception. To attain better reception, the new system will have to provide an improvement over the old system. Improved reception by installing a new antenna is not automatic. A haphazard installation of even the best equipment on the market can result in lowered, rather than increased, signal strength.

Special Tools

There are a number of tools not normally found in an electronic technician's tool kit, that, although not absolutely necessary, will make a job go a lot smoother. Here are a few:

Compass

Provides a starting point for orientation procedures. Through the use of a compass you can point the antenna directly at the station. Then, if necessary, the antenna may be slightly turned to take every advantage of signal fluctuation.

Bit Extension

It will sometimes be necessary to drill a number of holes through walls as much as 12″ thick. A drill bit of that length will have a tendency to snap if uneven pressure is applied. An extension provides much more strength.

Field Strength Meter

In difficult installations (fringe or ghosty areas) the field strength meter will help a lot in identifying main signals (as opposed to reflected signals), and also measure the signal strength. It can be used to prove or disprove the efficiency of the installation, and to isolate trouble by tracing the signal path from the antenna through the distribution system to the receiver.

Angle Drive Mechanism

If you have never layed on your stomach in an attic, or on your back in a crawl-space, trying to punch a hole through a pair of 2 x 4's at an angle, you probably won't appreciate a flexible angle drive tool. But the first time you try that little operation, you will purchase one.

Roof Pitch

You should have as many different colors of roof pitch as are available. It is absolutely necessary that you leave no possible chance of a roof leak. Damage from one leaking roof can consume the profits of many installations.

Patching Mortar

A small bag of ready-mix type mortar should be carried to seal holes in brick or cement.

Wood Filler

It is also necessary that you seal all holes in wood or frame.

Antenna Mounts

The type of mount used is usually dictated by the physical location, and personal preference by the customer.

Chimney Mount. (Fig. 1)

This is one of the most widely used mounts, its popularity stemming from ease of installation. A close inspection of the chimney should be made before installing the mount. Loose mortar, cracks, or other evidence of deterioration should be noted and brought to the customer's attention. In extreme cases, it may be necessary to point the chimney or have a stonemason effect the repair. You should proceed with the installation only when you are assured the chimney will withstand the added load. The actual mechanics of installing the mount are simple, and are usually covered by manufacturer's instructions packed with the hardware.

Roof Mount

If it has been decided that the antenna is to be mounted on the roof, and a tower is not to be used, some means must be provided to hold the base of the mast stationary. This base mounting can be a peak mount (Fig. 2), flat mount (Fig. 3), or of other physical characteristics. The type chosen will be determined both by mast height and location on the roof. For mast heights of 5′ to 10′, any of the lightweight, less expensive units will be satisfactory. For mast heights in excess of 10′, heavier units offering a more secure "foothold" should be used. The heavier mount should always be used in areas with a history of violent seasonal storms. Regardless of type chosen, the mechanics involved in installation are identical. Lag screws should be used in attaching the mount to the roof. They should be long enough to penetrate roofing material and roof decking, and bite deep enough into a rafter to provide a good strong connection.

Side Mounting Brackets

This type of mount works very well in older type homes. The low, sprawling construction, and wide roof overhang in the newer ranch styles precludes the use of side mounting brackets. Installation of side mounting brackets is simple, (Fig. 4) but the brackets must extend far enough to allow the mast to clear any existing roof overhang. Fig. 5 illustrates brackets for medium overhang.

The mounting brackets must be secured through the siding and into the wall studs of frame homes. Do not depend on the comparatively light and somewhat brittle wood siding to provide support for the mast and antenna, plus any accessories (rotors, amplifiers, etc.) that might be added. For stone or brick construction, drill holes in the mortar (use a ¼″ drill and carbide-tip bit), mount screw anchors in the holes, then secure the brackets firmly with lag screws.

Towers

Another method of antenna mounting is through the use of towers. Towers can be as short as 18″ (as in Fig. 6), or as tall as 100′, and the base of the tower can be mounted on a roof (same procedure as for other roof mounts) or on the ground. When the tower base is mounted at ground level, a cement footing should be poured to provide a base. Thickness of the footing will depend on the height of the tower. In general, the higher the tower, the more support the cement must provide. Tower installations are in the minority, due in part to cost and in part to requirements. In most of the urban areas of the nation, a good antenna properly installed, equipped with rotor, and extending approximately 5′ to 10′ above the average roof, will provide excellent reception. However, in many areas antenna height is of primary concern, and in these locales a tower installation may be best.

Masts

Masts normally used for FM and TV reception are either 5′ or 10′ in length. Telescopic types are available that extend from 10′ to 40′ in 10′ increments. Masts are available in varying degrees of weight; the type used should be selected according to height and support requirements. As you would expect, the longer the mast, the stronger it should be. Even if a 5′ mast is being used, and a heavy antenna and accessory equipment (rotors and amplifiers) are mounted, the stronger mast will be required.

Transmission Line

There are three widely used types of lead-in. Selection of the specific

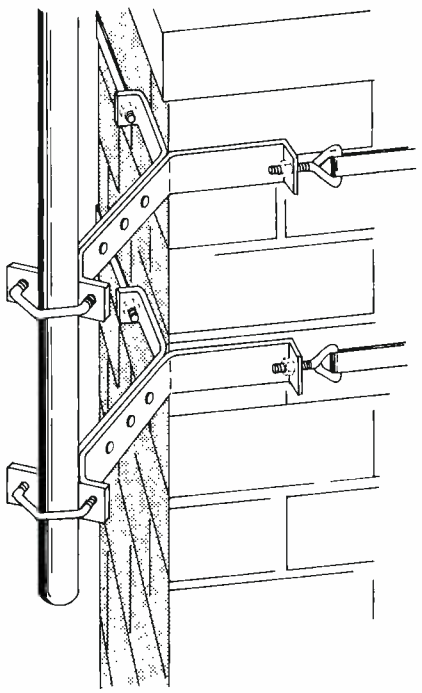


Fig. 1. Chimney mount is simple method of installation.

type best suited for a given installation is important. Selection of the proper lead-in should be made only after comparing the lead-in characteristics with the requirements of the reception anticipated, and climatic conditions inherent to the area. Further information about lead-in can be found in the article entitled "Facts about Lead-In" in this issue.

Running the Lead-In

You will probably never come across any two installations that can be done in the same way. Homes differ, people differ, and your own ideas change, but you can set up a few general rules that will prevent loss of time during installation, and

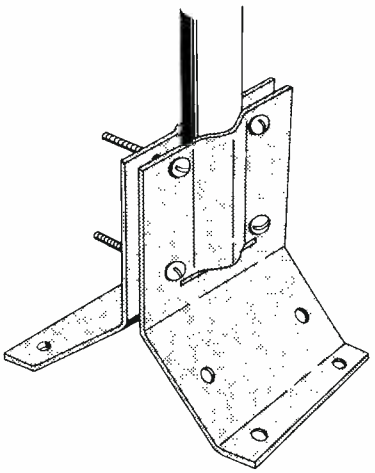


Fig. 2. Typical peak mount.

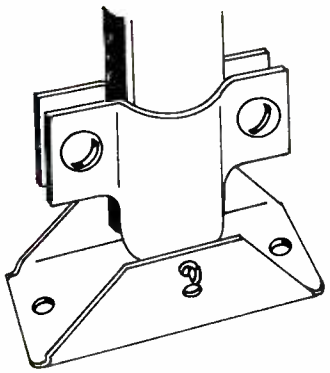


Fig. 3. Flat mount is adjustable.

perhaps avoid a call-back.

1. Make firm electrical and mechanical connections at the antenna terminals. Use connectors; do *not* chance a wire-wrap type connection.
2. Use the proper type stand-offs. These will vary (See Fig. 7), depending on type of roofing material, type of transmission line used, and projections or overhangs you have to dress over.
3. Use enough stand-offs. Place mast stand-offs every 5′, and roof stand-offs every 4′ to 6′. Adequate stand-offs prevent damage to transmission line and "fluttery" reception.
4. Dress line over eaves, gutters, and drain pipes; do not allow the lead-in to touch or rest against anything. (Shielded lines excepted.)
5. If the installation is to include a rotor, allow enough slack in the lead-in for antenna rotation.
6. Make entry into the house as follows:
   A. If entry is through a brick wall, use a power drill (¼″ or ½″) and a carbide-tip bit. Remember, this hole must be filled and water tight after installing the lead-in, so make it big enough, but not oversized. When you drill through the exterior wall, you still have to drill through the air space and the inside wall. A bit extension can be used to continue the hole from the outside; if an extension is not available, a method must be devised to locate the point at which you will drill from the inside out. A long awl or pick will do this very well. Place the point of the pick in the center of the exterior hole, rap sharply with a hammer, and the pick will protrude on the inside.
   B. If entry is through wood siding, the same method as outlined in Step 6A will be used, substituting a steel bit for the carbide tip. The same precaution about hole size should be followed. After running the lead-in into structure, fill all holes. Use plastic wood for holes in wood siding, and patching mortar for holes in brick or stone walls.
7. Whether you made entry to the structure at the attic or the crawl-space, the next step is to run the lead-in to the point of entry near the receiver. If in a crawl space, attach the lead-in to the bottom of the floor joints; in an attic, run the lead-in across the top of the ceiling joists, and secure it in place with insulated staples or tacks.
8. The next step is to locate the position where the lead-in terminates; it can terminate in a wall directly behind a receiver, in a utility room at a distribution box, or in a two- or four-set coupler in the crawl-space or attic. If a coupler is installed at this point, further runs along floor or ceiling joints must be made to the various points of entry to the final terminations.
9. Running the lead-in down inside an interior wall to an outlet connection can present a multitude of problems. The best method for becoming proficient at this is through experience. Some special tools you will find useful for this are:
   A. Right angle drill drive for your power drill.
   B. Drill extenders.
   C. Electrician's fish-tape.
10. When the lead-in is run through an interior wall, always terminate in a wall connector. Several types are available, and you should be able to match the decor of most homes. Stripping the lead-in and making a direct connection to the receiver input terminals may be adequate, but it won't help your "word of mouth" advertising a bit.

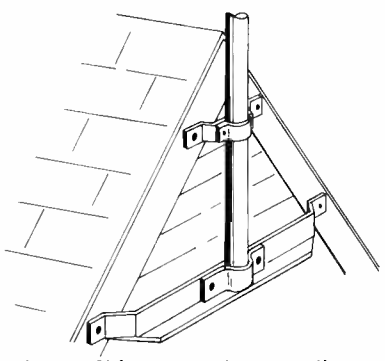


Fig. 4. Side mount is versatile.

Installing Antenna

The following is a typical step-by-step procedure for the installation of an antenna, using a 5′ mast, base or foot mount, guy wires, rotor, and feeding four receivers through a four-set coupler.

1. Attach the rotator near the top edge of the main mast.
2. Attach a length of from 2′ to 4′ of mast to the rotator.
3. Affix antenna to the top of the mast projecting from the rotator.
4. Mount a guy wire ring just below the bottom of the rotator.
5. Install the base mount on the roof. Be sure the retaining screws are imbedded in roof rafters.
6. Install guy wire anchors (screw eyes). These should be 120° apart in a circle around the antenna base. Make sure the anchors are going into rafters. Decking just won't hold under extreme weather conditions.
7. Attach stand-offs for rotor cable and lead-in. Orient the stand-offs for maximum separation of rotor wire and lead-in.
8. Attach the rotor cable to the rotator terminals, and the lead-in wire to the antenna terminals. Allow enough slack in each line to insure 360 degress rotation, then route the rotor and lead-in cables through the mast stand-offs.

weight of the armature causes friction when the motor is de-energized. Some motors are mounted horizontally with the armature spring loaded against the brake pad. In either case, if the end of the armature or the brake pad material is worn excessively, the armature will go beyond its intended position with reference to the stator, causing the pick-up voltage of the motor to be increased. Here, again, the best cure is to replace the motor. This cause of faulty cold weather operation is more likely to affect ring gear drive systems than worm drive systems, because a stronger brake is used in the ring systems. In worm drive systems, the motor brake is used primarily to minimize coast-down time, and the braking is accomplished by the worm drive mechanism.

4. The grease used to lubricate the rotator can be a major cause of cold weather problems. Even when new, the grease can freeze—literally welding all the high-speed gears together. This problem can become progressively worse in rotators that use aluminum or zinc gears, because the softness of the material causes the worn particles to be mixed with the grease. If you determine this to be the cause, disassemble the rotator and wash off all the old grease and residue. (Caution: Keep the solvent away from the motor itself. Its bearings are protected by a special long-lasting oil which should not be dissolved.) Replace the grease in the low-speed gears and rotator bearings with silicone grease (such as Dow Corning No. 7). Use it sparingly. Lubricate the high-speed gears, (motor pinion and mating gear) with 10W30 motor oil. Replace the slip sleeves or nylon strip bearings if required. Rotators with ball bearings should exhibit a slight play (5 to 6 mils). If they do not, shim them with aluminum foil at the ring and upper casting interface. If there is excessive play, sand the ring slightly on a flat surface.

5. Check that the installation does not cause binding of the rotator, and double check the wiring.

In cold climates the motor can usually be started by rocking the switch back and forth a few times. (The motor will heat up during this procedure.) Occasionally, in extremely cold climates, external heating may be necessary, and can be applied using the strip-type heaters ordinarily used to keep water pipes from freezing. If this is done, take these additional precautions:

1. The strip heater should be manually switched on only when warming the rotator.

2. Special care is required to attach the heater only to the non-rotating parts, and to be certain the rotating parts do not scrape or foul it.

3. The 115-volt strip line should be separately fused.

In very cold climates, install rotors with AWG 20 wire (AWG 18 over 75 feet). Although this adds to the cost of installation, it pays in satisfaction later. Taking the above precautions before installation, and applying the service tips, should provide very good results.

Tips For Color

Keep in mind that the color signal is phase modulated; therefore, any phase shift greatly affects the

picture. This means that you should use the best twin lead available. Several types are in general use:

1. The old twin lead (not recommended).
2. Foam-filled, flat twin lead.
3. Foam-filled, oval twin lead.
4. Shielded twin lead.
5. Coaxial cable.

The choice is up to you. If you use the flat or oval twin lead, twist it slightly, and keep it away from anything metal. Be careful of the impedance. Some sets and antennas are designed for 75-ohm lead-in, eliminating the need for matching transformers. However the use of 75-ohm lead-in on 300-ohm sets without the transformers will result in less-than-optimum performance —at least.

Today's antennas are much improved. Although generally larger, they are commonly quite sensitive and free of frequency selection. If you get a good one, it is usually not necessary to stack them or to use amplifiers. The author prefers stacking rather than amplifiers because the latter enhances everything received, including noise; however, sometimes an amplifier is the best way out in deep fringe areas. Here again, the service man uses his own experience in a given area. Don't look for quick answers or "mini-type" miracle antennas. They may come some day, but they are not here yet.

Servicing

Obtaining the proper schematic for servicing is important. Service booklets or manuals, and installation sheets are obtainable, or come with the rotor—get them and keep them handy in your service data library.

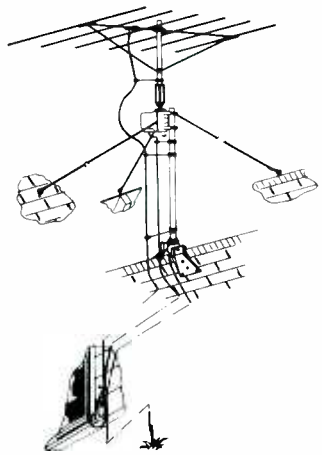


Fig. 5. Saddle mount should be guyed.

Ordinarily, a check-out from the ground is the first service step. Disconnect the power line and the rotator from the control, and check resistances looking towards the rotator. The resistance should read the lead resistance (which should be two ohms or less) plus two motor windings totaling approximately five ohms. If this is correct, the motor should run with 18-30 volts on the leads. If it does not, the rotator should be checked for faults. If the motor does run, the mechanical automatics should show voltage drop when the rotator switch operates. Electronic rotors and some manual rotors depend upon a wire-wound potentiometer in the rotator. Check the potentiometer continuity, and replace or clean as required.

Check the control circuits first, suspecting the motor electrolytic—particularly if the voltages seem low. Carry a fresh substitute capacitor. Its exact capacitance is not critical. Increasing the capacitance increases the average motor current (and the line drop). The advance in technology has helped these electrolytics, and the modern parts are much less troublesome than those of a few years ago.

A drop of oil often does wonders for the pawl arms and escapement mechanism in mechanical automatic controls. Only as a last resort should you disassemble the mechanical mechanism, because its proper adjustment determines its accuracy. Broken springs, damaged members, or electrical discontinuities are easy to spot, and should be corrected without disturbing other parts. AC is fed to the rotating mechanism in the control by leaf-spring commutators, so be sure they make good contact. The solenoid coils and transformers seldom open unless the rotor is hit by lightning. Solenoid mechanical position, however, can cause trouble if the control is dropped. If you determine that the control is operable but badly out of adjustment, it is best to return it to the factory.

Servicing electronic rotors is another matter, but the rotator procedure is the same. In one type of electronic control, the control faults are usually in the relays. In this control, one relay switches the transformer primary. Be sure the relay is pulling, and that the contacts will mate. If it does not operate at all, and does not have coil voltage, go through the circuitry to find out where the signal stops. If it is has voltage, and pulls in but doesn't switch, clean and/or adjust the contacts. If the relay doesn't pull in, let up very slightly on the back spring. If either relay chatters, check the diodes and electrolytics.

The second relay is the more critical of the two, since it operates in one direction but not the other. If it pulls in when it should not, tighten the back spring. Check the operation of the mechanical knob switch in this type rotor. Contacts should be biased and clean.

Another type of electronic, push-button control has less sensitive relays but heavier contacts. One relay operates to rotate in one direction, and the other to rotate in the other direction. Remove their covers and ascertain that they do pull in. If they do not, check for cold joints or faulty push buttons (which can be cleaned). If the relays stick, manually operate them about a dozen times to clean them. If they chatter, decrease the sensitivity adjustment. Then check the diodes and slide switch. It may even be necessary to clean the adjustment potentiometers.

The transformers in this type rotor can be left on without danger of overheating. To be conservative, the manufacturer recommends they be switched off. The transformer of both types of electronic rotors normally are thermally protected.

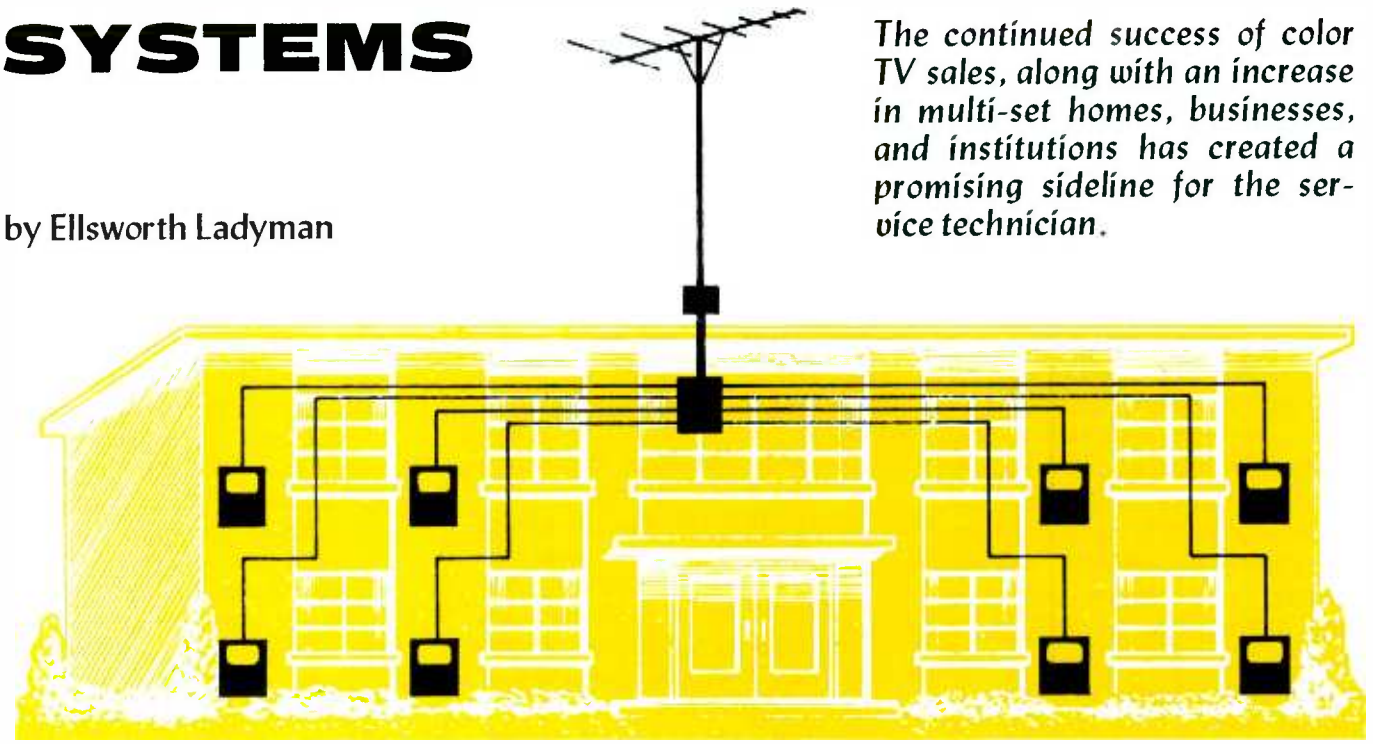
Conclusion

As can be seen, rotors are not very complicated devices. The small amount of additional installation time, compared to the profit, should be incentive enough to install them wherever they are justified. The customer satisfaction derived from a good installation, with its attendent side benefits(repeat business, word-of-mouth advertising, etc.) should be the greatest incentive of all. ▲

MATV SYSTEMS

The continued success of color TV sales, along with an increase in multi-set homes, businesses, and institutions has created a promising sideline for the service technician.

by Ellsworth Ladyman



The MATV (master antenna system) market is expanding by leaps and bounds. If you are not participating in this bonanza, it is time you investigate its possibilities.

Potential customers include:

Apartment Houses:

Apartment dwelling is on the increase: most urban areas are experiencing a tremendous increase in apartment construction, both the high-rise and garden types.

Motels:

Construction of new motels and renovation of older units shows no evidence of slowing. Competition among motels is keen, consequently all are striving to give better service. Good TV reception in every unit is a must for them.

Nursing Homes and Hospitals:

Entertaining the ill or infirm, who must pass many hours immobile or semi-immobile, is a problem. Good TV reception goes a long way toward accomplishing this.

Schools:

Good reception in schools is absolutely necessary; educational stations and current-event broadcasts have our youngsters running far ahead of us at comparable stages of development.

Dealer and Service-Dealer Showrooms & Service Departments:

Elimination of rabbit ears or long lengths of transmission line terminated in alligator clips does a lot for the appearance of a showroom or service area.

These are a few potential users of MATV. You will undoubtedly think of several more. The problem is how to sell to them.

Selling MATV

It is obvious that before you can install a system and pick up the added bonus of a maintenance contract, a job of selling must be done. Employing only the methods you normally use in reaching your service customers will not suffice. The MATV market is at a different level, and other means of advertising are needed. Several different methods may be employed to reach the potential buyers in this area, but all methods require thought, leg work and ingenuity. I'm sure that this sort of challenge is nothing new; anyone gainfully established in the highly competitive business of electronic servicing has accepted this kind of thing as a way of life.

One of the first things to do in seeking this business is to make yourself and your capabilities known to as many real estate men as possible. These people know when and where a motel, apartment motel, hotel, or apartment complex is going to be built. Remember, these guys are primarily salesmen, and salesmen get together and talk. If you impress them, they will pass along your name to the right people.

Watch your local newspaper for information regarding requests for zoning variances for new construction. Often this is the first clue that

apartment or motel construction is contemplated. This information will include the name of the builder or contractor. Contact him at once, and advise him of your eagerness to bid on the project.

Place advertisements in local or area trade publications relating to builders, contractors and real estate. Make yourself known to all types of subcontractors such as electricians, cement men, masons, carpenters, etc. These men are usually held in high esteem by the contractor or architect, and their advice to him could swing a contract your way.

A showing or demonstration of a functioning MATV system is still the best method of selling. Prospects are often confused by terms such as: head-end amplifiers, splitters, couplers, combiners, extenders, etc. Seeing these items in a working system will help to clarify their use.

The best place to conduct a demonstration is in your own building; whether your requirements are small compared to the prospects is of little consequence because the basic design remains the same. If you are located in a strong signal area that, in the past, has allowed you to operate with a half dozen rabbit ears, install a master antenna system. Not only will the appearance of your show room and service area be immeasurably improved, you will have a functioning system at hand to demonstrate to prospects and to people who didn't even realize they were prospects.

Designing the System

An MATV system is, in reality, a mini-CATV (Community Antenna) system. It can range from a system comprising an antenna and a two- or four-set coupler feeding two to four receivers as shown in Fig. 1, to an antenna system with increased amplification, splitters, couplers and impedance matching devices feeding a multitude of receivers (Fig. 2).

Calculating the Losses

The design of any MATV system, small or large, will be based on the following fundamental concepts:

1. An adequate signal at the base of the receiving antenna is a must. This will involve proper selection of the antenna or antenna array and possibly the addition of a mast-mounted amplifier such as the one shown in Fig. 3. Proper orientation of the antenna is of primary importance. Use a field-strength meter in conjunction with a monitor (portable, transistorized receiver) to determine when the signal is adequate.
2. Use high-gain antennas whenever practical. It is cheaper in the long run to start with as much signal as possible *before amplification*. This improves the signal-to-noise ratio and saves the additional cost of a bigger amplifier. It also minimizes the long-term maintenance problems.
3. Determine the signal you require at the input terminals of the farthest set, say 4000 microvolts, then calculate all the losses between this set and the antenna terminals: (See Fig. 4.)
   A. You will probably use RG-59 cable, so compute the losses for the highest channel in the system and the longest run. In Fig. 4, 500′ @ 4.4 dB/C = 22 dB.
   B. Add the insertion losses of the taps on the trunk line. 6 × .5 = 3 dB.
   C. Determine the loss of the farthest tap. Taps are supplied with a choice of isolation losses. In our example, tap B loses 12 dB.
   D. Add in the losses of any other devices in the line. The splitter has a loss of 4 dB.
4. Calculate the required signal at the farthest set as 0 dB, and add together all the losses back to the master antenna. In the example, (−4) + (−12) + (−22) + (−3) = −41 dB.
5. Determine the signal from the antenna and express it in dB relative to the signal required at the farthest set. Our channel 12 signal is +6 dB. Subtract the losses from the signal to determine the required amplifier gain; +6 dB − 41 dB = −35 dB. The amplifier must have 35 dB of gain to make up this loss.
6. Make the same calculations for the lowest channel in the system. If all channels are in the same band (channels 2-6 or 7-13) this is not necessary.
7. If one channel is much weaker than the other (about 6 to 10 dB) equalize the inputs to the master antenna by amplifying the weak signal. If the weak channel has about as much signal as you require at the last set, you may attenuate the strong signal, depending on the

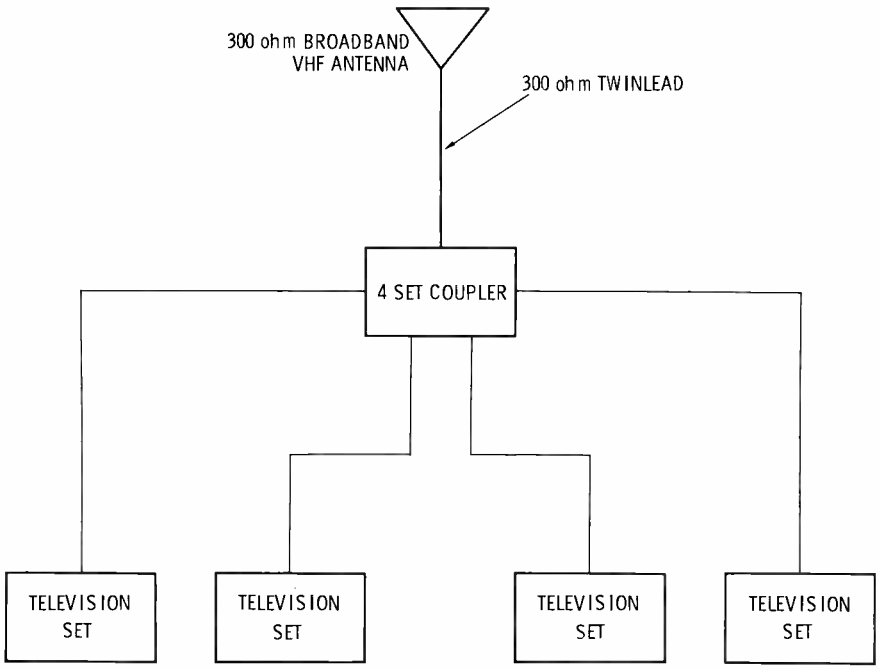


Fig. 1. Simple MATV system employing a 4-set coupler.

"For my money, the best antenna for Color TV is the JFD Color Laser,"...

says Ronnie Morgan of Best Antenna Service, Arlington, Va.

"When we install a JFD Color Laser or Log Periodic, we *know* we can guarantee better *color* pictures than the customer ever had before. We get sharp directivity and high front-to-back ratios that clean up ghosts. And the JFD's wide bandwidth and flat gain give us good color registration on all VHF and UHF stations in the area. JFD's are well constructed and easy to install... They go up fast and stay up for good."

Mr. Morgan (who has been installing antennas for twenty years and counts his installations in the hundred of thousands) does most of his work in metropolitan areas where that extra sharp, ghost-chasing directivity is mighty welcome. His opinion of the JFD is typical of professional antenna installers from coast to coast.

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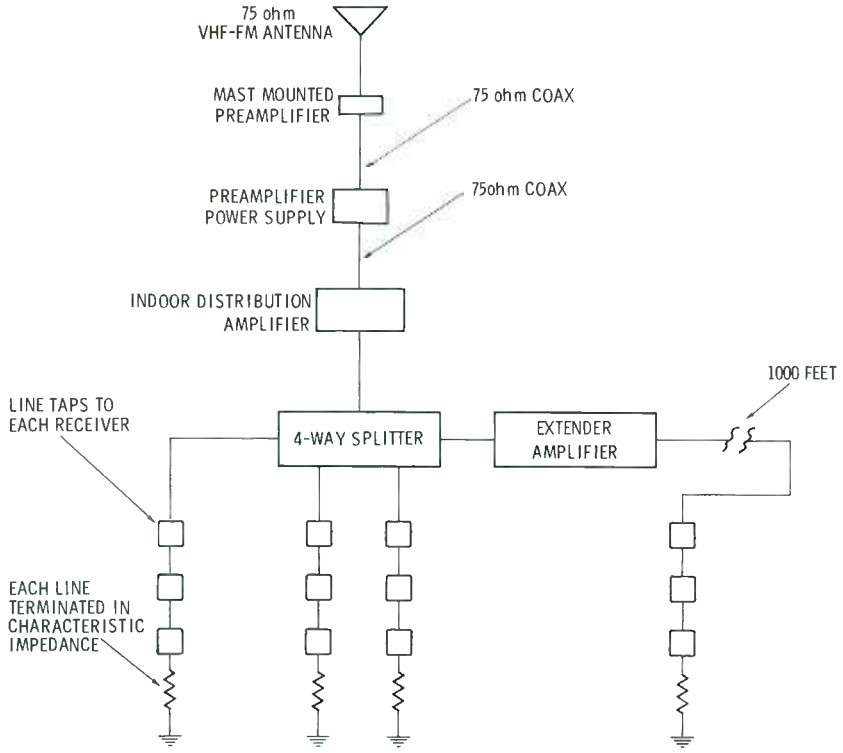

Fig. 2. More complex MATV system serving 12 color TV and/or FM receivers.

relative costs of the two approaches.

8. You know of an amplifier which has 35 dB gain on the high band and 35 dB on the low band. This gives you a 2 or 3 dB "fudge factor." At any rate, select an amplifier which meets or exceeds your requirements—systems have a habit of "growing."
9. As you work back towards the master amplifier, use taps with greater loss to compensate for the lower cable loss. Since the cable loss is different on different channels, you can never completely balance the system—but it doesn't hurt to try.
10. If one trunk is much larger than the others, it may be more economical to ignore this trunk and calculate the remainder of the system as detailed above. Then design the long trunk separately, using an auxiliary amplifier connected to a convenient point in the system, as indicated in Fig. 4.

Transmission Line

75-ohm coaxial cable is used almost universally in distribution systems. It combines the advantages of ease of installation, constant impedance that is not affected by surrounding conductors, minimum radiation and interference pickup, and low cost. Also, a wide selection of equipment designed for connection to coaxial cable is available. Technically, shielded 300-ohm line is feasible, but it is more expensive, harder to handle, and fewer devices for connection to it are available. It is unlikely that the use of unshielded 300-ohm lead-in can be justified in any antenna system that requires an amplifier.

The type of 75-ohm line you select is usually determined by cost. Cables with greater diameters usually have lower losses but they are more expensive and more difficult to install. In deciding which cable to use, you must compare the relative costs of cables and ampliers. For example, 500 feet of RG-11 cable has a loss of about 8 dB, and 500 feet of RG-59 has a of about 17 dB. The RG-11 will cost about $28.00 more. Perhaps you require 25 dB of gain in the master amplifier if you use RG-11, in which case you will require 34 dB of gain if you use RG-59. If you can buy the bigger amplifier for $25.00 more, you will save money by using RG-59. You will also save installation time, because RG-59 is easier to install.

Antenna

There are a multitude of antenna types available for use with MATV systems. These range from the heavy-duty 75-ohm types designed specifically for MATV applications to the more common broadcast VHF 300-ohm color/b-w types intended primarily for single set or two-set applications. In between fall a variety of single-channel VHF and UHF, combination VHF TV/FM, VHF/UHF, and broadband UHF

types. Choosing the correct type for a specific application involves studying the characteristics of the antennas available and matching these to the application requirements.

In any event, you should become familiar with the antenna types that will get the job done in your area. Also, you should become well versed in orienting them for the best possible signal.

Distribution Amplifiers

When one receiver is connected to an antenna, all available signal is applied to that receiver. When two receivers are connected to an antenna, the available signal is divided between them; the more receivers connected to an antenna, the more the available signal is divided. When a number of receivers are to be fed by a single antenna, a distribution amplifier, such as that shown in Fig. 5, is usually required. A distribution amplifier functions to keep the signal to all receivers at a useable level. Distribution amplifiers are available in a variety of outputs. Selection of the proper type depends on the requirements of each. An installation could use one main distribution amplifier, several repeaters, and possibly groups of two- and four-set couplers.

Splitters and Taps

A splitter divides the signal into several equal parts which are subsequently fed to separate receivers or trunks. Naturally, if the available signal is divided into two outputs, each output level is at least 3 dB lower than the input level. The device itself will also absorb some energy. Thus, a 2-way splitter has a loss of about 4 dB, a 4-way loses about 7 dB, etc. Actually, only 1 dB is "lost" in each case; the remainder is being used in the other load or loads.

A tap removes energy from the line and delivers it to the receiver. Also, it may match a 75-ohm distribution line to a 300-ohm receiver. If it does match impedances, remember to consider this when calculating system losses. 1000 μv on a 75-ohm line is the same energy level as 2000 μv on a 300-ohm line. In our example (Fig. 4) we measured all our signals across 300 ohms, so we ignored this point. Unlike a splitter, which divides the signal into equal parts, a tap takes only a small amount of energy from the trunk line. Since the amount of signal removed is proportional to the level of the signal on the trunk, this amount is expressed in dB, and it is called insertion loss. Typical values of insertion loss are perhaps .1 to .6 dB, so the total insertion loss of all taps on a trunk is usually small with respect to the loss of the cable itself.

A line tap also must isolate its load (the TV set, usually) from the trunk. This is accomplished by loose coupling between the tap and the trunk and by attenuation between the take-off point and the output jack of the tap. Because of this light coupling and attenuation, the signal level at the output connector of the tap is typically 10 to 30 dB below the level on the trunk. Although this is not truly a loss in the strict sense of the word (little or no energy is absorbed), it is usually termed isolation loss, isolation attenuation, or feed-through loss. Insofar as the TV set connected to the tap is con-

Fig. 3. Mast-mounted TV amplifier.

cerned, the effect is the same—a greatly reduced signal, 1/3 to 1/30 of the signal voltage on the trunk.

Isolation between the load and the trunk is very necessary for several reasons: (1) A shorted load must not short the line, (2) standing waves on the line between the tap and the receiver must not be coupled back to the trunk, (3) signal from the receiver local oscillator must not be coupled back to the trunk.

Taps, which are otherwise identical, are available with a wide selection of isolation loss. By selecting the correct value of isolation loss for each tap, the output signals from all the taps are equal. Thus, if there were 2 dB of cable loss from tap No. 1 to tap No. 2, the isolation loss of tap No. 1 should be 2 dB greater. In practice, many taps are available that have changes of loss in increments of 3 to 6 dB. For example, a certain tap might be available with a choice of 12, 18, 24, and 30 dB of isolation. Notice that the total attenuation of the trunk from the first tap to the last may not exceed the range of isolation losses available in the taps—18 dB in this example. If the cable loss is greater, install an amplifier in the line and proceed.

Preparing a Bid or Quote

Any bid or price quotation involves a computation of time required to do the job, materials that are necessary, and the desired profit margin. Provide the customer with brochures describing the equipment you have chosen for the installation, and include a diagram illustrating your design plan for the project. Provide specific explanations about points where confusion or misunderstanding is probable.

Let's examine a hypothetical installation. Assume the following conditions:

1. Installation in a two-story apartment house with six apartments on each floor.
2. Local reception is 1 UHF and 3 VHF stations: Channels 2, 4, 12, and 81.
3. Convert channel 81 to channel 6 to save money (cable loss at channel 81 is excessive, perhaps 15 dB per hundred feet). Also, some tenants may not have UHF sets.
4. Compute the total system loss by adding the cable loss with the losses of the splitters, couplers, and taps.
5. Determine the signal required at the farthest receiver and the signal available from the various stations.
6. Calculate the required gain of the amplifiers and the converter-amplifier.

Bill of Materials

A. 1 VHF antenna
B. 1 UHF antenna
C. X number of feet of mast
D. 2 antenna mounts
E. 1 UHF-VHF converter-amplifier
F. 1 distribution amplifier
G. 1 VHF 2-way splitter (75-ohm)
H. 12 line taps
I. 12 switch boxes
J. 12 wall plates
K. 3 line terminations
L. X number of feet of coax
M. Assorted hardware, saw blades, connectors, etc.
N. X number of hours labor.

Maintenance

A master antenna TV system requires periodic maintenance. The time to sell this program is when you sell the installation. A few of these contracts and you won't have to worry about the lease payment every month. A thorough check-out of the system every thirty days is good insurance against a call some snowy night, when you would much rather be home in bed. Following is a good preventive maintenance procedure:

1. Check antenna for rust, dirt, and corrosion. In coastal areas keep antenna as free from salt residue as possible.
2. Make a careful check of the transmission line; if any evidence of weather-checking, rubbing of insulation, or deterioration is observed, re-

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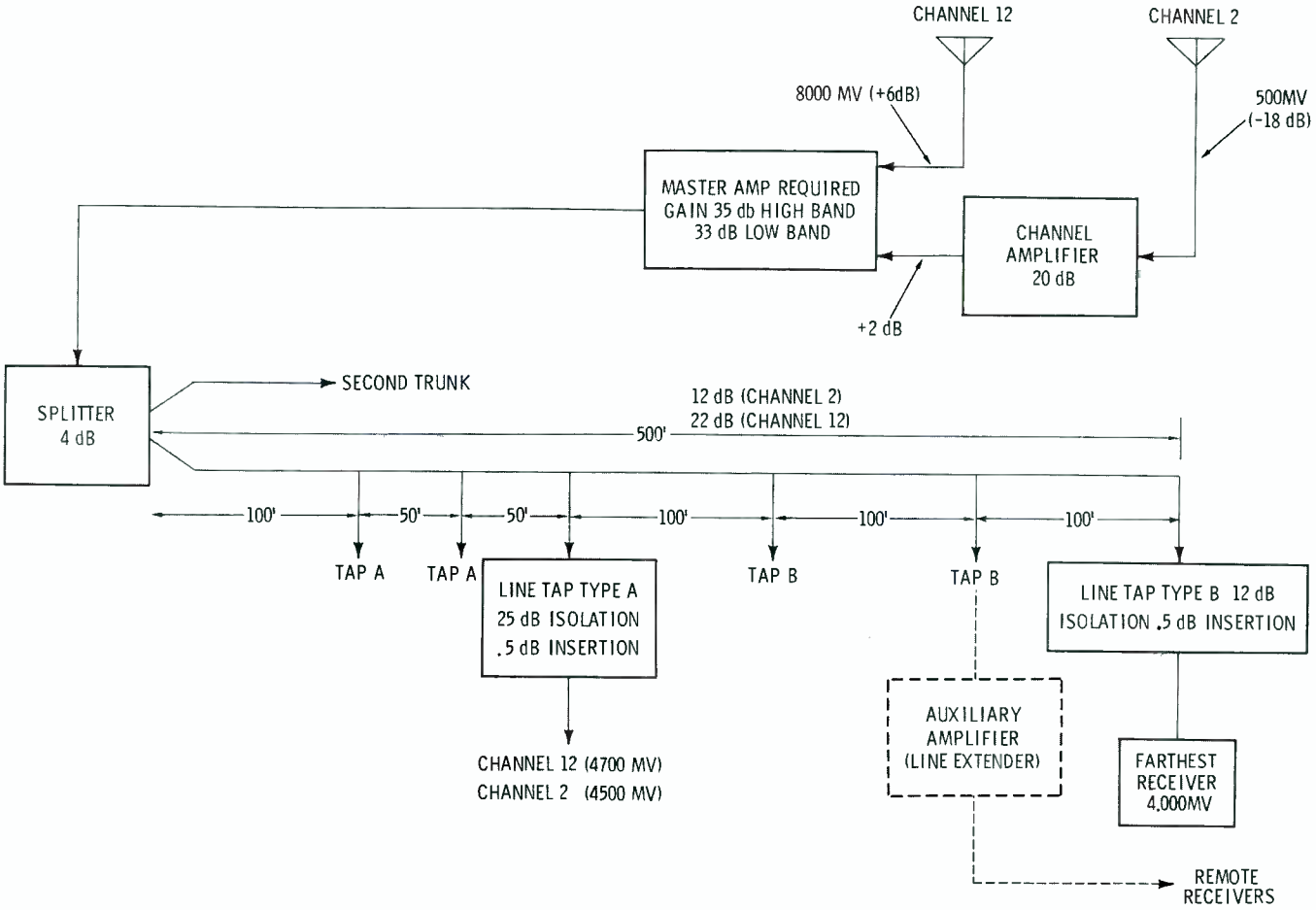


Fig. 4. MATV system with signal levels indicated.

place the transmission line.

3. Make field-strength readings at selected points along the line (outputs of distribution and repeater amplifiers are good points). Compare these readings with the original installation readings; investigate any drastic change.
4. Keep careful records of work done in routine maintenance, paying particular attention to time consumed and cost of equipment replacements. Such records will be beneficial when the time comes to renew your maintenance contract. After one year, you should be able to adjust your contract up or down, depending on the past service experience. Do not be reluctant to adjust your rates downward if the situation warrants; however, take into account the aging of the equipment. The goodwill generated by a reduction of service contract rates is good advertising.

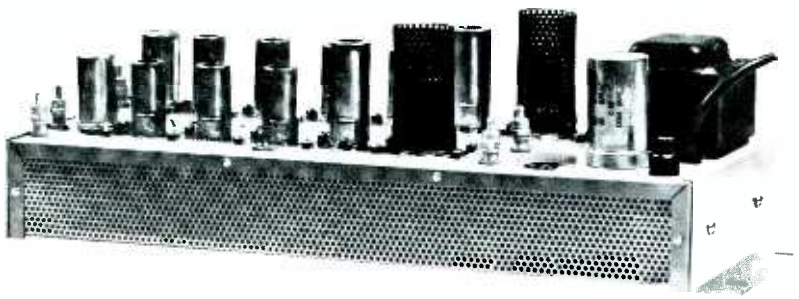


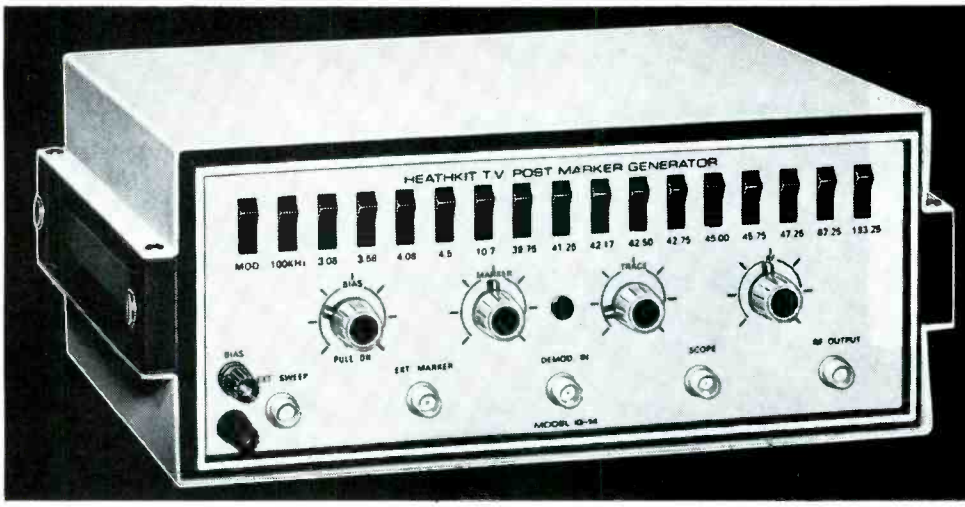
Fig. 5. Typical distribution amplifier.

Conclusion

The preceding paragraphs were intended to provide you with a brief, fundamental concept of MATV systems. Before actually attempting to sell, plan or install an MATV system, it will be necessary to become better acquainted with the equipment, terms, and installation techniques associated with such systems.

The best source for this information is the literature produced by the manufacturers of MATV system components. Most of this literature will give you the significant specifications and applications of each component, as well as practical examples of the various system designs.

Drop by the distributor(s) in your area and pick up every piece of literature you can on every antenna system component he handles, and spend some time studying it. Or, request such literature from four or five manufacturers. ▲



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Just Push A Button. That's all it takes to set a frequency . . . no dial to twiddle, no searching, no resetting problems. Fifteen switch selected crystal-controlled markers. Nothing could be easier or more accurate. The IG-14 has input and output connections so that it can be used with any sweep generator and scope. Also an external marker input. BNC connectors are used throughout.

No Trace Distortion. One of the big values to using a post marker generator like the IG-14 is that markers are injected after the sweep signal passes through the set being tested, thereby eliminating the 'scope trace distortion usually found when injection or absorption type marker generators are used.

Crystal-Controlled Markers For Any TV Alignment Task. Four marker frequencies are provided for setting color bandpass, one marker for TV sound, eight at the IF frequencies between 39.75 and 47.25 MHz, and markers for channel 4 and channel 10 picture and sound carriers for checking tuner RF response. With the ability to use up to six markers at once, such as picture and color carriers at 6 dB points, corner marker and trap frequencies, alignment is fast and precise. Trap alignment is just a matter of selecting the appropriate trap frequency, applying the 400 Hz modulation, and tuning the trap for minimum audio on a scope or meter.

Easy FM IF and Discriminator Alignment. The IG-14 provides *visible* markers at the 10.7 MHz center frequency plus 100 kHz markers on each side . . . visible because they are applied to the trace after detection and so are not attenuated by the discriminator. Use of harmonics, fully explained in the manual, provide tracking markers as well.

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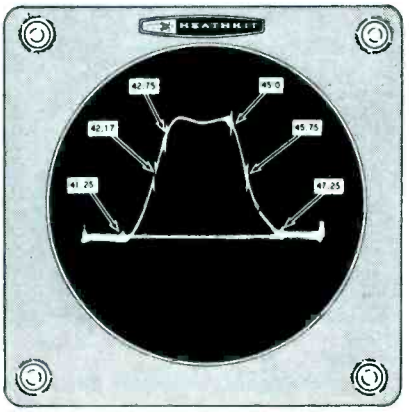
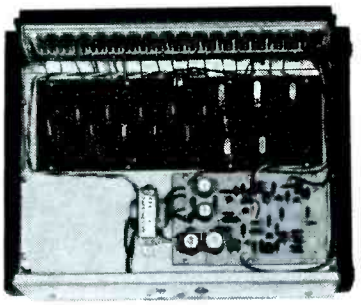
IG-14 SPECIFICATIONS—Crystal Marker Frequencies: 3.08, 3.58, 4.08, 4.5, and 10.7 MHz @ .01%; 39.750, 41.250, 42.170, 42.500, 42.750, 45.000, 45.750, 47.250, 67.250, and 193.250 MHz @ .005%. **FM Bandwidth Marker:** 100 kHz. **Modulation:** 400 Hz. **Input Impedance:** External sweep, 75 ohm; External marker, 75 ohm; Demodulation input, 220K ohm. **Output Impedance:** RF output, 75 ohm; Scope output, 22K ohm. **Bias Output Voltage:** Variable from 0 to 15 VDC @ 10 MA. Isolated from chassis for either negative or positive bias. **Type of Marker:** "Birdie." **Controls:** Bias voltage with AC on/off; Trace size; Marker amplitude; RF output; Modulation on/off; Markers, individual switches for each frequency. **Semiconductors:** Transistors: (16) 2N3692; (6) 2N3395; (3) Silicon diodes; (1) Zener diode, 13.6-V. **Power requirements:** 105-125 volts, 50/60 Hz AC @ 7.5 watts. **Net weight:** 8 lbs.



SIX MARKERS SIMULTANEOUSLY. The scope trace above shows how six markers can appear at the same time. Note the trap markers, 6 dB points, and picture and sound carriers . . . all on one trace with the IG-14.



EASY TO BUILD. Note how everything except the front panel switches and controls mount on two circuit boards . . . even the crystals.

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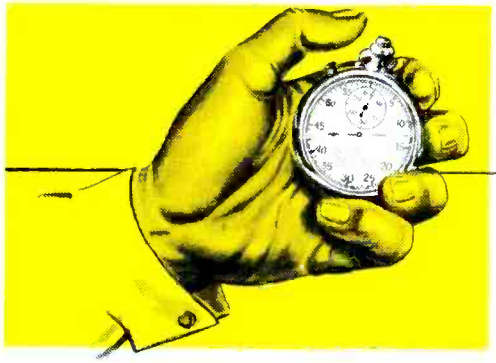


ANTENNAS are Quick

The following picture story proves that antenna installations are neither difficult nor time consuming.

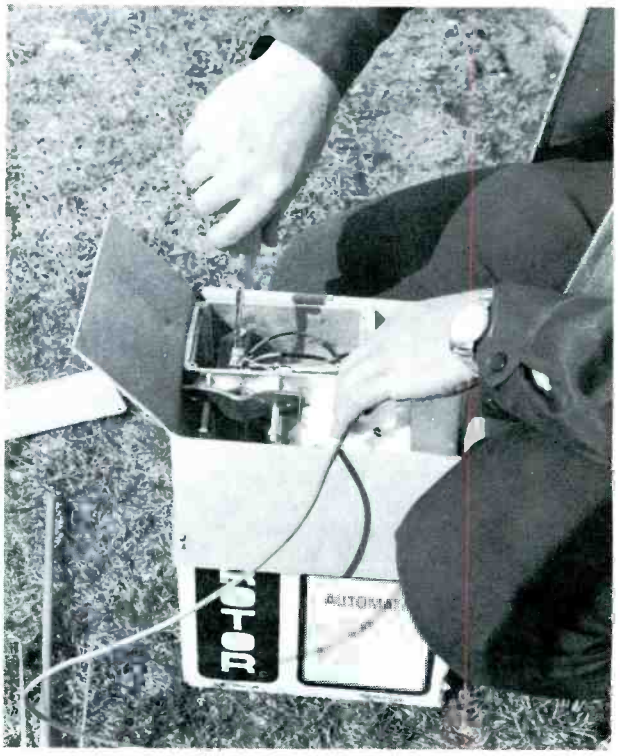
by J. W. Phipps

Antenna installations are not time consuming. The following picture story proves this point.

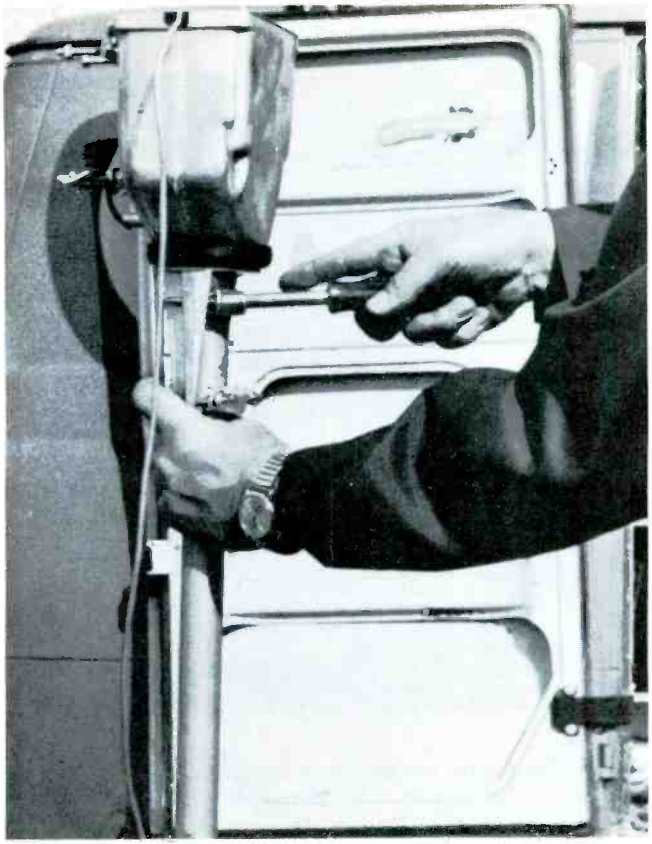
3:00 pm
Arrival at the installation site.

3:04 pm
The antenna is pulled from its box, the elements are unfolded, and the antenna is layed out on the ground (or driveway if the lawn is wet or muddy). Next, the 4′ rotator mast is attached to the antenna.

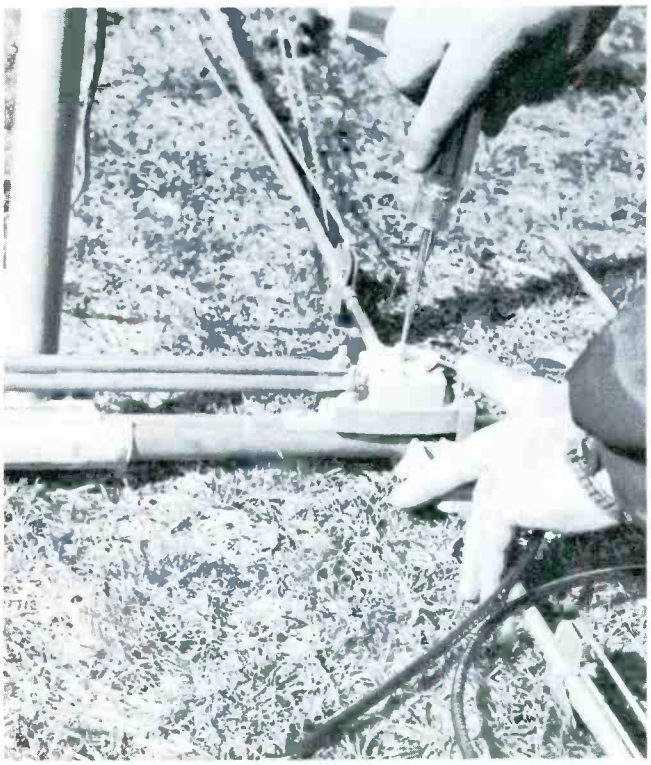
3:02 pm
Cutting the 4′ rotator mast from a 10′ mast section using a plumber's pipe cutter. The plumber's pipe cutter produces a cleaner and quicker cut than a hacksaw.



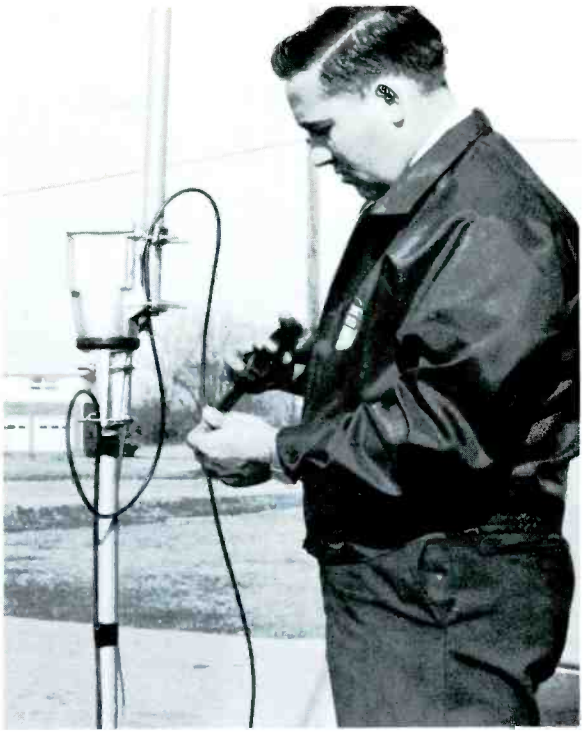
3:09 pm
The four-wire control cable is attached to the rotator; leaving the rotator in the box makes this operation much easier.



3:11 pm
The rotator is removed from the box and attached to the 4′ mast section already connected to the antenna. A nut driver is the only tool needed here. Next, two 10′ mast sections are connected together and attached to the stationary part of the rotator.

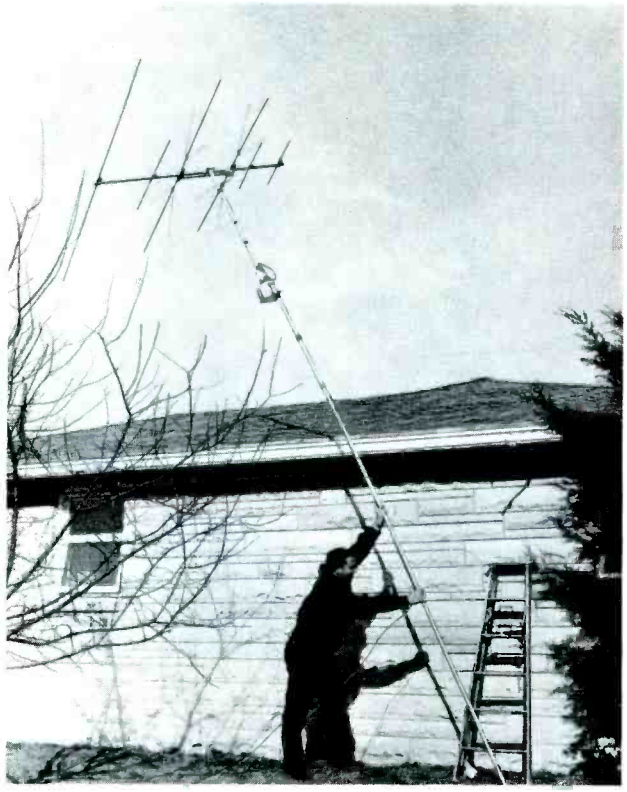


3:15 pm
The 75-ohm antenna coax is connected to the built-in balun on the antenna. The purpose of the balun is to match the 300-ohm antenna to the 75-ohm coax.

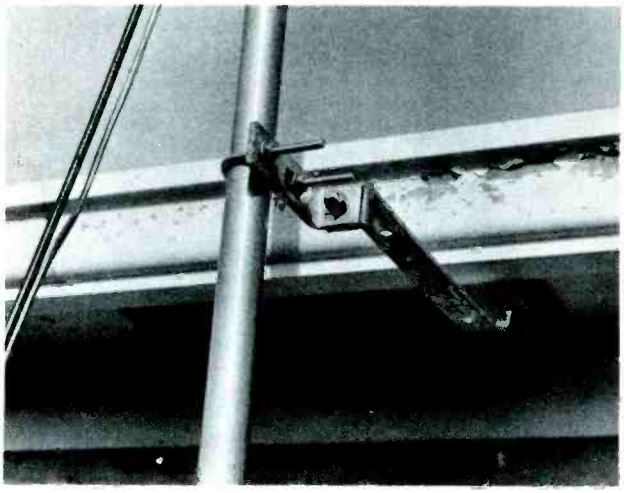


3:16 pm
The antenna cable is routed down the short rotator mast. In this case, since coax is being used, the cable is taped to the mast; however, standoffs would have been required if unshielded twin lead had been used. A good grade of plastic tape provides a secure and permanent installation. A 1½′ loop is formed where the antenna cable runs past the rotator; this provides enough slack for 360° rotation of the unit. Below the rotator (or above in the view here), the rotator and antenna cables are taped together along the mast as far as can be reached from the ground.

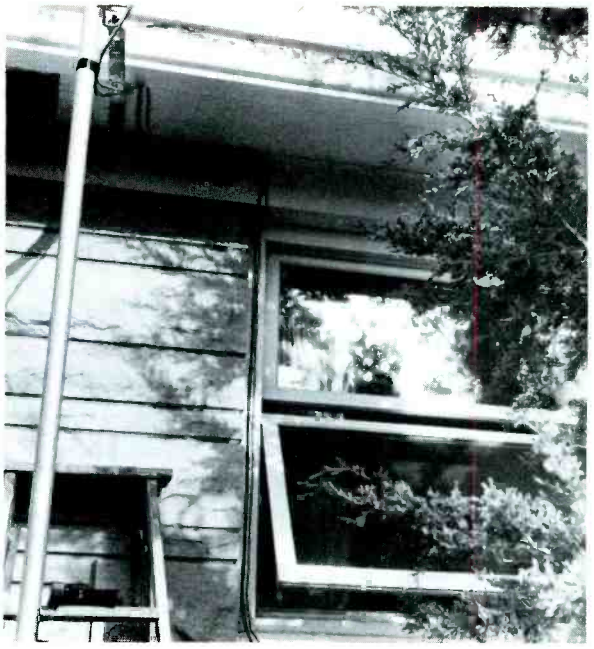
3:20 pm
A 2½′ section of ¼″ galvanized steel strap is bent (using the bumper on the truck) to conform to the contour of the eave and gutter. A 3″ steel strap with a "C" clamp is then attached to the outer end of the larger strap. The connection is left loose so that it can be rotated. Two holes are drilled in the large strap where it is to be placed against the eave. The strap is then attached to the eave using two 2″ lag bolts.



3:25 pm
The antenna, rotator, and mast assembly with antenna and rotator cables taped to it, are "walked up" to the steel strap on the eave.



3:26 pm
The mast is connected to the eave strap using a conventional "C" clamp. All bolts are left loose enough to allow movement for final alignment of the mast. The mast is aligned vertically, and the base of the mast is shoved in the ground to mark the spot where it is to be buried. The mast is then pulled up to free the base. The shallow hole left by the mast-end is deepened to at least 1′, and the mast is reinserted in it. A final check of vertical alignment is made, and the whole assembly rotated so that the antenna is facing directly north (antenna and rotator synchronized). Dirt or rock is then packed around the mast base.



3:31 pm
Both cables are brought down below the level of the eave (so water will drip off rather than run along the cable), taped to the mast, and run back up under the eave. They are then stapled across the eave, down the wallplate to the window sill, and down the window sill.

3:35 pm
A hole is drilled in the lower left corner of the window sill. (A pilot bit, or a bit that makes a smaller hole than will be required, is used first. If the hole is drilled in the wrong place, the smaller hole will be much easier to repair than a larger one. Also, if the inside wall is plaster, the small pilot bit will not break off a large area of plaster, as is possible with a larger bit.) Up to this point, one end of each cable is still attached to its respective cable spool. It must be decided now how much cable will be required to reach the receiver, plus the amount of surplus cable that will allow the customer to move the receiver any place in the room in the future. The surplus cable will be left coiled at the rear of the set. (Remember, you can coil coax without affecting the incoming signal; however, unshielded twin lead cannot be coiled without affecting the signal.) When the required length is determined, both cables are cut from their respective spools. The free ends of the cable are then taped together so that one cable extends beyond the other. This makes it easier to push the cable through the hole in the sill.

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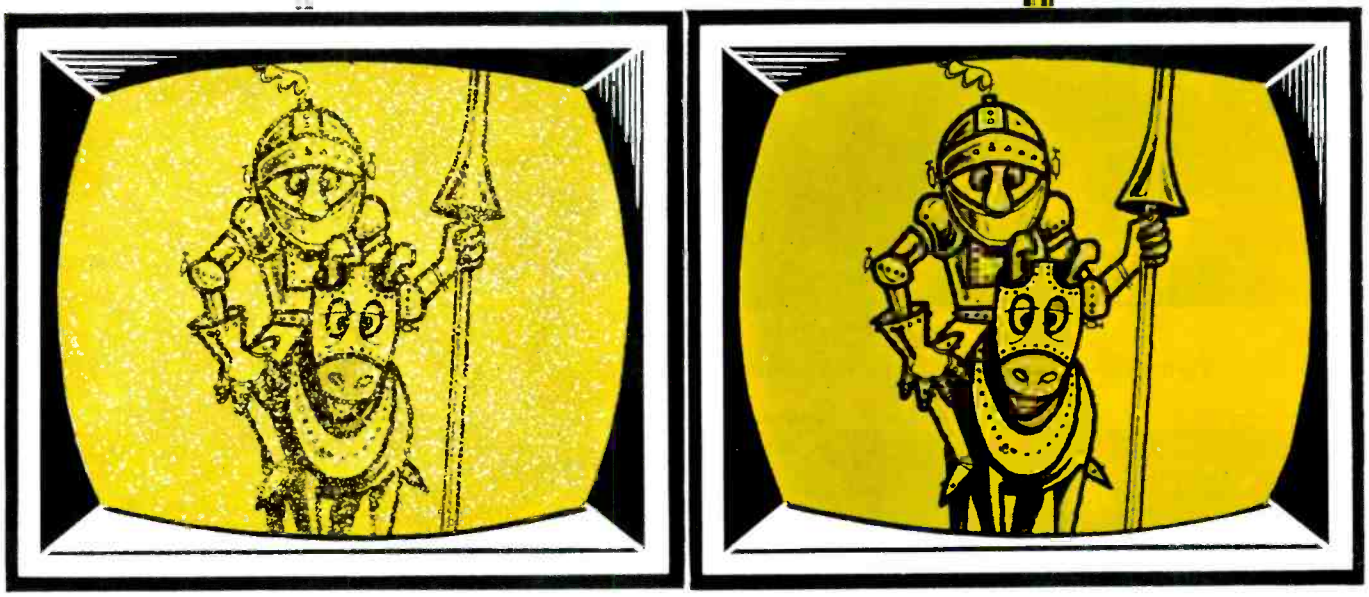

Side By Side Tests Prove...

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Here's how the test works: We hoist your favorite antenna up on our specially equipped van. We check the signal pick-up on a field strength meter and a color receiver simultaneously. Then, we replace your antenna with a Gavin antenna costing the same or less. The results are eye opening.

Ask us to set up a side-by-side test for you. Invite a representative of the antennas you now handle to observe the demonstration—or set it up himself if he likes. The field strength meter tells the truth no matter who's asking the questions.

Once you see this test, you'll probably switch to Gavin. What are you waiting for?

Circle 23 on literature card

Gavin®

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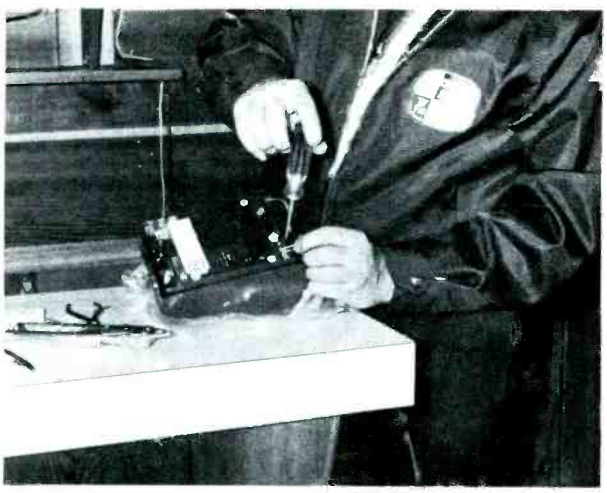
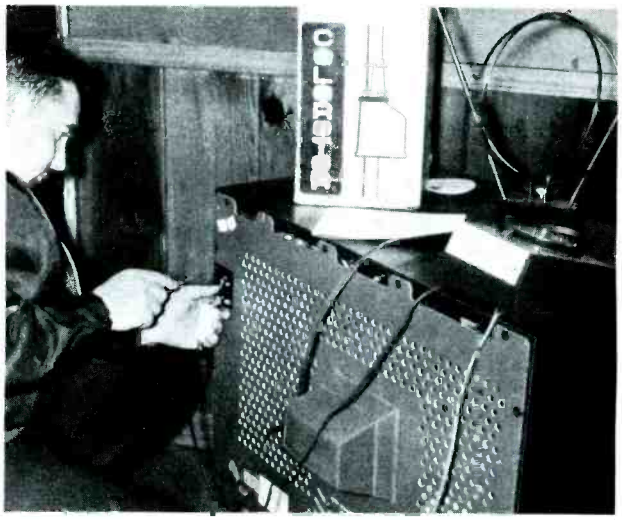
Somerville, N. J. 08876 U. S. A.

3:41 pm
The cable is pulled through the hole and then stapled down the wall along the base board to the area in back of the set.



3:45 pm
The 4-wire rotator cable is connected to the rotator unit.

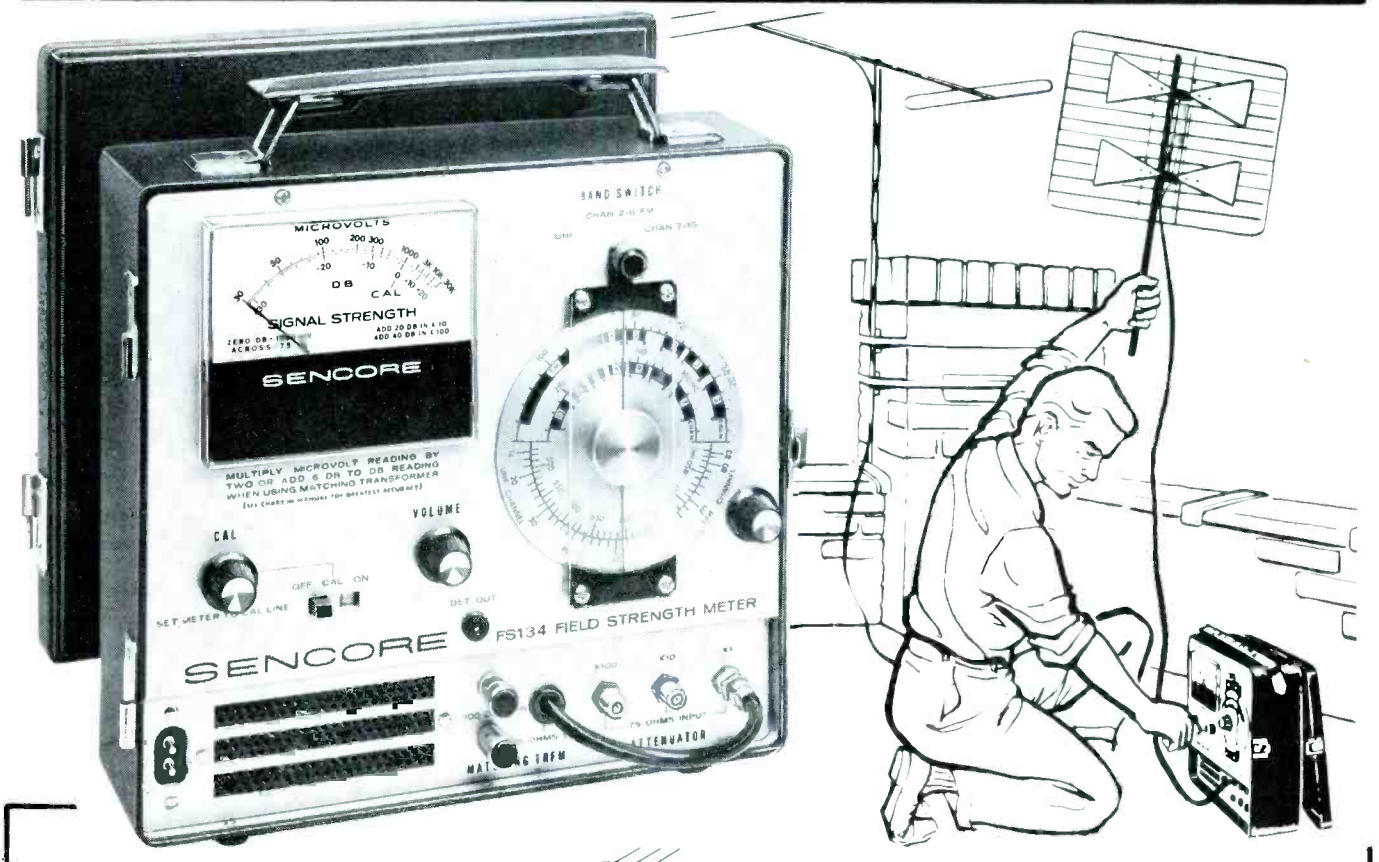
3:47 pm
A standard, crimp-on connector is fitted to the end of the antenna coax.



3:50 pm
The antenna coax is connected to a balun unit that, in turn, is connected to the VHF antenna terminals of the receiver. The function of the balun is to match the 300-ohm receiver input to the 75-ohm coax. Next, the rotator control unit is plugged into a nearby 110-volt AC receptacle, and an operational check of the system is made. Once it has been determined that the rotator system is functioning satisfactorily, the customer is shown how to properly operate the unit.

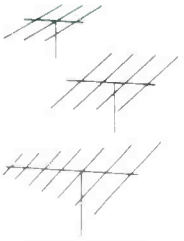
4:00 pm
Joining the customer in a look at the completed installation, pointing out the various features, and answering any questions he might have. ▲

FS134 UHF-VHF-FM Solid State Field Strength Meter

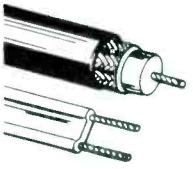


CHECK DISTRIBUTION SYSTEMS

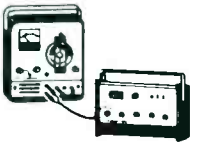
COLOR INSURANCE



MAKE ANTENNA COMPARISON



MEASURE DROP IN TRANSMISSION LINES



CHECK SIGNAL GENERATORS

Get in on the lucrative business in distribution systems, UHF, FM, and VHF antenna jobs with the all new FS134 completely solid state portable field strength meter. Calibrated in true microvolts on all bands: ±3DB on VHF-FM/±6DB on UHF.

FS134 Field Strength Meter—The FS134 uses Jerrold coax connectors so you can correct problems on existing systems, as well as install, balance, and check new distribution systems. Built-in attenuators of 0, 20, and 40 db (X1, X10, and X100) enable you to measure signal strength from the amplifier to the last tap-off in the system. The FS134 is portable and requires no AC cord; you can take it to the top of the tower to orient the VHF TV, UHF TV, and FM antennas for best signal with minimum interaction between them. Highly sensitive: 30 Microvolts ±3DB on VHF-FM and 30 Microvolts ±6DB UHF. Separate built-in UHF tuner for greater accuracy in critical antenna work and translator checking. 4" 2% meter calibrated in microvolts and db. Uses industrial standard for 0 db, often called 0 DBJ or DBM.

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Circle 24 on literature card

analysis of test instruments . . . operation . . . applications

NOTES ON TEST EQUIPMENT

by T. T. JONES

Fig. 1. New Sencore Model FE14.

The Model FE14 meter recently introduced by Sencore, has many interesting features. Considered in the light of features-versus-dollars, it's really quite inexpensive. The input impedance is very high, and the claimed AC response is almost unbelievable in an instrument in its price range.

We checked the lower end of the AC frequency response, and found it to be better than the published specifications. However, our lab equipment is questionable above 200 kHz, so we could not check the upper end of the response. Sencore claims the FE14 is flat from 25 Hz to 1 MHz, with 3-dB points of 10 Hz and 10 MHz. Furthermore, the AC input resistance is 10 megohms, shunted by 29 pf.

The AC circuit is strictly a peak-to-peak reading circuit, so the meter is calibrated with both p-p and RMS scales. The RMS calibration is only accurate for sine waves; any other waveshape applied should be interpreted in the p-p mode.

The AC circuits are shown in Fig. 2 The voltage is applied to Q1 through the multipliers in the range switch, and the output of Q1 is fed to a p-p detector consisting of X1, X2, C10, and C11. The DC output from this detector is applied to Q2 through a divider made up of R25, R26, R27, and X6. (The primary purpose of X6 is temperature compensation.) The DC developed in Q2 is fed through the meter, M1.

A closer look at the AC circuitry will reveal that it is essentially a bridge circuit made up of Q1, Q2, R14, and R22. Even though the

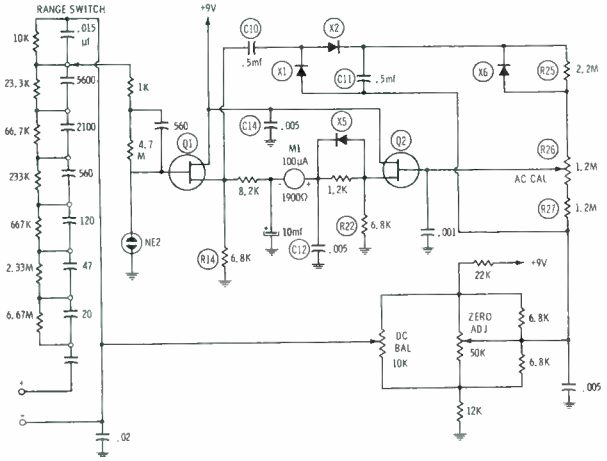


Fig. 2. Simplified schematic of AC circuitry.

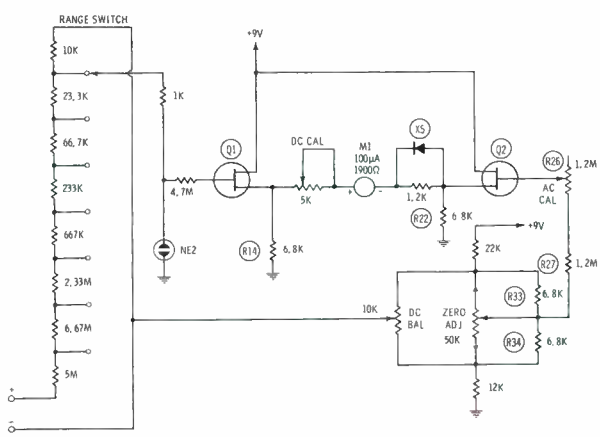


Fig. 3. Simplified schematic of DC circuitry.

Sencore Model FE14 Specifications

DC Volts

Ranges: 0–1 to 1000 volts full scale, in a 1–3 sequence. −.5 − +.5 to −500 − +500 volts zero center, in a 5–15 sequence.
Input resistance: 15 megohms.
Accuracy: ±3% full scale.

AC Volts

RMS Ranges: 0–1 to 1000 volts full scale, in a 1–3 sequence.
P-P Ranges: 0–2.8 to 2800 volts full scale, in a 2.8–8.4 sequence.
Input Resistance: 10 megohms shunted by 29 pf.
Frequency Response: Flat, 25 Hz–1 MHz, 3 dB points: 10 Hz–10 MHz.
Accuracy: ±5% full scale.

Ohmmeter

Ranges: 0–1000 ohms to 1000 megohms, 10 center.
Accuracy: ±3% linear arc.

DC Current

Ranges: 0–1000 microamps, 1 ma, 10 ma, 100 ma, and 1 Ampere.
Accuracy: ±3% full scale.

Power Requirements

9V NEDA 1604, 1½V "C" cell.

Size (HWD)

7 3/16" x 5" x 3 1/16".

Weight

3¼ lbs.

Price

$59.95.

Accessories

High-voltage probe, $9.95.

signal voltage is applied to Q1, the transistor is still a static component in the bridge. The only purpose in applying the voltage in this fashion is to maintain a high input impedance. The signal voltage then passes to the relatively low-impedance detector circuit, and thence to Q2, which is the dynamic element of the bridge (the unknown).

The DC measuring circuit, shown in Fig. 3, is a more conventional bridge. The input voltage is still applied to Q1, but since it is a DC voltage, the transistor operating points change, and the voltage at R14 changes. Q2 is now a static element in the bridge. A glance at R26, the AC CAL control, would leave a first impression that the control would affect the DC calibration. But remember, a FET draws practically no gate current, so the voltage on the gate will be equal to the supply voltage at the junction of R33 and R34, regardless of the resistance in between.

The ohmmeter operates in the same manner as the DC Voltmeter, except that a battery is switched into a multiplier circuit and the resulting voltage is fed to the gate of Q1.

For DC current measurements, the FET circuitry is bypassed. In fact, current measurements can be made with the power switched off. Shunt resistors are switched across the meter and connections are made directly to the input jacks.

There are several good features built into the Model FE14 to make maintenance a bit easier. Immediately obvious is a "battery check" position on the function switch.

Circle 41 on literature card ▲

THE TROUBLESHOOTER

Shorted Diodes—Again

I have a General Electric AY chassis that shorts the video diode every week or two. Any suggestions would be appreciated.

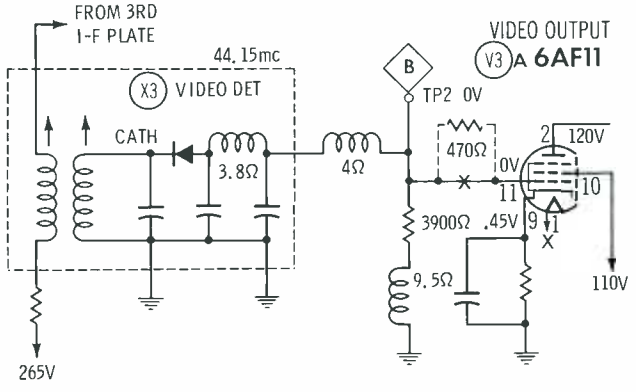
P. GONZALES

Gallup, N.M.

I have a General Electric AA chassis in which I have had to replace the video detector diode three times in less than a week.

R. GREGIVARE

Troy, N.Y.



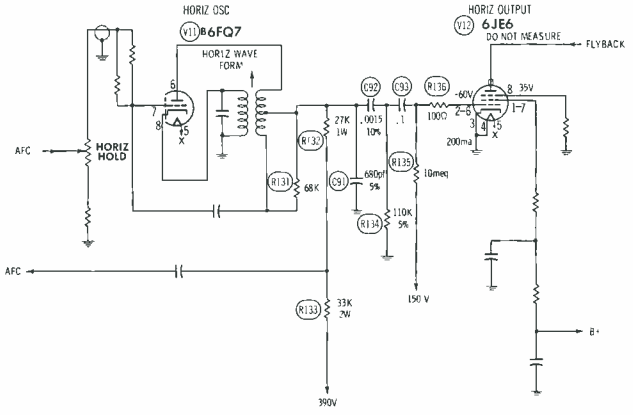
We covered a similar problem in our May, 1967 issue. The set in question was blowing diodes, and we suggested inserting a 750-ohm resistor in series with the detector output. Some versions of the AA chassis had a 450-ohm part inserted, as shown in our schematic, and later chassis all had this part installed. The resistor is added for diode protection in case the grid of V3A goes positive for any reason. Since the problem took so long to show up in these two cases, we suspect the 6AF11's may have intermittent shorts or leakage.

Pulled Horizontal

I have a Magnavox C/U 43-02-10 (PHOTOFACT 708-2) which is pulled in about 1½" from the right side. I changed the tubes, but it didn't help any. The rest of the picture and the sound are okay. If you can help me I would sure be thankful.

E. KLINGSTON

Kansas City, Mo.



We can assume before changing the tubes you checked the setting of the horizontal centering and linearity controls, therefore the problem can probably be traced to components in the oscillator plate, or output grid circuits. You could scope the drive waveform to make sure, but 9 times out of 10 this trouble is caused by the coupling capacitor C92 or C93, or the oscillator load resistor, R132. Other parts to check include R133, R131, C91, R134, R135, and R136.

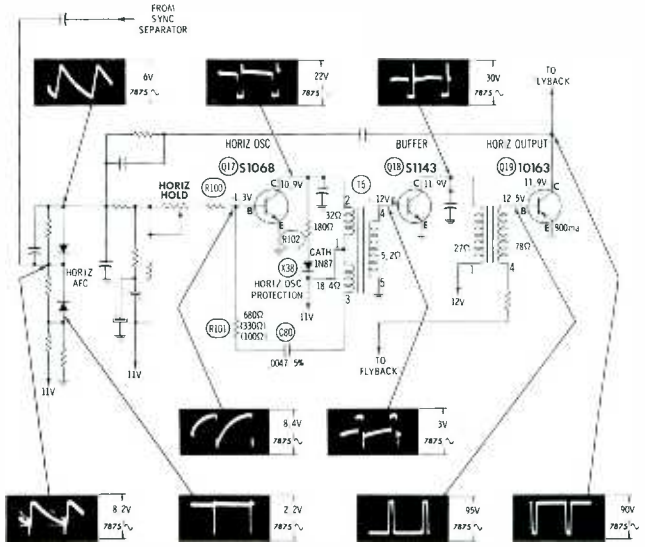
No High Voltage

I have a General Electric TA chassis (PHOTOFACT Folder 765-2) that has no high voltage. All voltages in the horizontal stages read very close to the correct value.

Making scope checks, I find no pulses at all on either the base or collector of Q19. The waveform on the base of Q18 looks more like a sawtooth than the waveform shown. At Q17 the collector waveform looks more like what the base waveform should be. The AFC waveforms are not quite right either. Video waveforms are fine.

R. L. PETRIE

Waterloo, Iowa



From the symptoms you describe, the problem is probably in the horizontal oscillator, Q17. The waveforms in the AFC circuit are derived from sync pulses matrixed with the horizontal output pulse. If the latter pulse is missing, the AFC waveforms will be affected.

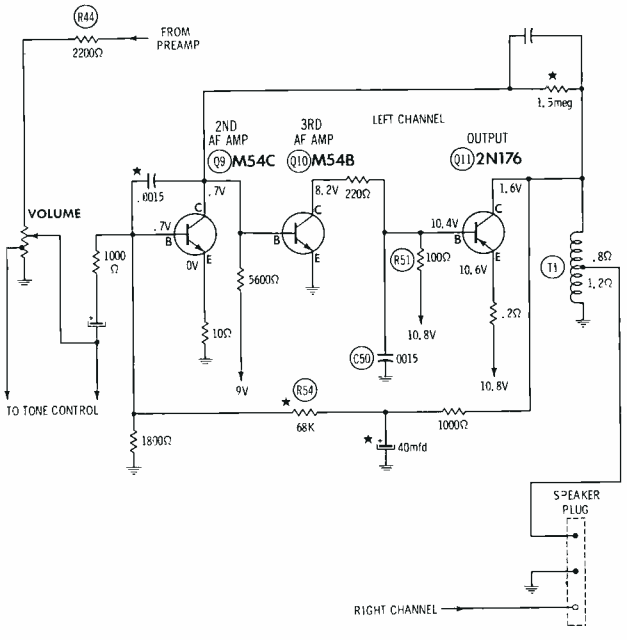
Our initial thought is a shorted oscillator transistor, Q17. This would produce a sawtooth on the collector. If this is not the case, then we must find a component that could go bad without upsetting the DC readings in the circuit. These parts include Q18, C80, C81, R101, or R102. In T5, shorted turns would produce little change in the DC levels, and likewise, if the section between terminals 1 and 3 opens, the DC will change very little.

Hot Transistor

I have a Ford Model T6SMS (PHOTOFACT AR-35) that originally came into the shop with a dead left channel. Q9 proved to be defective, and was replaced. Then the left channel was weak. R44 had increased in value, and it was also replaced. Now the volume is okay, but the output transistor (Q11) runs so hot it burns your finger to touch it. Voltage and current measurements show that Q11 is drawing 1 amp of collector current and there is a 0.65-volt drop across R51. I replaced Q10, R50, C50, and R51, but the output transistor still runs hot.

G. DUNN

Central City, Ky.



Our first thought is a lack of heat sink compound on Q11. The collector current is within reason, though somewhat higher than that indicated in the service literature. There is also a strong possibility that the transistor's I_{CEO} is out of tolerance. This would help account for the higher-than-normal drop across R51.

If neither of these conditions exist, and Q9 and Q10 are not leaky, then we can assume the replacement

transistors did not match the originals. Note that there are several parts marked with a star on the schematic. These parts may be adjusted in value to match the original conditions. In this case, R54 has the greatest effect on the X10 current levels.

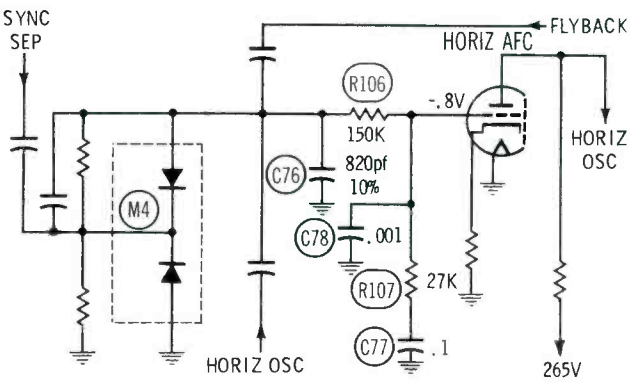
The easiest way to pick the proper part value is to compare the voltage readings with the opposite channel. (The power supply voltage could vary; therefore, the voltages given on the schematic are not absolute). Measure the voltage on the base of the output transistor in the opposite channel, and then adjust the value of R54 until the voltage on the base of Q11 matches the opposite channel reading. Make the adjustments under no-signal conditions; the adjustment is for static bias level.

Jitter

I have a Philco 12L80 chassis (PHOTOFACT 580-1) that shows wavy vertical lines on a crosshatch pattern. The horizontal lines are very straight, so the trouble must be in the vertical section. All voltages throughout the set check good, except the chroma sync phase detector, which measures 45 volts instead of the 20 shown in the PHOTOFACT folder. Scope patterns in the vertical output transformers look good. I have changed all filters, completely retubed the set, and had the tuner rebuilt. Color and all other circuits check good, but this wavy vertical trouble has just about beat me.

S. AMAIMO

Beaumont, Texas



Mr. Amaimo has a difficult problem indeed, but the problem is horizontal — not vertical. This particular sympton is called jitter, or AFC hunting. The best way to troubleshoot it is by experience, because the defective component often will not upset any voltages and will affect only one waveform — the signal on the grid of the AFC tube. And often this waveform is not very distorted, it just changes frequency slightly, producing a little "bounce" on recurrent-sweep scopes.

The actual trouble is in the anti-hunt network, which consists of C76, C77, C78, R106 and R107. These parts are installed to keep the AFC tube from over-correcting any error signal produced by the feedback pulses. The best test for jitter symptoms is to change the parts in the anti-hunt network one by one, until the trouble is corrected. Not very scientific, but effective. ▲

Book Review

CB Radio Antennas, 20567, second edition; David E. Hicks; Howard W. Sams, Indianapolis, Indiana, 1967; 144 pages, 8½" by 5½", paperback, $3.25.

The author has succeeded in answering all questions that will be raised by anyone interested in installing CB antennas or operating CB equipment. Various types of antennas, propagation of radio waves, installation, and the servicing and testing of antenna systems are explained in a manner that will be understood by both the technician and layman.

The material is presented in a logical manner that covers CB antennas from A to Z. Numerous illustrations supplement the text.

The book leads off with a discussion of the importance of the antenna and its various design considerations. Chapter 2 deals with the characteristics of radio waves, explaining their composition, polarization and travel behavior. The length, gain and impedance of an antenna, what determines them and why they are important, is explained in chapter 3. The illustrations of typical CB antennas in Chapter 4 cover a wide range of types (even the Gizmotchy). Chapters 5 and 6 provide a step-by-step procedure for installing a CB base station or mobile CB antenna. The FCC rules and regulations are also included.

Details to be considered when improving an existing antenna system are discussed in Chapter 7. Test instruments—how to use them and what the readings mean—are covered in the final chapter. ▲

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Two-way radio is booming. Today there are more than *five million* two-way transmitters for police cars, fire trucks, taxis, planes, etc. and Citizen's Band uses—and the number is growing at the rate of 80,000 new transmitters per month.

This wildfire boom presents a solid gold opportunity for trained two-way radio service experts. Many of them are earning $5,000 to $10,000 a year *more* than the average radio-TV repair man.

Why You'll Earn Top Pay

One reason is that the U.S. Government doesn't permit anyone to service two-way radio systems unless he is licensed by the FCC (Federal Communications Commission). And there simply aren't enough licensed electronics experts to go around.

Another reason two-way radio men earn so much more than radio-TV service men is that they are needed more often and more desperately. A two-way radio user *must* keep those transmitters operating at all times, and *must* have them checked at regular intervals by licensed personnel to meet FCC requirements.

This means that the licensed experts can "write their own ticket" when it comes to earnings. Some work by the hour and usually charge at least $5.00 per hour, $7.50 on evenings and Sundays, plus travel expenses. Others charge each customer a monthly retainer fee, such as $20 a month for a base station and $7.50 for each mobile station. A survey showed that one man can easily maintain at least 15 base stations and 85 mobiles. This would add up to at least $12,000 a year.

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There are other advantages too. You can become your own boss—work by yourself or gradually build your own fully staffed service company. Instead of being chained to a workbench, machine or desk, you'll move around, see lots of action, rub shoulders with important police and fire officials and business executives who depend on two-way radio for their daily operations.

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He's flying high. Before he got his CIE training and FCC License, Ed Dulaney's only professional skill was as a commercial pilot engaged in crop dusting. Today he has his own two-way radio company, with seven full-time employees. "I am much better off financially, and really enjoy my work," he says. "I found my electronics lessons thorough and easy to understand. The CIE course was the best investment I ever made."

1. Without quitting your present job, learn enough about electronics fundamentals to pass the Government FCC Exam and get your FCC License.
2. Then get a job in a two-way radio service shop and "learn the ropes" of the business. All CIE students can use our free employment service.
3. As soon as you've earned a reputation as an expert, there are several ways you can go. You can move *out* and start signing up and servicing your own customers. You might become a franchised service representative of a big manufacturer and then start getting into two-way radio sales, where one sales contract might net you $5,000. Or you may be invited to move *up* into a high-prestige salaried job with one of the major manufacturers.

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Cleveland Institute of Electronics has been successfully teaching electronics by mail for over thirty years. Right at home, in your spare time, you learn electronics step by step. Our AUTO-PROGRAMMED™ lessons and coaching by expert instructors make everything clear and easy, even for men who thought they were "poor learners." You'll learn not only the fundamentals that apply to all electronics design and servicing, but also the specific procedures for installing, troubleshooting, and maintaining two-way mobile equipment.

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Find out more about how to get ahead in all fields of electronics, including two-way radio. Mail coupon below for two FREE books, "How To Succeed In Electronics" and "How To Get A Commercial FCC License."

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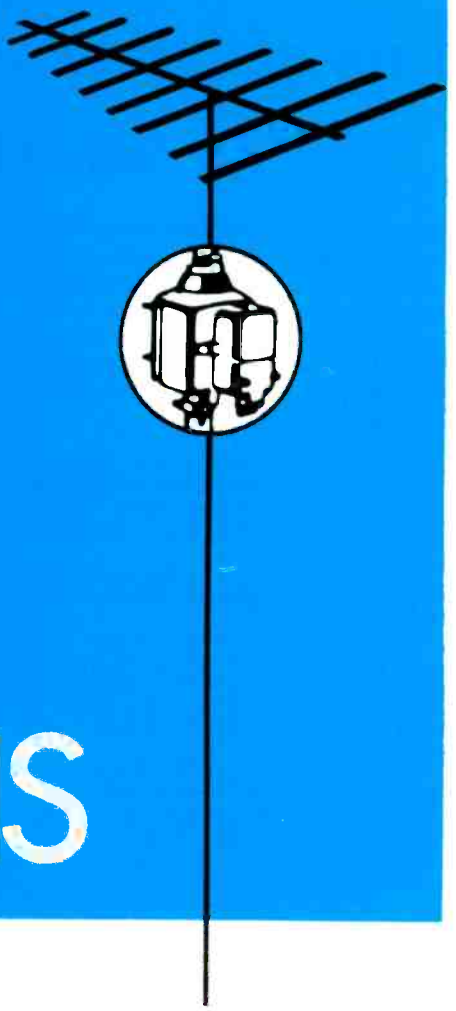
Circle 32 on literature card

Alliance Tenna-Rotor®

REDUCES COLOR SET RETURNS



- CUT COSTLY CALL BACKS
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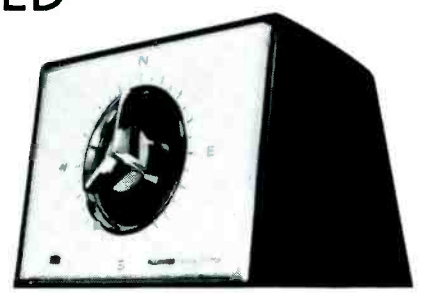
- EARN MORE PROFITS

Since color reception is so critical, it is important to have an Alliance Tenna-Rotor and proper antenna to eliminate color ghosts, snow, and other interference. With an Alliance Tenna-Rotor, your customers will enjoy improved Color TV reception, and you'll be backed by the nationwide Alliance Service, Advertising and Merchandising Program. There are four attractive models to choose from. Let us tell you how to take advantage of this program.



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Circle 33 on literature card

PRODUCT REPORT

for further information on any of the following items, circle the associated number on the Catalog & Literature Card.

240 Volt Power-Line Monitor

(45)

This instrument is designed for use by radio-TV repair shops, laboratories, and industries where it is important to know the power-line voltage at all times. The **RCA** Model WV-503A power line monitor provides an accurate and continuous indication of AC line voltage at a glance without the inconvenience of tying up more costly test instruments for monitoring

purposes. The unit may be used in conjunction with a variable isolation transformer as a valuable aid in selecting line voltages for such applications as TV servicing, test instrument calibration, and operation of electronic equipment that requires a known line-voltage supply.

The instrument features an accuracy of ±2% at 240 volts and can be used on AC power-line sources with frequencies of 25, 50, 60 or 400 Hz. Price is $18.50.

Nutdriver Set

(46)

An interchangeable, hollow-shaft nutdriver set (No. HSC-1), featuring a drilled handle for speeding locknut/slotted screw adjustments, has been announced by **Xcelite Inc.**

An 8-inch or longer round shank screwdriver blade can be passed through the center of the drilled handle and the hollow nutdriver shaft to permit adjustment of combination locknut and screw adjustments found on rheostats and similar controls used in a variety of electronic equipment.

Eight interchangeable shafts with hex openings from 3/16″ through 9/16″ are included. Being hollow, they permit installation or removal of nuts over protruding bolts. Finished in bright nickel chrome, the shafts have cold-drawn, casehardened sockets. The handle of the nutdriver is shockproof, breakproof, amber (UL) plastic and contains a patented spring lock. Blades snap in and out easily, yet are held firmly in alignment for driving. Price is $14.75.

CRT Tester

(47)

A lightweight tester-rejuvenator which features measurement of high-voltage internal leakage has been introduced by **Amphenol Corporation.** The unit can be used with almost all black-and-white and color picture tubes.

The instrument, Model 857, permits the service technician to check and/or rejuvenate picture tubes. Rejuvenation is accomplished by applying high voltage on G1 and G2 while retaining normal filament currents. The process can be repeated at a 35% higher filament voltage and, if necessary, a third time at 85%.

In addition to the high-voltage leakage and rejuvenating features, a heater-adjust control and variable G1 and G2 voltages have been incorporated. All heater voltages are monitored on a voltmeter.

Three different socket assemblies are provided with the instrument, permitting direct mating with more than 90% of all CRT types. A large storage area is included for housing cables and probes when the instrument is not in use.

A voltmeter on the front panel permits measurements of DC voltages in two ranges: 0-1000 volts and 0-50,000 volts, with optional ($12.95) Model 857-9 high-voltage probe for checking second anode voltage.

In checking for high-voltage internal leakage, the instrument is grounded to the TV chassis, and the CRT connected to the proper socket. The receiver is then turned on and the leakage read on the voltmeter. The intensity of the reading will determine the degree of actual CRT deterioration.

The unit incorporates a sensitive 50-μa meter movement, providing direct meter reading for making gas checks. In addition, the instrument has a constant, 2-μa cutoff current feature. After shorts have been opened or open filaments welded, G2 is adjusted for an emission current of 2μa (clearly marked on the meter). This cutoff is maintained as a constant base throughout the remainder of the tests. The unit weighs less than 6 lbs. Price is $99.50.

RF Test Probe

(48)

A miniature RF test probe that permits DC measurements of RF signals, extends the frequency response for AC voltage measurements to 250 MHz, and is designed to be used with the company's new 11-megohm input impedance Model 600 transistorized volt-ohmmeter (TVO), is announced by The **Triplett Electrical Instrument Company.**

Designed for use by radio and television technicians, hams, instrument-test laboratories, transmitter station technicians and engineers, the RF probe and the battery-operated Model 600 TVO serves as a signal tracer

and gain analyzer as well as an RF voltage-measuring device. It can also be used with an oscilloscope to observe detected, modulated RF signals.

The Model 79B-264 probe consists of a germanium rectifier and a 3.9-megohm resistor coupled to the probe tip with a 500-pf capacitor.

Extension of frequency response is accomplished by placing the rectifier in the probe tip and reducing the input capacitance of the probe. The DC output of the rectifier is then fed to the TVO through the probe lead.

Other features of the new RF probe include: low-capacitance loading, slim shape, and an insulated, red-colored, plastic body. The probe can be safely connected to DC voltages up to 500 volts as long as the superimposed RF voltage does not exceed the 20-volt limit. The probe is furnished with a four-foot long shielded connecting cable with phono plug connector and ground lead, and weighs only 2½ oz. Price is $9.00.

Alignment Tool Kit

(49)

Containing a total of six alignment tools, this kit supplies the service technician with a complete assortment of alignment tools for any make or model TV set, whether monochrome or color. The **Injectorall** kit includes two double-ended .100" hex wrenches (5" long and 11" long) for standard IF transformers and coils; a 5" long alignment tool with both hex and screwdriver tips; a pair of tuner alignment tools, 7" long and 12" long; and a double-ended .075" hex wrench (5" long) for miniature transformers and coils. All of the tools are made of nylon and will flex without breaking.

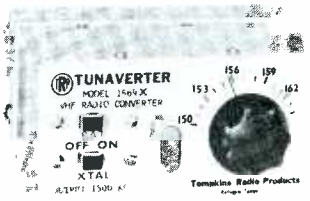
Each tool is double-ended, facilitating alignment of cores having either slotted or hex ends, even if recessed. Also, the nylon cannot damage ferrite-core slugs or slug screws. Contact is

positive and assured, with no tool slippage. The tools are completely non-magnetic and are constructed for positive gripping action. Price of the kit is $1.95.

UHF Converter

(50)

The 150- to 164-MHz (2 meter) VHF band used by fire, police, and other public services can now be heard on home, boat or auto radio with the new Tunaverter Model 1564X by **Tompkins Radio Products.** The new converter employs an FET transistor.



The unit can be crystal controlled by plugging in the correct crystal for no-drift reception. With the flip of a switch you can tune the band with a three-gang tuning capacitor (6:1 reduction tuning) that is peaked to improve selectivity, sensitivity, image rejection, and signal-to-noise ratio.

The converter can be connected between the auto antenna and radio or between a coupling loop and extension antenna for home radio use. Power is provided by a 9-volt transistor radio battery. The unit measures 2½" by 3½" by 4¼". Price is $32.95, less crystal. Crystals are $5.10 each.

VHF/FM Preamplifiers

(51)

Two new, transistorized, mast-mounted preamplifiers designed to meet the requirements of color TV have been announced by **JFD Electronics.**

The new Snowplow preamplifiers use silicon transistor circuitry and can handle up to 40-dBmv output on the high band, providing suitable reception on a distant channel without swamping by a local signal. (Such overload is seen on the TV screen as a crosshatch, beats, or windshield wiper effect.)

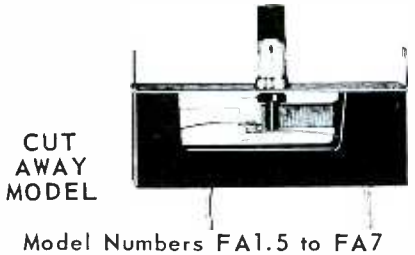
The unit features a gain of 15 dB on all VHF/FM channels, with an output strong enough to supply signals to two or more TV or FM receivers.

Both units come complete with remote power supply and necessary mounting brackets. The SP2300 uses 300-ohm twin lead and is priced at $47.50. Model SP2700 is designed for 75-ohm coaxial cable and is priced at $50.00.

Circuit Breaker

(52)

A dual-purpose circuit breaker with A B+ break current of 2.75 amps and horizontal break current of 650 ma. is **Workman Electronic Products'** new addition to their line of circuit breakers. The new Model FAD is designed



Model Numbers FA1.5 to FA7

for use in color TV. It will be included in the manufacturer's new cross reference No. X53. All of the company's circuit breakers for television are recognized under the component program of Underwriters Laboratories, Inc. List price is $1.27. ▲

PHOTOFACT™ BULLETIN

PHOTOFACT BULLETIN lists new PHOTOFACT coverage issued during the last month for new TV chassis. This is another way PF REPORTER brings you the very latest facts you need to keep fully informed between regular issues of PHOTOFACT Index Supplements issued in March, June, and September.

Admiral	Chassis H5NB29-1, 1H5NB79-1	948-1
	Chassis 6H1ONC59-1/-2/-3, 9H1ONC59-2	949-1
Airline	GEN-13468A (63-13468)	950-2
AMC	C411A	952-1
	C412A, C416A	950-1
Emerson	11P50, 11P50A, 12P50	950-3
	29P04	951-1
	Chassis 120852C/D/E, 120882A	952-2
Motorola	Chassis 23TS-915A/B, 23TS-919A, C23TS-919A	953-1
Olympic	6P31	953-2
Penncrest	1314A	949-2
	1316A-89	948-2
Sears	Chassis 562.10230	951-2
Tonemaster	TM-5711	952-3

Production Change Bulletins

Emerson	Chassis 120549C/550D/556F/ 582E/707B/725B/737J/756J	953-3
General Electric	Chassis AB, CB23, CB25 (Later versions)	951-3
	Chassis DA (Late Version), S-1, SC, T-1, TC	952-4
	Chassis DD	949-3
	Chassis KC (Late Version)	953-3
	Chassis SB (Late Version), V-1, VC	948-4
Motorola	Chassis TS-/JTS-/STS-/VTS-908Y (Late Version) NTS-/PTS-/QTS-908 (coded D-03 thru E-00)	950-4

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FREE Catalog and Literature Service

**Check "Index to Advertisers" for additional information.*

ANTENNAS

100. *BLONDER-Tongue*—24-page product guide to TV-FM reception products.
101. *FINNEY*—4-color brochure with description and technical details on new Finco Color Spectrum frequency-dependent antennas for UHF-VHF-FM, VHF-FM, and UHF. Form 20-413.*
102. *GAVIN INSTRUMENTS* — 6-page folder illustrating the complete outdoor antenna line, converters, and accessories with technical data.*
103. *JERROLD* — Complete catalog on antennas, reception aids, and TV distribution equipment (Form No. DS-C-1054).*
104. *JFD*—New 40-page Dealer Catalog of TV-FM antennas and accessories.*
105. *MOSLEY*—Catalogs on CB, amateur radio, and TV/FM antennas.
106. *WINEGARD*—Fact-finders on "color-Tracker" UHF antennas and a solid-state 4-set booster-coupler.*

AUDIO

107. *ELECTRO-VOICE*—Pocket-size guidebooks for microphones, hi-fi loudspeakers, and hi-fi systems.*
108. *JENSEN MFG.*—Product sheets 146, 147, and 148 with full information on column speakers.

COMMUNICATIONS

109. *AMPHENOL*—2-color spec sheets on new Model 650 CB transceivers and Model C-75 hand-held transceiver.

COMPONENTS

110. *BELDEN*—Catalog 867, a 56-page catalog of the complete Belden line.
111. *BUSSMANN*—New 1968, 16-page car and truck fuse list. Shows what fuse protects—proper fuse to use and where fuse is located. Also shows what BUSS fuse to use in servicing foreign cars and trucks. Ask for BUSS Form AWC.*
112. *CENTRALAB*—24-page replacement parts catalog 33GL.
113. *CORNELL-DUBILIER* — New 4-page Color-lytic list.*
114. *GC*—Giant wall chart with complete pictorial and cross-reference of phono and tape drives, belts, and pulleys.*
115. *IRC* — Brochure describing new "Snap Pak" resistor package.
116. *LITTELFUSE* — Pocket-sized TV circuit-breaker cross reference, CBCRP, gives the following information at a glance; manufacturer's part number, price, color or b-w designation, and trip ratings.*
117. *MALLORY*—Bulletin 4-82 describes radial- and axial-lead tantalum capacitors.*
118. *MILLER*—Catalog 167, a 156-page general catalog with complete cross-reference guide.
119. *QUAM-NICHOLS* — Catalog No. 67 has information on the entire line.
120. *SPRAGUE*—C-618, a new, complete, general-line catalog.*
121. *TEXAS CRYSTALS*—12-page catalog of crystals including engineering data, specifications, and prices.*
122. *TRIAD* — Engineering bulletin on toroidal and power inductors.
123. *WORKMAN* — New cross-reference for VDR's and thermistors used in color TV.*

SERVICE AIDS

124. *CASTLE TUNER*—Fast overhaul service on all makes and models of television tuners. Shipping instructions, labels, and tags are also included.
125. *INJECTORALL*—Literature describing a line of electronic chemicals and tools.*
126. *PERMA POWER*—Technical information on isolation briteners for color TV.

SPECIAL EQUIPMENT

127. *CONCORD*—Catalog sheet on a new camera for VTR and closed circuit use.
128. *STANDARD KOLLSMAN*—Flyers describe replacement TV tuners, built-in UHF converters, external UHF-to-VHF and VHF-to-UHF converters, and contact cleaner kits.
129. *VECTOR* — Literature on the new D.I.P. Plugboards.

TECHNICAL PUBLICATIONS

130. *CLEVELAND INSTITUTE OF ELECTRONICS*—Free illustrated brochure describing electronics slide rule, four-lesson instruction course, and grading service.*
131. *RCA INSTITUTES*—New 1968 career book describes home study programs and course in television (monochrome and color), communications, transistors, and industrial and automation electronics.*
132. *SAMS, HOWARD W.*—Literature describing popular and informative publications on radio and TV servicing, communications, audio, hi-fi, and industrial electronics, including special new 1968 catalog of technical books on every phase of electronics.*

TEST EQUIPMENT

133. *B & K*—Brochures about the B & K, Precision Apparatus, and "Cobra" lines.*
134. *EICO*—New spec sheet describes Model 100A4 multimeter with DC sensitivity of 100K ohms per volt.
135. *HICKOK*—Specification sheets covering Models CR-35 CRT analyzer, 860 Injecto-Tracer, GC-660 color generator, 677 wideband scope, and 661 NTSC color-bar generator.
136. *LECTROTECH* — Two-color catalog sheet on new Model V6-B color bar generator gives all specs and is fully illustrated.*
137. *SECO*—Operating manual for Model 260 dynamic in-circuit transistor tester.
138. *SENCORE*—New 12-page catalog on all Sencore products.*
139. *SIMPSON*—Reprint, "A Guide to the Selection of Multitesters" explains how to evaluate multitesters, explains how to evaluate multitesters before you buy.
140. *TRIPLETT*—Literature sheet on completely new FET VOM with 11-meg-ohm input impedance.

TOOLS

141. *ARROW*—Catalog sheet showing 3 staplegun tackers designed for fastening wires and cables up to ½" diameter.
142. *ENTERPRISE DEVELOPMENT* — Brochure from Endeco demonstrates improved desoldering and resoldering methods for speeding and simplifying operations on PC boards.
143. *PENCO*—Catalog of steel shelving and related products.
144. *SWING-O-LITE* — Catalog sheet on Models BBM-9 and BB-45 bench lamps.
145. *XCELITE*—Bulletin N867 describes hollow-shaft nutdrivers which speed locknut/screw adjustments.

TUBES AND TRANSISTORS

146. *GENERAL ELECTRIC*—Entertainment semiconductor almanac, ETR-4311C, and picture-tube replacement guide, ETR-702K are offered.
147. *IR*—Flyer sheet about a new universal replacement transistor (type TR-27) for vertical and horizontal output applications.
148. *MOTOROLA* — HEP cross-reference guide lists approximately 12,000 semiconductor types.
149. *RCA*—1D1304, a 12-page brochure on RCA's line of all-new HI-LITE color picture tubes for the replacement market. Explains latest technological advances, such as brightness, Perma-Chrome and unity current ratios.*

Antenna Systems Component Guide

The following guide provides a representative listing of the antenna system components available from those manufacturers who responded to our request for information concerning their lines.

In a few instances a specification, such as price, was not available at press time. The notation NA (not available) is used to indicate this fact. All prices given are list.

ACCESSORIES

ARRESTORS:

Coax grounding clamp, provides lightning protection.
Channel Master Corporation
Mfg. No. 7198
$.42

Lightning Arrestor
Channel Master Corporation
Mfg. No. 9049
$.92

Lighting Arrestor
G.C. Electronics
Mfg. No. 8642
$.99

Ground rod clamp
G.C. Electronics
Mfg. No. 8936
$.29

Lightning Arrestor
G.C. Electronics
Mfg. No. 9242
$.87

Lightning Arrestor
Jerrold Electronics Corporation
Mfg. No. 407
$.92

Lightning Arrestor
JFD Electronics Corporation
Mfg. No. AT-103S
$3.75

Arrestor, 4-wire rotator
JFD Electronics Corporation
Mfg. No.AT-104S
$3.00

Arrestor, 5-wire rotator
JFD Electronics Corporation
Mfg. No. AT-106S
$4.00

Arrestor, heavy duty lead-in
JFD Electronics Corporation
Mfg. No. AT 110S
$2.50

Lightning Arrestor
RMS Electronics, Inc.
Mfg. No. UL-5
$1.15

No Specifications available
South River Metal Products Company, Inc.

Coax, Cable:

RG-59/U
3.4 dB attenuation at 100 MHz per 100'
75 ohms
Belden Corporation
Mfg. No. 8221
NA

RG-59/U
3.2 dB attenuation at 100 MHz per 100'
Double Shielded
75 ohm
Belden Corporation
Mfg. No. 8232
NA

RG-11/U
1.5 dB attenuation at 100 MHz per 100'
Double Shielded
75 ohm
Belden Corporation
Mfg. No. 8233
NA

RG-11/U
1.9 dB attenuation at 100 MHz per 100'
75 ohm
Belden Corporation
Mfg. No. 8238
NA

Color Duct-82
8.3 dB attenuation at 800 MHz per 100'
75 ohm
Channel Master Corporation
Mfg. No. Color Duct-82
NA

RG-59/U
NA
73 ohm
Consolidated Wire and Associated Corporatiions
Mfg. No. 4401
NA

RG-59/U
Grey
73 ohm
Consolidated Wire and Associated Corporations
Mfg. No. 4402
NA

RG-59/U
White
73 ohm
Consolidated Wire and Associated Corporations
Mfg. No. 4403
NA

RG-11/U
NA
75 ohm
Consolidated Wire and Associated Corporations
Mfg. No. 4419
NA

RG-59A/U
NA
75 ohm
Consolidated Wire and Associated Corporations
Mfg. No. 4451
NA

Triaxial 59, RG-59/U
Double Shielded
73 ohm
Consolidated Wire and Associated Corporations
Mfg. No. 4460
NA

Triaxial 11, RG-11/U
NA
75 ohm
Consolidated Wire and Associated Corporations
Mfg. No. 4461
NA

82 channel Coloraxial
8.2 dB attenuation at channel 83 (890 MHz) per 100'
75 ohm
Jerrold Electronics Corporation
Mfg. No. CAC-1000
$129.00 per 1000'

RG-59/U
NA
75 ohm
Jerrold Electronics Corporation
Mfg. No. CAB-5
$8.55 per 50'

NA
With Matching Transformer
75 ohm
JFD Electronics Corporation
Mfg. No CS82-100
$17.00 per 100'

RG-59/U
NA
75 ohm
The Finney Company
Mfg. No. CX-283-1M
$93.75 per 1000'

RG-59/U
75 ohm
NA
The Finney Company
Mfg. No. CX-283-100
$14.50 per 100'

Connectors:

RG-11/U Connector
Antennacraft
Mfg. No. C-F-11
$1.18

RG-59/U Connector
Antennacraft
Mfg. No. C-F-59A
$.50

Connects two RG-59/U cables
Antennacraft
Mfg. No. C-F-81A
$1.76

75 ohm termination
Antennacraft
Mfg. No. TR-72F
$1.47

Two plugs, solderless
(for colortap outlet)
Blonder-Tongue
Mfg. No. 3653
$1.45

Crimp (uses cable as
center pin)
RG-11/U
Blonder-Tongue
Mfg. No. BTF-110
$1.17

Male "F" for RG-59/U
Blonder-Tongue
Mfg. No. BTF-591
$.57

Couples two RG-11/U cables
Blonder-Tongue
Mfg. No. CL-1111
$3.35

Couples RG-11/U to RG-59/U
Blonder-Tongue
Mfg. No. CL-1159
$3.35

Couples two RG-59/U cables
Blonder-Tongue
Mfg. No. CL-5959
$3.35

Holding ring for CL-1111,
CL-1159 and GAF404/201
Blonder-Tongue
Mfg. No. HR-11
$.08

Quick disconnect plug for
RG-59/U
Blonder-Tongue
Mfg. No. QDP
$.40

Solderless autoplug for
RG-59/U cable
Blonder-Tongue
Mfg. No. P-75S
$.75

Twin-lead connector
G.C. Electronics
Mfg. No. 8095
$.32

Polarized twin-lead connector,
double
G.C. Electronics
Mfg. No. 8221
$1.61

Polarized twin-lead connector,
single
G.C. Electronics
Mfg. No. 8596
$1.06

RG-11/U connector
Jerrold Electronics Corporation
Mfg. No. AF-101
$2.10

Coloraxial connector
Jerrold Electronics Corporation
Mfg. No. F-56A
$.60

RG-59/U connector
Jerrold Electronics Corporation
Mfg. No. F-59
$.60

75 ohm termination, UHF/VHF
Jerrold Electronics Corporation
Mfg. No. TR-72
$1.50

75 ohm termination, UHF/VHF
Jerrold Electronics Corporation
Mfg. No. TR-75UF
$1.65

Twin-lead connector
Mosley Electronics, Inc.
Mfg. No. 263
$1.06

Universal twin-lead line plug,
clear
Mosley Electronics Inc.
Mfg. No. 301
$.51

Polarized twin-lead line plug
Mosley Electronics, Inc.
Mfg. No. 303B
$.48

Twin-lead line socket, clear
Mosley Electronics, Inc.
Mfg. No. 311
$.41

Polarized twin-lead line
connector
Mosley Electronics, Inc.
Mfg. No. 321
$.94

4 or 5 wire rotor line plug
Mosley Electronics, Inc.
Mfg. No. 345B
$1.27

RG-11/U connector
The Finney Company
Mfg. No. F-11-C
$1.18

RG-59/U coax connector
The Finney Company
Mfg. No. F-59C
$.60

Coax splice
The Finney Company
Mfg. No. F-59-FS
$.95

Weather boot
The Finney Company
Mfg. No. F-59WB
$.12

Hardware, Misc:

Antenna coating
(Weather guard)
Mosley Electronics, Inc.
Mfg. No. 1746
$1.66

Anti-corrosion compound
Mosley Electronics, Inc.
Mfg. No. A-1123
$.34

Cable clip
With adhesive
JFD Electronics Corporation
Mfg. No. CC59
$17.70 per 100

Chimney mount
One 18' stainless steel strap
RCA
Mfg. No. 10Y159
NA

Chimney mount
Ratchet type, 12' stainless
steel strap
RCA
Mfg. No. 10Y138
NA

Chimney mount
Ratchet type
¾" by 12' stainless steel
straps
Channel Master Corporation
Mfg. No. 9072
NA

Chimney mount
"Y" type
RMS Electronics, Inc.
Mfg. No. CM-1
$4.45

Chimney mount
"Y" type, 18' stainless steel
straps
RCA
Mfg. No. 10Y133
NA

Chimney mount
"Y" type, snap-in
12' stainless steel straps
RCA
Mfg. No. 10Y135
NA

Chimney mount
"Y" type
12' stainless steel straps
Jerrold Electronics Corporation
Mfg. No. 446-12S
$5.25

Chimney mount
"Y" type, ¾" by 36'
galvanized steel straps
G. C. Electronics
Mfg. No. 8611-L
$5.26

Chimney mount
"Y" snap-in type
¾" by 20' galvanized
steel straps
G. C. Electronics
Mfg. No. 8612
$3.70

Chimney mount
"Y" type, ¾" by 24' stainless
steel straps
Aluminum "Y"
G. C. Electronics
Mfg. No. 8613
$5.46

Chimney mount
"Y" snap-in type
¾" by 20' stainless steel
straps
G. C. Electronics
Mfg. No. 8614
$4.30

Chimney mount
"Y" snap-in type
¾" by 36' stainless steel
straps
G. C. Electronics
Mfg. No. 8930-L
$6.56

Chimney mount
"Y" type, ¾" by 24' stainless

steel straps
G. C. Electronics
Mfg. No. 9026
$5.92

Chimney mount
"Y" type
10' stainless steel straps
Channel Master Corporation
Mfg. No. 9059
NA

Chimney mount
"Z" type
RMS Electronics, Inc.
Mfg. No. MZ-1
$2.95

Chimney mount
"Z" type, 12' stainless steel straps
RCA
Mfg. No. 10Y136
NA

Chimney mount
"Z" type
10' galvanized steel straps
Jerrold Electronics Corporation
Mfg. No. 447-10G
$2.81

Chimney mount
"Z" type
12' stainless steel straps
Jerrold Electronics Corporation
Mfg. No. 447-12S
$4.50

Chimney mount
"Z" type ¾" by 24' galvanized steel straps
G. C. Electronics
Mfg. No. 8005
$3.21

Chimney mount
"Z" type, ¾" by 36' galvanized steel straps
G. C. Electronics
Mfg. No. 8005-L
$3.85

Chimney mount
"Z" type, ¾" by 36' stainless steel straps
G. C. Electronics
Mfg. No. 9025-L
$5.62

Chimney mount
"Z" type
12' stainless steel straps
Channel Master Corporation
Mfg. No. 9061
NA

Chimney mount
"Z" type, ¾" by 20' stainless steel straps
G. C. Electronics
Mfg. No. 9127
$4.26

Eyebolt
Guy wire anchor
RMS Electronics, Inc.
Mfg. No. GI-4
$.17

Eyebolt
¼" eye 3" length
RCA
Mfg. No. 10Y111
NA

Eyebolt
¼" eye 2¼" length
Jerrold Electronics Corporation
Mfg. No. 421-2
$.07

Eyebolt
5/16" eye 5" length
Channel Master Corporation
Mfg. No. 9674
$.17

Ground rod
6'
RCA
Mfg. No. 10Y118
NA

Ground rod
4'
Jerrold Electronics Corporation
Mfg. No. 425-4
$1.50

Ground rod
6' by ⅜"
G. C. Electronics
Mfg. No 9016
$2.17

Ground rod
⅜" by 6'
Channel Master Corporation
Mfg. No. 9076
NA

Guy wire ring
1¼" mast
RMS Electronics, Inc.
Mfg. No. GWR-3
$.23

Guy wire ring
For 1¼" mast (¾" to 2" available)
G. C. Electronics
Mfg. No. 8314
$.25

Guy wire thimble
G. C. Electronics
Mfg. No. 8132
$.06

Guy wire clamp
⅛" wire
RCA
Mfg. No. 10Y152
NA

Guy wire clamp
3 eye
Jerrold Electronics Corporation
Mfg. No. 422-3
$.68

Guy wire clamp
⅛" wire
Jerrold Electronics Corporation
Mfg. No. 460
$.64

Guy wire clamp
Holds ⅛" wire
G. C. Electronics
Mfg. No. 8081
$.64

Guy wire clamp
NA
G. C. Electronics
Mfg. No. 8131
$.29

Guy wire clamp
Two eye, fits ¾" to 1½" mast
G. C. Electronics
Mfg. No. 8939
$.51

Guy wire clamp
2 eye
Channel Master Corporation
Mfg. No. 9015
$.67

Mast
1¼" by 10', 20 gauge, galvanized
RMS Electronics, Inc.
Mfg. No. CR-10
$3.00

Mast
1¼" by 10', heavy gauge
RCA
Mfg. No. 10Y171
NA

Mast
1¼" by 5', light gauge
RCA
Mfg. No. 10Y166
NA

Mast
1¼" by 10', medium gauge
RCA
Mfg. No. 10Y169
NA

Mast
10' of 16 gauge
Jerrold Electronics Corporation
Mfg. No. 452-1016
$4.15

Mast
10' of 18 gauge
Jerrold Electronics Corporation
Mfg. No. 452-1018
$3.48

Mast
10' of 20 gauge
Jerrold Electronics Corporation
Mfg. No. 452-1020
$3.08

Mast
10' x 1¼", 16 guage steel
Channel Master Corporation
Mfg. No. 1612
$2.45

Mast
5' x 1¼" 20 guage steel
Channel Master Corporation
Mfg. No. 2005-B
$.90

Mast
5' x 1¼", Gold anodized aluminum
G. C. Electronics
$2.42

Mast
5' x 1¼" Galvanized steel
G. C. Electronics
$1.71

Mast clamp
For guy wire
RCA
Mfg. No. 10Y113
NA

Mast coupler
1" to 1¾" mast, two piece
G. C. Electronics
Mfg. No. 8371
$1.52

Mast coupler
1" to 1¾" mast, 3 piece
G. C. Electronics
Mfg. No. 8645
$1.52

Mast mount bracket for couplers
NA
Blonder-Tongue
Mfg. No. Jiffy mount
$.75

Mast, telescoping
30'
RMS Electronics, Inc.
Mfg. No. M-30
$16.95

Mast, telescoping
50′
RMS Electronics, Inc.
Mfg. No. M-50
$32.95

Mast, telescoping
20′
RCA
Mfg. No. 10Y162
NA

Mast, telescoping
50′
RCA
Mfg. No. 10Y165
NA

Mast, telescoping
40′
Jerrold Electronics Corporation
Mfg. No. 450-40
$27.81

Mast, telescoping
20′, 16 gauge steel
Channel Master Corporation
Mfg. No. 1620-C
$6.30

30″ lower support
G. C. Electronics
Mfg. No. 8625
$5.46

Roof mount
Universal
RMS Electronics, Inc.
Mfg. No. VM-2
$3.75

Roof mount
1¼″ mast
RCA
10Y120
NA

Roof mount
to 2¼″ mast
RCA
Mfg. No. 10Y124
NA

Roof mount
1¼″ to 2″ mast, swivel
Jerrold Electronics Corporation
Mfg. No. 433-2
$2.81

Roof mount
To 1¾″ mast, zinc plated
G. C. Electronics
Mfg. No. 8575
$3.36

Roof mount
To 2½″ mast, galvanized
G. C. Electronics
Mfg. No. 8580
$5.28

Roof mount
Two 1¼″ mast, swivel base,
aluminum
G. C. Electronics
Mfg. No. 8628
$.43

Roof mount
To 1½″ mast, handy mount
G. C. Electronics
Mfg. No. 8800-U
$.78

Roof or wall mount
Hinged, to 1½″ mast
G. C. Electronics
Mfg. No. 9021
$1.41

Roof mount
Adjustable
G. C. Electronics
Mfg. No. 9024
$1.86

Roof mount
Four legs, cast-iron base
To 1½″ mast
G. C. Electronics
Mfg. No. 9060
$6.41

Stacking harness, Antennas
Channel Master Corporation
NA
NA

Stacking harness, Antennas
The Finney Company
NA
NA

Standoff
Twist-on, 1¼″ mast, 3½″
Rohn Manufacturing Company
Mfg. No. 3TS1 1/4U
$11.35 per 100

Standoff
Twist-on, 1½″ mast, 3½″
Rohn Manufacturing Company
Mfg. No. 3TS1 1/2U
$12.15 per 100

Standoff
Single eye, 3½″
RCA
Mfg. No. 10Y101
NA

Standoff
Double eye, 7½″
RCA
Mfg. No. 10Y104
NA

Standoff
Masonry nail
RCA
Mfg. No. 10Y106
NA

Standoff
Single eye, 3½″
Jerrold Electronics Corporation
Mfg. No. 410-3B
$4.50 per 100

Standoff
Single eye, 5½″
Jerrold Electronics Corporation
Mfg. No. 410-5B
$.08

Standoff
Double eye, 7½″
Jerrold Electronics Corporation
Mfg. No. 411-7B
$.22

Standoff
Nail-in, wood, 4″
Jerrold Electronics Corporation
Mfg. No. 413-B
$.09

Standoff
Nail-in, masonry
Jerrold Electronics Corporation
Mfg. No. 414-B
$.16

Standoff
Double eye, 3½″
G. C. Electronics
Mfg. No. 4027
$.05

Standoff
Double eye, 5½″
G. C. Electronics
Mfg. No. 4032
$.24

Standoff
Wood screw type, 7½″
G. C. Electronics
Mfg. No. 8029
$.09

Standoff
Machine screw type, 5½″
G. C. Electronics
Mfg. No. 8032
$.08

Standoff
Nail-in, wood, 3½″
G. C. Electronics
Mfg. No. 8343
$.08

Standoff
Single eye, 5½″, steel
Stainless steel strap
G. C. Electronics
Mfg. No. 8354
$.24
Also available
No. 8353—3½″—$.20
No. 8357—7½″—$.25

Standoff
Clamps on eave, 3½″
G. C. Electronics
Mfg. No. 8811
$.17

Standoff
Double eye, 7½″
Channel Master Corporation
Mfg. No. 9610V
$.29

Standoff
Single eye, 3½″
Channel Master Corporation
Mfg. No. 9632U
$4.50 per 100

Standoff
Woodscrew or machine screw
Single combo, 3½″,
5½″, 7½″
G. C. Electronics
Mfg. No. EZ-4027,
EZ-4028, EZ-4029
$.12 to $.15

Standoff
Woodscrew or machine screw
T type, 3½″,
5½″, 7½″
G. C. Electronics
Mfg. No. EZ-4031,
EZ-4032, EZ-4033
$.20 to $.24

Standoff
Woodscrew, 3½″,
5½″, 7½″
Single combo
G. C. Electronics
Mfg. No. EZ-8027,
EZ-8028, EZ-8029
$.12 to $.15

Standoff
Machine screw, 3½″,
5½″, 7½″
Single combo
G. C. Electronics
Mfg. No. EZ-8031,
EZ-8032, EZ-8035
$.11 to $.14

Standoff
Nail-in, for brick or masonry
G. C. Electronics
Mfg. No. EZ-8762
$.19

Standoff
Snap-on 1¼″ mast, 3½″
G. C. Electronics
Mfg. No. EZ-8798
$.23

Standoff
Single eye, 7½″

RMS Electronics, Inc.
Mfg. No. MC-7
$.25

Standoff
Woodscrew, single eye, 3½"
RMS Electronics, Inc.
Mfg. No. W-35
$.06

Standoff strap
9" stainless steel strap
RCA
Mfg. No. 10Y109
NA

Standoff strap
Stainless steel
Jerrold Electronics Corporation
Mfg. No. 412-S
$.16

Standoff strap
Galvanized metal, 9"
G. C. Electronics
Mfg. No. 4040-N
$.13

Standoff strap
Stainless steel, 9"
G. C. Electronics
Mfg. No. 4050-N
$.16

Standoff strap
Nut type, 9" stainless steel
G. C. Electronics
Mfg. No. 8250-N
$.16

Standoff strap
Nut type, 9" galvanized metal
G. C. Electronics
Mfg. No. 8251-N
$.12

Standoff strap
For 5" diameter mast
G. C. Electronics
Mfg. No. 8252
$.14

Strapping
¾" galvanized with ¼" holes
G. C. Electronics
Mfg. No. 8051
$8.03 per 100' (12', $1.03)

Strapping, stainless steel
¾" by 100'
G. C. Electronics
Mfg. No. 8806
$12.02—(25' is $3.21)

Strapping, galvanized
¾" by 100'
G. C. Electronics
Mfg. No. 8808
$5.92—(25' is $1.52)

Strapping
Two ¾" by 24', galvanized
G. C. Electronics
Mfg. No. 8931
$1.78

Strapping
Two ¾" x 24', stainless steel
G. C. Electronics
Mfg. No. 8932
$3.54

Strap clamp
Corrosion resistant
G. C. Electronics
Mfg. No. 8129
$29.67 per 100

Tower, tri-pod
3'
RCA
Mfg. No. 10Y125
NA

Tower, tri-pod
5'
Jerrold Electronics Corporation
Mfg. No. 435-5
$15.28

Tower, tri-pod
5', up to 1¾" mast
Channel Master Corporation
Mfg. No. 9004
$15.28

Tower, tri-pod
2'
G. C. Electronics
Mfg. No. 9063
$7.84

Tower, tri-pod
5'
G. C. Electronics
Mfg. No. 9143
$17.25

Tower, tri-pod
3'
G. C. Electronics
Mfg. No. 9144
$10.23

Turnbuckle
5½" closed, 7½" open
RMS Electronics, Inc.
Mfg. No. GTB-2
$.45

Turnbuckle
5½" closed, 7⅝" open
RCA
Mfg. No. 10Y115
NA

Turnbuckle
5½" closed, 7⅝" open
Jerrold Electronics Corporation
Mfg. No. 423-5
$.32
Also available
No. 423-4, 4½" to 6⅜", $.27
No. 423-6, 6¾" to 9⅜", $.55

Turnbuckle
4½" closed, 6⅜" open
G. C. Electronics
Mfg. No. 8058
$.26
Also available
No. 8056—3⅜" to 4⅝"—$.22
No. 8057—4" to 5⅝"—$.25
No. 8365—5½" to 7⅝"—$.32
No. 8366—6¾" to 9¼"—$.55
No. 8367—7½" to 10½"
—$.88

Turnbuckle
5½" closed, 7⅝" open
Channel Master Corporation
Mfg. No. 9668
$.50

Universal mount
1¼" to 1½" mast
Channel Master Corporation
Mfg. No. 9039
$2.36

Vent mount
2" to 4" vent
G. C. Electronics
Mfg. No. 8802
$3.21

Vent mount
4" to 6" vent
G. C. Electronics
Mfg. No. 8803
$3.21

Vent mount
Up to 4" vent
Channel Master Corporation
Mfg. No. 9001
$3.14

Wall mount
NA
RMS Electronics, Inc.
Mfg. No. WM-8
$2.95

Wall mount
4" clearance, stainless steel
RCA
Mfg. No. 10Y127
NA

Wall mount
18" clearance
Tubular tripod
RCA
Mfg. No. 10Y129
NA

Wall mount
18" clearance
Jerrold Electronics Corporation
Mfg. No. 438-18
$7.48

Wall mount
8" clearance
G. C. Electronics
Mfg. No. 8308
$3.66

Wall mount
12" clearance
G. C. Electronics
Mfg. No. 8312
$4.49

Wall mount
18" clearance
G. C. Electronics
Mfg. No. 8318
$5.92

Wall mount
24" clearance
G. C. Electronics
Mfg. No. 8324
$8.17

Wall mount
4" clearance
G. C. Electronics
Mfg. No. 9241
$1.05

Wall mount
1¼" to 1½" mast, heavy duty
Channel Master Corporation
Mfg. No. 9016
$2.11

South River Metal Products Company, Inc.
No specifications available

Matching Transformers, 300/75 ohm:

Antennacraft
UHF/VHF/FM
Indoor/outdoor
Mfg. No. MT-375-UVF
$4.95

Antennacraft
UHF/VHF/FM
Indoor/outdoor
UV-375-W
$3.25

Blonder-Tongue
VHF
Indoor
Mfg. No. Cablematch 3334
$3.21

Blonder-Tongue
UHF
NA

Mfg. No. Cablematch 3370
NA

Blonder-Tongue
VHF/FM
NA
Mfg. No. Cablematch F
$3.21

Blonder-Tongue
UHF/VHF/FM
Outdoor
Mfg. No. MT-283
$5.11

Channel Master Corporation
UHF/VHF/FM
Outdoor
Mfg. No. 0035-A
$3.86

Channel Master Corporation
UHF/VHF/FM
Indoor
Mfg. No. 7180
$1.92

Craftsman Electronic Products
VHF/FM
Indoor
Mfg. No. T-15
$3.10

Craftsman Electronic Products
VHF/FM
Outdoor
Mfg. No. 1002-A
$4.15

Gavin Instruments, Inc.
UHF/VHF/FM
Outdoor
Mfg. No. T-101
NA

Gavin Instruments, Inc.
UHF/VHF/FM
Indoor
Mfg. No. T-201
NA

G. C. Electronics
UHF/VHF/FM
Outdoor
Mfg. No. A-1088-1
$4.03

G. C. Electronics
UHF/VHF/FM
Indoor
Mfg. No. A-1089-1
$3.59

Jerrold Electronics Corporation
UHF/VHF/FM
Indoor
Mfg. No. T-379
$2.50

JFD Electronics Corporation
UHF/VHF/FM
Outdoor/indoor
Mfg. No. MT50
$3.95

JFD Electronics Corporation
UHF/VHF/FM
Indoor
Mfg. No. MT54
$3.50

JFD Electronics Corporation
UHF/VHF/FM
NA
Mfg. No. MT60
$2.95

Mosley Electronics, Inc.
NA
Outdoor/indoor
Mfg. No. MTR-37
$6.75

Mosley Electronics, Inc.
UHF/VHF/FM
Outdoor/indoor
Mfg. No. MTR-37A
$9.74

RMS Electronics, Inc.
NA
Outdoor
Mfg. No. ATR-375
$3.95

RMS Electronics, Inc.
UHF/VHF
Indoor
Mfg. No. TR-730
$2.95

S & A Electronics, Inc.
UHF/VHF/FM
Indoor and outdoor (2 units)
Mfg. No. 7018
$8.75

The Finney Company
UHF/VHF/FM
Outdoor
Mfg. No. M-248
$9.95

The Finney Company
VHF/FM
Outdoor
Mfg. No. 7512-A
$4.95

The Finney Company
VHF/FM
Indoor
Mfg. No. 7512-B
$2.95

Workman Electronic Products
UHF/VHF/FM
NA
Mfg. No. T490
$2.90

Zenith Radio Corporation
UHF/VHF/FM
Indoor
Mfg. No. 973-104
NA

Zenith Radio Corporation
UHF/VHF/FM
Outdoor
Mfg. No. 973-109
NA

Switches:

Antenna switch
2-way
300 and 75 input to
300 ohm output
Craftsman Electronic Products
Mfg. No. 617S
$13.25

Antenna switch
Two-way
300 ohm
Jerrold Electronics Corporation
Mfg. No. 823
$2.20

Antenna switch
Three-way
300 ohm
Jerrold Electronics Corporation
Mfg. No. 873
$4.95

Antenna switch
Three-way
NA
JFD Electronics Corporation
Mfg. No. AS1
$3.95

Antenna switch
Two-way
NA
JFD Electronics Corporation
Mfg. No. AS2
$2.95

Antenna switch
Twin-lead and dial switch
outlet (with hdwe pkg.)
Mosley Electronics, Inc.
Mfg. No. F-10PKB
$9.03

Antenna switch
Three-way
300 ohm
Mosley Electronics, Inc.
Mfg. No. F-20
$6.78

Antenna switch
Two-way
300 ohm
Mosley Electronics, Inc.
Mfg. No. F-40
$4.09

Attenuator switch
Three-way
0 db, 15 db, 25 db
JFD Electronics Corporation
Mfg. No. AS5
$4.95

Antenna switch
2-way (slide switch)
300 ohm
Mosley Electronics, Inc.
Mfg. No. F-42
$3.05

Antenna switch
2-way
NA
RCA
Mfg. No. 10Y254
NA

Tools:

Cable stripper
Blonder-Tongue
Mfg. No. S-1
$6.10

Crimping and cutting for
RG-11U and RG-59U cables
and rings
Blonder-Tongue
Mfg. No. CR-2
$13.80

Crimping tool for RG-59
and RG11
Jerrold Electronics Corporation
Mfg. No. PL-602
$8.98

Crimping tool for RG-59
and coloraxial
Jerrold Electronics Corporation
Mfg. No. PL-659-DP
$5.98

Standoff "eye-opener" tool
G. C. Electronics
Mfg. No. 8450
$.86

Staple gun for RG-11/U
The Finney Company
Mfg. No. T-75
NA

Staple gun for RG-59/U
The Finney Company
Mfg. No. T-25
NA

Traps, Filters:

FM—bandpass filter
Pass FM only
NA
S & A Electronics, Inc.
Mfg. No. 7016
$6.95

FM—bandpass filter
Pass FM only
300 ohm
The Finney Company
Mfg. No. 3007
$6.95

Hi-pass filter
NA
NA
JFD Electronics Corporation
Mfg. No. HP50
$5.50

FM trap
300 ohm
Blonder-Tongue
Mfg. No. FR-FM
NA

FM trap
300 ohm
The Finney Company
Mfg. No. M-523
$8.95

FM trap
NA
Jerrold Electronics Corporation
Mfg. No. TFM-1
$64.25

FM trap
NA
JFD Electronics Corporation
Mfg. No. TRFM
$6.25

FM trap
300 ohm
Channel Master Corporation
Mfg. No. 0014
$6.25

FM trap
300 ohm
The Finney Company
Mfg. No. 3006
$6.25

Single channel trap
300 ohm, indoor/outdoor
Blonder-Tongue
Mfg. No. FR (specify channel)
$9.20

Single channel trap
NA
JFD Electronics Corporation
Mfg. No. TR (specify channel 2-6)
$8.95

Low VHF band trap
NA
Jerrold Electronics
Mfg. No. TLB-1
$64.25

Low VHF band
Interference trap
JFD Electronics Corporation
Mfg. No. WT26
$5.50

High VHF band
Interference trap
JFD Electronics Corporation
Mfg. No. WT713
$5.50

6.8—8.5 MHz trap
Tunable
Mosley Electronics, Inc.
Mfg. No. WT-7
$5.83

13.8—16 MHz trap
Tunable
Mosley Electronics, Inc.
Mfg. No. WT-14
$5.83

16—28 MHz trap
Tunable
Mosley Electronics, Inc.
Mfg. No. WT-21
$5.83

27—55 MHz trap
Tunable
Mosley Electronics, Inc.
Mfg. No. WT-41
$5.83

47—110 MHz trap
Tunable
Mosley Electronics, Inc.
Mfg. No. WT-78
$5.83

100—230 MHz trap
Tunable
Mosley Electronics, Inc.
Mfg. No. WT-165
$5.83

Wall outlets:

One outlet
300 to 75 ohm match
The Finney Company
Mfg. No. M-302
$3.40

One outlet
300 ohm to 75 ohm match
Blonder-Tongue
Mfg. No. V-1SMT
$5.05

One outlet
300 ohm
Mosley Electronics, Inc.
Mfg. No. 343
$.76

One outlet
300 ohm
Blonder-Tongue
Mfg. No. 3649
$2.25

One outlet (with hdwe. pkg.)
300 ohm
G. C. Electronics
Mfg. No. 8595-1
$1.20

One outlet
300 ohm
The Finney Company
Mfg. No. F-82-LT-300
$3.50

One outlet
300 ohm
Mosley Electronics, Inc.
Mfg. No. F-1
$1.29

One outlet (with hdwe. pkg.)
300 ohm
Mosley Electronics, Inc.
Mfg. No. F-1PKB
$2.05

One outlet
300 ohm
Mosley Electronics, Inc.
Mfg. No. FY-1PKB
$2.05

One outlet
300 ohm
Surface mounting
Mosley Electronics, Inc.
Mfg. No. SM-1
$1.28

One outlet (with hdwe. pkg.)
300 ohm
Surface mounting
Mosley Electronics, Inc.
Mfg. SM-1PKB
$1.70

One outlet
300 ohm with variable tap
Jerrold Electronics Corporation
Mfg. No. VT-300
$3.60

One outlet (with hdwe. pkg.)
75 ohm (12 dB tap)
Jerrold Electronics Corporation
Mfg. No. FT-75
$3.50

One outlet
75 ohm (variable tap)
Winegard Company
Mfg. No. UVF-87
$7.25

One outlet
75 ohm with variable tap
Jerrold Electronics Corporation
Mfg. No. VT-75
$3.90

One outlet
75 ohm
The Finney Company
Mfg. No. F-82-LT-75
$3.95

One outlet (with hdwe. pkg.)
75 ohm
Mosley Electronics, Inc.
Mfg. No. FCC-1PK
$4.40

One outlet
75 ohm
JFD Electronics Corporation
Mfg. No. TT-7575
$3.40

Two outlets
300 to 75 matching transformer
Antennacraft
Mfg. No. WB-375-W
$4.35

Two outlets
300 ohm
UHF/VHF splitter
Antennacraft
Mfg. No. OP-2-UVW
$4.64

Two outlets
300 ohm
Mosley Electronics, Inc.
Mfg. No. F-11 PKB
$2.44

Two outlets
300 ohm
Surface mounting
Mosley Electronics, Inc.
Mfg. No. SM-11PKB
$2.76

Two outlets
300 ohm
Blonder-Tongue
Mfg. No. 3650
$3.05

Two outlets (with hdwe. pkg.)
300 ohm and 4 or 5 wire rotor
Mosley Electronics, Inc.
Mfg. No. F-145PKB
$3.60

Two outlets (with hdwe. pkg.)
300 ohm and 4 or 5 wire rotor
Mosley Electronics, Inc.
Mfg. No. FY-145PKB
$3.07

2 outets (with hdwe. pkg.)
300 ohm and 4 wire rotor
Antennacraft
Mfg. No. TRP-4-W
$3.80

Two outlets (with hdwe. pkg.)
300 ohm and 4 or 5
wire rotor
JFD Electronics Corporation
Mfg. No. TR-3030
$3.75

Two outlets (with hdwe. pkg.)
300 ohm and 4 or 5
wire rotor
Mosley Electronics, Inc.
Mfg. No. 355PKB
$3.37

Two outlets (with hdwe. pkg.)
75 ohm and 4 or 5
wire rotor
Surface mounting
Mosley Electronics, Inc.
Mfg. No. SM-145PKB
$4.77

Two outlets (with hdwe. pkg.)
75 ohm and 4 or 5
wire rotor
Mosley Electronics, Inc.
Mfg. No. FCC-145PK
$6.06

Two outlets (with hdwe. pkg.)
75 ohm and 8 wire rotor
Mosley Electronics, Inc.
Mfg. No. F-18PKB
$5.18

Two outlets
TV and FM (specify isolation)
75 ohm
The Finney Company
Mfg. No. M-304
$5.00

Two outlets
TV and FM (10 dB isolation)
300 ohm
Blonder-Tongue
Mfg No. 3654
$3.60

Two outlets (with hdwe. pkg.)
300 ohm and AC line
Mosley Electronics, Inc.
Mfg. No. AC-1PKB
$3.12

Two outlets (with hdwe. pkg.)
300 ohm and AC line
Mosley Electronics
Mfg. No. ACA-1PKB
$3.11

Two outlets
75 ohm and 300 ohm
Mosley Electronics, Inc.
Mfg. No. F-4PKB
$4.73

Two outlets (with hdwe. pkg.)
4 or 5 wire rotor and AC line
Mosley Electronics, Inc.
Mfg. No. AC-145PKB
$5.40

Three outlets (with hdwe. pkg.)
Two 300 ohm and AC line
Mosley Electronics, Inc.
Mfg. No. AC-11PKB
$3.80

Three outlets (with hdwe. pkg.)
4 or 5 wire rotor and
2 AC line
Mosley Electronics, Inc.
Mfg. No. AC-245PKB
$6.36

Three outlets (with hdwe. pkg.)
300 ohm
Surface mounting
Mosley Electronics, Inc.
Mfg. No. SM-111PKB
$4.37

Three outlets (with hdwe. pkg.)
Two 75 ohm and 4 or 5
wire rotor
Surface mounting
Mosley Electronics, Inc.
Mfg. No. SM-245PKB
$5.57

Three outlets (with hdwe. pkg.)
300 ohm
Mosley Electronics, Inc.
Mfg. No. F-111PKB
$4.70

Three outlets (with hdwe. pkg.)
Two 300 ohm and 8 wire rotor
Mosley Electronics, Inc.
Mfg. No. F-118PKB
$6.55

Three outlets (with hdwe. pkg.)
Two 75 ohm and 4 or 5
wire rotor
Mosley Electronics, Inc.
Mfg. No. F-245PKB
$4.14

Four outlet tap
NA
Jerrold Electronics Corporation
Mfg. No. 1405
$16.50

Wire, Miscellaneous:

Ground wire
Aluminum
RMS Electronics, Inc.
Mfg. No. GW-1000
$34.95 per 1000'

Ground wire
8 ga.
50'
RCA
Mfg. No. 10Y155
NA

Ground wire
8 ga. aluminum
Jerrold Electronics Corporation
Mfg. No. 462-50
$33.89 per 1000'

Ground wire
8 ga. aluminum
Belden Corporation
Mfg. No. 8018
NA

Ground wire
8 ga. aluminum
50' card
G. C. Electronics
Mfg. No. 8829
$3.85

Ground wire
8 ga.
Channel Master Corporation
Mfg. No. 9090
NA

Ground wire
NA
Consolidated Wire and
Associated Corporations
Mfg. No. NA
NA

No Specifications available
South River Metal Products
Company, Inc.

Guy wire
⅞"
RMS Electronics, Inc.
Mfg. No. AGY-100
$49.95 per 1000'

Guy wire
6 strands 20 ga. steel
RMS Electronics, Inc.
Mfg. No. GY-50
$14.95 per 1000'

Guy wire
7 strands 22 ga.
Vinyl covered steel
G. F. Wright Steel and
Wire Company
Mfg. No. V722
$31.00 per 1000'

Guy wire
6 strands 20 ga.
100'
RCA
Mfg. No. 10Y151
NA

Guy wire
50' card
G. C. Electronics
Mfg. No. 32-114
$.94

Guy wire
6 strands 20 ga. steel
Jerrold Electronics Corporation
Mfg. No. 461-50
$14.50 per 1000'

Guy wire
6 strands 18 ga.
galvanized steel
Channel Master Corporation
Mfg. No. 9085
NA

Guy Wire
NA
Consolidated Wire and
Associated Corporations
Mfg. No. NA
NA

Guy wire
6 strands 20 ga.,
galvanized steel
G. F. Wright Steel and
Wire Company
Mfg. No. NA
$10.15 per 1000'

Guy wire
7 strands 18 ga., aluminum
G. F. Wright Steel and
Wire Company
Mfg. No. NA
$37.30 per 1000'

Rotor (4 wire)
NA
75' card
G. C. Electronics
Mfg. No. 32-156
$3.39

Rotor (4 wire)
20 ga.
Flat (.070" x .390")
Belden Corporation
Mfg. No. 8464
NA

Rotor (4 wire)
20 ga.
.180" O.D.
Belden Corporation
Mfg. No. 8484
NA

Rotor (4 wire)
18 ga.
.250" O.D.
Belden Corporation
Mfg. No. 8489
NA

Rotor (4 wire)
22 ga.
Flat (.072" x .345")
Consolidated Wire and
Associated Corporations

Mfg. No. 4508
NA

Rotor (4 wire)
20 ga.
Flat (.072" x .400")
Consolidated Wire and
Associated Corporations
Mfg. No. 4510
NA

Rotor (4 wire)
22 ga.
.160" O.D.
Consolidated Wire and
Asscociated Corporations
Mfg. No. 4515
NA

Rotor (4 wire)
20 ga.
NA
Channel Master Corporation
Mfg. No. 9541
NA

Rotor (5 wire)
20 ga.
Flat (.070" x .375")
Belden Corporation
Mfg. No. 8463
NA

Rotor (5 wire)
20 ga.
.190" O.D.
Belden Corporation
Mfg. No. 8485
NA

Rotor (5 wire)
20 ga.
Flat (.072" x .400")
Consolidated Wire and
Associated Corporations
Mfg. No. 4517
NA

Rotor (5 wire)
20 ga.
170" O.D.
Consolidated Wire and
Associated Corporations
Mfg. No. 4518
NA

Rotor (8 wire)
22 ga.
.205" O.D.
Belden Corporation
Mfg. No. 8488
NA

Rotor (8 wire)
22 ga.
.205" O.D.
Consolidated Wire and
Associated Corporations
Mfg. No. 4521
NA

Test prod wire
18 ga.
.144" O.D.
20KV
Belden Corporation
Mfg. No. 8899
NA

Wire, 300 ohm Lead-in:

22 ga.
.055" x .365"
4.6 pf per ft.
.72 dB attenuation at
50 MHz per 100'
Consolidated Wire and
Associated Corporations
Mfg. No. 4500
NA

22 ga.
.072" x .400"
4.6 pf per ft.
.72 dB attenuation at
50 MHz per 100'
Consolidated Wire and
Associated Corporations
Mfg. No. 4502
NA

20 ga.
.072" x .400"
4.6 pf per ft.
.72 dB attenuation at
50 MHz per 100'
Consolidated Wire and
Associated Corporations
Mfg. No. 4503
NA

20 ga.
.080" x .400"
4.6 pf per ft.
.72 dB attenuation at
50 MHz per 100'
Consolidated Wire and
Associated Corporations
Mfg. No. 4504
NA

20 ga.
.100" x .400"
4.6 pf per ft.
.72 dB attenuation at
50 MHz per 100'
Consolidated Wire and
Associated Corporations
Mfg. No. 4506
NA

20 ga. three wire
.072" x .365"
4.6 pf per ft.
.72 dB attenuation at
50 MHz per 100'
Consolidated Wire and
Associated Corporations
Mfg. No. 4507
NA

18 ga.
.200" x .520"
5 pf per ft.
.7 dB attenuation at
50 MHz per 100'
Consolidated Wire and
Associated Corporations
Mfg. No. 4523
NA

20 ga.
.350" O.D. round
5.6 pf per ft.
.63 dB attenuation at
30 MHz per 100'
Consolidated Wire and
Associated Corporations
Mfg. No. 4527
NA

20 ga.
.072" x .400"
4.6 pf per ft.
.72 dB attenuation at
50 MHz per 100'
Consolidated Wire and
Associated Corporations
Mfg. No. 4529
NA

22 ga.
.150" x .410"
4.9 pf per ft.
1.04 dB attenuation at
100 MHz per 100'
Consolidated Wire and
Associated Corporations
Mfg. No. 4530
$33.25 per 1000'

22 ga. solid
.275" x .455"
6.8 pf per ft.
2.0 dB attenuation at
100 MHz per 100'
Consolidated Wire and
Associated Corporations
Mfg. No. 4535 shielded
$67.50 per 1000'

20 ga.
.058" x .400"
4.4 pf per ft.
1.1 dB attenuation at
100 MHz per 100'
Belden Corporation
Mfg. No. 8225
NA

20 ga., ivory, indoor only
.058" x .400"
4.4 pf per ft.
1.1 dB attenuation at
100 MHz per 100'
Belden Corporation
Mfg. No. 8226
NA

20 ga.
.072" x .400"
4.4 pf per ft.
1.1 dB attentuation at
100 MHz per 100'
Belden Corporation
Mfg. No. 8230
NA

18 ga.
.185" x .520"
4.4 pf per ft.
.85 dB attenuation at
100 MHz per 100'
Belden Corporation
Mfg. No. 8235
NA

20 ga. tubular
.300" x .400"
4.6 pf per ft.
1.05 dB attenuation at
100 MHz per 100'
Belden Corporation
Mfg. No. 8275
NA

22 ga.
.255" x .468"
5.3 pf per ft.
1.4 dB attenuation at
100 MHz per 100'
Belden Corporation
Mfg. No. 8285
NA

22 ga. shielded
.305" x .515"
7.8 pf per ft.
1.7 dB attenuation at
50 MHz per 100'
Belden Corporation
Mfg. No. 8290
NA

AMPLIFIERS

Indoor, Single Output:

550-1600 KHz
52 dB gain
75 ohm
Jerrold Electronics Corporation
Mfg. No. AMA-50
$410.00

FM
NA
300 ohm
JFD Electronics Corporation
Mfg. No. EF-1
$17.95

FM
18 dB gain
300 ohm
Blonder-Tongue
Mfg. No. FMB
$19.15

FM
18 dB gain
300 ohm

Winegard Company
Mfg. No. FM-340
$18.95

FM
NA
300 ohm
JFD Electronics Corporation
Mgf. No. HF-1
$24.95

VHF/FM
20 dB gain
300 or 75 ohm
Craftsman Electronic Products
Mfg. No. AVANTE 20
$69.50

VHF/FM
40 dB gain
75 ohm
The Finney Company
Mfg. No. M-108
$165.00

VHF/FM
14 dB gain
75 ohm
The Finney Company
Mfg. No. 65-5
$44.95

VHF/FM
41 dB lo band, 44 dB
high band, 41 dB FM
75 ohm
Jerrold Electronics Corporation
Mfg. No. 2880
$392.85

VHF/FM
33 dB gain
300/75 input, 75 ohm output
Jerrold Electronics Corporation
Mfg. No. 3450
$109.50

VHF/FM
40 dB gain
75 ohm
Jerrold Electronics Corporation
Mfg. No. 3660
$216.00

VHF/FM
15 dB gain
300 or 75 ohm
Channel Master Corporation
Mfg. No. 7035-A
$34.95

VHF/FM
30 dB gain
300 or 75 ohm
Channel Master Corporation
Mfg. No. 7043
$64.95

VHF/FM
50 dB gain
75 ohm
Channel Master Corporation
Mfg. No. 7050
$147.60

UHF/VHF/FM
NA
300 ohm
JFD Electronics Corporation
Mfg. No. HVU-3
$46.95

UHF/VHF/FM
NA
75 ohm
JFD Electronics Corporation
Mfg. No. HVU-475
$44.95

UHF
22 dB gain
75 ohm
Jerrold Electronics Corporation
Mfg. No. 5330
$190.00

Mast Mounted, Outdoor:

FM
NA
300 ohm
Winegard Company
Mfg No. AC-623
$34.95

FM
NA
75 ohm
Winegard Company
Mfg. No. AC-695
$39.95

FM
NA
300 ohm
2 outputs
JFD Electronics Corporation
Mfg. No. FT-1
$31.95

FM
NA
75 ohm
JFD Electronics Corporation
Mfg. No. FT-175
$34.95

FM
30 dB gain
300 ohm
The Finney Company
Mfg. No. M-17
$77.50

VHF/FM
17.5 dB gain
300 or 75 ohm
Antennacraft
Mfg. No. AA-5
$34.95

VHF/FM
18 times (25 dB)
300 ohm or 75 ohm
Blonder-Tongue
Mfg. No. AB-3
$152.10

VHF/FM
NA
300 ohm
Jerrold Electronics Corporation
Mfg. No. APM-106-L
$39.95

VHF/FM
NA
75 ohm
Jerrold Electronics Corporation
Mfg. No. CPM-107
$39.95

VHF/FM
20 dB gain
300 ohm
The Finney Company
Mfg. No. M-10
$49.95

VHF/FM
20 dB gain
75 ohm
The Finney Company
Mfg. No. M-12
$57.50

VHF/FM
NA
75 ohm
Jerrold Electronics Corporation
Mfg. No. SPC-132A-L
$97.95

VHF/FM
5 times (14 dB)
300 ohms
Blonder-Tongue
Mfg. No. VAMP-1
$22.60

VHF/FM
NA
300 ohm
2 outputs
Blonder-Tongue
Mfg. No. VAMP-2
$40.95

VHF/FM
NA
75 ohm
Blonder-Tongue
Mfg. No. VAMP-2-75
$45.95

VHF/FM
12 dB gain
300 ohm
The Finney Company
Mfg. No. 65-3
$44.95

VHF/FM
13 dB gain
300 ohm input, 75 ohm output
The Finney Company
Mfg. No. 65-4
$47.95

VHF/FM
NA
NA
Gavin Instruments, Inc.
Mfg. No. 1020
NA

VHF/FM
25 dB gain
300 ohm
RMS Electronics Inc.
Mfg. No. 3000
$53.95

VHF/FM
10 dB gain
300 ohm input, 75 ohm output
Channel Master Corporation
Mfg. No. 7060
$41.53

UHF/VHF
2-6 16.5 dB, 7-13 12 dB,
14-83 15 dB
UHF output, VHF output
300 ohm
Blonder-Tongue
Mfg. No. Color amp U/V
NA

Amplify VHF/FM, pass UHF
NA
300 ohm
Winegard Company
Mfg. No. AC-223
$34.95

Amplify VHF/FM, pass UHF
NA
75 ohm
Winegard Company
Mfg. No. AC-295
$34.95

UHF/VHF/FM
NA
300 ohm
Winegard Company
Mfg. No. AC-823
$39.95

UHF/VHF/FM
NA
75 ohm
Winegard Company
Mfg. No. AC-895
$42.50

UHF/VHF/FM
NA
300 ohm input, 75 ohm output
Winegard Company
Mfg. No. AP-87
$32.50

UHF/VHF/FM
15 dB gain
300 ohm
The Finney Company
Mfg. No. M-22
$59.95

UHF/VHF/FM
15 dB gain
300 ohm input, 75 ohm output
The Finney Company
Mfg. No. M-23
$62.50

UHF/VHF/FM
5 times (14 dB)
300 ohm
Blonder-Tongue
Mfg. No. U/V amp-2
$52.95

UHF/VHF/FM
NA
300 ohm
2 outputs
JFD Electronics Corporation
Mfg. No. VUT-3
$49.95

UHF/VHF/FM
NA
300 ohm
JFD Electronics Corporation
Mfg. No. VUT-3TF
$49.95

UHF
3 times (9.5 dB)
300 ohm
Blonder-Tongue
Mfg. No. ABLE-U2
$47.65

Amplify UHF, pass VHF
NA
300 ohm
Winegard Company
Mfg. No. AC-423
$34.95

Amplify UHF, pass VHF
NA
75 ohm
Winegard Company
Mfg. No. AC-495
$34.95

UHF
12 dB gain
300 ohm
Antennacraft
Mfg. No. UA-300
$39.95

UHF
NA
300 ohm
JFD Electronics Corporation
Mfg. No. UHT-2
$39.95

UHF
NA
300 ohm
Jerrold Electronics Corporation
Mfg. No. ULP-104
$34.95

UHF
NA
300 or 75 ohm
Jerrold Electronics Corporation
Mfg. No. UPC-105
$73.25

Multiple set output:

FM
15.5 dB gain
Two set
300 ohm
Jerrold Electronics Corporation
Mfg. No. SRX
$29.95

FM
NA
Two set
300 ohm
Channel Master Corporation
Mfg. No. 0025
$31.95

FM
20 dB gain
Two set
300 ohm
The Finney Company
Mfg. No. 65-7
$24.95

VHF/FM
NA
Four set
300 ohm
Blonder-Tongue
Mfg. No. B-24C
$27.85

VHF/FM
7 db gain
Four set
300 ohm
Winegard Company
Mfg. No. BC-210
$29.95

VHF/FM
7 db gain
Four set
300/75 input and 300 ohm output
Winegard Company
Mfg. No. BC-234
$34.95

VHF/FM
4 db gain
Four set
300/75 ohm input and 75 ohm output
Winegard Company
Mfg. No. BC-274
$39.95

VHF/FM
NA
Four set
300 ohm
Blonder-Tongue
Mfg. No. DA-4V
$27.90

VHF/FM
28 db gain
NA
75 ohm
Winegard Company
Mfg. No. DA-800
$90.00

VHF/FM
40 db gain
NA
75 ohm
Winegard Company
Mfg. No. DA-900
$140.00

VHF/FM
55 db gain
NA
75 ohm
Winegard
Mfg. No. DA-1000
$225.00

VHF/FM
NA
Four set
300 ohm
JFD Electronics Corporation
Mfg. No. HBV-2
$29.95

VHF/FM
NA
Four set
75 ohm
JFD Electronics Corporation
Mfg. HBV2-75
$37.50

VHF/FM
10 db gain
Four set
300 ohm
The Finney Company
Mfg. No. M-101
$42.50

VHF/FM
9 db gain
Four set
75 ohm
The Finney Company
Mfg. No. M-103
$44.95

VHF/FM
10 db gain
Four set
75 ohm
Jerrold Electronics Corporation
Mfg. No. TC-88-DP
$39.95

VHF/FM
5 db gain
Four set
75 ohm
Blonder-Tongue
Mfg. No. Homer HVB-3P
$27.50

VHF/FM
5 db gain
Four set
300 ohm
Blonder-Tongue
Mfg. No. Homer PS4-300
$19.45

VHF/FM
NA
Four set
300 ohm
Channel Master Corporation
Mfg. No. 0024
$24.95

VHF/FM
8 db gain
Four set
300 ohm
The Finney Company
Mfg. No. 65-1
$29.95

VHF/FM
8 db gain
Four set
75 ohm
The Finney Company
Mfg. No. 65-2
$39.95

UHF/VHF/FM
5 db gain
Four set
300 ohm
Winegard Company
Mfg. No. BC-382
$39.95

UHF/VHF/FM
6.5 db gain
Four set
75 ohm
Winegard Company
Mfg. No. BC-782
$44.95

UHF/VHF/FM
NA

Four set
300 ohm
Blonder-Tongue
Mfg. No. DA-4-U/V
$69.95

UHF/VHF/FM
25 db gain
Two set
75 ohm
Winegard Company
Mfg. No. DA-825
$59.95

UHF/VHF/FM
11 db gain
Four set
75 ohm
Jerrold Electronics Corporation
Mfg. No. TAC-4
$72.50

UHF/VHF
NA
300 ohm
Two set
Blonder-Tongue
Mfg. No. V/U-ALL 2
$44.75

UHF/VHF/FM
NA
Four set
NA
RMS Electronics, Inc.
Mfg. No. 4SA-1
$27.95

UHF
NA
Two set
300 ohm
Channel Master Corporation
Mfg. No. 0030
$39.95

ANTENNAS

FM

Antennacraft
Mfg. No. DXFM-80
NA
NA
6 elements
NA
$27.95

Antennacraft
Mfg. No. DXFM-120
NA
NA
10 elements
NA
$39.95

Blonder-Tongue
Mfg. No. Stereo Ranger-5
300 ohm
NA
5 elements
5 lbs.
$24.65

Blonder-Tongue
Mfg. No. Stereo Ranger-8
300 ohm
NA
8 elements
10 lbs.
$38.75

Channel Master Corporation
Mfg. No. 4401-G
NA
NA
5 element
NA
$16.50

Channel Master Corporation
Mfg. No. 4402-G
NA
NA
10 element
NA
$27.65

Channel Master Corporation
Mfg. No. 4409-G
NA
NA
6 element
NA
$24.95

Channel Master Corporation
Mfg. No. 4410-G
NA
NA
4 element
NA
$14.95

Gavin Instruments, Inc.
Mfg. No. FM-6
300 ohm
NA
6 element
Boom length 94"
Width NA
NA
NA

Gavin Instruments, Inc.
Mfg. No. FM-10
300 ohm
NA
10 element
Boom length 119"
Width NA
NA
NA

Jerrold Electronics Corporation
Mfg. No. FM-5
300 ohm
NA
5 element
5 lbs.
$11.50

Jerrold Electronics Corporation
Mfg. NO. FM-10
300 ohm
NA
10 element
7 lbs.
$19.95

Jerrold Electronics Corporation
Mfg. No. FMP-8
300 ohm
NA
8 element and paralog line
7½ lbs.
$29.95

Jerrold Electronics Corporation
Mfg. No. FMP-16
300 ohm
NA
16 element and paralog line
15 lbs.
$59.95

JFD Electronics Corporation
Mfg. No. LPL-FM4A
300 ohm
6.5 db gain
4 element
Boom length 63"
Width 112"
5 lbs.
$19.95

JFD Electronics Corporation
Mfg. No. LPL-FM6A
300 ohm
8.3 db gain
6 element
Boom length 98"
Width 112"
6 lbs.
$29.95

JFD Electronics Corporation
Mfg. No. LPL-FM8A
300 ohm
8.7 db gain
8 element
Boom length 121"
Width 112"
8 lbs.
$39.95

JFD Electronics Corporation
Mfg. No. LPL-FM10A
300 ohm
9.9 db gain
10 element
Boom length 166"
Width 112"
9 lbs.
$49.95

RCA
Mfg. No. 10B602
NA
NA
1 dipole
NA
NA

RCA
Mfg. No. 10B606
NA
NA
6 element
Boom length 70"
Width 68"
NA
NA

RCA
Mfg. No. 10B610
NA
NA
10 element
Boom length 145"
Width 68"
NA
NA

RMS Electronics, Inc.
Mfg. No. F-4
300 ohm
NA
4 element
NA
$8.20

RMS Electronics, Inc.
Mfg. No. FY-10
300 ohm
NA
10 element
NA
$18.75

The Finney Company
Mfg. No. CX-FM-4G
75 ohm
NA
6 element
NA
$33.20

The Finney Company
Mfg. No. CX-FM-5
75 ohm
NA
10 element
NA
$44.65

The Finney Company
Mfg. No. CX-FMSL-12
75 ohm
NA
12 element
NA
$58.25

The Finney Company
Mfg. No. FM-3
300 ohm
NA
4 element
NA
$13.50

The Finney Company
Mfg. No. FM3-GMC
(cut to length for specified frequency)
75 ohm
NA
4 element
NA
$13.44

The Finney Company
Mfg. No. FMSL-12
300 ohm
NA
12 element
NA
$49.95

The Finney Company
Mfg. No. Y5-FM-HD-GMC
75 ohm
NA
5 element (heavy duty)
NA
$39.95

Winegard Company
Mfg. No. SC-60
75 ohm
NA
7 element
NA
$24.95

Winegard Company
Mfg. No. SC-65
75 ohm
NA
11 element
NA
$36.95

Zenith
Mfg. No. 973-11
300 ohm
NA
6 element
Boom length 105¼"
Width 68-3/32"
NA
NA

Zenith
Mfg. No. 973-12
300 ohm
NA
8 element
Boom length 130⅜"
Width 68⅜"
NA
NA

Zenith
Mfg. No. 973-13
300 ohm
NA
10 element
Boom length 151⅞"
Width 68-3/32"
NA
NA

UHF

Blonder-Tongue
Mfg. No. Golden Dart
300 ohm
10 db gain
11 element
2 lbs.
$6.80

Blonder-Tongue
Mfg. No. U-Ranger-6
300 ohm
NA
6 element
1½" lbs.
$5.95

Blonder-Tongue
Mfg. No. U-Ranger-11
300 ohm
NA
11 element
2 lbs.
$8.95

Channel Master Corporation
Mfg. No. 4080-G
NA
NA
Bow tie
NA
$6.53

Channel Master Corporation
Mfg. No. 4104-G
NA
NA
Four bow tie
NA
$17.36

Channel Master Corporation
Mfg. No. 4251-G
NA
NA
Parabolic 84"
NA
$47.50

Channel Master Corporation
Mfg. No. 4310-G
NA
NA
Bandsaw, 22 element, adjustable
NA
$21.53

Gavin Instruments, Inc.
Mfg. No. CR-5
300 ohm
NA
1 bow tie and corner reflector
Boom length 18¼"
NA
NA

Gavin Instruments, Inc.
Mfg. No. J-1
300 ohm
NA
7 element
Boom length 28"
NA
NA

Gavin Instruments, Inc.
Mfg. No. J-2
300 ohm
NA
17 element
Boom length 66"
NA
NA

Jerrold Electronics Corporation
Mfg. No. JUP-1
300 ohm
NA
NA
Boom length 18"
Width 24"
2½ lbs.
$6.95

Jerrold Electronics Corporation
Mfg. No. JUP-3
300 ohm
NA
NA
Boom length 48"
Width 30"
9½ lbs.
$29.95

Jerrold Electronics Corporation
Mfg. No. PUX-450
300/75 ohm
NA
NA
Boom length 33½"
Width 12"
2½ lbs.
$10.95

Jerrold Electronics Corporation
Mfg. No. PUX-700
300/75 ohm
NA
NA
Boom length 54"
Width 12"
4½ lbs.
$18.95

Jerrold Electronics Corporation
Mfg. No. PUX-900
300/75 ohm
NA
NA
Boom length 64"
Width 12"
7 lbs.
$33.95

Jerrold Electronics Corporation
Mfg. No. 3044
300 ohm
NA
Four bow tie
7½ lbs.
$7.65

Jerrold Electronics Corporation
Mfg. No. 3088
300 ohm
NA
Eight bow tie
15 lbs.
$19.95

JFD Electronics Corporation
Mfg. No. LPV-U5
300 ohm
10 db gain
5 element
Boom length 13"
Width 33"
NA
$7.25

JFD Electronics Corporation
Mfg. No. LPV-U9
300 ohm
11.5 db gain
9 element
Boom length 21"
Width 33"
NA
$12.95

JFD Electronics Corporation
Mfg. No. LPV-U15
300 ohm
13 db gain
15 element
Boom length 35"
Width 33"
NA
$19.95

JFD Electronics Corporation
Mfg. No. LPV-U21
300 ohm
14 db gain
21 element
Boom length 63"
Width 33"
NA
$28.95

JFD Electronics Corporation
Mfg. No. LPV-ZU10
300 ohm
14 db gain
1 bay
Boom length 43"
Width 6"
NA
$16.95

JFD Electronics Corporation
Mfg. No. LPV-ZU20
300 ohm
16.5 db gain
2 bay
Boom length 43"
Width 29"
NA
$36.95

RCA
Mfg. No. 7B140
NA
NA
12 element
Boom length 30"
Width 22"
NA
NA

RCA
Mfg. No. 7B141
NA
NA
16 element
Boom length 38"
Width 28"
NA
NA

RCA
Mfg. No. 10B705
NA
NA
6 element
Boom length NA
Width NA
NA
NA

RCA
Mfg. No. 10B710
NA
NA
11 element
Boom length 22"
Width 18"
NA
NA

RCA
Mfg. No. 10B715
NA
NA
16 element
Boom length 22"
Width 34½"
NA
NA

RMS Electronics, Inc.
Mfg. No. BT-4
300 ohm
NA
Four bow tie
NA
$7.95

RMS Electronics, Inc.
Mfg. No. U-2-2
300 ohm
NA
11 element
NA
$5.45

RMS Electronics, Inc.
Mfg. No. U-15
300 ohm
NA
15 element
NA
$19.95

S & A Electronics, Inc.
Mfg. No. COL-4
300 ohm
NA
Four bow tie and
reflector
NA
$8.20

S & A Electronics, Inc.
Mfg. No. UPW-6
300 ohm
NA
6 element
Boom length 19"
Width NA
NA
$5.95

S & A Electronics, Inc.
Mfg. No. UPW-12
300 ohm
NA
12 element
Boom length 33"
Width NA
NA
$8.95

S & A Electronics, Inc.
Mfg. No.UPW-13
300 ohm
NA
12 element and reflector
Boom length 42"
Width NA
NA
$12.95

S & A Electronics, Inc.
Mfg. No. UPW-26
300 ohm
NA
26 element and reflector
Boom length 84"
Width NA
NA
$19.95

S & A Electronics, Inc.
Mfg. No. UPW-36
300 ohm
NA
36 element and reflector
Boom length 96"
Width NA
NA
$29.95

The Finney Company
Mfg. No. CS-U1
300 ohm
NA
6 element
Boom length 24"
Width NA
1½ lbs.
$9.95

The Finney Company
Mfg. No. CS-U2
300 ohm
NA
11 element
Boom length 38¼"
Width NA
2½ bs.
$14.95

The Finney Company
Mfg. No. CS-U3
300 ohm
NA
22 element
Boom length 93¼"
Width NA
4 lbs.
$21.95

The Finney Company
Mfg. No. P-7
300 ohm
NA
7' parabolic
NA
$47.50

The Finney Company
Mfg. No. 1BT
300 ohm
NA
One bow tie
NA
$2.35

The Finney Company
Mfg. No. 4BT
300 ohm
NA
Four bow tie with screen
NA
$8.95

Winegard Company
Mfg. No. U-630
NA
NA
NA
$29.95

Winegard Company
Mfg. No. U-965
300 or 75 ohm
NA
9 element
NA
$14.95

Winegard Company
Mfg. No. U-975
300 or 75 ohm
NA
18 element
NA
$22.95

Winegard Company
Mfg. No. U-995
300 or 75 ohm
NA
30 element
NA
$32.95

Zenith
Mfg. No. 973-7
300 ohm
NA
5 element
Boom length 23"
Width 32"
NA
NA

Zenith
Mfg. No. 973-9
300 ohm
NA
15 element
Boom length 42"
Width 32"
NA
NA

Zenith
Mfg. No. 973-10
300 ohm
NA
21 element
Boom length 69"
Width 32"
NA
NA

Zenith
Mfg. No. 973-18
300 ohm
NA
48 element
Boom length 42"
Width 31"
NA
NA

Zenith
Mfg. No. 973-101
300 ohm
NA
Four bow tie
NA
NA

Zenith
Mfg. No. 973-103
300 ohm
NA
One bow tie
NA
NA

VHF

Blonder-Tongue
Mfg. No. Color Ranger 15-300
300 ohm
NA

15 element
12 lbs.
$59.95

Blonder-Tongue
Mfg. No. Color Ranger 15-300/75
300 or 75 ohm
NA
15 element
12 lbs.
$63.70

Channel Master Corporation
Mfg. No. 3150-G
NA
NA
4 element, "V" type
NA
$5.78

Jerrold Electronics Corporation
Mfg. No. CG-13
300 ohm
NA
4 element
NA
$10.95

Jerrold Electronics Corporation
Mfg. No. V-301
300 ohm
NA
4 element
Boom length 32"
Width 102"
4 lbs.
$15.95

Jerrold Electronics Corporation
Mfg. No. V-304
300 ohm
NA
10 element
Boom length 109½"
Width 102"
10 lbs.
$41.95

Jerrold Electronics Corporation
Mfg. No. V-307
300 ohm
NA
19 element
Boom length 199½"
Width 102"
20 lbs.
$79.95

RMS Electronics, Inc.
Mfg. No. FLID-(Channel number)
300 ohm
NA
5 element, single channel
NA
$5.00

RMS Electronics, Inc.
Mfg. No. FLID-10 (channel number)
300 ohm
NA
10 element, single channel
NA
$10.45

The Finney Company
Mfg. No. B-1
300 ohm
NA
5 element
Boom length 41"
Width NA
3 lbs.
$6.00

The Finney Company
Mfg. No. E-420MG
300 ohm
NA
11 element
Boom length 48"
Width NA
5½ lbs.
$19.95

The Finney Company
Mfg. No. FC-123 (conical)
300 ohm
NA
4 forward, 2 reflector
NA
$9.35

The Finney Company
Mfg. No. FC-411 (conical)
300 ohm
NA
4 forward, 2 stubs, 2 reflector
NA
$6.05

The Finney Company
Mfg. No. FC-511 (conical)
300 ohm
NA
6 forward, 2 reflector
NA
$5.50

The Finney Company
Mfg. No. FC-611 (conical)
300 ohm
NA
6 forward, 4 reflector
NA
$6.25

The Finney Company
Mfg. No. FC-716 (conical)
300 ohm
NA
4 forward, 1 director, 2 reflector
NA
$4.90

The Finney Company
Mfg. No. FDR (channel number)
300 ohm
NA
2 element, single channel
NA
$2.50 to $5.95

The Finney Company
Mfg. No. Hi-Lo
300 ohm
NA
NA
NA
$8.25

The Finney Company
Mfg. No. S-420DG
300 ohm
NA
40 element
Boom length 147"
Width 93"
13 lbs.
$59.95

The Finney Company
Mfg. No. Y5-(channel number)
300 ohm
NA
5 element, single channel
NA
$5.15 to $11.65

The Finney Company
Mfg. No. Y5 (channel number) HD-GMC
75 ohm
NA
5 element (heavy duty, single channel)
NA
$31.50 to $47.50

The Finney Company
Y10 (channel number)
300 ohm
NA
10 element
NA
$8.35 to $23.50

The Finney Company
Mfg. No. Y10 (channel number) HD-GMC
75 ohm
NA
10 element (heavy duty, single channel)
NA
$47.50

VHF (low band):

Channel Master Corporation
Mfg. No. 1555-G (channel 5)
NA
NA
10 element
NA
$22.92

Channel Master Corporation
Mfg. No. 3120
NA
NA
NA
NA
$5.56

Channel Master Corporation
Mfg. No. 5520-G to 5560-G
NA
NA
5 element, specify channel (2-6)
NA
$11.39

Jerrold Electronics Corporation
Mfg.No. J-55-LD (heavy duty)
75 ohm
NA
NA
NA
$123.75

Jerrold Electronics Corporation
Mfg. No. J-105-Hi (heavy duty)
75 ohm
NA
NA
NA
$123.75

Jerrold Electronics Corporation
Mfg. No. JTL5 (channel number)
300 ohm
NA
5 element, single channel
NA
$10.45 to $13.20

The Finney Company
Mfg. No. L-FDR
300 ohm
NA
NA
NA
$5.25

The Finney Company
Mfg. No. L-26
300 ohm
NA
6 element
Boom length 118¾"
Width NA
7½ lbs.
$24.90

VHF (high band):

Channel Master Corporation
Mfg. No. 15 (channel number-07,08) -G
NA
NA
10 element, single channel
NA
$11.11

Channel Master Corporation
Mfg. No. 1673-G
NA
NA
10 element
NA
$10.14

Channel Master Corporation
Mfg. No. 3121
NA
NA
NA
NA
$2.50

Channel Master Corporation
Mfg. No. 5070-G to 5130-G
NA
NA
5 element (specify channel)
NA
$5.97

Jerrold Electronics Corporation
Mfg. No. JHB-713
300 ohm
NA
10 element
NA
$12.75

Jerrold Electronics Corporation
Mfg. No. JTH-10-(channel number)
300 ohm
NA
10 element, single Channel
NA
$9.35

RMS Electronics, Inc.
Mfg. No. FLID-10-7-13
300 ohm
NA
10 element
NA
$15.97

The Finney Company
Mfg. No. Y10-713
300 ohm
NA
10 element
NA
10 element, single channel
NA
$10.75

VHF (2-13), FM:

Antennacraft
Mfg. No. CS-600
NA
NA
7 element
NA
$21.95

Antennacraft
Mfg. No. CS-800
NA
NA
12 element
NA
$39.95

Antennacraft
Mfg. No. CS-1000
NA
NA
22 element
NA
$69.95

Blonder-Tongue
Mfg. No. Color Ranger 3
300 ohm
NA
3 element
3 lbs.
$13.45

Blonder-Tongue
Mfg. No. Color Ranger 5-300
300 ohm
NA
5 element
6 lbs.
$22.45

Blonder-Tongue
Mfg. No. Color Ranger 5-300/75
300 or 75 ohm
NA
5 element
6 lbs.
$25.25

Blonder-Tongue
Mfg. No. Color Ranger 7-300
300 ohm
NA
7 element
7¼ lbs.
$29.25

Blonder-Tongue
Mfg. No. Color Ranger 7-300/75
300 or 75 ohm
NA
7 element
7½ lbs.
$32.25

Blonder-Tongue
Mfg. No. Color Ranger 10-300
300 ohm
NA
10 element
9 lbs.
$38.25

Blonder-Tongue
Mfg. No. Color Ranger 10-300/75
300 or 75 ohm
NA
10 element
9 lbs.
$43.25

Channel Master Corporation
Mfg. No. 3010-G (conical)
NA
NA
4 front and 2 reflector
NA
$6.11

Channel Master Corporation
Mfg. No. 3050-G (conical)
NA
NA
4 front and 4 reflector with 2 stubs
NA
$7.22

Channel Master Corporation
Mfg. No. 3611-G
NA
NA
23 element
NA
$49.95

Channel Master Corporation
Mfg. No. 3615-G
NA
NA
7 element
NA
$15.95

Channel Master Corporation
Mfg. No. 3617-G
NA
NA
32 element
NA
$79.95

Gavin Instruments, Inc.
Mfg.No. 1007
300 ohm
NA
7 element
Boom length 50"
Width NA
NA
NA

Gavin Instruments, Inc.
Mfg. No. 1015
300 ohm
NA
15 element
Boom length 98"
Width NA
NA
NA

Gavin Instruments, Inc.
Mfg. No. 1019
300 ohm
NA
19 element
Boom length 122"
Width NA
NA
NA

Gavin Instruments, Inc.
Mfg. No. 1026
300 ohm
NA
26 element
Boom length 145"
Width NA
NA
NA

Jerrold Electronics Corporation
Mfg. No. GS-42 (conical)
300 ohm
NA
4 forward, 2 reflectors, 1 stub
NA
$4.70

Jerrold Electronics Corporation
Mfg. GS-44 (conical)
300 ohm
NA
4 forward, 4 reflector, 2 stubs
NA
$5.45

Jerrold Electronics Corporation
Mfg. No. PIX-35
75 ohm
NA
4 element
Boom length 33"
Width 102"
4½ lbs.
$17.95

Jerrold Electronics Corporation
Mfg. No. PIX-105
75 ohm
NA
10 element
Boom length 109½"
Width 102"
10 lbs.
$43.95

Jerrold Electronics Corporation
Mfg. No. PIX-225
75 ohm
NA
19 element
Boom length 199½"
Width 102"
20 lbs.
$81.95

JFD Electronics Corporation
Mfg. No. LPV-4L
300 ohm
Low band 1.8 dB, high band 6 dB
5 element

Boom length 39⅝"
Width 86"
NA
$16.50

JFD Electronics Corporation
Mfg. No. LPV-6L
300 ohm
Low band 3.8 dB, high band 7.8 dB
6 element
Boom length 67½"
Width 88"
NA
$23.50

JFD Electronics Corporation
Mfg. No. LPV-8L
300 ohm
Low band 4.5 dB, high band 9 dB
8 element
Boom length 98⅞"
Width 88"
NA
$32.50

JFD Electronics Corporation
Mfg. No. LPV-11L
300 ohm
Low band 5 dB, high band 9 dB
11 element
Boom length 125½"
Width 92"
NA
$44.50

JFD Electronics Corporation
Mfg. No. LPV-14L
300 ohm
Low band 5.5 dB, high band 10 dB
14 element
Boom length 151⅝"
Width 91"
NA
$54.50

JFD Electronics Corporation
Mfg. No. LPV-17L
300 ohm
Low band 7 dB, high band 11dB
17 element
Boom length 180"
Width 91½"
NA
$65.50

JFD Electronics Corporation
Mfg. No. LPV-TV40
300 ohm
Low band 3.5 dB, high band 7.7 dB
4 element
Boom length 44"
Width 90"
NA
$16.95

JFD Electronics Corporation
Mfg. No. LPV-TV130
300 ohm
Low band 6 dB, high band 10.5 dB
13 element
Boom length 143"
Width 92"
NA
$55.95

JFD Electronics Corporation
Mfg. No. LPV-TV190
300 ohm
Low band 7.5 dB, high band 11.5 dB
19 element
Boom length 205"
Width 92"
NA
$84.95

RCA
Mfg. No. 10B807
NA
NA
7 element
Boom length 50"
Width 108"
NA
NA

RCA
Mfg. No. 10B811
NA
NA
12 element
Boom length 71"
Width 108"
NA
NA

RCA
Mfg. No. 10B814
NA
NA
16 element
Boom length 90"
Width 108"
NA
NA

RCA
Mfg. No. 10B819
NA
NA
22 element
Boom length 135"
Width 108"
NA
NA

RCA
Mfg. No. 10B825
NA
NA
30 element
Boom length 190"
Width 108"
NA
NA

RMS Electronics, Inc.
Mfg. No. A-BIG-100
300 ohm
NA
1 bay
NA
$23.91

RMS Electronics, Inc.
Mfg. No. CR-7
300 ohm
NA
7 element
NA
$17.95

RMS Electronics, Inc.
Mfg. No. DJR-4
300 ohm
NA
4 element
NA
$14.95

RMS Electronics, Inc.
Mfg. No. DJR-8
300 ohm
NA
8 element
NA
$29.95

RMS Electronics, Inc.
Mfg. No. DJR-18
300 ohm
NA
18 element
NA
$58.95

RMS Electronics, Inc.
Mfg. No. EC-52 (conical)
300 ohm
NA
6 front and 2 reflector
NA
$5.00

RMS Electronics, Inc.
Mfg. No. EC-54 (conical)
300 ohm
NA
4 front and 4 reflector
NA
$6.11

RMS Electronics, Inc.
Mfg. No. EVA-100A
300 ohm
NA
"V" type
NA
$6.15

RMS Electronics, Inc.
Mfg. No. GEC-52 (conical)
300 ohm
NA
6 front and 2 reflector
NA
$6.00

RMS Electronics, Inc.
Mfg. No. GEC-64 (conical)
300 ohm
NA
6 front and 4 reflector
NA
$7.26

RMS Electronics, Inc.
Mfg. No. STP-7
300 ohm
NA
7 element
NA
$14.45

RMS Electronics, Inc.
Mfg. No. STP-19
300 ohm
NA
19 element
NA
$41.95

RMS Electronics, Inc.
Mfg. No. STP-28
300 ohm
NA
28 element
NA
$56.95

RMS Electronics, Inc.
Mfg. No. TP-1100
300 ohm
NA
11 element
NA
$21.95

RMS Electronics, Inc.
Mfg. No. TP-1500
300 ohm
NA
15 element
NA
$29.95

RMS Electronics, Inc.
Mfg. No. TP-2300
300 ohm
NA
23 element
NA
$49.95

RMS Electronics, Inc.
Mfg. No. WC-50
300 ohm
NA
4 element, window antenna
NA
$10.03

S & A Electronics, Inc.
Mfg. No. AET-5
300 ohm
NA
5 element
4 lbs.
$11.95

S & A Electronics, Inc.
Mfg. No. AET-8
300 ohm
NA
8 element
6 lbs.
$20.50

S & A Electronics, Inc.
Mfg. No. AET-12
300 ohm
NA
12 element
7 lbs.
$27.95

S & A Electronics, Inc.
Mfg. No. AET-16
300 ohm
NA
16 element
11 lbs.
$39.95

S & A Electronics, Inc.
Mfg. No. AET-22
300 ohm
NA
22 element
13 lbs.
$49.95

S & A Electronics, Inc.
Mfg. No. AET-31
300 ohm
NA
31 element
16 lbs.
$64.95

South River Metal Products Company, Inc.
No specifications available

The Finney Company
Mfg. No. CS-V3
300 ohm
NA
3 element
Boom length 45"
Width NA
3½ lbs.
$10.95

The Finney Company
Mfg. No. CS-V10
300 ohm
NA
10 element
Boom length 118¾"
Width NA
10 lbs.
$35.95

The Finney Company
Mfg. No. CS-V18
300 ohm
NA
18 element
Boom length 180⅞"
Width NA
15 lbs.
$56.50

The Finney Company
Mfg. No. XCS-V3
75 ohm
NA
3 element
Boom length 30"
Width NA
3½ lbs.
$19.25

The Finney Company
Mfg. No. XCS-V10
75 ohm
NA
10 element
Boom length 118¾"
Width NA
10 lbs.
$44.95

The Finney Company
Mfg. No. XCS-V18
75 ohm
NA
18 element
Boom length 108⅞"
Width NA
15 lbs.
$64.95

Winegard Company
Mfg. No. SC-51
300 ohm
NA
11 element
NA
$24.95

Winegard Company
Mfg. No. SC-52
300 ohm
NA
14 element
NA
$34.95

Winegard Company
Mfg. No. SC-53
300 ohm
NA
20 element
NA
$49.95

Winegard Company
Mfg. No. SC-54
300 ohm
NA
29 element
NA
$64.95

Zenith
Mfg. No. 973-83
300 ohm
NA
8 element
Boom length 36"
Width 109"
NA
$19.95

Zenith
Mfg. No. 973-85
300 ohm
NA
17 element
Boom length 83¾"
Width 110½"
NA
$39.95

Zenith
Mfg. No. 973-87
300 ohm
NA
23 element
Boom length 124½"
Width 110½"
NA
$59.95

Zenith
Mfg. No. 973-88
300 ohm
NA
26 element
Boom length 148½"
Width 110½"
NA
$89.95

VHF, UHF:

The Finney Company
Mfg. No. 400A (colinear)
300 ohm
NA
NA
Boom length 15"
Width NA
12½ lbs.
$48.50

VHF, UHF, FM:

Antennacraft
Mfg. No. CDX-650
NA
NA
12 element
NA
$24.95

Antennacraft
Mfg. No. CDX-850
NA
NA
18 element
NA
$44.95

Anntennacraft
Mfg. No. CDX-1050
NA
NA
29 element
NA
$69.95

Audiotex Home Electronics
Mfg. No. 32-506
300 ohm
NA
6 element
NA
$13.75

Audiotex Home Electronics
Mfg. No. 32-509
300 ohm
NA
9 element
NA
$24.90

Audiotex Home Electronics
Mfg. No. 32-516
300 ohm
NA
16 element
NA
$38.75

Audiotex Home Electronics
Mfg. No. 32-524
300 ohm
NA
26 element
NA
$59.95

Channel Master Corporation
Mfg. No. 3632-G
NA
NA
NA
NA
$69.95

Channel Master Corporation
Mfg. No. 3634-G
NA
NA
NA
NA
$49.95

Channel Master Corporation
Mfg. No. 3640-G
NA
NA
NA
NA
$22.95

Gavin Instruments, Inc.
Mfg. No. 1106
300 ohm
NA
6 element

Boom length 44"
Width NA
NA
NA

Gavin Instruments, Inc.
Mfg. No. 1113
300 ohm
NA
13 element
Boom length 79"
Width NA
NA
NA

Gavin Instruments, Inc.
Mfg. No. 1118
300 ohm
NA
18 element
Boom length 76"
Width NA
NA
NA

Gavin Instruments, Inc.
Mfg. No. 1134
300 ohm
NA
34 element
Boom length 148"
Width NA
NA
NA

Jerrold Electronics Corporation
Mfg. No. CG-81
300 ohm
NA
6 element
NA
$15.95

Jerrold Electronics Corporation
Mfg. No. CGX-82
300 ohm
NA
11 element
NA
$26.50

Jerrold Electronics Corporation
Mfg. No. MCX-82
300/75 ohm
NA
NA
Boom length 31½"
Width 70"
5 lbs.
$29.95

Jerrold Electronics Corporation
Mfg. No. PXB-30
300/75 ohm
NA
14 element
Boom length 47"
Width 84"
5 lbs.
$18.50

Jerrold Electronics Corporation
Mfg. No. PXB-50
300/75 ohm
NA
33 element
Boom length 90"
Width 102"
8 lbs.
$36.50

Jerrold Electronics Corporation
Mfg. No. PXB-90
300/75 ohm
NA
101 element
Boom length 165"
Width 102"
16 lbs.
$66.50

Jerrold Electronics Corporation
Mfg. No. VU-831
300 ohm
NA
15 element
Boom length 50"
Width 102"
6 lbs.
$19.95

Jerrold Electronics Corporation
Mfg. No. VU-833
300 ohm
NA
20 element
Boom length 94"
Width 102"
9 lbs.
$39.95

Jerrold Electronics Corporation
Mfg. No. VU-836
300 ohm
NA
31 element
Boom length 156"
Width 102"
17 lbs.
$79.95

JFD Electronics Corporation
Mfg. No. LPV-CL55
300 ohm
Low band 1dB, high band 6 dB, UHF 6.5 dB
9 element
Boom length 45"
Width 88"
NA
$19.95

JFD Electronics Corporation
Mfg. No. LPV-CL300
300 ohm
Low band 3.5 dB, high band 9 dB, UHF 10 dB
19 element
Boom length 93"
Width 91"
NA
$33.95

JFD Electronics Corporation
Mfg. No. LPV-CL500
300 ohm
Low band 5 dB, high band 10.5 dB, UHF 9 dB
26 element
Boom length 141"
Width 92½"
NA
$57.95

JFD Electronics Corporation
Mfg. No. LPV-CL700
300 ohm
Low band 8 dB, high band 11.2 dB, UHF 11.5 dB
35 element
Boom length 191"
Width 92½"
NA
$79.95

JFD Electronics Corporation
Mfg. No. LPV-UV5
300 ohm
Low band .5 dB, high band 5 dB, UHF 6.5 dB
9 element
Boom length 44⅝"
Width 84½"
NA
$19.95

JFD Electronics Corporation
Mfg. No. LPV-VU30
300 ohm
Low band .5 dB, high band 5 dB, UHF 6.5 dB
9 element
Boom length 46½"
Width 91"
NA
$23.95

JFD Electronics Corporation
Mfg. No. LPV-VU40
300 ohm
Low band 3.5 dB, high band 6.7 dB, UHF 7 dB
11 element
Boom length 67½"
Width 88"
NA
$27.95

JFD Electronics Corporation
Mfg. No. LPV-VU60
300 ohm
Low band 3.6 dB, high band 8 dB, UHF 8 dB
14 element
Boom length 97"
Width 91"
NA
$33.95

JFD Electronics Corporation
Mfg. No. LPV-VU90
300 ohm
Low band 4 dB, high band 8.8 dB, UHF 9.5 dB
21 element
Boom length 119"
Width 92½"
NA
$45.95

JFD Electronics Corporation
Mfg. No. LPV-VU120
300 ohm
Low band 4.8 dB, high band 9.8 dB, UHF 10 dB
26 element
Boom length 157"
Width 92½"
NA
$57.95

JFD Electronics Corporation
Mfg. No. LPV-VU150
300 ohm
Low band 6 dB, high band 10.5 dB, UHF 11 dB
30 element
Boom length 164"
Width 92½"
NA
$69.95

JFD Electronics Corporation
Mfg. No. LPV-VU180
300 ohm
Low band 7 dB, high band 11 dB, UHF 12 dB
35 element
Boom length 206"
Width 92"
NA
$79.95

RCA
Mfg. No. 10B907
NA
NA
9 element
Boom length 34"
Width 102"
NA
NA

RCA
Mfg. No. 10B910
NA
NA
12 element
Boom length 55"
Width 108"
NA
NA

RCA
Mfg. No. 10B917
NA
NA
19 element
Boom length 64"
Width 108"
NA
NA

RCA
Mfg. No. 10B920
NA
NA
23 element
Boom length 88"
Width 108"
NA
NA

RCA
Mfg. No. 10B925
NA
NA
28 element
Boom length 88"
Width 108"
NA
NA

RCA
Mfg. No. 10B930
NA
NA
34 element
Boom length 131"
Width 108"
NA
NA

RMS Electronics, Inc.
Mfg. No. BJ-8
300 ohm
NA
8 element
NA
$10.95

RMS Electronics, Inc.
Mfg. No. DJR-4U
300 ohm
NA
15 element
NA
$20.40

RMS Electronics, Inc.
Mfg. No. DJR-11U
300 ohm
NA
22 element
NA
$49.40

RMS Electronics, Inc.
Mfg. No. DJR-18U
300 ohm
NA
29 element
NA
$64.40

RMS Electronics, Inc.
Mfg. No. DYN-33US
300 ohm
NA
6 element
NA
$19.95

RMS Electronics, Inc.
Mfg. No. DYN-88US
300 ohm
NA
16 element
NA
$44.95

RMS Electronics, Inc.
Mfg. No. DYN-158US
300 ohm
NA
23 element
NA
$49.95

RMS Electronics, Inc.
Mfg. No. STP-7U
300 ohm
NA
18 element
NA
$19.90

RMS Electronics, Inc.
Mfg. No. STP-15U
300 ohm
NA
26 element
NA
$33.40

RMS Electronics, Inc.
Mfg. No. STP-28U
300 ohm
NA
39 element
NA
$62.40

RMS Electronics, Inc.
Mfg. No. TP-1100U
300 ohm
NA
22 element
NA
$27.40

RMS Electronics, Inc.
Mfg. No. TP-2300U
300 ohm
NA
34 element
NA
$55.40

S & A Electronics, Inc.
Mfg. No. FSM-20
300 ohm
NA
9 element
Boom length 60"
Width NA
NA
$18.25

S & A Electronics, Inc.
Mfg. No. FSM-30
300 ohm
NA
13 element
Boom length 108"
Width NA
NA
$29.95

S & A Electronics, Inc.
Mfg. No. FSM-35
300 ohm
NA
15 element
Boom length 144"
Width NA
NA
$41.50

S & A Electronics, Inc.
Mfg. No. FSM-40
300 ohm
NA
18 element
Boom length 180"
Width NA
NA
$54.95

The Finney Company
Mfg. No. CS-A3
300 ohm
NA
9 element
Boom length 54⅞"
Width NA
4½ lbs.
$18.95

The Finney Company
Mfg. No. CS-A3
300 ohm
NA
25 element
Boom length 104"
Width NA
5½ lbs.
$30.95

The Finney Company
Mfg. No. CS-B1
300 ohm
NA
13 element
Boom length 93"
Width NA
6 lbs.
$29.95

The Finney Company
Mfg. No. CS-B3
300 ohm
NA
28 element
Boom length 139⅛"
Width NA
7 lbs.
$49.95

The Finney Company
Mfg. No. CS-C2
300 ohm
NA
20 element
Boom length 138¼"
Width NA
9 lbs.
$51.95

The Finney Company
Mfg. No. CS-D3
300 ohm
NA
36 element
Boom length 204⅛"
Width NA
14 lbs.
$69.95

The Finney Company
Mfg. No. XCS-A1
75 ohm
NA
9 element
Boom length 54⅞"
Width NA
4½ lbs.
$27.45

The Finney Company
Mfg. No. XCS-A3
75 ohm
NA
25 element
Boom length 104"
Width NA
5½ lbs.
$39.45

The Finney Company
Mfg. No. XCS-B1
75 ohm
NA
13 element
Boom length 93"
Width NA
6 lbs.
$38.45

The Finney Company
Mfg. No. XCS-B3
75 ohm
NA
28 element
Boom length 139⅛"
Width NA
7 lbs.
$58.45

The Finney Company
Mfg. No. XCS-C2
75 ohm
NA
20 element
Boom length 166½"
Width NA
9 lbs.
$60.45

The Finney Company
Mfg. No. XCS-D3
75 ohm
NA

36 element
Boom length 204⅛"
Width NA
14 lbs.
$78.45

Winegard Company
Mfg. No. SC-79
300 ohm
NA
12 element
NA
$21.50

Winegard Company
Mfg. No. SC-80
300 ohm
NA
16 element
NA
$29.95

Winegard Company
Mfg. No. SC-81
300 ohm
NA
21 element
NA
$39.95

Winegard Company
Mfg. No. SC-82
300 ohm
NA
27 element
NA
$54.95

Winegard Company
Mfg. No. SC-83
300 ohm
NA
35 element
NA
$69.95

Zenith
Mfg. No. 973-89
300 ohm
NA
14 element
Boom length 50"
Width 109"
NA
$21.95

Zenith
Mfg. No. 973-91
300 ohm
NA
22 element
Boom length 80"
Width 109"
NA
$36.95

Zenith
Mfg. No. 973-92
300 ohm
NA
27 element
Boom length 97"
Width 110½"
NA
$49.95

Zenith
Mfg. No. 973-94
300 ohm
NA
47 element
Boom length 155"
Width 110½"
NA
$79.95

CONVERTERS

UHF to VHF:

UHF to VHF
Battery powered
Blonder-Tongue
Mfg. No. BTD-44A
$18.85

UHF to VHF
Blonder-Tongue
Mfg. No. BTX-66A
$21.95

UHF to VHF
Blonder-Tongue
Mfg. No. BTX-99B
$27.95

UHF to VHF
300 ohm
JFD Electronics Corporation
Mfg. No. CR1-J
$29.95

UHF to VHF
Specify channels to be converted
The Finney Company
Mfg. No. M-403
$227.50

UHF to VHF
The Finney Company
Mfg. No. U-VERT-100
$20.95

UHF to VHF
Gavin Instruments, Inc.
Mfg. No. 501B
NA

UHF to VHF
Gavin Instruments, Inc.
Mfg. No. 502B
NA

UHF to VHF
Channel Master Corporation
Mfg. No. 6708
$39.95

UHF to VHF
Channel Master Corporation
Mfg. No. 6709
$19.95

VHF to VHF
High to low channel
Low to high channel
Specify channel
The Finney Company
Mfg. No. M-400
$137.50

UHF to VHF with Amplification:

UHF to VHF
NA
NA
Blonder-Tongue
Mfg. No. BTX-11A
$49.95

UHF to VHF
10 dB gain
300 ohm
JFD Electronics Corporation
Mfg. No. CR2-J
$39.95

UHF to VHF
12 dB gain
300 ohm
RMS Electronics, Inc.
Mfg. No. CR-2TW
$27.95

UHF to VHF
17 dB gain
300 ohm
RMS Electronics, Inc.
Mfg. No. CR-300
$34.95

UHF to VHF
27 dB gain
300 ohm
RMS Electronics, Inc.
Mfg. No. CR-550A
$49.95

UHF to VHF
NA
NA
The Finney Company
Mfg. No. U-VERT-200
$28.50

UHF to VHF
7 dB
300 or 75 ohm (specify)
Jerrold Electronics Corporation
Mfg. No. U5V
$211.90

UHF to VHF
NA
NA
The Finney Company
Mfg. No. U-VERT-300
$43.55

UHF to VHF
NA
Jerrold Electronics Corporation
Mfg. No. UV-82
$39.95

UHF to VHF
NA
NA
Gavin Instruments, Inc.
Mfg. No. 503B
NA

COUPLERS

Multiple Set:

Antennacraft
Mfg. No. C-302UVF
UHF/VHF/FM
300 ohm
2 set
$4.50

Channel Master Corporation
Mfg. No. 0038
UHF/VHF/FM
300 ohm
2 set
$2.78

Channel Master Corporation
Mfg. No. 0047
UHF/VHF/FM
75 ohm
2 set
$4.86

Gavin Instruments, Inc.
Mfg. No. C-200
UHF/VHF/FM
NA
2 set
NA

G. C. Electronics
Mfg. No. A-1090-1
NA
NA
2 set
$3.94

G. C. Electronics
Mfg. No. A-1091-1
NA
NA
2 set
$2.95

JFD Electronics Corporation
Mfg. No. SC42
UHF/VHF/FM
300 ohm
2 set
$4.00

JFD Electronics Corporation
Mfg. No. RA2
NA
NA
2 set
$1.65

Mosley Electronics, Inc.
Mfg. No. BL-2 (heavy duty)
NA
300 ohm
2 set
$3.19

Mosley Electronics, Inc.
Mfg. No. BL-2PK
NA
75 ohm
2 set
$4.12

Mosley Electronics, Inc.
Mfg. No. PC-2
NA
300 ohm
2 set
$1.86

RMS Electronics, Inc.
Mfg. No. C-2UV
NA
300 ohm
2 set
$2.95

S & A Electronics, Inc.
Mfg. No. 7002
NA
NA
2 set
$3.95

S & A Electronics, Inc.
Mfg. No. 7004
NA
NA
2 set
$2.95

The Finney Company
Mfg. No. M-200
UHF/VHF/FM
300 ohm
2 set (indoor)
$4.25

The Finney Company
Mfg. No. 3001
UHF/VHF/FM
300 ohm
2 set
$3.95

Winegard Company
Mfg. No. CC-282
UHF/VHF/FM
NA
2 set
$4.50

Jerrold Electronics Corporation
Mfg. No. M2A
VHF
300 ohm
2 set
$3.10

The Finney Company
Mfg. No. 3015
UHF
300 ohm
2 set
$4.25

Zenith
Mfg. No. 973-36
NA
NA
3 set
NA

JFD Electronics Corporation
Mfg. No. SC62
UHF/VHF/FM
300 ohm
3 set
$4.95

Antenncraft
Mfg. No. C-304-UVF
UHF/VHF/FM
300 ohm
4 set
$5.50

Channel Master Corporation
Mfg. No. 0044
UHF/VHF/FM
300 ohm
4 set
$5.56

Channel Master Corporation
Mfg. No. 0045
UHF/VHF/FM
75 ohm
4 set
$5.56

G. C. Electronics
Mfg. No. A-1095-1
NA
NA
4 set
$5.74

G. C. Electronics
Mfg. No. A-1096-1
NA
NA
4 set
$4.94

JFD Electronics Corporation
Mfg. No. SC72
UHF/VHF/FM
300 ohm
4 set
$5.50

Mosley Electronics, Inc.
Mfg. No. BL-4
300 ohm
4 set
$3.50

Mosley Electronics, Inc.
Mfg. No. BL-4PK
NA
75 ohm
4 set
$4.19

Mosley Electronics, Inc.
Mfg. No. PC-4
NA
300 ohm
4 set
$3.25

S & A Electronics, Inc.
Mfg. No. 7006
NA
NA
4 set
$5.75

S & A Electronics, Inc.
Mfg. No. 7008
NA
NA
4 set
$4.95

The Finney Company
Mfg. No. M-206
UHF/VHF/FM
75 ohm
4 set
$11.10

The Finney Company
Mfg. No. 3003
UHF/VHF/FM
300 ohm
4 set
$5.75

Winegard Company
Mfg. No. CC-482
UHF/VHF/FM
NA
4 set
$5.50

Jerrold Electronics Corporation
Mfg. No. MF-4
VHF
300 ohm
4 set
$5.75

Winegard Company
Mfg. No. LT-103
VHF
NA
To 10 sets
$12.85

Splitters, Mixers:

Splitter, 2-way
VHF (high band - Low band) FM
300 ohm
Antennacraft
Mfg. No. HLC-2
$4.50

3-way splitter
UHF-VHF-FM
300 ohm
Antennacraft
Mfg. No. S-300-UVF
$4.50

2-way splitter
UHF-VHF
300 to 75 ohm match
Antennacraft
Mfg. No. S-375UV
$5.50

2-way splitter
UHF-VHF
300 ohm
Blonder-Tongue
Mfg. No. A-102-U/V
$3.30

4-way splitter
UHF-VHF
300 ohm
Blonder-Tongue
Mfg. No. A-104-U/V
$4.70

Mixer or splitter
VHF (high band - low band)
300 ohm
Blonder-Tongue
Mfg. No. A-105
$6.80

Splitter
UHF-VHF
300 ohm
Blonder-Tongue
Mfg. No. A-107
$5.95

Splitter
UHF-VHF
300 to 75 ohm match
Blonder-Tongue
Mfg. No. Co-Match 11
$9.35

Mixer or splitter
VHF high band - low band
75 ohm
Blonder-Tongue
Mfg. No. MX-M
$12.70

Splitter
UHF-VHF
300 ohm
Blonder-Tongue
Mfg. No. UV-C/S
$3.75

Mixer
UHF-VHF-FM
300 ohm
Blonder-Tongue
Mfg. No. UVF-1
$14.95

Splitter
UHF-VHF-FM
300 ohm
Blonder-Tongue
Mfg. No. UVF-C/S
$6.25

Splitter
VHF-FM
75 ohm
Blonder-Tongue
Mfg. No. TS-772
$6.61

Splitter, 4-way
VHF-FM
75 ohm
Blonder-Tongue
Mfg. No. TS-774F
$14.05

Splitter, 4-way
VHF-FM, indoor
75 ohm
Blonder-Tongue
Mfg. No. TSb-774
$8.90

Splitter
UHF-VHF
300 ohm
Blonder-Tongue
Mfg. No. TV-2
$1.43

Mixer
VMF high band
4 input, 1 output
75 ohm
Channel Master Corporation
Mfg. No. 7006
$18.88

Mixer
VHF low band
3 input, 1 output
75 ohm
Channel Master Corporation
Mfg. No. 7005
$18.78

FM Tap (88-108 MHz)
VHF-FM
75 ohm
Craftsman Electronic Products
Mfg. No. 1WD-1-F
$10.95

Splitter, 4-way
VHF/FM, 30 dB isolation
75 ohm
Craftsman Electronic Products
Mfg. No. 4WDW-F
$13.25

Splitter, 2-way
VHF/FM, 30 dB isolation
75 ohm
Craftsman Electronic Products
Mfg. No. 1592
$10.95

Splitter
UHF-VHF
NA
G. C. Electronics
Mfg. No. A-1075-1
$4.25

Splitter
VHF (high band - low band)
NA
G. C. Electronics
Mfg. No. A-1077-1
$4.00

Splitter
TV-FM
NA
G. C. Electronics
Mfg. No. A-1079-1
$6.50

Splitter
UHF-VHF
NA
Mfg. No. A-1083
$2.95

Mixer or splitter
UHF-VHF-FM
NA
G. C. Electronics
Mfg. No. A-1086-1
$5.50

Mixer
VHF high band
2 input to 1 output
75 ohm
Jerrold Electronics Corporation
Mfg. No. AMN-Hi
$43.75

Mixer
VHF low band
4 input to 1 output
75 ohm
Jerrold Electronics Corporation
Mfg. No. AMN-LO
$43.75

Splitter, 8-way
VHF-FM
75 ohm
Jerrold Electronics Corporation
Mfg. No. G-1518
$29.50

Splitter
UHF-VHF
300 to 75 ohm match
Jerrold Electronics Corporation
Mfg. No. T-380A-DP
$7.95

Splitter
VHF-FM
300 ohm
Jerrold Electronics Corporation
Mfg. No. TX-FM
$5.95

Splitter, 4-way
VHF-FM
75 ohm
Jerrold Electronics Corporation
Mfg. No. 1514A
$14.29

Splitter, 2-way
UHF-VHF-FM
75 ohm
Jerrold Electronics Corporation
Mfg. No. 1596
$18.50

Splitter
UHF-VHF-FM
300 ohm to 75 ohm matching
Jerrold Electronics Corporation
Mfg. No. MT-58
$6.95

Splitter
VHF (high band - low band)
NA
JFD Electronics Corporation
Mfg. No. SC10
$4.00

Splitter, 2-way
UHF-VHF-FM
75 ohm
JFD Electronics Corporation
Mfg. No. SC42-75
$10.95

Splitter, 4-way
UHF-VHF-FM
75 ohm
JFD Electronics Corporation
Mfg. No. SC72-75
$14.50

Splitter, 2-way
VHF-FM
75 ohm
Mosley Electronics, Inc.
Mfg. No. M-22
$8.19

Splitter, 4-way
VHF-FM
75 ohm
Mosley Electronics, Inc.
Mfg. No. M-24
$11.80

Splitter
UHF-VHF
300 ohm
Mosley Electronics, Inc.
Mfg. No. UV-1
NA

Splitter
UHF-VHF
75 ohm
Mosley Electronics, Inc.
Mfg. No. UV-2
NA

Splitter
UHF-VHF
300 ohm
RMS Electronics, Inc.
Mfg. No. S-500
$2.95

Splitter
UHF-VHF
300 to 75 ohm match
RMS Electronics, Inc.
Mfg. No. TRS-732
$3.95

Splitter
UHF-VHF
300 ohm
RMS Electronics, Inc.
Mfg. No. UVC-2
$4.95

Splitter
UHF-VHF-FM
NA
S & A Electronics, Inc.
$8.95

Splitter
TV-FM
NA
S & A Electronics, Inc.
Mfg. No. 7010
$6.50

Splitter
UHF-VHF
NA
S & A Electronics, Inc.
Mfg. No. 7012
$4.25

Splitter, 2-way
UHF-VHF1FM
75 ohm
The Finney Company
Mfg. No. F-82S-2S
$10.95

Splitter, 4-way
UHF-VHF-FM
75 ohm
The Finney Company
Mfg. No. F-82S-4T
$14.95

FM tap
NA
NA
The Finney Company
Mfg. No. M-218
$8.40

Splitter
VHF (high band - low band
75 ohm

The Finney Company
Mfg. No. M-237
$13.75

Mixer
4 high band and 3 low band
NA
The Finney Company
Mfg. No. M-243
$78.50

Mixer
VHF (4 high band)
NA
The Finney Company
Mfg. No. M-245
$35.00

Splitter
VHF-FM
300 ohm
The Finney Company
Mfg. No. 3005
$6.50

Splitter
UHF-VHF
300 ohm
The Finney Company
Mfg. No. 3014
$4.25

Splitter - mixer
VHF (high band - low band)
300 ohm
The Finney Company
Mfg. No. 3016
$4.00

Splitter
UHF-VHF-FM
300 ohm
The Finney Company
Mfg. No. 3018
$8.95

Spitter
UHF-VHF
300 ohm, indoor
The Finney Company
Mfg. No. 3020
$2.95

Splitter
UHF-VHF
300 to 75 ohm match, indoor
The Finney Company
Mfg. No. 7520
$4.95

Splitter, 2-way
NA
NA
Workman Electronic Products
Mfg. No. T492
$8.23

Splitter,4-way
NA
NA
Workman Electronic Products
Mfg. No. T494
$11.50

Splitter
NA
NA
Winegard Company
Mfg. No. L-820 (use with DA-823)
$24.95

Splitter
VHF (high band - low band)
NA
Zenith
Mfg. No. 973-27
NA

Splitter
UHF-VHF
NA
Zenith
Mfg. No. 973-28
NA

ROTATORS

Alliance
Mfg. No. C-225
5 wire cable
Fully automatic
Sensing electronic bridge
Magnetic brake
NA

Alliance
Mfg. No. K-22
4 wire cable
Instantly reversible
NA

Alliance
Mfg. No. T-10
4 wire cable
360° rotation
NA

Alliance
Mfg. No. T-12
4 wire cable
Indicates direction of antenna at all tnmes
NA

Alliance
Mfg. No. T-20
4 wire cable
One RPM motor speed
NA

Alliance
Mfg. No. T-45
5 wire cable
Can be used with two or more controls
NA

Alliance
Mfg. No. U-83
4 wire cable
Fully antomatic
NA

Alliance
Mfg. No. U-98
5 wire cable
Magnetic brake
NA

Alliance
Mfg. No. U-100
4 wire cable
Automatic stepping
NA

C D E
Mfg. No. AR-10
4 wire cable
$44.95

C D E
Mfg. No. AR-10B
4 wire cable
$46.95

C D E
Mfg. No. AR-22R
4 wire cable
Automatic shut-off
$54.95

C D E
Mfg. No. AR-33
5 wire cable
Five button selection
Silent solid-state circuitry
$79.95

C D E
Mfg. No. HAM-M
Amateur radio use
Heavy duty
Disc-clutch brake
$129.95

C D E
Mfg. No. TR-2C
8 wire cable
FM meter for fine tuning
$47.95

C D E
Mfg. No. TR-44
Amateur radio use
Disc-clutch barke
$69.95

Channel Master Corporation
Mfg. No. 9513
Semi-automatic
$39.95

Channel Master Corporation
Mfg. No. 9512
Fully automatic
$49.95

RCA
Mfg. No. 10W505
NA
NA
NA

RCA
Mfg. No. 10W707
NA
NA
NA

TEST EQUIPMENT

Amphenol Corporation
Mfg. No. 840-13
Field strength meter
Tunes VHF, FM bands
300 or 75 ohm input
Battery powered
3½ lbs.
$232.85 (UHF plug-in $54.95)

Channel Master Corporation
Mfg. No. 7275
Field Strangth meter
Tunes UHF, VHF, FM bands
75 ohm input impedance
Battery powered
7.5 lbs.
NA

Jerrold Electronics Corporation
Mfg. No. AIM-718
Field strength meter
Tunes, UHF, VHF, FM bands
300 ohm input impedance
Battery powered
5½ lbs.
$198.50

Jerrold Electronics Corporation
Mfg. No. 727
Field strength meter
Tunes VHF, FM bands
75 ohm input impedance
Battery powered
Tune UHF with UH-727 plug-in
NA

Sencore
Mfg. No. FS-134
Field strength meter
Tunes UHF, VHF, FM bands
300 or 75 ohm input impedance
Battery powered
9 lbs.
$199.50

The Finney Company
Mfg. No. M-550
Field strength meter
Tunes VHF, FM bands
300 or 75 ohm input impedance
Battery or AC powered
7 lbs. 10 oz.
$435.00

▲

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- Transistor Television Circuits
- Servicing Transistor Circuits

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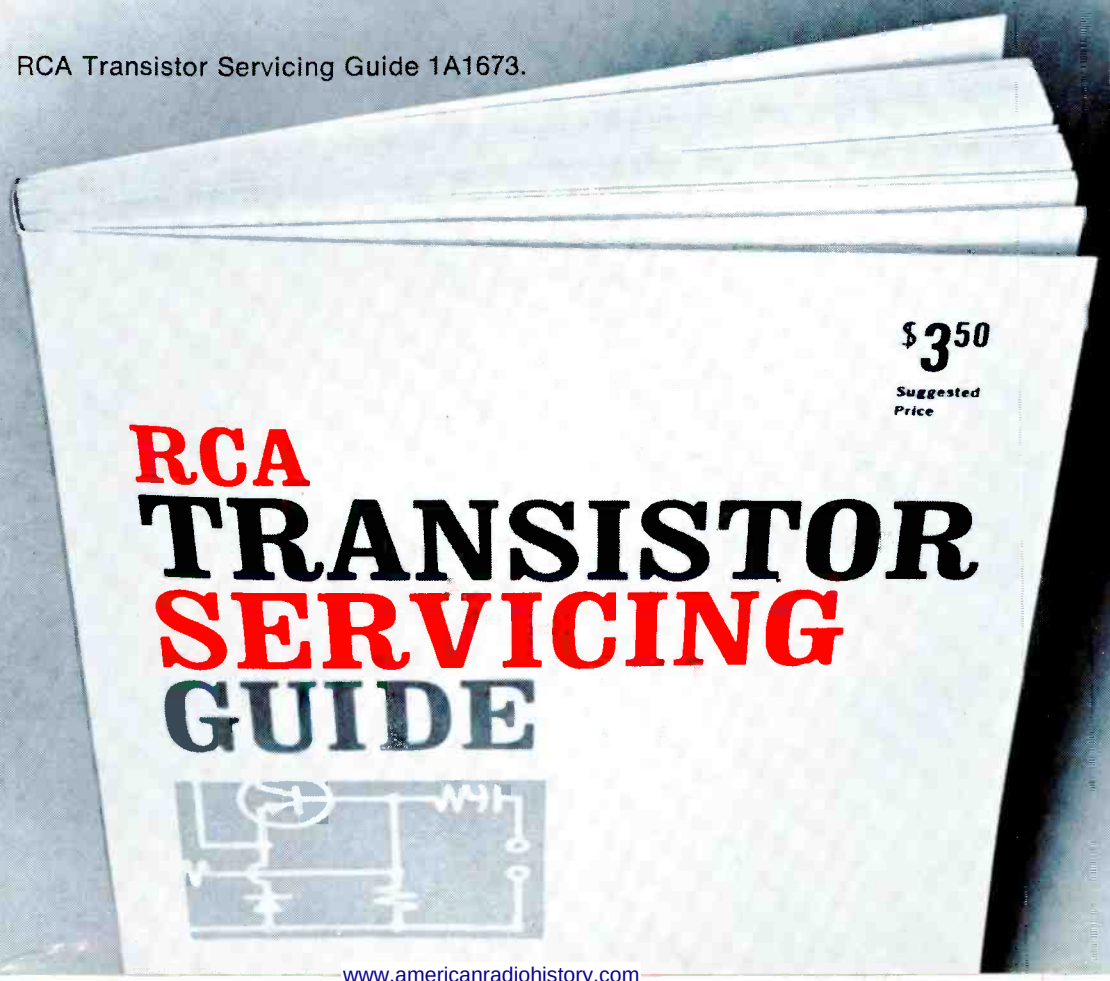

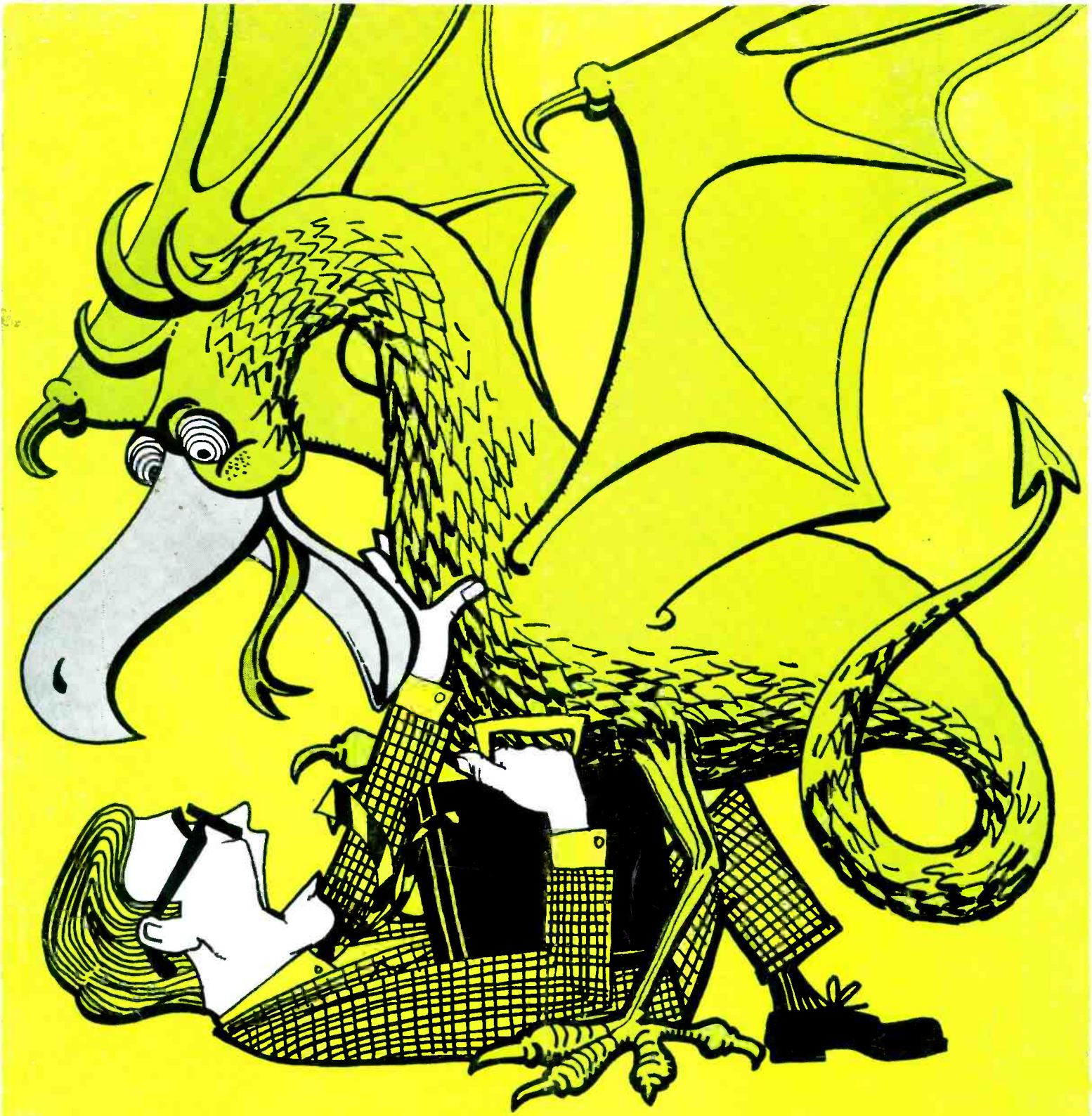

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