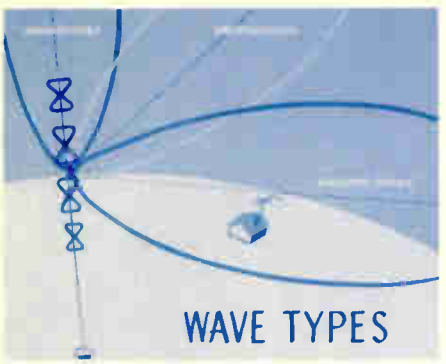
A sincere discussion of Television Antennas based on actual field tests, dealing with the characteristics of the various types of antennas and the conditions which affect their performance . . .

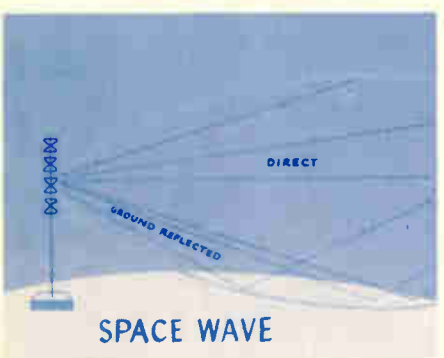
AMERICAN PHENOLIC CORPORATION
1830 SOUTH 54TH AVENUE • CHICAGO 50, ILLINOIS

Experienced television installers say that for their consideration, an antenna must not only meet their electrical requirements, dependent on TV signals in their areas, but must be mechanically rugged for a long service life of trouble-free operation.

And, who should be in any better position to appreciate how important the electrical and mechanical characteristics of a television antenna are to his success than the man who is responsible for the installation? For, after all, the set manufacturer depends upon him as his representative in the customer's home, the customer depends upon his good judgment for uninterrupted televiewing, and, lastly, his future in television is associated with the efficiency of his installation and service practices.

So, doesn't it seem well worth while to investigate the electrical and mechanical requirements of the television antenna whose important function it is to intercept and reproduce faithfully at the television set's terminals sufficient audio and video energy for proper set operation, irrespective of weather conditions?





Busy as you have been, in most cases you have not had the time to do this research work. To conserve your time, we'd like to share with you the findings of the Development division of The American Phenolic Corporation, makers of television and radio parts and television antennas, and present to you, "The Antenna Story."

Of the three types of radio frequency waves, at television frequencies, we are normally concerned with only the Ground Wave type. This Ground Wave type consists of two parts: the Surface Wave and the Space Wave. The Surface Wave hugs the earth and is quickly absorbed, within a comparatively short distance from the transmitter. But, the Space Wave is more fortunate and has the opportunity of providing most of our television signal.

The Space Wave, in turn, consists of two parts: The Direct, and the Ground Reflected components. However, if anybody thinks that the Space Wave has an easy time of it, let them use caution. As soon as it leaves the transmitting antenna, the Space Wave is af-

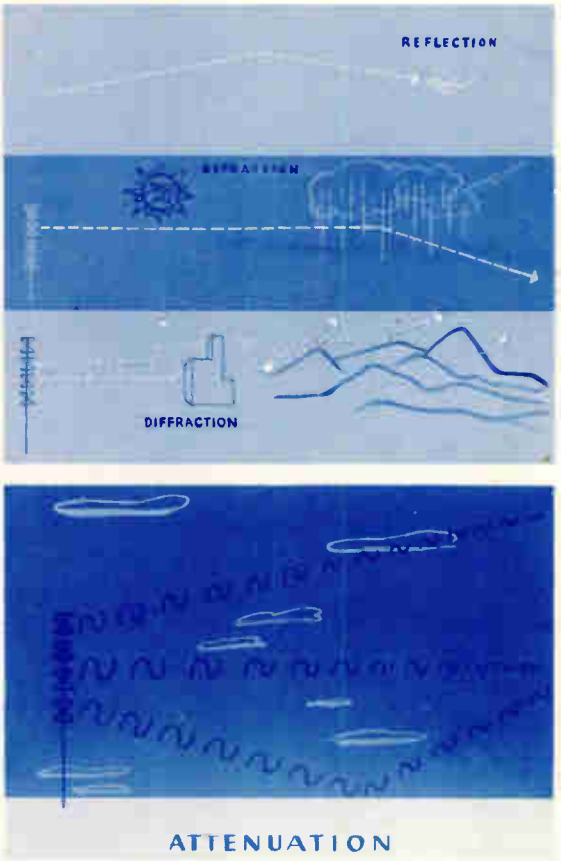
fected by Reflection, Refraction and Diffraction. Attenuation, too, plays an important part in its life.

REFLECTION

Most of us have experienced what Reflection does. It can cause our wave to bounce off structures or moving objects, usually creating "Ghosts" or multiple images on the screen because the Reflected signal arrives later than the Direct signal.

REFRACTION

If the medium through which our wave is passing changes due to differences in temperature, moisture content, or atmospheric density, Refraction will curve or bend its forward travel and may slow down the wave. Therefore, it is possible that changes in the atmosphere may alter the direction of the wave front and its intensity at your reception point.



DIFFRACTION

The bend of the wave due to Diffraction is usually attributed to a physical object impeding the wave's forward progress, or can be the result of the wave trying to follow the curvature of the earth—something it's not supposed to do. This Diffraction bend accounts frequently for some signal strength being present in "no signal" or "shadow" areas that are below the line of sight, behind physical obstructions, or in mountainous or irregular terrain.

ATTENUATION

Of course, we realize that as our wave travels forward, it covers more and more territory. Its strength is continually being spread thinner and thinner as it brushes against earth and other physical objects. It almost seems as though our Space Wave has a problem just trying to exist. Perhaps, the mere fact that it reaches your antenna is a major victory.

Also, we must not forget that if the two components of our Space Wave, the Direct Wave and the Ground Reflected Wave arrive at our reception point out of phase, they tend to cancel each other and our signal may be very weak in comparison to our neighbor's where these components are arriving in phase and are additive, making their signal much stronger at their location. This stresses the importance of probing your roof for the best location, for a difference of only a few feet up, down, or sideways may make a worthwhile change in your television reception.

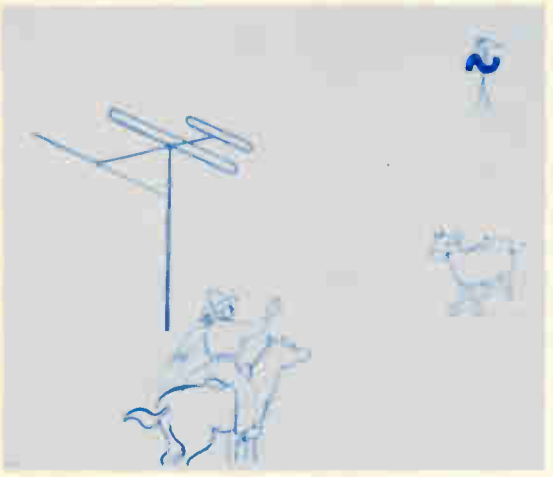
ELECTRICAL CHARACTERISTICS

Many technicians agree that the more important electrical characteristics of a good television antenna are:

1. Impedance
2. Radiation Patterns
3. Gain
4. Broadbanding
5. Front-to-Back and Front-to-Side Ratios

IMPEDANCE

The ratio of the voltage to the current at the antenna's terminals is called Impedance. The impedance of a single dipole at resonance is about 72 ohms; a folded dipole, about 300 ohms. It is important that the impedance of your antenna match the impedance of the transmission line, and, in turn, the impedance of the television set. A 300 ohm antenna, if connected without a transformer to a 72 ohm transmission line, then into a 72 ohm TV set, will present a 4 to 1 mismatch, resulting in a 37 percent loss of energy in transfer of the signal from the antenna to the transmission line. If we mismatch impedances at the set's terminals, we may have reflected signals on the transmission line, resulting in ghosts on our TV screen.



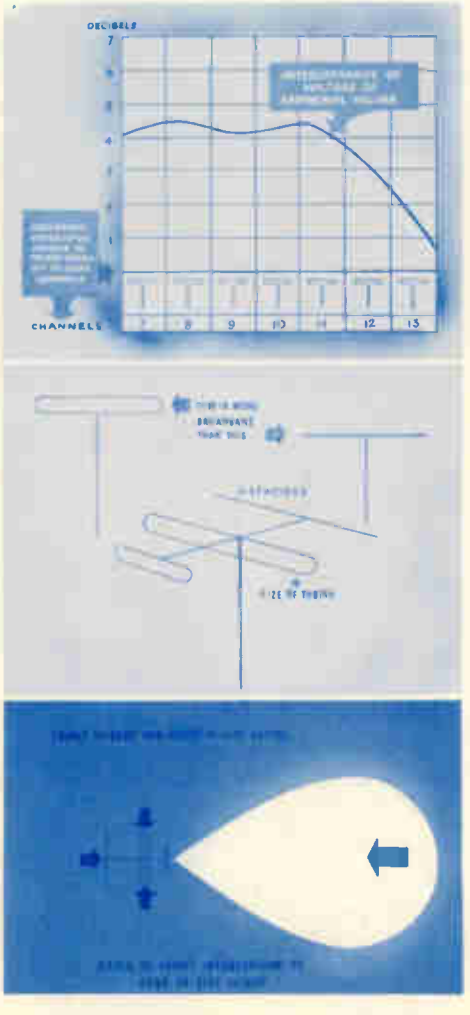
RADIATION PATTERNS

When a cowboy throws a lariat and ropes a steer, he intercepts that animal and the pattern made by the rope is large enough to assure capture. Your television antenna's radiation patterns consist of lobes that are somewhat like the outline of the cowboy's rope as it sails through the air. These lobes are the interception area as presented by your antenna to the oncoming television signal.

The cowboy throws only one rope because he is projecting all of his energy into one target area. The lobes in the radiation patterns of your antenna, too, should be concentrated on its target—the television channel being intercepted. Any lobes in directions other than the one in which the signal is coming usually are wasteful and can permit conflicting electrical disturbances and reflected signals to enter those additional interception areas.

GAIN

In determining the voltage gain or loss of a television antenna, the voltage intercepted by the antenna under test is compared to the voltage intercepted by a separate dipole antenna tuned for each channel individually. In other words, this gain curve for the high band indicates that the voltages intercepted by the Amphenol Inline antenna are greater than those voltages intercepted by any one of seven separately tuned folded dipoles, one for each high band channel.



BROADBANDING

In television, a broadbanded antenna is usually one that has been designed to cover all channels with as much gain as possible. When you realize that the entire AM broadcast band, from 550 kc. through 1500 kc., is but one-eighth the width of a single television channel, you can appreciate how difficult it is to design a TV antenna with gain across all channels. A folded dipole is more broadbanded than a simple dipole. When additional elements are used, proper spacing and larger sized tubing can increase broadbanding characteristics.

FRONT-TO-BACK AND FRONT-TO-SIDE RATIO

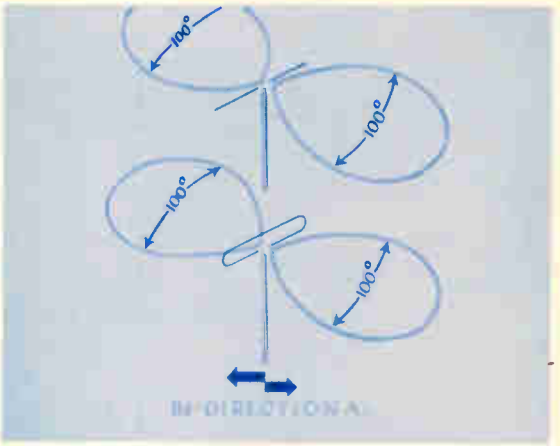
This is the ratio of the energy picked up or intercepted in the front lobes as compared to that intercepted off the back or side of the

antenna. Naturally, with good back and side rejection, your reception is less likely to intercept objectional interferences.

Now that we have briefly discussed some of the electrical characteristics, let us look at some specific types of television antennas.

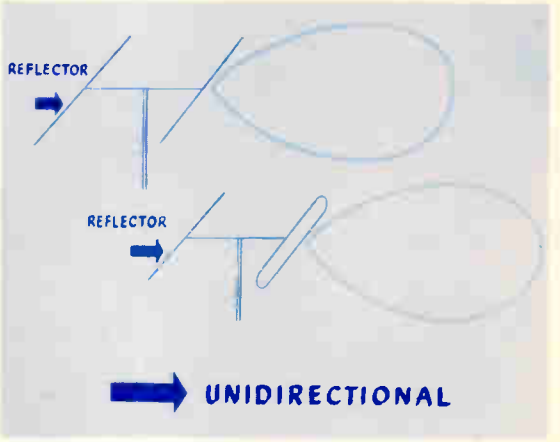
DIPOLES

We know that the lobes of a simple or folded dipole are bidirectional (two directions) and at half-power point have a width of approximately 100 degrees. This width provides little directivity and no forward gain and its extremely wide dual lobes may not only intercept the signal, but also adjacent noise or reflected signals in the same fields.

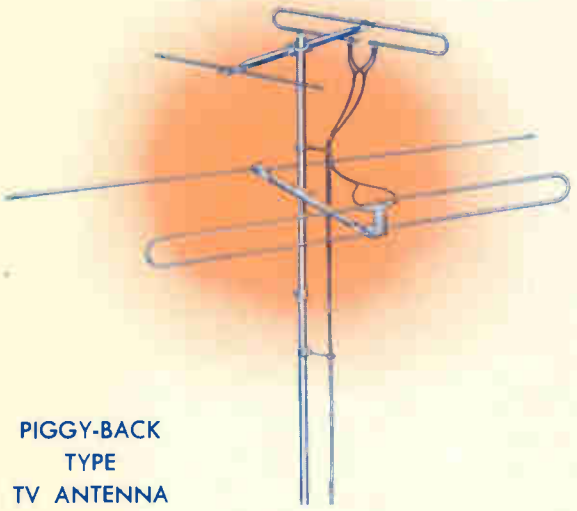


DIPOLE WITH REFLECTOR

By adding a reflector to a dipole, it is possible to incorporate forward gain, narrow the width of the lobes and considerably reduce its rear lobe to the point of it being considered unidirectional, or one direction. However, its gain is somewhat concentrated in the channel for which it is cut. If you were to use this low band antenna in the high band, its radiation pattern looks like a four leaf clover. This is not particularly desirable for most television applications.



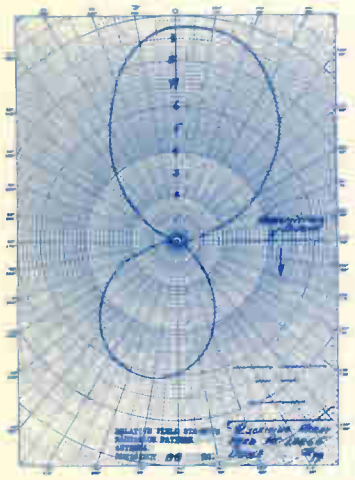
PIGGY BACK ANTENNA



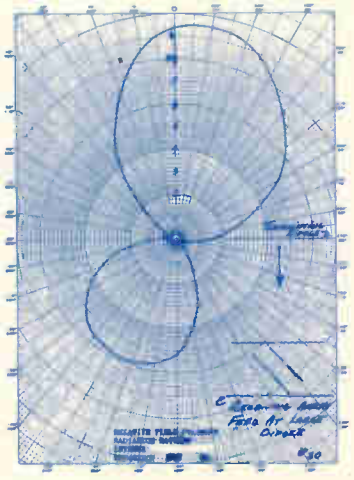
PIGGY-BACK
TYPE
TV ANTENNA

When we consider a combination of dipoles with reflectors for both low and high channels, we have what most installers call "Piggy Back" antennas. Unless they are fed separately, using two transmission lines, or unless they incorporate an isolating network in the harness that joins both sections, the interaction of the two antennas presents radiation patterns that usually are objectionable.

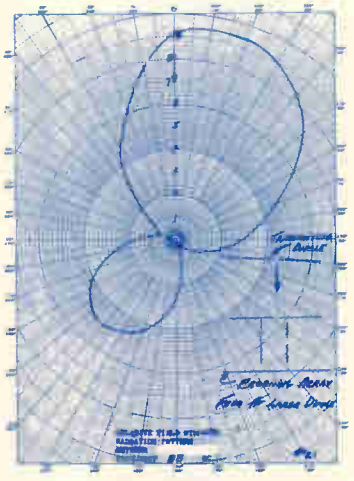
In these radiation patterns for 88 mc., which are typical of those in the low band, we have the low band section of the antenna facing the transmitter and the high band section orientated in three different directions with respect to the low band section; namely, in line, at 45 degrees to, and 90 degrees to. This is illustrated by the outline drawing of the piggy back's elements as indicated in the lower right-hand corner of these charts.



Frequency 88 mc

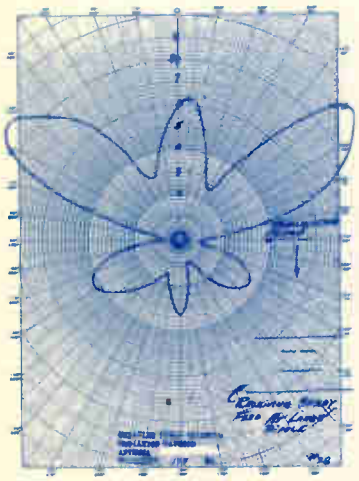


Frequency 88 mc

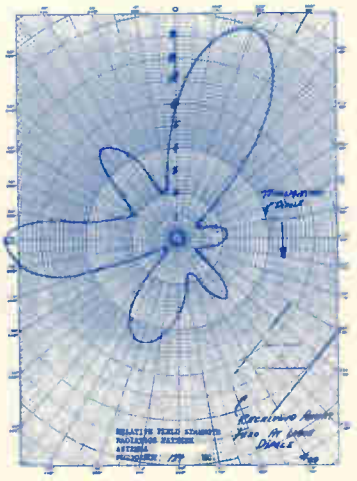


Frequency 88 mc

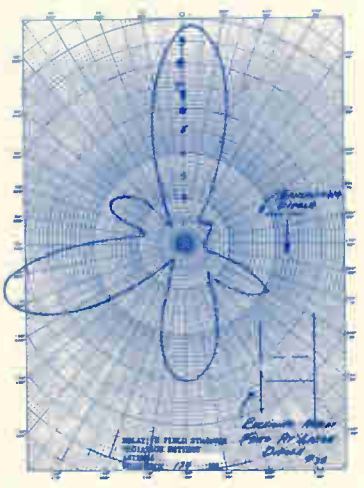
In these high band illustrations, we face the high band section toward the transmitter and orient the low band section likewise.



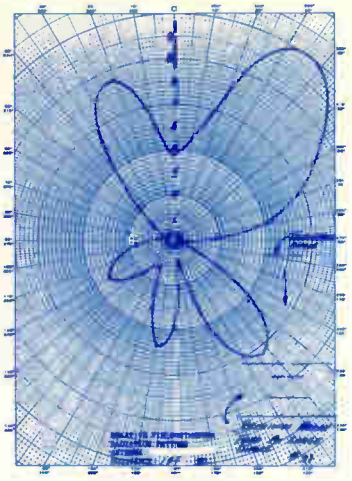
Frequency 174 mc



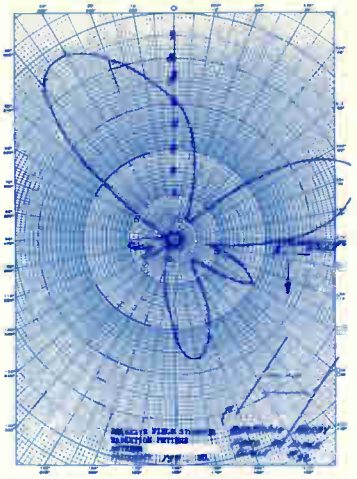
Frequency 174 mc



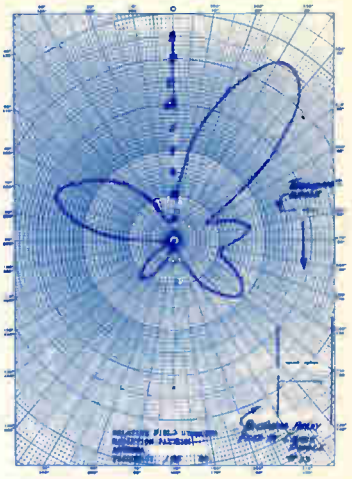
Frequency 174 mc



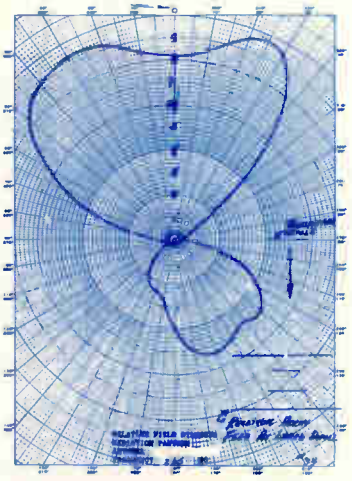
Frequency 194 mc



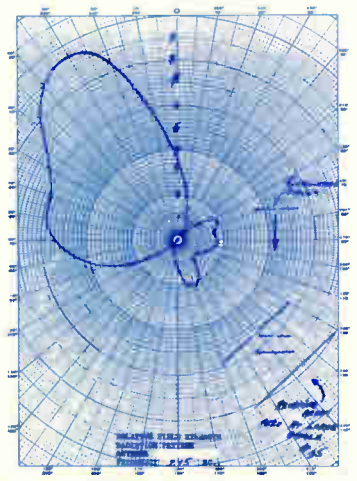
Frequency 194 mc



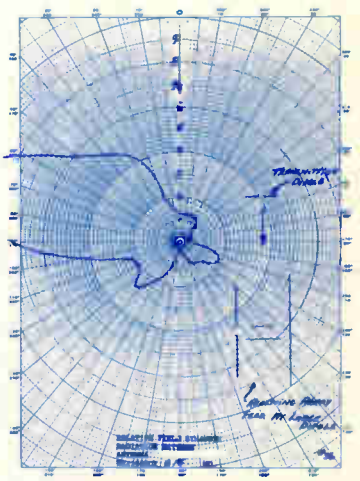
Frequency 194 mc



Frequency 215 mc



Frequency 215 mc

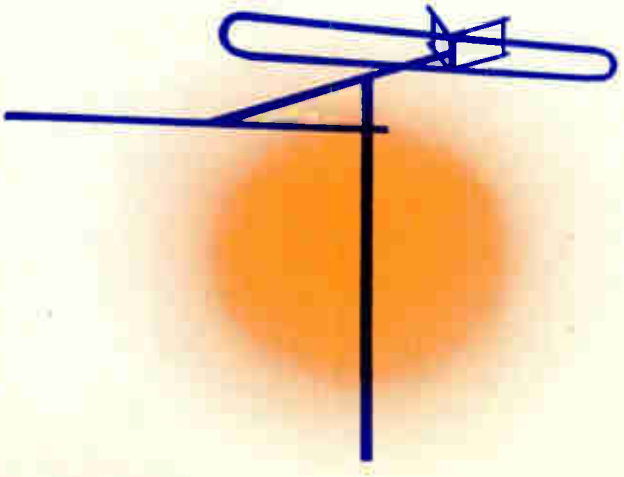


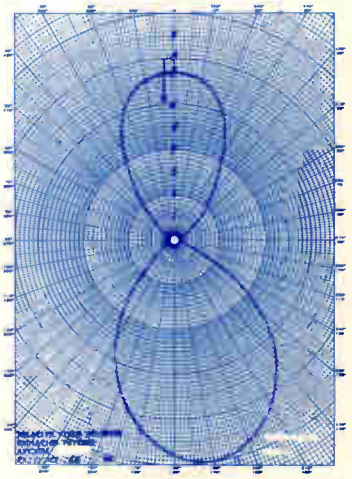
Frequency 215 mc

You'll find the patterns for 174 mc., 194 mc., and 215 mc. very interesting. We shouldn't forget that when we have multiple lobes, like these of the piggy back for the high channels, we have open doors for all types of interferences to enter into these interception areas.

BAT WING ANTENNA

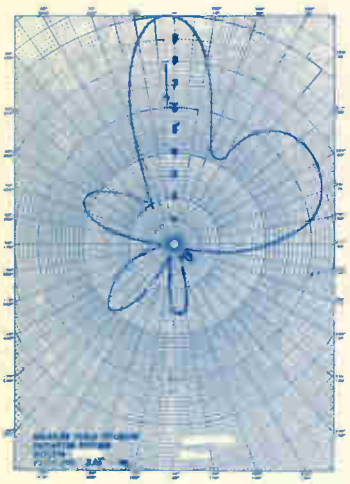
The Bat Wing type antenna seems to have more pickup off the back at 66 mc. than off the front.



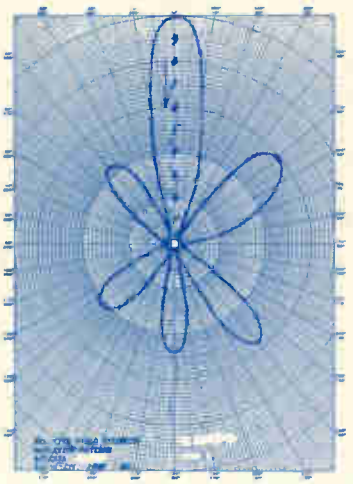


Frequency 66 mc

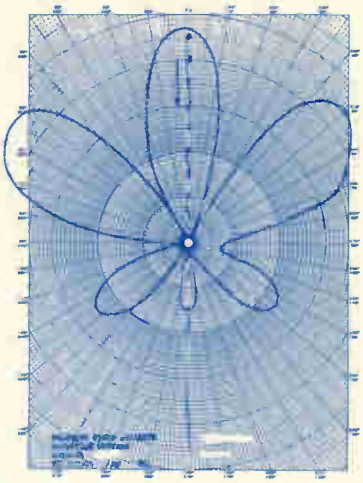
At 174 mc., 194 mc., and 215 mc., the radiation patterns of the Bat Wing type antenna contain many lobes.



Frequency 174 mc



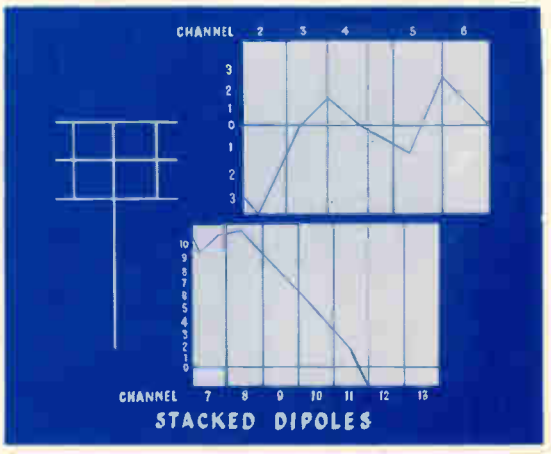
Frequency 194 mc

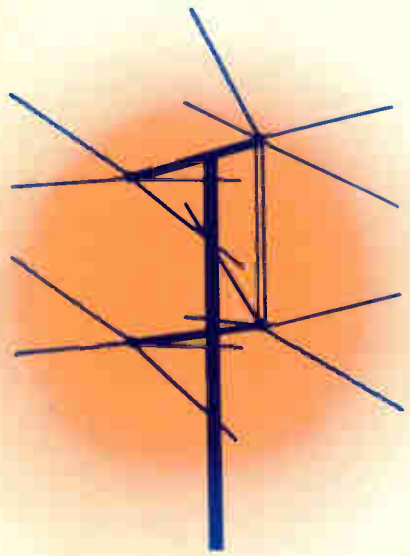


Frequency 215 mc

STACKED DIPOLES

Whenever an attempt is made to stack dipoles, such as this "Fly Swatter," the gain will usually be good over only a few of the channels. Notice how its gain curve peaks and then rapidly decreases. If this happens to fall within your present television channels, it can be satisfactory, providing additional channels have not been assigned to your area for future operations. In addition, its radiation pattern is bi-directional.

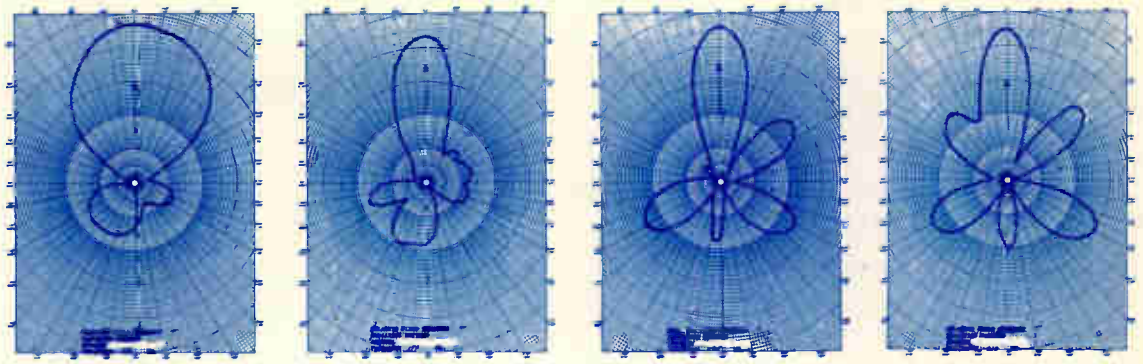




CONICAL ANTENNA

The installers' experiences with this "X" type antenna have been varied. Its radiation pattern at 66 mc., typical of those in the low band, is acceptable as to width and back and side rejection. But, look at the patterns at 177 mc., 195 mc., and 213 mc. As many as five additional lobes in addition to the forward one.

Did you know, as you increase frequency in the high band, the conical's forward lobe becomes narrower and narrower, until at Channel 13, it is approximately 9 degrees at half power point? Remember how Refraction can vary the wave front's approach, depending on the temperature, moisture content, or atmospheric density of the medium in which the wave is traveling?

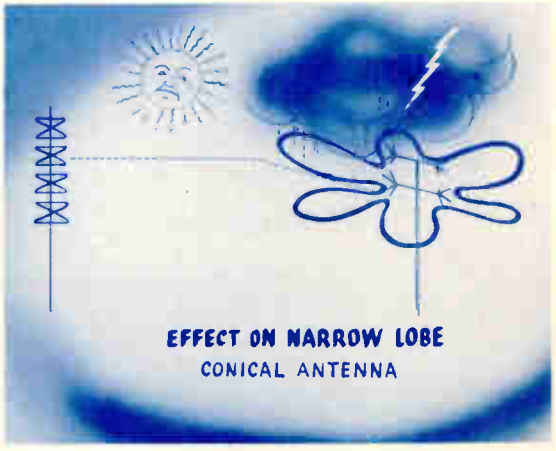


Frequency 66 mc | Frequency 177 mc | Frequency 195 mc | Frequency 213 mc

Is this narrow forward lobe adequate to allow for these variations? Is it possible that when you orient your antenna on Monday, for maximum pickup with this narrow lobe, that on Friday a variation caused by Refraction will cause the wave front to come in at half power point, or not at all? Furthermore, will physical movement of this type antenna, due to wind, cause your picture to vary in intensity because of this narrow acceptance area?

It has also been said that the gain of this type antenna is not as flat as is desirable; that it has more than a 3 decible gain change in a channel which modulates the picture information and causes fuzziness in its reproduction.

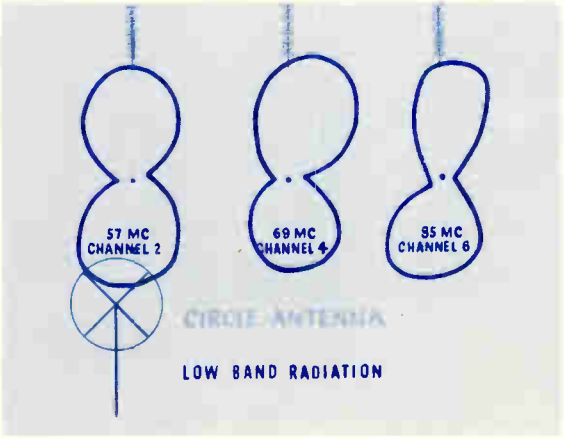
With at least eight straight elements jutting out at various angles, all subject to the whims of mother nature, some installers recommend that this type antenna, mechanically, should bear careful investigation before consideration.

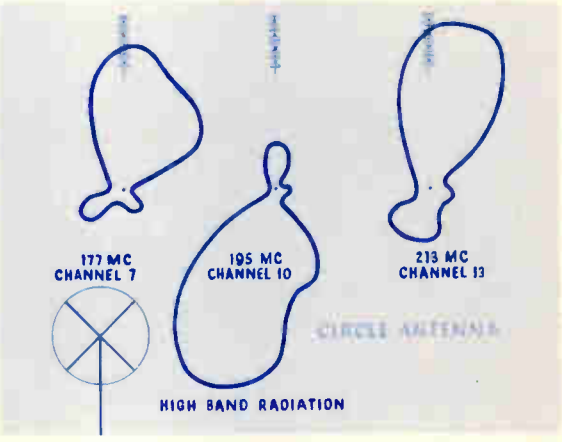


CIRCLE ANTENNA

Here is a comparative newcomer in the field. Its gain is modest in the low channels and increases to some extent in the upper channels. Its radiation patterns are rather interesting, being bidirectional in the low channels.

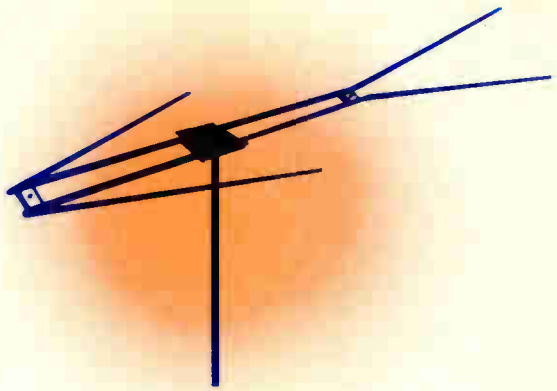
You'll find the high channel patterns revealing. The pattern at 195 mc. indicates more pickup off the back than off the front.

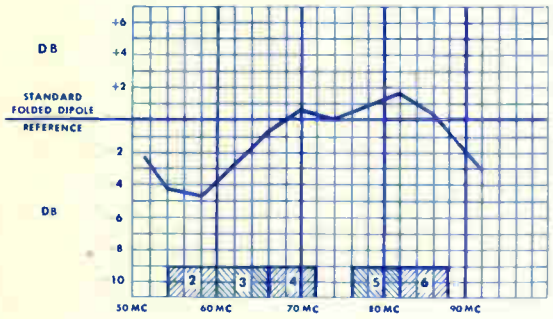


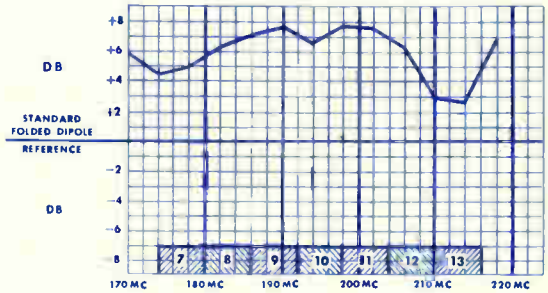


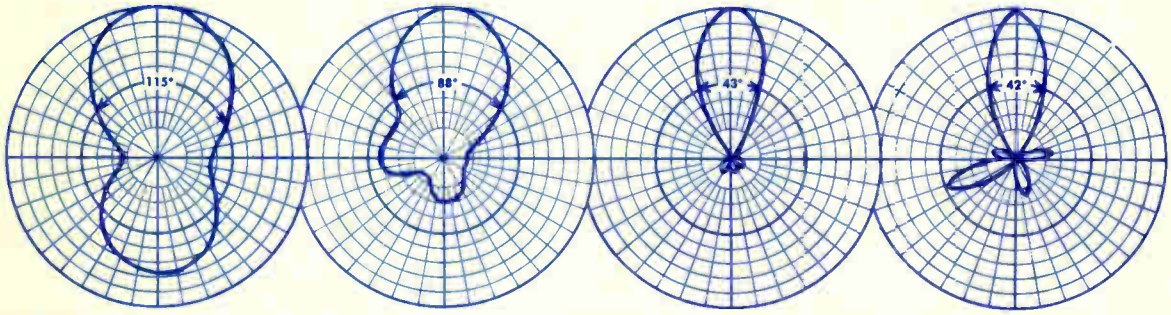
"V" OR "ARROW" ANTENNA

This has recently been introduced as a "new" type antenna on the market. The findings of our laboratories indicate that its gain in the high band is commendable. However, the gain in the low band, apparently, leaves much to be desired. The radiation patterns at 57 mc., 85 mc., 177 mc., and 213 mc., are also presented for your information. Again, mechanically, it may be advisable to investigate this type antenna carefully before consideration.





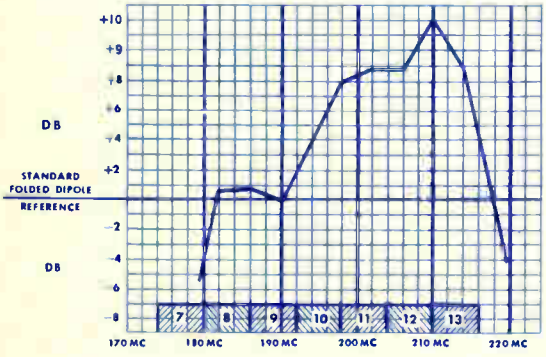


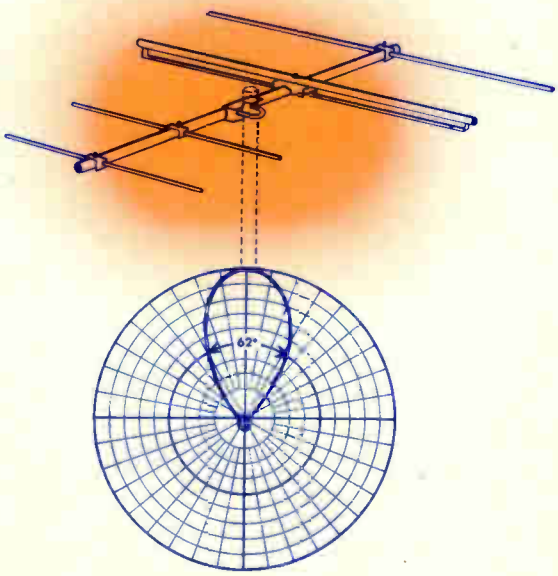


CHANNEL 2—FREQUENCY 57 mc. CHANNEL 6—FREQUENCY 85 mc. CHANNEL 7—FREQUENCY 177 mc. CHANNEL 13—FREQUENCY 213 mc.

YAGI ANTENNA

Usually, particularly on the low band, the Yagi antennas are considered single channel antennas. Yet, on the high band, they can be designed to be effective over two or three channels. Here is the gain curve of a four element Yagi designed for channels 11, 12, and 13. Its radiation patterns on channels 11 and 13 are similar to channel 12 which is indicated here.





CHANNEL 12—FREQUENCY 207 mc.

There is no "Fountain of Youth" in antenna design. It is apparent that if the extreme in the direction of one characteristic is incorporated into a broadband antenna, it can only be at the expense of another desirable feature. Therefore, the design of a dependable broadband antenna must be done with great care by engineers familiar with television problems and equipped with the proper tools to do the job.

Many installers say that the Amphenol Inline type antenna, designed by engineers of the Amphenol laboratories, is their choice for a broadband television antenna that incorporates the maximum of the more desirable electrical characteristics and mechanical features.

AMPHENOL
INLINE ANTENNA

You might call this the mechanical heart of the Amphenol Inline antenna. It is a well-designed and engineered die-casting of aluminum alloy having a tensile strength of 45,000 pounds per square inch. It shares, with the "T" casting, the responsibility of keeping intact, for years of trouble-free operation, the complete Amphenol Inline antenna assembly.

Strength is not incorporated only in these castings. For example, consider the wall thickness, .049", of our reflectors and folded dipoles. This may be greater than is needed for normal use, but it adds a safety factor for those unusual stresses when ordinary antennas may fail.

In addition to the importance of adequate wall thicknesses, the matter of proper materials is a serious design problem. Element materials cannot be too hard, because of the possibility of crystallization and consequent breakage; nor can they be too soft, for fear that they will bend under ice loadings, bird sittings, or wind whip. Amphenol Inline antennas utilize type 3S one-half hard aluminum that has a yield strength of 19,000 pounds per square inch.

Even installers who are just starting in television find that the new quick-up assembly of the AMPHENOL Inline antenna takes them little more than three minutes to erect. Here is a table of mechanical specifications that merits your full consideration.

MECHANICAL SPECIFICATIONS—AMPHENOL INLINE ANTENNA

Part	Material	Yield Strength	Size	
		psi	o.d.	Wall
Mast (galv.)	¾" Thinwall Steel Conduit	32,000	.922"	.049"
Large Folded Dipole	3S ½ H Al.	19,000	.500"	.049"
Small Folded Dipole	3S ½ H Al.	19,000	.375"	.049"
Reflector	3S ½ H Al.	19,000	.500"	.049"
Crossarm	3S H Al.	26,000	.875"	.065"
Center Support & T Casting	Al. Alloy 45,000 psi tensile strength			

What does all of this mechanical information about the AMPHENOL Inline antenna mean to you? It means, that in your purchase of an AMPHENOL Inline antenna, you have a product that has been designed to withstand winds of 70 miles per hour and ice loadings of one-half inch, with a safety factor of 3 to 1.

The relatively few mechanical failures of AMPHENOL Inline antennas have confirmed these facts to television installers.

CITY CODES

Many city engineers are becoming concerned with the mechanical failures of some television antennas because of faulty design. Several have written our laboratory requesting mechanical specification recommendations so that they may consider adopting such requirements in a code covering antenna installations in their respective cities.

Of course, mechanical advantages are only one half of the AMPHENOL Inline story. Let's discuss the other half, the electrical advantages.

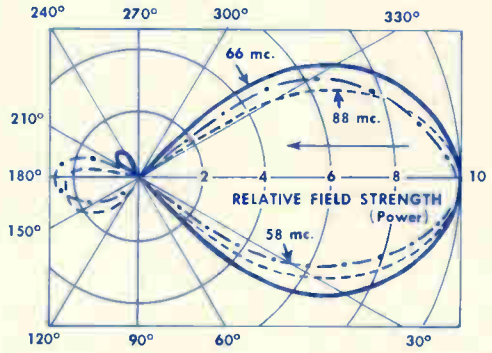
ELECTRICAL CHARACTERISTICS AMPHENOL INLINE ANTENNA

It is seldom that the United States Patent Office finds it possible to issue a patent on an antenna design because of its electrical circuit. Yet the issuance of United States Patent No. 2,474,480 by that office protects the electric circuit principle and mechanical arrangement available only in the AMPHENOL Inline antenna. Physically, there may be many antennas that look like an AMPHENOL Inline, but, electrically and mechanically, they are as much alike as a Zircon and a Diamond.

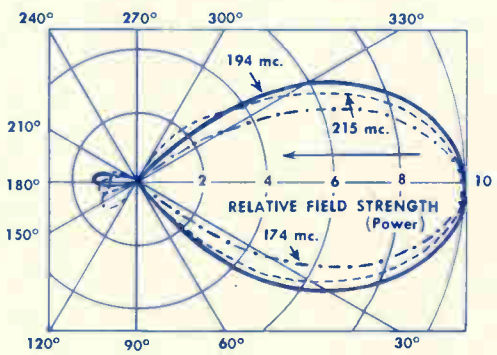
RADIATION PATTERNS AMPHENOL INLINE ANTENNA

These are the radiation patterns of the AMPHENOL Inline antenna at 58 mc., 66 mc., and 88 mc., in the low band, and 174 mc., 194 mc., and 215 mc. in the high band. Notice the uniformity of these lobes at all frequencies. The lack of lobes off the sides and negligible ones off the back maintains high front-to-back and front-to-side ratios necessary for the rejection of various interferences. The presence of a single forward lobe is usually a very desirable feature, especially when it is wide enough to provide adequate interception area for some differences in transmitter location, changes in the wave front's direction of travel, or physical movement of the antenna in high winds. Furthermore, it is not too critical of orientation. It is necessary only to aim it and forget it.

This single forward lobe of the AMPHENOL Inline antenna, consistent on all TV frequencies, is in sharp contrast to those antennas that have an excellent radiation pattern on only a few channels. If a television antenna is not properly designed, its radiation pattern can change decidedly from channel to channel.



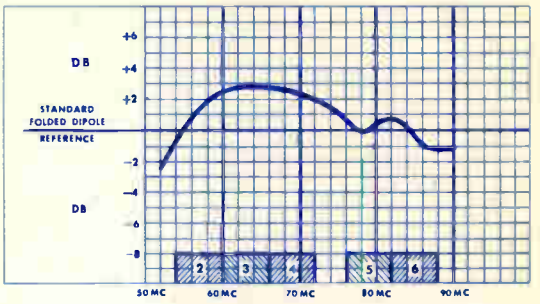
Horizontal radiation pattern of Amphenol TV Antenna Model No. 114-005



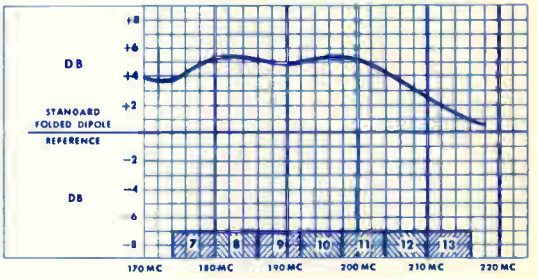
GAIN CURVES
AMPHENOL INLINE ANTENNA

These gain curves of the AMPHENOL Inline antenna represent the intercepted voltage of the AMPHENOL Inline antenna as plotted against the intercepted voltage of a reference folded dipole cut to the frequency being compared. There is no channel in either the low band or high band where there is more than a three decible change within the channel that can cause picture modulation or "fuzziness." The gain of the AMPHENOL Inline antenna is quite flat over all channels.

You will find more gain designed into the high band because of greater need for it, due to higher losses at these frequencies. Also, notice the drop-off on channel six. This is at the edge of the FM band and is subject to FM interference, so the Inline's gain is purposely held down at that frequency.



Gain of Amphenol Model No. 114-005 Antenna over a reference folded dipole, 174 to 216 mc.



Gain of Amphenol Model No. 114-005 Antenna over a reference folded dipole, 54 to 88 mc.

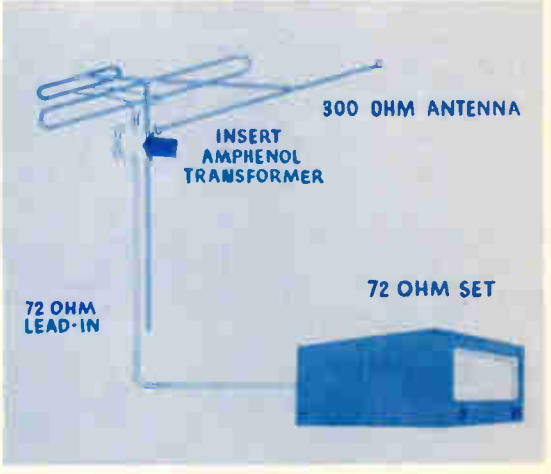
IMPEDANCE MATCH

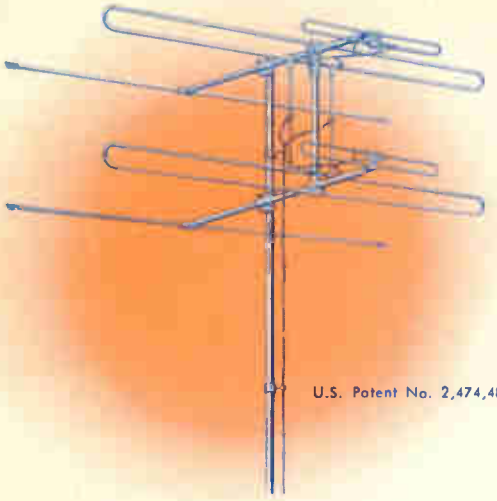
Inasmuch as a folded dipole has an impedance of 300 ohms, there is excellent match between the AMPHENOL Inline antenna and 300 ohm transmission line. If you plan to use it with a 72 ohm transmission line, a transformer such as AMPHENOL's #114-313, should be used to match the 300 ohm impedance to the 72 ohm impedance.

Actually, the AMPHENOL Inline antenna is an efficient combination of two antennas which gives the appearance of being only one. It utilizes a two-purpose element that not only acts as the folded dipole for the low band, but also serves as the reflector for the high band. In this way, the antenna operates most efficiently and provides complete coverage over all the television channels. Further, the response within each channel is uniform so that the picture signal does not change in strength as the video modulation carries it across the channel width.

The AMPHENOL Inline antenna has very little response to interfering signals from the sides and rear and thus assures a clear, ghost-free signal. Of course, its all-channel coverage protects you from obsolescence when additional channels may be operating in your area.

So, in considering the requirements that are essential in your antenna installations, the excellent broadband characteristics, impedance match, single forward lobe radiation patterns on all channels, maximum gain, lightning protection, and superior mechanical features of the AMPHENOL Inline antenna continue to specify it as the favorite of experienced television installers.



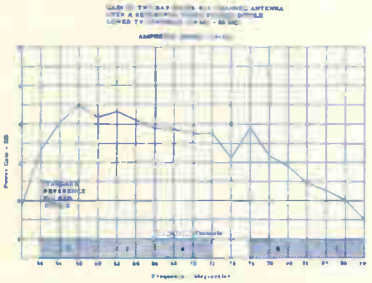


U.S. Patent No. 2,474,480

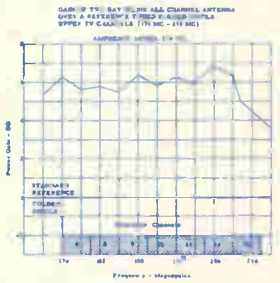
"FRINGE" TELEVISION RECEPTION

No doubt, an entire book could be devoted to problems experienced in "fringe" areas, or those locations considered out of the TV service zone. Normally, this area has been accepted as anything beyond 40 to 50 miles of the transmitter.

For such installations, many technicians depend upon AMPHENOL 114-302 stacked array. In addition to retaining all of the mechanical and electrical advantages of the single bay No. 114-005, it provides approximately two DB more gain over most channels.



Gain of Amphenol Model No. 114-302 antenna over a reference folded dipole, 54 to 88 mc.

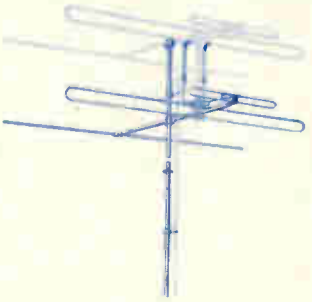


Gain of Amphenol Model No. 114-302 antenna over a reference folded dipole, 174-216 mc.

In comparing these gain curves of the stacked array with those gain curves of the single bay, on page 12, you can readily appreciate where this additional gain of the stacked array can mean reception in areas that previously were questionable. Some have even stacked two of these arrays, creating a four bay installation.

CONVERSION KIT

If, at present, you have a single bay, No. 114-005, and you want more gain, why not use the 114-301 conversion unit? It supplies all of the necessary components to convert your single bay into a stacked array. While it provides the additional gain you need, it will enable you to save your original investment in the single bay.



TELEVISION ACCESSORIES

Accessories, too, play an important part in television installation work. It is a wise technician that insists upon quality transmission lines, stand-off insulators, lightning arrestors, and matching transformers. AMPHENOL makes these accessories with the same production and engineering skill evident in all of its products.

NEW! UNIVERSAL MOUNTING CLAMP

The only mounting clamp that is *truly* universal. Will accommodate mast sizes of 1" to 1½" OD. which includes 1" water pipe as well as ¾" to 1¼" electrical conduit. Two U bolts and channeled plate maintain perfect right angle alignment. Stress to horizontal member is spread over entire length of clamp, preventing distortion and buckling.

No. 114-500 AMPHENOL Universal Mounting Clamp.

MATCHING TRANSFORMER

Entirely new in design. Provides an excellent match between any 300 ohm antenna and 70 ohm coax or 300 ohm input receiver and 70 ohm transmission line. Fine for matching broad band antenna to coaxial lead-in. Spade type lug terminals. **114-313** AMPHENOL Matching Transformer.

NEW! TWIN-LEAD CONNECTOR

Permits solderless, low-loss splicing of 300 ohm Twin-Lead without changing line impedance. One terminal is plug, other terminal is socket. Use in pairs.

No. 80-850 AMPHENOL Twin-Lead Connector. (Single unit.)

REMOTE CONTROL WIRE

Multi-wire cable for low voltage applications such as antenna rotator remote control, electric trains, etc. For circuits up to 28 volts. Wires easily separated and stripped. 7-28 copper wire, one being tinned for coding identification. Insulation is weatherproof. In 500 and 1000 foot reels.

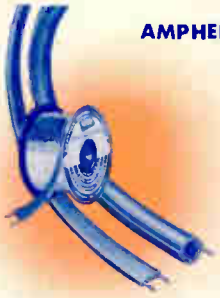
AMPHENOL NUMBER	DESCRIPTION
14-316	3 Conductor Remote Control Wire.
14-298	4 Conductor Remote Control Wire.
14-317	5 Conductor Remote Control Wire.

COAXIAL CABLE

If your application is for a 72 ohm installation where a shielded line is necessary, RG59/U or RG11/U coaxial cables will meet those requirements.

AMPHENOL TWIN-LEAD

The First Choice of Servicemen and TV Installers



14-056 Flat Twin-Lead and 14-271 Tubular Twin-Lead.

AMPHENOL Twin-Lead transmission line is manufactured from the very finest of materials and under rigid quality control. TV and FM radio dealers, servicemen and installers—men who must satisfy their customers to insure continued success – specify AMPHENOL Twin-Lead.

Handy carton of 300 Ohm Receiving Twin-Lead.

MORE DURABLE MORE EFFICIENT

AMPHENOL Twin-Lead may be used in any clime and is especially valuable where weather conditions cause rapid deterioration of ordinary transmission line.

The use of brown pigmented polyethylene dielectric assures minimum RF loss and a more constant impedance over the exceptionally long life. This material remains flexible at —70° C and does not craze or crack under excessive exposure to ultra-violet rays. Resists effects of salt-laden air. Unaffected by chemical fumes or gas-polluted air.

AMPHENOL'S POPULAR RECEIVING TYPE TWIN-LEAD

For Ordinary FM & TV Installation

300 OHM Twin-Lead standard for FM and TV antennas
184-801 Carton of 75 feet
184-802 Carton of 100 feet
14-056 (500) and 14-056 (1000) Reels of 500 and 1000 feet respectively

300 OHM Clear White Twin-Lead for indoor use only
14-318 (500) and 14-318 (1000) Reels of 500 and 1000 feet respectively

150 OHM Twin-Lead for experimental work
14-079 (500) and 14-079 (1000) Reels of 500 and 1000 feet respectively

75 OHM Twin-Lead for applications requiring lower impedance
14-080 (500) and 14-080 (1000) Reels of 500 and 1000 feet respectively

300 OHM Tubular Twin-Lead for DELUXE FM and TV installations
14-271 (500) and 14-271 (1000) Reels of 500 and 1000 feet respectively

AMATEUR TRANSMITTING AND COPPER-CLAD TYPES OF TWIN-LEAD

75 OHM Twin-Lead for transmitting rated 1 KW RF power
14-023 (500) and 14-023 (1000) Reels of 500 and 1000 feet respectively

300 OHM Tubular Twin-Lead rated 1 KW RF power.
14-076 (500) and 14-076 (1000) Reels of 500 and 1000 feet respectively

300 OHM Extra-Strength Twin-Lead with copper-clad conductors
14-022 (500) and 14-022 (100) Reels of 500 and 1000 feet respectively

14-080 14-079 14-056 14-023 14-271 14-076 14-022

UNIVERSAL WRAP-AROUND MAST CLAMP FOR STAND-OFF INSULATOR

An improved clamp that can be slipped around mast after installation of antenna. Will fit any mast from ¾" electrical conduit with an OD. of .922" to 1¼" waterpipe with a maximum OD. of 1.660".

No. 114-490 Universal Wrap-Around Mast Clamp with AMPHENOL 66-204 Screw-Eye Insulator.

No. 114-492 Same as above but less Screw-Eye Insulator.

SILICONE COMPOUND

A thin coating of AMPHENOL Silicone Compound on RF transmission lines causes surface moisture to break up into isolated drops preventing formation of moisture film with attendant impedance change. Non-corrosive, effective up to 400°C. In handy tube.

No. 53-307 AMPHENOL Silicone Compound, one ounce tube.

STAND-OFF INSULATORS

Screw-eye stand-off insulators with low-loss polyethylene inserts. Twin-Lead types fit all flat receiving twin-lead. Coax types fit cables to ½" D. Packed 100 to a carton.

66-202 3½", No. 14 wood screw
66-204 3½", No. 10-32 machine screw
66-209 7½", No. 14 wood screw
66-210 7½", No. 10-32 machine screw
66-211 3½", Nail-in type

FOR COAX OR TUBULAR

66-201 3½", No. 14 wood screw
66-203 3½", No. 10-32 machine screw
66-208 7½", No. 14 wood screw
66-212 3½", Nail-in type

POLYSTYRENE TWIN-LEAD STAND-OFF INSULATORS

66-909 Use with 300 ohm No. 14-056 AMPHENOL Twin-Lead. Packed 100 to a carton.

MAST SECTIONS

114-291 Extension mast for TV stacked arrays. Includes 5' length of 1¼" D. alloy steel tubing, guy ring and two clamp-type stand-off insulators.

114-300 Mast extension kit for TV and FM antennas. 5' length of ¾" steel conduit with end tapered to fit inside next section of ¾" conduit. Includes guy clamp and necessary hardware.

AMPHENOL's products are available through its hundreds of distributors all over the world. These distributors are specialists in the radio industry and many have been with AMPHENOL since the founding of the firm. Each is anxious to assist you in every possible way.

"BUY AMPHENOL TELEVISION ANTENNAS AND ACCESSORIES"

AMPHENOL

AMERICAN PHENOLIC CORPORATION

Phone: Bishop 2-1000 **1830 South 54th Avenue** **Cable Address: AMPHENOL**
CHICAGO 50, ILLINOIS

More complete information or prices on any of the thousands of Amphenol products can be quickly provided by your territorial representative or a letter to the Chicago Office

Atlanta 3, Ga.	Hollingsworth & Still	407 Whitehead Bldg.	Main 5878
Boston 15, Mass.	Richard E. Hall	208 United Bldg.	Garrison 7-0456
Camden 2, N. J.	Bittan-Baenecke Co., Inc.	130 North Broadway	Woodlawn 4-8650
Cleveland 15, Ohio	Earl S. Dietrich Co.	320 Hanna Bldg.	Cherry 1-7770
Dallas 1, Tex.	J. F. McKinney Sales Co.	1523 Dragon Street	Sterling 8-1997
Denver 3, Colo.	Ronald G. Bowen	852 Broadway, Rm 205	Acoma 5211
Detroit 3, Mich.	R. C. Nordstrom & Co.	15840 Second Blvd.	Townsend 9-8291
Greensboro, N. C.	Tankin & Schiffer, Inc.	115½ S. Elm St.	Greensboro 3-5578
Indianapolis 5, Ind.	Leslie M. DeVoe Co.	4014 Washington Blvd.	Humboldt 1395
Kansas City 8, Mo.	H. A. Raes & Co.	1805 Grand Ave.	Harrison 2036
Los Angeles 5, Calif.	Marshank Sales Co.	672 S. Lafayette Park Pl.	Dunkirk 7-8235
Minneapolis 1, Minn.	Fred B. Hill	256 First Ave. North	Main 8353
New York 7, N. Y.	D. R. Bittan Co.	53 Park Place	Barclay 7-2789
Pittsburgh 19, Pa.	G. O. Tanner	600 Grant St.	Court 1-0131
Portland 5, Ore.	Dan H. Burcham Co.	917 South West Oak St.	Broadway 3830
St. Louis 3, Mo.	Norman W. Kathrinus & Co.	1218 Olive St.	Central 6300
Syracuse 2, N. Y.	Ray C. Whitmore	Empire Bldg.	Syracuse 3-1311
San Francisco 3, Calif.	James P. Hermans	1234 Folsom Street	Market 1-4166
Washington 5, D. C.	William J. Sheets	1039 Continental Bldg	Executive 6223
		CANADA	
Toronto 1, Ont.	J. R. Langstaffe Ltd.	11 King Street, West	Elgin 4167
Vancouver, B. C.	Chas. L. Thampson Ltd.	132 W. Hastings St.	Pacific 3195

AMFORM 1738-8040 PTD IN U. S. A.