# Let's Make the "Hentenna"

## No, this antenna won't lay eggs, but it will produce an excellent signal at your fixed or portable location.

By Koji Sugihara,* JJ1UMS

Have you heard of the Hentenna? This antenna is very popular in Japan, especially on 6 meters. A recent survey revealed that 10% of hams active on 50 MHz in Japan are using the Hentenna.

At first glance, a reader might assume this antenna is somehow related to a female chicken. This is not the case, however, as the "hen" in the name is a transliteration of the word "interesting" or "unusual" in Japanese. Let's take a look at the Hentenna and see why it got its name.

### The Antenna

Fig. 1 shows the basic design of the Hentenna. On inspection, it would appear that the Hentenna is vertically polarized. Not so! The antenna is *horizontally* polarized. This is the first unusual aspect of the Hentenna.

Another oddity is its dimensions — a 5- to 10-percent variation won't adversely affect the performance of the antenna; in fact, a "fork" Hentenna is only half of a Hentenna. Mr. Ota, JJ1CCH, constructed a 11.5-foot-high[1] Hentenna for 50 MHz, and it still worked well. Distances of 280 miles have been covered on 6 meters with 1-1/2 watts and a Hentenna. This performance is outstanding considering the simplicity of the antenna.

The Hentenna structure is fairly simple, which lends it to portable operation; the few components for construction are relatively small and easy to carry. Set-up, adjustment and disassembly can be accomplished in a few minutes, which can be handy if rain or lightning threatens while operating in the field.

The radiation pattern of the Hentenna is shown in Fig. 2; the main lobes are broadside to the element, with nulls appearing off to the sides. To fully realize the performance benefits, some method of rotation must be employed. This should not pose too great a problem, as wind loading is negligible because wind tends to blow *through* the element rather than acting on it. The author uses the "Armstrong" method of rotation, although any small TV rotator should handle the job.

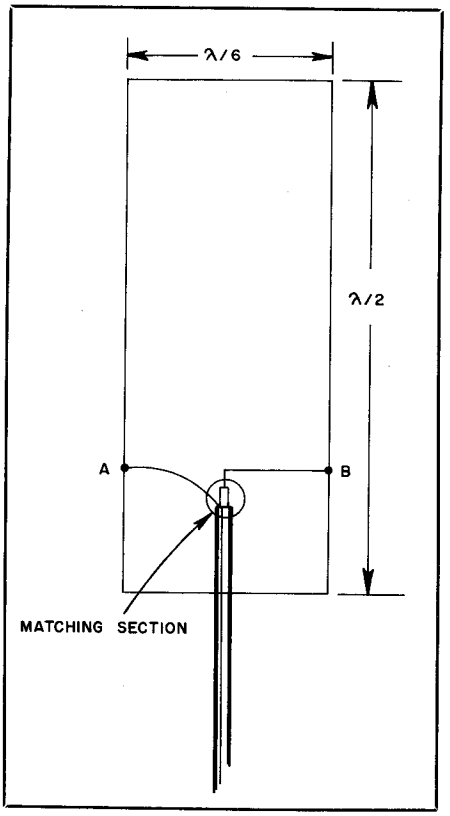


Fig. 1 — The Hentenna is fed through a Bazooka match coupled to the element at points A and B.

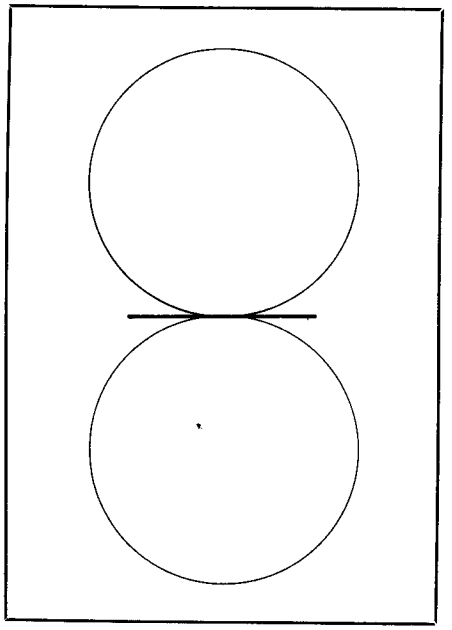

Fig. 2 — Directivity of the Hentenna. The pattern shown is perpendicular to the element plane.

### Construction Methods and Details

There are three methods commonly used in Hentenna construction. The first is to use a bamboo framework and attach the wire element to it. This is the simplest method, and the technique will be explained later in this article.

A portable version of the Hentenna can be constructed with aluminum tubing for the top and bottom of the element, with wire employed at the sides. While this method is more difficult than that of the wooden framework, it is much easier to set up and break down after initial construction.

Above 50 MHz it becomes practical to construct the entire element from aluminum tubing. This technique is commonly used for construction of Hentennas for 144 and 430 MHz.

The simplest method of construction will now be explained. First, firmly attach the top and bottom supports to the mast at the appropriate places. These supports must be attached securely to ensure the durability of the installation. Next, connect both ends of a 26-1/4 foot piece of stranded no. 14 wire together to form a closed loop. Firmly connect the wire loop to the framework. Strong string or wire should be used to keep the loop attached to the framework during adverse weather conditions.

The Hentenna may be fed with 50- or 75-ohm coaxial cable. A bazooka match is

[1]M = ft × 0.3048; km = mi × 1.6; mm = in. × 25.4.

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recommended. To make one, remove a 1/2-inch-wide strip of insulation 40.6 inches from the end of the feed line, as shown in Fig. 3. A length of braid, sufficient to cover 39 inches of the cable, is carefully soldered to the point where the insulation was removed. Use a soldering iron of sufficient size to quickly flow the solder before the inner dielectric of the cable melts. Slide the braid toward the end of the cable and neatly trim it 1-1/4 inches from the end of the cable. The other end of the coax should now be fitted with a suitable connector for coupling to the transmitter. A continuity test is recommended at this time to ensure that both the matching section and connector have been attached properly. Tape both ends of the braid to prevent water from entering the coax at these points. Take your time and do a neat job — the better the seal, the longer the cable will last.

The feed line may now be connected to the element. Cut a 55-inch length of tinned antenna wire in half and attach one end of each to a center insulator. Solder the prepared end of the coaxial cable to the insulator, making sure the cable is not heated sufficiently to melt the center dielectric. Attach the tinned wire to the element with alligator clips, making sure the wire is pulled taut.

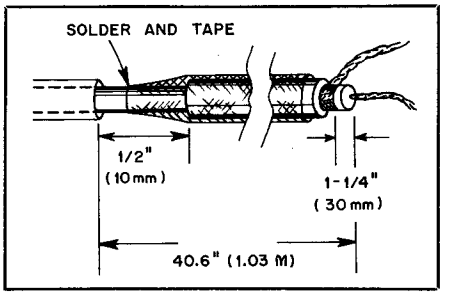



Fig. 3 — Bazooka matching section for the Hentenna. After construction, both ends should be taped and the entire length weatherproofed.

### Adjustment

Tune up of the antenna is straightforward. It is set up on a short mast, the coax attached to the output side of an SWR bridge and power applied to the antenna. The clips are now moved up and down the element until the best match (lowest SWR) is obtained. Remove the clips and solder the wire to the element at these points. The antenna is now ready for permanent installation, either atop a tower or TV mast. Once in place, the Hentenna can provide years of operating pleasure.

[Editor's Note: After this article was prepared for publication, the author informed us that his original design was for 28 MHz.]

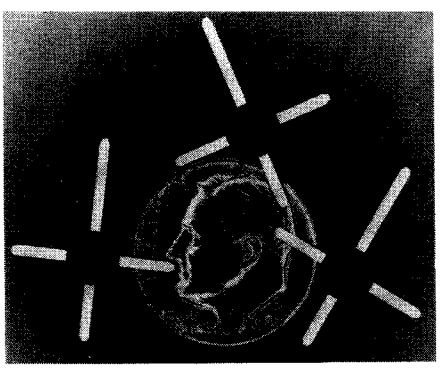
# New Products

### NEW MOTOROLA SEMICONDUCTOR

☐ The slogan is "Performance up, cost down," in new low-power rf transistors, as noted in some recent Motorola promotional literature that describes the MRF559 0.5-watt bipolar transistor which has a recommended operating range of 250 MHz to 1.5 GHz.

Effective emitter ballasting (protection against hotspotting) is ensured by the current techniques in geometry, processing and packaging. This type of design in overlay transistors improves the operating linearity and enhances the reliability of the device. The metalization of the semiconductor "sandwich" uses nichrome, titanium, tungsten and gold to eliminate the corrosion malady that is referred to in the industry as "purple plague." This is said to improve the transistor longevity by a factor of 10.

The MRF559 is contained in a Macro-X plastic package, rather than in the more familiar TO-39 case. Four 10-mil-thick, silver-plated copper leads extend at 90-degree increments from the case, and aid cooling of the semiconductor junction.



Although the new transistor is characterized mainly for use in MATV/CATV systems, it should be excellent for amateur applications at vhf and uhf. Its ratings at 870 MHz are: $P_o$ = 0.5 W; Gain = 8 dB (min); Eff. = 50%; $V_{cc}$ = 12; 1-dB compression greater than +20 dBm (typ). The $f_T$ is rated at 3 GHz and the noise figure at 1 GHz is 4 dB [$I_c$ = 40 mA (3 dB at 500 MHz)]. $P_D$ is 2 watts at a case temperature of 50° C. Price class: $1.80 in 100-999 lots. Available from Motorola distributors or the factory in Phoenix, AZ 85036. Phone Tom Bishop at 602-244-6394 for additional information. — *Doug DeMaw, W1FB*

### MOTOROLA LINEAR VOLTAGE REGULATORS

☐ The LM117M/217M/317M are adjustable, three-terminal linear voltage regulators. These devices are capable of supplying in excess of 0.5 A over an output-voltage range of 1.2 to 37 V. The regulators are very easy to use and require only two external resistors to set the desired output voltage. They employ internal current limiting, thermal shutdown and safe-area compensation, making them virtually failure proof.

Serving a wide variety of applications including local, on-card regulation, the devices also make simple adjustable switching regulators and programmable output regulators. By connecting a fixed resistor between the adjustment and output terminals, the units can be used as precision current regulators.

These devices are available in TO-66 and TO-220 cases; three temperature ranges are offered. The TO-220 plastic package is available only in the lower temperature range of 32° to 257° F (0° to 125° C). Device variations and pricing in 100 to 999 quantities are: LM317MT, 32° to 257° F (0° to 125° C), TO-220 case, $0.80; LM317MR, 32° to 257° F, TO-66 case, $1.25; LM217MR, −77° to 300° F (−25° to 150° C), TO-66 case, $3.57; LM117MR, −130° to 300° F (−55° to 150° C), TO-66 case, $5.07. For further information, contact Mr. Roger Janikowski at Motorola Semiconductor Products Inc., P.O. Box 20912, Phoenix, AZ 85036, tel. 602-962-2124. — *Paul K. Pagel, N1FB*