

Tennadyne T-28 VHF/UHF Log Periodic Antenna

Reviewed by H. Ward Silver, N0AX
ARRL Contributing Editor
n0ax@arrl.org

The T-28 delivers useful performance over four-and-a-half octaves of frequency — from 50 MHz to 1300 MHz — on a single structure. (See Table 3 for specifications.) The log-periodic's usual crisscross transmission line that drives the array of 28 elements is integrated into the supporting double-boom — a pair of square tubes to which the elements are mounted. In fact, with its 12 foot boom and turning radius of 7.5 feet, the T-28 looks just like a super-sized version of a standard TV antenna and that's what the neighbors will think it is when you put it up. Whether you enlighten them is up to you, of course. In fact, the T-28 *can* be used as a TV antenna if you used an appropriate diplexer or antenna switch. It might require a bit more rotator than the standard TV antenna (I'm using a Ham-IV) but a sturdy installation is in everyone's interest, if you get my drift. I'm sure the armchair lawyers are already

Table 3 **Tennadyne T-28** **Specifications**

Frequency coverage:	50-1300 MHz.
Boom length:	12 feet.
Half-power beamwidth:	50 degrees.
Front-to-back ratio:	up to 45 dB.
Weight:	17 pounds.
Wind load:	3 square feet.
Turning radius:	7.5 feet.
Typical max SWR:	1.75:1.
Feed point impedance:	50 Ω .
Price:	\$415.

Bottom Line

The Tennadyne T-28 log periodic is ruggedly built and will get you on six amateur bands with some gain and a single feed line.

wondering about antenna restrictions and TV reception and that sort of thing.

This is not a high gain antenna — the specifications claim 6.3 dBd and that's about right from what I observed on the air. The front-to-back ratio was observed to be anywhere from 3 to 5 S units (18 to 30 dB at 6 dB per S unit) during the contest. (Tip — do not try to do a product review and make a decent contest score at the same time!) All in all, it was a *lot* better than a dipole or whip and not as good as long-boom Yagis on taller towers.

Assembling and Installing the T-28

Figure 6 shows the parts that you get when you open the box and sort them out — there are lots of pieces, including small ones. The smaller tubes are not bagged — count them before beginning and be sure you have retrieved all 56 element halves from the packing. Read through the instructions completely before beginning and practice with the elements, clamps and inserts to be sure of correct assembly. Make sure you understand

the process of alternating elements between booms. (See the comments below on Manuals and Examples.)

I recommend that you assemble the antenna either indoors (measure the exterior door first — do not ask me how I know to do this) or in the garage or somewhere over a smooth surface on which a 6-32 nut can be seen after you drop it. (Tennadyne kindly supplied some extra hardware for the inevitable, “Oops!”) Because there are so many elements of not-so-different lengths, I also recommend that you pair them up and sort by length so that you minimize the chances of installing them out of order. (Don’t ask me how I know to do this, either.)

Start with the small elements to learn the right technique of inserting the element through the boom, then the screw through the element, and getting the Nylok nut started on the screw. Both $\frac{3}{8}$ and $\frac{1}{2}$ inch nutdrivers are required for this operation and a punch awl is handy for lining up element holes inside the boom. A portable workbench with a vise to hold the boom while you work makes things easy. Once each individual boom is assembled, double-check that you have the right element in the right place before final assembly and attachment of the feed line. Figure 7 shows the partially completed antenna.

Mounting the antenna on the mast is straightforward and can be done by one person. The antenna weighs less than 20 pounds but it is unwieldy and with so many elements, you have to hold it above your head while attaching the boom-to-mast hardware. The mounting point is not at the balance point — there is more weight towards the front of the antenna — so if that is important (perhaps



Figure 7 — Be sure to alternate the elements as described in the manual.



Figure 6 — The parts and pieces received from Tennadyne. Assemble the antenna over a smooth surface to prevent losing any dropped pieces.

you have a lightweight mast) you’ll want to add some weight in the hollow booms at the rear. Metal rod or bar works well and can be secured with a screw through the boom.

T-28 Performance

Up in the air with plenty of time before the VHF Sweepstakes, I was able to give the antenna a spin. Initially, the SWR seemed a little high, particularly on 6 meters when the antenna was aligned with the rearward elements parallel to a nearby wire doublet — hardly a surprise. In the final installation, I found it necessary to have the antenna at least 3 feet above the composition roof and clear of the doublet before SWR stabilized on the 2 meter through 70 cm bands. I used

a Bird wattmeter to measure the SWR on 6, 2, $1\frac{1}{4}$ meters and 70 cm with the following results averaged across each band through 50 feet of RG-213 coaxial cable:

Frequency	Average SWR
50-54 MHz	1.4:1
144-148 MHz	1.8:1
222-225 MHz	1.7:1
430-450 MHz	1.9:1

(I do not have equipment for 902 and 1296 MHz at the moment.) The specification is for a peak SWR of 1.75:1 and these figures are within the range of measurement error of meeting that spec.

Once the antenna was installed sufficiently above the roof (and with additional clearance from the wire doublet) it played well and continues to play well. Figure 8 shows the antenna against a high January sky. I received good signal reports and could work any station I heard.

Swinging the beam back and forth confirmed the expected directivity. We’ve had several episodes of high wind or storms and I’ve noticed nothing amiss with the antenna.

I recently noticed an unexpected feature while working in the backyard garden. What was that faint calliope music and where was it coming from? As it turns out, the open-ended elements were resonating in the breeze with different notes sounding as the wind speed and direction varied! You get free wind-chimes with the antenna — if that might be a problem, a piece of sponge or foam inserted into the end of each element will eliminate it.

Manual and Examples

As with the L222-28 transverter, the manual is okay but assumes a lot of the builder. In particular, for this complex antenna with many opportunities to get things wrong, why not supply a step-by-step checklist? A text paragraph with several steps may contain the necessary information but a checklist augments the graphics by 10 dB! Putting supplementary information online would cost nothing and avoids adding paper pages.

Summary

The T-28 log periodic is a good single-antenna compromise to getting on the VHF and UHF bands without breaking the budget. It’s not a high-performance, tight-pattern band-burner but it gets you on six amateur bands with some gain and a single feed line. Giving the evaluation unit a permanent home on my roof was an easy decision!


Manufacturer: Tennadyne, PO Box 352, Alto, MI 49302; 616-622-4968; www.tennadyne.com. 



Figure 8 — The T-28 at about 35 feet looks a lot like a TV antenna while doing an effective job on six amateur bands.