NEW LIFE FOR THE TH6DXX

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From listening on air over the last few months, there seems to be some interest in the new HY-GAIN Antenna the TH7DX. However by the tone of most comments little is known about the technical side of the antenna, and very few are aware there is also a kit available to convert your existing TH6DXX into a TH7DX.

After losing my tower and TH6DXX in a storm (see article April 82 AR) I wrote to HY-GAIN in the States for a replacement price. They sent not only the data for the TH6DXX but also the technical data for the new TH7DX, plus the information that one may convert a TH6DXX with a kit (No 392s) into the new broadband version. Good points about the antenna or kit are the broadbanding without any apparent loss in gain, improved front to back, and in particular the fact that all the fittings are now stainless steel. Anyone who has had to hang by one leg and arm 30 ft up in the air like I have trying to undo rusted up fittings on a beam that had only been up eighteen months will know that zinc or cadmium plating leaves a lot to be desired, particularly in seaside locations! In my opinion the TH7DX is an expensive antenna landed in Australia (then what isn't expensive these days, unless you have a good tax dodge like some). But the kit could offer a viable alternative to the many TH6DXX owners in VK. The following are extracts from HY-GAIN'S form No 5314 which reports on both antennas. I leave it to you to decide.

MULTI-BANDING TECHNIQUES:

There are two commonly used techniques for isolating sections of a multi-band antenna. One is the "lumped-constant" L/C circuit which is commonly known as a trap. Basically a trap is a parallel resonant circuit consisting of a capacitor and an inductor. The most common configuration of a trap is a wire coil enclosed within an aluminium tube. The capacitor is formed by the outer tube and the coil inside.

Other types of traps may use linear-loading techniques to replace the coil by a long length of rod or tubing. These traps result in the same amount of inductive loading as a conventional trap, since the shortening effect on the elements is the same. As a general rule-of-thumb for both driven and parasitic elements, the shorter the element is, the more loading and less efficient it is. The second technique is a circuit commonly known as "stub-decoupling". This circuit utilises ¼ wave stubs to isolate certain portions of elements and is considered very efficient. In a multi-band parasitic array such as the TH7DX, the use of lumped-constant traps is the most desirable. Preassembled and tested traps substantially reduce on-site assembly time, which is a fact that all of us can appreciate. These traps allow half driven element lengths of 0.225 wavelength on 10 metres, 0.203 wavelength on 15 metres and 0.185 wavelength on 20 metres.

The TH7DX also features a combination of trapped and monoband parasitic elements. Extensive research by HY-GAIN's engineering team indicated that a higher average front-to-back ratio could be maintained on each band by using this combination. Besides the two driven elements, there are two singly-trapped parasitics on 20 metres, one monoband director and one singly-trapped reflector on 15 metres, and one singly-trapped director as well as a monoband director and monoband reflector on 10 metres. Two of these singly-trapped parasitics are capacitively end-loaded to minimise the shortening effect and resulting in higher efficiency then would be possible with inductive loading.

DUAL-DRIVEN ELEMENTS FOR LOW VSWR ON ALL THREE BANDS

The new TH7DX utilises a combination of two driven-elements, one resonant low in each band and the other resonant high, to produce VSWR less than 2:1 across each of the 10, 15 and 20 metre amateur bands. This dual driven element system uses a standard 50 ohm BN-86 balun and covers the entire 10-metre band from 28.0 to 29.7 MHz. These features are standard only on HY-GAIN's TH7DX. This makes the TH7DX ideal for OSCAR satellite reception when the other HF bands may be useless due to low sun spot numbers. The TH7DX is also ideal for "all-mode" operation, especially with the increasing popularity of RTTY terminals and code-readers in the CW band segments.

GAIN AND RADIATION PATTERN MEASUREMENTS:

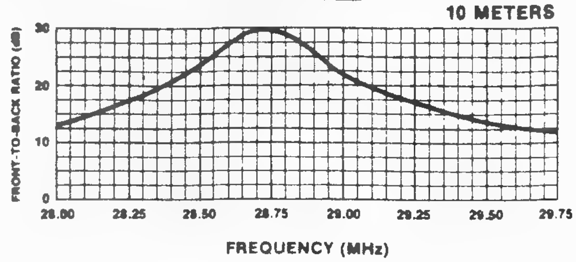
In the amateur radio service it is virtually impossible to measure HF antenna gain and defend your results. This is a highly controversial subject for most manufacturers, publishers and consumers in the amateur radio field. The problem stems from the fact that most amateur radio operators cannot afford the time and equipment necessary to individually verify the advertised gain specifications. Also, no amateur radio publication has the capability to measure and verify antenna gain.

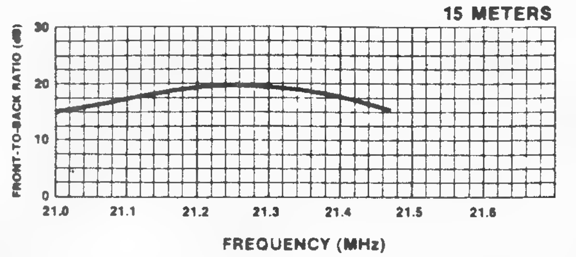
In an effort to avoid controversy and still quantify the gain performance of the new TH7DX, it was decided to simply compare it to the best known high-performance tribander in the world — the TH6DXX. Both antennas were measured against the same reference dipoles using the same test set-up, and under exactly the same conditions. The TH6DXX was selected at random from stock and assembled by an antenna technician. Standard assembly procedures were also used in assembling the new TH7DX. The test antennas were measured at 70 feet (23 metres) above ground and approximately 1500 feet from the transmitter. The gain figures stated for the TH7DX are the measured differences between it and the TH6DXX. "Average gain" numbers were obtained by averaging three measurements for each band — top, bottom and band-centre.

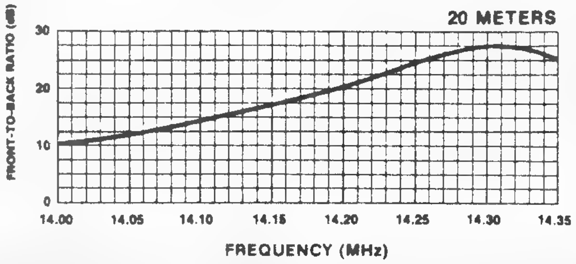
The antenna radiation patterns of the TH7DX and the TH6DXX were also

FRONT-TO-BACK RATIOS:

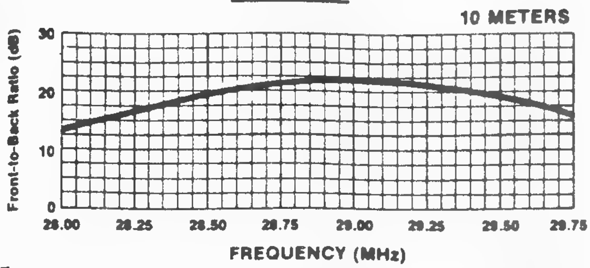
*TH6DXX

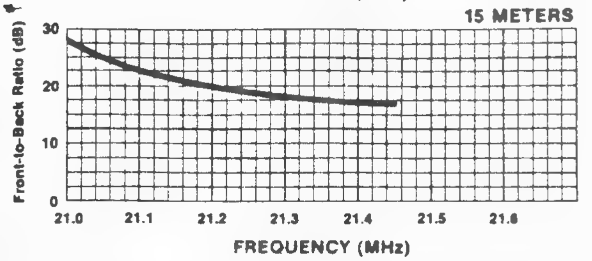


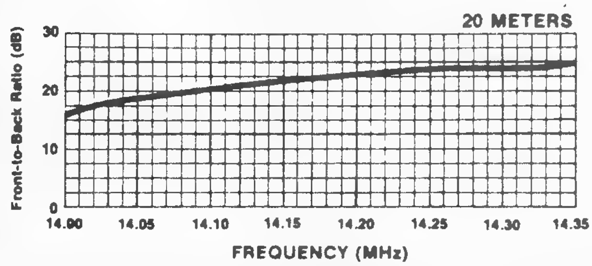




TH7DX







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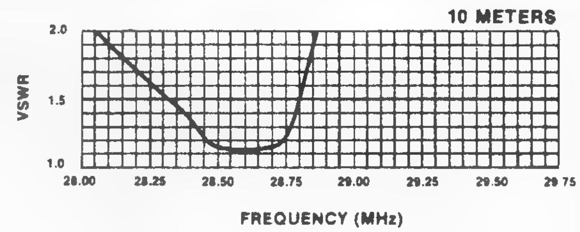

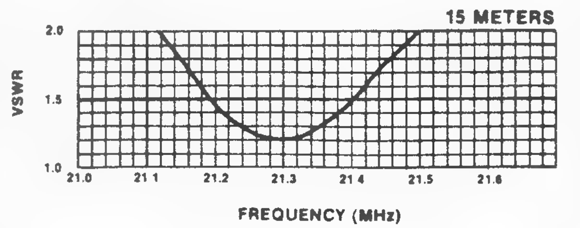

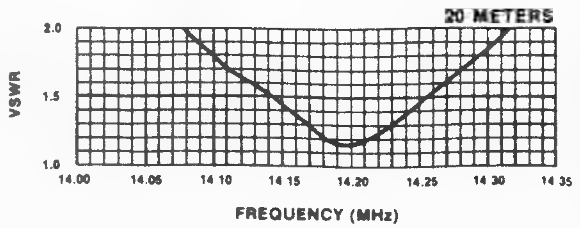

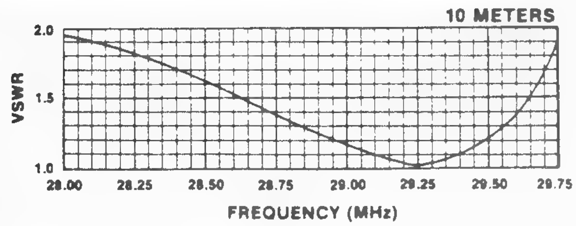

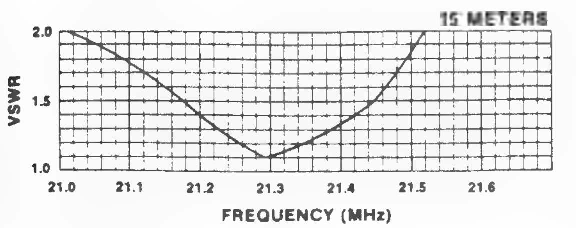

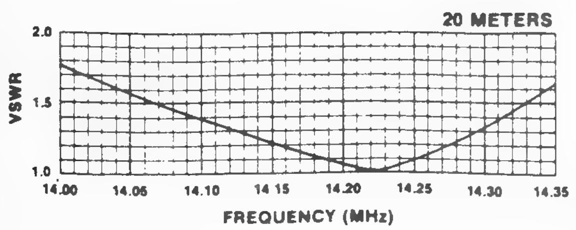

*THE TH6DXX WAS ASSEMBLED TO THE "LOW PHONE" SETTING.