



TZ-80-1 80m 1/4 Sloper

The TZ-80-1 is a high performance antenna for both DXing and local rag-chewing in the 80m band. The antenna can be user tuned to operate in the 80m CW section, phone band or the DX phone window –around 3.775 to 3.800 MHz. Compared to traditional DX antennas, such as verticals, the TZ-80-1 is broadband and in certain installations can be tuned with a VSWR of less than 2.0: 1 over the frequency range 3.500 to 3.800 MHz. The radiation pattern of the antenna includes both horizontal and vertical components as well as low and high angle radiation. The TZ-80-1 is designed to be used with an existing tower, 13.7m (45 feet) tall.

Supplied Equipment

The following equipment and/or facilities are supplied with the TZ-80-1 antenna:

Radiating element:	21m (70 ft) grey PVC coated 2.5m ² electrical wire complete with eyelet and Triple heatshrink mechanical strengthening.
Balun	1:1 linear ferrite core balun designed for operation 1.8 – 45 MHz
Mounting bracket	Aluminium mounting bracket attached to balun
Mounting hardware	(1) One 30mm stainless steel U bolt.
Thimble	(1) One nylon thimble to be used as an end termination
Cable Ties	(4) Four 100mm black UV stable cable ties, (wire termination).
Instruction Manual	This document.

Required but not Supplied

To operate efficiently the TZ-80-1 must be mounted on a tower or other support structure that is at least 10m tall. The support structure must be metal (conductive) or a separate down conductor must also be run to the ground. Note, as supplied the TZ-80-1 is designed for tower mounting. The base of the tower must be grounded. For optimum low angle radiation at least 4 ground radials should be attached to the ground point. The longer and greater the number of radials the better will be the low angle performance of the antenna and the greater will be the radiating efficiency.

The following equipment and/or facilities are *not* supplied with the TZ-80-1 antenna but must be provided by the operator for the antenna to operate correctly:

Ground Space	When mounted on a 14m tower the bottom mounting point for the radiating element is required to be approximately 14m away from the base of the tower.
Ground Rod	2m or greater length copper clad steel earthing rod (available from electrical distributors)
Ground Radials	up to 64 insulated or bare copper conductors, preferably 20m long or greater.

Using the TZ-80-1 on a 14m or greater height tower.

The TZ-80-1 may be mounted on a 14m or taller tower or support structure. Installation on an Australian “nally” tower or American Rohn 50 is perfect for this antenna. For other taller towers the feed point should be mounted at approximately 14 – 15m (45 – 50 ft) mark.

Determine the required frequency of operation of the antenna. For CW and rag-chewing select a resonance frequency of 3.600. For SSB rag-chewing with the occasional foray into the DX window choose a resonance point of 3.700 MHz. For SSB DX operation in the DX window, use a resonance frequency of 3.800 MHz.

The base point for the radiating element should be approximately the same distance from the base of the tower as the height at the mounting point. Thus, the radiating element is mounted at 45° to the tower. Alter the configuration of the radiating element to achieve the best VSWR. This may involve raising or lowering the

feed point, the terminating height of the radiating element, the length of the radiating element or a combination of all three.

Normally, a good match can be achieved by altering the radiating element length. Since this can be achieved at ground level this task is relatively simple. If difficulties are encountered use an antenna analyser to measure the input impedance of the antenna. This is best achieved using a 1/2 wavelength feeder cable or RG-58 or RG-8 (RG213). Using a 1/2 wavelength of cable ensures that the antenna analyser readout is correct.

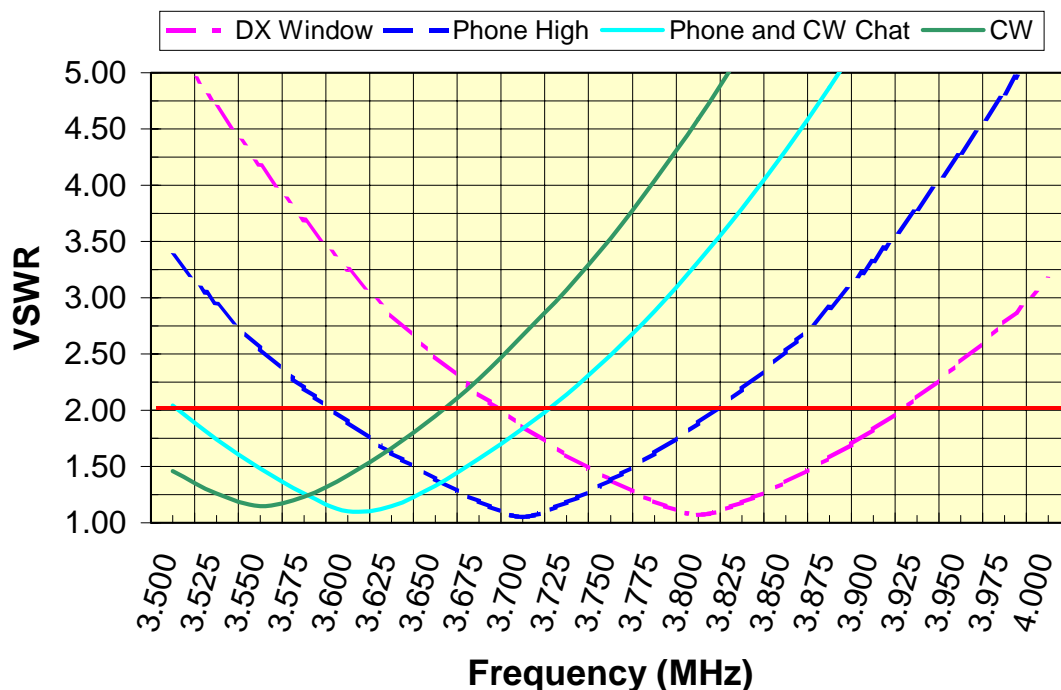


Figure 1 – Typical TZ-80-1 VSWR Plot

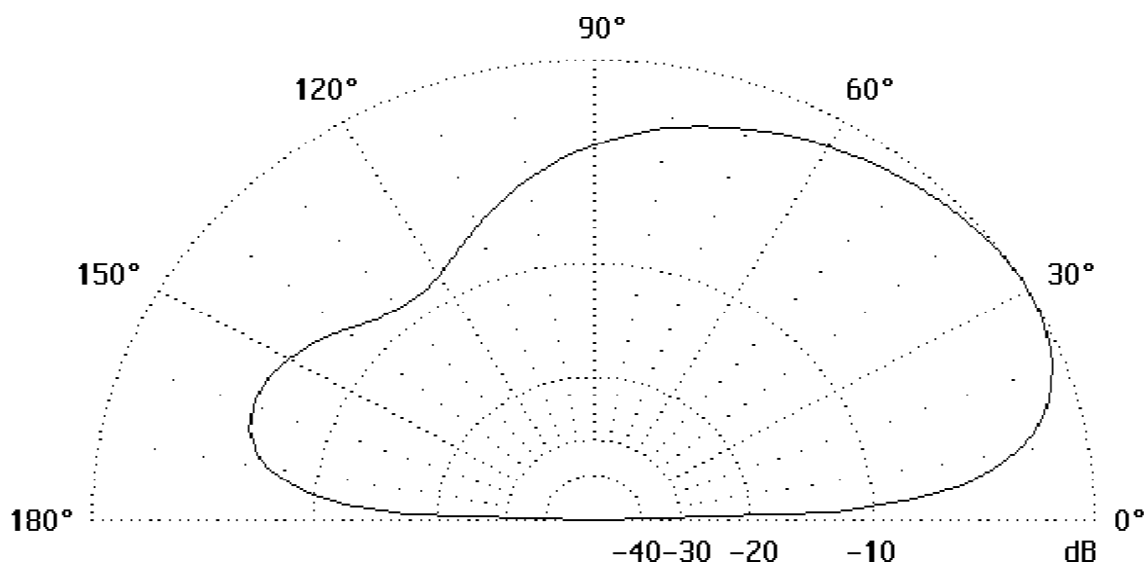


Figure 2 – Typical TZ-80-1 SLOPER Radiation Pattern

By adding 32 1/4 wavelength radials to the base of the tower the low angle radiation performance of the antenna can be improved by about 1.0 dB. The front to back ratio of the antenna will also diminish. For DX contacts, it is still advisable to locate the radiating element towards the DX.

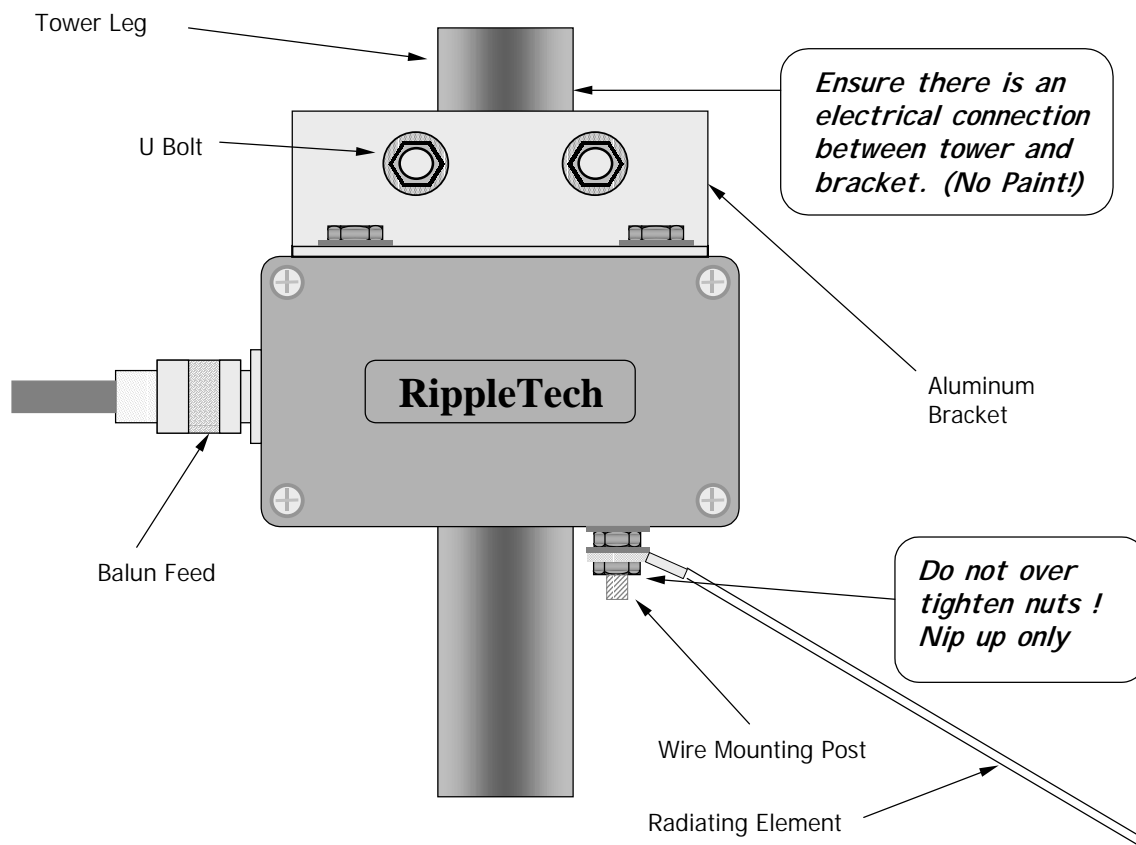


Figure 3 – Tower Mounting Details

Installation on a Short Tower

The TZ-80-1 may be mounted on a shorter tower or support structure, however the performance of the antenna will be reduced with respect to acceptable VSWR, bandwidth and gain. The configuration of the antenna will need to be altered. To achieve an acceptable VSWR for this configuration, it is highly desirable to use an antenna analyser or other measurement equipment (such as a noise bridge) that can determine both the input reactance and resistance at the feed point. Adjustment can be made using a VSWR meter, however due to the wide variance of installation configurations this method may be extremely time consuming.

Using the 80m Sloper without a tower

The 80m sloper can be put to good use without a tower as long as the basic configuration of the sloper remains in tact. If you have a galvanized steel (water pipe) mast secured to your house, this can also be used. Just make sure that the base of the pipe is earthed. Once again a 2m copper clad steel earth rod hammered into to the ground at the base of the mast will suffice. Normally the maximum height of such a mast might be 10 – 12m so the full height of a tower is not available. In this instance, use the direction given for a small tower, or extend the radiating element out further from the mast and keep the radiating element length the same. Adjust length and terminating height for best VSWR.

Alternatively, if you do not have a mast or tower, a tall tree may be used, although separate down conductors will be required. 2 or 3 or three down conductors should be used to simulate a larger diameter structure. Mount the balun at 14m (45ft) and run the down conductors to the ground (vertically) and once again ensure a good earth. The down conductors must be earthed at the base using a ground rod and preferably four (4) or more radials. The radiating element may then be erected (configured as per a normal tower installation).

Note since there is no beam or other antenna above feed point of the sloper, the radiating resistance may not be as per a tower installation and the length, end height, and sloper angle may need to be varied considerably.

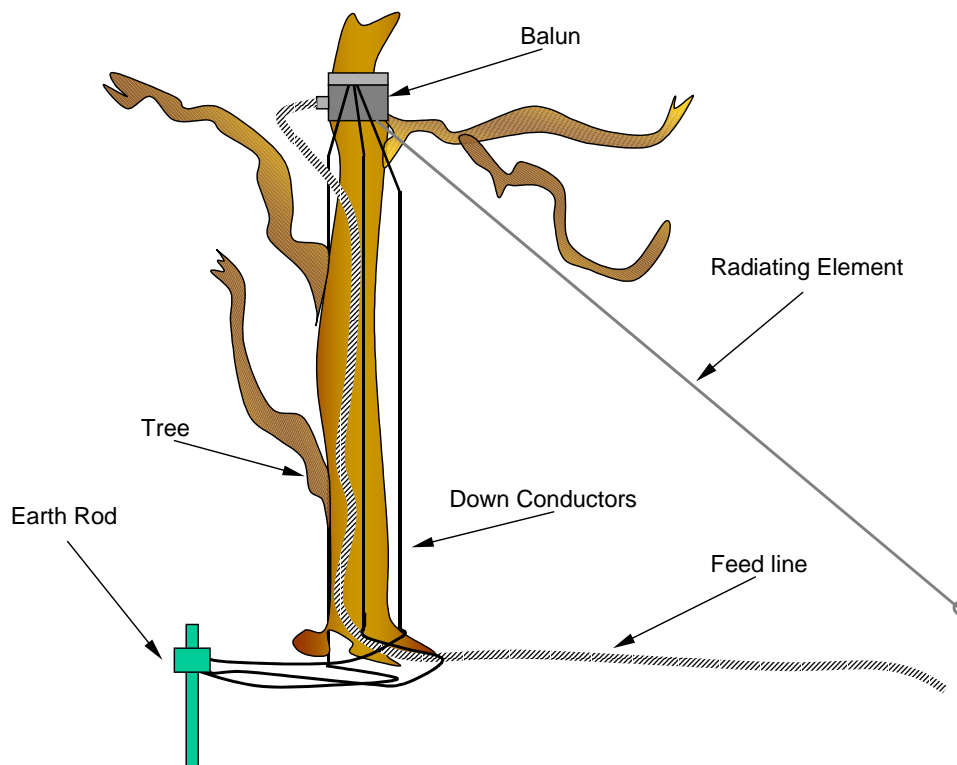


Figure 4 - Tree or Non-metallic Support Installation

Using the 80m Sloper on other bands

The 80m sloper operates well on 30m since the antenna is about $\frac{3}{4}$ of a wavelength long on these frequencies. The antenna may present a VSWR of approximately 3.0:1 on 30m. An ATU may be used to provide a suitable match to your amplifier or transceiver. On air performance is similar to a wire dipole mounted at approximately the same height as the feed point. Radiation is best in the direction of the radiating element.

The antenna may be used on other bands, however the feed impedance is not ideal and much higher losses are encountered due to the high VSWR. The antenna presents a very high impedance on 40m and will not perform well on this band. A reasonable level of performance can be achieved on the 17m band, however in general the antenna will be several dB down on a simple dipole mounted at the same height.

A shortened 160m sloper is available from RippleTech Electronics for use on a 14m (45 ft) or greater tower. A mod kit to convert your 80m sloper to a dual band 160m/80m sloper will be available from RippleTech in the near future. Please contact your dealer or RippleTech Electronics directly for further information.

Specifications

Type	$\frac{1}{4}$ wave half sloper antenna.
Frequency Range	Adjustable 3.5 to 4.0 MHz .
Bandwidth	200 kHz (2.0 : 1 VSWR limit) Refer to Figure 1.
Input Impedance	Nominally 50 ohm.
Radiation polarisation	Both Horizontal and Vertical components
Gain	2.0 dBi at 3.8 MHz
Directivity	Up to 3 dB at low radiation angles omni-directional at high angles.
Front to Back	Up to 6 dB at low radiation angles.
Power Handling	1000 Watts PEP
Radiation Pattern	Near Omni-directional, See Figure 2.
Antenna Colour	Light Grey