

3 T838 Initial Tuning & Adjustment

The following section describes the full tuning and adjustment procedure to be carried out before operating the T838.

The following topics are covered in this section.

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3.1 Test Equipment Required

- DC power supply capable of delivering 15A at 13.8V (e.g. Tait T807).
- Multimeter or DMM (e.g. Fluke 77).
- RF power meter usable 136-174MHz (e.g. Bird 43 with 5 & 100W elements).
- Thru-line wattmeter with 5W element.
- 100W 3dB 50 ohm pad.
- 'BNC' to 'N' type adaptors (e.g. Amphenol, Greenpar).
- Appropriate trimming tools.
- Special connector 50 ohm BNC to SMC female.

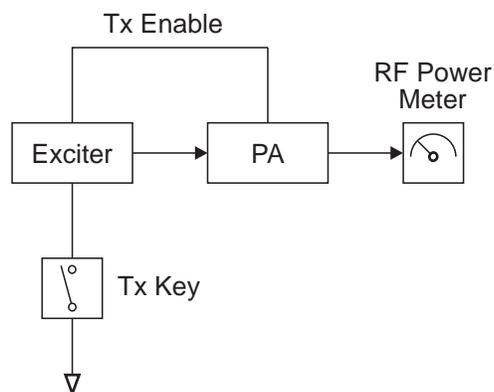


Figure 3.1 Test Equipment Set-up

3.2 Optimising Intermodulation Performance

TL1 and TL2 are phasing lines supplied cut to the maximum length at the bottom of the band.

If it is necessary to minimise IM products, TL1 and TL2 may be cut to suit the mid-switching range frequency, using the formula:

$$\text{length of centre conductor (cm)} = \frac{5250}{\text{frequency (MHz)}}$$

Refer to Figure 3.2 for stripping dimensions (in mm).

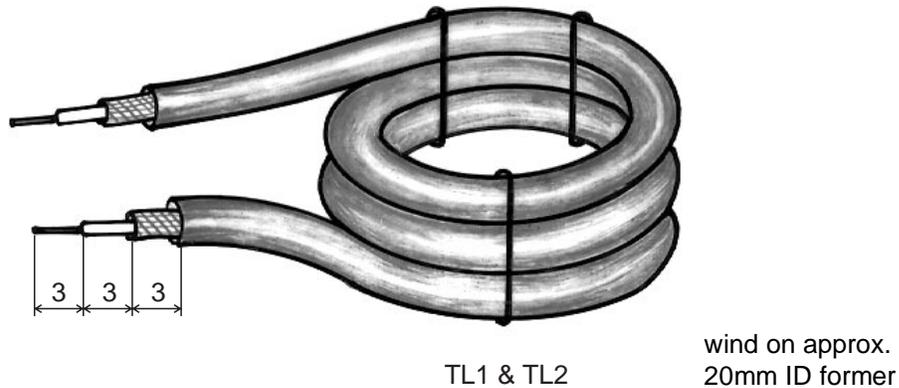


Figure 3.2 Phasing Line Details

3.3 Preliminary Checks

Check for short circuits between the positive rail and earth.

Set up the test equipment as in Figure 3.1.

Connect the T838 to a 13.8V DC supply.

Check that the quiescent current is approximately 45mA.

To key the transmitter, earth the key line (pin 13) on the exciter.

Check that the power supply is still at 13.8V under load.

Check that the regulated power control supply is approximately 7V.

3.4 RF Alignment

Refer to the circuit diagram in Section 5.

Note 1: The power amplifier circuit is 'broad band'. If the T838 is being retuned to a frequency less than 8MHz from the frequency already set up, there will be no need to retune the PA circuit.

For operation over a segment of the band, tune the PA to the centre frequency of the band of interest. If only two channels are programmed, use the highest frequency channel.

Note 2: Cables and connectors can easily cause a power loss of several watts if either too long or poorly terminated. Always use the shortest possible lead between the T838 and power meter.

Note 3: With the T838 partially withdrawn from the rack frame for tuning, the T006-80 (formerly TA-068) lead is required to connect the T838 to the T837 exciter.

Connect the exciter output to the PA input via a thru-line wattmeter with a 5W full scale reading. Special SMC/BNC leads will be required.

Connect an RF power meter to the PA output. Set the front panel power control preset (RV32) fully clockwise.

Set CV57, CV76 and CV96 to the half-meshed position.

Key the transmitter.

Check that the input to the PA is at least 0.5W.

Tune CV76 & CV96 for maximum output power, then tune CV57 for maximum output power.

Readjust CV76 and CV96 for maximum output power (60 to 70W). Some slight readjustment of CV57 may be necessary.

3.5 Setting The Output Power

Note 1: The PA cover shield should be in position when the metering and power controls are set up.

Note 2: The actual power used may be limited by regulatory requirements (e.g. NZ 33W, Australia 50W).

Once the PA has been tuned to full power, set the output power by adjusting RV32 (the front panel power adjust control) to any desired output power between 10 and 60W.

3.6 Remote Forward Power Meter Calibration

If a remote meter is connected, adjust RV16 (forward power meter) for the remote reading to agree with the RF power meter reading.

3.7 Remote Reverse Power Meter Calibration

If a remote meter is connected, connect a 50 ohm 3dB pad (with the output open circuit) to the PA output.

Apply RF drive and Tx key.

Adjust RV8 (reverse power meter) for a quarter of the forward power reading.

3.8 Setting Alarm Levels

Note 1: The PA cover shield should be in position when setting the forward and reverse power alarm levels.

Note 2: If forward and reverse power metering is being used, set up their calibration (Section 3.6 and Section 3.7) before setting the alarm levels.

3.8.1 Forward Power

Power up the T838 and adjust the power output pot. (RV32) so that the output power is at the alarm level required (e.g. 40W if the PA normally operates at 50W).

Adjust the forward power alarm set pot. (RV10) so that the forward power alarm LED lights.

Check the alarm level setting by adjusting the power up and down and observing the alarm LED. A few watts hysteresis can be expected.

Readjust the power control (RV32) for the normal operating level.

3.8.2 Reverse Power

Power up the T838 and adjust the power control pot. (RV32) for the normal operating power level.

Place a known mismatch of the required value (e.g. 5:1 VSWR) and adjust the reverse power alarm set pot. (RV6) so that the reverse power alarm LED lights.

3.9 Temperature Shutdown

Note: The temperature shutdown circuit is factory set to approximately 130°C and 5W. RV35 and RV39 should not be readjusted if normal operation is required.

Power up the T838 and adjust the power control pot. (RV32) for the normal operating power level.

Turn the temperature set pot. (RV35) fully anticlockwise.

Apply heat to the NTC (R37) with the tip of a soldering iron.

Adjust the shutdown power level pot. (RV39) to the desired level.

For continuous operation during fault conditions, set the shutdown power in the range 10 to 20W.

For normal operation, i.e. shutdown under extreme PA internal temperatures (approx. 130°C) or excessive dissipation in the combiner balance resistor (R69), adjust the temperature set pot. (RV35) for a voltage reading of 150mV on pin 8 of the LM339 (IC1).