

- Change the audio generator frequency to frequency 1 and adjust RV3 (reference deviation speech) on the T800-30-0000 PCB to obtain $\pm 3\text{kHz}$ [$\pm 1.5\text{kHz}$] peak deviation.
- Change the audio generator input frequency back to frequency 2 and repeat steps 2 and 3 until the deviations achieved at the two input frequencies are within 0.2dB of each other.

You will need to do this at least four times.

Data Modulation Adjustment

- Inject a 100Hz 1:1 square wave into S4 of the T800-30-0000 PCB (D-range 2 pin 13) of at least 5Vp-p, to simulate a data input.
- Monitor the carrier FM with a modulation meter via a suitable attenuator (if necessary), and observe the modulation level.
- Monitor the control line of the VCO (pin 1 on the VCO PCB) with an AC coupled oscilloscope set to a sensitivity of at least 20mV/div with the time base set to 2ms/div.
- Adjust both RV1 (VCO modulation) and RV2 (reference modulation) on the T800-30-0000 PCB to achieve a flat topped square wave on the oscilloscope, corresponding to $\pm 4.5\text{kHz}$ peak on the modulation meter.

You may need to repeat this procedure several times.

Figure 5 shows a typical 100HZ VCO control line waveform with RV1 and RV2 set correctly.

Note: Be aware that if the lower cut off frequency of an AC coupled oscilloscope is too high, excessive distortion may be introduced which will result in 'sag' on the square wave displayed. Determine if this is a problem by directly monitoring the original square wave source and observe any sag.

If there is sag, switch the oscilloscope to DC and use a 10 μF capacitor in series with the scope probe (observing the correct polarity) to directly monitor the VCO control line. Note that the trace settling time will be approximately one minute.

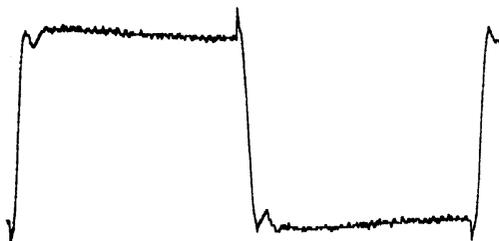


Figure 5 100Hz VCO Control Line Waveform

DATA/SPEECH Input

With S6 low, data mode is enabled. If no data is present, the DFSK modulator defaults to speech mode. However if S6 is high, only speech mode is enabled, regardless of the presence of data.

Introduction

The T800-30-0000 is a DFSK Modulator for T800 transmitters, suitable for POCSAG or similar paging data formats. Analogue transmissions (e.g. tone or speech) are still possible by disabling the data path with control line S6. 512 or 1200 baud data rates are link selectable and reference frequency stability is $\pm 2.5\text{ppm}$ from -30°C to $+70^{\circ}\text{C}$. The T800-30-0000 PCB is not designed for use with 66 to 88MHz equipment.

Parts Required

The T800-30-0000 kit should contain the following items:

1 x T800-30-0000 DFSK modulator board	1 x terminated coaxial cable
1 x T800-03-0000 auxiliary D-range kit	4 x M3 x 8 Taptite Pan Torx screws
1 x coaxial socket	4 x cable ties
1 x 47 ohm resistor SMD 0805	3 x cable clips

Installation



Caution: The radio must be powered off for this modification. After modification, do not remove the coaxial lead from the socket unless the radio is powered off.

- Remove the TCXO module from the synthesiser compartment of the T800 transmitter.

Fit the miniature coaxial socket (=SK710) and 47 Ohm SMD resistor (=R705) to the PCB pads provided beneath the TCXO, as shown in Figure 1.

Note: Keep the angle of the coaxial socket steep to ensure that there is space for the Micromatch cable as well as for the coaxial cable.

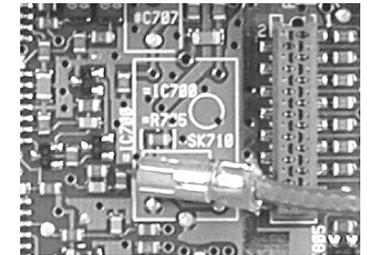


Figure 1 Location Of Socket And SMD Resistor

- Remove the two screws and cover plate from the second D-range mounting hole at the rear of the T800 chassis.
- Remove C263 and R296 from the audio processor (shown in Figure 2), and clear the holes of solder.

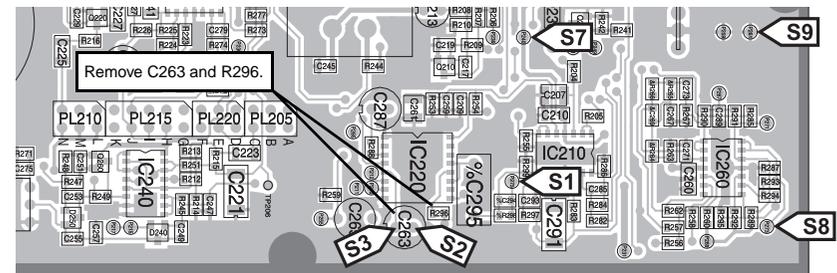


Figure 2 T800 Transmitter Audio Processor - Top Side

- Remove R841 and R842 (SMD) from the microcontroller compartment to disconnect the appropriate lines from the microcontroller.
- Lay the T800-30-0000 PCB above the exciter compartment with the component side up and positioned so that the wires are facing the front panel of the radio.

Twist the yellow, green and blue wires together and secure with the cable ties provided.

Route the wires and coaxial cable via the loom channel cast into the chassis to the synthesiser and D-range compartments as shown in Figure 3. Depending on the chassis type, there will be either holes in the chassis through which to pass the wires, or slots in the top of the chassis walls. If the wires are passed through slots, use cable clips to hold them in place.

Pass the three wires through the D-range hole and connect to the auxiliary D-range plug (D-range 2) as follows:

Wire	Length (mm)	Connection	Signal
yellow	370	S4 pin 13	DATA
green	370	S5 pin 8	GROUND
blue	370	S6 pin 14	DATA/SPEECH

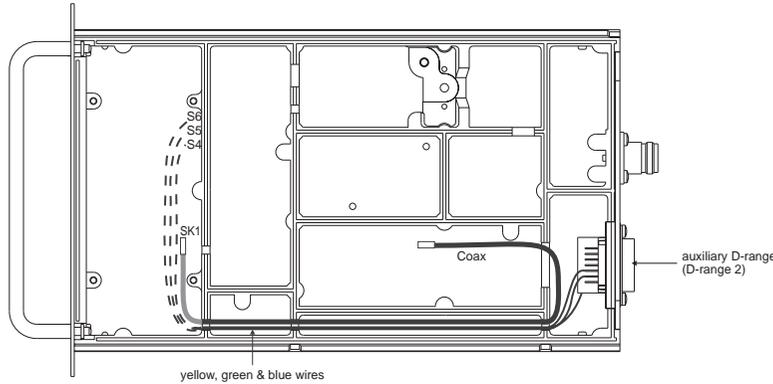


Figure 3 Cable Routing

- Screw D-range 2 in place.
- Connect the wires from the T800-30-0000 PCB to the audio processor as follows (refer to Figure 2 and the Test Points & Options Connections drawing in the relevant service manual):

Wire	Length (mm)	Connection
brown	150	S1 I/O Pad, P275 (POCR) between C295 and IC210
red	140	S2 positive side of C263
orange	190	S3 negative side of C263
purple	100	S7 I/O Pad, P240 (+9V) just below D230
grey	150	S8 I/O Pad, P273 (POCI)
white	205	S9 I/O Pad, P261 (GND)

- The T800-30-0000 PCB links are set for UHF operation and 512 baud data rate. For the location of the PCB links refer to Figure 4.

For 1200 baud rate, solder short LINK2.

For VHF operation, solder short LINK3, LINK4 and LINK5.

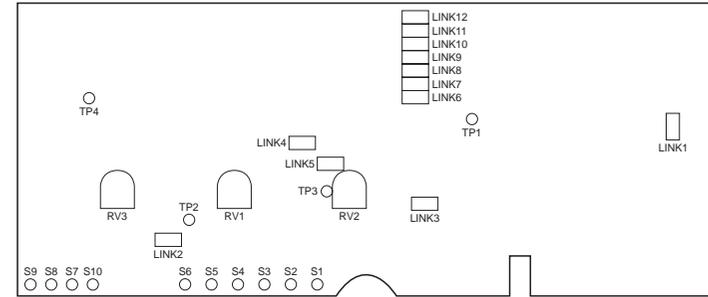


Figure 4 T800-30-0000 Link Location - Top Side

- Connect the coaxial cable provided between SK1 on the T800-30-0000 PCB and =SK710 on the T800 transmitter PCB, as shown in Figure 3.
 - Position the T800-30-0000 PCB above the audio processor compartment, with the wires and components facing down.
- Screw in place using the 4 M3 x 8 screws provided.

Adjustment

For speech modulator and data modulation adjustment with a T800-30-0000 DFSK modulator PCB, carry out the following instructions instead of the audio processor modulator adjustments in Section 3 of the service manuals. Carry out the limiter adjustments as described in the service manuals.

During adjustment **do not** provide an input on the DATA/SPEECH terminal (S6).

The audio test frequencies used are as follows:

Transmitter	Frequency 1	Frequency 2
T836/7	120Hz	600Hz
T856/7	100Hz	300Hz

Note: Deviation settings are given first for wide band radios, followed by settings for narrow band radios in brackets [].

Speech Modulator Adjustment

- Inject an audio signal of frequency 2 at approximately +5dBm (1.4Vrms) into the CTCSS input (D-range 1 pin 8) and earth the key line.
- Adjust the audio generator output to obtain ±3kHz [±1.5kHz] peak deviation at frequency 2.