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T837 Exciter

VHF FM 136-174MHz

(M837-00)

Issue A

TECHNICAL INFORMATION

For further information about this Manual or the equipment it describes, contact the Product Distribution Group, Tait Electronics Ltd, at the above address.

UPDATING EQUIPMENT AND SERVICE MANUALS

In the interests of improving performance, reliability or servicing, Tait Electronics Ltd reserve the right to update their equipment and/or Service Manuals without prior notice.

SCOPE OF MANUAL

This Manual contains general, technical and servicing information on the T837 exciter.

T837

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When ordering Tait Service Manuals, quote the Tait Internal Part Number (IPN) and, where applicable, the version.

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SECTION 1 GENERAL INFORMATION

1.1 INTRODUCTION

The T837 is a synthesised, FM base station exciter for single or multichannel operation in the 136 to 174MHz frequency range. With a standard power output of only 800mW, the exciter is designed for use with the T838 50W power amplifier.

The RF section of the exciter comprises a frequency synthesiser, which provides 170mW of frequency modulated RF drive to a two stage, wide band output amplifier. The synthesiser frequency is programmed via an EPROM which is attached to a separate plug-in memory PCB. A DIP switch on the memory PCB allows fast single channel selection from a multichannel programmed EPROM, but for true multichannel capability the EPROM must be addressed separately via an additional D-range connector at the rear of the set.

A wide selection of audio characteristics may be obtained from the audio processor. Optional circuit blocks are an audio compressor and a pre-emphasis stage. They can be bypassed or linked to one or both audio inputs, and then back into the remaining audio circuitry in almost any combination. All audio processor options are link selectable.

All components except those of the VCO and memory PCB are mounted on a single PCB. This is secured to a die-cast chassis which is divided into compartments to individually shield each section of circuitry. Access to both sides of the main circuit board is obtained by removing each of the chassis lids. There is provision within the chassis to mount small option PCB's.

1.2 SPECIFICATIONS**1.2.1 INTRODUCTION**

The performance figures given are minimum figures, unless otherwise indicated, for equipment tuned with the maximum switching band and operating at standard room temperature (+22°C to +28°C).

Where applicable, the test methods used to obtain the following performance figures are those described in the EIA specification. However, there are several parameters for which performance according to the CEPT specification is given.

Details of test methods and the conditions which apply for Type Approval testing in all countries can be obtained from Tait Electronics Ltd.

1.2.2 GENERAL

Frequency Range	.. 136-174MHz
Modulation Type	.. direct FM
Frequency Increment	.. 5 or 6.25kHz
Switching Range	.. 8MHz
Number Of Channels:	
Standard	.. 1
Optional	.. 8
Internally Selectable	.. 128
Supply Voltage:	
Operating Voltage	.. 10.8 to 16V DC
Standard Test Voltage	.. 13.8V DC
Polarity	.. negative earth only
Polarity Protection	.. crowbar diode
Keying Supply (if required)	.. -50V DC
Supply Current:	
Transmit	.. 600mA
Standby	.. 120mA
Load Impedance	.. 50 ohms
Operating Temperature Range	.. -30°C to +60°C
Dimensions:	
Height	.. 191mm
Width	.. 60mm
Length	.. 320mm
Weight	.. 2kg
Time-Out Timer (optional)	.. 1 to 4 minutes (adjustable)
Tail Timer	.. 5ms to 4 seconds (adjustable)
Transmit Key Time	.. <25ms

T837 General Information

1.2.3 RF SECTION

Adjacent Channel Power (full deviation):

Wide Band (+25kHz/15kHz B/W) .. -75dBc
Narrow Band (+12.5kHz/7.5kHz B/W) .. -65dBc

Transmitter Side Band Noise:
(no modulation, 15kHz bandwidth)

At +25kHz	.. -95dBc
At +1MHz	.. -105dBc

Radiated Spurious Emissions:

Transmit	.. -36dBm to 1GHz
	-30dBm to 4GHz
Standby	.. -57dBm to 1GHz
	-47dBm to 4GHz

Frequency Stability:

Standard Version	.. $\pm 2.5\text{ppm}$, -30°C to $+60^{\circ}\text{C}$
Very High Stability Option	.. $\pm 1\text{ppm}$, 0°C to $+60^{\circ}\text{C}$

Power Output .. 800mW

1.2.4 AUDIO PROCESSOR

Inputs Available .. line, microphone and CTCSS

Line Input:

Impedance	.. 600 ohms (balanced)
Sensitivity (60% modulation @ 1kHz)-	
With Compressor	.. -50dBm
Without Compressor	.. -30dBm

Microphone Input:

Impedance	.. 600 ohms
Sensitivity (60% modulation @ 1kHz)-	
With Compressor	.. -70dBm
Without Compressor	.. -50dBm

Modulation Characteristics

Frequency Response .. flat or pre-emphasised (optional)
(below limiting)

Line And Microphone Inputs:

Pre-emphasised Response-	
Bandwidth	.. 300Hz to 3kHz
Below Limiting Response	.. within +1, -3dB of a 6dB/octave pre-emphasis characteristic
Flat Response	.. within +1, -2dB of output at 1kHz

Above Limiting Response .. within +1, -2dB of a flat response
(ref. 1kHz)

Distortion .. 2%

T837 General Information

Hum And Noise:

Narrow Band
Wide Band

.. -50dB (CEPT)
.. -55dB (300Hz to 3kHz [EIA])

Compressor (optional):

Attack Time
Decay Time
Range

.. 10ms
.. 800ms
.. 50dB

CTCSS Input:

Bandwidth
Response

.. 65 to 250Hz
.. within ± 1 dB of a flat response (ref. 150Hz)

1.3 VERSIONS

Description	T837 Versions			
	10	15	20	25
136-156MHz	+	+		
148-174MHz			+	+
5kHz Deviation	+		+	
2.5kHz Deviation		+		+
2.5ppm TCXO	+	+	+	+

SECTION 2 CIRCUIT OPERATION

2.1 INTRODUCTION

The individual circuit blocks which make up the T837 are: the synthesiser, VCO, audio processor, drive amplifier and voltage regulators. Each of these circuit blocks is set in its own shielded compartment, formed as an integral part of the main chassis.

The configuration of the circuit blocks may be seen on a functional level in Figure 1. Refer to the Circuit Diagrams for more detail.

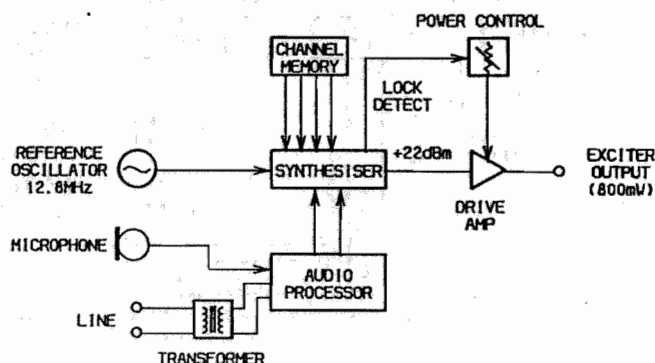


Figure 1 T837 High Level Block Diagram

2.2 SYNTHESISER (Refer to Figure 2.)

The synthesiser employs a phase-locked loop (PLL) to lock a voltage controlled oscillator (VCO) to a given reference frequency. A reference oscillator at 12.8MHz (&IC1) is buffered (IC7c & b) and divided down to 200kHz (IC4). This 200kHz square wave is then summed with the modulating audio and passed to an integrator (IC7f, Q8, Q9). This produces a ramping waveform which is centred around a DC level determined by the incoming audio. IC7e performs as a comparator, ultimately producing a phase-modulated 200kHz square wave. This is followed by a similar phase shifting stage (IC7d & a, Q10, Q11), before being divided down to 6.25kHz or 5kHz within the synthesiser IC (IC5).

A buffered output of the VCO is divided with a programmable divider, comprising a VHF prescaler (IC3) and a divider within IC5. This signal is compared with the phase modulated reference signal at the phase detectors in IC5. A digital phase detector (PDB) provides rapid coarse tuning of the VCO until the phase error is within the range of the high gain sample and hold detector (PDA). The phase detector outputs are passed through an active loop filter (IC6) which produces a DC voltage between 0V and 20V to tune the VCO. This VCO control line is further filtered to attenuate noise and other spurious signals. Note that the VCO frequency increases with increasing control voltage.

If the synthesiser loop loses lock, a pulsed signal appears at LD (pin 3) of IC5. This signal is filtered and buffered by IC6, producing the lock detect signal used to shut off the power supply to the drive amplifier.

The division ratio of the programmable divider is stored within EPROM memory. Up to 128 frequencies can be stored within the EPROM and are addressed using the internal DIP switches. Three of the address lines are also available for external frequency control via an extra D-range connector at the rear of the chassis. A change of state of any of these three lines commences a programming cycle, during which time the frequency data in the EPROM is down loaded to the divider (IC5). 32 bits of data are loaded in eight 4-bit words.

T837 Circuit Operation

Note that the three address lines must change their state decisively and simultaneously. Methods which allow the states of the three lines during transition to be undefined for indeterminate lengths of time, as with some mechanical BCD switches, are unsuitable.

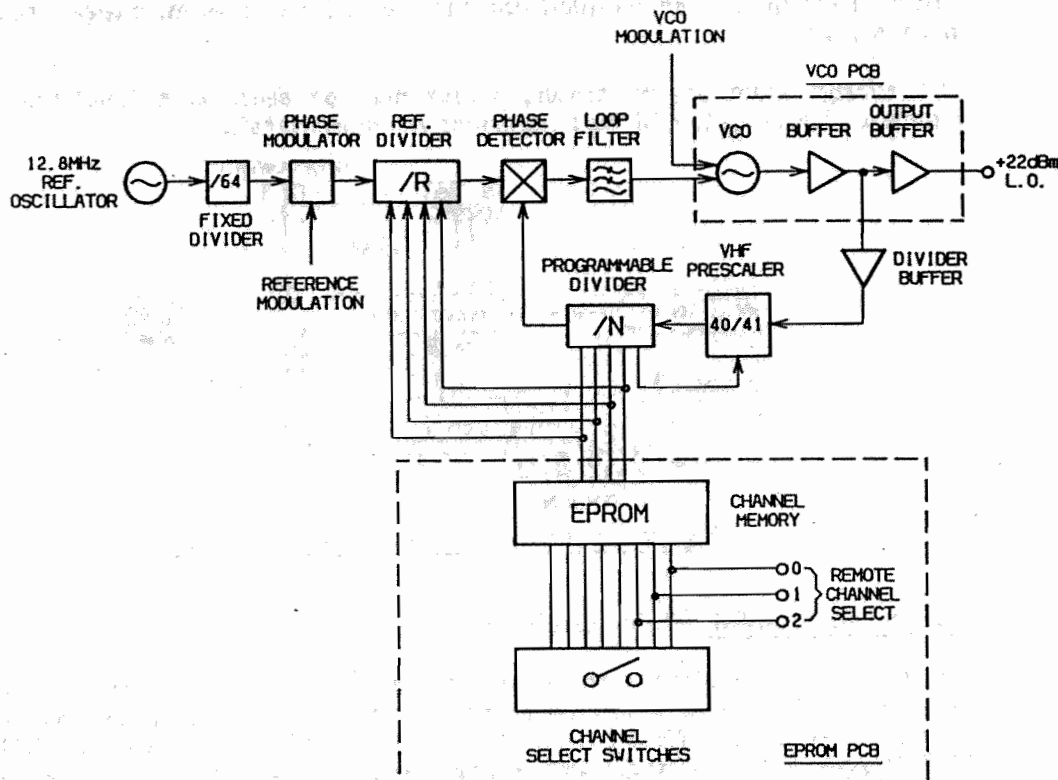


Figure 2 Synthesiser Block Diagram

2.3 VCO

The VCO transistor (Q1) operates in a common source configuration, with an LC tank circuit coupled between its gate and drain to provide the feedback necessary for oscillation. The VCO control voltage from the loop filter (IC6) is applied to the varicaps (D1-D4) to facilitate tuning within an 8MHz band of frequencies. A trimcap (VC1) is used for coarse tuning of the VCO. The output from the oscillator circuit drives a cascode amplifier stage (Q2, Q3) which supplies +10dBm (typically) to a further stage of amplification, Q5. This is the final amplifier on the VCO PCB, and delivers +22dBm (typically) to the exciter drive amplifier.

A low level "sniff" is taken from the input to Q5 and used to drive the divider buffer for the VHF prescaler (IC3). The prescaler divide ratio is 40/41.

The VCO operates at the actual output frequency of the exciter, i.e. there are no multiplier stages. It is modulated by superimposing the audio signal onto the control voltage and by phase modulating the reference signal.

2.3.1 TWO-POINT MODULATION

Both the VCO and reference oscillator are modulated so that the phase detectors of IC5 see no frequency error under modulation. Thus, the synthesiser loop will not attempt to correct for modulation and the response of the transmitter remains unaffected.

2.4 AUDIO PROCESSOR (Refer to Figure 3.)

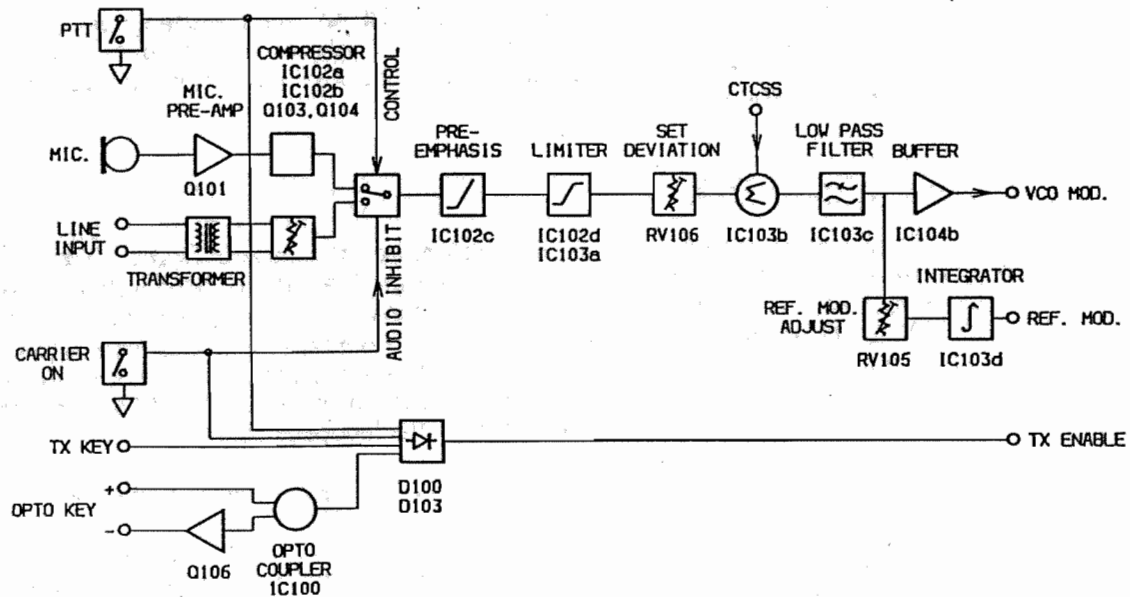


Figure 3 Audio Processor Block Diagram

2.4.1 GENERAL

The audio processor comprises several link selectable circuit blocks which may be configured in a variety of combinations to suit individual requirements. The pre-emphasis network and compressor may be linked individually or cascaded between either or both audio inputs and the limiter.

Refer to Section 4.4.1 for linking details.

2.4.2 AUDIO INPUTS

Two audio inputs are available: one from a 600 ohm balanced (or unbalanced) line, and the other from a local microphone. The microphone signal is passed first to a pre-amplifier (Q101) and ultimately to a multiplexer (IC101), but in between may pass through the compressor and pre-emphasis network (depending on the linking details). The line transformer is also connected to the multiplexer and is disabled when the microphone pre-amplifier is enabled by the microphone PTT switch.

A third input for CTCSS tones is also provided.

2.4.3 KEYING INPUTS

There are four ways to key the exciter:

1. Pull the Tx-key line low (pin 13 on the D-range connector at the rear of the set).
2. Push the "Carrier" button on the front panel - this will inhibit all audio.
3. Use the PTT button on the local microphone, which disables audio from the line.
4. Via the opto-key inputs (pins 11 and 12 on the D-range connector) where electrical isolation is required. This features a constant current source (Q106) to ensure reliable activation of the opto-coupler (IC100) at low keying voltages.

2.4.4 COMPRESSOR

The input signal is fed via a current controlled attenuator (Q103, Q104) to a high gain stage (IC102a) from which the output signal is taken. This signal is passed to a comparator (IC102b) which toggles whenever the audio signal exceeds a DC threshold determined by RV104. Thus, the comparator produces a square wave whose mark-space ratio is determined by the amplitude of the audio signal. This square wave pumps up the reservoir capacitor (C129) which controls the attenuator (Q103, Q104), thus completing the feedback loop.

The compression level is set by adjustment of the comparator threshold (RV104).

Note: Although the high dynamic range of the compressor allows the use of very low audio signal levels, such conditions will be accompanied by a degradation of the signal to noise ratio. Very low audio input levels should therefore be avoided where possible.

2.4.5 OUTPUTS TO MODULATORS

The output signal from the limiter (IC102d, IC103a) is added to any incoming CTCSS tone at a summing amplifier (IC103b). The signal is then low pass filtered (IC103c) and split to supply the two modulators.

Since the VCO modulator is a true frequency modulator, its audio is simply buffered (IC104b). The reference modulator, however, is a phase modulator and its audio must first be integrated (IC103d).

It is vital that the audio levels to the modulators are accurately set, relative to each other. Hence the inclusion of level adjustment in the reference modulator path (RV105). Once set, adjustments to absolute deviation may be made only via the deviation pot (RV106).

2.5 POWER SUPPLY & REGULATOR CIRCUITS (Refer to Figure 4.)

The T837 is designed to operate from a 10.8-16V DC supply, although the standard test voltage is 13.8V. A 5.3V regulator (IC201) running directly from the 13.8V rail drives much of the synthesiser circuitry. It is also used as the reference for a DC amplifier (IC202d, Q209, Q210) which provides a medium current capability 9V supply.

T837 Circuit Operation

A self-oscillating, switch-mode power supply (Q208, Q212) runs from the 9V supply, producing a low current capability +20V supply. This is used to supply the synthesiser loop filter (IC6), giving a VCO control voltage range of up to 20V.

Ultimate control of the exciter is via the Tx reg. supply, switched from 9V by Q211. This is enabled by the Tx enable signal from the audio processor, but is subject to gating by the transmit timer (IC202b). If the exciter is keyed continuously for a time exceeding that set by RV201 and C222, the Tx timer will force the Tx reg. supply off until the exciter is keyed again. If required, the Tx timer may be disabled by the removal of R257.

The tail timer provides a repeater tail of up to several seconds and is adjusted by RV202.

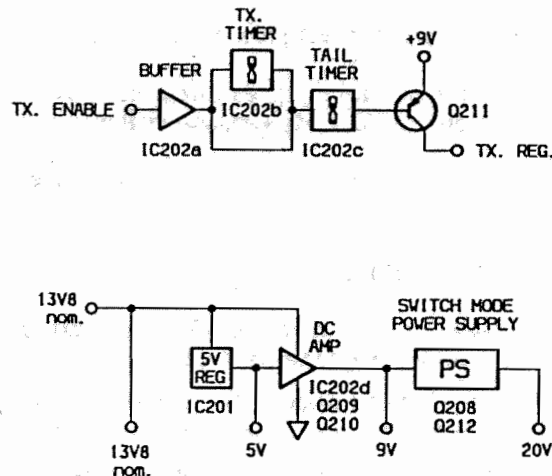


Figure 4 Power Supply & Regulator Block Diagram

2.6 EXCITER DRIVE AMPLIFIER (Refer to Figure 1.)

A two-stage, wide band amplifier (Q300, Q301) provides an output level of approximately 800mW (+29dBm) for an input of 170mW (+22dBm) from the VCO. D351 (11V zener) on the supply of IC350 provides a 10.5V regulated rail for the exciter.

To reduce the spurious output level, the synthesiser out-of-lock signal inhibits the exciter via Q350 & IC350A.

R300, R301 & R302 form a 6dB attenuator to provide good VCO/drive amplifier isolation.

The output attenuator (&R425, &R426, &R427, &R428) assists in reducing exciter/PA interaction while also ensuring a good match for Q301.

T837 Introduction To Servicing

Remove the tip while continuing suction to ensure that all solder is removed from the joint, then stop the suction.

Before pulling the lead out, ensure it is not stuck to the plating.

If the lead is still not free, resolder the joint and try again.

Note: The desoldering iron does not usually have enough heat to desolder leads from the ground plane. Additional heat may be applied by holding a soldering iron on the tip of the desoldering iron (this may require some additional help).

3.3.1.2 Component Cutting Method

Cut the leads on the component side of the PCB.

Heat the solder joint sufficiently to allow easy removal of the lead by drawing it out from the component side: do not use undue force.

Fill the hole with solder and then clear with solderwick.

3.3.2 SURFACE MOUNT DEVICES

CAUTION: Surface mount devices (SMD's) require special storage, handling, removal and replacement techniques.

This equipment should be serviced only by an approved Tait Dealer or Service Centre equipped with the necessary facilities.

Repairs attempted with incorrect equipment or by untrained personnel may result in permanent damage. If in doubt, contact Tait Electronics Ltd or your nearest Tait Branch or Subsidiary.

SECTION 4 INITIAL TUNING & ADJUSTMENT

4.1 INTRODUCTION

The full tuning and adjustment procedure is as follows:

- channel programming
- channel selection
- selecting required audio links
- synthesiser alignment
- modulator adjustment
- limiter adjustment
- setting line level
- compressor adjustment.

These operations are described more fully in the following Sections.

4.2 CHANNEL PROGRAMMING

Up to 128 channel frequencies can be stored in the EPROM memory (IC1). Each channel can be addressed using the bank of 8 switches (SW1). The most significant bit of this switch (8) is set according to the type of EPROM fitted:

ON = 27C16
OFF = 27C64

Note: Only CMOS EPROMs may be used.

Up to 8 channels may be addressed externally when the optional extra rear D-range connector is fitted.

Programming is accomplished by using an IBM* PC, a PROM programmer and the PGM800 software package. For a full description of the programming procedure, refer to the T800 Programming Handbook.

*IBM is a registered trademark of International Business Machines.

4.3 DIP SWITCH CODES FOR CHANNEL ADDRESSES

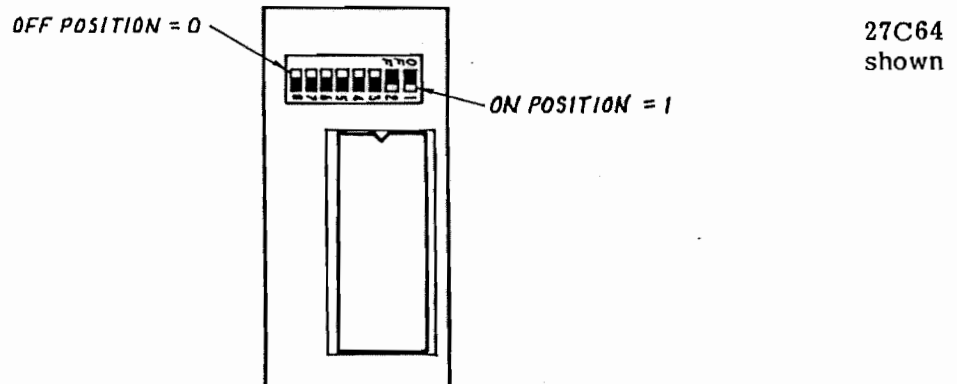


Figure 5 Channel DIP Switch Setting

The PGM800 software used to programme the EPROM will present the user with a DIP switch code for each channel address; e.g. channel 124 will be assigned a switch code of 0000011, in which case the switches should be set as shown in Figure 5.

T837 Initial Tuning & Adjustment

Note 1: For remote multichannel applications using the T800-07 multichannel memory PCB, the DIP switch is not used and should have the first 3 least significant bits (1-3) in the off position. The next 4 bits (4-7) should be on, while the most significant bit (8) is selected according to the EPROM used (refer to Section 4.2). This will allow the existing CHSEL lines to be used to select up to 8 channels.

It is possible to address blocks of 8 channels throughout the 128 channel EPROM capacity by switching bits 4 to 7 on the DIP switch.

Note 2: Alternatively, all 128 channels may be remotely addressed on the T800-07, but bits 1-7 of the DIP switch should be in the off position.

In this case it will be necessary to drill a hole to route the 7 channel select lines from the synthesiser compartment to the D-range connector.

4.4 AUDIO PROCESSOR LINKS

4.4.1 LINK DETAILS

The links available for various circuit block options are listed by function as follows:

Plug PL100	1-2	not connected
	3-4	microphone pre-amp. output to compressor input
	5-6	microphone pre-amp. output to multiplexer input
Plug PL101	1-2	multiplexer output to pre-emphasis input
	3-4	multiplexer output to compressor input
	5-6	multiplexer output to limiter input
Plug PL102	1-2	not connected
	3-4	not connected
	5-6	compressor output to pre-emphasis input
	7-8	compressor output to limiter input
	9-10	compressor output to multiplexer input
Plug PL103	1-2	pre-emphasis output to multiplexer input
	3-4	pre-emphasis output to limiter input
	5-6	not connected

4.4.2 TYPICAL OPTIONS

	PL100	PL101	PL102	PL103
microphone pre-amp. compressed and pre-emphasised; line input pre-emphasised (standard set-up)	3-4	1-2	9-10	3-4
microphone pre-amp. compressed and pre-emphasised; line input unprocessed	3-4	5-6	5-6	1-2
line and microphone compressed and pre-emphasised	5-6	3-4	5-6	3-4
microphone pre-amp. compressed; line and microphone flat response	3-4	5-6	9-10	5-6

4.5 TEST EQUIPMENT SET-UP

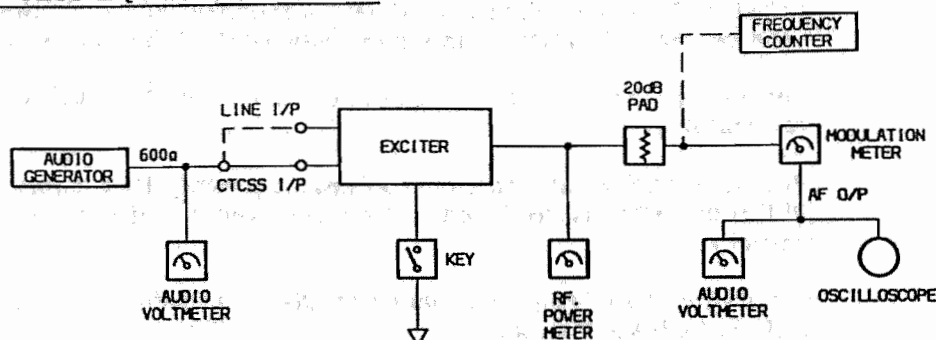


Figure 6 Test Equipment Set-Up

4.6 SYNTHESISER ALIGNMENT

1. Ensure that the EPROM (IC1) has been programmed with the required frequencies using PGM800 software.

2. Single Channel:

Select a channel on the EPROM PCB DIP switch.

Multichannel:

Select the middle channel via the EPROM PCB DIP switch.

3. Connect a high impedance voltmeter to the junction of L1 and R1 in the VCO (this measures the synthesiser loop voltage).

4. Earth the Tx key line.

Single Channel:

Tune VCO trimmer VC1 for a synthesiser loop voltage of 9V.

Multichannel:

Tune VCO trimmer VC1 for a synthesiser loop voltage of 9V on the middle channel.

If there is no middle channel, tune VC1 so that the channels are symmetrically placed around a loop voltage of 9V.

All channels should lie within the upper and lower limits of 15V and 5V respectively.

Do not attempt to programme channels with a greater frequency separation than the specified switching range (8MHz).

5. Check that the exciter output power is 800mW +200, -100mW.
6. Measure the exciter output frequency and adjust the TCXO (&IC1) trimmer if required (+100Hz).

CAUTION: This trimmer is susceptible to physical damage. Do not exert a downward force of more than 500g (1lb) when adjusting.

T837 Initial Tuning & Adjustment

Adjust RV104 (compression level) anticlockwise until the demodulated waveform is just clipping (approximately 4kHz [2kHz] deviation).

Increase the audio level by 10dB and verify that the test tone is held just into clipping.

Whistle steadily into the microphone, checking that approximately 4kHz [2kHz] deviation is produced. The modulated waveform should be basically sinusoidal.

Speak into the microphone, checking that the modulation peaks reach about 5kHz [2.5kHz] deviation.

4.7.5.3 Compressor On Both Line & Microphone Inputs

Set up as described in Section 4.7.5.1.

SECTION 5 FUNCTIONAL TESTS

The following test procedures will confirm that the T837 has been tuned and adjusted correctly and is fully operational.

Note: In this and following Sections deviation settings are given first for wide band sets, followed by settings for narrow band sets in brackets [].

5.1 CURRENT CONSUMPTION

Connect the T837 to a 13.8V power supply.

Check that the current in the 13.8V power cable is less than 120mA.

Key the exciter (the "Carrier On" LED should light).

Check that the current is less than 600mA.

5.2 OUTPUT POWER

Connect an RF power meter to the exciter output socket.

Key the exciter.

Check that the output power is 800mW +200, -100mW.

5.3 OUTPUT FREQUENCY

Connect the exciter output to a frequency counter via a 20dB attenuator pad.

Measure the output frequency and, if necessary, adjust the TCXO (&IC1) to trim to the nominal frequency ($\pm 100\text{Hz}$).

5.4 TAIL TIMER

Adjust RV202 fully anticlockwise.

Connect the key line to earth, then disconnect, and check that the exciter remains on for at least 3 seconds.

Reset RV202 fully clockwise.

Connect the key line to earth, then disconnect, ensuring that the exciter turns off immediately the key line is broken.

Set RV202 for the required tail time.

5.5 TRANSMIT TIMER

Adjust RV201 fully anticlockwise.

Earth the key line.

Check that the exciter turns off after approximately 1 minute.

T837 Functional Tests

Adjust RV201 fully clockwise.

Open and then earth the key line.

Check that the exciter turns off after approximately 3 minutes.

Set RV201 for the required transmit time.

5.6 FREQUENCY RESPONSE

If the exciter has been correctly adjusted, the pre-emphasis and limiting responses should closely match those shown in Figures 7 and 8 respectively.

Note: The limits shown on these graphs should not be exceeded.

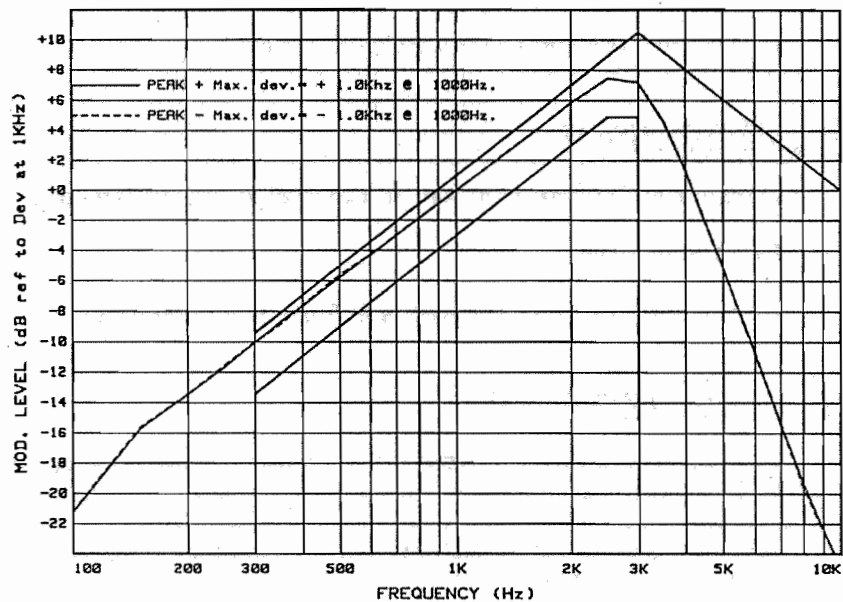


Figure 7 Pre-emphasis Response

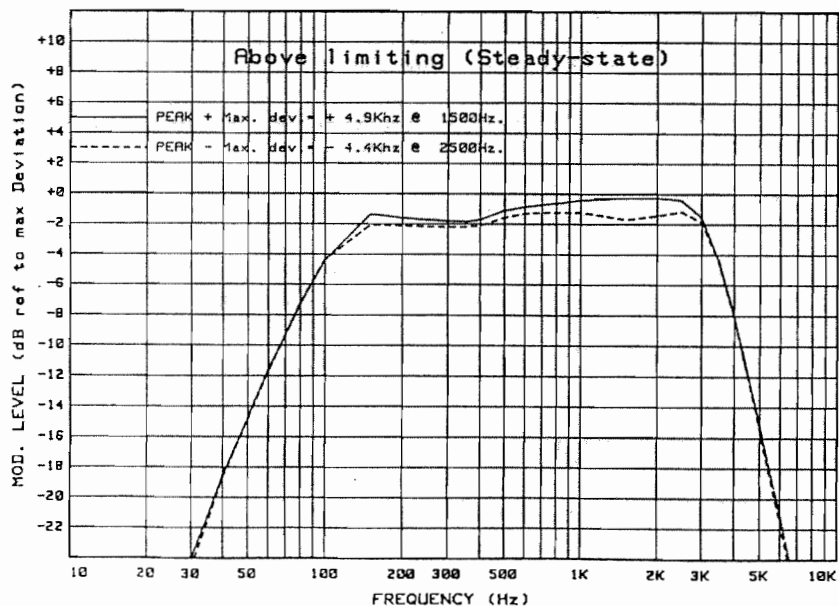


Figure 8 Limiting Response

T837 Functional Tests

1. Measure the pre-emphasis response as follows:
Reduce the line level to give 1kHz [0.5kHz] deviation at 1kHz.
Sweep the modulation frequency.
The response should closely match that shown in Figure 7.
2. Measure the limiting response as follows:
Set the line level to give 3kHz [1.5kHz] deviation at 1kHz.
Increase the line level 20dB and sweep the modulation frequency.
The response should closely match that shown in Figure 8.

5.7 AUDIO LEVEL INPUT SENSITIVITY

1. Adjust RV100 (line sensitivity) fully clockwise.
2. Check that the input sensitivities are better than those specified below:
 - (a) Line Input- 600 ohms, 3kHz [1.5kHz] deviation at 1kHz:
with compressor -50dBm
without compressor -30dBm
 - (b) Microphone Input- 600 ohms, 3kHz [1.5kHz] deviation at 1kHz:
with compressor -75dBm
without compressor -55dBm
 - (c) CTCSS Input- 1kHz deviation at 150Hz 500mV rms

Note: A degraded signal to noise ratio can be expected with the compressor selected. The extent of the degradation is dependent on the audio input level.

T837 Fault Finding

If the VCO is not locked, refer to the synthesiser fault finding chart (Section 6.6).

Note: When changing frequencies, only the three least significant bits of the EPROM address (e.g. DIP switch) will initiate a synthesiser programme cycle.

Changing a high order bit will therefore not result in a change of frequency unless a low order bit is also changed.

6.4 RF CHECKS

In circuit RF levels may be measured with an RF probe on which the earth lead has been shortened to a minimum (i.e. 13mm). Refer to the Circuit Diagrams for typical levels.

6.4.1 OUTPUT POWER

Refer to the exciter drive amplifier fault finding chart (Section 6.7).

Ensure that the VCO locks (refer to Section 6.3.2).

Connect the exciter output to a power meter and key the exciter.

Check that the output power is between 700 and 1000mW.

Note: The lock detector (synthesiser, IC5 pin 3) will not allow supply to the exciter amplifier (Q300, Q301) if the synthesiser is out of lock.

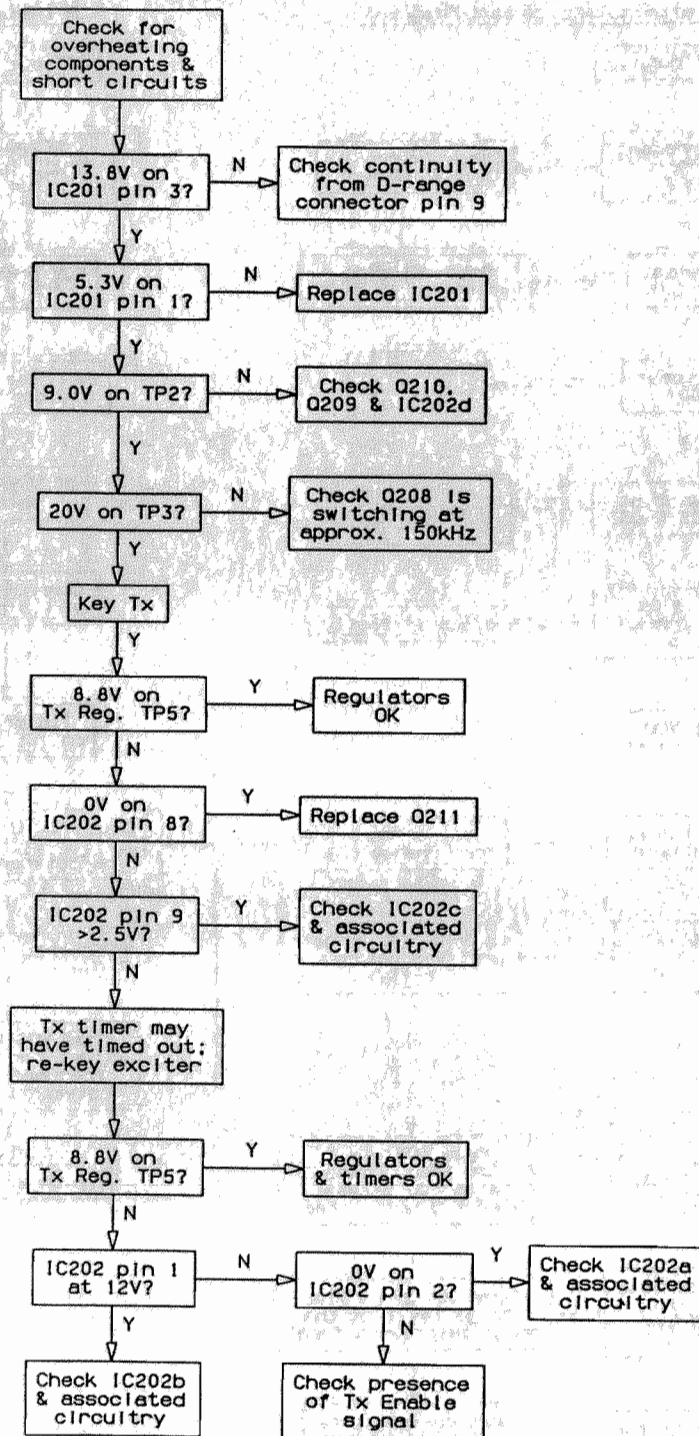
6.4.2 AUDIO AND MODULATION

Refer to the audio processor fault finding chart (Section 6.8).

Set up the audio processor as described in Section 4.7.

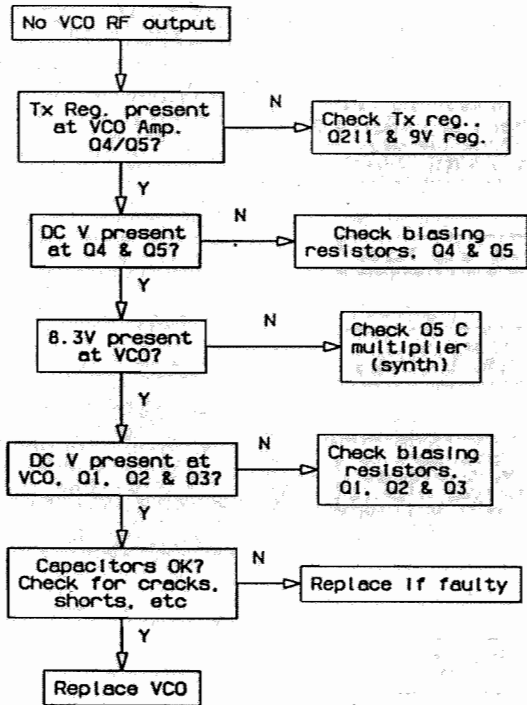
Check that the demodulated RF output has the frequency response referred to in Section 5.5 with at least 5kHz [2.5kHz] deviation available at 1kHz modulating frequency.

If the above result is not achieved, either the two modulators are incorrectly adjusted or a fault condition exists.

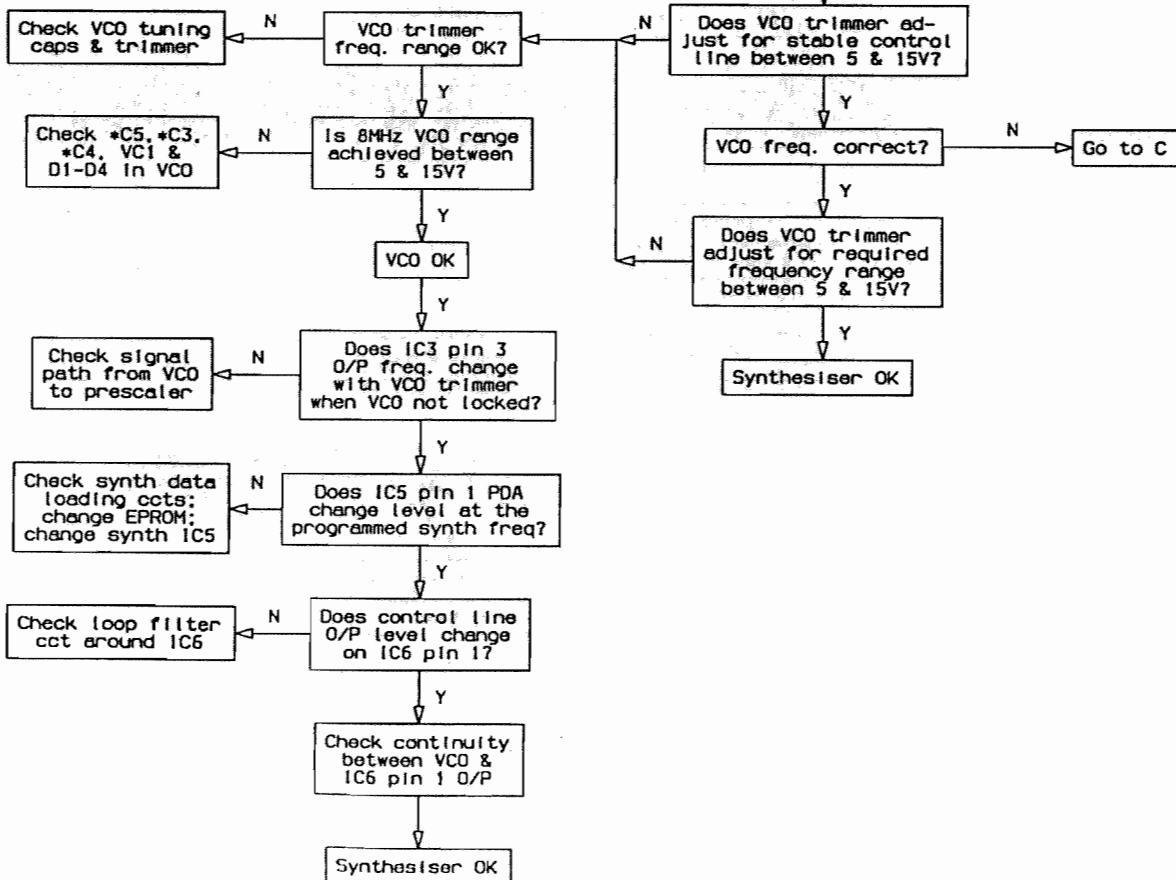
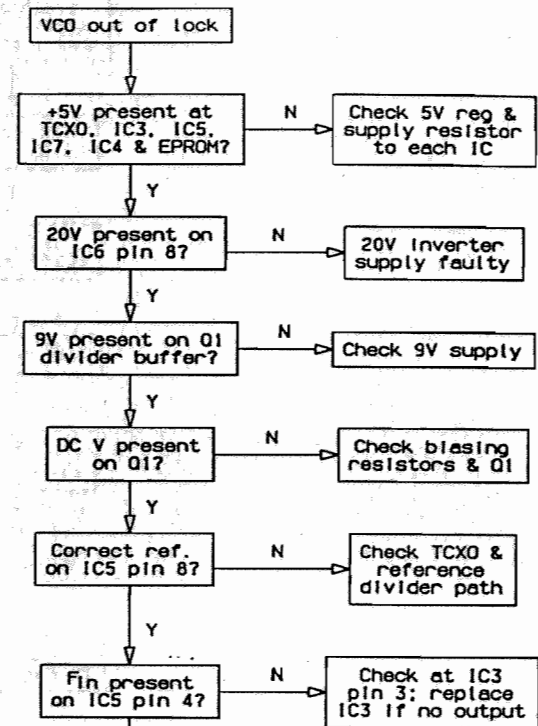
6.5 REGULATOR FAULT FINDING CHART

6.6 SYNTHESISER FAULT FINDING CHARTS

A (Refer to VCO Circuit Diagram)

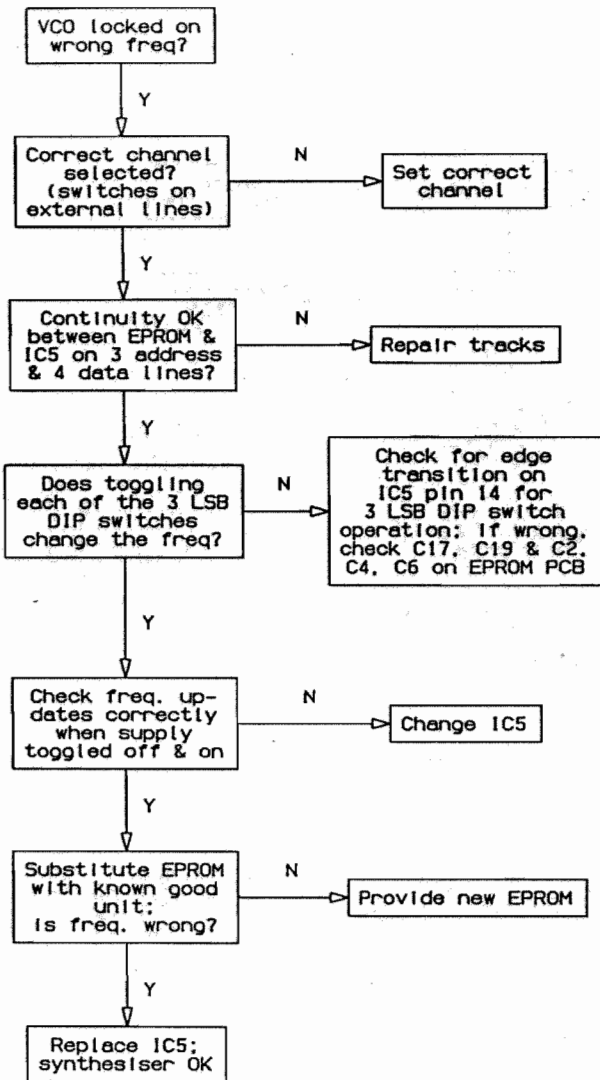


B (Refer to Synth. Circuit Diagram)

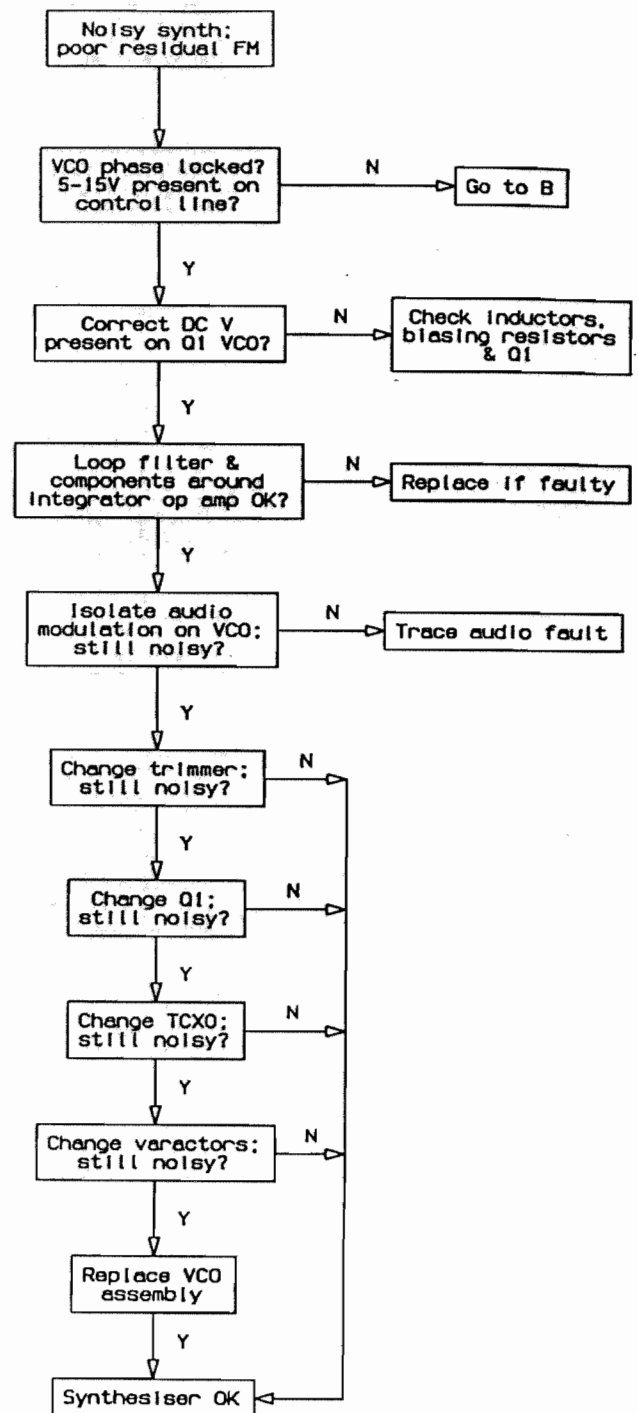


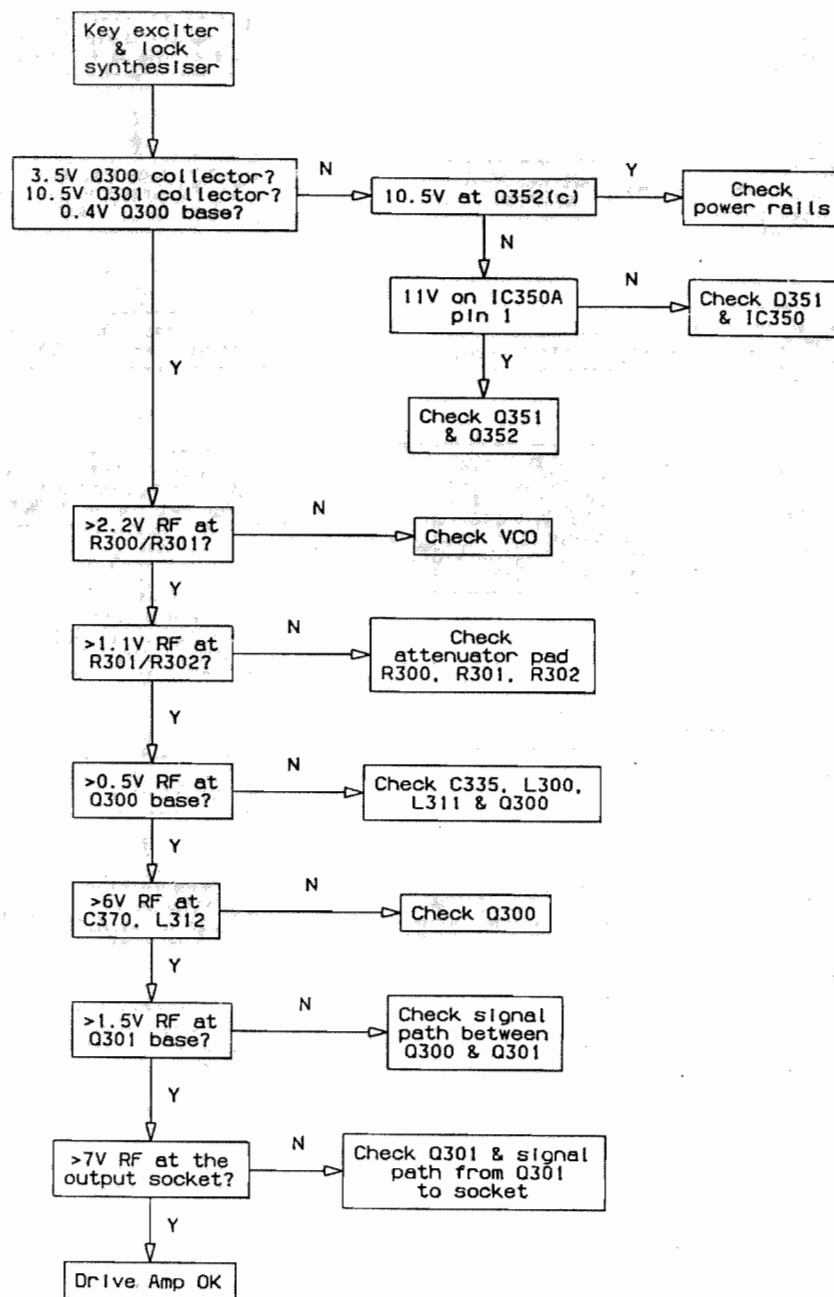
Continued on next page.

C Refer to synthesiser Circuit Diagram

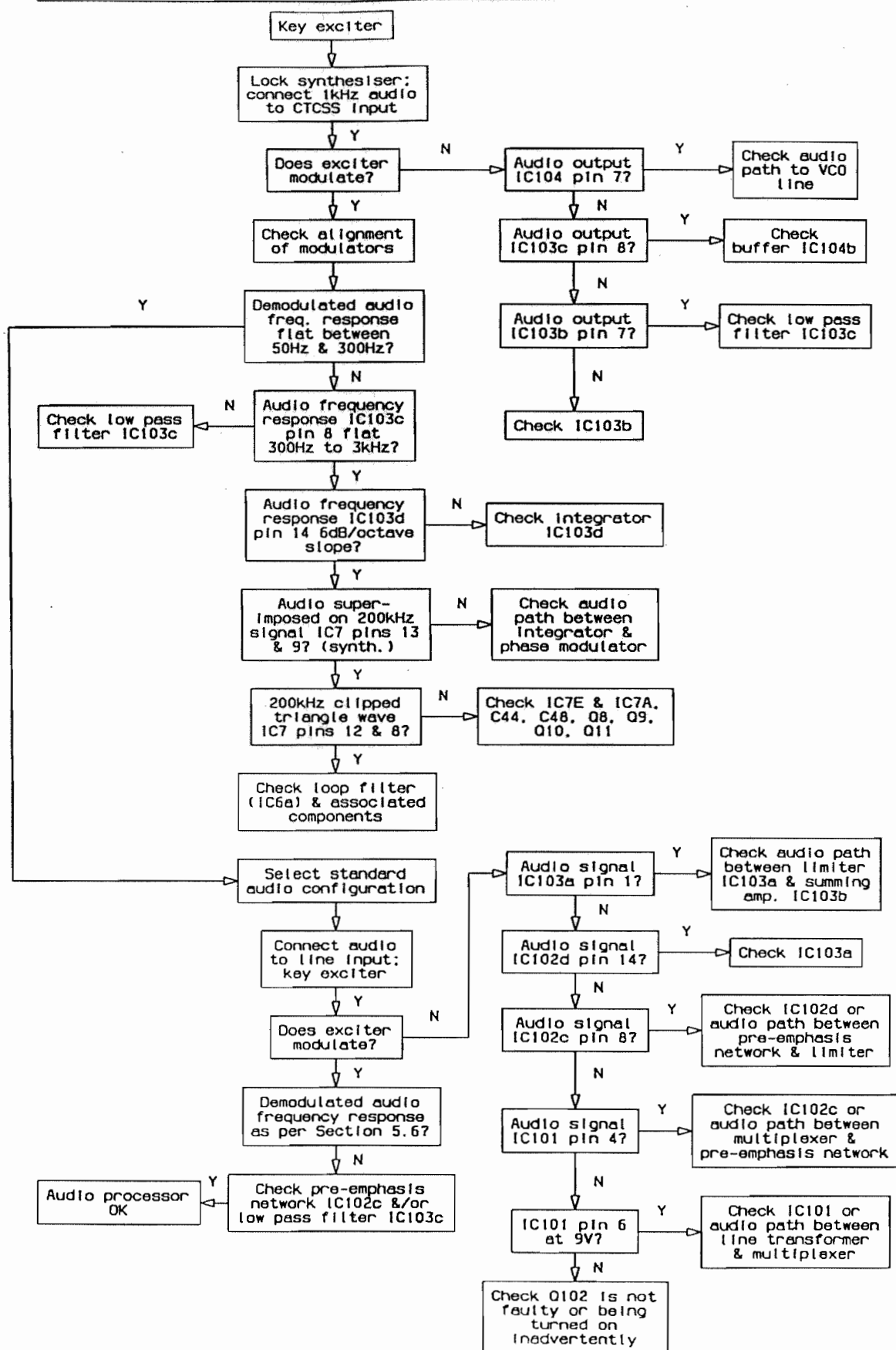


D Refer to synthesiser & VCO Circuit Diagrams



6.7 EXCITER DRIVE AMPLIFIER FAULT FINDING CHART

6.8 AUDIO PROCESSOR FAULT FINDING CHART



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SECTION 7 INSTALLATION

7.1 RACK MOUNTING

The T837 base station exciter is designed for use in a standard 483mm rack frame using a Tait T800 Series guide which locates and mates the rear D-range connectors (refer to Figures 9 & 10).

A T800 Series guide is supplied with each T837. The guide is located in the rack frame with four screws, two at the rear and two at the front. The T837 is secured into the guide with two front panel mounting screws.

The RF output is via the front panel SMC connector on the T837, while all DC, audio and control connections are via the D-range connector. An additional rear D-range connector (T800-03) is fitted when remote multichannel operation or additional control of low frequency lines is required.

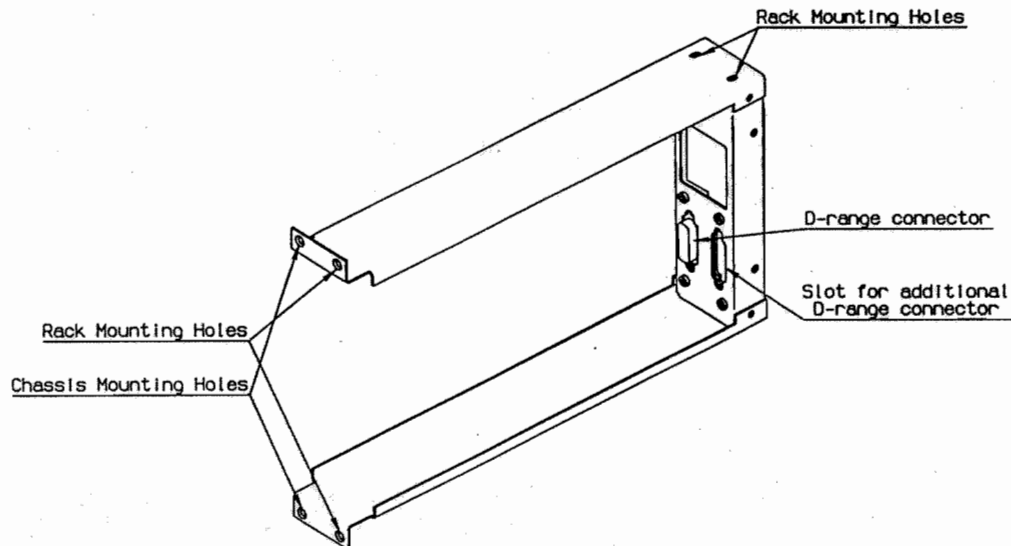


Figure 9 T800 Series Guide

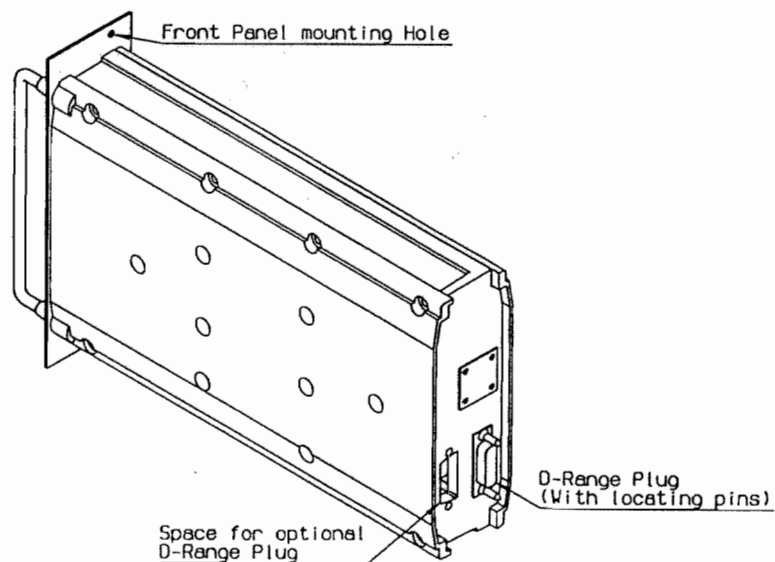


Figure 10 T837 Chassis Connectors

7.2 RACK WIRING

Wire the D-range connector according to the pin outs shown in Figure 11. Ensure that the cables are not subjected to any stresses due to tight bends or incorrect lengths.

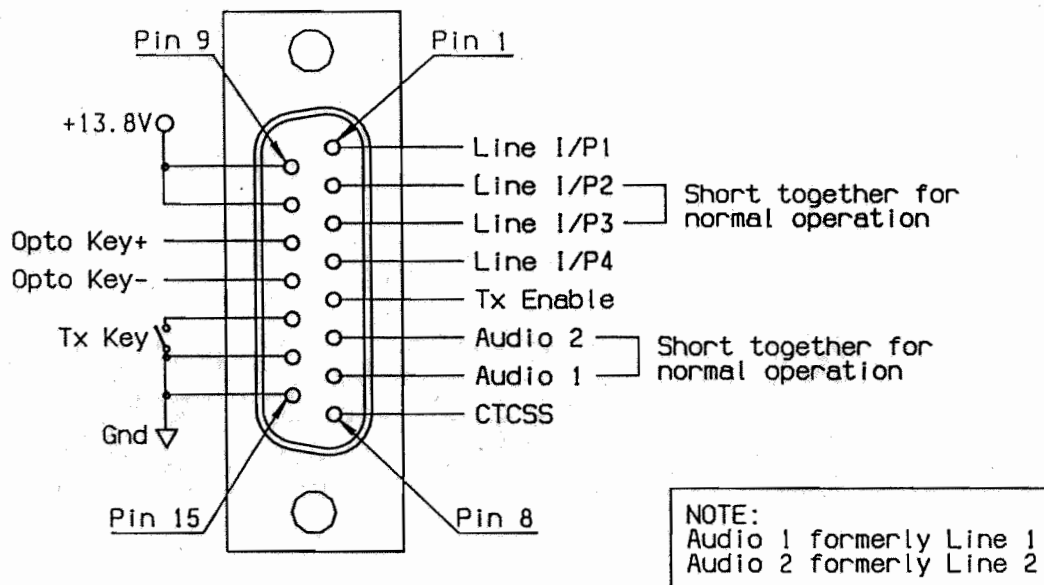


Figure 11 D-Range Wiring - Rear View

7.3 POWER SUPPLY

If a non-standard Tait power supply is used, ensure that it is capable of providing enough current to drive the T800 system and is also free from excessive ripple or noise.

The system should be protected by the use of appropriately rated fuses in the power supply. Where several transmitters are powered by the same supply, each unit should be individually protected with a fuse.

Note: It is particularly important when the prime power source is a battery that fuses be fitted in all supply lines.

7.4 REVERSE POLARITY PROTECTION

A shunt diode is fitted to each T837 for protection against connection to a power supply of incorrect polarity.

Note: A fuse must be fitted in the power supply line for the diode to provide effective protection.

SECTION 8 SYSTEM CONFIGURATIONS

8.1 GENERAL

Tait Fixed Equipment transmitters and receivers may be assembled into a wide variety of fixed equipment systems, from a simple land mobile base to a complex linking system operating in hot standby mode.

8.2 AUDIO PROCESSOR

The T837 comes with a number of link selectable features which give added system flexibility.

Refer to Section 4.4 for further details.

8.3 LINE TRANSFORMER INPUTS AND OUTPUTS

The line transformer (T100) is designed to provide a balanced interface to 600 ohm lines. For normal operation the two centre connections (LINE I/P 2, LINE I/P 3) are shorted together, and the 600 ohm line is connected between LINE I/P 1 and LINE I/P 4.

The secondary winding of the transformer is connected via a 1k resistor to pin 7 of the D-range connector and may be used to monitor audio on the line. It is normally shorted at the connector socket to pin 6 to route the audio signal back into the processor. If required, the audio path may be broken at this point for use with signalling options, e.g. CTCSS (refer to Section 9).

8.4 OPTO KEY

The keying circuitry may be completely isolated from the rest of the system by means of the optocoupler (IC100) connected between pins 11 and 12 of the D-range connector. A constant current source (Q106) allows keying voltages between 6 and 50V.

8.5 RELAY DRIVER

A dedicated transistor (Q105) is provided for the purpose of switching an external (e.g. coaxial) relay. The output is open collector and is activated by the Tx-reg rail.

This output is not normally connected to the standard D-range connector, and use of the relay driver will necessitate manual wiring to an additional D-range connector, as supplied with the T800-03 kit.

8.6 LOCAL MICROPHONE

Use of the local microphone (via the front panel stereo socket) will disable the audio input from the line. The audio switching occurs when the PTT switch is closed.

8.7 KEYING WITH OPTION PCB'S

If an option PCB (e.g. CTCSS) is fitted to the exciter, keying may then be accomplished via the TX-EN-OPT pad in the audio processor. The line must be pulled low to key.

8.8 DC LINE KEYING

Where the transmitter and receiver are separated by only a short distance and DC isolation is not required, DC loop keying may be employed as shown in Figure 12.

A small DC current (usually less than 10mA) can be fed via the balanced 2-wire line to provide remote control of various functions.

In a duplex system the receiver mute is used to key a transmitter, provided there is a common earth between the two units (refer to Figure 12).

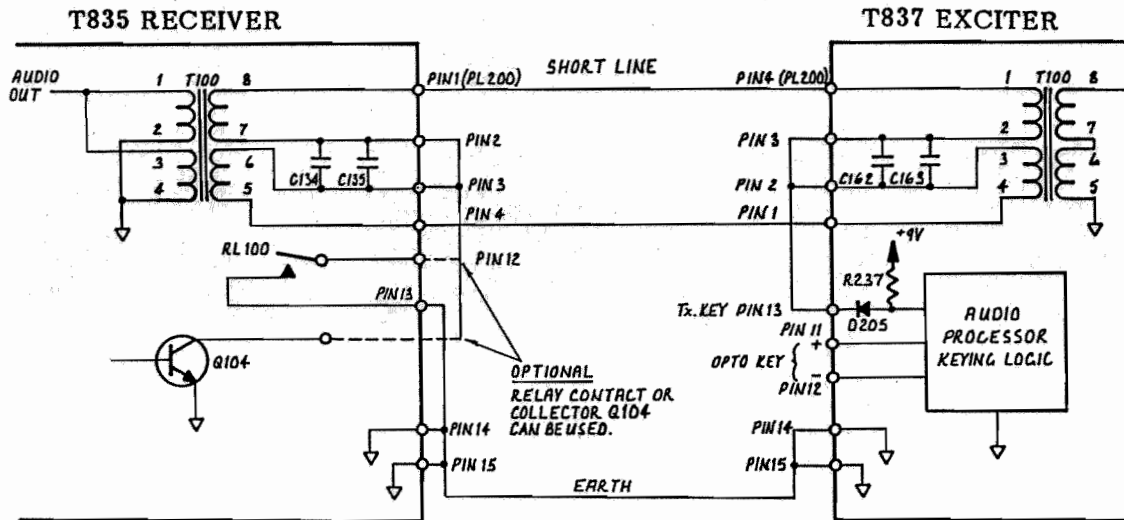


Figure 12 DC Loop Keying With Common Earth

Where the receiver and transmitter (or remote control) are distant, DC loop keying is provided by an isolated supply, driver and detector because an earth cannot be relied on (refer to Figures 13 & 14).

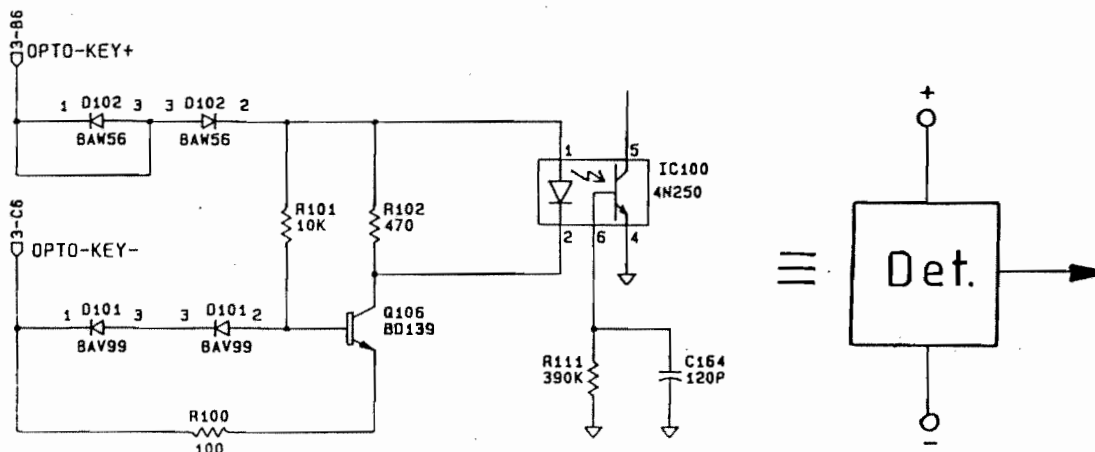


Figure 13 Isolated Constant Current Loop Current Detector
(Opto-key input on T837)

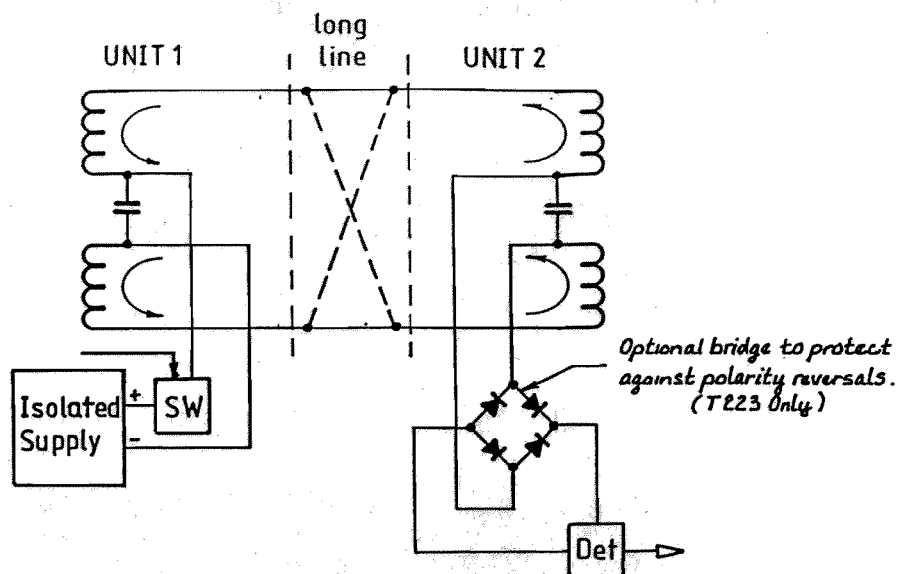


Figure 14 Typical System

8.9 TALK THROUGH REPEATER (Refer to Figure 15)

In this configuration the receiver directly keys the transmitter when the signal is received. The demodulated audio is fed via 600 ohm lines to the transmitter to modulate the carrier. The receiver and transmitter operate simultaneously and must therefore be on different frequencies. The minimum frequency separation depends on the duplexer used.

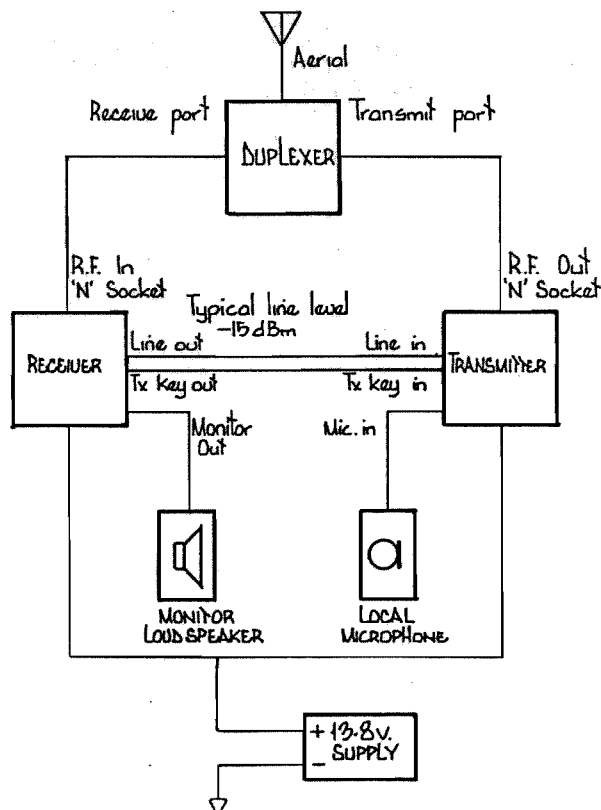
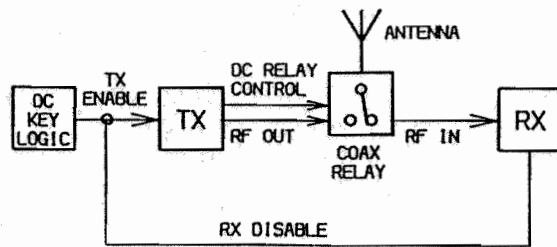


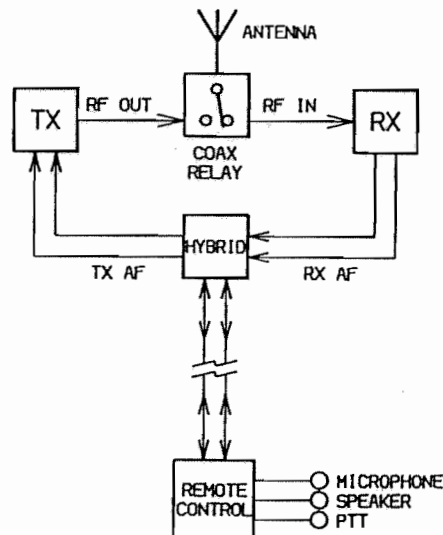
Figure 15 Talk Through Repeater

8.10 LINE CONTROLLED BASE STATION (WITHOUT TALK THROUGH)**Figure 16 Basic Configuration**

This installation contains a transmitter and receiver which may or may not be on the same frequency, thus simultaneous transmission and reception is not possible. When the transmitter is keyed, the coaxial relay is also energised. When the relay is in its rest position, signals from the aerial are passed to the receiver and the demodulated output is fed via 600 ohm lines to the RCU.

The receiver is disabled when the transmitter is energised to prevent the receiver mute opening from RF due to lack of isolation in the relay, direct radiation or the noise skirt of the dual frequency link.

Since the base station may be controlled via a 2-wire line and a 4-wire to 2-wire hybrid, there is a possibility of system oscillation if the receiver is not disabled during transmit. This occurs when the transmit energy enters the receiver and produces an audio response which can pass from the receive to the transmit audio part of the hybrid (impedance imbalance, etc).

**Figure 17 Remote Line Controlled Base Station**

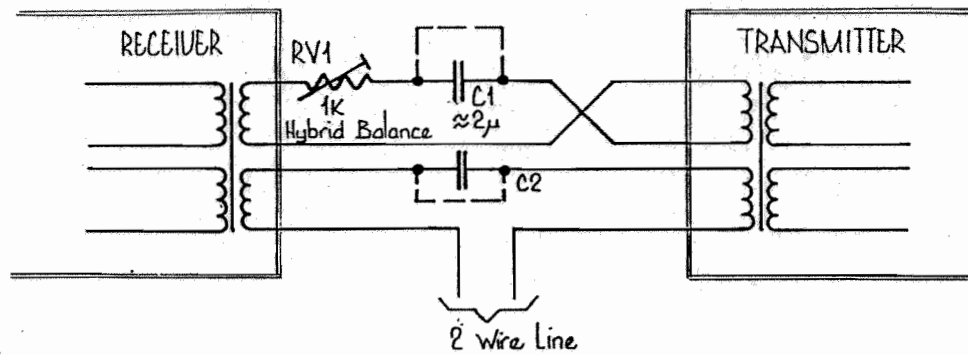


Figure 18 4-Wire to 2-Wire Converter

If the transmitter has a tail timer fitted, the receiver disable timer must be set so that $t_{Rx/Dis} > t_{Tx/Tail}$.

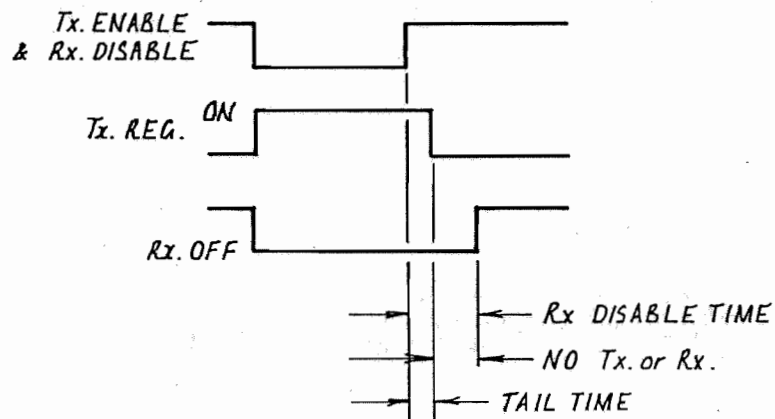


Figure 19 Receiver Disable Time vs Tail Time

SECTION 9 STANDARD OPTIONS

9.1 GENERAL

The T837 is available with a range of standard options to suit many requirements. For further details on these or more specialised options, please contact your nearest Tait dealer or agent.

9.2 TCXO

A very high stability TCXO is available to suit specific requirements. The stability of this and the standard TCXO is set out below:

<u>+1ppm</u>	0°C to +60°C
<u>+2.5ppm</u>	-30°C to +60°C (standard)

They are pin compatible devices and may be fitted in location &IC1 in the synthesiser compartment.

Refer to Section 1.3 for details of specific versions.

9.3 MULTICHANNEL

9.3.1 REMOTE

For multichannel operation it is necessary to fit an additional D-range connector (T800-03) to the rear of the chassis and replace the standard plug-in EPROM PCB with the T800-07 multichannel memory PCB. Three channel select lines (CH SEL 0, 1 & 2) are brought into the D-range connector compartment and should be connected to pins 11, 12 and 13 of the extra D-range, providing 8 channel control. The fourth wire is earth and should be soldered onto the main PCB.

For remote operation it is necessary to disable these three lines internally by switching the 3 least significant address DIP switches (SW1:1-3) to the off position. Channel selection is achieved by pulling one or more of the channel select lines low.

If more channels are required (up to 128 are available), a hole must be drilled in the end wall of the synthesiser compartment to route the extra channel select wires.

9.3.2 INTERNAL SELECTION

The EPROM can be loaded with up to 128 channel frequencies, each of which is addressable via the 8 bit DIP switch (SW1). Thus, one of 128 channel operation is possible.

9.4 CTCSS

9.4.1 SINGLE CHANNEL - SINGLE TONE

For single tone use, the T800-02 unit should be used. This is a retrofit PCB which is mounted on the specially provided lugs in the audio processor compartment of the exciter (refer to Figure 20).

Access to all necessary audio and power supply points is provided by accessory pads in the audio processor (refer to Figures 21 & 22).

T837 Standard Options

If required, the CTCSS processing can be carried out in the receiver (refer to M835-00). This can have the advantage of pre-filtering the CTCSS tone from the speech before the signal is passed to the 600 ohm line (if desired).

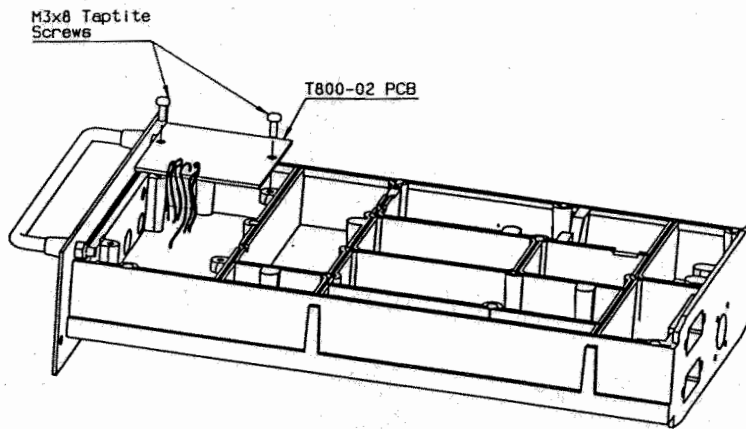


Figure 20 T800-02 Mounting Details

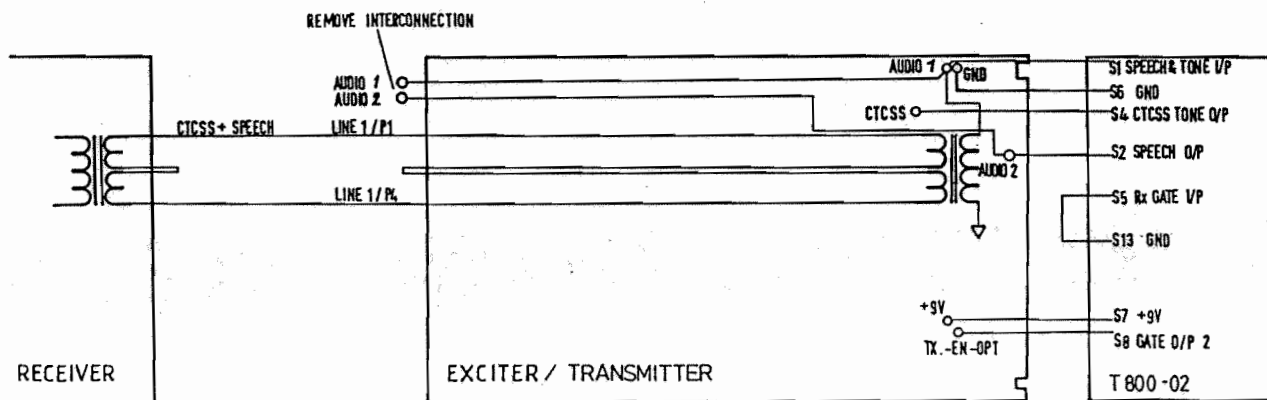
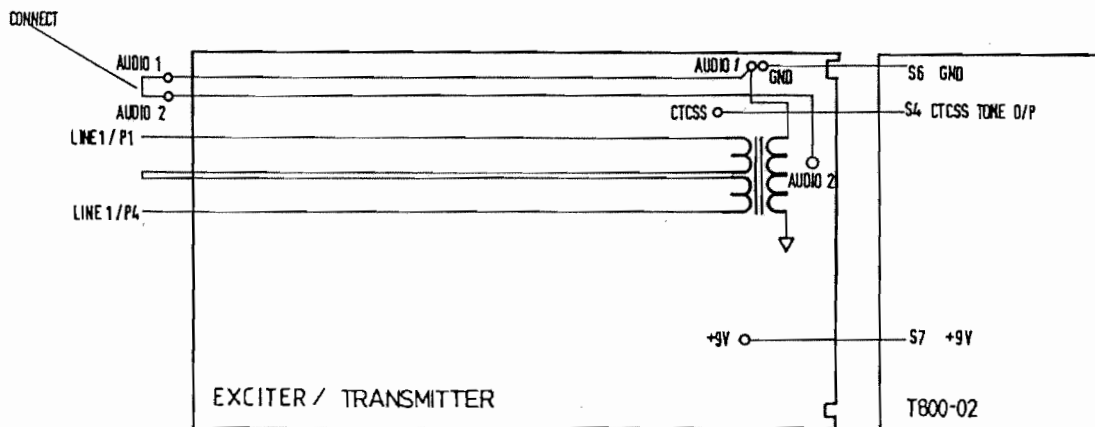


Figure 21 Talk Through Repeater Wiring



**Figure 22 Base Station Transmitter Wiring
(Without talk through)**

9.4.2 MULTICHANNEL - SEPARATE TONES

In applications where each RF channel has a separate CTCSS tone, it is necessary to take the CTCSS tone select lines to the additional rear D-range connector. From the D-range, up to eight RF channels and any of the CTCSS tones can be selected by grounding the necessary pins.

9.4.3 SINGLE CHANNEL - MULTI-TONE

Where more than one tone is used on the same channel, some form of external encoding/decoding such as the T310-05 or T310-10 must be used. The system should be connected as shown in Figure 23.

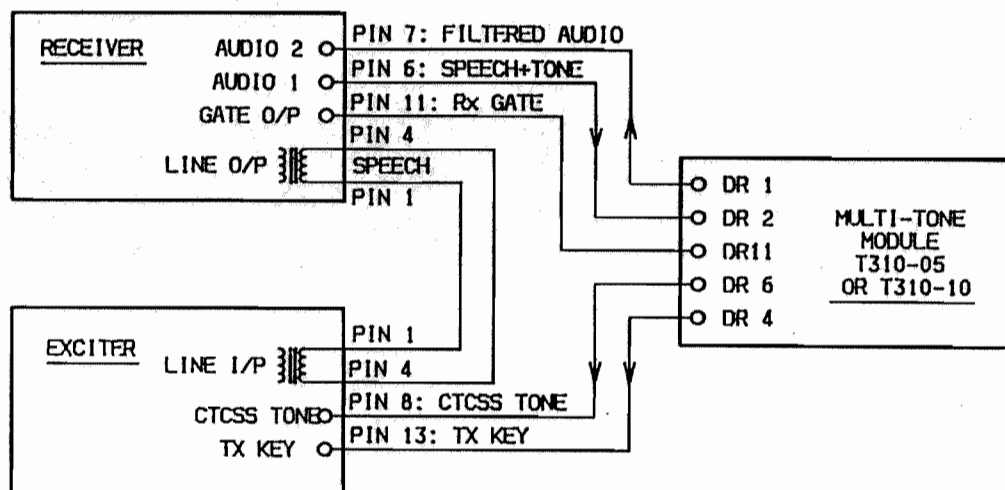


Figure 23 Multi-Tone Control with T310-05 or T310-10

SECTION 10 PARTS LIST

INTRODUCTION

The 10 digit numbers (000-00000-00) in this Parts List are "internal part numbers" (IPN's). Your spare parts orders can be handled more efficiently if you quote: equipment type, circuit reference and IPN, along with a brief description of the part.

The components listed in this Parts List are divided into two main types: those with a circuit reference (e.g. C2, D106, R121, etc) and those without (miscellaneous and mechanical).

Those with a circuit reference are grouped firstly by PCB, then by component type in numerical order. Each component entry comprises four columns: the circuit reference, variant number (if applicable), IPN and description. A number in the variant column indicates that this particular component is fitted only to that variant.

The miscellaneous and mechanical section lists the variant and common parts in IPN order.

T837 Parts List

INDEX

Main PCB:	Capacitors	10.3
	Diodes	10.3
	Integrated Circuits	10.3
	Coils	10.3
	LED's	10.3
	Headers/Plugs	10.3
	Transistors	10.4
	Resistors	10.4
	Sockets/Switches	10.5
	Transformers	10.5
	Feedthrough Capacitors (D-range)	10.6
Miscellaneous & Mechanical		10.7
Memory PCB		10.8
VCO PCB		10.9

T837 MAIN BOARD PARTS LIST

REF	VAR	IPN	DESCRIPTION	REF	VAR	IPN	DESCRIPTION
C1		015-06100-08	CAPACITOR CERAMIC 1206 CHIP 100N 10% X7R 50V	C223		020-07220-01	CAPACITOR ELECTRO RADIAL 2M2 50V 5X11MM
C2		015-23680-08	CAPACITOR CERAMIC 0805 CHIP 680P 10% X7R 50V	C224		025-07330-01	CAPACITOR TANT BEAD 3M3 35V
C3		015-06100-08	CAPACITOR CERAMIC 1206 CHIP 100N 10% X7R 50V	C225		015-24470-08	CAPACITOR CERAMIC 0805 CHIP 4N7 10% X7R 50V
C5		015-23680-08	CAPACITOR CERAMIC 0805 CHIP 680P 10% X7R 50V	C226		020-07100-02	CAPACITOR ELECTRO RADIAL 1M 50V 5X11MM
C6		015-24100-08	CAPACITOR CERAMIC 0805 CHIP 1N 10% X7R 50V	C227		020-08100-03	CAPACITOR ELECTRO RADIAL 10UF 50V 5X11MM
C8		015-23680-08	CAPACITOR CERAMIC 0805 CHIP 680P 10% X7R 50V	C228		015-24100-08	CAPACITOR CERAMIC 0805 CHIP 1N 10% X7R 50V
C9		015-23680-08	CAPACITOR CERAMIC 0805 CHIP 680P 10% X7R 50V	C229		015-24100-08	CAPACITOR CERAMIC 0805 CHIP 1N 10% X7R 50V
C10		015-23680-08	CAPACITOR CERAMIC 0805 CHIP 680P 10% X7R 50V	C230		015-24100-08	CAPACITOR CERAMIC 0805 CHIP 1N 10% X7R 50V
C11		015-23680-08	CAPACITOR CERAMIC 0805 CHIP 680P 10% X7R 50V	C231		015-24100-08	CAPACITOR CERAMIC 0805 CHIP 1N 10% X7R 50V
C12		015-23680-08	CAPACITOR CERAMIC 0805 CHIP 680P 10% X7R 50V	C232		015-06100-08	CAPACITOR CERAMIC 1206 CHIP 100N 10% X7R 50V
C13		015-06100-08	CAPACITOR CERAMIC 1206 CHIP 100N 10% X7R 50V	C233		015-06100-08	CAPACITOR CERAMIC 1206 CHIP 100N 10% X7R 50V
C15		020-08100-03	CAPACITOR ELECTRO RADIAL 10UF 50V 5X11MM	C300		015-24470-08	CAPACITOR CERAMIC 0805 CHIP 4N7 10% X7R 50V
C16		015-06100-08	CAPACITOR CERAMIC 1206 CHIP 100N 10% X7R 50V	C303		015-24100-08	CAPACITOR CERAMIC 0805 CHIP 1N 10% X7R 50V
C17		015-22560-01	CAPACITOR CERAMIC 0805 CHIP 56P 5% NPO 50V	C308		015-24100-08	CAPACITOR CERAMIC 0805 CHIP 1N 10% X7R 50V
C19		015-23680-08	CAPACITOR CERAMIC 0805 CHIP 680P 10% X7R 50V	C313		015-04100-04	CAPACITOR CERAMIC 1206 CHIP 1N 10% X7R 50V
C20		015-23470-08	CAPACITOR CERAMIC 0805 CHIP 470P 10% X7R 50V	C317		015-22820-01	CAPACITOR CERAMIC 0805 CHIP 82P 5% NPO 50V
C21		015-24100-08	CAPACITOR CERAMIC 0805 CHIP 1N 10% X7R 50V	C319		015-22470-01	CAPACITOR CERAMIC 0805 CHIP 47P 5% NPO 50V
C25		025-08100-02	CAPACITOR TANT BEAD 10M 10% 16V	C322		015-21820-01	CAPACITOR CERAMIC 0805 CHIP 8P2 +/-0.25P NPO 50V
C26		015-25100-08	CAPACITOR CERAMIC 0805 CHIP 10N 10% X7R 50V	C330		015-06100-08	CAPACITOR CERAMIC 1206 CHIP 100N 10% X7R 50V
C29		022-06330-03	CAPACITOR METAL POLYESTER 330N 10% 50V 5MM LS	C335		015-22330-01	CAPACITOR CERAMIC 0805 CHIP 33P 5% NPO 50V
C30		020-08100-03	CAPACITOR ELECTRO RADIAL 10UF 50V 5X11MM	C350		015-24100-08	CAPACITOR CERAMIC 0805 CHIP 1N 10% X7R 50V
C33		015-06100-08	CAPACITOR CERAMIC 1206 CHIP 100N 10% X7R 50V	C351		015-24100-08	CAPACITOR CERAMIC 0805 CHIP 1N 10% X7R 50V
C34		020-08100-03	CAPACITOR ELECTRO RADIAL 10UF 50V 5X11MM	C352		022-05470-01	CAPACITOR MYLAR 47N 10% 50V
C35		020-08100-03	CAPACITOR ELECTRO RADIAL 10UF 50V 5X11MM	C355		015-24100-08	CAPACITOR CERAMIC 0805 CHIP 1N 10% X7R 50V
C36		015-06100-08	CAPACITOR CERAMIC 1206 CHIP 100N 10% X7R 50V	C356		015-24100-08	CAPACITOR CERAMIC 0805 CHIP 1N 10% X7R 50V
C39		015-06100-08	CAPACITOR CERAMIC 1206 CHIP 100N 10% X7R 50V	C357		015-25100-08	CAPACITOR CERAMIC 0805 CHIP 10N 10% X7R 50V
C40		015-21820-01	CAPACITOR CERAMIC 0805 CHIP 8P2 +/-0.25P NPO 50V	C358		015-24100-08	CAPACITOR CERAMIC 0805 CHIP 1N 10% X7R 50V
C42		015-25150-08	CAPACITOR CERAMIC 0805 CHIP 15N 10% X7R 50V	C359		015-24100-08	CAPACITOR CERAMIC 0805 CHIP 1N 10% X7R 50V
C43		015-25100-08	CAPACITOR CERAMIC 0805 CHIP 10N 10% X7R 50V	C360		015-24100-08	CAPACITOR CERAMIC 0805 CHIP 1N 10% X7R 50V
C44		015-23220-01	CAPACITOR CERAMIC 0805 CHIP 220P 5% NPO 50V	C381		015-24100-08	CAPACITOR CERAMIC 0805 CHIP 1N 10% X7R 50V
C45		015-24470-08	CAPACITOR CERAMIC 0805 CHIP 4N7 10% X7R 50V	C382		015-24470-08	CAPACITOR CERAMIC 0805 CHIP 4N7 10% X7R 50V
C46		015-06100-08	CAPACITOR CERAMIC 1206 CHIP 100N 10% X7R 50V	C383		015-24100-08	CAPACITOR CERAMIC 0805 CHIP 1N 10% X7R 50V
C47		020-08470-02	CAPACITOR ELECTRO RADIAL 47M 16V 6X11MM	C384		015-24100-08	CAPACITOR CERAMIC 0805 CHIP 1N 10% X7R 50V
C48		015-23220-01	CAPACITOR CERAMIC 0805 CHIP 220P 5% NPO 50V	C386		020-07470-04	CAPACITOR ELECTRO RADIAL 4M7 25V 20% 8X13MM SOLID
C101		020-08100-03	CAPACITOR ELECTRO RADIAL 10UF 50V 5X11MM	C387		015-24100-08	CAPACITOR CERAMIC 0805 CHIP 1N 10% X7R 50V
C102		020-07470-91	CAPACITOR ELECTRO RADIAL 4M7 63V 6X11MM BI-POLAR	C370		015-24100-08	CAPACITOR CERAMIC 0805 CHIP 1N 10% X7R 50V
C103		020-07470-91	CAPACITOR ELECTRO RADIAL 4M7 63V 6X11MM BI-POLAR	C371		025-08100-02	CAPACITOR TANT BEAD 10M 10% 16V
C104		015-24100-08	CAPACITOR CERAMIC 0805 CHIP 1N 10% X7R 50V	C373		025-08100-02	CAPACITOR TANT BEAD 10M 10% 16V
C105		015-24100-08	CAPACITOR CERAMIC 0805 CHIP 1N 10% X7R 50V				
C106		015-24220-08	CAPACITOR CERAMIC 0805 CHIP 2N2 10% X7R 50V	D4		001-10000-70	DIODE SMD BAV70 DUAL SWITCH SOT-23 COMMON CATHODE
C107		020-08220-01	CAPACITOR ELECTRO RADIAL 22M 16V 5X11MM	D5		001-10000-99	DIODE SMD BAV99 DUAL SWITCH SOT-23 SINGLE IN LINE
C108		015-24100-08	CAPACITOR CERAMIC 0805 CHIP 1N 10% X7R 50V	D6		001-10000-99	DIODE SMD BAV99 DUAL SWITCH SOT-23 SINGLE IN LINE
C109		015-24100-08	CAPACITOR CERAMIC 0805 CHIP 1N 10% X7R 50V	D100		001-10000-56	DIODE SMD BAW56 DUAL SWITCH SOT-23 COMMON ANODE
C110		015-24100-08	CAPACITOR CERAMIC 0805 CHIP 1N 10% X7R 50V	D101		001-10000-99	DIODE SMD BAV99 DUAL SWITCH SOT-23 SINGLE IN LINE
C111		015-22470-01	CAPACITOR CERAMIC 0805 CHIP 47P 5% NPO 50V	D102		001-10000-56	DIODE SMD BAW56 DUAL SWITCH SOT-23 COMMON ANODE
C112		020-08220-01	CAPACITOR ELECTRO RADIAL 22M 16V 5X11MM	D103		001-10000-56	DIODE SMD BAW56 DUAL SWITCH SOT-23 COMMON ANODE
C113		015-25100-08	CAPACITOR CERAMIC 0805 CHIP 10N 10% X7R 50V	D104		001-10000-99	DIODE SMD BAV99 DUAL SWITCH SOT-23 SINGLE IN LINE
C115		015-06100-08	CAPACITOR CERAMIC 1206 CHIP 100N 10% X7R 50V	D106		001-00015-29	DIODE ZENER 33V 0.4W 82X78C33
C118		015-06100-08	CAPACITOR CERAMIC 1206 CHIP 100N 10% X7R 50V	D107		001-00012-00	DIODE 1N4148 SILICON SMALL SIGNAL GENERAL PURPOSE
C119		020-07470-91	CAPACITOR ELECTRO RADIAL 4M7 63V 6X11MM BI-POLAR	D108		001-00012-00	DIODE 1N4148 SILICON SMALL SIGNAL GENERAL PURPOSE
C121		015-06100-08	CAPACITOR CERAMIC 1206 CHIP 100N 10% X7R 50V	D204		001-10000-70	DIODE SMD BAV70 DUAL SWITCH SOT-23 COMMON CATHODE
C123		015-23470-08	CAPACITOR CERAMIC 0805 CHIP 470P 10% X7R 50V	D205		001-10000-70	DIODE SMD BAV70 DUAL SWITCH SOT-23 COMMON CATHODE
C124		015-21470-01	CAPACITOR CERAMIC 0805 CHIP 4P7 +/-0.25P NPO 50V	D206		001-10000-99	DIODE SMD BAV99 DUAL SWITCH SOT-23 SINGLE IN LINE
C126		015-06100-08	CAPACITOR CERAMIC 1206 CHIP 100N 10% X7R 50V	D207		001-10000-70	DIODE SMD BAV70 DUAL SWITCH SOT-23 COMMON CATHODE
C128		015-23470-08	CAPACITOR CERAMIC 0805 CHIP 470P 10% X7R 50V	D208		001-10000-70	DIODE SMD BAV70 DUAL SWITCH SOT-23 COMMON CATHODE
C129		020-08470-02	CAPACITOR ELECTRO RADIAL 47M 16V 6X11MM	D209		001-10000-70	DIODE SMD BAV70 DUAL SWITCH SOT-23 COMMON CATHODE
C133		015-24470-08	CAPACITOR CERAMIC 0805 CHIP 4N7 10% X7R 50V	D210		001-00015-17	DIODE ZENER 9V1 0.4W 82X79C9V1
C135		015-22470-01	CAPACITOR CERAMIC 0805 CHIP 47P 5% NPO 50V	D211		001-10000-70	DIODE SMD BAV70 DUAL SWITCH SOT-23 COMMON CATHODE
C137		020-08220-01	CAPACITOR ELECTRO RADIAL 22M 16V 5X11MM	D212		001-00011-60	DIODE SR2607 6A/30V
C139		015-06100-08	CAPACITOR CERAMIC 1206 CHIP 100N 10% X7R 50V	D351		001-00015-69	DIODE ZENER 11V 0.5W LO CURRENT HZ118
C141		015-05470-08	CAPACITOR CERAMIC 1206 CHIP 47N 10% X7R 50V	IC1		539-00010-41	TCXO 12.8MHZ +/-2.5PPM -30 TO +70C NDK NSA0175A
C145		015-06100-08	CAPACITOR CERAMIC 1206 CHIP 100N 10% X7R 50V	IC3		002-00017-51	INTEGRATED CCT SP8793 DUAL MOD PRESCALER 40/41(S)
C146		015-24100-08	CAPACITOR CERAMIC 0805 CHIP 1N 10% X7R 50V	IC4		002-74045-20	INTEGRATED CCT 74HC4520 DUAL 4BIT SYNCRO CNTR (S)
C147		020-07100-02	CAPACITOR ELECTRO RADIAL 1M 50V 5X11MM	IC5		002-00017-63	INTEGRATED CCT NJ88200P FREQ SYNTHESIZER (S)
C148		015-05220-06	CAPACITOR CERAMIC 1206 CHIP 22N 10% X7R 50V	IC6		002-00012-47	INTEGRATED CCT MC33078 DUAL OP AMP LO NOISE (S)
C149		015-06100-08	CAPACITOR CERAMIC 1206 CHIP 100N 10% X7R 50V	IC7		002-74000-04	INTEGRATED CCT 74HC04 UNBUFFERED HEX INVERTER (S)
C150		020-08100-03	CAPACITOR ELECTRO RADIAL 10UF 50V 5X11MM	IC100		002-00020-50	INTEGRATED CCT 4N25A OPTOCOUPLER (S)
C151		015-21470-01	CAPACITOR CERAMIC 0805 CHIP 4P7 +/-0.25P NPO 50V	IC101		002-00015-30	INTEGRATED CCT 40538 2CHAN MUX/DEMUX (S)
C152		020-09100-03	CAPACITOR ELECTRO RADIAL 100M 16V 8X11MM	IC102		002-00014-40	INTEGRATED CCT 324P QUAD OP AMP (S)
C153		015-24100-08	CAPACITOR CERAMIC 0805 CHIP 1N 10% X7R 50V	IC103		002-00012-25	INTEGRATED CCT TL084 QUAD OP AMP JFET VP (S)
C154		020-09100-03	CAPACITOR ELECTRO RADIAL 100M 16V 8X11MM	IC104		002-00012-40	INTEGRATED CCT 358P QUAD OP AMP (S)
C156		020-07470-91	CAPACITOR ELECTRO RADIAL 4M7 63V 6X11MM BI-POLAR	IC201		002-00014-62	INTEGRATED CCT 317L 100MA REG 3 TERMINAL TO-92
C157	10	015-21150-01	CAPACITOR CERAMIC 0805 CHIP 1P5 +/-0.25P NPO 50V	IC202		002-00014-40	INTEGRATED CCT 324P QUAD OP AMP (S)
C157	15	015-21470-01	CAPACITOR CERAMIC 0805 CHIP 4P7 +/-0.25P NPO 50V	IC350		002-00012-40	INTEGRATED CCT 358P DUAL OP AMP (S)
C157	20	015-21150-01	CAPACITOR CERAMIC 0805 CHIP 1P5 +/-0.25P NPO 50V				
C157	25	015-21470-01	CAPACITOR CERAMIC 0805 CHIP 4P7 +/-0.25P NPO 50V	L1		052-08160-25	COIL A/W 2.5T/6.0MM HOR 0.8MM WIRE
C158		015-05470-08	CAPACITOR CERAMIC 1206 CHIP 47N 10% X7R 50V	L300		052-08125-15	COIL A/W 1.5T/2.5MM HOR 0.8MM WIRE
C160		015-05470-08	CAPACITOR CERAMIC 1206 CHIP 47N 10% X7R 50V	L303		065-00010-04	BEAD FERRITE F8 4X2X5MM
C161		015-24100-08	CAPACITOR CERAMIC 0805 CHIP 1N 10% X7R 50V	L308		056-00021-01	INDUCTOR FIXED 1.5UH AXIAL
C162		020-07470-91	CAPACITOR ELECTRO RADIAL 4M7 63V 6X11MM BI-POLAR	L309		052-08145-35	COIL A/W 3.5T/3.5MM HOR 0.8MM WIRE
C163		020-07470-91	CAPACITOR ELECTRO RADIAL 4M7 63V 6X11MM BI-POLAR	L310		056-00021-01	INDUCTOR FIXED 1.5UH AXIAL
C164		015-23470-08	CAPACITOR CERAMIC 0805 CHIP 470P 10% X7R 50V	L311		052-08135-25	COIL A/W 2.5T/3.5MM HOR 0.8MM WIRE
C166		015-05470-08	CAPACITOR CERAMIC 1206 CHIP 47N 10% X7R 50V	L312		052-08140-35	COIL A/W 3.5T/4.0MM HOR 0.8MM WIRE
C209		020-08100-03	CAPACITOR ELECTRO RADIAL 10UF 50V 5X11MM	L313		052-08130-15	COIL A/W 1.5T/3.0MM HOR 0.8MM WIRE
C212		015-06100-08	CAPACITOR CERAMIC 1206 CHIP 100N 10% X7R 50V	L314		056-00021-01	INDUCTOR FIXED 1.5UH AXIAL
C213		025-08100-02	CAPACITOR TANT BEAD 10M 10% 16V	LED_1		008-00013-32	LED 3MM RED LOW CURRENT LESS MOUNTING (S)
C214		015-06100-08	CAPACITOR CERAMIC 1206 CHIP 100N 10% X7R 50V	LED_2		008-00013-35	LED 3MM GREEN LOW CURRENT LESS MOUNTING (S)
C215		025-08100-02	CAPACITOR TANT BEAD 10M 10% 16V				
C216		015-06100-08	CAPACITOR CERAMIC 1206 CHIP 100N 10% X7R 50V	PL1		240-00020-57	HEADER 10 WAY 1 ROW PCB MTG
C217		015-24100-08	CAPACITOR CERAMIC 0805 CHIP 1N 10% X7R 50V	PL100		240-00020-67	HEADER 6WAY 2X3 PCB MTG STD
C218		015-24100-08	CAPACITOR CERAMIC 0805 CHIP 1N 10% X7R 50V	PL101		240-00020-67	HEADER 6WAY 2X3 PCB MTG STD
C219		020-09470-07	CAP 470M 16V 20% ELEC VRT #20 3.5MM LS LO-ESR	PL102		240-00020-44	HEADER 10 WAY 2 ROW (S-2) PCB MTG
C220		015-24470-08	CAPACITOR CERAMIC 0805 CHIP 4N7 10% X7R 50V				
C221		015-24100-08	CAPACITOR CERAMIC 0805 CHIP 1N 10% X7R 50V				
C222		020-09100-03	CAPACITOR ELECTRO RADIAL 100M 16V 8X11MM				

T837 MAIN BOARD PARTS LIST

REF	VAR	IPN	DESCRIPTION	REF	VAR	IPN	DESCRIPTION
PL103		240-00020-67	HEADER 6WAY 2X3 PCB MTG STD	R110		036-15100-00	RESISTOR MF 0805 CHIP 10K 5%
Q1		000-10057-10	TRANSISTOR SMD MM8571 NPN SOT-23 UHF LO POWER	R111		036-16390-00	RESISTOR MF 0805 CHIP 390K 5%
Q5		000-10008-48	TRANSISTOR SMD BCW60/BC848 NPN SOT-23 AF SMALL SIG	R112		036-16100-00	RESISTOR MF 0805 CHIP 100K 5%
Q6		000-10008-57	TRANSISTOR SMD BCW70/BC857 PNP SOT-23 AF SMALL SIG	R113		036-16100-00	RESISTOR MF 0805 CHIP 100K 5%
Q7		000-10008-48	TRANSISTOR SMD BCW60/BC848 NPN SOT-23 AF SMALL SIG	R115		036-15100-00	RESISTOR MF 0805 CHIP 10K 5%
Q8		000-10008-48	TRANSISTOR SMD BCW60/BC848 NPN SOT-23 AF SMALL SIG	R116		036-16100-00	RESISTOR MF 0805 CHIP 100K 5%
Q9		000-10008-57	TRANSISTOR SMD BCW70/BC857 PNP SOT-23 AF SMALL SIG	R117		036-15100-00	RESISTOR MF 0805 CHIP 10K 5%
Q10		000-10008-48	TRANSISTOR SMD BCW60/BC848 NPN SOT-23 AF SMALL SIG	R118		036-13560-00	RESISTOR MF 0805 CHIP 560E 5%
Q11		000-10008-57	TRANSISTOR SMD BCW70/BC857 PNP SOT-23 AF SMALL SIG	R119		036-16100-00	RESISTOR MF 0805 CHIP 100K 5%
Q101		000-10008-48	TRANSISTOR SMD BCW60/BC848 NPN SOT-23 AF SMALL SIG	R120		036-16100-00	RESISTOR MF 0805 CHIP 100K 5%
Q102		000-10008-57	TRANSISTOR SMD BCW70/BC857 PNP SOT-23 AF SMALL SIG	R121		036-16100-00	RESISTOR MF 0805 CHIP 100K 5%
Q103		000-10008-17	TRANSISTOR SMD BCX19/BC817 NPN SOT-23 AF LO POWER	R122		036-15120-00	RESISTOR MF 0805 CHIP 12K 5%
Q104		000-10008-48	TRANSISTOR SMD BCW60/BC848 NPN SOT-23 AF SMALL SIG	R123		036-15120-00	RESISTOR MF 0805 CHIP 12K 5%
Q105		000-10008-17	TRANSISTOR SMD BCX19/BC817 NPN SOT-23 AF LO POWER	R124		036-14270-00	RESISTOR MF 0805 CHIP 2K7 5%
Q106		000-00011-41	TRANSISTOR BD138 NPN TO-18 AF POWER	R127		036-16100-00	RESISTOR MF 0805 CHIP 100K 5%
Q208		000-10008-17	TRANSISTOR SMD BCX19/BC817 NPN SOT-23 AF LO POWER	R128		036-16100-00	RESISTOR MF 0805 CHIP 100K 5%
Q209		000-00011-30	TRANSISTOR BC557B PNP TO-92 AF SMALL SIG	R131		036-17100-00	RESISTOR MF 0805 CHIP 1M 5%
Q210		000-00012-15	TRANSISTOR BD234 PNP TO-18 AF POWER	R136		036-15100-00	RESISTOR MF 0805 CHIP 10K 5%
Q211		000-10008-07	TRANSISTOR SMD BC807 PNP SOT-23 AF LO POWER	R141		036-16150-00	RESISTOR MF 0805 CHIP 150K 5%
Q212		000-10008-57	TRANSISTOR SMD BCW70/BC857 PNP SOT-23 AF SMALL SIG	R143		036-14220-00	RESISTOR MF 0805 CHIP 2K2 5%
Q300		000-00031-96	TRANSISTOR 3866 NPN TO-92 SW. MOT ONLY (S)	R146		036-15220-00	RESISTOR MF 0805 CHIP 22K 5%
Q301		000-00022-30	TRANSISTOR 2N4427 NPN TO-39 VHF POWER DRIVE	R147		036-15470-00	RESISTOR MF 0805 CHIP 47K 5%
Q350		000-10008-48	TRANSISTOR SMD BCW60/BC848 NPN SOT-23 AF SMALL SIG	R148		036-16150-00	RESISTOR MF 0805 CHIP 150K 5%
Q351		000-10008-17	TRANSISTOR SMD BCX19/BC817 NPN SOT-23 AF LO POWER	R149		036-15470-00	RESISTOR MF 0805 CHIP 47K 5%
Q352		000-00012-15	TRANSISTOR BD234 PNP TO-18 AF POWER	R150		036-15470-00	RESISTOR MF 0805 CHIP 47K 5%
R1		036-12100-00	RESISTOR MF 0805 CHIP 10E 5%	R151		036-14470-00	RESISTOR MF 0805 CHIP 4K7 5%
R2		036-12220-00	RESISTOR MF 0805 CHIP 22E 5%	R152	10	036-15220-00	RESISTOR MF 0805 CHIP 22K 5%
R3		036-17100-00	RESISTOR MF 0805 CHIP 1M 5%	R152	15	036-15270-00	RESISTOR MF 0805 CHIP 27K 5%
R5		036-14100-00	RESISTOR MF 0805 CHIP 1K 5%	R152	20	036-15220-00	RESISTOR MF 0805 CHIP 22K 5%
R6		036-17100-00	RESISTOR MF 0805 CHIP 1M 5%	R152	25	036-15270-00	RESISTOR MF 0805 CHIP 27K 5%
R7		036-14330-00	RESISTOR MF 0805 CHIP 3K3 5%	R155		036-15100-00	RESISTOR MF 0805 CHIP 10K 5%
R8		036-13100-00	RESISTOR MF 0805 CHIP 100E 5%	R158		036-14220-00	RESISTOR MF 0805 CHIP 2K2 5%
R9		036-12680-00	RESISTOR MF 0805 CHIP 68E 5%	R162		036-13680-00	RESISTOR MF 0805 CHIP 680E 5%
R10		036-13220-00	RESISTOR MF 0805 CHIP 220E 5%	R163		036-14100-00	RESISTOR MF 0805 CHIP 1K 5%
R11		036-17100-00	RESISTOR MF 0805 CHIP 1M 5%	R164		036-13680-00	RESISTOR MF 0805 CHIP 680E 5%
R14		036-17100-00	RESISTOR MF 0805 CHIP 1M 5%	R166		036-17100-00	RESISTOR MF 0805 CHIP 1M 5%
R16		036-17100-00	RESISTOR MF 0805 CHIP 1M 5%	R167		036-14680-00	RESISTOR MF 0805 CHIP 6K8 5%
R18		036-12100-00	RESISTOR MF 0805 CHIP 10E 5%	R168		036-17100-00	RESISTOR MF 0805 CHIP 1M 5%
R19		036-17100-00	RESISTOR MF 0805 CHIP 1M 5%	R169		036-16120-00	RESISTOR MF 0805 CHIP 120K 5%
R20		036-17100-00	RESISTOR MF 0805 CHIP 1M 5%	R170		036-15100-00	RESISTOR MF 0805 CHIP 10K 5%
R21		036-12100-00	RESISTOR MF 0805 CHIP 10E 5%	R171		036-14220-00	RESISTOR MF 0805 CHIP 2K2 5%
R22		036-12220-00	RESISTOR MF 0805 CHIP 22E 5%	R172		036-16470-00	RESISTOR MF 0805 CHIP 470K 5%
R24		036-12220-00	RESISTOR MF 0805 CHIP 22E 5%	R173		036-15100-00	RESISTOR MF 0805 CHIP 10K 5%
R25		036-15220-00	RESISTOR MF 0805 CHIP 22K 5%	R174		036-16330-00	RESISTOR MF 0805 CHIP 330K 5%
R29		036-17100-00	RESISTOR MF 0805 CHIP 1M 5%	R175		036-14100-00	RESISTOR MF 0805 CHIP 1K 5%
R30		036-13220-00	RESISTOR MF 0805 CHIP 220E 5%	R176		036-16100-00	RESISTOR MF 0805 CHIP 100K 5%
R32		036-14100-00	RESISTOR MF 0805 CHIP 1K 5%	R177		036-16100-00	RESISTOR MF 0805 CHIP 100K 5%
R35		036-15100-00	RESISTOR MF 0805 CHIP 10K 5%	R178		036-15560-00	RESISTOR MF 0805 CHIP 56K 5%
R36		036-16470-00	RESISTOR MF 0805 CHIP 470K 5%	R179		036-15560-00	RESISTOR MF 0805 CHIP 56K 5%
R37		036-15120-00	RESISTOR MF 0805 CHIP 12K 5%	R180		036-17100-00	RESISTOR MF 0805 CHIP 1M 5%
R38		036-15100-00	RESISTOR MF 0805 CHIP 10K 5%	R181		036-14220-00	RESISTOR MF 0805 CHIP 2K2 5%
R39		036-16470-00	RESISTOR MF 0805 CHIP 470K 5%	R182		036-14220-00	RESISTOR MF 0805 CHIP 2K2 5%
R40		036-15470-00	RESISTOR MF 0805 CHIP 470K 5%	R183		036-14560-00	RESISTOR MF 0805 CHIP 5K6 5%
R42		036-14560-00	RESISTOR MF 0805 CHIP 5K6 5%	R184	10	036-15150-00	RESISTOR MF 0805 CHIP 15K 5%
R43		036-12220-00	RESISTOR MF 0805 CHIP 22E 5%	R184	15	036-15180-00	RESISTOR MF 0805 CHIP 18K 5%
R46		036-13680-00	RESISTOR MF 0805 CHIP 680E 5%	R184	20	036-15150-00	RESISTOR MF 0805 CHIP 15K 5%
R47		036-14100-00	RESISTOR MF 0805 CHIP 1K 5%	R184	25	036-15180-00	RESISTOR MF 0805 CHIP 18K 5%
R48		036-14470-00	RESISTOR MF 0805 CHIP 4K7 5%	R185	10	036-15470-00	RESISTOR MF 0805 CHIP 47K 5%
R49		036-14470-00	RESISTOR MF 0805 CHIP 4K7 5%	R185	15	036-15560-00	RESISTOR MF 0805 CHIP 56K 5%
R50		036-15100-00	RESISTOR MF 0805 CHIP 10K 5%	R185	20	036-15470-00	RESISTOR MF 0805 CHIP 47K 5%
R51		036-15100-00	RESISTOR MF 0805 CHIP 10K 5%	R185	25	036-15560-00	RESISTOR MF 0805 CHIP 56K 5%
R52		036-15100-00	RESISTOR MF 0805 CHIP 10K 5%	R186		036-15100-00	RESISTOR MF 0805 CHIP 10K 5%
R54		036-14100-00	RESISTOR MF 0805 CHIP 1K 5%	R187		036-15560-00	RESISTOR MF 0805 CHIP 56K 5%
R55		036-13100-00	RESISTOR MF 0805 CHIP 100E 5%	R188		036-17100-00	RESISTOR MF 0805 CHIP 1M 5%
R56		036-17100-00	RESISTOR MF 0805 CHIP 1M 5%	R189		036-13560-00	RESISTOR MF 0805 CHIP 560E 5%
R57		036-15100-00	RESISTOR MF 0805 CHIP 10K 5%	R190		036-14220-00	RESISTOR MF 0805 CHIP 2K2 5%
R58		036-15100-00	RESISTOR MF 0805 CHIP 10K 5%	R192		036-14270-00	RESISTOR MF 0805 CHIP 2K7 5%
R59		036-14270-00	RESISTOR MF 0805 CHIP 2K7 5%	R194		036-15470-00	RESISTOR MF 0805 CHIP 47K 5%
R60		036-15560-00	RESISTOR MF 0805 CHIP 56K 5%	R195		036-14470-00	RESISTOR MF 0805 CHIP 4K7 5%
R61		036-15100-00	RESISTOR MF 0805 CHIP 10K 5%	R196		036-14470-00	RESISTOR MF 0805 CHIP 4K7 5%
R62		036-15100-00	RESISTOR MF 0805 CHIP 10K 5%	R197		036-14270-00	RESISTOR MF 0805 CHIP 2K7 5%
R64		036-15150-00	RESISTOR MF 0805 CHIP 15K 5%	RV201		042-07100-06	RESISTOR PRESET 1M CARBON 6MM FLAT
R65		036-16100-00	RESISTOR MF 0805 CHIP 100K 5%	RV202		042-07100-06	RESISTOR PRESET 1M CARBON 6MM FLAT
R67		036-14270-00	RESISTOR MF 0805 CHIP 2K7 5%	R224		036-13100-00	RESISTOR MF 0805 CHIP 100E 5%
R68		036-15560-00	RESISTOR MF 0805 CHIP 56K 5%	R227		036-12100-00	RESISTOR MF 0805 CHIP 10E 5%
R72		036-15150-00	RESISTOR MF 0805 CHIP 15K 5%	R228		036-12330-00	RESISTOR MF 0805 CHIP 33E 5%
R73		036-13330-00	RESISTOR MF 0805 CHIP 330E 5%	R229		036-12330-00	RESISTOR MF 0805 CHIP 33E 5%
R74		036-12100-00	RESISTOR MF 0805 CHIP 10E 5%	R230		036-14470-00	RESISTOR MF 0805 CHIP 4K7 5%
R75		036-12100-00	RESISTOR MF 0805 CHIP 10E 5%	R231		036-14100-00	RESISTOR MF 0805 CHIP 1K 5%
R100		036-13100-00	RESISTOR MF 0805 CHIP 100E 5%	R232		032-33270-00	RESISTOR MF POWER 270E 5% 1W 12X4.5MM
RV100		040-05100-21	POTENTIOMER 10K LIN VERT PCB MTG 15MM SLOT SHAFT	R233		032-31100-00	RESISTOR MF POWER 1E0 5% 1W 12X4.5MM
R101		036-15100-00	RESISTOR MF 0805 CHIP 10K 5%	R234		032-31100-00	RESISTOR MF POWER 1E0 5% 1W 12X4.5MM
R102		036-13470-00	RESISTOR MF 0805 CHIP 470E 5%	R235		036-14680-00	RESISTOR MF 0805 CHIP 6K8 5%
R103		036-13560-00	RESISTOR MF 0805 CHIP 560E 5%	R236		036-15100-00	RESISTOR MF 0805 CHIP 10K 5%
R104		036-13560-00	RESISTOR MF 0805 CHIP 560E 5%	R237		036-15100-00	RESISTOR MF 0805 CHIP 10K 5%
RV104		042-05470-06	RESISTOR PRESET 47K CARBON 6MM FLAT	R238		036-16100-00	RESISTOR MF 0805 CHIP 100K 5%
R105		036-15100-00	RESISTOR MF 0805 CHIP 10K 5%	R239		036-16100-00	RESISTOR MF 0805 CHIP 100K 5%
RV105		042-06100-06	RESISTOR PRESET 100K CARBON 6MM FLAT	R240		036-15470-00	RESISTOR MF 0805 CHIP 47K 5%
R106		036-14220-00	RESISTOR MF 0805 CHIP 2K2 5%	R241		036-16470-00	RESISTOR MF 0805 CHIP 470K 5%
RV106		042-04470-06	RESISTOR PRESET 4K7 CARBON 6MM FLAT	R242		036-14100-00	RESISTOR MF 0805 CHIP 1K 5%
R107		036-15100-00	RESISTOR MF 0805 CHIP 10K 5%	R243		036-16100-00	RESISTOR MF 0805 CHIP 100K 5%
R108		036-14100-00	RESISTOR MF 0805 CHIP 1K 5%	R244		036-16100-00	RESISTOR MF 0805 CHIP 100K 5%
R109		036-14390-00	RESISTOR MF 0805 CHIP 3K9 5%	R245		036-14150-00	RESISTOR MF 0805 CHIP 1K5 5%
				R246		036-15470-00	RESISTOR MF 0805 CHIP 47K 5%
				R247		036-16330-00	RESISTOR MF 0805 CHIP 330K 5%

T837 MAIN BOARD PARTS LIST

REF	VAR	IPN	DESCRIPTION
R248		036-16120-00	RESISTOR M/F 0805 CHIP 120K 5%
R249		036-16330-00	RESISTOR M/F 0805 CHIP 330K 5%
R250		036-14100-00	RESISTOR M/F 0805 CHIP 1K 5%
R251		036-13560-00	RESISTOR M/F 0805 CHIP 560E 5%
R252		036-16100-00	RESISTOR M/F 0805 CHIP 100K 5%
R253		036-15150-00	RESISTOR M/F 0805 CHIP 15K 5%
R254		036-15560-00	RESISTOR M/F 0805 CHIP 56K 5%
R255		036-15100-00	RESISTOR M/F 0805 CHIP 10K 5%
R256		036-15100-00	RESISTOR M/F 0805 CHIP 10K 5%
R257		036-10000-00	RESISTOR M/F 0805 CHIP ZERO OHM
R258		036-15100-00	RESISTOR M/F 0805 CHIP 10K 5%
R259		036-14150-00	RESISTOR M/F 0805 CHIP 1K5 5%
R260		036-13470-00	RESISTOR M/F 0805 CHIP 470E 5%
R300		030-03150-20	RESISTOR FILM 150E 5% 0.4W 4X1.6MM
R301		030-02390-20	RESISTOR FILM 39E 5% 0.4W 4X1.6MM
R302		030-03150-20	RESISTOR FILM 150E 5% 0.4W 4X1.6MM
R303		036-13330-00	RESISTOR M/F 0805 CHIP 330E 5%
R304		036-12560-00	RESISTOR M/F 0805 CHIP 56E 5%
R305		030-03560-20	RESISTOR FILM 560E 5% 0.4W 4X1.6MM
R306		036-12470-00	RESISTOR M/F 0805 CHIP 47E 5%
R313		036-14100-00	RESISTOR M/F 0805 CHIP 1K 5%
R350		036-15100-00	RESISTOR M/F 0805 CHIP 10K 5%
R352		036-14100-00	RESISTOR M/F 0805 CHIP 1K 5%
R353		036-14470-00	RESISTOR M/F 0805 CHIP 4K7 5%
R354		036-16220-00	RESISTOR M/F 0805 CHIP 220K 5%
R357		036-14220-00	RESISTOR M/F 0805 CHIP 2K2 5%
R358		036-14220-00	RESISTOR M/F 0805 CHIP 2K2 5%
R359		036-14100-00	RESISTOR M/F 0805 CHIP 1K 5%
R360		036-13100-00	RESISTOR M/F 0805 CHIP 100E 5%
R361		036-15150-00	RESISTOR M/F 0805 CHIP 15K 5%
R362		036-14470-00	RESISTOR M/F 0805 CHIP 4K7 5%
R363		036-13220-00	RESISTOR M/F 0805 CHIP 220E 5%
R364		036-11330-00	RESISTOR M/F 0805 CHIP 3E3 5%
R365		036-13390-00	RESISTOR M/F 0805 CHIP 390E 5%
R366		036-13390-00	RESISTOR M/F 0805 CHIP 390E 5%
AR367		036-15470-00	RESISTOR M/F 0805 CHIP 47K 5%
R417		036-16470-00	RESISTOR M/F 0805 CHIP 470K 5%
R420		036-12100-00	RESISTOR M/F 0805 CHIP 10E 5%
R421		036-15150-00	RESISTOR M/F 0805 CHIP 15K 5%
R422		030-03180-20	RESISTOR FILM 180E 5% 0.4W 4X1.6MM
R423		030-03180-20	RESISTOR FILM 180E 5% 0.4W 4X1.6MM
R424		030-03560-20	RESISTOR FILM 560E 5% 0.4W 4X1.6MM
AR425		030-02120-20	RESISTOR FILM 12E 5% 0.4W 4X1.6MM
AR426		030-02120-20	RESISTOR FILM 12E 5% 0.4W 4X1.6MM
AR427		030-03820-20	RESISTOR FILM 820E 5% 0.4W 4X1.6MM
AR428		030-03820-20	RESISTOR FILM 820E 5% 0.4W 4X1.6MM
SK1		240-04020-57	SOCKET 10 WAY 1ROW PCB MTG TOP ENTRY
SK100		240-02020-05	SOCKET STEREO PHONE JACK PCB MTG
SW101		232-00010-26	SWITCH PUSH SPDT RIGHT ANGLE PCB MTG LESS BUTTON
SW101		232-00020-26	BUTTON PUSH FOR 232-00010-26 SWITCH
SK300		240-02100-44	SOCKET COAXIAL MINIATURE JACK PCB MTG ANGLED
SK301		240-04020-65	SOCKET JACK PIN 1.3MM PCB MTG 64 WAY SIL STRAP
SK302		240-04020-65	SOCKET JACK PIN 1.3MM PCB MTG 64 WAY SIL STRAP
SK303		240-04020-65	SOCKET JACK PIN 1.3MM PCB MTG 64 WAY SIL STRAP
SK304		240-04020-65	SOCKET JACK PIN 1.3MM PCB MTG 64 WAY SIL STRAP
SK305		240-04020-65	SOCKET JACK PIN 1.3MM PCB MTG 64 WAY SIL STRAP
SK306		240-04020-65	SOCKET JACK PIN 1.3MM PCB MTG 64 WAY SIL STRAP
SK307		240-04020-65	SOCKET JACK PIN 1.3MM PCB MTG 64 WAY SIL STRAP
SK308		240-04020-65	SOCKET JACK PIN 1.3MM PCB MTG 64 WAY SIL STRAP
SK309		240-04020-65	SOCKET JACK PIN 1.3MM PCB MTG 64 WAY SIL STRAP
SK310		240-04020-65	SOCKET JACK PIN 1.3MM PCB MTG 64 WAY SIL STRAP
SK311		240-04020-65	SOCKET JACK PIN 1.3MM PCB MTG 64 WAY SIL STRAP
SK312		240-04020-65	SOCKET JACK PIN 1.3MM PCB MTG 64 WAY SIL STRAP
SK401		240-02100-44	SOCKET COAXIAL MINIATURE JACK PCB MTG ANGLED
SK311		240-04020-65	SOCKET JACK PIN 1.3MM PCB MTG 64WAY SIL STRAP
T100		053-00010-17	TRANSFORMER T4030 LINE MATCH POT CORE
T200		050-00016-50	COIL TAIT NO 650 455KHZ 5.6MM CAN

T837 MAIN BOARD PARTS LIST

T837 D-RANGE PARTS

REF	IPN	DESCRIPTION
C1	012-04150-01	CAPACITOR CERAMIC FEEDTHRU 1N5 LESS LEAD
C2	012-04150-01	CAPACITOR CERAMIC FEEDTHRU 1N5 LESS LEAD
C3	012-04150-01	CAPACITOR CERAMIC FEEDTHRU 1N5 LESS LEAD
C4	012-04150-01	CAPACITOR CERAMIC FEEDTHRU 1N5 LESS LEAD
C5	012-04150-01	CAPACITOR CERAMIC FEEDTHRU 1N5 LESS LEAD
C6	012-04150-01	CAPACITOR CERAMIC FEEDTHRU 1N5 LESS LEAD
C7	012-04150-01	CAPACITOR CERAMIC FEEDTHRU 1N5 LESS LEAD
C8	012-04150-01	CAPACITOR CERAMIC FEEDTHRU 1N5 LESS LEAD
C9	012-04150-01	CAPACITOR CERAMIC FEEDTHRU 1N5 LESS LEAD
C10	012-04150-01	CAPACITOR CERAMIC FEEDTHRU 1N5 LESS LEAD
C11	012-04150-01	CAPACITOR CERAMIC FEEDTHRU 1N5 LESS LEAD
C12	012-04150-01	CAPACITOR CERAMIC FEEDTHRU 1N5 LESS LEAD
C13	012-04150-01	CAPACITOR CERAMIC FEEDTHRU 1N5 LESS LEAD
C14	012-04150-01	CAPACITOR CERAMIC FEEDTHRU 1N5 LESS LEAD
C15	012-04150-01	CAPACITOR CERAMIC FEEDTHRU 1N5 LESS LEAD

T837 PARTS LIST MECHANICAL & MISCELLANEOUS

IPN	DESCRIPTION	IPN	DESCRIPTION
065-00010-08	BEAD FERRITE 453 3*0.7*10MM RED*4x0R	360-00010-40	BUSH SNAP BLACK HEYCO SB-375-4
308-01007-00	HANDLE A4M949 FXD EQUIP	362-00010-08	GASKET SILICONE INSULATING TO-5 TO-39 FOR Q301
065-00010-13	BEAD FERRITE 7D 1.9*0.9*3.8MM STACK POLE	362-00010-23	GASKET SILICONE INSULATING TO-220 CLIP MOUNTED
206-00010-11	CABLE COAXIAL 50 OHM RG316-U PTFE 1 x 140mm 1 x 90mm	362-00010-23	GASKET SILICONE INSULATING TO-220 CLIP MOUNTED
206-00010-11	CABLE COAXIAL 50 OHM RG316-U PTFE	362-00010-33	GROMMET LED MTG 3MM LO CURRENT LEDS
220-01178-02	PRINTED CIRCUIT BOARD T836TX T837EX	365-00100-20	LABEL WHITE S/A 28X11MM QUIKSTIK RW718/4
240-00010-55	PLUG 15 WAY D RANGE WIRE WRAP PINS PNL MTG	400-00020-05	SLEEVING 1.5MM SILICONE RUBBER
240-00100-43	PLUG COAXIAL MINATURE PIN PLUG CRIMP 1.5D COAX	410-00010-42	PACKAGING CARTON 60MM FXD EQUIP MODULE UEB 1509
240-00100-46	PLUG COAXIAL BULKHEAD JACK SUHNER 24 SMCS0-2-10		
240-02100-46	SOCKET COAXIAL ELBOW SUHNER 16SMCS0-2-10C		
303-11168-00	CHASSIS HEATSINK PAINTED CMPLT A1M2364 800 SERI		
303-23055-00	COVER PLATE A4M955 N CONNECTOR HOLE T857		
303-23118-00	COVER A3M2247 D RANGE HOLE T855/7 D range connector		
303-50074-00	CLIP A4M2246 SPRING TRANSISTOR CLAMP T857		
303-50074-00	CLIP A4M2246 SPRING TRANSISTOR CLAMP T857		
308-01007-00	HANDLE A4M949 FXD EQUIP		
312-01052-00	LID TOP PAINTED COMPLETE A1M2364 800 SERIES		
312-01053-00	LID BOTTOM PAINTED COMPLETE A1M2364 800 SERIES		
316-06409-00	PANEL FRONT COMPLETE T837 A3M2218 A3M2218/4		
316-80031-00	PAD A4M2155 PRESSURE T306		
316-85015-00	PIN A4M775 LOCATING D RANGE		
316-85099-00	PLATE FLOAT A3M2248 DUAL D RANGE SOCKET BOX		
316-85100-00	PLATE FRONT A3M2249 DUAL D RANGE SOCKET BOX		
318-01014-00	RAIL A2M2214 FOR 800 SERIES FXD EQUIP		
319-01152-00	SHIELD A4M2250 FEEDTHRU MTG T857		
345-00040-06	SCREW M3*8MM PAN POZI ST BZ		
345-00040-06	SCREW M3*8MM PAN POZI ST BZ skt box x2.		
345-00040-08	SCREW M3*12MM PAN POZI ST BZ D range cover		
345-00040-09	SCREW M3*6MM CSK POZI ST BZ rail mounting - pack with rails		
345-00040-10	SCREW M3*6MM PAN POZI ST BZ Rail x4 Float Plate x4.		
345-00040-11	SCREW M3X10MM PAN POZI ST BZ VCO mounting		
345-00040-20	SCREW M3*8MM BUTTON SKT HD BLACK ZINC PHOS front panel		
349-00020-32	SCREW TAPTITE M3X8MM PAN POZI BZ PCB mounting x8 1/8" hole cover x4.		
349-00020-43	SCREW TAPTITE M4X12MM PAN POZI BZ top cover x14		
349-00020-45	SCREW TAPTITE M4X20MM PAN POZI BZ bottom cover x14		
352-00010-08	NUT M3 COLD FORM HEX ST BZ D socket x4 Skt cover x4		
352-00010-29	NUT M4 NYLOC HEX		
353-00010-10	WASHER M3 FLAT ST BZ 6.75MM OD A4M1215 VCO mounting spacer		
353-00010-12	WASHER M3 SPRING BZ D skt & cover		
353-00010-13	WASHER M3 SHAKEPROOF INT BZ VCO mtg x2 O hole cover x2		

T800 EPROM PARTS LIST

REFERENCED PARTS

REF	IPN	DESCRIPTION
C1	015-24100-08	CAPACITOR CERAMIC 0805 CHIP 1N 10% X7R 50V
C2	015-24100-08	CAPACITOR CERAMIC 0805 CHIP 1N 10% X7R 50V
C3	015-24100-08	CAPACITOR CERAMIC 0805 CHIP 1N 10% X7R 50V
C4	015-24100-08	CAPACITOR CERAMIC 0805 CHIP 1N 10% X7R 50V
C5	015-24100-08	CAPACITOR CERAMIC 0805 CHIP 1N 10% X7R 50V
C6	015-24100-08	CAPACITOR CERAMIC 0805 CHIP 1N 10% X7R 50V
C7	015-06100-08	CAPACITOR CERAMIC 1206 CHIP 100N 10% X7R 50V
C8	025-08100-02	CAPACITOR TANT BEAD 10M 10% 16V
D1	001-10000-70	DIODE SMD BAV70 DUAL SWITCH SOT-23 COMMON CATHODE
D2	001-10000-70	DIODE SMD BAV70 DUAL SWITCH SOT-23 COMMON CATHODE
D3	001-10000-70	DIODE SMD BAV70 DUAL SWITCH SOT-23 COMMON CATHODE
IC1	002-00018-04	INTEGRATED CCT 27C64 CMOS 8K*8 UV EPROM (S)
PL1	240-00020-57	HEADER 10 WAY 1 ROW PCB MTG
R	036-15100-00	RESISTOR MF 0805 CHIP 10K 5%
R1	036-15100-00	RESISTOR MF 0805 CHIP 10K 5%
R2	036-15100-00	RESISTOR MF 0805 CHIP 10K 5%
R3	036-15100-00	RESISTOR MF 0805 CHIP 10K 5%
R4	036-15100-00	RESISTOR MF 0805 CHIP 10K 5%
R5	036-15100-00	RESISTOR MF 0805 CHIP 10K 5%
R6	036-15100-00	RESISTOR MF 0805 CHIP 10K 5%
R7	036-15100-00	RESISTOR MF 0805 CHIP 10K 5%
R9	036-12220-00	RESISTOR MF 0805 CHIP 22E 5%
SW1	230-00010-19	SWITCH*8 SPST DIP PACKAGE
SK1	240-04020-57	SOCKET 10 WAY 1ROW PCB MTG TOP ENTRY

MISCELLANEOUS & MECHANICAL

IPN	DESCRIPTION
220-01144-00	PRINTED CIRCUIT BOARD T855/856/857 MEMORY
240-04020-35	SOCKET 28 PIN DIL INTEGRATED CCT LOW PROFILE

T830 VCO PARTS LIST

REFERENCED PARTS

REF	VAR	IPN	DESCRIPTION
CV1		028-02400-02	CAP TRIM 5/40P CER 5MM KV40001
C2		015-23680-08	CAPACITOR CERAMIC 0805 CHIP 6 10%
*C3	10	015-22180-01	CAPACITOR CERAMIC 0805 CHIP 18P 5% NPO 50V
*C3	15	015-22180-01	CAPACITOR CERAMIC 0805 CHIP 18P 5% NPO 50V
*C3	20	015-22180-01	CAPACITOR CERAMIC 0805 CHIP 18P 5% NPO 50V
*C3	25	015-22180-01	CAPACITOR CERAMIC 0805 CHIP 18P 5% NPO 50V
*C4	10	015-22180-01	CAPACITOR CERAMIC 0805 CHIP 18P 5% NPO 50V
*C4	15	015-22180-01	CAPACITOR CERAMIC 0805 CHIP 18P 5% NPO 50V
*C4	20	015-22150-01	CAPACITOR CERAMIC 0805 CHIP 15P 5% NPO 50V
*C4	25	015-22150-01	CAPACITOR CERAMIC 0805 CHIP 15P 5% NPO 50V
*C5		015-22220-01	CAPACITOR CERAMIC 0805 CHIP 22P 5% NPO 50V
*C6	10	015-22150-01	CAPACITOR CERAMIC 0805 CHIP 15P 5% NPO 50V
*C6	15	015-22150-01	CAPACITOR CERAMIC 0805 CHIP 15P 5% NPO 50V
*C6	20	015-22150-01	CAPACITOR CERAMIC 0805 CHIP 15P 5% NPO 50V
*C6	25	015-22150-01	CAPACITOR CERAMIC 0805 CHIP 15P 5% NPO 50V
*C7	10	015-22150-01	CAPACITOR CERAMIC 0805 CHIP 15P 5% NPO 50V
*C7	15	015-22150-01	CAPACITOR CERAMIC 0805 CHIP 15P 5% NPO 50V
*C7	20	015-22150-01	CAPACITOR CERAMIC 0805 CHIP 15P 5% NPO 50V
*C7	25	015-22150-01	CAPACITOR CERAMIC 0805 CHIP 15P 5% NPO 50V
C8		015-23120-01	CAPACITOR CERAMIC 0805 CHIP 120P 5% NPO 50V
C9		015-23680-08	CAPACITOR CERAMIC 0805 CHIP 680P 10% X7R 50V
C10		015-21220-01	CAPACITOR CERAMIC 0805 CHIP 2P2 /-0.25P NPO 50V
C11		015-23680-08	CAPACITOR CERAMIC 0805 CHIP 680P 10% X7R 50V
C12		015-23680-08	CAPACITOR CERAMIC 0805 CHIP 680P 10% X7R 50V
C13		025-08100-02	CAPACITOR TANT BEAD 10M 10% 16V
C14		015-23680-08	CAPACITOR CERAMIC 0805 CHIP 680P 10% X7R 50V
C15		015-23680-08	CAPACITOR CERAMIC 0805 CHIP 680P 10% X7R 50V
C16		015-22560-01	CAPACITOR CERAMIC 0805 CHIP 56P 5% NPO 50V
C17		015-22560-01	CAPACITOR CERAMIC 0805 CHIP 56P 5% NPO 50V
C18		015-23680-08	CAPACITOR CERAMIC 0805 CHIP 680P V
C19		015-05470-08	CAPACITOR CERAMIC 1206 CHIP 47N
C20		015-23680-08	CAPACITOR CERAMIC 0805 CHIP 680P V
C21		015-23680-08	CAPACITOR CERAMIC 0805 CHIP 680P V
C22		015-23680-08	CAPACITOR CERAMIC 0805 CHIP 680P V
C23		015-21820-01	CAPACITOR CERAMIC 0805 CHIP 8P2 50V
C24		015-21680-01	CAPACITOR CERAMIC 0805 CHIP 6P8 50V
*C26	10	015-22560-01	CAPACITOR CERAMIC 0805 CHIP 56P 5% NPO 50V
*C26	15	015-22560-01	CAPACITOR CERAMIC 0805 CHIP 56P 5% NPO 50V
*C26	20	015-22270-01	CAPACITOR CERAMIC 0805 CHIP 27P 5% NPO 50V
*C26	25	015-22270-01	CAPACITOR CERAMIC 0805 CHIP 27P 5% NPO 50V
D1		001-00012-63	DIODE VARICAP B8809
D2		001-00012-63	DIODE VARICAP B8809
D3		001-00012-63	DIODE VARICAP B8809
D4		001-00012-63	DIODE VARICAP B8809
L1		056-00021-56	INDUCTOR FIXED 3.3UH AXIAL 10X4
L2		056-00021-60	INDUCTOR FIXED 330NH 6.6X2.7MM GNETI
*L3		055-01004-00	COIL TOROID 103NH 22P 9T T830 TX
L4		056-00021-52	INDUCTOR FIXED 820NH 10% NON MTIC
L5		056-00021-56	INDUCTOR FIXED 3.3UH AXIAL 10X4OLIC
L6		052-08135-35	COIL A/W 3.5T/3.5MM HOR 0.8MM
L7		056-00021-56	INDUCTOR FIXED 3.3UH AXIAL 10X4OLIC
L8		052-08130-45	COIL A/W 4.5T/3.0MM HOR 0.8MM
PL-1		240-00025-36	PLUG 32WAY 1ROW PC MTG HARWIN
PL-2		240-00025-36	PLUG 32WAY 1ROW PC MTG HARWIN
*R5		036-13390-00	RESISTOR M/F 0805 CHIP 390E 5%
Q1		000-10003-10	TRANSISTOR SMD MMBFJ310 JFET SO UHF
Q2		000-10057-10	TRANSISTOR SMD MMBR571 NPN SOT-OWER
Q3		000-10057-10	TRANSISTOR SMD MMBR571 NPN SOT-OWER
Q4		000-10008-57	TRANSISTOR SMD BCW70/BC857 PNP ALL SIG
Q5		000-00032-47	TRANSISTOR MRF559 NPN XPACK UHF
R1		036-12220-00	RESISTOR M/F 0805 CHIP 22E 5%
R3		036-11470-00	RESISTOR M/F 0805 CHIP 4E7 10%
R6		036-12560-00	RESISTOR M/F 0805 CHIP 56E 5%
R7		036-14100-00	RESISTOR M/F 0805 CHIP 1K 5%
R8		036-12560-00	RESISTOR M/F 0805 CHIP 56E 5%
R9		036-14100-00	RESISTOR M/F 0805 CHIP 1K 5%
R10		036-12100-00	RESISTOR M/F 0805 CHIP 10E 5%
R11		036-14270-00	RESISTOR M/F 0805 CHIP 2K7 5%
R12		036-13180-00	RESISTOR M/F 0805 CHIP 180E 5%
R13		036-12220-00	RESISTOR M/F 0805 CHIP 22E 5%
R14		036-12560-00	RESISTOR M/F 0805 CHIP 56 E 5%
R15		036-12220-00	RESISTOR M/F 0805 CHIP 22E 5%
R16		036-13270-00	RESISTOR M/F 0805 CHIP 270E 5%
R17		036-13270-00	RESISTOR M/F 0805 CHIP 270E 5%
R18		036-12180-00	RESISTOR M/F 0805 CHIP 18E 5%
R19		036-14100-00	RESISTOR M/F 0805 CHIP 1K 5%
R20		036-14680-00	RESISTOR M/F 0805 CHIP 6K8 5%
R21		036-14100-00	RESISTOR M/F 0805 CHIP 1K 5%
R22		036-14220-00	RESISTOR M/F 0805 CHIP 2K2 5%
R23		036-12180-00	RESISTOR M/F 0805 CHIP 18 E 5%
R24		036-12220-00	RESISTOR M/F 0805 CHIP 22E 5%
R25		036-13220-00	RESISTOR M/F 0805 CHIP 220E 5%

MISCELLANEOUS & MECHANICAL

IPN	DESCRIPTION
220-01176-01	PRINTED CIRCUIT BOARD T830 VCO

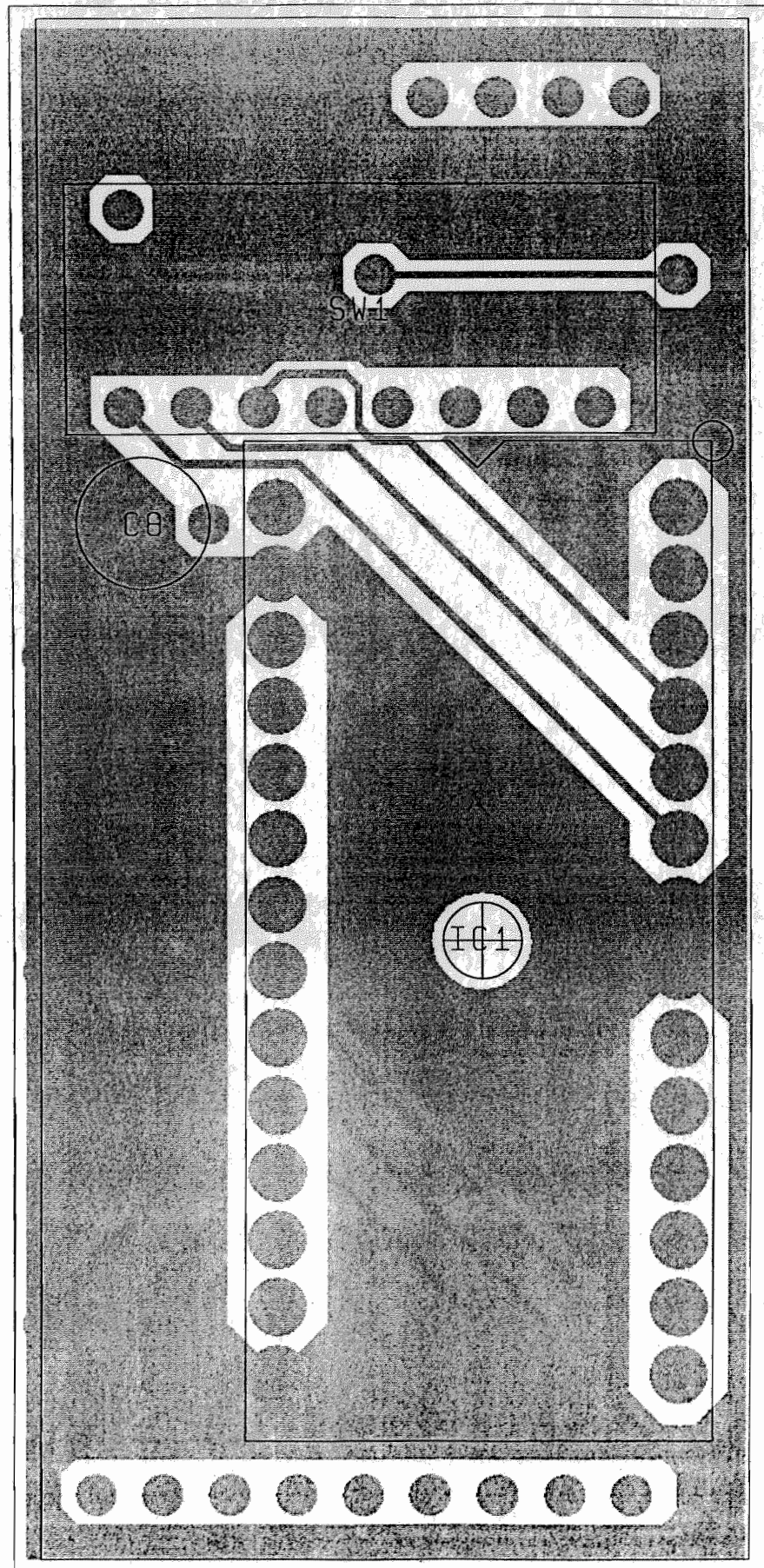
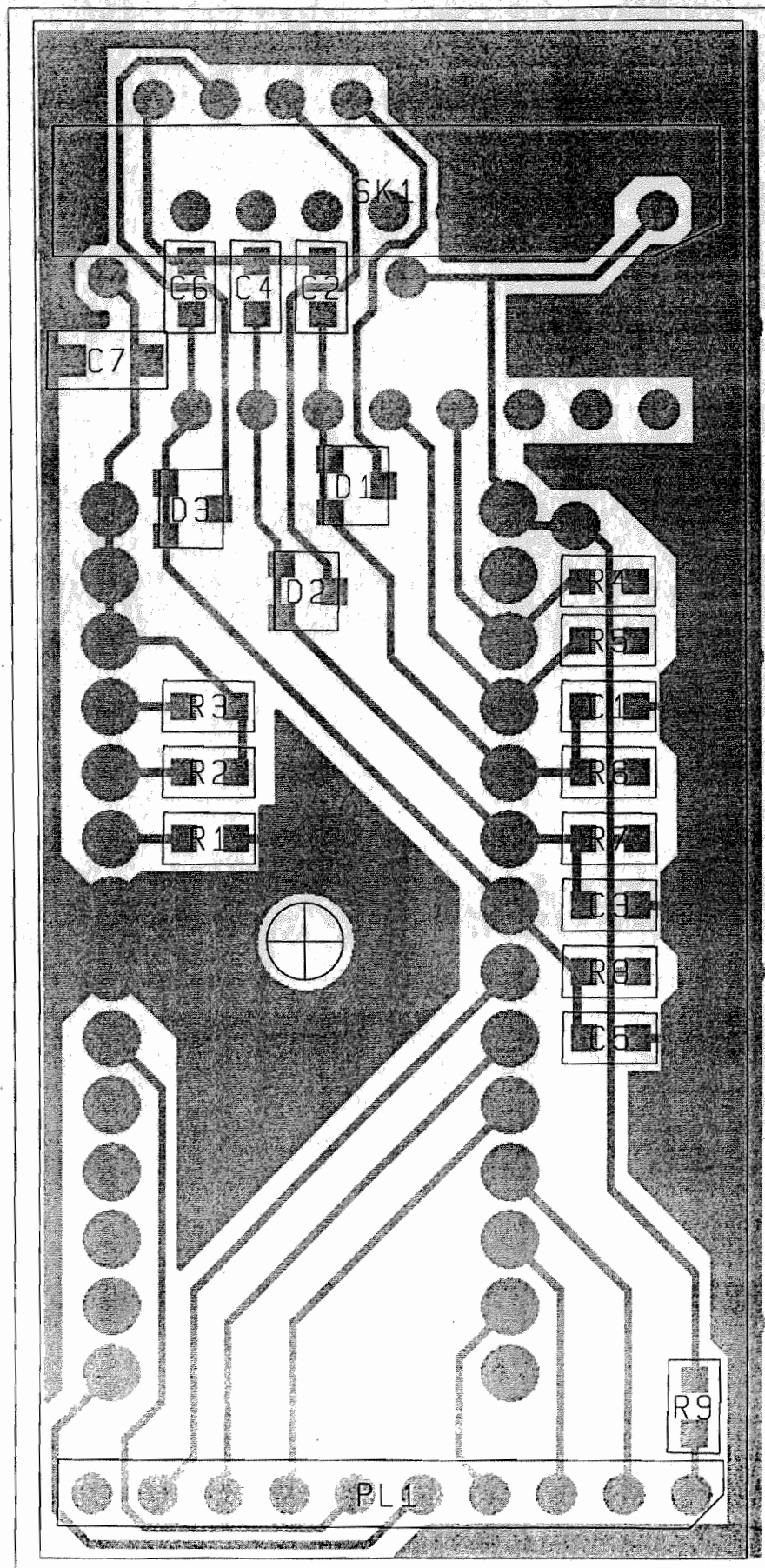


DIAGRAM 1 - EPROM PCB LAYOUT - TOP SIDE

220-00011-44B



220-00011-44B

DIAGRAM 2 - EPROM PCB LAYOUT - BOTTOM SIDE

IPN: 220-01176-01 ISSUE: 1B

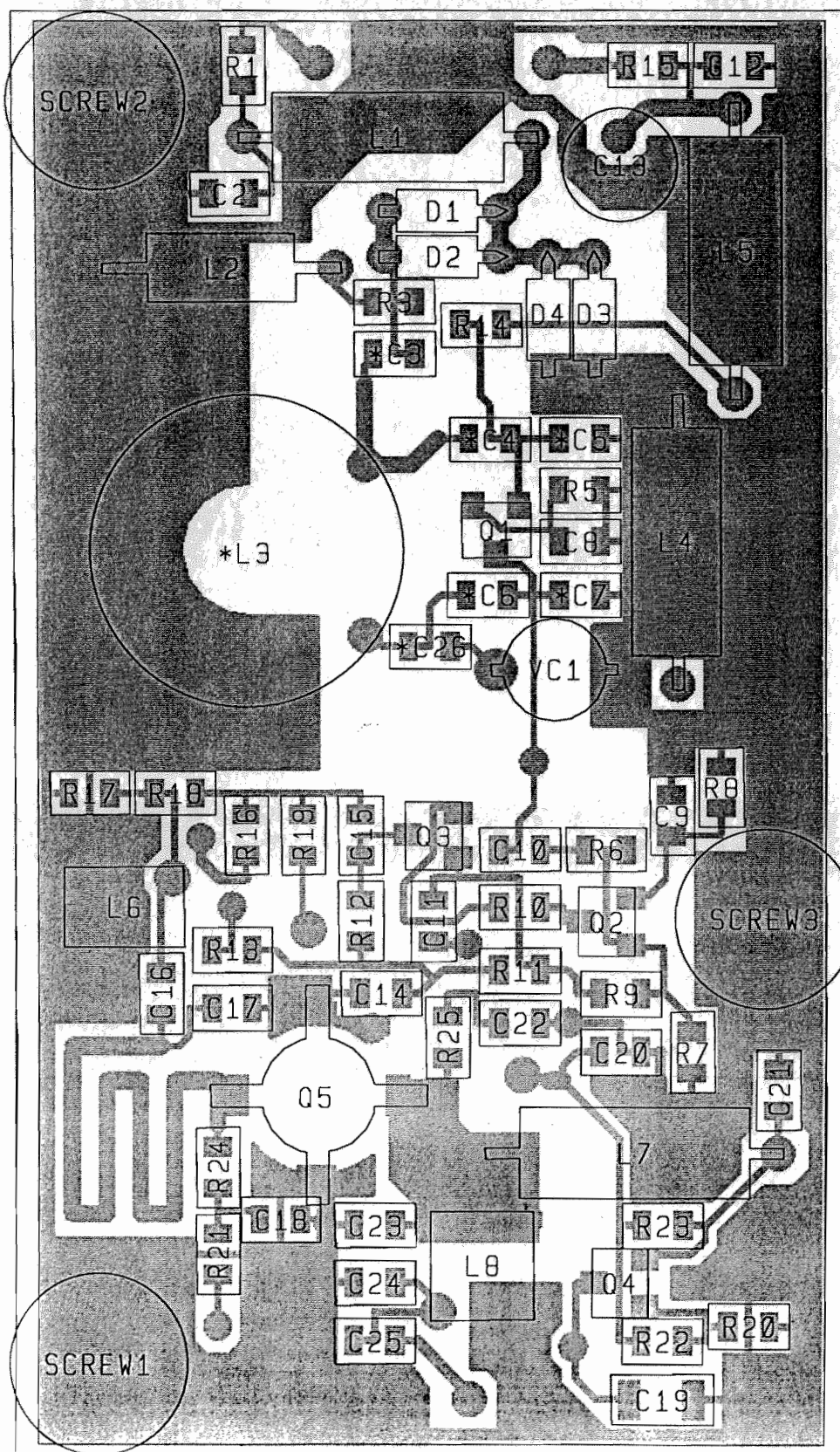


DIAGRAM 3 - VCO PCB LAYOUT - TOP SIDE

IPN: 220-01176-01

ISSUE: 1B

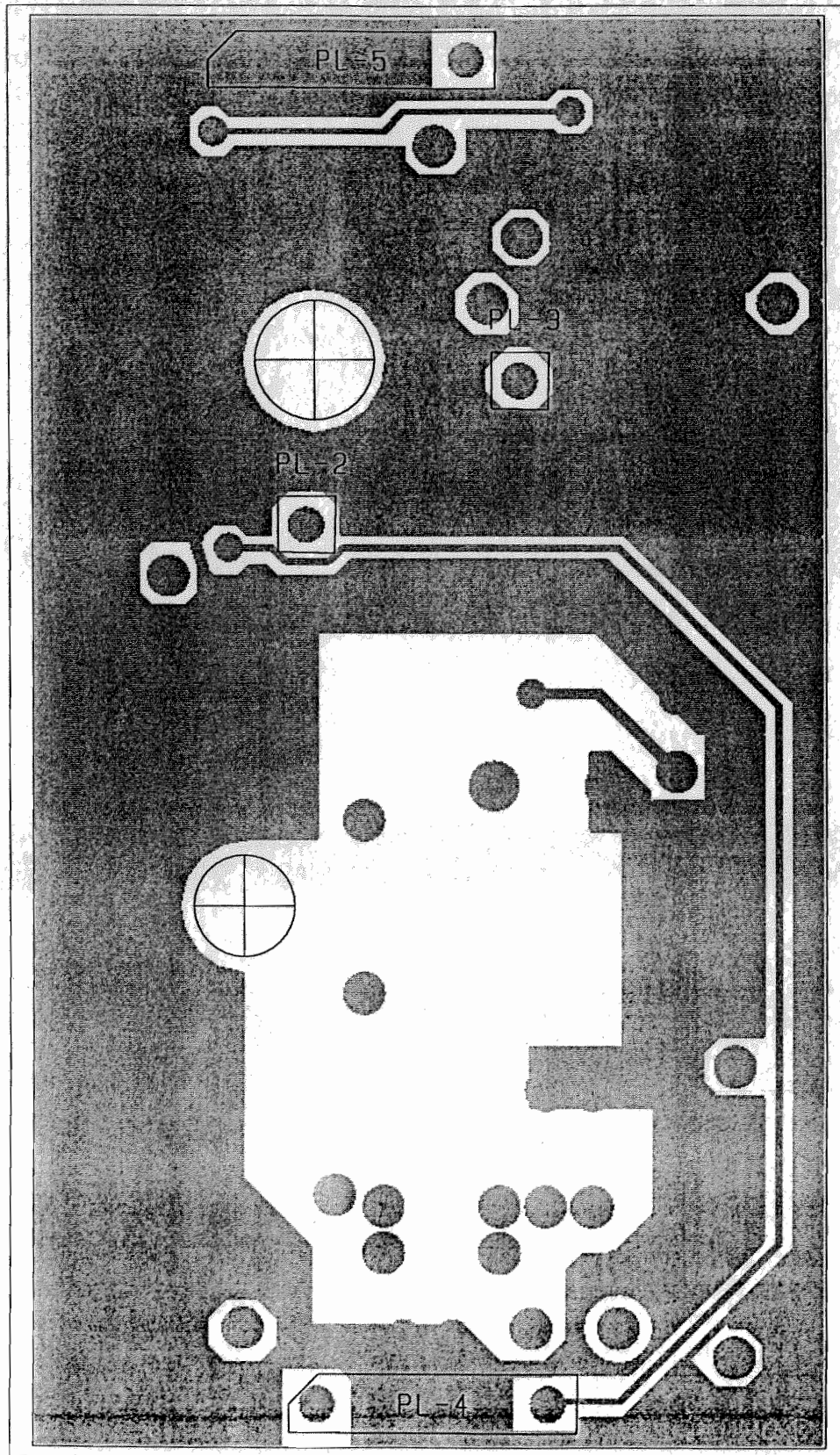


DIAGRAM 4 - VCO PCB LAYOUT - BOTTOM SIDE

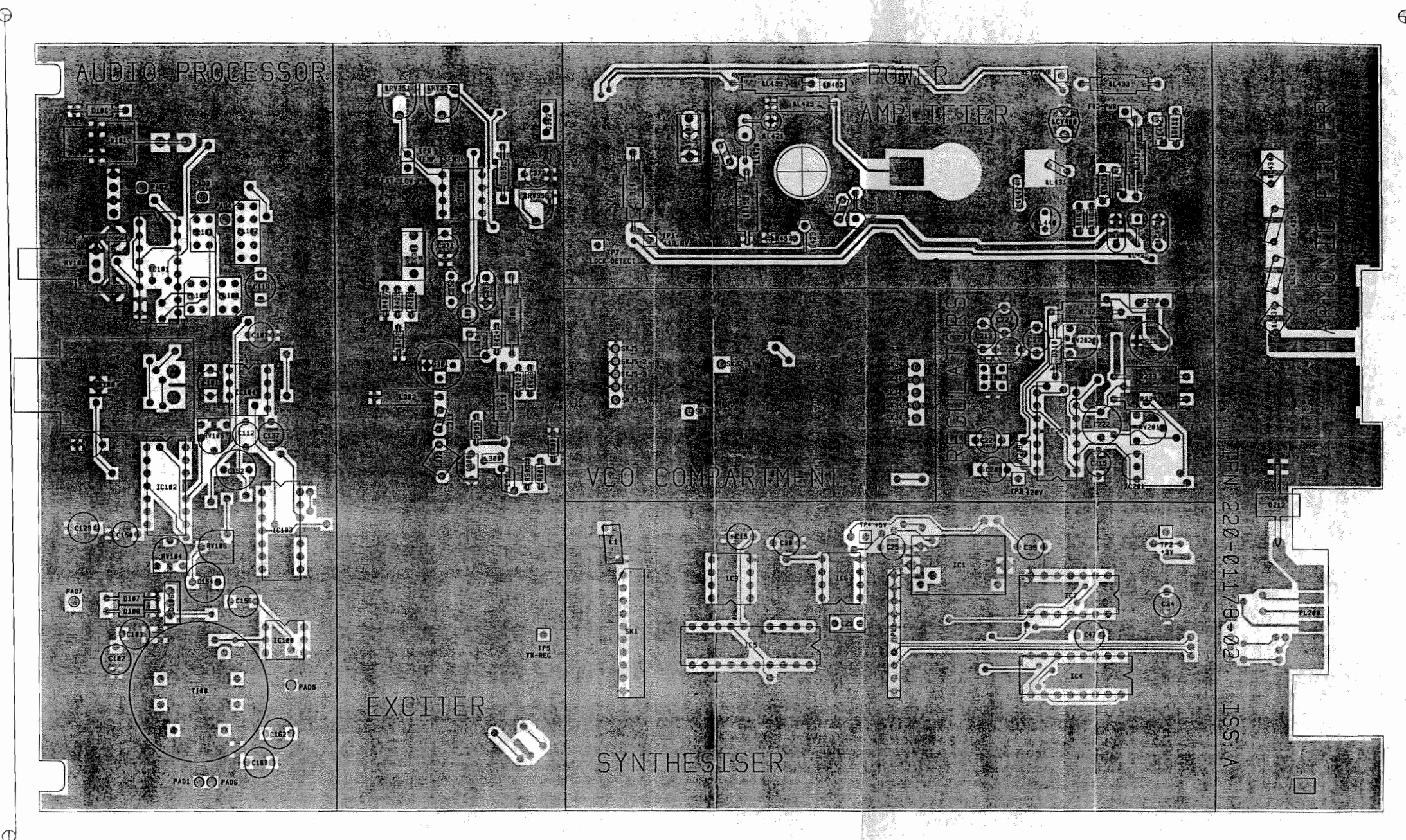
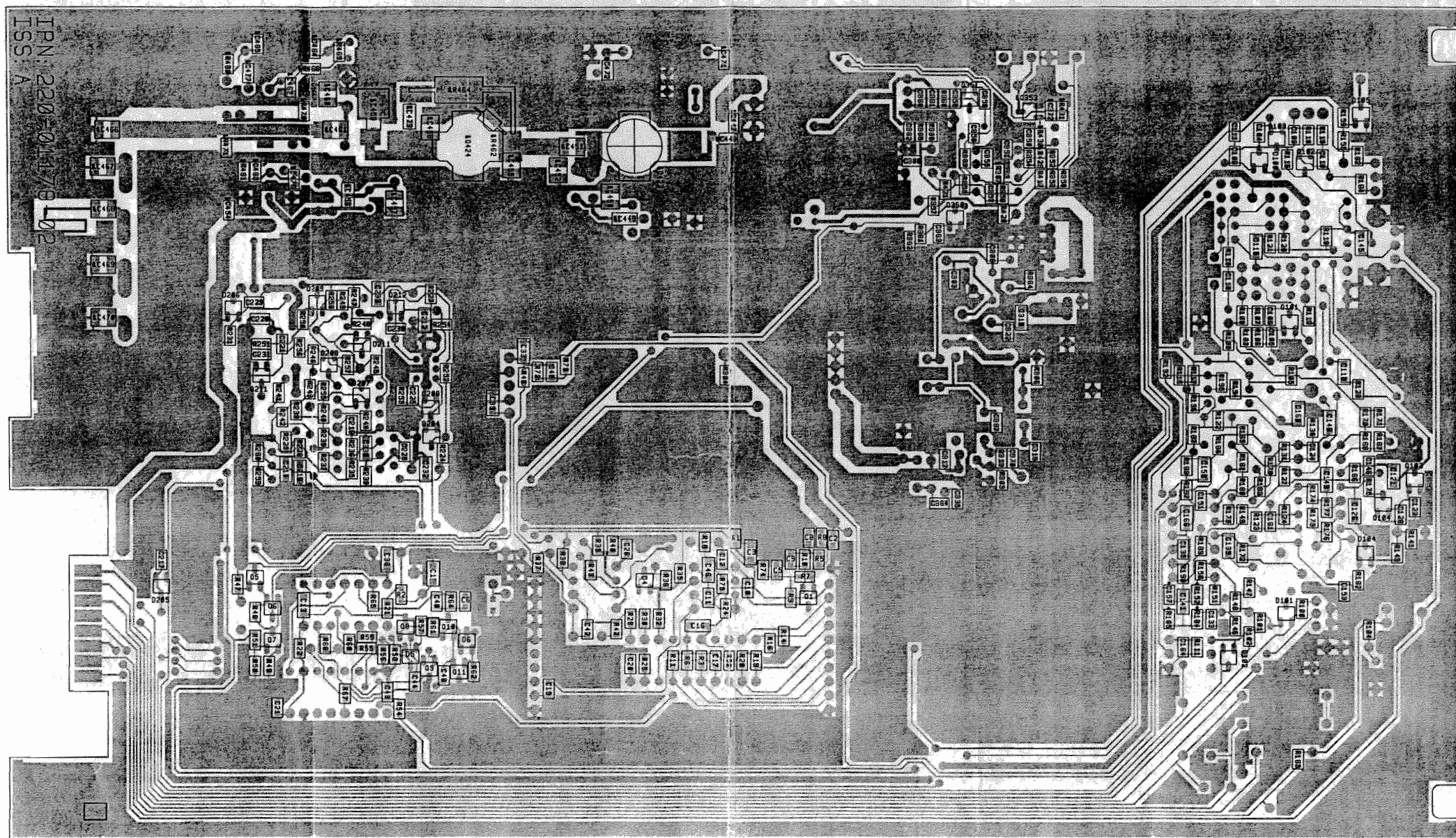


DIAGRAM 5 T836/7 PCB LAYOUT - TOP SIDE.

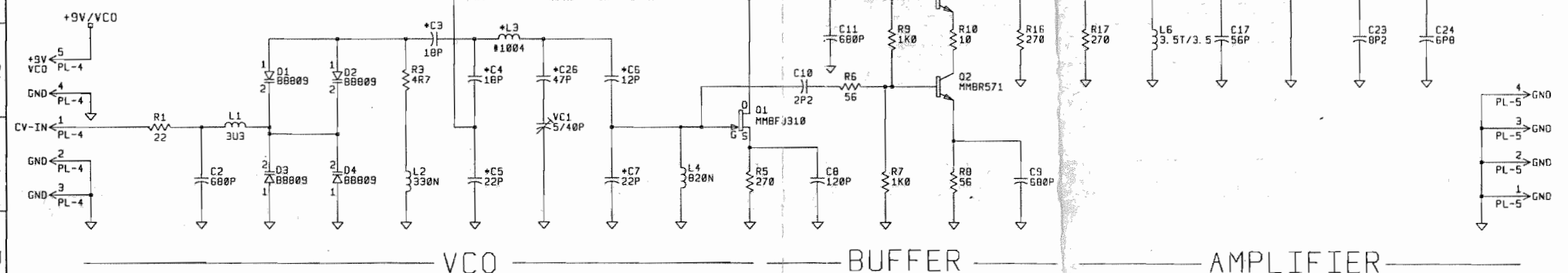


IPN: 220701476
ISS: A

DIAGRAM 6 TR-67-104 LAYOUT - BOTTOM SIDE.

LAYOUT FOR TX LOW

*TX/RX-BAND	VCO_FREQ MHZ	*C3	*C4	*C5	*C6	*C7	*L3	*C26
TX LOW	136-156	18PS	18PS	22PS	12PS	22PS	1004	47PS
TX HIGH	148-174	22PS	15PS	22PS	12PS	22PS	1004	33PS
RX LOW	157.4-177.4	22PS	15PS	22PS	12PS	22PS	1004	33PS
RX HIGH	169.4-195.4	15PS	12PS	18PS	15PS	27PS	1003	33PS



1B CH/N: 90/03-445		W0		TITLE		TAIT ELECTRONICS NEW ZEALAND	
1A FIRST PRODUCTION RUN		W0		T830 VCO		DRAWING NO: C701 SHEET 1	
199 ORIGINAL		BP		11-01-90		IPN: 220-01176-01 OF 1	
P1		D.B.H.		APVD: DATE:		FILE NAME: 830VCL18 FILE DATE: 20/5/90	
ISSUE:		AMENDMENTS:		DRAWN: CHKD: APVD: DATE:		ISSUE 1B	

