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T535TR Trunked Mobile Two Way Radio

VHF FM 136–174MHz

(M535–98)

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 T535TR trunked mobile two way radio.

Ordering Tait Service Manuals

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

Date Of Issue

IPN	M535-98	T535TR Service Manual
		Provisional Issue published August 1990 Issue A published November 1990

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DIAGRAMS

SECTION 1 GENERAL INFORMATION

1.1 INTRODUCTION

The T535TR is a high performance FM synthesised mobile two way radio with a nominal RF power output of 25W. It is intended for operation in the 136 to 174MHz frequency range with 12.5kHz channel spacing and ±2.5kHz deviation. The T535TR is for use on trunking systems.

Operation of the T535TR is by hand-held microphone and press-to-talk switch, plus six front panel mounted controls: 'Volume', 'Call', three push buttons for ident selection and an 'On/Off' switch. Visual indication of 'Transmit', 'Go', 'System' and ident number is by illuminated front panel display.

The two injection moulded plastic covers and the plastic front panel can be easily removed to expose both of the printed circuit boards for ease of servicing.

The dual conversion receiver employs both discrete components and integrated circuits. It also includes a signal-to-noise ratio operated squelch circuit. The receiver delivers approximately 2W of audio power to an 8 ohm internal speaker.

The VCO provides about 10mW of frequency modulated RF drive to the four stage broad band RF power amplifier. An audio processor contains modulation level control and deviation limiting circuits.

A trunking control board is plugged onto the radio unit and together they form a trunked radio. A display PCB is mounted behind the front panel itself and this is plugged as a unit onto the trunking control board.

The T535TR is light and compact and is supplied with a rugged mounting system which allows easy installation in any vehicle. Mains operation is possible when the T535TR is used with the Tait T508 power supply.

The DC supply to the T535TR must be negative earth and must be between 10.8 and 16V. The T535TR is protected against reversal of the DC supply polarity.

1.2 SPECIFICATIONS

1.2.1 INTRODUCTION

The performance figures given are typical figures, unless otherwise indicated, for equipment operating at standard room temperature (22°C to 28°C). Unless otherwise indicated, the figures apply to all versions.

Where applicable, the test methods used to obtain the following performance figures are those described in the UK Department of Trade and Industry Specification MPT1323.

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

Modulation Type	.. Frequency Modulation
Frequency Range	.. 136 to 174MHz
Channel Separation	.. 12.5kHz (minimum)
Frequency Increment	.. 12.5kHz
Number Of Channels	.. 320 (maximum) [system dependent]
Switching Range:	
Receiver	.. 4MHz
Transmitter	.. 6MHz
Supply Voltage:	
Operating Range	.. 10.8 to 16V DC
Standard Test Voltage	.. 13.8V DC
Polarity	.. negative earth only
Protection	.. internal crow-bar diode
Supply Current:	
Receiver - Squelched	.. 300mA
Receiver - Full Audio	.. 700mA
Transmitter	.. 4.5A (at 25W)
Antenna Impedance	.. 50 ohms
T/R Changeover Switching	.. relay
Operating Temperature Range (refer to Section 1.2.5)	.. -10°C to +60°C
Dimensions:	
Length	.. 238mm
Width	.. 150mm
Height	.. 45mm
Weight	.. 1.2kg

1.2.3 RECEIVER

Type	.. dual conversion superhet
12dB Sinad Sensitivity	.. -118dBm
IF Amplifiers:	
Frequencies	.. 21.4MHz and 455kHz
Bandwidth	.. 7.5kHz
Signal+Noise-to-Noise Ratio	.. 28dB
Selectivity (adjacent channel)	.. 70dB
Spurious Response Attenuation	.. 85dB
Intermodulation Response Attenuation	.. 75dB
Spurious Emissions:	
Conducted	.. -57dBm
Radiated (½-wavelength dipole)	.. -57dBm
Audio:	
Output into internal 8 ohm speaker	.. 2W
Output into external 3.5 ohm speaker	.. 4W
Distortion (at 4 watts)	.. <5%
Load Impedance	.. 2 ohms (minimum)
Audio Response	.. within +1, -3dB of a 6dB/octave de-emphasis characteristic (ref. 1kHz)
Audio Bandwidth	.. 300Hz to 3kHz
Squelch:	
Threshold	.. -120dBm (0.22µV pd)/6dB Sinad
Hard Setting	.. -104dBm (1.4µV pd)/26dB Sinad
Ratio	.. 70dB

1.2.4 TRANSMITTER

Power Output	.. 25W
Transmit Timer	.. system dependent
Mismatch Capability:	
Stability	.. VSWR <5:1 (all phase angles)
Ruggedness	.. 2 minute transmit into infinite VSWR (all phase angles)
Spurious Emissions:	
Conducted	.. -36dBm
Radiated (½-wavelength dipole)	.. -36dBm
Adjacent Channel Power	.. -70dBc

Modulation System:	
Type	.. direct FM
Deviation Limiting	.. ±2.5kHz (peak) maximum
Bandwidth	.. 300Hz to 3kHz
Responses:	
In Limiting	.. within +0, -4dB of maximum system deviation
Below Limiting	.. within +1, -3dB of 6dB/octave pre-emphasis (ref. 1kHz)
Frequencies Above 3kHz	.. greater than 25dB/octave roll-off
Audio:	
Input For Maximum Deviation (at 1kHz)	.. 1mV rms
Distortion	.. <5%
Hum & Noise	.. 45dB

1.2.5 FREQUENCY REFERENCE

Crystal Type:	
± 5ppm (-10°C to +60°C)	.. TE/9
Oscillator Frequency	.. 12.8MHz

1.3 VERSIONS

1.	T535-92 (Australia)	136-174MHz frequency range 7.5kHz IF bandwidth 12.5kHz frequency increments 2.5kHz deviation Trunking PCB
2.	T535-98	136-174MHz frequency range 7.5kHz IF bandwidth 12.5kHz frequency increments 2.5kHz deviation Trunking PCB

1.4 OPERATING INSTRUCTIONS

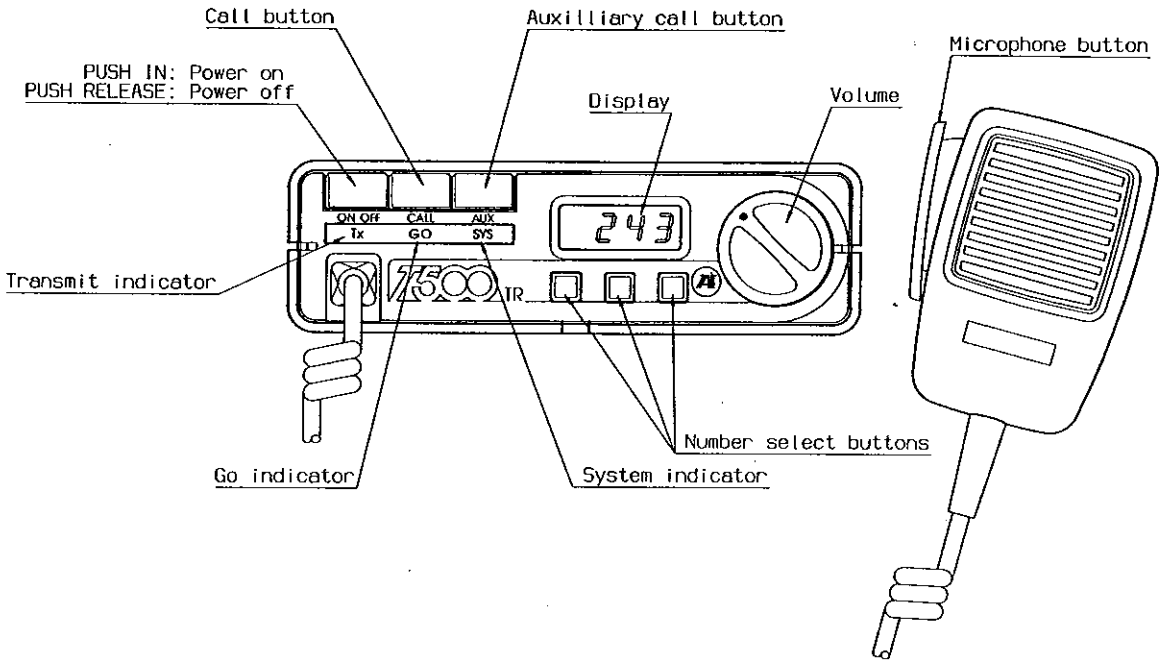


Figure 1 T535TR Front Panel

1.4.1 GENERAL

The following instructions assume that the radio is correctly installed (see Section 4). Some aspects of radio operation are dependent on the trunking system in use; contact your supplier or service facility in case of difficulty.

1.4.2 SWITCHING ON

The 'On/Off' switch turns the radio on when it is pressed, and pressing it again turns the radio off. When the radio is turned on, it will momentarily show the mobile unit number, and will then display the last button entry made before the radio was switched off.

The system indicator ('SYS') will light if the radio is in range of the trunked system and is receiving valid digital information from the control channel transmitter.

CAUTION: A functioning T535TR is always active and can respond automatically to an incoming call. It is therefore advisable to switch the T535TR off with the 'On/Off' button when entering a petrol station.

The T535TR should always be switched off if the aerial is disconnected.

1.4.3 MAKING A CALL

1. Enter the number of the mobile or despatcher to be called by pressing the appropriate call number buttons.

   Pressing each of the buttons alters the appropriate digit of the display in single digit increments upwards. Attempts to call invalid idents or idents of mobiles or despatchers not available to the user will cause the characters 'UA' to be displayed.

2. Momentarily press the 'Call' button or PTT switch.

   The transmit indicator will light and may flash on and off while the call is being established. If the called party is available, an audible indicator will be heard from the speaker and the display will indicate a countdown of the call time remaining in minutes and seconds.

3. If the call is not connected immediately, an audible indicator is sounded. If the indicator changes to a lower frequency, this means the call has been queued by the system and will be connected shortly.

4. To talk, press the PTT switch on the microphone.

   Speak directly into the microphone, holding it approximately 100mm from the mouth.

   To listen, release the PTT switch.

   Adjust the volume control clockwise to increase and anticlockwise to reduce the volume.

5. The call can be cleared by returning the microphone to the hook or by pressing one of the three call number buttons. During the last few seconds allowed to a call, a pip will sound each second as a warning. Cleardown will take place automatically at the termination of the countdown time.

1.4.4 MAKING A GROUP CALL

Group calls are made (if the radio is programmed for them) by entering the group call number on the front panel and making the call as normal.

1.4.5 RECEIVING A CALL

Incoming calls are audibly indicated by the ringing tone.

Lift the microphone off the hookswitch and acknowledge the call in the normal manner, pressing the PTT switch to talk and releasing it to listen.

The ident number of the mobile or despatcher making the call will be displayed for five seconds on the front panel, followed by the "call time remaining" display.

Note: A call may be cleared down if neither party transmits within a specific time period.

SECTION 2 CIRCUIT OPERATION

Refer to the Block and Circuit Diagrams at the rear of this Manual.

2.1 SYNTHESISER

The T535TR employs the dual modulus system of frequency synthesis.

The synthesiser chip, IC8, contains a reference oscillator, frequency dividers and a phase comparator. The reference oscillator is controlled by a 12.8MHz quartz crystal. The output from the reference oscillator is divided internally to 12.5kHz and fed to the phase comparator.

The transmit and receive VCO's are formed by QC51, Q53 and QC50, Q52 respectively. The VCO frequency is divided by the 40/41 prescaler, IC9, and then further divided within IC8 to provide the other input to the phase comparator. The division ratio in IC8, and hence the channel frequency, is determined by the 16-bit binary word from the trunking control board (TCB).

2.2 RECEIVER

The VCO output is fed in antiphase to the gates of the two balanced mixer J-FETs, Q16 and Q17. The RF signal from the Tx/Rx relay is amplified by Q15 and fed to the mixer via a double tuned circuit.

The 21.4MHz IF output from the mixer passes through crystal filter XF1 and is amplified by Q18 before being fed to IC7. IC7 contains a second mixer and 455kHz second IF stages, a demodulator and squelch control circuits.

The audio at pin 9 of IC7 is de-emphasised by R68 and C55 and fed through the audio processor (see Section 2.4.2) to the audio output amplifier, IC4.

2.3 SQUELCH

An input signal to the squelch circuit is obtained from the audio output of IC7 via RV149. This signal has a noise level which is inversely related to the level of the RF signal at the receiver input.

An op-amp within IC7 is used in a band pass filter configuration to select and amplify noise frequencies above the audio band. This signal is rectified by Q20 to give a positive going DC voltage which is an inverse function of the RF signal strength.

This DC voltage is then fed to a threshold detector within IC7, in such a way that the voltage at pin 14 of IC7 is high in the presence of noise and low in the absence of noise. The threshold point occurs at approximately 0.7V.

The switching signal from the threshold detector is then inverted by Q7. C17 and R26 prevent squelch closure during rapid fades, while maintaining a fast opening time.

Q6 drives the squelch switch and the 'Busy' LED.

2.4 TRANSMITTER

2.4.1 RF STAGES

The VCO output is amplified to a level of 25W by a 4 stage broad band amplifier (Q40, Q44, Q45, Q46). The power amplifier output passes via the relay through a low pass filter to the antenna connector.

The transmit power output is set at 25W by RV260 which controls the collector voltage of Q44, and hence the gain of the broad band amplifier. The circuit utilises a power detector (D50) and a feed back loop to hold the transmitter power to 25W under conditions of varying supply voltage.

Transistor Q41 prevents the power amplifier turning on when the synthesiser is out of lock.

2.4.2 AUDIO PROCESSOR

Transistor Q10 is a microphone preamplifier. IC2 provides the necessary gain limiting and filter functions for the audio signal. An automatic level control (ALC) function is performed by detector Q11 and shunt elements D15 and D16. The analogue switches within IC3 allow either transmit or receive audio to be directed through the audio processor.

2.5 POWER SUPPLY

2.5.1 GENERAL

Note: The T535TR is suitable for negative earth applications only.

The unit is protected by a crowbar diode (D1) which will blow the fuse if the supply is reverse connected.

DC is connected to the audio output IC and the transmitter final and driver whenever the T535TR is connected to a supply, regardless of the position of the on/off switch.

2.5.2 CONTINUOUS SUPPLIES

DC from the on/off switch enables the audio output IC and supplies the power turn down stage and short circuit protected 9V regulator. Output from this regulator powers the audio processor, synthesiser and TCB.

2.5.3 RECEIVE

The switched Rx 9V and Tx 9V lines are controlled by Q5 and Q4 respectively.

The Rx 9V line is high only on receive and powers the following:

- the receive VCO;
- the receiver RF, IF and demodulator stages;
- the squelch control circuit;
- an analogue switch in the audio output circuit.

2.5.4 TRANSMIT

When the PTT switch is closed, power is supplied to the following:

- the transmit VCO;
- the low power transmitter stages;
- the antenna changeover relay;
- the analogue switches in the audio processor.

2.6 FREQUENCY INFORMATION

The synthesiser programming is controlled by the microprocessor. 16 data bits are presented to the synthesiser A & N lines. Refer to Table 1 in Section 5.4.3 to check the synthesiser programming data.

2.7 TRUNKING CONTROL BOARD

2.7.1 ANALOGUE INTERFACES TO THE RADIO

2.7.1.1 Received Signal Strength Indicator (RSSI)

The RSSI is an analogue DC voltage produced by a detector in the receiver. The voltage enters the PCB at SKT-3 pin 3 and is fed to PE7 of the microcomputer via R95 and C85.

2.7.1.2 Lock Detect

This analogue voltage produced on the main board is fed to the TCB at SKT-3 pin 12. The signal is then fed via IC2 to microcomputer port PA2, thus enabling the synthesiser lock status to be monitored.

2.7.1.3 FFSK (Including Modem)

The received FFSK signal enters the PCB at SKT-1 pin 2 and is AC coupled to a pre-amplifier, IC2. FFSK is then passed to the modem chip via IC14 pin 16, which results in a logic '1' at IC14 pin 15 and decoded data at IC14 pin 14.

For transmit data, the modem provides a Tx sync signal at pin 3. The transmit data which originates at microcomputer port PA3 (pin 31) is applied to the modem at pin 7. It appears as FFSK at pin 5 and leaves the PCB at SKT-1 pin 5. RV1 controls the FFSK deviation, which is set at a 1.5kHz peak while sending a pattern of alternate '1's and '0's in test mode.

2.7.1.4 Sidetone

Audible 'pips' and 'ringing' sounds are produced from the speaker during various stages of call set-up. These are generated in the microcomputer and appear at port PA4. The signals are then passed via C50/RV2 to SKT-3 pin 4 to the radio where they are mixed into the speaker amplifier. RV2 adjusts the tone level.

2.7.2 DIGITAL INTERFACE CIRCUITS TO THE RADIO

2.7.2.1 Pressel (PTT)

This signal takes one of three forms:

(a) A 12k ohm resistance to ground from the radio to the PCB when the microphone is 'on hook', i.e. when the stud on the microphone is grounded.

(b) A short circuit to ground from the radio to the PCB when the pressel is pushed.

(c) A short circuit to ground from the PCB to the radio to command the transmitter to key during signalling.

The PTT/hook signal is fed to microcomputer port PE4 (pin 44). This port samples the analogue input and the microcomputer determines the status. Tx-CRL is driven low by Q3 to enable transmission.

2.7.2.2 Microphone Mute

This signal passes from the TCB to the radio. The microphone is muted during signalling by Q2 turning on. The microphone mute signal leaves the board at SKT-3 pin 2.

2.7.2.3 Receive Audio Mute

This signal passes from the TCB to the radio and disables received audio to the speaker.

2.7.2.4 Synthesiser Control

This is a 16-bit parallel interface from the TCB to the radio to control the synthesiser frequency. The supply voltage to the synthesiser is 9V; thus IC3 and IC4, which perform the serial-parallel conversion, also run from 9V. IC10 provides the level shifting from 5V to 9V. The synthesiser data is controlled via synchronous communications with the microcomputer. Port lines PA5, PA6 and PD2 provide the serial clock (SYC), the serial data (SYD) and the latch (SYL) respectively to IC3 and IC4. The transfer command originates at microcomputer port PD2 and is also level shifted in IC10.

2.7.2.5 PA Disable

This is a signal from the TCB to the radio which disables the transmitter. The PA will be disabled when this line goes high.

2.7.2.6 Call Button

The 'Call' button initiates call requests and is passed from the radio to the TCB. It enters the board at SKT-3 pin 1 and is applied to microcomputer port PD4 (pin 24).

2.7.2.7 AUX Button

This button is connected via SKT-3 pin 14 to microcomputer port PA7 (pin 27); its function is software definable.

2.7.2.8 Emergency

This wire is taken from SKT-3 pin 13 to the rear panel power connector pin adjacent to the ground return wire. On the TCB it is connected to microcomputer port PE3 (pin 49).

2.7.3 DIGITAL INTERFACE TO THE FRONT PANEL

2.7.3.1 Clock, Data and Enable

These lines come from ports PA5 (pin 29), PA6 (pin 28) and PD5 (pin 25) respectively of the microcomputer. The lines leave the TCB at SKT-8 pins 8, 9 and 10. The data is in serial format with a synchronous clock; the enable line is necessary to update the display.

2.7.3.2 Buttons

The front panel buttons which are used to enter the called address and clear down are connected via the front panel to SKT-8 pins 3, 6 and 7 on the TCB.

2.7.4 MICROCOMPUTER CIRCUITS

2.7.4.1 The Microcomputer (IC12)

The heart of the TCB is the MC68HC1141, which controls all radio functions via software resident in the memory devices.

2.7.4.2 Memory Devices

The RAM (IC9) is a zero power device with its own internal battery.

The EPROM (IC8) is mounted in a socket for easy software updating.

The EEPROM is resident in the microcomputer (IC12).

2.7.4.3 Miscellaneous Functions

Miscellaneous functions are:

(a) 'GO' LED

This LED indicates traffic channel allocation for a call.

(b) 'SYS' & 'TX' LED's

The 'SYS' LED is switched on when the radio is receiving valid digital information from the control channel transmitter.

The 'TX' LED is switched on during transmit key.

2.7.4.4 Test Mode

The 'test mode' pins will pull microcomputer port line PD5 low when fitted with a shorting link. When shorted together on switch-on, the TCB goes into test mode to aid servicing.

2.7.4.5 Clock Circuit

The clock is generated by an on-chip oscillator and external crystal (XTAL 1). The clock is divided by 4 within the microcomputer and appears as 'E' on pin 5.

2.7.5 MICROCOMPUTER SUPERVISORY CIRCUIT

$\overline{\text{RES}}$ is driven by a three terminal LVI chip (IC15). An internal bandgap reference and external resistors R66/R67 ensure a $\overline{\text{RESET}}$ when the 5V supply falls below 4.8V.

2.7.6 POWER SUPPLIES

The supply to the TCB from the radio is taken from both the 13.8V switched and 9V regulated supplies. 13.8V is fed to a discrete regulator in the front panel to supply the 'SYS' and 'GO' LED's and IC100. 9V is further regulated by another 78L05 (VREG1) and this supplies all other TCB hardware.

2.8 FRONT PANEL DISPLAY

Data from the TCB is presented via SKT-8 to the 14499 display driver (IC100), which controls the four 7-segment displays.

SECTION 3 ANCILLARY EQUIPMENT

3.1 T508-01/02 POWER SUPPLY

The T508 Power Supply will allow the operation of a T500 Series I or II two way radio from a 230V (nominal) 50Hz or a 115V (nominal) 60Hz mains supply. The radio can be mounted on the T508 to give a compact desk top installation, or they can be separately wall mounted to save desk space.

The T508 provides a 13.8V DC 5.5A (intermittent) regulated supply for the T500 Series I and II two way radios and incorporates current limiting and thermal protection.

Type Numbers:

230V Supply	.. T508-01 (previously designated T508)
115V Supply	.. T508-02 (previously designated T508/115)

3.2 T508-21/22 SWITCH MODE REGULATOR

The T508-21/22 Power Supply uses switch mode technology to control the regulation of the output voltage. This results in a power supply with a higher temperature rating, improved efficiency and greater reliability.

The T508-21/22 provides a 13.8V DC 6.5A (intermittent) regulated supply for the T500 Series I and II two way radio and incorporates current limiting and thermal protection.

Type Numbers:

230V Supply	.. T508-21
115V Supply	.. T508-22

3.3 T220-02 REMOTE SPEAKER ASSEMBLY

The T220-02 remote speaker assembly may be used with the T535TR. It comprises a heavy duty 4 watt speaker mounted in a rugged enclosure which pivots on its mounting bracket. The 3.5 ohm voice coil of the speaker is connected by a short lead terminated in a 2 pin cord mounted connector. The enclosure is compact and easily mounted in any convenient position.

3.4 T500-20 SERIAL DATA INTERFACE

This is used to interface the T535TR with an IBM* XT or AT PC (or compatible) for identity programming. Circuitry to level shift the RS232 signals is built into the interface.

*IBM is a registered trademark of International Business Machines.

SECTION 4 INSTALLATION

4.1 VEHICLE INSTALLATION

Installation instructions (IPN 409-50001-00) are packed with each radio.

CAUTION: The T535TR is suitable for negative earth installation only.

4.2 T508 POWER SUPPLY UNIT

When using the T535TR with a T508 power supply, it is essential that the RF power output is adjusted so that the station effective radiated power (ERP) from the antenna complies with the licence conditions in force.

SECTION 5 SERVICING

5.1 GENERAL

5.1.1 NOTES

If further information is required about the T535TR or this Manual, it may be obtained from Tait Electronics Ltd or accredited agents. When requesting this information, please quote either the equipment type number (e.g. T535-98), or serial number (found adjacent to the aerial connector at the back of the set). In the case of the Circuit Diagrams quote the 'Title' and 'Issue' and for the Service Manual quote the internal part number (IPN) and Issue, e.g. M535-98, Issue A.

CAUTION: SWITCH OFF IN EXPLOSIVE ENVIRONMENTS

A functioning T535TR is always active and can respond automatically to an incoming call. It is therefore advisable to switch the T535TR off with the 'On/Off' button when entering potentially hazardous areas, such as petrol stations, or when in close proximity to quarries or tunnelling works where remote controlled explosive charges may be in use.

CAUTION: CLEANING

This is a plastic based product with a secondary finish on the front panel. Use a cloth dampened with warm, soapy water to clean. If solvent cleaners are to be used for stubborn stains, test first on a part of the set normally out of sight. Do not use solvent cleaners on the front panel.

CAUTION: AERIAL LOADING

The equipment has been designed to operate over a wide range of aerial loading conditions. However, it is strongly recommended that the transmitter is not operated in the absence of a suitable load. Failure to observe this precaution may result in damage to the transmitter power output stage.

CAUTION: BERYLLIUM OXIDE & POWER TRANSISTORS

The RF power transistors in current use all contain some beryllium oxide. This substance, while perfectly harmless in its normal solid form, can become a severe health hazard when it has been reduced to dust. For this reason the RF power transistors should not be scratched, mutilated, filed, machined, or physically damaged in any way that can produce dust particles.

CAUTION: CMOS DEVICES

The equipment contains CMOS devices which are susceptible to damage from static charges. Care when handling these devices is essential. For correct handling procedures refer to the manufacturers data books, e.g. Philips data books covering CMOS devices, or Motorola CMOS data books, Section 5 'Handling', etc.

5.1.2 TECHNICAL INSTRUCTIONS

From time to time 'Technical Instructions' (TI's) are issued by Tait Electronics Engineering Division. These TI's may be used to update equipment or information, or to meet specific operational requirements.

5.2 MECHANICAL

5.2.1 POZIDRIV RECESS HEAD SCREWS

Pozidriv screws are the preferred standard on all Tait manufactured equipment. The very real advantages of this type of screw will not be realised unless the correct screwdrivers are used by servicing personnel.

Pozidriv No 1 screwdrivers will fit the pozidriv screws used in the T535TR. Philips cross-head screwdrivers are not satisfactory for use on these screws.

5.2.2 DISASSEMBLY INSTRUCTIONS

Note 1: To carry out alignment procedures it is necessary to remove only the bottom cover as given in 5.2.2.1 below.

Note 2: To assist in separating the top and bottom covers, a thin plastic strip (such as a plastic rule) may be inserted between the covers and used as a lever.

5.2.2.1 To Gain Access To The Component Side Of The Radio PCB

Place the T535TR upside down on the bench.

Remove the 4 bottom cover retaining screws.

Gently lift both ends of the bottom cover until it clears the front panel and heatsink.

Lift away the bottom cover.

Remove the front panel as instructed below (Section 5.2.2.3).

With the power removed from the radio, carefully lift off the TCB.

5.2.2.2 To Gain Access To The Track Side Of The PCB

Remove the bottom cover as in 5.2.2.1 above.

Turn the T535TR over on the bench, taking care not to bend or damage any header pins on the main PCB.

Remove the 2 top cover retaining screws.

Gently raise both ends of the top cover until it clears the front panel and heatsink.

5.2.2.3 To Remove The Front Panel

Remove the microphone cord relief grommet from its seat.

Unplug the microphone.

Remove the bottom and top covers as instructed above.

Slide the front panel forward.

It is not necessary to remove the knob - it may be left in place.

5.2.2.4 To Gain Access To The PA Components

To gain access to the PA, remove the screws retaining the two PA cavity lids.

Remove the component side lid towards the right hand side of the PCB (as viewed from the front of the set) so that it clears the power supply feedthrough capacitor.

5.2.2.5 Speaker Removal/Refitting

The speaker in the T535TR is held in place with four "push-on fix" spring clips (IPN 357-00010-09, Spire No. SFP 3253) which may cause problems when the speaker is removed.

To remove the speaker, cut the spring clips off the plastic locating pegs with wire cutters. Do not attempt to prise off the spring clips as this will damage the pegs.

Fit four new clips when refitting the speaker.

5.2.3 VCO CAN

CAUTION: When loosening or tightening the 4 retaining screws of the VCO can, support the can from the component side as undue pressure on the PCB may fracture some of the chip capacitors.

5.2.4 REASSEMBLY

Reassembly is carried out in the reverse order of the above.

Replace the PA covers.

Replace the TCB carefully, ensuring that all header pins are located in the bottom entry sockets. The plastic pillar will click into place, securely locking the TCB in place.

Slide on the front panel.

Fit the top cover:

Gently press the cover into position, taking care to position the rim at the rear of the cover into the heatsink groove. Ensure that the rim of the front panel fits into the groove round the front of the top cover.

Replace the two "Taptite" screws at the rear of the cover.

Fit the bottom cover:

Invert the T535TR.

Gently press the cover into position, taking care to position the rim at the rear of the cover into the heatsink groove. Ensure that the rim of the front panel fits into the groove round the front of the bottom cover.

While fitting the bottom cover, check that the right hand retaining screw pillar slides into the hole in the LED PCB.

Replace the two "Taptite" screws at the rear of the cover and the two "Plastite" screws at the front of the cover.

Plug the microphone back in and reseat the cord relief grommet.

5.3 REPAIR

5.3.1 COMPONENT CHECKS

If a transistor is suspected of faulty operation, an indication of its performance can be assessed by measuring the forward and reverse resistance of the junctions. First make sure that the transistor is not shunted by some circuit resistance (unless the device is completely unsoldered). An AVO model 8 or equivalent meter should be used for taking the measurements, using only the medium or low resistance ranges.

The collector current drawn by multijunction transistors is a further guide to their operating performance.

If an integrated circuit (IC) is suspect, the most reliable check is to measure the DC operating voltages. Due to the catastrophic nature of most IC failures, the pin voltages will usually be markedly different from the recommended values in the presence of a fault. These values can be found on the Circuit Diagram, or in the component data catalogue.

5.3.2 LEADED COMPONENT REPLACEMENT

Whenever components are removed from, or fitted to the printed circuit track, care must be taken to avoid damage to the track. If it is necessary to remove a component from the track, the following procedure is recommended:

Remove the solder from the component leads using a solder wick.
Loosen the individual leads from the printed track.
Withdraw the component from the top of the PCB.

Because of the delicate nature of the printed track, the use of solder suckers is not recommended.

Do not remove the component from the PCB while the solder is still molten.

Keep all soldering operations, and the heat and solder applied, to a minimum. A thermally controlled, fine tip soldering iron should be used. Ensure that the iron is earthed back to the frame of the set.

5.3.3 CHIP COMPONENT REMOVAL/REPLACEMENT

Note 1: **The following procedure applies only to chip capacitors, resistors and transistors. Do not attempt to remove surface mount IC's by hand with a soldering iron. These devices must be serviced only with appropriate desoldering equipment or by an Approved Tait Dealer.**

Note 2: The temperature of the soldering iron must be maintained at 320-370°C (600-700°F) and a low temperature solder should be used.

5.3.3.1 Component Removal

1. Place the soldering iron tip directly on the component in order to melt the solder and glue as shown in Figure 2. Remove the component with tweezers or long nose pliers.

2. Completely remove the old solder from the PCB, using a solder wick. Application of a small amount of flux will greatly aid in the removal of old solder. The use of 'solder suckers' is not recommended.

5.3.3.2 Replacement

1. After a component has been removed and the PCB pattern cleaned, apply a small amount of solder on the PC pattern and allow to cool, as shown in Figure 3.

2. Insert the new components and apply the soldering iron tip to the PC pattern as shown in Figure 4 (a), (b) and (c).

CAUTION: As patterns and components are close to each other, extreme care must be excercised when soldering so as not to damage components or bridge the PCB pattern paths. High soldering iron temperatures can cause component damage. Do not apply the soldering iron tip to the new component during installation.

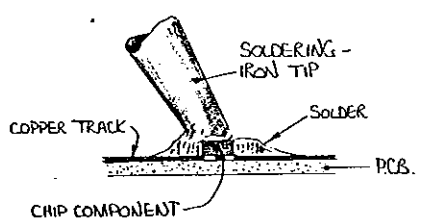


Figure 2

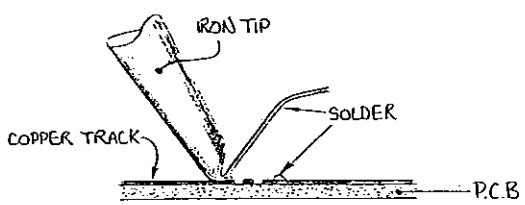
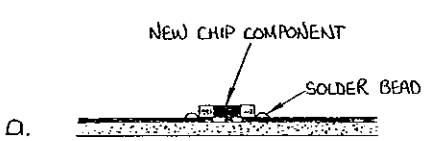
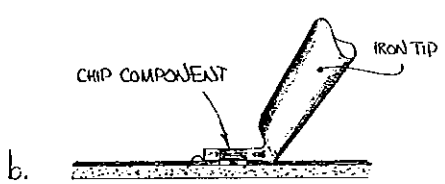


Figure 3





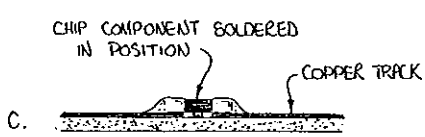


Figure 4

5.3.4 COMPONENT REMOVAL FROM PTH PCB's

The two satisfactory methods of removing components from PTH PCB's are detailed below.

Note: The first method requires the use of a desoldering station, e.g. Philips SBC 314 or Pace MBT-100E.

5.3.4.1 Desoldering Iron Method

Place the tip over the lead and, as the solder starts to melt, move the tip in a circular motion.

Start the suction and continue the movement until 3 or 4 circles have been completed.

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).

5.3.4.2 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.

5.3.5 CRYSTAL FILTER REPLACEMENT

Should it become necessary to replace the crystal filter, both cans should be replaced together as the new parts are supplied as matched pairs. Each can is marked with a dot and the correct polarity should be maintained when the replacement crystal filter pair is fitted.

5.3.6 PA - SPECIAL INSTRUCTIONS

CAUTION: As the location of certain components in the PA is critical to performance, it is important that any components removed or disturbed be refitted in exactly the same location.

5.3.6.1 To Replace The PA Transistors

Unsolder the tabs by heating them with a soldering iron, then lifting them up towards the transistor with a thin stainless steel spike or screwdriver. Unscrew the transistor mounting screws or stud nuts and remove the transistor.

Trim the tabs of the replacement to make them similar to the faulty item, then lightly tin the underside of the tabs.

Smear the underside of the transistor with heatsink compound.

Screw the transistor tightly to the heatsink then solder the tabs.

CAUTION: Do not solder the tabs before tightening the screws or nut, as this will fracture the device.

5.3.7 MICROPROCESSOR REPLACEMENT

The microprocessor (IC12) is factory programmed and permanently bonded to the PCB. If this device fails, the trunking logic PCB must be replaced.

5.4 SETTING UP

Note: The T535TR software enables a "test mode" function which allows ease of service without requiring interaction with a trunking system. The purpose of this test mode is to enable the normal radio functions to be set up. However, a trunking test set (e.g. Marconi TF2960) or Schlumberger 4040/4041 system is required to test the trunking signalling protocols.

It is recommended that the serviced radio is field tested by the serviceman on the customer's trunking system before being returned to the customer.

5.4.1 TEST EQUIPMENT REQUIRED

1. Multimeter (e.g. AVO Model 8)
2. DC electronic voltmeter (e.g. Tech TE65)
3. RF power meter 30 watts FSD usable to 520MHz with 5 and 30 watt elements (e.g. Bird Model 6154 or 611).
4. Power Supply - output adjustable between 9 and 16 volts DC with a capacity of at least 8 amps.
5. Modulation meter (e.g. Sayrosa 252)
6. Sinad meter (e.g. Helper Instruments Sinadder)
7. VHF signal generator. Good quality FM. Useable from 0.1µV (-127dBm) to 200mV (0dBm) pd. (e.g. HP 8640B).
8. VHF frequency counter accurate to within 2ppm.
9. 10.7MHz Crystal marker (second harmonic gives beat for 21.4MHz IF)
10. Audio oscillator, 10Hz to 10kHz (e.g. HP 204C/D)
11. Tone Box: Audio amplifier, with about 1.5 watts output, to drive a small speaker which can be coupled to the T535TR microphone. An adaptor should be made whch will hold the speaker and microphone close together.
12. AC millivoltmeter
13. Calibrated oscilloscope
14. Speaker 4 ohm voice coil
15. RF power attenuator, total attenuation 50dB
(e.g. Weinschel 40-40-33 30dB 150W, plus Coline 1200 85 20dB 1w)
16. RF diode probe (e.g. Coline M12DM modular RF detector probe)

5.4.2 TUNING HINTS

1. Diagram 1 shows the test set-up for receiver and transmitter alignment.

2. For accurate tuning, the test cable connecting the signal generator or power meter to the T535TR should be as short as practical and fitted with a 'mating' BNC connector. Do not use adaptors, 'sniffer' couplings, etc, which introduce changes to cable impedance and errors in test results.

3. Non-metallic tuning tools must be used for the alignment of all coil slugs to avoid the tuning errors introduced by the use of metallic tools. Tuning tools need to be of correct size to avoid the damage to slugs which results from the use of incorrect tuning tools.

   Tuning tool WT 11 (Tait IPN 9360112) is suitable for adjusting trimming capacitors.

4. When using the RF diode probe, the earth return should be kept as short as possible and connected as close as possible to the point at which the measurement is being taken. This is to minimise stray pick-up which may affect the reading.

5. The front panel 'on/off' switch removes power from the regulated supplies only. The RF power amplifier, the audio output IC and the DC hash filter are not controlled by this switch.

6. Check for obvious mechanical faults in the printed circuit board, controls, microphone etc.

5.4.3 OPERATION BELOW 150MHz - VCO

When operating the T535TR on frequencies below 150MHz, connect CC326 (8p2) in circuit by shorting the pads of the link in the receive VCO.

For frequencies above 150MHz, leave CC326 out of circuit.

5.4.4 CHANNEL PROGRAMMING

Note: VCO operation is restricted to a 4MHz switching range on receive and a 6MHz switching range on transmit within the band 136 to 174MHz. Do not programme frequencies outside these limits.

The switching range is defined as the change in frequency for a loop voltage of between 2 and 6.5 volts.

To check that the synthesiser is programmed correctly, refer to Table 1.

A logic level 1 on the pins listed adds that frequency increment to the total VCO frequency.

A logic level 0 on the pin means that it is not added.

Table 1

Frequency Increment MHz	Code	Pin No. IC8 (MC14152)	Connector
256.0	N9	20	SKT-3, pin 5
128.0	N8	19	SKT-3, pin 6
64.0	N7	18	SKT-3, pin 7
32.0	N6	17	SKT-3, pin 8
16.0	N5	16	SKT-3, pin 9
8.0	N4	15	SKT-3, pin 10
4.0	N3	14	SKT-4, pin 6
2.0	N2	13	SKT-4, pin 7
1.0	N1	12	SKT-4, pin 8
0.5	N0	11	SKT-4, pin 9
0.4	A5	10	SKT-4, pin 10
0.2	A4	25	SKT-4, pin 1
0.1	A3	24	SKT-4, pin 2
0.05	A2	22	SKT-4, pin 4
0.025	A1	21	SKT-4, pin 5
0.0125	A0	22	SKT-4, pin 3

5.4.5 TEST MODE

5.4.5.1 General

The test facility enables the TCB to emulate a multichannel radio, utilising the frequencies reserved for trunking. On transmit the TCB emits a stream of 1's and 0's to set the data modulation rate.

5.4.5.2 To Enter Test Mode

Switch the radio off.

Remove the bottom cover (refer to Section 5.2.2).

Place a temporary short across the two pins labelled "TEST MODE".

Switch the radio on.

The last channel number to be entered while in "test mode" (before power down) will be displayed; the dash (-) in the leftmost display position indicates the radio is in "test mode".

Remove the short.

Note: When in "test mode", connect the aerial socket to a dummy load to prevent interference with trunking systems and avoid testing on channels in use locally.

5.4.5.3 Function Selection

Use the digit entry buttons to set up the desired function number from the list below:

modem control:	10	continuous zeros (1800Hz tone)
	11	continuous ones (1200Hz tone)
	12	preamble (alternating 1200/1800Hz)
	13	modem Tx off
mute control:	20	mute the receive audio
	21	unmute the receive audio
	22	mute the microphone audio
	23	unmute the microphone audio
PA control:	30	inhibit the PA
	31	enable the PA
RSSI threshold set up:	61	set up L1 threshold value
	62	set up L2 threshold value
	63	display RSSI level (averaged)
	64	display L1 threshold value
	65	display L2 threshold value
special functions:	99	display/modify channel number entry

Press the AUX button to execute the function.

For radio control functions, an "A" will appear in the display to indicate that the number is valid and that the function has been executed.

To set an RSSI threshold value:

Apply a signal to the radio at the threshold level.

Select the required function.

Two dashes will appear in the display while averaging of the RSSI signal is taking place.

When averaging is complete, the result is displayed (in decimal, full scale = 255) and stored in the radio's database. The database checksum is automatically updated.

Function 63 displays the averaged RSSI level and also indicates when the threshold values have been exceeded. The leftmost decimal point lights when L1 is exceeded, the rightmost when L2 is exceeded.

5.4.5.4 Channel Selection

Use the digit entry buttons to set up the desired one, two or three digit channel number.

Press the CALL button to execute the channel change. A dash will appear in the display to indicate that the channel number is valid and that the channel change has been executed.

The radio can be incremented to the next channel by grounding the "EMERGENCY" line (available on the power connector). Channel incrementing starts from the last programmed channel. When the highest valid channel is reached, the radio will reset to the lowest valid channel at the next increment.

5.4.5.5 Power Up State

In test mode the radio powers up in the following state:

- modem Tx off (13)
- receive audio unmuted (21)
- microphone audio unmuted (23)
- PA enabled (31)
- receive mode (PTT released)
- display showing channel number, with a dash in the leftmost display position (the last channel number entry in "test mode" at power down will be displayed on the next power up in "test mode")

5.4.5.6 General

An invalid number selection is indicated by a "UA2" message in the display.

The microphone pressel functions as per normal radio operation. The 'TX' LED indicates that the radio is in transmit mode but does not necessarily mean that it is transmitting (e.g. the PA could be inhibited).

The 'SYS' LED indicates the synthesiser lock status, and is on whenever the synthesiser is out of lock.

The 'GO' LED indicates the squelch status and is on whenever a signal is detected on the selected channel.

5.5 VCO ALIGNMENT

Connect the T535TR to a dummy RF load.

Plug a VHF frequency counter onto radio test plug TP3:

Connect:-	centre pin	to	ground
	left pin	to	Rx VCO
	right pin	to	Tx VCO

Enter "test mode" as described in Section 5.4.5.2.

Monitor the loop voltage (TP2) with a high impedance voltmeter (0-10V range).

Select the highest channel.

1. Receive Mode

   Adjust CV291 for >6.25V and <6.5V at radio TP2.

   Check that the frequency is:

   highest Rx frequency - 21.4MHz

2. Transmit Mode (PTT switch closed)

   Adjust CV292 for >5.9V and <6.1V at radio TP2.

   Check that the frequency is:

   highest Tx frequency

Note: A loop voltage of less than 0.6V or more than 7.5V indicates the synthesiser is out of lock.

3. Select channel 1.

   Check that the voltage at radio TP2 is more than 3.5V in both transmit and receive modes.

5.6 REFERENCE FREQUENCY ADJUSTMENT

The 12.5kHz reference frequency must be accurately set. This is measured indirectly by monitoring the VCO frequency.

Connect a frequency counter to the VCO output (TP3).

Select the lowest channel.

Adjust L30 so that the receive VCO frequency is equal to the lowest receive channel frequency minus 21.4MHz (±300Hz).

Check that the transmit VCO frequency is equal to the lowest transmit channel frequency (±300Hz).

5.7 TRANSMITTER ADJUSTMENTS

5.7.1 ALIGNMENT

Connect a power meter to the aerial socket.

Set RV260 (power control) fully clockwise (as viewed from the component side).

Enter "test mode" as described in Section 5.4.5.2.

Select the middle channel.

Close the PTT switch.

Tune CV273, CV289 and CV290 for maximum power.

Adjust RV260 for 25W output.

Slightly adjust CV290 (in the direction which produces a decrease in current) to set the total current to between 4.0 and 4.5A.

Readjust RV260 to set the output power to 25W.

Check the RF power output on the highest frequency channel and, if necessary, increase it to approximately 25W by slightly adjusting the capacitance of CV289.

Check that the power output on the lowest frequency channel has not dropped more than 4W.

Check that the total current does not exceed 4.5A on either channel.

Note: Some variation in power output can be expected as channel separation extends towards 6MHz.

5.7.2 MODULATION ADJUSTMENT (SPEECH)

Enter "test mode" as described in Section 5.4.5.2.

Select channel 1.

Disable the modem as described in Section 5.4.5.3.

Connect an audio signal source of approximately 600 ohms impedance across the microphone (level 25mV PD).

Close the PTT switch and measure the deviation.

Sweep the audio frequency between 300Hz and 3kHz to check for maximum deviation.

Note the audio frequency at which the maximum deviation occurs, and then check the deviation on the middle and highest channels.

Set the channel with the highest deviation to ±2.5kHz maximum.

5.7.3 MODULATION ADJUSTMENT (SIGNALLING)

Select the middle channel.

Disconnect the audio generator and enable "Preamble" from the modem as described in Section 5.4.5.3.

Mute the microphone as described in Section 5.4.5.3.

Set the data deviation to ±1.5kHz via RV1 on the TCB.

Check the lowest and highest channels to ensure that the deviation is between ±1.3kHz and ±1.7kHz.

5.7.4 RF POWER ADJUSTMENTS

Note: To comply with licence requirements when used in a fixed station role with the T508 power supply unit (e.g. as a despatcher), the T535TR should have the RF power output reduced.

Connect a power meter to the aerial socket.

Set RV256 (power control) to adjust the RF power output to the required level.

For use with the T508 power supply unit, the RF power output should be adjusted to the level required to achieve the correct rating (ERP) as permitted in the relevant licence document for the installation, allowing for antenna gain and feeder/connector losses.

Do **not** adjust the RF power output level for less than 5W.

5.8 RECEIVER ADJUSTMENTS

5.8.1 ALIGNMENT

1. Adjust RV149 fully clockwise.

2. Connect the radio aerial output to a signal generator set to the middle channel.

+ + + + + + +

3. The IF/Quad coils will need tuning only if they have been adjusted or if components have been replaced in the IF; if not, proceed to instruction 4.

   Adjust the signal generator to -20dBm with no modulation.

   Tune L21 for 2.5V ±100mV at IC7 pin 9.

   Adjust the signal generator (modulated 1kHz at 1.5kHz deviation) to give a reading of approximately 12dB sinad.

   Tune L20 and L19 for best sinad, adjusting the RF output level of the signal generator to maintain approximately 12dB sinad; repeat this at least twice.

+ + + + + + +

4. Adjust the signal generator (modulated 1kHz at 1.5kHz deviation) to give a reading of approximately 12dB sinad.

5. Tune L15, L13, L12 and L10 in that order for best sinad.

   Repeat the tuning until a maximum sensitivity of </= -118dBm for 12dB sinad is obtained. Do not adjust L19, L20 or L21.

6. Retune L13, L12 and L10 to set the three RSSI levels so that the difference between the highest and lowest levels is </=200mV.

   Check that a sensitivity of </= -118dBm for 12dB sinad can still be obtained across the band.

7. Adjust the level of the signal generator to give 12dB sinad on the middle channel.

8. Adjust RV149 so that the mute gate just opens.

5.8.2 RSSI ALIGNMENT

Complete the receiver alignment as instructed in Section 5.8.1.

Select the middle channel.

Enter the L1 and L2 levels as described in Section 5.4.5.3.

Set the L1 threshold level with an input signal of -108dBm.

Set the L2 threshold level with an input signal of -94dBm.

Check the L levels as follows:

Enter "63" on the display and push "AUX": the average RSSI level will be displayed.

When the RSSI level exceeds L1, the leftmost decimal point will light.

When the L2 level is exceeded, the rightmost decimal point will light.

Ensure that the L2 level is reached with a signal generator input of -94dBm ±6dB across the band.

5.9 RADIO FAULT FINDING

5.9.1 GENERAL

During servicing it may be necessary to measure specific performance parameters as a means of verifying the presence of a fault condition.

The following performance tests provide a means for checking the various two way radio parameters. When used in conjunction with the voltage level test points which are given on the Circuit Diagrams, a fault can be readily pinpointed.

To assist circuit tracing, all plugs and connections are shown on the outer edge of the Wiring Diagram, where the "Function" is shown.

5.9.2 RECEIVER PERFORMANCE TESTS

Carry out the following checks in "test mode" after the alignment has been completed.

5.9.2.1 To Check The Squelch Operation

Select the middle channel.

Connect a sinad meter across the speaker terminals.

Connect a VHF signal generator to the aerial input terminal.

Set the signal generator output level to zero and the modulation to ±1.5kHz deviation at 1kHz.

Increase the signal generator level until the squelch just opens (12dB ±2dB sinad).

Reduce the signal generator level until the squelch gate just closes.

5.9.2.2 To Check The Audio Output Level

Connect an AC mV/meter and an oscilloscope across the speaker terminals.

Connect a VHF signal generator to the aerial input socket, with the output set to -87dBm (1µV) modulated to ±1.5kHz deviation at 1kHz.

Set the volume control to the onset of clipping.

The receiver output should be 3.7V across 4 ohms at +13.8V supply.

Check the distortion with the aid of a distortion analyzer connected across the speaker terminals.

The distortion should be </=5%.

5.9.2.3 To Check The Sinad Sensitivity

Connect a sinad meter across the speaker terminals.

Connect the signal generator to the aerial input terminal.

Set the signal generator accurately on the receive frequency.

Couple a 10.7MHz (second harmonic) reference oscillator loosely into the receiver IF stage, tune the signal generator for a zero beat, then uncouple the reference oscillator.

Set the signal generator deviation to ±1.5kHz at 1kHz.

Note: It is important that the modulating frequency matches the notch of the sinad meter.

Set the signal generator output level to zero.

Set RV149 fully clockwise, as viewed from the component side of the main PCB.

Increase the signal generator output level until a sinad of 12dB is reached.

The signal generator output should not be greater than -118dBm. As the channel separation extends towards 4MHz, the sinad sensitivity will degrade towards -117dBm.

Reset RV149 so the squelch opens at 12dB ±2dB sinad.

5.9.2.4 To Check The Signal+Noise to Noise Ratio

Set the signal generator output level to -107dBm (1µV) modulated to ±2.5kHz deviation at 1kHz.

Set the volume control for a reading of 0dB on a convenient scale on the mV/meter.

Switch the signal generator modulation off.

Note the reading on the mV/meter.

The fall in reading when the modulation is switched off should be >/=27dB.

5.9.2.5 To Check The Ultimate Signal To Noise Ratio

Note: A good quality low noise RF signal generator should be used for this check (e.g. HP8640B or 8656).

Set the signal generator to give an 'on channel' signal, modulated to ±2.5kHz with a 1kHz tone.

Set the signal generator output level to -47dBm.

Connect an AC mV/meter across the speaker terminals.

Adjust the volume control for a reading of 0.8V ('0'dBm) on a convenient scale.

Turn the signal generator modulation off.

Note the reading on the mV/meter.

The fall in reading when the modulation is switched off should be at least 45dB (a low reading could be caused by a faulty IC7 or a noisy VCO).

5.9.3 TRANSMITTER PERFORMANCE TESTS

Carry out the following checks in "test mode" after the alignment has been completed.

5.9.3.1 Audio Processor

(a) TO CHECK THE LIMITER CIRCUIT

Connect an oscilloscope to monitor the waveform at pin 14 of IC2.

Provide an audio signal to the audio processor as in Section 5.7.2.

Set the frequency of the audio signal generator to 1kHz.

Slowly increase the signal generator output level until the waveform begins to distort (squaring), indicating that limiting has commenced.

Any further increase in signal generator output level should not increase the amplitude of the waveform.

(b) TO CHECK THE AUDIO ALC OPERATION

Set up the audio signal as described above (Section 5.7.2).

Set the oscilloscope to monitor the waveform at pin 1 of IC2.

Connect an EVM to the junction of C49/R52.

Increase the output level of the signal generator to 10dB above the limiting level (Section 5.9.3.1). Note the amplitude on the oscilloscope, then increase the signal generator output level by another 10dB.

Check that the amplitude of the waveform does not increase or distort significantly.

The EVM should show a 'positive DC' reading.

(c) TO CHECK THE GAIN OF THE AUDIO PROCESSOR

Provide an audio signal to the audio processor as in Section 5.7.2.

Connect the T535TR antenna output through a 50dB RF power attenuator (see Section 5.4.1, item 15) to a modulation meter.

Connect a mV/meter across the microphone terminals on the PCB. (To monitor the input to the audio processor.)

Set the frequency of the audio signal generator to 1kHz.

Check the deviation control, RV79, as in Section 5.7.2.

Slowly increase the output level of the audio signal generator until a deviation of ±1.5kHz is reached.

Check that the mV/meter reads 1mV ±1mV.

Note: The audio processor gain must be checked at a level below that at which the audio ALC or limiting are influencing the measurements.

5.9.3.2 Modulation Characteristics

(a) TO CHECK THE ABOVE LIMITING RESPONSE

Connect the T535TR aerial output via a 50dB RF power attenuator to a modulation meter.

Provide an audio signal to the audio processor.

Increase the audio signal generator output level to 20dB above the limiting level (Section 5.9.3.1).

Vary the frequency of the signal generator between 0.3 and 10kHz.

Note the deviation on the modulation meter.

Between 300Hz and 3kHz the deviation should be within 4dB of maximum.

Above 3kHz the deviation should decrease in excess of 25dB/octave.

(b) TO CHECK THE BELOW LIMITING RESPONSE

Decrease the audio signal generator output level to 10dB below the limiting level (Section 5.9.3.1).

Vary the frequency of the audio signal generator between 0.3 and 10kHz.

Note the reading on the modulation meter.

Within the specified bandwidth for the version of T535TR, the deviation should increase at the rate of 6dB/octave (+1, -3dB relative to 1kHz).

Above 3kHz the deviation should decrease in excess of 25dB/octave.

5.9.3.3 To Check The Power Control Circuit

Connect an RF power meter to the transmitter output.

Close the PTT switch.

Ensure that the transmitter is correctly tuned (Section 5.7).

Vary the supply voltage between 10 and 16V.

Above 13.8V the RF power output should not increase by more than 2W.

At 10.8V the RF power output should be more than 10W.

5.9.3.4 To Check The Transmission Timer

Connect an RF power meter to the transmitter output.

Close the PTT switch.

Check that the T535TR reverts to 'receive' after approximately 1.5 minutes (+15, -45 seconds) of transmission time.

The transmission time may be set accurately by changing the value of either C16 (100µF) and/or R17 (1M).

To increase the transmission time increase the value of resistance or capacitance as required.

5.9.3.5 To Check The Transmit & Receive VCO Control Range

Plug a frequency counter onto the VCO test plug (TP3).

Short TP2 alternately to earth and 8V on both receive and transmit.

The frequency shift should be more than 6MHz on transmit and more than 4MHz on receive.

5.9.4 SYNTHESISER FAULT FINDING

Carry out the following checks in "test mode" after the alignment has been completed.

5.9.4.1 If The VCO Gives No Output

Ensure the frequency counter is connected to the middle pin of TP3.

Check the supply voltages are as follows:

receive VCO	R290	6.5V
	RC300	8V
transmit VCO	R291	6.5V
	RC303	8V

Remove the VCO box and check for shorts inside.

Check the gate and source voltages as per the Circuit Diagram.

5.9.4.2 If The Synthesiser Does Not Lock Up

Check the VCO control range following the instructions in Section 5.9.3.5.

If the control range is low, check the circuit for faults between TP2 and the varicaps. The voltage on the varicaps must be the same as the loop voltage.

Tune the receive VCO until its programmed frequency is within the switching range.

If the loop voltage is still either less than 0.6V or more than 7.5V, check pin 7 and pin 8 of the synthesiser (IC 8):

(Under normal operating conditions the loop voltage is between 1.75 and 6.5V and both pin 7 and pin 8 are high, except for very narrow pulses [100ns] at the same rate as the reference frequency.)

(a) If pin 7 pulses low and the loop voltage is low (TP2), or if pin 8 pulses low and the loop voltage is high, check the circuitry between Q27/Q30 and TP2.

(b) If both stay high and the loop voltage is high, check the crystal oscillator.

Measure the VCO frequency.

Measure the prescaler output frequency (pin 3).

Check that $f_{prescaler} = f_{VCO}/40$

Note: The prescaler should not be loaded with 50 ohms - a 1M ohm input counter must be used.

Check that the input voltage of the synthesiser (pin 1) is more than 500mV pp.

5.9.4.3 To Check The VCO Output Frequency Stability

If the synthesiser locks up but does not reach a stable VCO output frequency, or if the VCO output frequency is a few channels off frequency, check:

(a) that the input power to the prescaler from the VCO is not too low;

(Check the VCO output power and the circuitry between the VCO and the prescaler.)

(b) that the modulus control pulse (pin 1 of the prescaler) is more than 4.0V.

5.9.4.4 To Check The Transmitter Switch-On

If the synthesiser locks up but there is no transmitter power, check:

(a) that, if the synthesiser is locked, the lock detect output (IC8, pin 28) is high;

(This output pulses low if the synthesiser is out of lock.)

(b) that the voltages are as shown in the Circuit Diagram (Q25, Q41).

5.9.4.5 Microphonics

If the set shows a high level of microphonics:

(a) Check that all components inside the VCO box are flush mounted to the PCB, paying special attention to the trimmer capacitors. (Resoldering may be attempted, but a solvent cleaner must never be used inside the VCO box.)

(b) Check the sensitivity of L37. Cracked lacquer inside the coil may cause microphonics. Remove the can, disassemble, and recoat the coil with nail polish.

(c) Remove any excess solder where the VCO box touches the PCB.

(d) Ensure that all screws are securely tightened and that the rubber base pad and coil bumpers are in place.

5.10 TRUNKING CONTROL BOARD FAULT FINDING

5.10.1 GENERAL

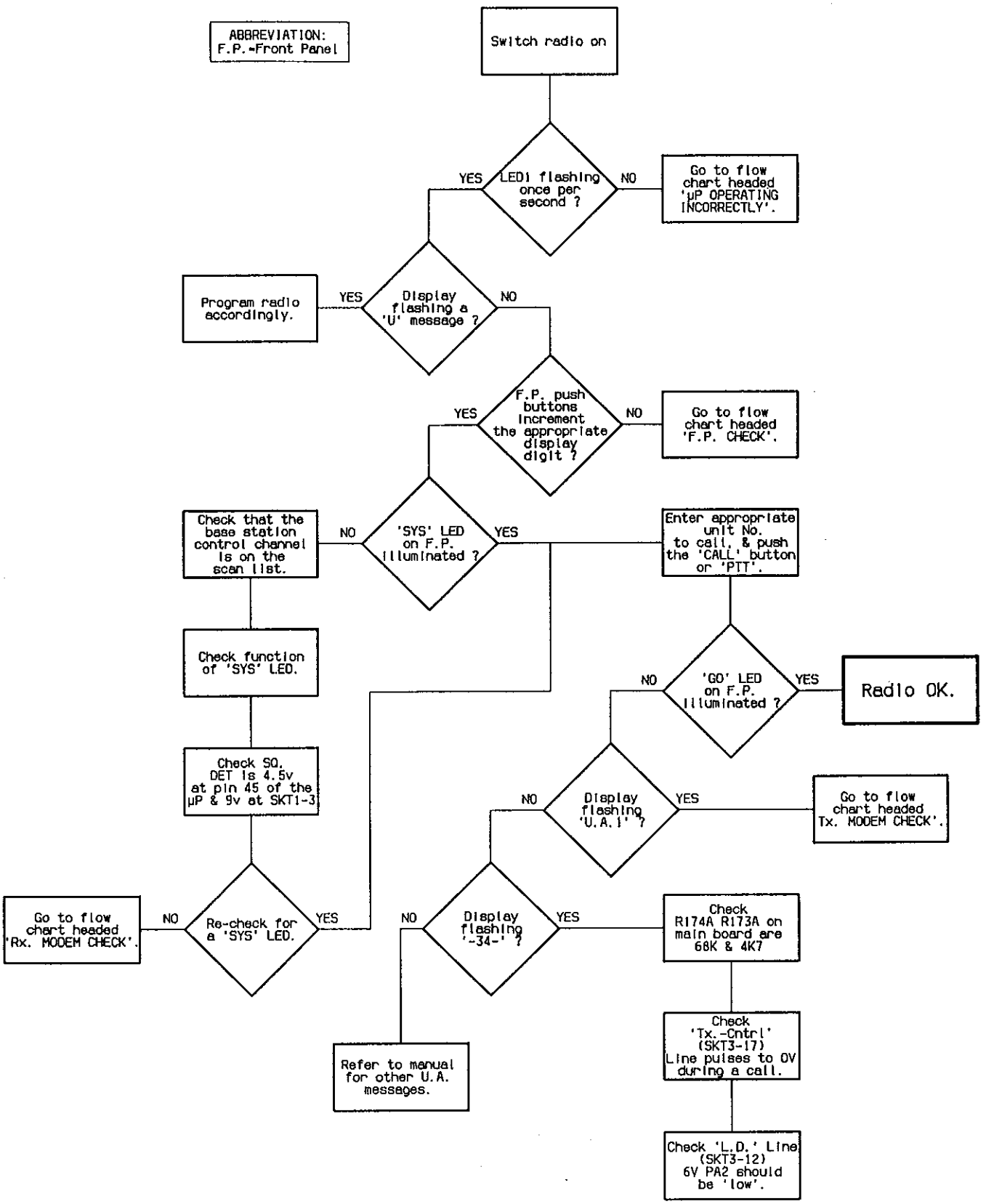
Five flow charts are provided in this Section as an aid to fault finding the TCB. The aim of these charts is to enable simple faults to be traced quickly to a certain area of the board.

If there is a regular fault that requires replacement of the TCB, please contact the Product Support Group at Tait Electronics Ltd.

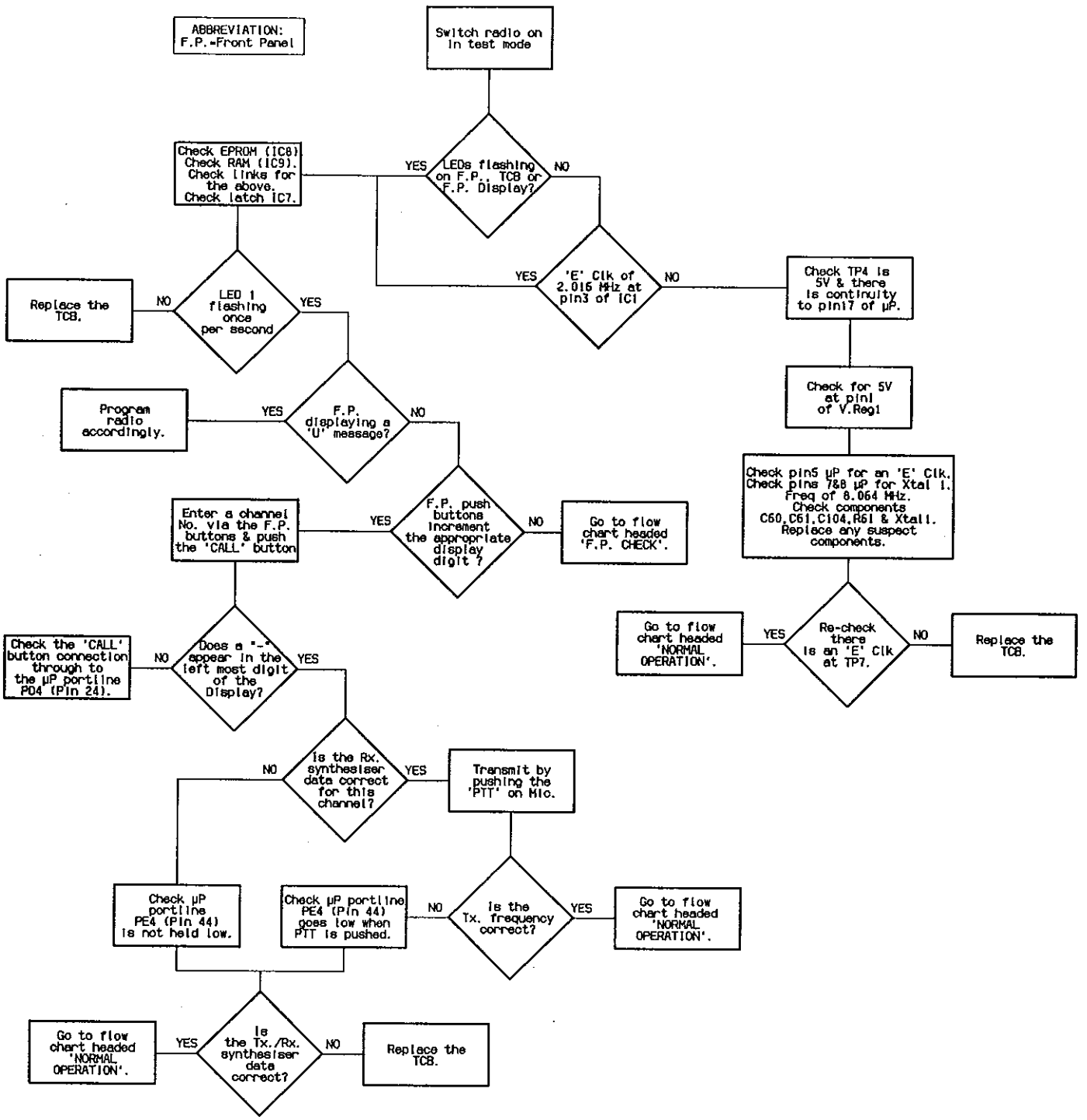
Start the fault finding by referring to Section 5.10.2, "Normal Operation", referring thereafter to the other flow charts as directed (removal of the radio covers is described in Section 5.2).

Note: When servicing is complete, always check that the "radio personality" is correct for the user. A before and after check of the "radio personality" is recommended.

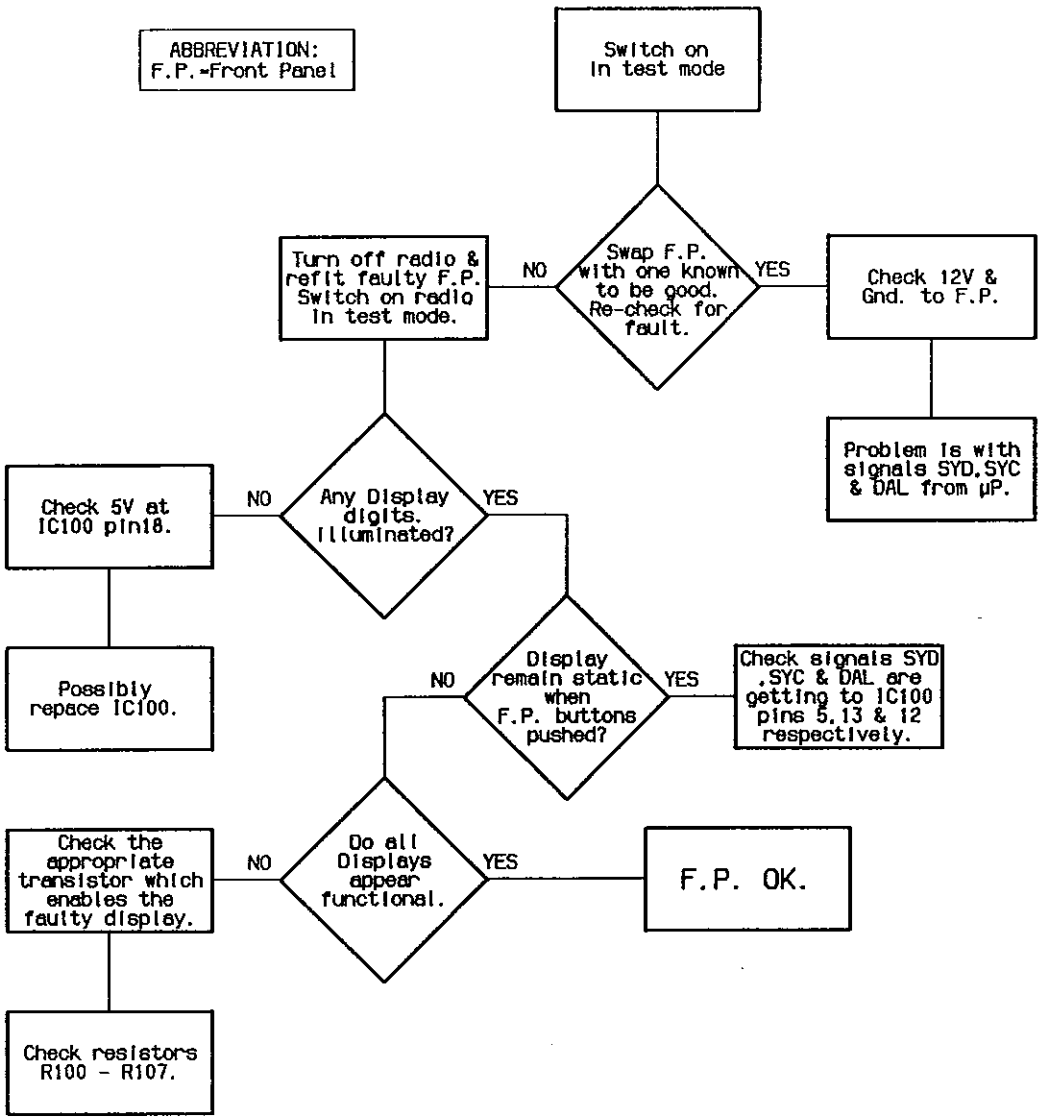
5.10.2 NORMAL OPERATION



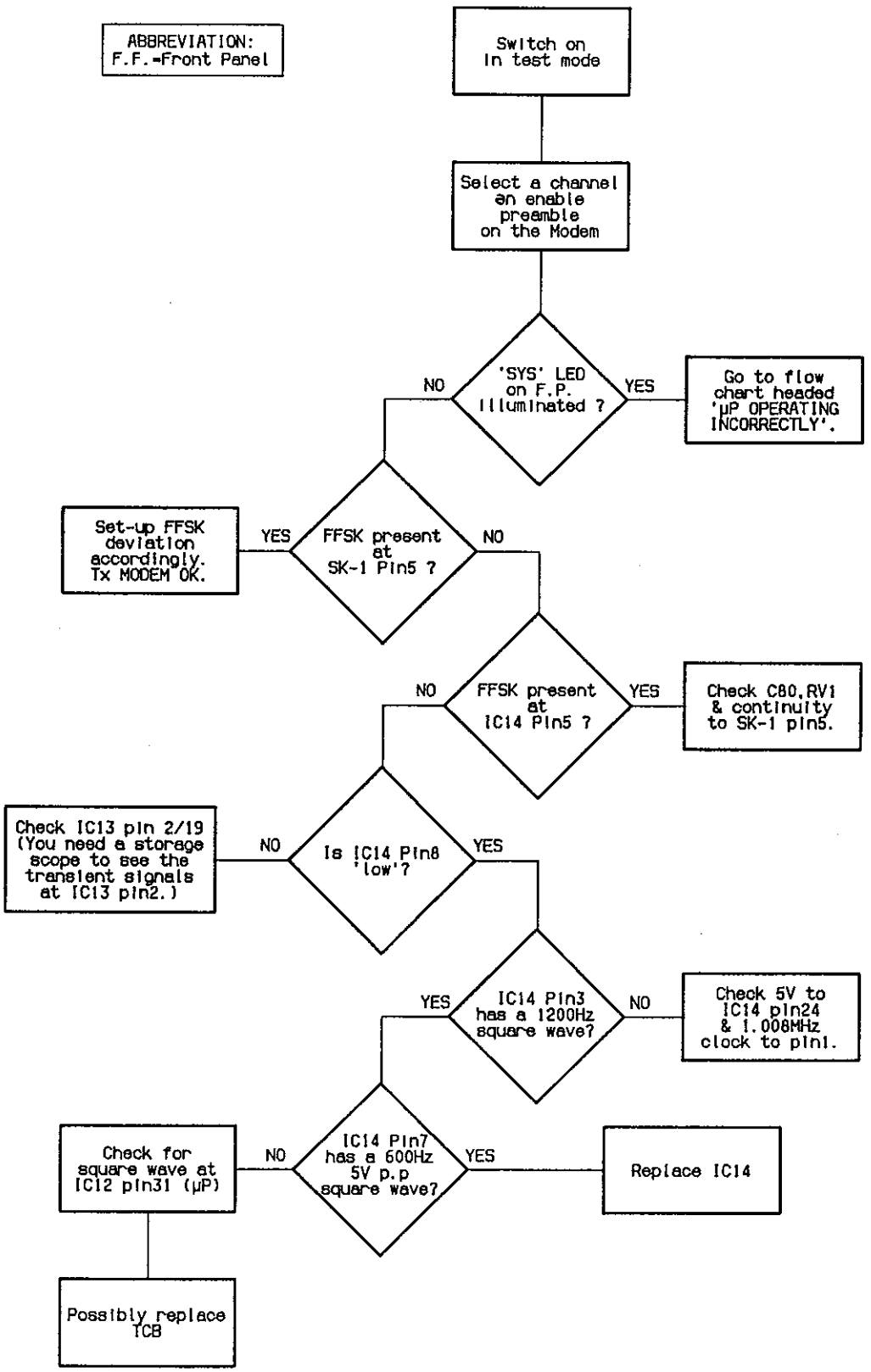
5.10.3 MICROPROCESSOR OPERATING INCORRECTLY



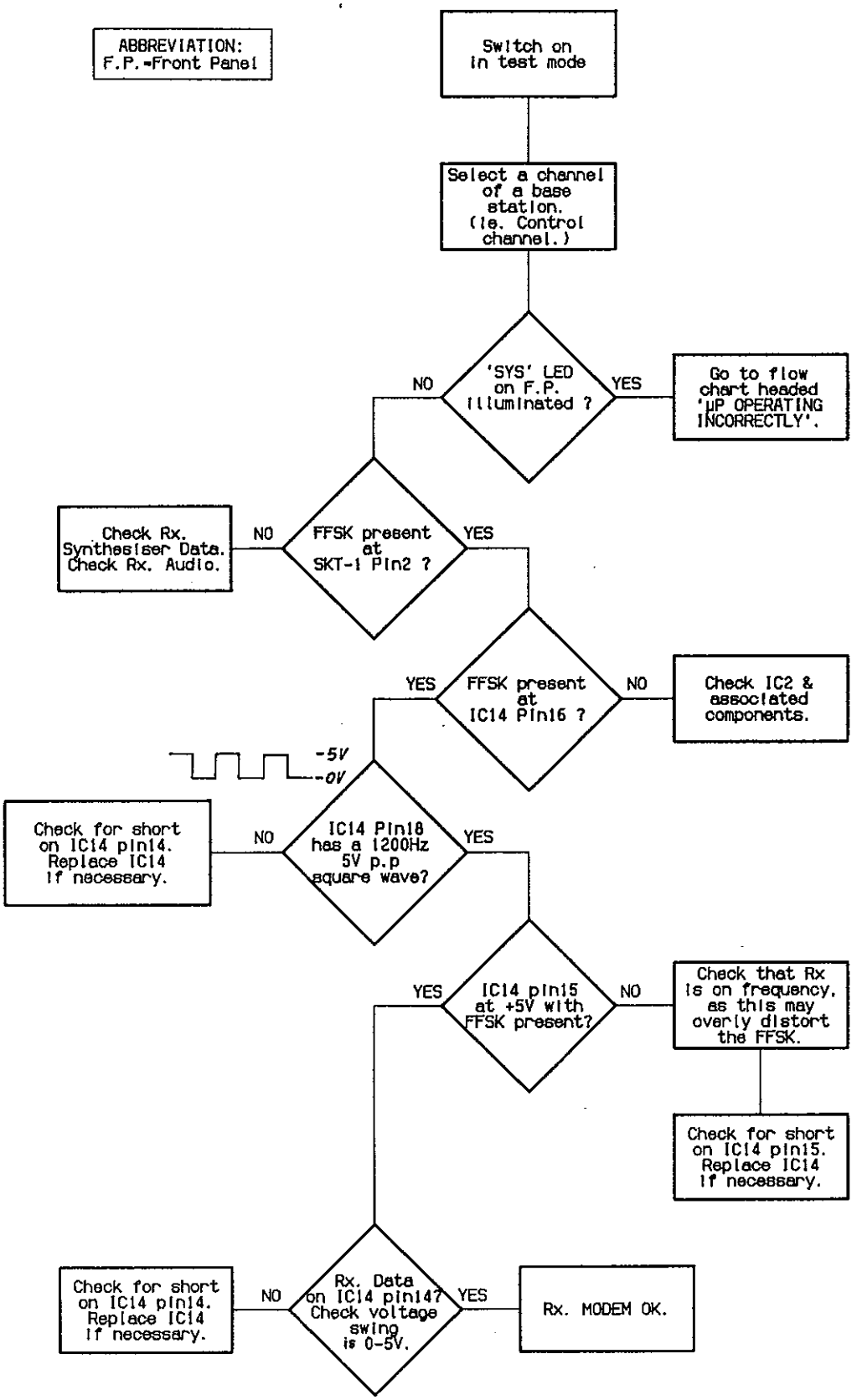
5.10.4 FRONT PANEL CHECK



5.10.5 TX MODEM CHECK



5.10.6 RX MODEM CHECK



SECTION 6 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, D6, 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 three columns: the circuit reference, IPN and description.

INDEX

T535TR PARTS LIST MAIN BOARD

REF	IPN	DESCRIPTION
A/2	237-00010-23	RELAY 9V DPDT 14 PIN DIL PCB MTG FUJITSU 244
C1	011-54470-03	CAPACITOR CERAMIC AUTOINSERT 4N7 10% T/C B 50V
CF1	276-00010-13	FILTER CERAMIC 455KHZ 9KHZ B/W CFW455G
CFL1	012-04100-01	CAPACITOR CERAMIC FEEDTHRU 1N LESS LEAD
C2	020-19100-02	CAPACITOR ELECTRO RADIAL 1000M 16V 12X20MM
CFL2	012-04100-01	CAPACITOR CERAMIC FEEDTHRU 1N LESS LEAD
C3	011-54470-03	CAPACITOR CERAMIC AUTOINSERT 4N7 10% T/C B 50V
CFL3	012-04100-01	CAPACITOR CERAMIC FEEDTHRU 1N LESS LEAD
CF3	012-04100-01	CAPACITOR CERAMIC FEEDTHRU 1N LESS LEAD
C4	020-57100-55	CAPACITOR ELECTRO AUTOINSERT RDL 1UF 50V 4X7MM
CC4A	015-24100-08	CAPACITOR CERAMIC 0805 CHIP 1N 10% X7R 50V
CC4B	015-24100-08	CAPACITOR CERAMIC 0805 CHIP 1N 10% X7R 50V
CC4C	015-24100-08	CAPACITOR CERAMIC 0805 CHIP 1N 10% X7R 50V
C9	011-54470-03	CAPACITOR CERAMIC AUTOINSERT 4N7 10% T/C B 50V
C10	020-09100-07	CAPACITOR ELECTRO RADIAL 100M 10V 6.3X7MM 5MM LS
C10A	020-09100-07	CAPACITOR ELECTRO RADIAL 100M 10V 6.3X7MM 5MM LS
C10B	020-09100-07	CAPACITOR ELECTRO RADIAL 100M 10V 6.3X7MM 5MM LS
C11	011-54100-01	CAPACITOR CERAMIC AUTOINSERT 1N 10% T/C B 63V
C15	011-53150-01	CAPACITOR CERAMIC AUTOINSERT 150P 5% N150 50/63V
C16	020-09100-07	CAPACITOR ELECTRO RADIAL 100M 10V 6.3X7MM 5MM LS
C17	020-57100-55	CAPACITOR ELECTRO AUTOINSERT RDL 1UF 50V 4X7MM
C40	011-53150-01	CAPACITOR CERAMIC AUTOINSERT 150P 5% N150 50/63V
C41	025-06220-01	CAPACITOR TANT BEAD 220N 35V
C42	011-54470-03	CAPACITOR CERAMIC AUTOINSERT 4N7 10% T/C B 50V
C44	020-58470-05	CAPACITOR ELECTRO AUTOINSERT RDL 47M 16V 6.3X7MM
C45	011-53100-01	CAPACITOR CERAMIC AUTOINSERT 100P 5% N150 50/63V
C45A	022-55470-10	CAPACITOR MYLAR AUTOINSERT 47N 10% 63V POTTED
C46	011-53100-01	CAPACITOR CERAMIC AUTOINSERT 100P 5% N150 50/63V
C46A	022-55470-10	CAPACITOR MYLAR AUTOINSERT 47N 10% 63V POTTED
C47	022-55220-10	CAPACITOR MYLAR AUTOINSERT 22N 10% 63V POTTED
C48	011-52470-01	CAPACITOR CERAMIC AUTOINSERT 47P 5% N150 50/63V
C49	020-58470-05	CAPACITOR ELECTRO AUTOINSERT RDL 47M 16V 6.3X7MM
C50	022-54220-10	CAPACITOR MYLAR AUTOINSERT 2N2 10% 63V POTTED
C51	022-55150-10	CAPACITOR MYLAR AUTOINSERT 15N 10% 63V POTTED
C52	022-55150-10	CAPACITOR MYLAR AUTOINSERT 15N 10% 63V POTTED
C53	022-55220-10	CAPACITOR MYLAR AUTOINSERT 22N 10% 63V POTTED
C54	022-55100-10	CAPACITOR MYLAR AUTOINSERT 10N 10% 63V POTTED
C55	011-03680-01	CAPACITOR CERAMIC 680P 10% N1K5 50/63V
CC56	015-24100-08	CAPACITOR CERAMIC 0805 CHIP 1N 10% X7R 50V
C58	022-55470-10	CAPACITOR MYLAR AUTOINSERT 47N 10% 63V POTTED
C62	022-55680-10	CAPACITOR MYLAR AUTOINSERT 68N 10% 63V POTTED
C63	011-52330-01	CAPACITOR CERAMIC AUTOINSERT 33P 5% N150 50/63V
C64	022-55100-10	CAPACITOR MYLAR AUTOINSERT 10N 10% 63V POTTED
C65	022-54470-10	CAPACITOR MYLAR AUTOINSERT 4N7 10% 63V POTTED
C66	011-51820-01	CAPACITOR CERAMIC AUTOINSERT 8P2 5% NPO 50/63V
C67	011-52680-01	CAPACITOR CERAMIC AUTOINSERT 68P 5% N150 50/63V
C68	022-55470-10	CAPACITOR MYLAR AUTOINSERT 47N 10% 63V POTTED
C85	020-57100-55	CAPACITOR ELECTRO AUTOINSERT RDL 1UF 50V 4X7MM
C86	020-57100-55	CAPACITOR ELECTRO AUTOINSERT RDL 1UF 50V 4X7MM
C87	020-57100-55	CAPACITOR ELECTRO AUTOINSERT RDL 1UF 50V 4X7MM
C88	022-54220-10	CAPACITOR MYLAR AUTOINSERT 2N2 10% 63V POTTED
C90	020-58470-05	CAPACITOR ELECTRO AUTOINSERT RDL 47M 16V 6.3X7MM
C91	022-56100-10	CAPACITOR MYLAR AUTOINSERT 100N 10% 63V POTTED
C92	020-09220-01	CAPACITOR ELECTRO RADIAL 220M 16V 10X12.5MM
C93	011-53470-02	CAPACITOR CERAMIC AUTOINSERT 470P 10% T/C B 63V
C100	011-51820-01	CAPACITOR CERAMIC AUTOINSERT 8P2 5% NPO 50/63V
C101	011-51470-01	CAPACITOR CERAMIC AUTOINSERT 4P7 5% NPO 50/63V
C102	011-52120-01	CAPACITOR CERAMIC AUTOINSERT 12P 5% NPO 50/63V
C103	011-51680-01	CAPACITOR CERAMIC AUTOINSERT 6P8 5% NPO 50/63V
C104	011-54470-03	CAPACITOR CERAMIC AUTOINSERT 4N7 10% T/C B 50V
C106	011-54470-03	CAPACITOR CERAMIC AUTOINSERT 4N7 10% T/C B 50V
C107	011-51220-01	CAPACITOR CERAMIC AUTOINSERT 2P2 5% NPO 50/63V
C107A	011-51100-01	CAPACITOR CERAMIC AUTOINSERT 1PO 5% P100 50/63V
C108	011-00500-01	CAPACITOR CERAMIC OP5 +/-0.25P P100 50V 5MM L/S
C109	011-52150-01	CAPACITOR CERAMIC AUTOINSERT 15P 5% NPO 50/63V
C110	011-52270-01	CAPACITOR CERAMIC AUTOINSERT 27P 5% N150 50/63V
C111	011-52180-01	CAPACITOR CERAMIC AUTOINSERT 18P 5% N150 50/63V
C112	022-55470-10	CAPACITOR MYLAR AUTOINSERT 47N 10% 63V POTTED
C113	020-58100-03	CAPACITOR ELECTRO AUTOINSERT RDL 10M 50V 5X11MM
C114	011-53470-02	CAPACITOR CERAMIC AUTOINSERT 470P 10% T/C B 63V
C115	011-51270-01	CAPACITOR CERAMIC AUTOINSERT 2P7 5% NPO 50/63V
C116	011-51820-01	CAPACITOR CERAMIC AUTOINSERT 8P2 5% NPO 50/63V
C117	011-51680-01	CAPACITOR CERAMIC AUTOINSERT 6P8 5% NPO 50/63V
C118	011-52100-01	CAPACITOR CERAMIC AUTOINSERT 10P 5% NPO 50/63V
C119	011-53120-01	CAPACITOR CERAMIC AUTOINSERT 120P 5% N150 50/63V
C120	011-53120-01	CAPACITOR CERAMIC AUTOINSERT 120P 5% N150 50/63V
C121	011-54470-03	CAPACITOR CERAMIC AUTOINSERT 4N7 10% T/C B 50V
C122	022-56100-10	CAPACITOR MYLAR AUTOINSERT 100N 10% 63V POTTED
C123	011-53100-01	CAPACITOR CERAMIC AUTOINSERT 100P 5% N150 50/63V
C124	011-53100-01	CAPACITOR CERAMIC AUTOINSERT 100P 5% N150 50/63V
CC125	015-22150-01	CAPACITOR CERAMIC 0805 CHIP 15P 5% NPO 50V
C127	020-58470-05	CAPACITOR ELECTRO AUTOINSERT RDL 47M 16V 6.3X7MM
C128	011-54470-03	CAPACITOR CERAMIC AUTOINSERT 4N7 10% T/C B 50V
CC129	015-23220-01	CAPACITOR CERAMIC 0805 CHIP 220P 5% NPO 50V
CC134	015-05470-08	CAPACITOR CERAMIC 1206 CHIP 47N 10% X7R 50V
CC136	015-05470-08	CAPACITOR CERAMIC 1206 CHIP 47N 10% X7R 50V
C137	011-52270-01	CAPACITOR CERAMIC AUTOINSERT 27P 5% N150 50/63V
C138	011-52680-01	CAPACITOR CERAMIC AUTOINSERT 68P 5% N150 50/63V
C140	011-54470-03	CAPACITOR CERAMIC AUTOINSERT 4N7 10% T/C B 50V
C141	011-54470-03	CAPACITOR CERAMIC AUTOINSERT 4N7 10% T/C B 50V
C142	011-54470-03	CAPACITOR CERAMIC AUTOINSERT 4N7 10% T/C B 50V
C143	025-07330-02	CAPACITOR TANT BEAD 3M3 20% 16V 4X7MM
C151	022-56100-10	CAPACITOR MYLAR AUTOINSERT 100N 10% 63V POTTED
C152	022-55470-10	CAPACITOR MYLAR AUTOINSERT 47N 10% 63V POTTED
C153	022-55470-10	CAPACITOR MYLAR AUTOINSERT 47N 10% 63V POTTED
C154	022-55470-10	CAPACITOR MYLAR AUTOINSERT 47N 10% 63V POTTED
C155	020-09100-07	CAPACITOR ELECTRO RADIAL 100M 10V 6.3X7MM 5MM LS
C156	022-54470-10	CAPACITOR MYLAR AUTOINSERT 4N7 10% 63V POTTED
C170A	022-55470-10	CAPACITOR MYLAR AUTOINSERT 47N 10% 63V POTTED
C171	020-58470-05	CAPACITOR ELECTRO AUTOINSERT RDL 47M 16V 6.3X7MM
C172	011-54470-03	CAPACITOR CERAMIC AUTOINSERT 4N7 10% T/C B 50V
C173	011-52220-06	CAPACITOR CERAMIC AUTOINSERT 22P 5% N750 50/63V
C174	011-52150-06	CAPACITOR CERAMIC AUTOINSERT 15P 5% N750 50/63V
C175	022-55470-10	CAPACITOR MYLAR AUTOINSERT 47N 10% 63V POTTED
C176	022-54470-10	CAPACITOR MYLAR AUTOINSERT 4N7 10% 63V POTTED
C177	022-06330-03	CAPACITOR METAL POLYESTER 330N 10% 50V 5MM L/S
C178	025-07330-02	CAPACITOR TANT BEAD 3M3 20% 16V 4X7MM
C179	020-58470-05	CAPACITOR ELECTRO AUTOINSERT RDL 47M 16V 6.3X7MM
C182	022-55150-10	CAPACITOR MYLAR AUTOINSERT 15N 10% 63V POTTED
C184	022-55470-10	CAPACITOR MYLAR AUTOINSERT 47N 10% 63V POTTED
C186	022-55470-10	CAPACITOR MYLAR AUTOINSERT 47N 10% 63V POTTED
C220	011-54100-01	CAPACITOR CERAMIC AUTOINSERT 1N 10% T/C B 63V
C222	022-55470-10	CAPACITOR MYLAR AUTOINSERT 47N 10% 63V POTTED
C224	011-54100-01	CAPACITOR CERAMIC AUTOINSERT 1N 10% T/C B 63V
C225	011-54100-01	CAPACITOR CERAMIC AUTOINSERT 1N 10% T/C B 63V
C228	011-52330-01	CAPACITOR CERAMIC AUTOINSERT 33P 5% N150 50/63V
C229	011-52270-01	CAPACITOR CERAMIC AUTOINSERT 27P 5% N150 50/63V
C238	022-54470-10	CAPACITOR MYLAR AUTOINSERT 4N7 10% 63V POTTED
C250	011-52150-01	CAPACITOR CERAMIC AUTOINSERT 15P 5% NPO 50/63V
C251	011-51470-01	CAPACITOR CERAMIC AUTOINSERT 4P7 5% NPO 50/63V
C252	011-54470-03	CAPACITOR CERAMIC AUTOINSERT 4N7 10% T/C B 50V
C253	020-58100-03	CAPACITOR ELECTRO AUTOINSERT RDL 10M 50V 5X11MM
C254	011-54100-01	CAPACITOR CERAMIC AUTOINSERT 1N 10% T/C B 63V
C255	011-52100-01	CAPACITOR CERAMIC AUTOINSERT 10P 5% NPO 50/63V
C256	011-54470-03	CAPACITOR CERAMIC AUTOINSERT 4N7 10% T/C B 50V
C257	011-52270-01	CAPACITOR CERAMIC AUTOINSERT 27P 5% N150 50/63V
C258	011-52390-01	CAPACITOR CERAMIC AUTOINSERT 39P 5% N150 50/63V
C259	011-52390-01	CAPACITOR CERAMIC AUTOINSERT 39P 5% N150 50/63V
C260	011-54470-03	CAPACITOR CERAMIC AUTOINSERT 4N7 10% T/C B 50V
C261	011-53150-01	CAPACITOR CERAMIC AUTOINSERT 150P 5% N150 50/63V
C262	011-53220-01	CAPACITOR CERAMIC AUTOINSERT 220P 10% N750 50/63V
CC265	015-24100-08	CAPACITOR CERAMIC 0805 CHIP 1N 10% X7R 50V
CC266	015-24100-08	CAPACITOR CERAMIC 0805 CHIP 1N 10% X7R 50V
C267	022-55100-10	CAPACITOR MYLAR AUTOINSERT 10N 10% 63V POTTED
C268	011-54470-03	CAPACITOR CERAMIC AUTOINSERT 4N7 10% T/C B 50V
C269	020-58470-05	CAPACITOR ELECTRO AUTOINSERT RDL 47M 16V 6.3X7MM
C270	022-55100-10	CAPACITOR MYLAR AUTOINSERT 10N 10% 63V POTTED
CC271	015-24100-08	CAPACITOR CERAMIC 0805 CHIP 1N 10% X7R 50V
CC272	015-24100-08	CAPACITOR CERAMIC 0805 CHIP 1N 10% X7R 50V
CV273	028-02300-03	CAPACITOR TRIMMER 5/30P N750 TOP ADJ GREEN MUR TZ
C274	011-52220-01	CAPACITOR CERAMIC AUTOINSERT 22P 5% N150 50/63V
C275	011-51220-01	CAPACITOR CERAMIC AUTOINSERT 2P2 5% NPO 50/63V
CC275	015-23100-01	CAPACITOR CERAMIC 0805 CHIP 100P 5% NPO 50V
CC276	015-22470-01	CAPACITOR CERAMIC 0805 CHIP 47P 5% NPO 50V
C277	011-53220-01	CAPACITOR CERAMIC AUTOINSERT 220P 10% N750 50/63V
CC279	015-22270-01	CAPACITOR CERAMIC 0805 CHIP 27P 5% NPO 50V
CC280	015-22470-01	CAPACITOR CERAMIC 0805 CHIP 47P 5% NPO 50V
CC282	015-03270-02	CAPACITOR CERAMIC HIQ 1210 CHIP 270P 5% NPO 100V
C284	022-56100-10	CAPACITOR MYLAR AUTOINSERT 100N 10% 63V POTTED
C285	020-58470-05	CAPACITOR ELECTRO AUTOINSERT RDL 47M 16V 6.3X7MM
C286	011-54470-03	CAPACITOR CERAMIC AUTOINSERT 4N7 10% T/C B 50V
C287	011-54470-03	CAPACITOR CERAMIC AUTOINSERT 4N7 10% T/C B 50V
C288	011-00500-01	CAPACITOR CERAMIC OP5 +/-0.25P P100 50V 5MM L/S
CV289	028-02600-01	CAPACITOR TRIMMER 5/60P FILM 3TAG PH 809
C290	011-54100-01	CAPACITOR CERAMIC AUTOINSERT 1N 10% T/C B 63V
CV290	028-02600-01	CAPACITOR TRIMMER 5/60P FILM 3TAG PH 809
C291	015-02180-06	CAPACITOR CERAMIC 1210 CHIP 18P NPO 500V GRH42-2
CV291	028-02100-08	CAPACITOR TRIMMER 2/10P CERAMIC 5MM TOP ADJUST
C292	015-04100-05	CAPACITOR CERAMIC HIQ 1210 CHIP 1N 10% NPO 50V
CV292	028-02100-08	CAPACITOR TRIMMER 2/10P CERAMIC 5MM TOP ADJUST
C293	015-02180-06	CAPACITOR CERAMIC 1210 CHIP 18P NPO 500V GRH42-2
C294	015-02300-06	CAPACITOR CERAMIC 1210 CHIP 30P NPO 500V GRH42-2
C295	015-02330-06	CAPACITOR CERAMIC 1210 CHIP 33P NPO 500V GRH42-2
C296	015-02300-06	CAPACITOR CERAMIC 1210 CHIP 30P NPO 500V GRH42-2
C297	015-02150-06	CAPACITOR CERAMIC 1210 CHIP 15P NPO 500V GRH42-2
C298	017-15470-01	CAPACITOR CERAMIC SURFACE BARRIER 47N 20% 50V
C299	010-02180-01	CAPACITOR CERAMIC 18P 5% NPO 500V
C306	020-58470-05	CAPACITOR ELECTRO AUTOINSERT RDL 47M 16V 6.3X7MM
CC307	015-21820-01	CAPACITOR CERAMIC 0805 CHIP 8P2 +/-0.25P NPO 50V
CC308	015-21820-01	CAPACITOR CERAMIC 0805 CHIP 8P2 +/-0.25P NPO 50V
C309	025-06220-01	CAPACITOR TANT BEAD 220N 35V
C310	025-06220-01	CAPACITOR TANT BEAD 220N 35V
CC311	015-24100-08	CAPACITOR CERAMIC 0805 CHIP 1N 10% X7R 50V
CC312	015-21180-01	CAPACITOR CERAMIC 0805 CHIP 1P8 +/-0.25 NPO 50V
CC313	015-24100-08	CAPACITOR CERAMIC 0805 CHIP 1N 10% X7R 50V
CC314	015-24100-08	CAPACITOR CERAMIC 0805 CHIP 1N 10% X7R 50V
CC315	015-21180-01	CAPACITOR CERAMIC 0805 CHIP 1P8 +/-0.25 NPO 50V
CC316	015-24100-08	CAPACITOR CERAMIC 0805 CHIP 1N 10% X7R 50V
CC317	015-24100-08	CAPACITOR CERAMIC 0805 CHIP 1N 10% X7R 50V
CC319	015-24100-08	CAPACITOR CERAMIC 0805 CHIP 1N 10% X7R 50V
C320	011-54100-01	CAPACITOR CERAMIC AUTOINSERT 1N 10% T/C B 63V
C321	011-52100-01	CAPACITOR CERAMIC AUTOINSERT 10P 5% NPO 50/63V
C322	011-54100-01	CAPACITOR CERAMIC AUTOINSERT 1N 10% T/C B 63V
C323	011-54100-01	CAPACITOR CERAMIC AUTOINSERT 1N 10% T/C B 63V
CC324	015-24100-08	CAPACITOR CERAMIC 0805 CHIP 1N 10% X7R 50V
C325	011-52100-01	CAPACITOR CERAMIC AUTOINSERT 10P 5% NPO 50/63V
CC326	015-21820-01	CAPACITOR CERAMIC 0805 CHIP 8P2 +/-0.25P NPO 50V
CC327	015-23220-01	CAPACITOR CERAMIC 0805 CHIP 220P 5% NPO 50V

T535TR PARTS LIST MAIN BOARD

REF	IPN	DESCRIPTION
D1	001-00011-60	DIODE SR2607 6A/30V
D2	001-50012-00	DIODE AUTO INSERT 1N4148 SI GEN PURPOSE
D3	001-00015-16	DIODE ZENER 8V2 0.4W BZX79/C8V2
D4	001-50012-00	DIODE AUTO INSERT 1N4148 SI GEN PURPOSE
D5	001-50012-00	DIODE AUTO INSERT 1N4148 SI GEN PURPOSE
D6	001-50012-00	DIODE AUTO INSERT 1N4148 SI GEN PURPOSE
D8	001-50012-00	DIODE AUTO INSERT 1N4148 SI GEN PURPOSE
D14	001-50012-00	DIODE AUTO INSERT 1N4148 SI GEN PURPOSE
D15	001-50012-00	DIODE AUTO INSERT 1N4148 SI GEN PURPOSE
D16	001-50012-00	DIODE AUTO INSERT 1N4148 SI GEN PURPOSE
D20	001-50012-00	DIODE AUTO INSERT 1N4148 SI GEN PURPOSE
D21	001-00015-13	DIODE ZENER 6V2 0.4W BZX79/C6V2
D31A	001-50012-00	DIODE AUTO INSERT 1N4148 SI GEN PURPOSE
D39	001-00012-53	DIODE VARICAP BB405B
D40	001-00012-53	DIODE VARICAP BB405B
D41	001-00012-53	DIODE VARICAP BB405B
D48	001-50015-11	DIODE ZENER AUTOINSERT 5V1 0.4W BZX79/C5V1
D50	001-00013-45	DIODE SCHOTTKY 1SS97/2 (S
IC1	002-00014-91	INTEGRATED CCT 4001B QUAD 2 I/P NOR GATE (S
IC2	002-00014-40	INTEGRATED CCT 324P QUAD OP AMP (S
IC3	002-00015-70	INTEGRATED CIRCUIT 4066B QUAD BILATERAL SWITCH (S
IC4	002-00013-70	INTEGRATED CCT TDA1020 AF POWER AMP 9PIN SIL
IC4	353-00010-11	WASHER M3 FLAT ST BZ 9.5MM OD A4M1216
IC5	002-00012-35	INTEGRATED CIRCUIT LF353 DUAL FET I/P OP AMP
IC7	002-00014-72	INTEGRATED CIRCUIT MC3361 LO PWR FM IF (S)
IC8	002-00017-60	INTEGRATED CCT MC145152 FREQ SYNTHESIZER (S
IC9	002-00017-50	INTEGRATED CCT MC12016 VHF 40/41 PRESCALER (S
L2	056-00021-01	INDUCTOR FIXED 1.5UH AXIAL
L-6	240-00020-72	HEADER 2 WAY PCB MTG ULTREX
L10	050-00016-23	COIL TAIT NO 623 20-120MHZ 7MM CAN
L11	056-00021-01	INDUCTOR FIXED 1.5UH AXIAL
L12	050-00016-23	COIL TAIT NO 623 20-120MHZ 7MM CAN
L13	050-00016-23	COIL TAIT NO 623 20-120MHZ 7MM CAN
L14	056-00021-00	INDUCTOR FIXED 3.3UH AXIAL
L15	050-00016-23	COIL TAIT NO 623 20-120MHZ 7MM CAN
L18	056-00021-00	INDUCTOR FIXED 3.3UH AXIAL
L19	050-00016-29	COIL TAIT NO 629 21.4MHZ 7MM CAN
L20	050-00016-22	COIL TAIT NO 622 20-120MHZ 7MM CAN
L21	050-00016-61	COIL QUAD 455KHZ +-4% 8MM SQ CAN P2164-005-89
L30	050-00016-17	COIL TAIT NO 617 4UH 7MM BASE SLEEVED LESS CAN
L31	056-00021-02	INDUCTOR FIXED 100UH AXIAL
L33	056-00021-02	INDUCTOR FIXED 100UH AXIAL
L45	056-00021-02	INDUCTOR FIXED 100UH AXIAL
L55	052-08130-55	COIL A/W 5.5T/3.0MM HOR 0.8MM WIRE
L56	052-08135-65	COIL A/W 6.5T/3.5MM HOR 0.8MM WIRE
L57	052-08140-25	COIL A/W 2.5T/4.0MM HOR 0.8MM WIRE
L58	052-08123-15	COIL A/W 1.5T/2.3MM HOR 0.8MM WIRE
L63	052-08140-35	COIL A/W 3.5T/4.0MM HOR 0.8MM WIRE
L64	052-08130-45	COIL A/W 4.5T/3.0MM HOR 0.8MM WIRE
L65	052-08140-15	COIL A/W 1.5T/4.0MM HOR 0.8MM WIRE
L67A	065-00010-04	BEAD FERRITE F8 4X2X5MM(BOTH ON SAME WIRE)
L67B	065-00010-04	BEAD FERRITE F8 4X2X5MM(BOTH ON SAME WIRE)
L69	065-00010-01	BEAD FERRITE 3B 6 HOLE
L70	052-08130-15	COIL A/W 1.5T/3.0MM HOR 0.8MM WIRE
L74	052-08140-35	COIL A/W 3.5T/4.0MM HOR 0.8MM WIRE
L75	056-00010-17	INDUCTOR FIXED TAIT NO 17 6T ON 3B BEAD
L77	052-08135-15	COIL A/W 1.5T/3.5MM HOR 0.8MM WIRE
L78	052-08130-55	COIL A/W 5.5T/3.0MM HOR 0.8MM WIRE
L79	052-08135-55	COIL A/W 5.5T/3.5MM HOR 0.8MM WIRE
L80	052-08135-55	COIL A/W 5.5T/3.5MM HOR 0.8MM WIRE
L81	052-08130-55	COIL A/W 5.5T/3.0MM HOR 0.8MM WIRE
L82	065-00010-04	BEAD FERRITE F8 4X2X5MM(BOTH ON SAME WIRE)
L84	056-00021-09	INDUCTOR FIXED 820NH AXIAL 4X9MM
L85	056-00021-09	INDUCTOR FIXED 820NH AXIAL 4X9MM
L87	050-00016-57	COIL TAIT NO 657 100MHZ 10MM CAN ORANGE MOULDED
L89	050-00016-57	COIL TAIT NO 657 100MHZ 10MM CAN ORANGE MOULDED
L91	056-00021-09	INDUCTOR FIXED 820NH AXIAL 4X9MM
L92	056-00021-09	INDUCTOR FIXED 820NH AXIAL 4X9MM
L93	056-00021-09	INDUCTOR FIXED 820NH AXIAL 4X9MM
L94	056-00021-09	INDUCTOR FIXED 820NH AXIAL 4X9MM
PL-1	240-00026-05	HEADER 5WAY 1ROW 26MM PIN PCB MTG
PL-2	240-00026-05	HEADER 5WAY 1ROW 26MM PIN PCB MTG
PL-3	240-00026-18	HEADER 18WAY 1ROW 26MM PIN PCB MTG
PL-4	240-00026-10	HEADER 10WAY 1ROW 26MM PIN PCB MTG
PL-7	240-00026-03	HEADER 3WAY 1ROW 26MM PIN PCB MTG
Q1	000-50011-10	TRANSISTOR AUTO INSERT BC547B NPN TO-92 AF S/SIG
Q2	000-50011-10	TRANSISTOR AUTO INSERT BC547B NPN TO-92 AF S/SIG
Q3	000-00011-70	TRANSISTOR BD136 PNP TO-126 AF POWER
Q3	353-00010-10	WASHER M3 FLAT ST BZ 6.75MM OD A4M1215
Q4	000-50010-60	TRANSISTOR AUTO INSERT BC327 PNP TO-92 AF POWER
Q5	000-50010-60	TRANSISTOR AUTO INSERT BC327 PNP TO-92 AF POWER
Q6	000-50011-30	TRANSISTOR AUTO INSERT BC557B PNP TO-92 AF S/SIG
Q7	000-50011-10	TRANSISTOR AUTO INSERT BC547B NPN TO-92 AF S/SIG
Q10	000-50011-10	TRANSISTOR AUTO INSERT BC547B NPN TO-92 AF S/SIG
Q11	000-50011-30	TRANSISTOR AUTO INSERT BC557B PNP TO-92 AF S/SIG
Q15	000-50033-10	TRANSISTOR AUTO INSERT J310 JFET TO-92 VHF (S)
Q16	000-50033-10	TRANSISTOR AUTO INSERT J310 JFET TO-92 VHF (S)
Q17	000-50033-10	TRANSISTOR AUTO INSERT J310 JFET TO-92 VHF (S)
Q18	000-50020-11	TRANSISTOR AUTO INSERT BF494 NPN TO-92 RF S/SIG
Q20	000-50011-10	TRANSISTOR AUTO INSERT BC547B NPN TO-92 AF S/SIG

REF	IPN	DESCRIPTION
Q21	000-50011-10	TRANSISTOR AUTO INSERT BC547B NPN TO-92 AF S/SIG
Q22	000-50011-10	TRANSISTOR AUTO INSERT BC547B NPN TO-92 AF S/SIG
Q23	000-50011-30	TRANSISTOR AUTO INSERT BC557B PNP TO-92 AF S/SIG
Q24	000-50011-10	TRANSISTOR AUTO INSERT BC547B NPN TO-92 AF S/SIG
Q25	000-50011-30	TRANSISTOR AUTO INSERT BC557B PNP TO-92 AF S/SIG
Q26	000-50011-10	TRANSISTOR AUTO INSERT BC547B NPN TO-92 AF S/SIG
Q27	000-50011-30	TRANSISTOR AUTO INSERT BC557B PNP TO-92 AF S/SIG
Q28	000-50011-30	TRANSISTOR AUTO INSERT BC557B PNP TO-92 AF S/SIG
Q29	000-50011-10	TRANSISTOR AUTO INSERT BC547B NPN TO-92 AF S/SIG
Q30	000-50011-30	TRANSISTOR AUTO INSERT BC557B PNP TO-92 AF S/SIG
Q40	000-50031-95	TRANSISTOR AUTO INSERT MPS3646 NPN TO-92 SWITCH(S)
Q42	000-50011-10	TRANSISTOR AUTO INSERT BC547B NPN TO-92 AF S/SIG
Q43	000-00011-70	TRANSISTOR BD136 PNP TO-126 AF POWER
Q44	000-00022-30	TRANSISTOR 2N4427 NPN TO-39 VHF POWER DRIVE
Q44	362-00010-08	GASKET SILICONE INSULATING TO-5 TO-39
Q45	000-00023-13	TRANSISTOR MRF237 NPN TO-39 VHF POWER 4W
Q46	000-00023-23	TRANSISTOR SRFH1001 NPN STUD MTG VHF POWER 30W
Q47	000-50011-10	TRANSISTOR AUTO INSERT BC547B NPN TO-92 AF S/SIG
Q48	000-50011-30	TRANSISTOR AUTO INSERT BC557B PNP TO-92 AF S/SIG
Q49	000-50011-30	TRANSISTOR AUTO INSERT BC557B PNP TO-92 AF S/SIG
QC50	000-10003-10	TRANSISTOR SMD MMBFJ310 JFET SOT-23 UHF
QC51	000-10003-10	TRANSISTOR SMD MMBFJ310 JFET SOT-23 UHF
Q52	000-00031-75	TRANSISTOR 3SK87K DG MOSFET X PACK VHF (S
Q53	000-00031-75	TRANSISTOR 3SK87K DG MOSFET X PACK VHF (S
R1	030-55180-20	RESISTOR FILM AUTOINSERT 18K 5% 0.4W 4X1.6MM
R2	030-53120-20	RESISTOR FILM AUTOINSERT 120E 5% 0.4W 4X1.6MM
R3	030-54100-20	RESISTOR FILM AUTOINSERT 1K 5% 0.4W 4X1.6MM
R4	030-55470-20	RESISTOR FILM AUTOINSERT 47K 5% 0.4W 4X1.6MM
R5	030-53680-20	RESISTOR FILM AUTOINSERT 680E 5% 0.4W 4X1.6MM
R6	030-53820-20	RESISTOR FILM AUTOINSERT 820E 5% 0.4W 4X1.6MM
R8	030-54100-20	RESISTOR FILM AUTOINSERT 1K 5% 0.4W 4X1.6MM
R9	030-54220-20	RESISTOR FILM AUTOINSERT 2K2 5% 0.4W 4X1.6MM
R10	030-53680-20	RESISTOR FILM AUTOINSERT 680E 5% 0.4W 4X1.6MM
R11	030-54220-20	RESISTOR FILM AUTOINSERT 2K2 5% 0.4W 4X1.6MM
R16	030-54220-20	RESISTOR FILM AUTOINSERT 2K2 5% 0.4W 4X1.6MM
R17	030-57100-20	RESISTOR FILM AUTOINSERT 1M 5% 0.4W 4X1.6MM
R18	030-54100-20	RESISTOR FILM AUTOINSERT 1K 5% 0.4W 4X1.6MM
R19	030-56100-20	RESISTOR FILM AUTOINSERT 100K 5% 0.4W 4X1.6MM
R20	030-55220-20	RESISTOR FILM AUTOINSERT 22K 5% 0.4W 4X1.6MM
R21	030-55100-20	RESISTOR FILM AUTOINSERT 10K 5% 0.4W 4X1.6MM
R25	030-55470-20	RESISTOR FILM AUTOINSERT 47K 5% 0.4W 4X1.6MM
R26	030-56120-20	RESISTOR FILM AUTOINSERT 120K 5% 0.4W 4X1.6MM
R27	030-54470-20	RESISTOR FILM AUTOINSERT 4K7 5% 0.4W 4X1.6MM
R28	030-57100-20	RESISTOR FILM AUTOINSERT 1M 5% 0.4W 4X1.6MM
R29	030-54470-20	RESISTOR FILM AUTOINSERT 4K7 5% 0.4W 4X1.6MM
R30	030-55100-20	RESISTOR FILM AUTOINSERT 10K 5% 0.4W 4X1.6MM
R31	030-55470-20	RESISTOR FILM AUTOINSERT 47K 5% 0.4W 4X1.6MM
R32	030-53680-20	RESISTOR FILM AUTOINSERT 680E 5% 0.4W 4X1.6MM
R33	030-55470-20	RESISTOR FILM AUTOINSERT 47K 5% 0.4W 4X1.6MM
R34	030-51220-20	RESISTOR FILM AUTOINSERT 2E2 5% 0.4W 4X1.6MM
R40	030-53680-20	RESISTOR FILM AUTOINSERT 680E 5% 0.4W 4X1.6MM
R41	030-54220-20	RESISTOR FILM AUTOINSERT 2K2 5% 0.4W 4X1.6MM
R42	030-55100-20	RESISTOR FILM AUTOINSERT 10K 5% 0.4W 4X1.6MM
R43	030-53220-20	RESISTOR FILM AUTOINSERT 220E 5% 0.4W 4X1.6MM
R44	030-53680-20	RESISTOR FILM AUTOINSERT 680E 5% 0.4W 4X1.6MM
R45	030-54220-20	RESISTOR FILM AUTOINSERT 2K2 5% 0.4W 4X1.6MM
R46	030-55470-20	RESISTOR FILM AUTOINSERT 47K 5% 0.4W 4X1.6MM
R47	030-55100-20	RESISTOR FILM AUTOINSERT 10K 5% 0.4W 4X1.6MM
R48	030-56470-20	RESISTOR FILM AUTOINSERT 470K 5% 0.4W 4X1.6MM
R49	030-56470-20	RESISTOR FILM AUTOINSERT 470K 5% 0.4W 4X1.6MM
R50	030-55330-20	RESISTOR FILM AUTOINSERT 33K 5% 0.4W 4X1.6MM
R51	030-56470-20	RESISTOR FILM AUTOINSERT 470K 5% 0.4W 4X1.6MM
R53	030-55100-20	RESISTOR FILM AUTOINSERT 10K 5% 0.4W 4X1.6MM
R60	030-51220-20	RESISTOR FILM AUTOINSERT 2E2 5% 0.4W 4X1.6MM
R61	030-55220-20	RESISTOR FILM AUTOINSERT 22K 5% 0.4W 4X1.6MM
R62	030-57100-20	RESISTOR FILM AUTOINSERT 1M 5% 0.4W 4X1.6MM
R63	030-54470-20	RESISTOR FILM AUTOINSERT 4K7 5% 0.4W 4X1.6MM
R64	030-55470-20	RESISTOR FILM AUTOINSERT 47K 5% 0.4W 4X1.6MM
R65	030-56470-20	RESISTOR FILM AUTOINSERT 470K 5% 0.4W 4X1.6MM
R67	030-56180-20	RESISTOR FILM AUTOINSERT 180K 5% 0.4W 4X1.6MM
R68	030-55470-20	RESISTOR FILM AUTOINSERT 47K 5% 0.4W 4X1.6MM
R71	030-55100-20	RESISTOR FILM AUTOINSERT 10K 5% 0.4W 4X1.6MM
R72	030-56470-20	RESISTOR FILM AUTOINSERT 470K 5% 0.4W 4X1.6MM
R73	030-54220-20	RESISTOR FILM AUTOINSERT 2K2 5% 0.4W 4X1.6MM
R74	030-54680-20	RESISTOR FILM AUTOINSERT 6K8 5% 0.4W 4X1.6MM
R75	030-55150-20	RESISTOR FILM AUTOINSERT 15K 5% 0.4W 4X1.6MM
R76	030-55100-20	RESISTOR FILM AUTOINSERT 10K 5% 0.4W 4X1.6MM
R77	030-55180-20	RESISTOR FILM AUTOINSERT 18K 5% 0.4W 4X1.6MM
R78	030-55390-20	RESISTOR FILM AUTOINSERT 39K 5% 0.4W 4X1.6MM
RV79	042-04220-01	RESISTOR PRESET 2K2 CARBON 10MM FLAT
R80A	030-54180-20	RESISTOR FILM AUTOINSERT 1K8 5% 0.4W 4X1.6MM
R81	030-55180-20	RESISTOR FILM AUTOINSERT 18K 5% 0.4W 4X1.6MM
R82	030-56100-20	RESISTOR FILM AUTOINSERT 100K 5% 0.4W 4X1.6MM
R84	030-54100-20	RESISTOR FILM AUTOINSERT 1K 5% 0.4W 4X1.6MM
RV85	040-05100-13	POTENTIOMETER 10K LOG LESS SW PCB MOUNTING
R86	030-55390-20	RESISTOR FILM AUTOINSERT 39K 5% 0.4W 4X1.6MM
R87	030-56100-20	RESISTOR FILM AUTOINSERT 100K 5% 0.4W 4X1.6MM
R88	030-56470-20	RESISTOR FILM AUTOINSERT 470K 5% 0.4W 4X1.6MM
R89	030-51220-20	RESISTOR FILM AUTOINSERT 2E2 5% 0.4W 4X1.6MM
R90	032-31470-00	RESISTOR M/F POWER 4E7 5% 1W 12X4.5MM
R90	032-31470-00	RESISTOR M/F POWER 4E7 5% 1W 12X4.5MM
R100	030-52470-20	RESISTOR FILM AUTOINSERT 47E 5% 0.4W 4X1.6MM
R101	030-52470-20	RESISTOR FILM AUTOINSERT 47E 5% 0.4W 4X1.6MM

REF	IPN	DESCRIPTION
R103	030-53330-20	RESISTOR FILM AUTOINSERT 330E 5% 0.4W 4X1.6MM
R104	030-54220-20	RESISTOR FILM AUTOINSERT 2K2 5% 0.4W 4X1.6MM
R105	030-54220-20	RESISTOR FILM AUTOINSERT 2K2 5% 0.4W 4X1.6MM
R106	030-54220-20	RESISTOR FILM AUTOINSERT 2K2 5% 0.4W 4X1.6MM
R107	030-55180-20	RESISTOR FILM AUTOINSERT 18K 5% 0.4W 4X1.6MM
R108	030-54330-20	RESISTOR FILM AUTOINSERT 3K3 5% 0.4W 4X1.6MM
R119	030-53150-20	RESISTOR FILM AUTOINSERT 150E 5% 0.4W 4X1.6MM
R127	030-55680-20	RESISTOR FILM AUTOINSERT 68K 5% 0.4W 4X1.6MM
R140	030-56150-20	RESISTOR FILM AUTOINSERT 150K 5% 0.4W 4X1.6MM
R141	030-53390-20	RESISTOR FILM AUTOINSERT 390E 5% 0.4W 4X1.6MM
R142	030-55100-20	RESISTOR FILM AUTOINSERT 10K 5% 0.4W 4X1.6MM
R143	030-56470-20	RESISTOR FILM AUTOINSERT 470K 5% 0.4W 4X1.6MM
R144	030-55100-20	RESISTOR FILM AUTOINSERT 10K 5% 0.4W 4X1.6MM
R145	030-54220-20	RESISTOR FILM AUTOINSERT 2K2 5% 0.4W 4X1.6MM
R146	030-55100-20	RESISTOR FILM AUTOINSERT 10K 5% 0.4W 4X1.6MM
R147	030-56270-20	RESISTOR FILM AUTOINSERT 270K 5% 0.4W 4X1.6MM
R148	030-54820-20	RESISTOR FILM AUTOINSERT 8K2 5% 0.4W 4X1.6MM
R149	030-54820-20	RESISTOR FILM AUTOINSERT 8K2 5% 0.4W 4X1.6MM
RV149	042-05100-01	RESISTOR PRESET 10K CARBON 10MM FLAT
R150	030-54470-20	RESISTOR FILM AUTOINSERT 4K7 5% 0.4W 4X1.6MM
R151	030-54100-20	RESISTOR FILM AUTOINSERT 1K 5% 0.4W 4X1.6MM
R152	030-54560-20	RESISTOR FILM AUTOINSERT 5K6 5% 0.4W 4X1.6MM
R153	030-56470-20	RESISTOR FILM AUTOINSERT 470K 5% 0.4W 4X1.6MM
R154	030-54100-20	RESISTOR FILM AUTOINSERT 1K 5% 0.4W 4X1.6MM
R155	032-06330-00	RESISTOR M/F 330K 1% 7X2.5MM
R156	030-55470-20	RESISTOR FILM AUTOINSERT 47K 5% 0.4W 4X1.6MM
R157	030-54150-20	RESISTOR FILM AUTOINSERT 1K5 5% 0.4W 4X1.6MM
RV157	042-05100-01	RESISTOR PRESET 10K CARBON 10MM FLAT
R158	030-54470-20	RESISTOR FILM AUTOINSERT 4K7 5% 0.4W 4X1.6MM
R159	030-52470-20	RESISTOR FILM AUTOINSERT 47E 5% 0.4W 4X1.6MM
R160	030-54390-20	RESISTOR FILM AUTOINSERT 3K9 5% 0.4W 4X1.6MM
R161	030-55150-20	RESISTOR FILM AUTOINSERT 15K 5% 0.4W 4X1.6MM
R162	030-55680-20	RESISTOR FILM AUTOINSERT 68K 5% 0.4W 4X1.6MM
R173A	030-54100-20	RESISTOR FILM AUTOINSERT 1K 5% 0.4W 4X1.6MM
R174A	030-56270-20	RESISTOR FILM AUTOINSERT 270K 5% 0.4W 4X1.6MM
R175	030-54330-20	RESISTOR FILM AUTOINSERT 3K3 5% 0.4W 4X1.6MM
R176	030-53120-20	RESISTOR FILM AUTOINSERT 120E 5% 0.4W 4X1.6MM
R177	030-53560-20	RESISTOR FILM AUTOINSERT 560E 5% 0.4W 4X1.6MM
R178	030-53330-20	RESISTOR FILM AUTOINSERT 330E 5% 0.4W 4X1.6MM
R179	030-54470-20	RESISTOR FILM AUTOINSERT 4K7 5% 0.4W 4X1.6MM
R180	030-54100-20	RESISTOR FILM AUTOINSERT 1K 5% 0.4W 4X1.6MM
R181	030-54220-20	RESISTOR FILM AUTOINSERT 2K2 5% 0.4W 4X1.6MM
R182	030-53390-20	RESISTOR FILM AUTOINSERT 390E 5% 0.4W 4X1.6MM
R183	030-56220-20	RESISTOR FILM AUTOINSERT 220K 5% 0.4W 4X1.6MM
R184	030-55560-20	RESISTOR FILM AUTOINSERT 56K 5% 0.4W 4X1.6MM
R185	030-56100-20	RESISTOR FILM AUTOINSERT 100K 5% 0.4W 4X1.6MM
R186	030-56100-20	RESISTOR FILM AUTOINSERT 100K 5% 0.4W 4X1.6MM
R187	030-56100-20	RESISTOR FILM AUTOINSERT 100K 5% 0.4W 4X1.6MM
RC193	036-13100-00	RESISTOR M/F 0805 CHIP 100E 5%
R200	030-56100-20	RESISTOR FILM AUTOINSERT 100K 5% 0.4W 4X1.6MM
R201	030-54680-20	RESISTOR FILM AUTOINSERT 6K8 5% 0.4W 4X1.6MM
R202	030-54820-20	RESISTOR FILM AUTOINSERT 8K2 5% 0.4W 4X1.6MM
R203	030-54560-20	RESISTOR FILM AUTOINSERT 5K6 5% 0.4W 4X1.6MM
R204	030-55100-20	RESISTOR FILM AUTOINSERT 10K 5% 0.4W 4X1.6MM
R205	030-57100-20	RESISTOR FILM AUTOINSERT 1M 5% 0.4W 4X1.6MM
R206	030-57100-20	RESISTOR FILM AUTOINSERT 1M 5% 0.4W 4X1.6MM
R207	030-54330-20	RESISTOR FILM AUTOINSERT 3K3 5% 0.4W 4X1.6MM
R208	030-54820-20	RESISTOR FILM AUTOINSERT 8K2 5% 0.4W 4X1.6MM
R220	030-54100-20	RESISTOR FILM AUTOINSERT 1K 5% 0.4W 4X1.6MM
R221	030-54470-20	RESISTOR FILM AUTOINSERT 4K7 5% 0.4W 4X1.6MM
R222	030-54220-20	RESISTOR FILM AUTOINSERT 2K2 5% 0.4W 4X1.6MM
R223	030-54820-20	RESISTOR FILM AUTOINSERT 8K2 5% 0.4W 4X1.6MM
R224	030-53330-20	RESISTOR FILM AUTOINSERT 330E 5% 0.4W 4X1.6MM
RC235	036-16100-00	RESISTOR M/F 0805 CHIP 100K 5%
RC236	036-14330-00	RESISTOR M/F 0805 CHIP 3K3 5%
R250	030-53560-20	RESISTOR FILM AUTOINSERT 560E 5% 0.4W 4X1.6MM
R251	030-51820-20	RESISTOR FILM AUTOINSERT 8E2 5% 0.4W 4X1.6MM
R252	030-53560-20	RESISTOR FILM AUTOINSERT 560E 5% 0.4W 4X1.6MM
R253	030-54120-20	RESISTOR FILM AUTOINSERT 1K2 5% 0.4W 4X1.6MM
R254	030-54470-20	RESISTOR FILM AUTOINSERT 4K7 5% 0.4W 4X1.6MM
R255	030-54220-20	RESISTOR FILM AUTOINSERT 2K2 5% 0.4W 4X1.6MM
R256	030-52330-20	RESISTOR FILM AUTOINSERT 33E 5% 0.4W 4X1.6MM
R257	030-52470-20	RESISTOR FILM AUTOINSERT 47E 5% 0.4W 4X1.6MM
R258	030-54100-20	RESISTOR FILM AUTOINSERT 1K 5% 0.4W 4X1.6MM
R259	030-54120-20	RESISTOR FILM AUTOINSERT 1K2 5% 0.4W 4X1.6MM
RV260	042-04220-01	RESISTOR PRESET 2K2 CARBON 10MM FLAT
R262	030-53680-20	RESISTOR FILM AUTOINSERT 680E 5% 0.4W 4X1.6MM
R263	030-53680-20	RESISTOR FILM AUTOINSERT 680E 5% 0.4W 4X1.6MM
R264	030-54100-20	RESISTOR FILM AUTOINSERT 1K 5% 0.4W 4X1.6MM
R265	030-53220-20	RESISTOR FILM AUTOINSERT 220E 5% 0.4W 4X1.6MM
R266	030-53220-20	RESISTOR FILM AUTOINSERT 220E 5% 0.4W 4X1.6MM
R267	030-52220-20	RESISTOR FILM AUTOINSERT 22E 5% 0.4W 4X1.6MM
R269	032-33180-00	RESISTOR M/F POWER 180E 5% 1W 12X4.5MM
R270	032-32100-00	RESISTOR M/F POWER 10E 5% 1W 10X4MM
R271	032-32100-00	RESISTOR M/F POWER 10E 5% 1W 10X4MM
R272	030-55220-20	RESISTOR FILM AUTOINSERT 22K 5% 0.4W 4X1.6MM
R273	030-54470-20	RESISTOR FILM AUTOINSERT 4K7 5% 0.4W 4X1.6MM
R274	030-55220-20	RESISTOR FILM AUTOINSERT 22K 5% 0.4W 4X1.6MM
R275	030-55150-20	RESISTOR FILM AUTOINSERT 15K 5% 0.4W 4X1.6MM
RC276	036-14820-00	RESISTOR M/F 0805 CHIP 8K2 5%
R283	030-54150-20	RESISTOR FILM AUTOINSERT 1K5 5% 0.4W 4X1.6MM
RC284	036-13100-00	RESISTOR M/F 0805 CHIP 100E 5%
R286	030-55220-20	RESISTOR FILM AUTOINSERT 22K 5% 0.4W 4X1.6MM
R287	030-54330-20	RESISTOR FILM AUTOINSERT 3K3 5% 0.4W 4X1.6MM
R288	030-55220-20	RESISTOR FILM AUTOINSERT 22K 5% 0.4W 4X1.6MM
R289	030-54330-20	RESISTOR FILM AUTOINSERT 3K3 5% 0.4W 4X1.6MM

REF	IPN	DESCRIPTION
R290	030-53100-20	RESISTOR FILM AUTOINSERT 100E 5% 0.4W 4X1.6MM
R291	030-53100-20	RESISTOR FILM AUTOINSERT 100E 5% 0.4W 4X1.6MM
RC292	036-12470-00	RESISTOR M/F 0805 CHIP 47E 5%
RC293	036-13220-00	RESISTOR M/F 0805 CHIP 220E 5%
RC294	036-12470-00	RESISTOR M/F 0805 CHIP 47E 5%
RC295	036-13220-00	RESISTOR M/F 0805 CHIP 220E 5%
RC296	036-15220-00	RESISTOR M/F 0805 CHIP 22K 5%
RC297	036-15220-00	RESISTOR M/F 0805 CHIP 22K 5%
RC298	036-15220-00	RESISTOR M/F 0805 CHIP 22K 5%
RC299	036-15220-00	RESISTOR M/F 0805 CHIP 22K 5%
RC300	036-12470-00	RESISTOR M/F 0805 CHIP 47E 5%
R301	030-53680-20	RESISTOR FILM AUTOINSERT 680E 5% 0.4W 4X1.6MM
R302	030-53680-20	RESISTOR FILM AUTOINSERT 680E 5% 0.4W 4X1.6MM
RC303	036-12470-00	RESISTOR M/F 0805 CHIP 47E 5%
SW1	232-00010-19	SWITCH PUSH DPDT LATCHING PCB MOUNT
SW2	232-00010-20	SWITCH PUSH DPDT MOMENTARY PCB MOUNT
SW3	232-00010-20	SWITCH PUSH DPDT MOMENTARY PCB MOUNT
TP2	240-00026-03	HEADER 3WAY 1ROW 26MM PIN PCB MTG
TP-3	240-00020-59	HEADER 3 WAY 1 ROW PCB MTG
X1	274-00010-02	CRYSTAL 20.945MHZ SPEC TE/15
XL1	274-00010-37	CRYSTAL 12.8MHZ TE-37 HY-Q 3LD
XF1A	276-00010-44	FILTER XTAL ONE PAIR 21.4MHZ 7.5KHZ B/W 4 POLE 21
XF1B	276-00010-44	FILTER XTAL ONE PAIR 21.4MHZ 7.5KHZ B/W 4 POLE 21

MECHANICAL & MISCELLANEOUS

IPN	DESCRIPTION
051-00006-03	LEAD FEEDTHRU 0.7MM TCW A4M2230
065-00010-07	BEAD FERRITE 4S3 5*2*4MM RED
200-00010-04	WIRE TINNED COPPER 0.7MM for f8 bead R15 20mm
200-00010-04	WIRE TINNED COPPER 0.7MM
200-00010-04	WIRE TINNED COPPER 0.7MM
201-00030-04	WIRE REMIT 7/0.2MM PVC YELLOW
201-00030-04	WIRE REMIT 7/0.2MM PVC YELLOW
201-00030-04	WIRE REMIT 7/0.2MM PVC YELLOW
201-00030-10	WIRE REMIT 7/0.2MM PVC BLACK
201-00030-10	WIRE REMIT 7/0.2MM PVC BLACK
205-00010-06	CABLE TWIN AUTO 153 2/28/0.3 RED & BLAC
220-01142-02	PRINTED CIRCUIT BOARD T535-39
240-00010-60	PLUG HOUSING 4 WAY MOLEX
240-00010-61	PLUG TERMINAL MALE SOLDER TAG MOLEX
240-02010-60	SOCKET HOUSING 4 WAY MOLEX
240-02010-61	SOCKET RECEPTACLE 152 AUTO CRIMP MOLEX
240-02100-11	SOCKET COAXIAL BNC 3.5MM BULKHEAD LESS EARTH TAG
240-04020-72	SOCKET HOUSING 2 WAY CORD MTG ULTREX
240-04020-76	SOCKET RECEPTACLES WIRE CRIMP FOR ULTREX HOUSING
250-00010-14	SPEAKER 8 OHM 92MM SQ A3M1799
265-00010-17	FUSE 10A CARTRIDGE 6*32MM 32V NON SPEC
302-40042-00	BUTTON A3M1585 PUSH MOULDED PLASTIC T500
302-45035-00	BOSS A4M2148 THREADED M5 OD M3 ID 5X5 SERIES
303-20042-00	COVER TOP COMPLETE A1M2375 TEXTURED METALISED 5X5
303-20044-00	COVER BTTM COMPLETE A1M2376 TEXTURED METALISED 5X
303-30047-00	CRADLE A2M1920 A3M1955 RUGGED ASSEMBLY T500
303-30049-00	CLIP A2M1922 RUGGED CRADLE T500
303-50071-00	CLIP A4M2008 FEEDTHRU MTG 5*5 SERIES
306-01041-00	CLIP - PLASTIC WIRE HARNESS
308-13065-00	HEATSINK A4M1816 DRIVER T530/535
308-13071-00	HEATSINK A1M1931 DIECAST 500 SERIES
312-01014-00	LID A2M1932 DIECAST PA SOLDER SIDE 5X5 SERIES
312-01015-00	LID A2M1933 DIECAST PA COMPONENT SIDE 5X5 SERIES
316-85094-00	PLATE A4M2160 BNC MTG UK 5X5 SERIES
316-87064-00	PILLAR 11.1MM PLASTIC SNAP IN PCB POST
319-01138-00	SHIELD A4M2151 POWER SOCKET T640
319-01151-00	SHIELD A3M2236 SOLDER SIDE T535
319-01155-00	SHIELD A3M2304 LID TOP T535
319-01156-00	SHIELD A3M2303 WALL T535
319-01156-00	SHIELD A3M2303 WALL T535
340-00010-10	FUSEHOLDER INLINE BOOK HOUSING
340-00010-11	TERMINAL CRIMP BOOK FUSEHOLDER
345-00040-08	SCREW M3*12MM PAN POZI ST BZ IC4 MTG

IPN	DESCRIPTION
349-00010-25	SCREW NO.4*3/8 PAN SUPA POLYMATE REQUIRED IN FRONT END OF BOTTOM COVER.
349-00020-31	SCREW TAPTITE M3X10MM PAN POZI BZ Q3X1 VCOX4 PLASTIC COVERX4.
349-00020-31	SCREW TAPTITE M3X10MM PAN POZI BZ FASTEN TOP & BOTTOM COVERS HEATSINK END.
349-00020-32	SCREW TAPTITE M3X8MM PAN POZI BZ PA COVERSX16 H/SX2.
349-00020-32	SCREW TAPTITE M3X8MM PAN POZI BZ
352-00010-08	NUT M3 COLD FORM HEX ST BZ
352-00010-35	NUT 8-32 UNC HEX RF POWER TRANSISTOR MOUNTING
353-00010-13	WASHER M3 SHAKEPROOF INT BZ Q3 & IC4
356-00010-01	TAG SOLDER 3MM SHORT M6132/3.2
357-00010-09	FIX PUSH ON SFP 3253
359-00010-37	RIVET 3*5MM FLAT HD ST TINMENS NO 7 used on rugged cradle
365-00011-54	LABEL WHITE QUIKSTIK RW1556/2
365-00013-47	LABEL T5X5 SERIES SCREW DETAILS A4A603
365-00013-60	LABEL T545-98 A4A653 MPT1352 APPROVAL
365-00100-10	BARCODE LABEL & LAMINATE 2 PARTS 3/8 WIDE
369-00010-27	TIE CABLE NYLON 140*2.6MM
369-00020-35	TAPE PVC FOAM 1 SIDE S/A 9*10MM INSEAL 5375 CUT TO 20mm. PLACE ON IC8 (EPROM).
369-01028-00	BUMPER RUBBER A4M2509
369-01029-00	PAD RUBBER A4M2510
399-00010-56	BAG PLASTIC 200*250MM
399-00010-78	PLASTIC BAG 155MM * 230MM MINI GRIP PLASTIC BAG FOR PAPERWORK.
400-00020-07	SLEEVING 2MM SILICONE RUBBER TO COVER RES 4E7.
409-50001-00	INSTALLATION GUIDE T500 SERIES 2
409-50005-00	T500TR REFERENCE CARD
409-54501-00	T545TR OPERATORS HANDBOOK
410-00010-37	SLEEVE CARD 500 SERIES A1A361 A4M1814
410-00010-50	PACKAGING POLY FOAM 2 PCS 5*5 SERIES A1M2027
319-01109-00	SHIELD A2M1655 VCO LID 500/5X5 SERIES
319-01149-00	SHIELD BOX A1M2229 VCO T5X5 SERIES*&a0R

T535TR PARTS LIST CONTROL & DISPLAY BOARDS

REF	IPN	DESCRIPTION
C10	015-24100-08	CAPACITOR CERAMIC 0805 CHIP 1N 10% X7R 50V
C11	015-24100-08	CAPACITOR CERAMIC 0805 CHIP 1N 10% X7R 50V
C12	015-24100-08	CAPACITOR CERAMIC 0805 CHIP 1N 10% X7R 50V
C13	015-24100-08	CAPACITOR CERAMIC 0805 CHIP 1N 10% X7R 50V
C50	016-07100-01	CAPACITOR ELECTRO 6X4MM CHIP 1M 20% 16V
C60	015-22390-01	CAPACITOR CERAMIC 0805 CHIP 39P 5% NPO 50V
C61	015-22180-01	CAPACITOR CERAMIC 0805 CHIP 18P 5% NPO 50V
C62	015-06100-08	CAPACITOR CERAMIC 1206 CHIP 100N 10% X7R 50V
C63	016-08100-01	CAPACITOR ELECTRO 6X4MM CHIP 10M 20% 16V
C65	015-25100-08	CAPACITOR CERAMIC 0805 CHIP 10N 10% X7R 50V
C66	015-25100-08	CAPACITOR CERAMIC 0805 CHIP 10N 10% X7R 50V
C67	015-25100-08	CAPACITOR CERAMIC 0805 CHIP 10N 10% X7R 50V
C68	016-07100-01	CAPACITOR ELECTRO 6X4MM CHIP 1M 20% 16V
C75	015-25100-08	CAPACITOR CERAMIC 0805 CHIP 10N 10% X7R 50V
C76	015-22330-01	CAPACITOR CERAMIC 0805 CHIP 33P 5% NPO 50V
C77	016-07100-01	CAPACITOR ELECTRO 6X4MM CHIP 1M 20% 16V
C78	015-06100-08	CAPACITOR CERAMIC 1206 CHIP 100N 10% X7R 50V
C80	016-07100-01	CAPACITOR ELECTRO 6X4MM CHIP 1M 20% 16V
C83	015-24100-08	CAPACITOR CERAMIC 0805 CHIP 1N 10% X7R 50V
C84	015-24100-08	CAPACITOR CERAMIC 0805 CHIP 1N 10% X7R 50V
C85	015-23100-01	CAPACITOR CERAMIC 0805 CHIP 100P 5% NPO 50V
C86	016-07100-01	CAPACITOR ELECTRO 6X4MM CHIP 1M 20% 16V
C87	015-06100-08	CAPACITOR CERAMIC 1206 CHIP 100N 10% X7R 50V
C88	015-06100-08	CAPACITOR CERAMIC 1206 CHIP 100N 10% X7R 50V
C89	016-08100-01	CAPACITOR ELECTRO 6X4MM CHIP 10M 20% 16V
C90	015-24100-08	CAPACITOR CERAMIC 0805 CHIP 1N 10% X7R 50V
C95	015-25100-08	CAPACITOR CERAMIC 0805 CHIP 10N 10% X7R 50V
C96	015-25100-08	CAPACITOR CERAMIC 0805 CHIP 10N 10% X7R 50V
C100	015-06100-08	CAPACITOR CERAMIC 1206 CHIP 100N 10% X7R 50V
C101	015-25100-08	CAPACITOR CERAMIC 0805 CHIP 10N 10% X7R 50V
C102	016-08100-01	CAPACITOR ELECTRO 6X4MM CHIP 10M 20% 16V
C103	016-08100-01	CAPACITOR ELECTRO 6X4MM CHIP 10M 20% 16V
C104	015-22270-01	CAPACITOR CERAMIC 0805 CHIP 27P 5% NPO 50V
C105	015-05220-08	CAPACITOR CERAMIC 1206 CHIP 22N 10% X7R 50V
D62	001-10084-62	DIODE ZENER SMD BZX84C6V2 SOT23
D63	001-10000-70	DIODE SMD BAV70 DUAL SWITCH SOT-23 COMMON CATHODE
D64	001-10000-70	DIODE SMD BAV70 DUAL SWITCH SOT-23 COMMON CATHODE
D65	001-10000-70	DIODE SMD BAV70 DUAL SWITCH SOT-23 COMMON CATHODE
D66	001-10000-70	DIODE SMD BAV70 DUAL SWITCH SOT-23 COMMON CATHODE
IC1	002-10040-27	INTEGRATED CCT SMD 4027B DUAL JK F/F (S)
IC2	002-10003-24	INTEGRATED CCT SMD 324 QUAD OP AMP SO-14 (S)
IC3	002-10040-94	INTEGRATED CCT SMD 4094B 8STAGE BUS REG SO-16 (S)
IC4	002-10040-94	INTEGRATED CCT SMD 4094B 8STAGE BUS REG SO-16 (S)
IC5	002-74901-39	INTEGRATED CCT SMD 74HC139 DUAL 1-4 DECODER (S)
IC6	002-74900-00	INTEGRATED CCT SMD 74HC00 QUAD 2 I/P NAND (S)
IC7	002-74905-73	INTEGRATED CCT SMD 74HC573D OCTAL 3STATE LATCH(S)
IC8	002-00018-08	INTEGRATED CIRCUIT 27C256 32KX8 EPROM (S)
IC9	002-00018-30	INTEGRATED CCT MK48Z12-20 RAM 2KX8 (S)
IC10	002-10041-04	INTEGRATED CCT SMD 4104 QUAD VOLT SHIFTER (S)
IC12	002-16800-11	INTEGRATED CCT SMD MC68HC11A1 MCU PLCC52 (S)
IC13	002-74905-74	INTEGRATED CCT SMD 74HC574 OCTAL NON INV D F/F (S)
IC14	002-10004-19	INTEGRATED CCT SMD FX419 FFSK MODEM (S)
IC15	002-10340-64	INTEGRATED CCT SMD MC34064 LO VOLT SENSE (S)
IC16	002-74900-00	INTEGRATED CCT SMD 74HC00 QUAD 2 I/P NAND (S)
IC100	002-00017-20	INTEGRATED CCT MC14499 4*7SEGMENT LED DRIVER (S)
VREG	002-10078-05	INTEGRATED CCT SMD 78L05 5V REGULATOR
L1	056-00021-01	INDUCTOR FIXED 1.5UH AXIAL
L2	056-00021-01	INDUCTOR FIXED 1.5UH AXIAL
L3	056-00021-01	INDUCTOR FIXED 1.5UH AXIAL
LED1	008-00010-15	LED 3MM GREEN HLMP1585 LESS MOUNTING
LED2	008-00010-15	LED 3MM GREEN HLMP1585 LESS MOUNTING
LED100	008-00014-72	LED 10X5MM RECTANGLE RED HLMP2300
LED101	008-00014-72	LED 10X5MM RECTANGLE RED HLMP2300
LED102	008-00014-72	LED 10X5MM RECTANGLE RED HLMP2300
LED103	008-00020-10	LED DISPLAY 8MM 1 DIGIT 7 SEGMENT HDSP7503
LED104	008-00020-10	LED DISPLAY 8MM 1 DIGIT 7 SEGMENT HDSP7503
LED105	008-00020-10	LED DISPLAY 8MM 1 DIGIT 7 SEGMENT HDSP7503
LED106	008-00020-10	LED DISPLAY 8MM 1 DIGIT 7 SEGMENT HDSP7503
PL-8	240-00021-10	HEADER 10 WAY 1 ROW PCB MTG 18.5MM PINS
PL-9	240-00021-04	HEADER 4 WAY 1 ROW PCB MTG 18.5MM PINS
Q1	000-10008-57	TRANSISTOR SMD BCW70/BC857 PNP SOT-23 AF SMALL SIG
Q2	000-10008-48	TRANSISTOR SMD BCW60/BC848 NPN SOT-23 AF SMALL SIG
Q3	000-10008-48	TRANSISTOR SMD BCW60/BC848 NPN SOT-23 AF SMALL SIG
Q5	000-10008-48	TRANSISTOR SMD BCW60/BC848 NPN SOT-23 AF SMALL SIG
Q11	000-10004-10	TRANSISTOR SMD MJD41C NPN PWR SW DPAK
Q12	000-10008-48	TRANSISTOR SMD BCW60/BC848 NPN SOT-23 AF SMALL SIG
Q13	000-10008-48	TRANSISTOR SMD BCW60/BC848 NPN SOT-23 AF SMALL SIG
Q14	000-10008-57	TRANSISTOR SMD BCW70/BC857 PNP SOT-23 AF SMALL SIG
Q100	000-10008-48	TRANSISTOR SMD BCW60/BC848 NPN SOT-23 AF SMALL SIG
Q101	000-10008-48	TRANSISTOR SMD BCW60/BC848 NPN SOT-23 AF SMALL SIG
Q102	000-10008-48	TRANSISTOR SMD BCW60/BC848 NPN SOT-23 AF SMALL SIG
Q103	000-10008-48	TRANSISTOR SMD BCW60/BC848 NPN SOT-23 AF SMALL SIG
Q104	000-10008-48	TRANSISTOR SMD BCW60/BC848 NPN SOT-23 AF SMALL SIG
R0	036-16100-00	RESISTOR M/F 0805 CHIP 100K 5%
R1	036-16100-00	RESISTOR M/F 0805 CHIP 100K 5%
RV1	042-15200-01	RESISTOR PRESET SMD 20K 4X4.5MM
R2	036-16100-00	RESISTOR M/F 0805 CHIP 100K 5%
RV2	042-15200-01	RESISTOR PRESET SMD 20K 4X4.5MM
R3	036-16100-00	RESISTOR M/F 0805 CHIP 100K 5%
R4	036-16100-00	RESISTOR M/F 0805 CHIP 100K 5%

REF	IPN	DESCRIPTION
R5	036-14220-00	RESISTOR M/F 0805 CHIP 2K2 5%
R6	036-14220-00	RESISTOR M/F 0805 CHIP 2K2 5%
R7	036-14220-00	RESISTOR M/F 0805 CHIP 2K2 5%
R8	036-14220-00	RESISTOR M/F 0805 CHIP 2K2 5%
R9	036-14220-00	RESISTOR M/F 0805 CHIP 2K2 5%
R10	036-14150-00	RESISTOR M/F 0805 CHIP 1K5 5%
R11	036-15100-00	RESISTOR M/F 0805 CHIP 10K 5%
R12	036-13680-00	RESISTOR M/F 0805 CHIP 680E 5%
R60	036-14100-00	RESISTOR M/F 0805 CHIP 1K 5%
R61	036-17100-00	RESISTOR M/F 0805 CHIP 1M 5%
R62	036-15100-00	RESISTOR M/F 0805 CHIP 10K 5%
R63	036-15100-00	RESISTOR M/F 0805 CHIP 10K 5%
R64	036-15100-00	RESISTOR M/F 0805 CHIP 10K 5%
R66	036-13150-00	RESISTOR M/F 0805 CHIP 150E 5%
R67	036-14470-00	RESISTOR M/F 0805 CHIP 4K7 5%
R68	036-15100-00	RESISTOR M/F 0805 CHIP 10K 5%
R74	036-13680-00	RESISTOR M/F 0805 CHIP 680E 5%
R75	036-15100-00	RESISTOR M/F 0805 CHIP 10K 5%
R76	036-15100-00	RESISTOR M/F 0805 CHIP 10K 5%
R77	036-15100-00	RESISTOR M/F 0805 CHIP 10K 5%
R79	036-15100-00	RESISTOR M/F 0805 CHIP 10K 5%
R80	036-15100-00	RESISTOR M/F 0805 CHIP 10K 5%
R81	036-15100-00	RESISTOR M/F 0805 CHIP 10K 5%
R82	036-13270-00	RESISTOR M/F 0805 CHIP 270E 5%
R83	036-15100-00	RESISTOR M/F 0805 CHIP 10K 5%
R85	036-16100-00	RESISTOR M/F 0805 CHIP 100K 5%
R86	036-16560-00	RESISTOR M/F 0805 CHIP 560K 5%
R87	036-14220-00	RESISTOR M/F 0805 CHIP 2K2 5%
R88	036-14150-00	RESISTOR M/F 0805 CHIP 1K5 5%
R90	036-16100-00	RESISTOR M/F 0805 CHIP 100K 5%
R91	036-15100-00	RESISTOR M/F 0805 CHIP 10K 5%
R93	036-15100-00	RESISTOR M/F 0805 CHIP 10K 5%
R94	036-15120-00	RESISTOR M/F 0805 CHIP 12K 5%
R95	036-15100-00	RESISTOR M/F 0805 CHIP 10K 5%
R100	036-13270-00	RESISTOR M/F 0805 CHIP 270E 5%
R101	036-13270-00	RESISTOR M/F 0805 CHIP 270E 5%
R102	036-13270-00	RESISTOR M/F 0805 CHIP 270E 5%
R103	036-13270-00	RESISTOR M/F 0805 CHIP 270E 5%
R104	036-13270-00	RESISTOR M/F 0805 CHIP 270E 5%
R105	036-13270-00	RESISTOR M/F 0805 CHIP 270E 5%
R106	036-13270-00	RESISTOR M/F 0805 CHIP 270E 5%
R107	036-13270-00	RESISTOR M/F 0805 CHIP 270E 5%
R110	036-12180-00	RESISTOR M/F 0805 CHIP 18E 5%
R111	036-12180-00	RESISTOR M/F 0805 CHIP 18E 5%
R112	036-12180-00	RESISTOR M/F 0805 CHIP 18E 5%
R115	036-17100-00	RESISTOR M/F 0805 CHIP 1M 5%
R116	036-15100-00	RESISTOR M/F 0805 CHIP 10K 5%
R117	036-15220-00	RESISTOR M/F 0805 CHIP 22K 5%
R118	036-16270-00	RESISTOR M/F 0805 CHIP 270K 5%
R119	036-15100-00	RESISTOR M/F 0805 CHIP 10K 5%
R120	036-14220-00	RESISTOR M/F 0805 CHIP 2K2 5%
R121	036-14470-00	RESISTOR M/F 0805 CHIP 4K7 5%
R122	036-15100-00	RESISTOR M/F 0805 CHIP 10K 5%
R123	036-16100-00	RESISTOR M/F 0805 CHIP 100K 5%
R124	036-14220-00	RESISTOR M/F 0805 CHIP 2K2 5%
R125	036-12470-00	RESISTOR M/F 0805 CHIP 47E 5%
R126	036-12470-00	RESISTOR M/F 0805 CHIP 47E 5%
R127	036-15100-00	RESISTOR M/F 0805 CHIP 10K 5%
R128	036-16100-00	RESISTOR M/F 0805 CHIP 100K 5%
R129	036-16100-00	RESISTOR M/F 0805 CHIP 100K 5%
R130	036-15100-00	RESISTOR M/F 0805 CHIP 10K 5%
SKT-1	240-04020-55	SOCKET 5 WAY 1 ROW PCB MTG BOTTOM ENTRY
SKT-2	240-04020-55	SOCKET 5 WAY 1 ROW PCB MTG BOTTOM ENTRY
SKT-3	240-04021-18	SOCKET 18WAY VERT PCB MTG BOTTOM ENTRY
SKT-4	240-04020-56	SOCKET 10 WAY 1ROW PCB MTG BOTTOM ENTRY
SKT-7	240-04021-13	SOCKET 3WAY VERT PCB MTG BOTTOM ENTRY
SKT-8	240-04021-27	SOCKET 10WAY PCB EDGE MTG RT ANGLE ENTRY
SKT-9	240-04021-24	SOCKET 4WAY PCB EDGE MTG RT ANGLE ENTRY
SKT-10	240-04020-91	SOCKET 6WAY MODULAR PHONE RT ANG PC MT SO MOLEX
SW100	232-00010-23	SWITCH KEYBOARD SPST MOMENTARY ON ALPS KEG
SW100	232-00020-25	KEYTOP GREY FOR 232-00020-23 CUSTOM MADE A3M2289
SW101	232-00010-23	SWITCH KEYBOARD SPST MOMENTARY ON ALPS KEG
SW101	232-00020-25	KEYTOP GREY FOR 232-00020-23 CUSTOM MADE A3M2289
SW102	232-00010-23	SWITCH KEYBOARD SPST MOMENTARY ON ALPS KEG
SW102.	232-00020-25	KEYTOP GREY FOR 232-00020-23 CUSTOM MADE A3M2289
VREG	002-10078-05	INTEGRATED CCT SMD 78L05 5V REGULATOR
XL1	274-00010-36	CRYSTAL 8.064MHZ MICRO P HC-18U

IPN	DESCRIPTION
### VARIANT T535-98	93 TRANSCEIVER FM 135-175MHZ 2.5K DEV TRUNKING RC
220-01163-00	PRINTED CIRCUIT BOARD T545/T535 TRUNKING CONTROL
232-00020-23	KEYBASE 6MM SQ FOR KEYSWITCH 232-00010-23
240-00020-68	HEADER 2WAY PCB MOUNTING STANDARD
240-04020-64	SOCKET JACK AN 0.98MM PCB MTG 64 WAY SIL STRIP
311-01033-00	KNOB COMPLETE WITH DOT A2M1584 T500 SERIES ON FRONT PANEL.
312-01041-00	LENS A3M2286 LED DISPLAY WINDOW T5X5 TR
312-01044-00	LENS ANNUNCIATOR COMPLETE T545-98 A4A631
319-01158-00	SHIELD A3M2321 MIC SKT T5X5 TR AROUND SKT-10.
349-00010-23	SCREW 4X5/16 PAN POZI TYPE 25 THREADCUTTER ZP
365-00100-03	LABEL BLANK 10.8X30MM S/A METALISED POLYESTER
365-00100-09	LABEL WHITE VINYL 15X11MM S/A ESN LABEL ON IC12
369-00020-33	TAPE VINYL FOAM 1 SIDE S/A 12*3MM TESASPONGE 8mm ON SW1 OF MAIN BOARD.

IPN	DESCRIPTION
### VARIANT T535-98	93 TRANSCEIVER FM 135-175MHZ 2.5K DEV TRUNKING RC
240-00100-13	PLUG COAXIAL BNC CORD MTG CRIMP URM76
240-02010-62	SOCKET RECEPTACLE 7/0.2 WIRE CRIMP MOLEX
252-00010-02	CLIP MICROPHONE MTG
303-30052-00	KEY A4M1925 RUGGED CRADLE T500
316-06417-00	PANEL FRONT COMPLETE A3M2514 T535 TRUNKING
349-00010-49	SCREW SELFTAP NO 10X1/2 IN TYPE AB PAN POZI BZ
353-00010-32	WASHER M5 SHAKEPROOF EXT BZ
399-00010-51	BAG PLASTIC 75*100MM

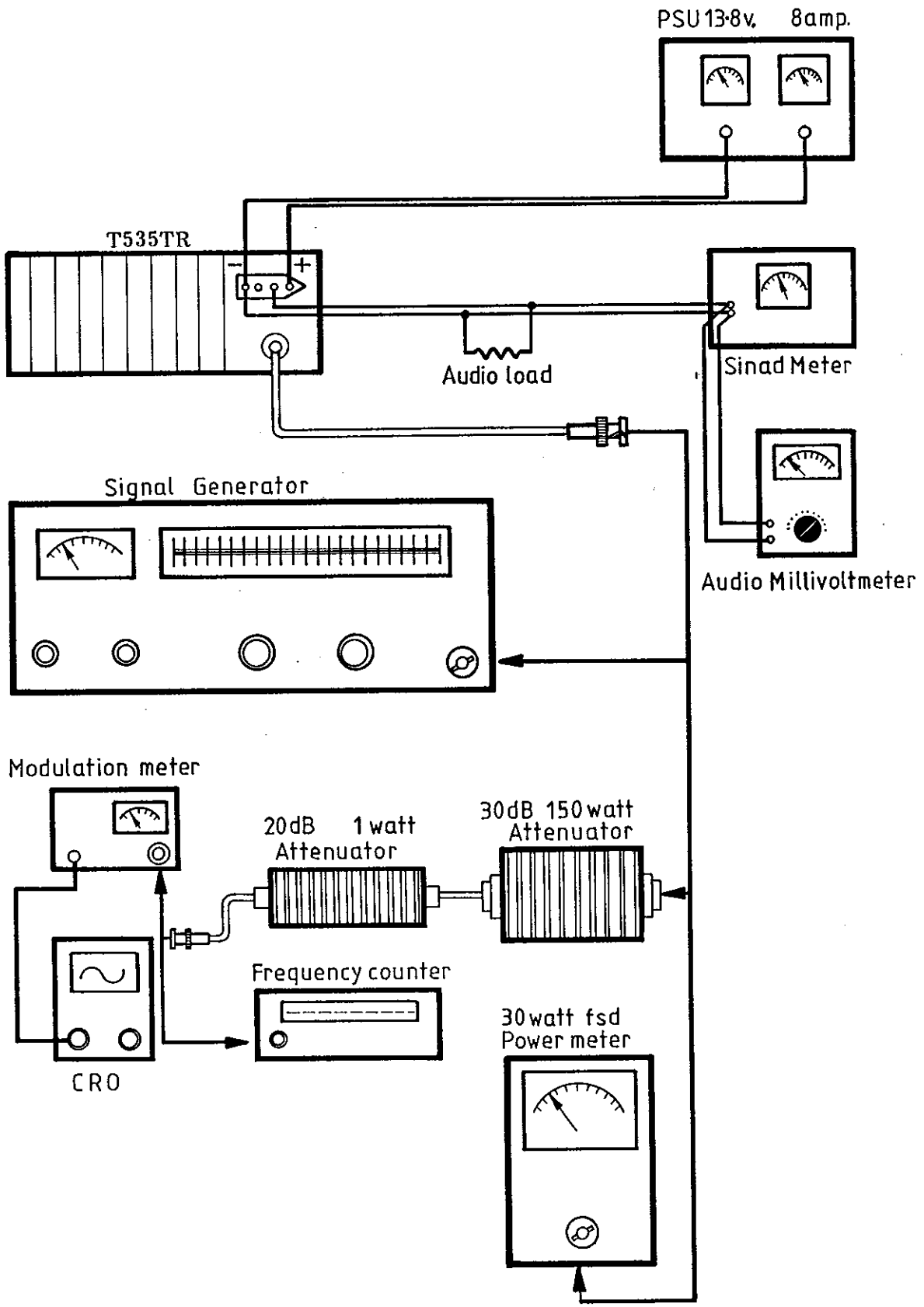


Diagram 1 Suggested Test Equipment Set-Up

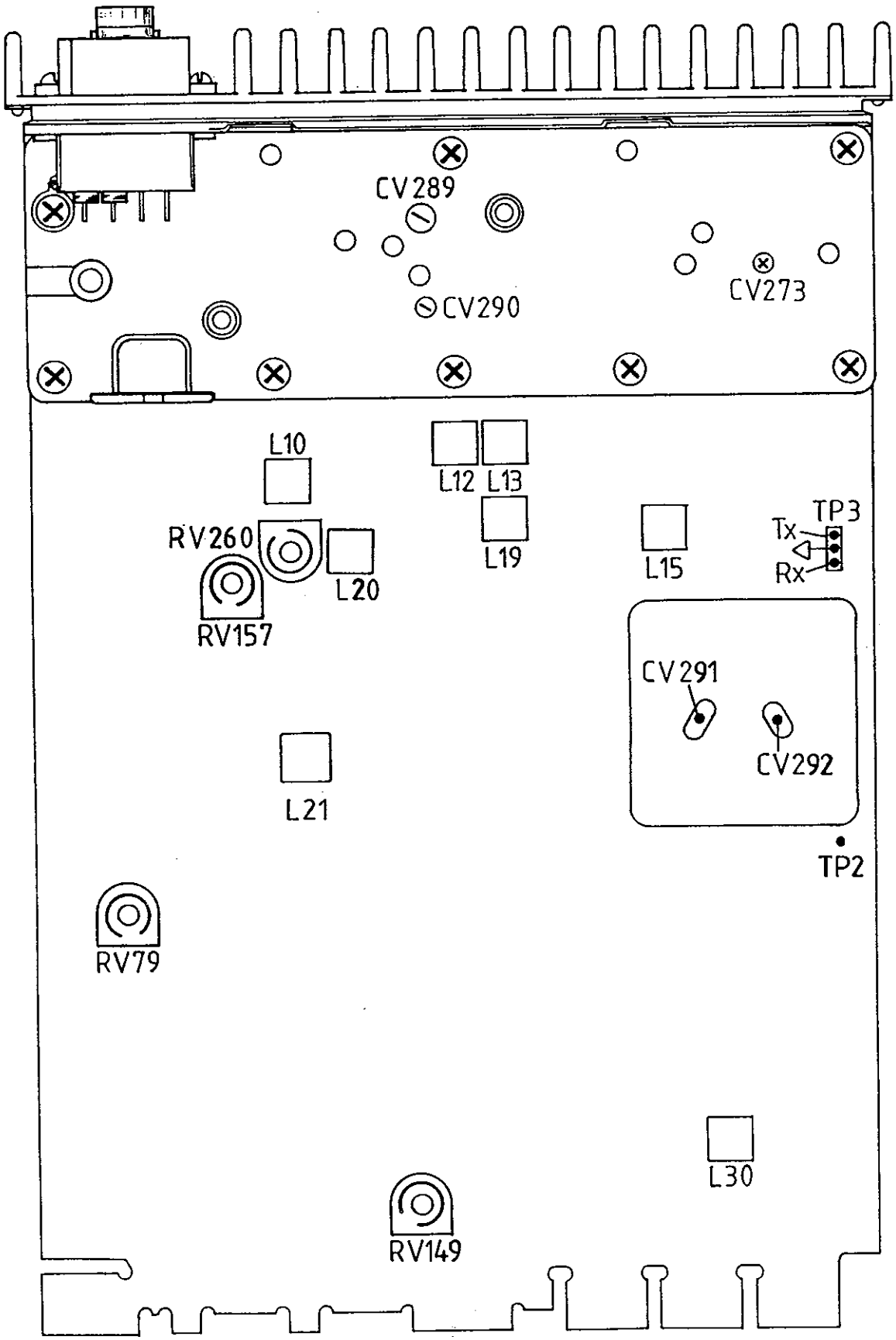


Diagram 2 T535TR Tuning Points

220-01142-02 ISS: 2A

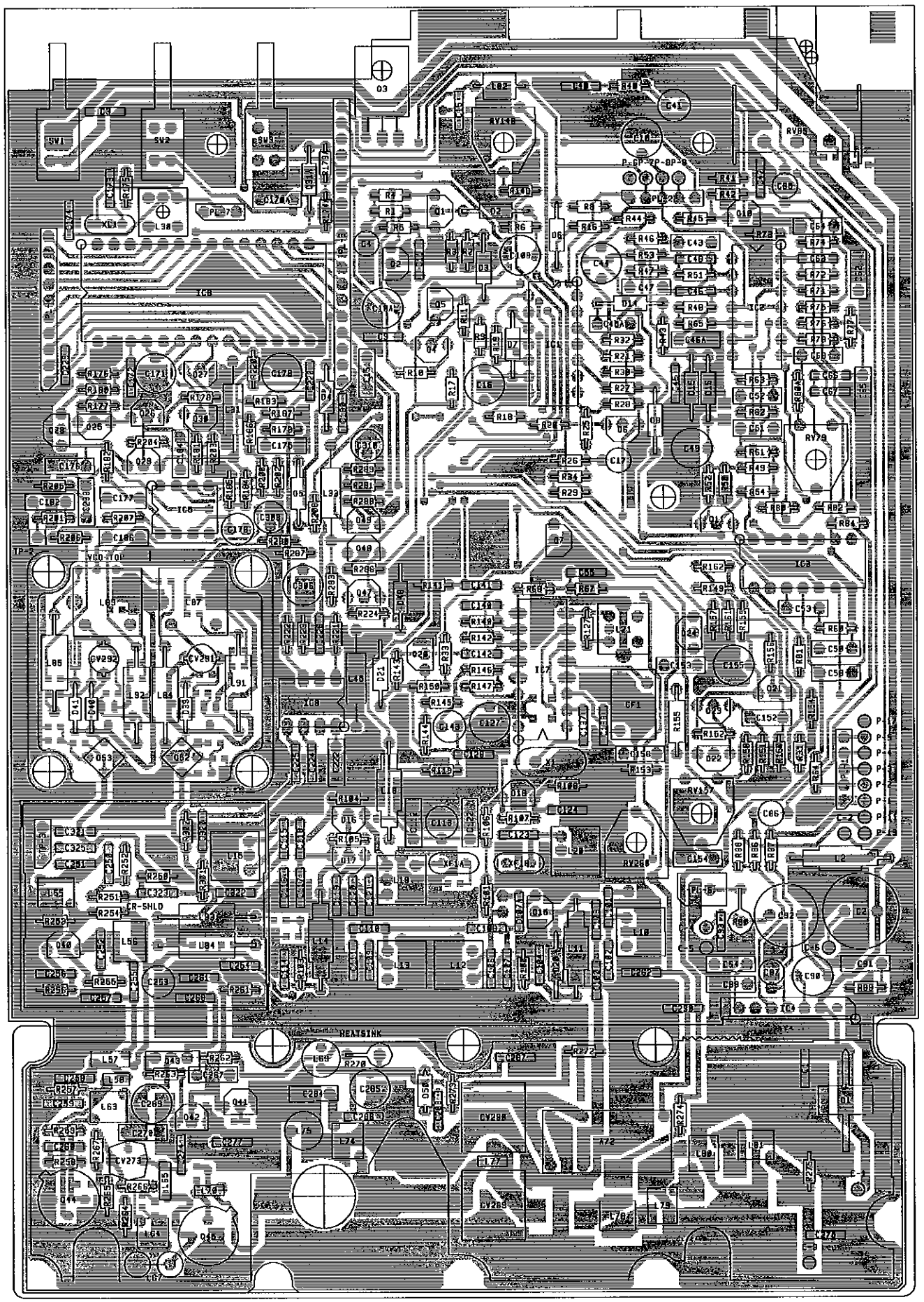


DIAGRAM 3 : T535TR PCB LAYOUT - TOP ENCODING/BOTTOM COPPER.

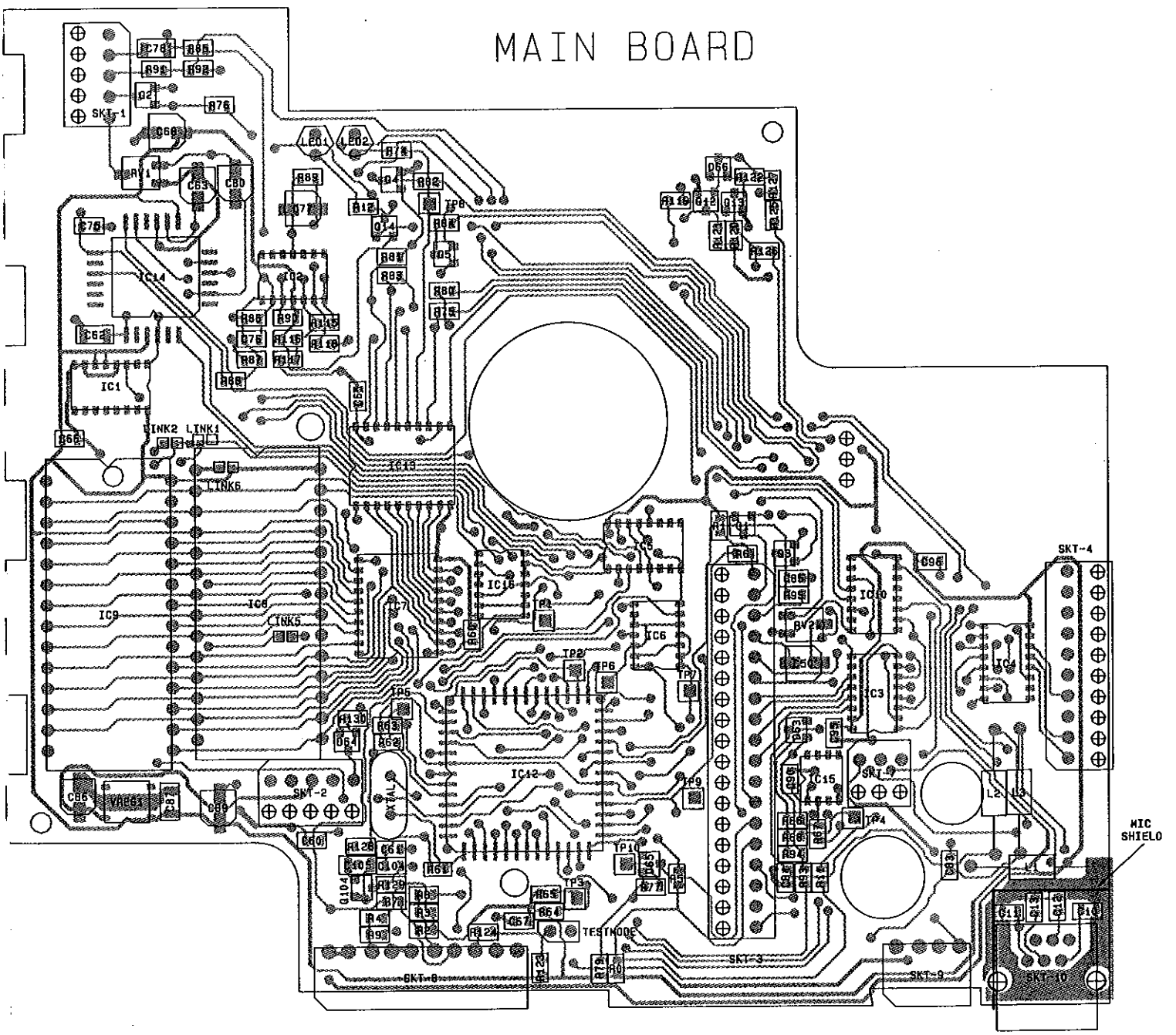


Diagram 4 Trunking Control Board Layout

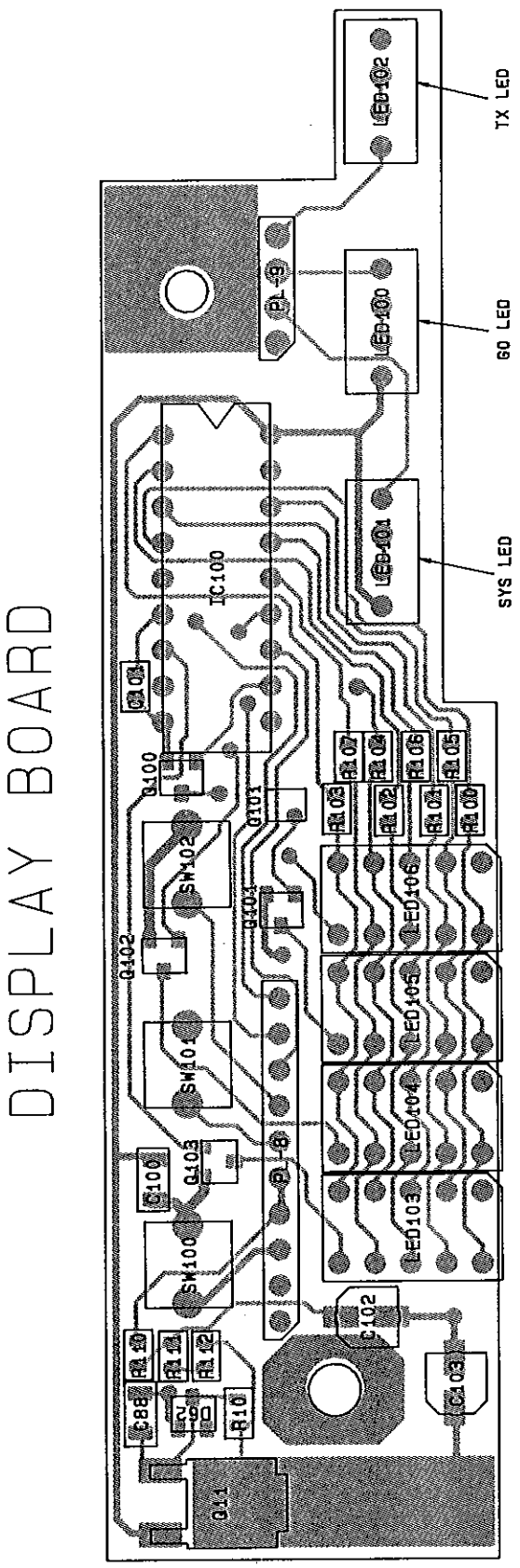


Diagram 5 Trunking Display Board Layout

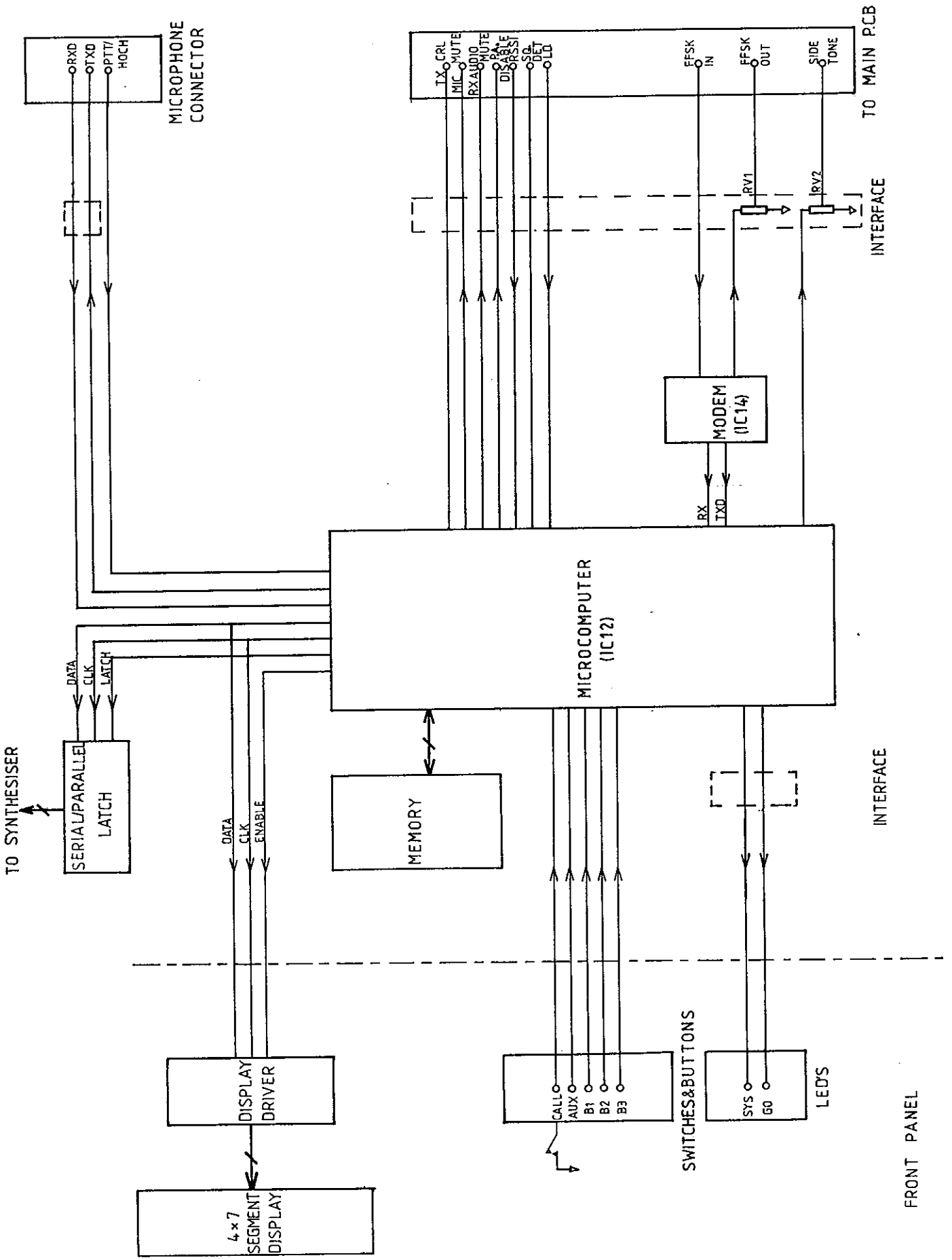
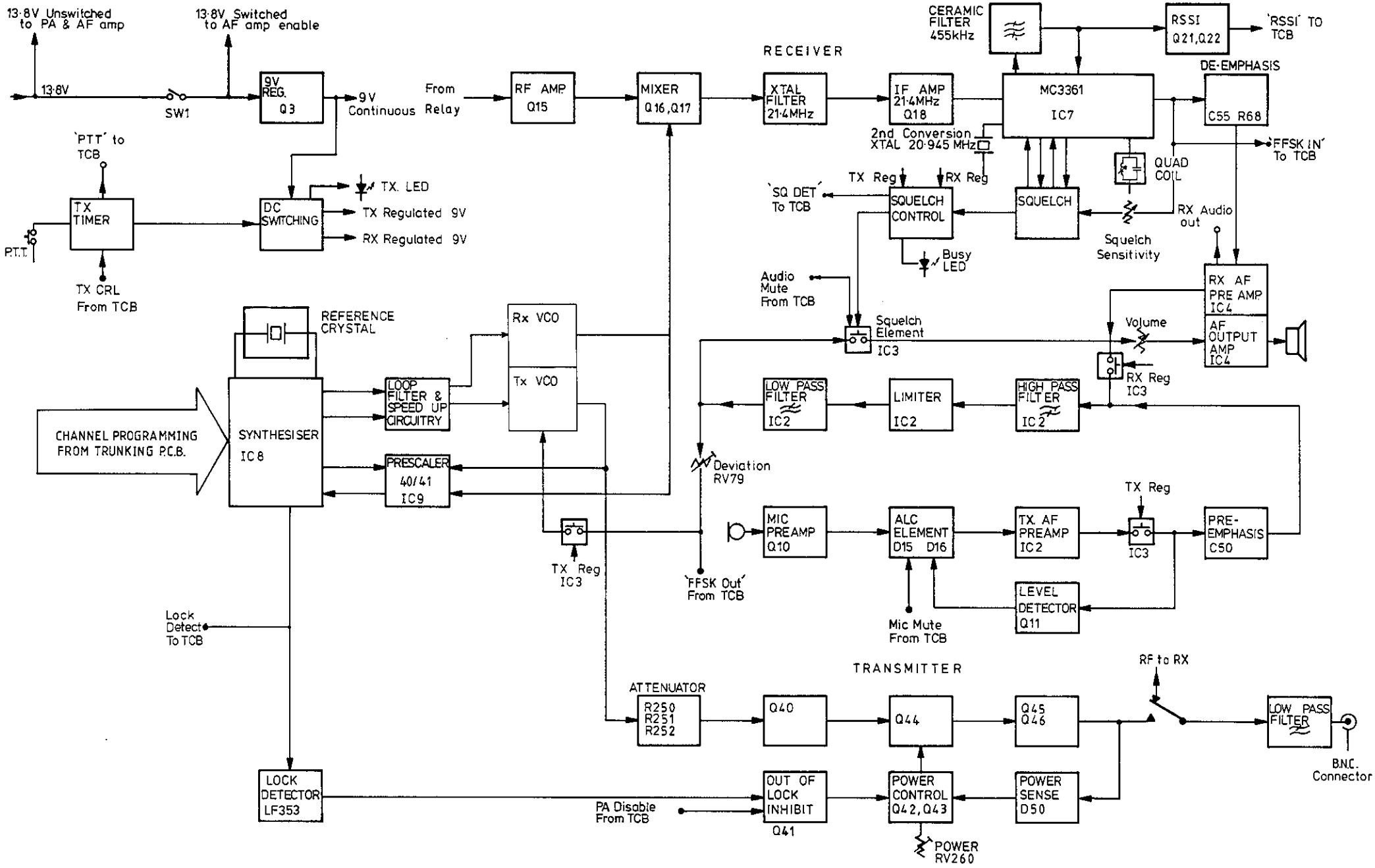


Diagram 6 Trunking Control Board Block Diagram



ISSUE	AMENDMENTS	DRN.	CHKD	APVD	DATE
A	ORIGINAL				

ISSUE	AMENDMENTS	DRN.	CHKD	APVD	DATE

DO NOT SCALE OFF DRAWING

BLOCK DIAGRAM T535-39

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Christchurch New Zealand

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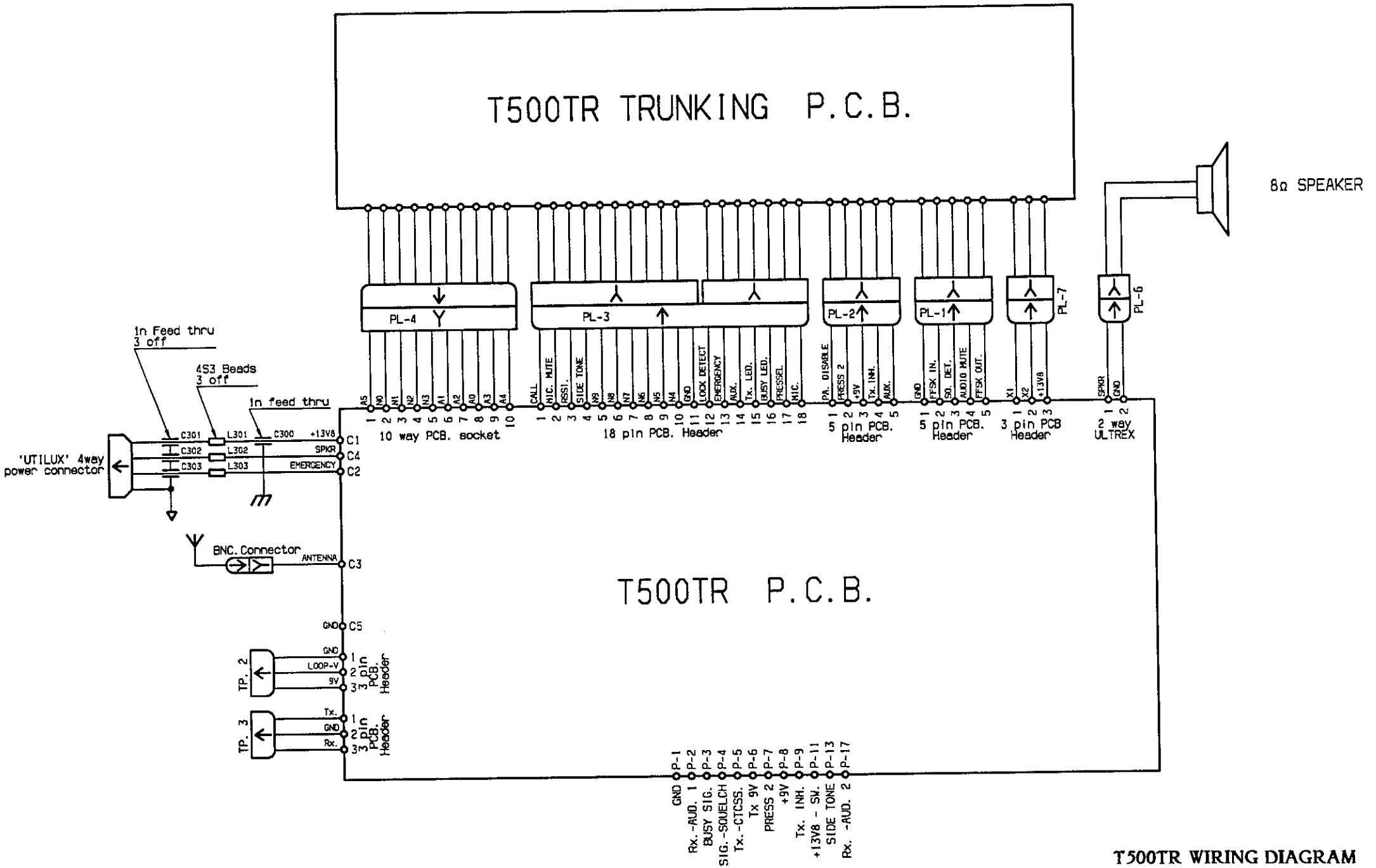
ISSUE A



T500TR WIRING DIAGRAM
A2M2253
ISSUE B