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**T555 Mobile Two Way Radio**

**UHF FM 400-520MHz**

**(M555-00)**

**Issue B**

**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 covers the General, Technical and Servicing Information on the T555 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.

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Manual Revisions

This Tait Service Manual may incorporate textural revisions and, where necessary, updated Parts Lists and Diagrams.

Those portions of text that have been changed from the previous issue Manual are indicated by a vertical line in the outer margin of the page.

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SECTION 1 GENERAL INFORMATION

1.1 INTRODUCTION

The T555 is a high performance, synthesized mobile two way radio with a nominal RF power output of 25 watts. It is intended for operation in the 400 to 520MHz frequency range with 25kHz channel spacing at  $\pm 5$ kHz deviation, or 12.5kHz channel spacing and  $\pm 2.5$ kHz deviation. The standard set has a two channel capacity.

Operation of the T555 is by hand held microphone and press-to-talk switch, plus five front panel mounted controls: 'Volume', 'Squelch', 'Channel Change', 'Call' and 'On/Off switch'. Visual indication of 'Channel Selected', 'Transmit', 'Busy' and 'Call' (if selective calling is fitted) is by illuminated front panel display.

Provision is made for selective calling and CTCSS to be incorporated within the case of the T555.

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

The T555 employs the dual modulus system of frequency synthesis. Channel information is held on a plug-in diode matrix board which can be field programmed with a soldering iron.

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 4 watts of audio power to an 8 ohm speaker.

The transmitter VCO provides about 10 milliwatts of frequency modulated RF drive to the five stage broad band RF power amplifier. An audio processor provides modulation level control and deviation limiting and a transmit timer returns the T555 to receive after approximately one and a half minutes of transmission.

The T555 is light and compact and is supplied with a versatile mounting system to allow easy installation in any vehicle. Mains operation is possible when the T555 is used with the T508 power supply.

The DC supply to the set must be negative earth and may be between 10.8 and 16 volts. The T555 is protected against reversal of the DC supply polarity.

## 1.2 SPECIFICATIONS

### 1.2.1 GENERAL

The performance figures given are typical figures, unless otherwise indicated, for equipment tuned with the maximum switching band and 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 New Zealand Post Office Specification RTA25.

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

Modulation Type	.. Frequency Modulation
Frequency Ranges	.. 400 to 520MHz
Frequency Increment	.. 12.5kHz (minimum)
Number Of Channels	.. 2, 10, 40 or 80 (to order)
Switching Range: Transmitter & Receiver	.. 6MHz
Supply Voltage:	
Operating Range	.. 10.8 to 16V DC
Standard Test Voltage	.. 13.8V DC
Polarity	.. negative earth only
Polarity Protection	.. internal crowbar diode
Supply Current:	
Receiver - Squelched	.. 175mA
Receiver - Full Audio	.. 700mA
Transmitter	.. 5.5A
Antenna Impedance	.. 50 ohms (nominal)
T/R Changeover Switching	.. solid state
Operating Temperature Range (refer to Section 1.2.4)	.. -30°C to +60°C
Dimensions:	
Length	.. 238mm
Width	.. 150mm
Height	.. 45mm
Weight	.. 1.2kg



## T555 General Information

### 1.2.2 RECEIVER

Type	.. dual conversion superhet
12dB Sinad Sensitivity:	
Wide Band	.. -117dBm (0.32 $\mu$ V)
Narrow Band	.. -116dBm (0.35 $\mu$ V)
I.F Amplifiers:	
Frequencies	.. 21.4MHz and 455kHz
Bandwidth:	
Narrow	.. 7.5kHz
Wide	.. 15kHz
Signal+Noise-to-Noise Ratio:	
Narrow Band	.. 28dB
Wide Band	.. 33dB
Selectivity (adjacent channel)	.. 75dB
Spurious Response Attenuation	.. 70dB
Intermodulation Response Attenuation	.. 75dB
Spurious Emissions:	
Conducted	.. -60dBm
Radiated ( $\frac{1}{2}$ -wavelength dipole)	.. -57dBm
Audio:	
Output into internal 8 ohm speaker	.. 2 watts
Output into external 3.5 ohm speaker	.. 4 watts
Distortion (at rated power)	.. 2%
Minimum Load Impedance	.. 2 ohms
Audio Response	.. within +1, -3dB of a 6dB/octave de-emphasis characteristic (ref. 1kHz)
Audio Bandwidth	.. 300Hz to 3kHz
Squelch:	
Threshold	.. -117dBm (0.32 $\mu$ V pd)/3dB Sinad
Hard Setting	.. -110dBm (0.71 $\mu$ V pd)/16dB Sinad
Ratio	.. 70dB
Opening Time	.. 10ms (-113dBm)

### 1.2.3 TRANSMITTER

Power Output	.. 25 watts
Tx Lockup Time	.. 35ms
Spurious Emissions:	
Conducted	.. -26dBm
Radiated ( $\frac{1}{2}$ -wavelength dipole)	.. -26dBm

## T555 General Information

### Adjacent Channel Power:

Narrow Band	.. -70dBc
Wide Band	.. -80dBc

### Modulation System:

Type	.. direct FM
Deviation Limiting	.. $\pm 5$ kHz (peak) maximum
Bandwidth	.. 300Hz to 3kHz

### Responses:

In Limiting	.. within +0dB, -4dB of max. 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 60% Maximum Deviation (at 1kHz)	.. 6mV rms
Distortion	.. 2%
Hum & Noise	.. 45dB

### Mismatch Capability:

Stability	.. VSWR < 5:1 (all phase angles)
Ruggedness	.. 2 minute transmit into infinite VSWR (all phase angles)

### Transmit Timer

.. 1.5 minutes

## 1.2.4 FREQUENCY REFERENCE

### Stability:

$\pm 5$ ppm (-10°C to +60°C)	.. TE/9 or TE/37
$\pm 5$ ppm (-30°C to +60°C)	.. TE/9 or TE/37 + crystal heater (after 1 minute)
$\pm 4$ ppm (-10°C to +60°C)	.. TE/24 or TE/26
$\pm 3$ ppm (-10°C to +60°C)	.. TCXO

### Heater Warm-Up Time (below 0°C)

.. 1 minute

### Oscillator frequency:

For channel spacing at multiples of 12.5kHz .. 12.8MHz

1.3 VERSIONS

Description	Version																							
	10	15	20	21	22	23	24	25	26	27	28	29	30	32	33	35	50	51	52	60	70	71	73	90
400-470MHz	+		+	+	+	+							+	+	+			+	+	+	+			+
450-520MHz		+					+	+	+	+		+				+	+						+	
7.5kHz IF Bandwidth					+			+	+				+	+				+					+	
15kHz IF Bandwidth	+	+	+	+		+					+	+					+		+	+	+			+
CTCSS	+	+	+		+	+		+	+					+			+							+
Scanning Multichannel																	+	+	+					
TCXO					+				+	+								+						
Crystal Heater																				+				+
1W Tx Power						+				+														
Standard Cradle	+																				+			
Rugged Cradle			+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		+	+	+	+

Note: T555-60 has a CMC front panel.  
 T555-70 has an Intron front panel.  
 T555-73 has a GSA2210J 5 tone/CTCSS PCB fitted.

## 1.4 OPERATING INSTRUCTIONS

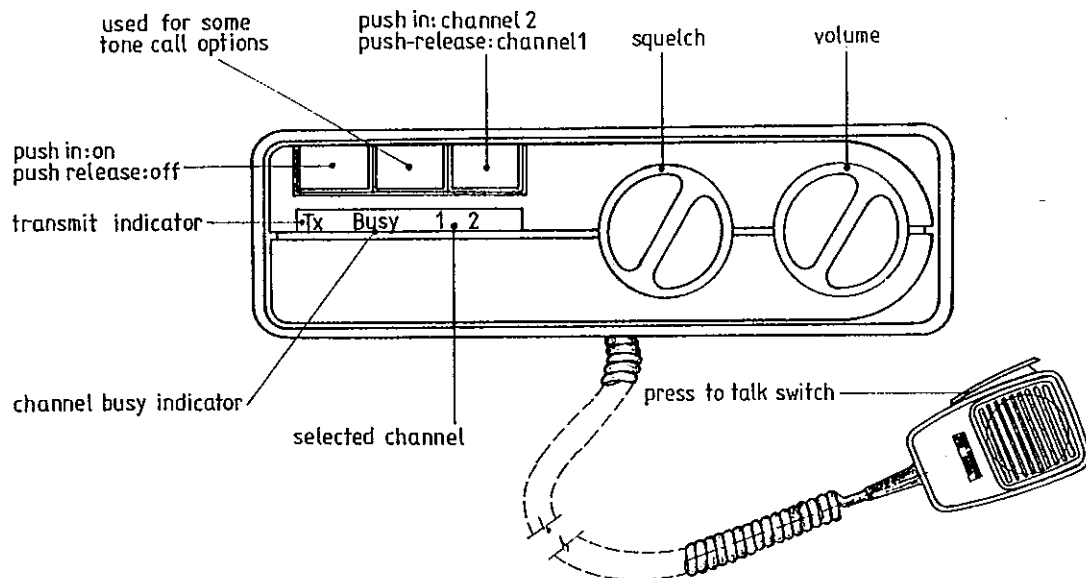


Figure 1 Front Panel Layout

### To Receive:

- a) The front panel display will indicate which channel has been selected.
- b) Turn the squelch control clockwise until noise is heard, then turn it anticlockwise 5° beyond the point at which the receiver quietens.

Note: Where CTCSS is used without a hook monitoring facility, it will be necessary to view the 'Busy' indicator when setting the squelch.

### To Transmit:

- a) Check that the channel is vacant before transmitting.
- b) Close the press-to-talk switch before beginning to speak.
- c) The T555 will automatically revert to receive after 1.5 minutes of transmission. To continue transmitting, release, then close the press-to-talk switch.
- d) Always replace the microphone in the clip when not in use.

## SECTION 2 CIRCUIT OPERATION

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

### 2.1 SYNTHESIZER

The dual modulus synthesizer of the T555 features separate on-frequency VCOs for receive and for transmit. Each VCO consists of a J-FET oscillator buffered by a dual gate MOSFET. The transmit VCO is frequency modulated by the application of audio to the source of Q36.

A crystal provides a stable reference frequency of 12.8MHz which is divided down to 12.5kHz and fed to one input of a phase comparator within IC8. For applications which require high frequency stability over a wide temperature range, a crystal heater is added. The crystal and heater are mounted on the LED board.

The VCO frequency is divided by the 64/65 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 diode matrix board.

The phase comparator output (pins 7 & 8 of IC8) is fed to VCO varicaps D35 & D50 via the speedup circuit (Q27, Q28) and the loop filter (R181, C177, R183, C178, R186), and then to either R187 & C185 on receive, or R227 & C226 on transmit.

### 2.2 RECEIVER

The RF signal from the PIN switch is amplified by Q15 and fed to the gate of the mixer FET (Q16) via a triple tuned circuit (note the use of LC circuits rather than helical resonators). 10mW from the receive VCO is fed to the source of the mixer.

The IF output from the mixer passes through the first 21.4MHz crystal filter and is amplified by Q21 and Q2. It then passes through the second 21.4MHz crystal filter before being fed to IC7.

IC7 provides the following functions: IF conversion from 21.4MHz to 455kHz with external crystal X1 (CF1 sets the 455kHz IF bandwidth); amplitude limiting; quadrature detection with CD1; and squelch. Q19 provides additional limiting gain.

Audio from pin 9 of IC7 is de-emphasised by R68 and C55 and is 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 an 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. The centre frequency is approximately 8kHz for the wide band T555 and 4.5kHz for the narrow band version.

## T555 Circuit Operation

The band pass filter output 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 pin 14 of IC7 is high in the presence of noise and low in the absence of noise. The threshold point occurs at approximately 0.7 volts.

The switching signal from the threshold detector is then inverted by Q7. D9, C17 and R26 provide an extended tail time (to prevent squelch closure during rapid fades) while maintaining a fast opening time.

Q6 drives the squelch element, which is part of the audio processor, and the 'Busy' LED.

### 2.4 TRANSMITTER

#### 2.4.1 RF STAGES

The 10mW output of the frequency modulated transmit VCO is amplified to a level of 25 watts by a 5 stage broad band amplifier (Q40, Q41, Q45, Q46, Q47). High level RF then passes via the aerial PIN switch through the low pass filter to the aerial connector.

The transmit power output is set at 25 watts by RV253 which controls the collector voltage of Q45 and hence the gain of the broad band amplifier. The circuit utilises a power detector, D57, and a feed back loop to hold the transmitter power to 25 watts under conditions of varying supply voltage.

Transistor Q42 prevents the transmitter turning on when the synthesizer is out of lock.

Note: A receiver front end protection circuit, consisting of D58 and R269, detects the presence of avalanche current in the series receiver PIN diode (D56) and turns the PA power down via the out of lock transistor (Q42). The avalanche current can occur under extreme VSWR conditions. Transistor Q48 adds a small delay to the switching voltage for D56.

#### 2.4.2 AUDIO PROCESSOR

Transistor Q10 provides microphone preamplification while 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. Connection points for CTCSS or selective calling options are shown on the Circuit Diagram.

### 2.5 POWER SUPPLY

#### 2.5.1 GENERAL

Note: The T555 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, driver, and power turn-down stages whenever the T555 is connected to a supply.

2.5.2 CONTINUOUS SUPPLIES

DC from the on/off switch supplies the audio output IC enable and the short circuit protected 9 volt regulator. A continuous 9 volts is applied to the audio processor and synthesizer.

2.5.3 RECEIVE

When the PTT switch is open, IC1 turns Q5 on and Q4 off, enabling the following circuits:

- that part of the diode matrix board containing receive channel information
- receive VCO
- receiver
- squelch control
- CMOS gate in the receive audio path
- receive diode in the aerial switch.

2.5.4 TRANSMIT

When the PTT switch is closed, IC1 turns Q4 on and Q5 off enabling the following circuits:

- that part of the diode matrix board containing transmit channel information
- transmit VCO
- low power transmitter stages
- CMOS gates in the microphone audio and modulation paths
- transmit diode in the aerial switch.

Closing the PTT switch also initiates a timer circuit around IC1 which will return the T555 to receive after 1.5 minutes of transmission.

2.5.5 FREQUENCY INFORMATION

This is supplied by a matrix board using surface mount devices.

The diode matrix board has four rows of diodes. A row is selected by D44 to D47 and R216 to R219 according to the channel switch position and whether the T555 is in the receive or transmit mode. The channel frequency is selected by soldering between pads as described in Tables 1 and 2, such that the correct pattern of '0's and '1's is presented to IC8.





### 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 (previously designated the T220/2) is a remote speaker assembly which may be used with the T555. It comprises a heavy duty 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 T500-01 CTCSS

The T500-01 CTCSS unit (previously designated the TA-500/CTCSS) is a plug-in option designed to fit T500 Series I and II two way radios.

It requires no wiring to install and will encode and decode CTCSS tone frequencies within the range 67Hz to 250Hz with separate adjustment for each channel. Hook switch monitoring and transmit inhibit on "busy" may be field selected.

Refer to TI-343 for fitting and servicing details.

#### 3.5 T500-11 CTCSS

The T500-11 is a plug-in CTCSS encoder/decoder designed to fit T500 Series II radios. All functions and specifications of the T500-11 are the same as the T500-01, but the T500-11 has an additional alert tone ("beep") circuit.

## T555 Ancillary Equipment

This feature gives an audible indication of a busy channel when transmit inhibit is active. The operator no longer needs to look at the radio for a busy indication (which may be unsafe in a motor vehicle), as is the case with the T500-01.

Refer to TI-336B for fitting and servicing details.

### 3.6 T500-02 MULTICHANNEL CTCSS

The T500-02 (previously designated TA-500MC/CTCSS) is a high performance CTCSS encoder/decoder for use with T500 Series I and II radios equipped with any one of the following multichannel conversion kits:

- T500-03 (previously designated TA-500/10)
- T500-04 (previously designated TA-500/40)
- T500-55
- T500-58

It will encode and decode all 37 standard tones from groups A, B and C, permitting the use of all 37 tones on one repeater. Encode and decode tones may be the same or different on each radio channel programmed. No tone on transmit and no CTCSS mute on receive may also be programmed on any radio channel.

Hook switch monitoring is also programmable on any channel. Transmit inhibit on busy is fitted as standard.

Refer to TI-328 for fitting and servicing details.

### 3.7 T500-03/04 MULTICHANNEL

The T500-03 and T500-04 (previously designated TA-500/10 and /40 respectively) are add-on kits which convert a T500 Series I or II two way radio to 10 or 40 channel operation. Compatibility is maintained with all other Tait T500 accessories.

An Erasable Programmable Read Only Memory (EPROM) is used to store channel and CTCSS data. The EPROM is field programmable using a Tait T601 Programmer.

Refer to TI-292B for fitting and servicing details.

### 3.8 T500-55 MULTICHANNEL

The T500-55 is a retrofit kit which converts a T500 Series II two way radio to 10, 20, 40 or 80 channel operation. Compatibility is maintained with all other Tait T500 Series II accessories.

An Erasable Programmable Read Only Memory (EPROM) is used to store channel and CTCSS data. The EPROM is field programmable using a Tait T601 Programmer.

Channel selection is made by the front panel mounted up/down push buttons. A squelch defeat button is also provided.

Refer to TI-323 for fitting and servicing details.

### 3.9 T500-58 SCANNING MULTICHANNEL

The T500-58 is a retrofit kit which converts a T500 Series II two way radio to 10, 20, 40 or 80 channel operation with the capability of scanning up to 10 channels. If priority scanning is required, this is reduced to 5 scanning channels plus the priority channel.

An Erasable Programmable Read Only Memory (EPROM) is used to store channel, scanning and CTCSS data. The EPROM is field programmable using the T500-25 Tait programming kit and a user supplied EPROM programmer.

Channel selection is made by the front panel mounted up/down push buttons. A squelch defeat button is also provided.

Refer to TI-352A for fitting and servicing details.

### 3.10 T500-07 RUGGED CRADLE

The T500-07 (previously designated the TA-500/RC) is a rugged cradle affording a higher level of environmental and mounting security than the standard cradle. It comes complete with mounting screws and cradle unlocking key.

### 3.11 T500-22 DIODE MATRIX

The T500-22 (previously designated the TA-500/M2) is a plug-in memory unit using surface mount devices.

### 3.12 T500-26/27 TCXO

The T500-26 or -27 TCXO PCB's are 12.8MHz reference oscillators with  $\pm 3.0$ ppm temperature stability over the temperature range of  $-10^{\circ}\text{C}$  to  $+60^{\circ}\text{C}$ . The T500-27 is additionally specified to be within  $\pm 5.0$ ppm from  $-30^{\circ}\text{C}$  to  $-10^{\circ}\text{C}$ .

These optional PCB's are fitted in place of the T500 LED PCB, and employ temperature sensing and compensation techniques to achieve the  $\pm 3.0$ ppm stability without the high current consumption normally associated with crystal heaters.

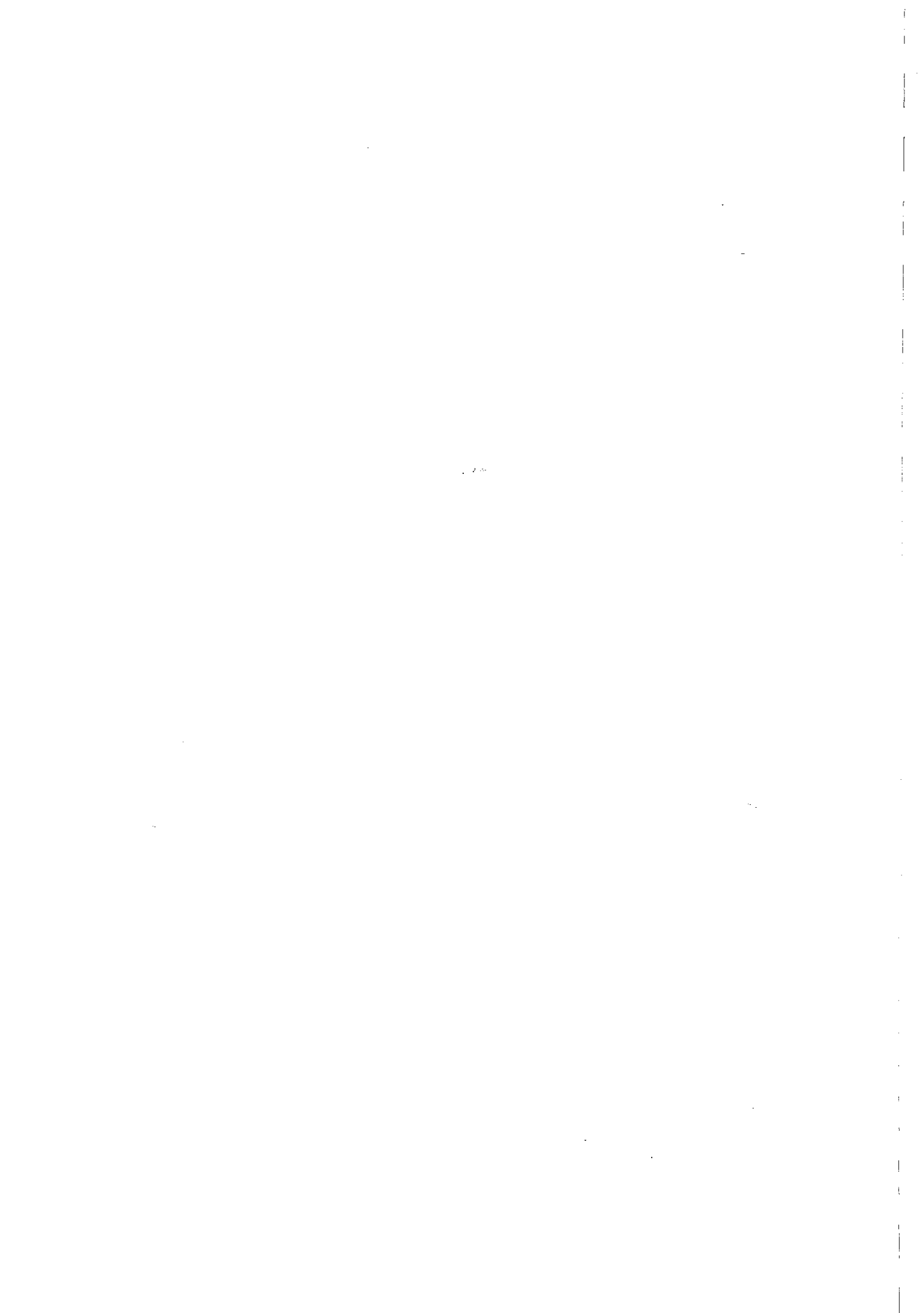
Refer to TI-316B for fitting and servicing details.

### 3.13 T500-56/57 TCXO

The T500-56 or -57 TCXO PCB's are 12.8MHz reference oscillators with  $\pm 3.0$ ppm temperature stability over the temperature range of  $-10^{\circ}\text{C}$  to  $+60^{\circ}\text{C}$ . The T500-57 is additionally specified to be within  $\pm 5.0$ ppm from  $-30^{\circ}\text{C}$  to  $-10^{\circ}\text{C}$ .

These add-on PCB's are used when the T500 Series II two way radio is fitted with a combined T500 Diode Matrix and LED, a T500-55 Multichannel or a T500-58 Scanning Multichannel PCB. The TCXO employs temperature sensing and compensation techniques to achieve the  $\pm 3.0$ ppm stability without the high current consumption normally associated with crystal heaters.

Refer to TI-338B for fitting and servicing details.



**SECTION 4 INSTALLATION**

**4.1 VEHICLE INSTALLATION**

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

**CAUTION:** The T555 is suitable for negative earth installation only.



## SECTION 5 SERVICING

### 5.1 GENERAL

#### 5.1.1 NOTES

If further information is required about the T555 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 (eg. T555-10), 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. M555-00, Issue A.

#### 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, eg. 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 T555. Philips cross-head screwdrivers are not satisfactory for use on these screws.

5.2.2 DISASSEMBLY INSTRUCTIONS

Note: 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 PCB

Place the T555 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.

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 T555 over on the bench.

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 bottom and top covers as instructed above.

Slide the front panel forward.

It is not necessary to remove the knobs, they may be left in situ.

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 T555 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.

Slide on the front panel, taking care to guide the four LEDs into their respective channels in the plastic moulding.

Press the microphone cord into its retaining slot.

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 T555.

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 diode matrix/LED PCB.

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

### 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 exercised 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.

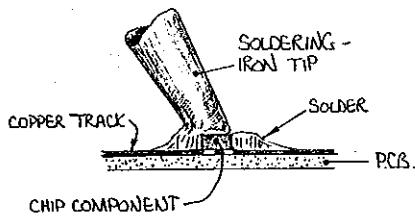


Figure 2

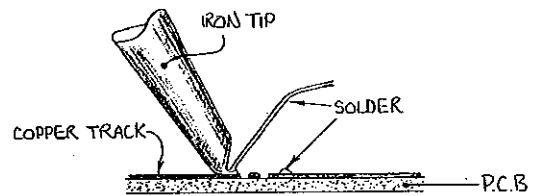


Figure 3

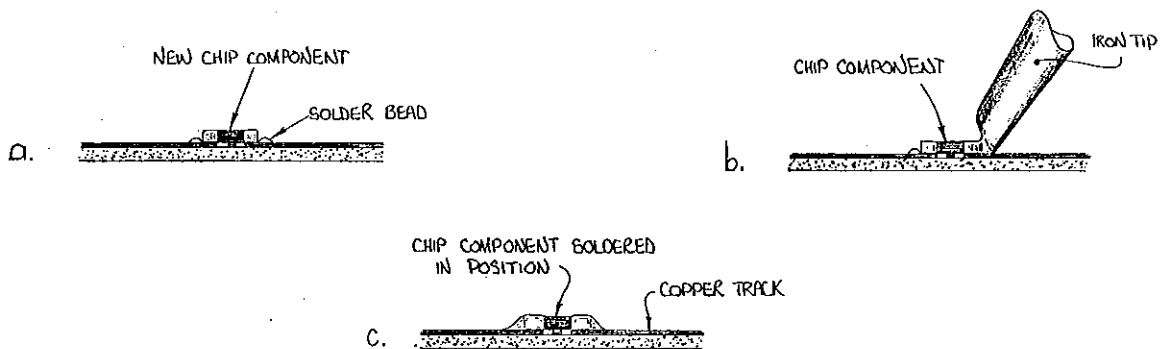


Figure 4

### 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.

##### 5.3.6.2 To Remove Cased Mica Capacitors

Apply a heavy duty soldering iron to the top of the capacitor case.

When the solder is molten, ease the capacitor away from the PCB with a thin stainless steel spike or screwdriver.

## 5.4 SETTING UP

### 5.4.1 TEST EQUIPMENT REQUIRED

1. Multimeter (eg. AVO Model 8)
2. DC electronic voltmeter (eg. Tech TE65)
3. RF power meter 50 ohm, 30 watts FSD usable to 520MHz with 5 and 30 watt elements (eg. 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 (eg. Sayrosa 252)
6. Sinad meter (eg. Helper Instruments sinadder)
7. UHF signal generator. Good quality FM 50 ohm. Useable from 0.1 $\mu$ V (-127dBm) to 200mV (0dBm) pd. (eg. HP 8640B).
8. UHF 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 (eg. 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 T555 microphone. An adaptor should be made which will hold the speaker and microphone close together.
12. AC millivoltmeter
13. Calibrated oscilloscope
14. Speaker 4 ohm voice coil
15. RF power attenuator 50 ohm, total attenuation 50dB (eg. Weinschel 40-40-33 30dB 150W, plus Coline 1200 85 20dB 1W)
16. RF diode probe (eg. Coline M12DM modular RF detector probe)

### 5.4.2 TUNING HINTS

1. Diagrams 1 and 2 show the test set-up for receiver and transmitter alignment. Diagram 3 shows tuning points.
2. For accurate tuning, the test cable connecting the signal generator or power meter to the T555 should be as short as practical and fitted with a 'mating' UHF or 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.

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.
7. See Section 1.3 for the frequency range of each version.

### 5.4.3 CHANNEL PROGRAMMING

Note 1: VCO operation is restricted to a 6MHz switching range within the band covering 380 to 520MHz. Do not programme frequencies outside these limits.

Switching range is defined as the maximum change in frequency to obtain a loop voltage between 1.75 and 6.5 volts.

Note 2: For single channel applications, channel 2 should be programmed to the same frequencies as channel 1.

Tables 1 and 2 show how, when starting with A0, each successive diode influences the synthesiser frequency by a multiple of 12.5kHz in an ascending binary sequence. Note that it is sometimes possible to have two correct solutions for one particular frequency.

#### 5.4.3.1 Combined Diode Matrix/LED PCB

Refer to Table 1 and Diagram 7.

The programming of each of the two transmit and receive channels is accomplished by soldering between the required pads, shown as LK1 to LK64 in Diagram 7. A connected pad pulls IC8 input low and deletes the frequency increment. An unconnected pad allows IC8 input to go high and adds the frequency increment.

Note: It is not necessary to remove the combined diode matrix/LED PCB from the radio for programming.

When a pad is solder bridged, its corresponding N or A value is subtracted from the maximum frequency count.

When a pad is left open, the corresponding value is incremented from zero.

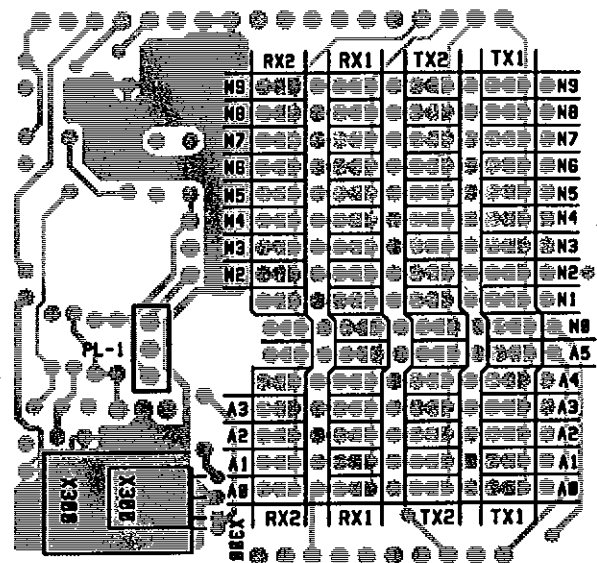
The following examples show a simple method of calculating the correct diode programme.

In each case subtract the largest value from Table 1 which yields a positive result. Continue the process until zero is reached.

Table 1

Frequency Increment (MHz) Code

409.6	N9
204.8	N8
102.4	N7
51.2	N6
25.6	N5
12.8	N4
6.4	N3
3.2	N2
1.6	N1
0.8	N0-
0.4	A5
0.2	A4
0.1	A3
0.05	A2
0.025	A1
0.0125	A0



Example 1

Tx frequency = 458.5MHz

VCO frequency:	458.5	
subtract	409.6	pad N9 unconnected
	48.9	
subtract	25.6	pad N5 unconnected
	23.3	
subtract	12.8	pad N4 unconnected
	10.5	
subtract	6.4	pad N3 unconnected
	4.1	
subtract	3.2	pad N2 unconnected
	0.9	
subtract	0.8	pad N0 unconnected
	0.1	
subtract	0.1	pad A3 unconnected
	0.0	

To check: The sum of the extracted values should equal the required VCO frequency.

$$N9 + N5 + N4 + N3 + N2 + N0 + A3 = VCO$$

$$409.6 + 25.6 + 12.8 + 6.4 + 3.2 + 0.8 + 0.1 = 458.5$$

Note: All these A and N values have pads left open. The remainder, i.e. N8, N7, N1, A5, A4, A2, A1 & A0, are all solder shorted.

Example 2

Rx frequency = 425.9375MHz. The T555 receiver has a 21.4MHz IF and low side injection.

$$fVCO = fRx - 21.4 = 404.5375$$

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VCO frequency:	404.5375	
subtract	204.8	pad N8 unconnected
	199.7375	
subtract	102.4	pad N7 unconnected
	97.3375	
subtract	51.2	pad N6 unconnected
	46.1375	
subtract	25.6	pad N5 unconnected
	20.5375	
subtract	12.8	pad N4 unconnected
	7.7375	
subtract	6.4	pad N3 unconnected
	1.3375	
subtract	0.8	pad N0 unconnected
	0.5375	
subtract	0.4	pad A5 unconnected
	0.1375	
subtract	0.1	pad A3 unconnected
	0.0375	
subtract	0.025	pad A1 unconnected
	0.0125	
subtract	0.0125	pad A0 unconnected
	0.0	

In each case subtract the largest value from Table 1 which yields a positive result. Continue the process until zero is reached.

Check:

$$N8 + N7 + N6 + N5 + N4 + N3 + N0 + A5 + A3 + A1 + A0 = VCO$$

$$204.8 + 102.4 + 51.2 + 25.6 + 12.8 + 6.4 + 0.8 + 0.4 + 0.1 + 0.025 + 0.0125 = 404.5375$$

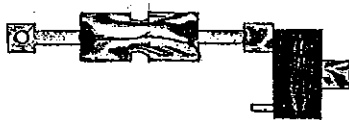
$$404.5375 + 21.4 = 425.9375$$

Note: All the above A and N values have pads left open. The remainder, i.e. N9, N2, N1, A4 & A2, are solder shorted.

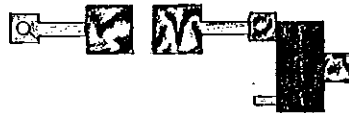
5.4.3.2 T500-22 Diode Matrix PCB

Refer to Figure 5 and Table 2.

The programming of each of the two transmit and receive channels is accomplished by soldering between the required pads on each row of surface mount diodes (see Figure 5).



A connected pad pulls IC8 input low and deletes the frequency increment.



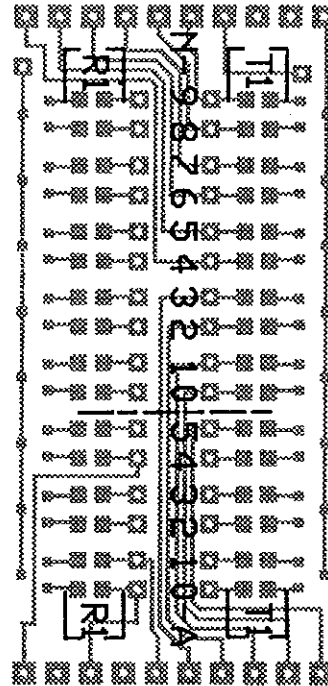
An unconnected pad allows IC8 input to go high and adds the frequency increment.

Figure 5



Table 2

Frequency Increment (MHz)	Code
409.6	N9
204.8	N8
102.4	N7
51.2	N6
25.6	N5
12.8	N4
6.4	N3
3.2	N2
1.6	N1
0.8	N0
0.4	A5
0.2	A4
0.1	A3
0.05	A2
0.025	A1
0.0125	A0



When a pad is solder bridged, its corresponding N or A value is subtracted from the maximum frequency count.

When a pad is left open, the corresponding value is incremented from zero.

Examples 1 and 2 in Section 5.4.3.1 show a simple method of calculating the correct diode programme.

Once the correct diode programme has been calculated, remove the diode matrix board from the T555 and solder the pads as required.

Figure 5 shows where to solder the diode programming pads and Table 2 shows the diode matrix board with one channel. The other channel is identical and is on the other side of the board.

When programming is complete, replace the diode matrix board in the T555.

## 5.5 VCO ALIGNMENT

### 5.5.1 GENERAL

Connect the T555 to a dummy RF load.

Remove the RF shield cover to gain access to TP3.

Plug a UHF frequency counter onto the test plug (TP3):

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

Ensure that a correctly programmed diode matrix PCB is fitted.

Connect 13.8 volts of the correct polarity.

Monitor the loop voltage (centre pin of TP2) with a high impedance voltmeter (0-10 volt range).

Position CV110 for minimum capacitance as shown on the PCB encoding.

### 5.5.2 SINGLE CHANNEL OPERATION

Receive mode:

Adjust CV190 for 4 volts at TP2.

Check frequency.

Transmit mode (PTT switch closed):

Adjust CV232 for 4 volts at TP2.

Check frequency.

### 5.5.3 DUAL CHANNEL OPERATION

Receive mode:

Adjust CV190 so that when switching between channel 1 and channel 2, the loop voltages are symmetrically placed around 4 volts, but within the limits of 1.75 and 6.5 volts.

Check both frequencies.

Transmit mode: (PTT switch closed):

Adjust CV232 so that when switching between channel 1 and channel 2 the loop voltages are symmetrically placed around 4 volts, but within the limits of 1.75 and 6.5 volts.

Check both frequencies.

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

## 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 required VCO output (TP3).

Select channel 1 and adjust L30 for the correct VCO frequency (+100Hz).

Repeat this measurement for receive and transmit on both channels to verify the diode programming.

Replace the RF shield cover and solder the four locating tabs.

## 5.7 TRANSMITTER ADJUSTMENTS

### 5.7.1 ALIGNMENT

Note: In this and following Sections, measurements are given which differ for wide band and narrow band sets. In these cases the figures for wide band sets are given first followed by figures for the narrow band versions in square brackets [ ].

Connect a power meter to the aerial socket.

Set RV253 (power control) fully clockwise (viewed from component side).

Close the PTT switch.

Adjust CV269 for maximum power.

Adjust CV284 for maximum power.

Note: For two channel operation tune CV269 and CV284 for optimum performance on both channels.

Adjust RV253 to reduce the output power to 25 watts.

Adjust CV284 to reduce the transmitter current for best efficiency.

Readjust RV253 for 25 watts if necessary.

Check that the transmit current does not exceed 6.0 amps for 25 watts output, with 13.8 volts at the set.

### 5.7.2 MODULATION ADJUSTMENT

Connect the T555 antenna output through a 50dB RF power attenuator (see Section 5.4.1, item 15) to a modulation meter.

Short circuit C49 to disable the ALC circuitry.

Connect the microphone to the tone box (see Section 5.4.1, item 11) or connect the audio oscillator to the microphone pads on the PCB.

Apply a 1kHz sine wave to give -30dBm (25mV rms) at the microphone pads.

Set the channel switch to the lowest frequency channel.

Set the modulation meter to read '1' deviation.

Close the PTT switch and adjust RV79 for approximately -5kHz [-2.5kHz] deviation.

Reduce the audio input to obtain -3kHz [-1.5kHz] deviation, and then increase it by 20dB.

Sweep the audio frequency 300Hz to 3kHz and find the frequency of maximum '-' deviation.

Set RV79 to give -5kHz [-2.5kHz] deviation at this frequency.

Set the modulation meter to read '+' deviation.

Sweep the audio signal 300Hz to 3kHz and readjust RV79 if a peak exceeding +5kHz [+2.5kHz] is found.

Set the channel switch for the other channel and check that  $\pm 5$ kHz [ $\pm 2.5$ kHz] deviation is not exceeded for any modulation frequency.

Remove the short from C49.

## 5.8 RECEIVER ADJUSTMENTS

### 5.8.1 RF ALIGNMENT

Connect a signal generator modulated to  $\pm 5$ kHz [ $\pm 2.5$ kHz] at 1kHz AF.

Set the signal generator to the required receive frequency.

Connect a sinad meter across the speaker terminals.

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

Tune CV110, CV106, CV105, CV104 and CV100 for best sinad while reducing the signal generator output level to maintain approximately 12dB sinad.

Repeat the above tuning.

Reduce the signal generator deviation to  $\pm 3$ kHz [ $\pm 1.5$ kHz].

Check that the signal generator output does not exceed -117dBm [-116dBm] for 12dB sinad.

For dual channel operation, readjust CV110, CV106, CV105, CV104 and CV100 for equal sensitivity on both channels.

**Note:** Sensitivity will degrade towards -115dBm [-114dBm] (worst case) as the channel separation extends to 6MHz.

### 5.8.2 IF ALIGNMENT

**Note:** The Intermediate Frequency Section has been accurately aligned during manufacture and should not be adjusted unless repairs have been carried out, or there is clear evidence of malfunction.

To obtain the best performance from the IF, the receiver pass band must be swept. Alignment of L21 and L23 for best 12dB sinad sensitivity may result in high audio distortion or poor mute performance.

The following IF sweep procedure assumes the front end alignment has been completed (see Section 5.8.1).

Set up the test equipment as in Diagram 2.

Set the signal generator to give an unmodulated 'on channel' signal.

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Connect the audio oscillator to externally modulate the signal generator with a sine or triangular waveform to approximately  $\pm 1.5\text{kHz}$  deviation at a rate of about 10Hz.

Connect the audio oscillator output to the oscilloscope (DC coupled).

Connect the second oscilloscope input (AC coupled) via a 10:1 scope probe to pin 5 IC7 of the T555 (R124).

Set the oscilloscope to 'X-Y' display and adjust the signal generator output level so that the IF is not limiting (this should be less than  $-100\text{dBm}$ ).

Adjust L21 and L23 for minimum ripple and slope. Maximise the width and amplitude.

At an RF input level of  $-115\text{dBm}$ , the amplitude at the centre of the sweep should be approximately:

wide band	- 5-10mV rms
narrow band	- 10-15mV rms

### 5.9 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 pin-pointed.

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 only after the alignment has been completed.

##### 5.9.2.1 Squelch

###### (a) TO CHECK THE SQUELCH OPERATION

Connect a sinad meter across the speaker terminals.

Connect a UHF signal generator to the aerial input terminal.

Set the signal generator output level to zero and the modulation to  $\pm 3\text{kHz}$  [ $\pm 1.5\text{kHz}$ ] deviation at 1kHz.

Adjust the front panel squelch control until the noise just disappears.

Slowly increase the signal generator output level until the squelch gate 'opens'; this should be less than 8dB sinad.

(b) TO CHECK THE SQUELCH RATIO

Set the signal generator output level to  $-47\text{dBm}$  ( $20\text{mV}$ ), modulated to  $\pm 5\text{kHz}$  [ $\pm 2.5\text{kHz}$ ] deviation at  $1\text{kHz}$ .

Replace the sinad meter with a  $\text{mV/meter}$  across the speaker terminals. Turn the squelch control fully anticlockwise.

Adjust the volume control to give a reading of 3 volts on the  $\text{mV/meter}$ .

Reduce the signal generator output level to  $-127\text{dBm}$ .

The fall in output is the 'squelch ratio' and this should be at least  $70\text{dB}$ .

5.9.2.2 To Check The Audio Output Level

Connect an AC  $\text{mV/meter}$  and an oscilloscope across the speaker terminals.

Connect a UHF signal generator to the aerial input socket, with the output set to  $-107\text{dBm}$  ( $1\mu\text{V}$ ) modulated to  $\pm 5\text{kHz}$  [ $\pm 2.5\text{kHz}$ ] deviation at  $1\text{kHz}$ .

Set the volume control to the onset of clipping.

The receiver output should be 4 volts across 8 ohms at  $+13.8\text{V}$  supply.

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

The distortion should not exceed 5%.

5.9.2.3 To Check The VCO Injection To The Mixer

Desolder the four locating tabs and remove the RF shield cover.

Connect a DC EVM to the junction of  $\text{R109/C111}$  via a  $33\text{k ohm}$  isolating resistor at the probe tip.

Short the junction of  $\text{C198/L27}$  to ground.

Check that the EVM reads approximately  $1.5\text{V DC}$ .

Remove the short and note the increase in EVM reading.

The EVM reading should increase by more than  $0.1$  volt. Insufficient injection will result in poor receiver sensitivity.

Replace the RF shield cover and resolder the four locating tabs.

5.9.2.4 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  $21.4\text{MHz}$  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  $\pm 3\text{kHz}$  [ $\pm 1.5\text{kHz}$ ] at  $1\text{kHz}$ .

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

Set the signal generator output level to  $-127\text{dBm}$ .

Increase the signal generator output level until a sinad of  $12\text{dB}$  is reached.

The signal generator output should not be greater than  $-117\text{dBm}$  [ $-116\text{dBm}$ ] and is typically  $-119\text{dBm}$  [ $-118\text{dBm}$ ], for single channel use or two channels separated by less than  $2\text{MHz}$ . As the channel separation extends towards  $6\text{MHz}$ , the sinad sensitivity will degrade towards  $-115\text{dBm}$  [ $-114\text{dBm}$ ].

#### 5.9.2.5 To Check the Signal+Noise To Noise Ratio

Set up the signal generator and mV/meter as in Section 5.9.2.1 (b).

Set the squelch control fully clockwise.

Set the volume control for a reading of  $0.8\text{V}$  ( $0\text{dB}$ ) 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 at least  $30\text{dB}$  [ $25\text{dB}$ ] for single channel use or two channels separated by less than  $3\text{MHz}$ . As the channel separation extends towards  $6\text{MHz}$ , the signal + noise to noise ratio will degrade towards  $27\text{dB}$  [ $22\text{dB}$ ].

#### 5.9.2.6 To Check The Ultimate Signal To Noise Ratio

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

Set the signal generator to give an 'on channel' signal, modulated to  $\pm 5\text{kHz}$  [ $\pm 2.5\text{kHz}$ ] with a  $1\text{kHz}$  tone.

Set the signal generator output level to  $-47\text{dBm}$ .

Connect an AC mV/meter across the speaker terminals.

Adjust the volume control for a reading of  $0.8\text{V}$  ( $0\text{dBm}$ ) 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  $45\text{dB}$  (a low reading could be caused by a faulty IC7 or a noisy VCO).

5.9.3 TRANSMITTER PERFORMANCE TESTS

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 (a)]. 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 T555 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  $\pm 3$ kHz [ $\pm 1.5$ kHz] is reached.

Check that the mV/meter reads approximately 6mV rms.

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 T555 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 (a)].

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

Note the deviation on the modulation meter.

Between 450Hz 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 (a)].

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

Note the reading on the modulation meter.

From 450Hz to 3kHz 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 RF 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 16 volts.

Above 13.8 volts the RF power output should not increase by more than 2 watts.

At 10.8 volts the RF power output should be more than 10 watts.

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 T555 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 (100 $\mu$ F) 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 VCO Control Range

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

Short the middle pin on TP2 alternately to each of the outer pins of TP2.

The frequency shift should be more than 10MHz.

#### 5.9.4 SYNTHESIZER FAULT FINDING

##### 5.9.4.1 If The VCO Gives No Output

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

Check the supply voltages at R191 (6.5V) and L38 (8V) for the Rx VCO, and at R230 (6.5V) and L53 (8V) for the Tx VCO.

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 Synthesizer Does Not Lock Up

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

If the control range is less than 10MHz, 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 Rx 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 synthesizer (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 R176/D32 and TP2. The voltage at C176 (use a 10M ohm probe) and TP2 should differ by no more than 200mV. If not, check the behaviour of the buffer amplifier (Q29, Q30).

(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  $f_{\text{prescaler}} = f_{\text{VCO}}/64$

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 synthesizer (pin 1) is more than 500mV pp.

#### 5.9.4.3 To Check The VCO Output Frequency Stability

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

- (a) that, if the synthesizer is locked, the lock detect output (IC8, pin 2) is high;  
(This output pulses low if the synthesizer is out of lock.)
- (b) that the voltages are as shown in the Circuit Diagram (Q25, Q42).

#### 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 and the inductors at the bottom side. (Resoldering may be attempted, but a solvent cleaner must never be used inside the VCO box.)
- (b) Remove any excess solder where the VCO box touches the PCB.
- (c) Ensure that all screws are securely tightened.



**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 four columns: the circuit reference, variant number (if applicable), IPN and description. A number in the variant column indicates that this particular component is fitted only to that variant (note that some components are not fitted to all variants; refer to the tables in the Circuit Diagrams).

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

## T555 Parts List

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T555 PARTS LIST MECHANICAL & MISCELLANEOUS

**IPN DESCRIPTION**

**### VARIANT T555-10 22 TRANSCEIVER FM 400-470MHZ 5KHZ DEV CTCSS SC**

	T500 LED/DIODE MATRIX PCB
T500-11	CTCSS DECODER 2CHAN TX INHIBIT ALERT 500 SERIES
240-00100-13	PLUG COAXIAL BNC CORD MTG CRIMP URM76
240-02100-11	SOCKET COAXIAL BNC 3.5MM BULKHEAD LESS EARTH TA
252-00010-12	MICROPHONE 600 OHM WITH HANGER CONNECTION FOSTE
303-30043-00	CLIP A3M1656 PLASTIC CRADLE T500
303-30044-00	CLAMP A3M1657 PLASTIC CRADLE LOCK T500
303-30046-00	CRADLE A3M1887 BRACKET SHORT T500
308-13071-00	HEATSINK A1M1931 DIECAST 500 SERIES
316-06359-00	PANEL FRONT MTLSD COMPLETE SERIES 2 A4M2295 T5X
316-85094-00	PLATE A4M2160 BNC MTG UK 5X5 SERIES
400-00020-01	SLEEVING 0.7MM SILICONE RUBBER
409-50000-00	HANDBOOK 500 SERIES OPERATORS HANDBOOK
410-00010-37	SLEEVE CARD 500 SERIES A1A361 A4M1814

**### VARIANT T555-15 22 TRANSCEIVER FM 450-520MHZ 5KHZ DEV CTCSS SC**

	T500 LED/DIODE MATRIX PCB
T500-11	CTCSS DECODER 2CHAN TX INHIBIT ALERT 500 SERIES
240-00100-13	PLUG COAXIAL BNC CORD MTG CRIMP URM76
240-02100-11	SOCKET COAXIAL BNC 3.5MM BULKHEAD LESS EARTH TA
252-00010-12	MICROPHONE 600 OHM WITH HANGER CONNECTION FOSTE
303-30043-00	CLIP A3M1656 PLASTIC CRADLE T500
303-30044-00	CLAMP A3M1657 PLASTIC CRADLE LOCK T500
303-30046-00	CRADLE A3M1887 BRACKET SHORT T500
308-13071-00	HEATSINK A1M1931 DIECAST 500 SERIES
316-06359-00	PANEL FRONT MTLSD COMPLETE SERIES 2 A4M2295 T5X
316-85094-00	PLATE A4M2160 BNC MTG UK 5X5 SERIES
409-50000-00	HANDBOOK 500 SERIES OPERATORS HANDBOOK
410-00010-37	SLEEVE CARD 500 SERIES A1A361 A4M1814

**### VARIANT T555-20 22 TRANSCEIVER FM 400-470MHZ 5KHZ DEV CTCSS RC AUST**

	T500 LED/DIODE MATRIX PCB
T500-11	CTCSS DECODER 2CHAN TX INHIBIT ALERT 500 SERIES
240-00100-13	PLUG COAXIAL BNC CORD MTG CRIMP URM76
240-02100-11	SOCKET COAXIAL BNC 3.5MM BULKHEAD LESS EARTH TA
252-00010-12	MICROPHONE 600 OHM WITH HANGER CONNECTION FOSTE
303-30047-00	CRADLE A2M1920 A3M1955 RUGGED ASSEMBLY T500
303-30049-00	CLIP A2M1922 RUGGED CRADLE T500
303-30052-00	KEY A4M1925 RUGGED CRADLE T500
308-13071-00	HEATSINK A1M1931 DIECAST 500 SERIES
316-06359-00	PANEL FRONT MTLSD COMPLETE SERIES 2 A4M2295 T5X
316-85094-00	PLATE A4M2160 BNC MTG UK 5X5 SERIES
359-00010-37	RIVET 3*5MM FLAT HD ST TINMENS NO 7
400-00020-01	SLEEVING 0.7MM SILICONE RUBBER
409-50000-00	HANDBOOK 500 SERIES OPERATORS HANDBOOK
410-00010-37	SLEEVE CARD 500 SERIES A1A361 A4M1814

**IPN DESCRIPTION**

**### VARIANT T555-21 18 TRANSCEIVER FM 400-470MHZ 5KHZ DEV RC AUST**

	T500 LED/DIODE MATRIX PCB
240-00100-10	PLUG COAXIAL BNC CORD MTG CAPTIVE & CLAMPED
240-02100-11	SOCKET COAXIAL BNC 3.5MM BULKHEAD LESS EARTH TA
252-00010-12	MICROPHONE 600 OHM WITH HANGER CONNECTION FOSTE
303-30047-00	CRADLE A2M1920 A3M1955 RUGGED ASSEMBLY T500
303-30049-00	CLIP A2M1922 RUGGED CRADLE T500
303-30052-00	KEY A4M1925 RUGGED CRADLE T500
308-13071-00	HEATSINK A1M1931 DIECAST 500 SERIES
316-06359-00	PANEL FRONT MTLSD COMPLETE SERIES 2 A4M2295 T5X
316-85094-00	PLATE A4M2160 BNC MTG UK 5X5 SERIES
359-00010-37	RIVET 3*5MM FLAT HD ST TINMENS NO 7
400-00020-01	SLEEVING 0.7MM SILICONE RUBBER
409-50000-00	HANDBOOK 500 SERIES OPERATORS HANDBOOK
410-00010-37	SLEEVE CARD 500 SERIES A1A361 A4M1814

**### VARIANT T555-22 21 TRANSCEIVER FM 400-470MHZ 2.5K DEV CTCSS TCXO RC**

T500-22	T500 DIODE MATRIX PCB
T500-11	CTCSS DECODER 2CHAN TX INHIBIT ALERT 500 SERIES
T500-26	T500-26 TCXO -10 TO +60 C
240-00100-13	PLUG COAXIAL BNC CORD MTG CRIMP URM76
240-02100-11	SOCKET COAXIAL BNC 3.5MM BULKHEAD LESS EARTH TA
252-00010-12	MICROPHONE 600 OHM WITH HANGER CONNECTION FOSTE
303-30047-00	CRADLE A2M1920 A3M1955 RUGGED ASSEMBLY T500
303-30049-00	CLIP A2M1922 RUGGED CRADLE T500
303-30052-00	KEY A4M1925 RUGGED CRADLE T500
308-13071-00	HEATSINK A1M1931 DIECAST 500 SERIES
316-06359-00	PANEL FRONT MTLSD COMPLETE SERIES 2 A4M2295 T5X
316-85094-00	PLATE A4M2160 BNC MTG UK 5X5 SERIES
319-01160-00	SHIELD A4M2372 FRONT EARTHING 5X5 SERIES
359-00010-37	RIVET 3*5MM FLAT HD ST TINMENS NO 7
400-00020-01	SLEEVING 0.7MM SILICONE RUBBER
409-50000-00	HANDBOOK 500 SERIES OPERATORS HANDBOOK
410-00010-37	SLEEVE CARD 500 SERIES A1A361 A4M1814

**### VARIANT T555-23 21 TRANSCEIVER FM 400-470M 1W 2.5K DEV CTCSS TCXO RC**

T500-22	T500 DIODE MATRIX PCB
T500-11	CTCSS DECODER 2CHAN TX INHIBIT ALERT 500 SERIES
T500-26	T500-26 TCXO -10 TO +60 C
240-00100-13	PLUG COAXIAL BNC CORD MTG CRIMP URM76
240-02100-11	SOCKET COAXIAL BNC 3.5MM BULKHEAD LESS EARTH TA
252-00010-12	MICROPHONE 600 OHM WITH HANGER CONNECTION FOSTE
303-30047-00	CRADLE A2M1920 A3M1955 RUGGED ASSEMBLY T500
303-30049-00	CLIP A2M1922 RUGGED CRADLE T500
303-30052-00	KEY A4M1925 RUGGED CRADLE T500
308-13071-00	HEATSINK A1M1931 DIECAST 500 SERIES
316-06359-00	PANEL FRONT MTLSD COMPLETE SERIES 2 A4M2295 T5X
316-85094-00	PLATE A4M2160 BNC MTG UK 5X5 SERIES
359-00010-37	RIVET 3*5MM FLAT HD ST TINMENS NO 7

# T555 PARTS LIST MECHANICAL & MISCELLANEOUS

IPN	DESCRIPTION
400-00020-01	SLEEVEING 0.7MM SILICONE RUBBER
409-50000-00	HANDBOOK 500 SERIES OPERATORS HANDBOOK
410-00010-37	SLEEVE CARD 500 SERIES A1A361 A4M1814
<b>### VARIANT T555-24 22 TRANSCEIVER FM 400-470MHZ 5KHZ DEV CTCSS RC 1W TX</b>	
	T500 LED/DIODE MATRIX PCB
T500-11	CTCSS DECODER 2CHAN TX INHIBIT ALERT 500 SERIES
240-00100-13	PLUG COAXIAL BNC CORD MTG CRIMP URM76
240-02100-11	SOCKET COAXIAL BNC 3.5MM BULKHEAD LESS EARTH TA
252-00010-12	MICROPHONE 600 OHM WITH HANGER CONNECTION FOSTE
303-30047-00	CRADLE A2M1920 A3M1955 RUGGED ASSEMBLY T500
303-30049-00	CLIP A2M1922 RUGGED CRADLE T500
303-30052-00	KEY A4M1925 RUGGED CRADLE T500
308-13071-00	HEATSINK A1M1931 DIECAST 500 SERIES
316-06359-00	PANEL FRONT MTLSD COMPLETE SERIES 2 A4M2295 T5X
316-85094-00	PLATE A4M2160 BNC MTG UK 5X5 SERIES
359-00010-37	RIVET 3*5MM FLAT HD ST TINMENS NO 7
400-00020-01	SLEEVEING 0.7MM SILICONE RUBBER
409-50000-00	HANDBOOK 500 SERIES OPERATORS HANDBOOK
410-00010-37	SLEEVE CARD 500 SERIES A1A361 A4M1814
<b>### VARIANT T555-25 22 TRANSCEIVER FM 450-520MHZ 5KHZ DEV CTCSS RC AUST</b>	
	T500 LED/DIODE MATRIX PCB
T500-11	CTCSS DECODER 2CHAN TX INHIBIT ALERT 500 SERIES
240-00100-13	PLUG COAXIAL BNC CORD MTG CRIMP URM76
240-02100-11	SOCKET COAXIAL BNC 3.5MM BULKHEAD LESS EARTH TA
252-00010-12	MICROPHONE 600 OHM WITH HANGER CONNECTION FOSTE
303-30047-00	CRADLE A2M1920 A3M1955 RUGGED ASSEMBLY T500
303-30049-00	CLIP A2M1922 RUGGED CRADLE T500
303-30052-00	KEY A4M1925 RUGGED CRADLE T500
308-13071-00	HEATSINK A1M1931 DIECAST 500 SERIES
316-06359-00	PANEL FRONT MTLSD COMPLETE SERIES 2 A4M2295 T5X
316-85094-00	PLATE A4M2160 BNC MTG UK 5X5 SERIES
359-00010-37	RIVET 3*5MM FLAT HD ST TINMENS NO 7
409-50000-00	HANDBOOK 500 SERIES OPERATORS HANDBOOK
410-00010-37	SLEEVE CARD 500 SERIES A1A361 A4M1814
<b>### VARIANT T555-26 21 TRANSCEIVER FM 450-520MHZ 2.5K DEV CTCSS TCXO RC</b>	
T500-22	T500 DIODE MATRIX PCB
T500-11	CTCSS DECODER 2CHAN TX INHIBIT ALERT 500 SERIES
T500-26	T500-26 TCXO -10 TO +60 C
240-00100-13	PLUG COAXIAL BNC CORD MTG CRIMP URM76
240-02100-11	SOCKET COAXIAL BNC 3.5MM BULKHEAD LESS EARTH TA
252-00010-12	MICROPHONE 600 OHM WITH HANGER CONNECTION FOSTE
303-30047-00	CRADLE A2M1920 A3M1955 RUGGED ASSEMBLY T500
303-30049-00	CLIP A2M1922 RUGGED CRADLE T500
303-30052-00	KEY A4M1925 RUGGED CRADLE T500
308-13071-00	HEATSINK A1M1931 DIECAST 500 SERIES
316-06359-00	PANEL FRONT MTLSD COMPLETE SERIES 2 A4M2295 T5X

IPN	DESCRIPTION
316-85094-00	PLATE A4M2160 BNC MTG UK 5X5 SERIES
319-01160-00	SHIELD A4M2372 FRONT EARTHING 5X5 SERIES
359-00010-37	RIVET 3*5MM FLAT HD ST TINMENS NO 7
409-50000-00	HANDBOOK 500 SERIES OPERATORS HANDBOOK
410-00010-37	SLEEVE CARD 500 SERIES A1A361 A4M1814
<b>### VARIANT T555-27 21 TRANSCEIVER FM 450-520M 1W 2.5K DEV CTCSS TCXO RC</b>	
T500-22	T500 DIODE MATRIX PCB
T500-11	CTCSS DECODER 2CHAN TX INHIBIT ALERT 500 SERIES
T500-26	T500-26 TCXO -10 TO +60 C
240-00100-13	PLUG COAXIAL BNC CORD MTG CRIMP URM76
240-02100-11	SOCKET COAXIAL BNC 3.5MM BULKHEAD LESS EARTH TA
252-00010-12	MICROPHONE 600 OHM WITH HANGER CONNECTION FOSTE
303-30047-00	CRADLE A2M1920 A3M1955 RUGGED ASSEMBLY T500
303-30049-00	CLIP A2M1922 RUGGED CRADLE T500
303-30052-00	KEY A4M1925 RUGGED CRADLE T500
308-13071-00	HEATSINK A1M1931 DIECAST 500 SERIES
316-06359-00	PANEL FRONT MTLSD COMPLETE SERIES 2 A4M2295 T5X
316-85094-00	PLATE A4M2160 BNC MTG UK 5X5 SERIES
359-00010-37	RIVET 3*5MM FLAT HD ST TINMENS NO 7
409-50000-00	HANDBOOK 500 SERIES OPERATORS HANDBOOK
410-00010-37	SLEEVE CARD 500 SERIES A1A361 A4M1814
<b>### VARIANT T555-28 22 TRANSCEIVER FM 450-520MHZ 1W 5KHZ DEV CTCSS RC</b>	
	T500 LED/DIODE MATRIX PCB
T500-11	CTCSS DECODER 2CHAN TX INHIBIT ALERT 500 SERIES
240-00100-13	PLUG COAXIAL BNC CORD MTG CRIMP URM76
240-02100-11	SOCKET COAXIAL BNC 3.5MM BULKHEAD LESS EARTH TA
252-00010-12	MICROPHONE 600 OHM WITH HANGER CONNECTION FOSTE
303-30047-00	CRADLE A2M1920 A3M1955 RUGGED ASSEMBLY T500
303-30049-00	CLIP A2M1922 RUGGED CRADLE T500
303-30052-00	KEY A4M1925 RUGGED CRADLE T500
308-13071-00	HEATSINK A1M1931 DIECAST 500 SERIES
316-06359-00	PANEL FRONT MTLSD COMPLETE SERIES 2 A4M2295 T5X
316-85094-00	PLATE A4M2160 BNC MTG UK 5X5 SERIES
359-00010-37	RIVET 3*5MM FLAT HD ST TINMENS NO 7
409-50000-00	HANDBOOK 500 SERIES OPERATORS HANDBOOK
410-00010-37	SLEEVE CARD 500 SERIES A1A361 A4M1814
<b>### VARIANT T555-29 19 TRANSCEIVER FM 450-520MHZ 5KHZ DEV RC</b>	
	T500 LED/DIODE MATRIX PCB
240-00100-10	PLUG COAXIAL BNC CORD MTG CAPTIVE & CLAMPED
240-02100-11	SOCKET COAXIAL BNC 3.5MM BULKHEAD LESS EARTH TA
252-00010-12	MICROPHONE 600 OHM WITH HANGER CONNECTION FOSTE
303-30047-00	CRADLE A2M1920 A3M1955 RUGGED ASSEMBLY T500
303-30049-00	CLIP A2M1922 RUGGED CRADLE T500
303-30052-00	KEY A4M1925 RUGGED CRADLE T500
308-13071-00	HEATSINK A1M1931 DIECAST 500 SERIES
316-06359-00	PANEL FRONT MTLSD COMPLETE SERIES 2 A4M2295 T5X

T555 PARTS LIST MECHANICAL & MISCELLANEOUS

IPN	DESCRIPTION
316-85094-00	PLATE A4M2160 BNC MTG UK 5X5 SERIES
359-00010-37	RIVET 3*5MM FLAT HD ST TINMENS NO 7
409-50000-00	HANDBOOK 500 SERIES OPERATORS HANDBOOK
410-00010-37	SLEEVE CARD 500 SERIES A1A361 A4M1814

### VARIANT T555-30 18 TRANSCEIVER FM 400-470MHZ 2.5K DEV TCXO RC

T500-22	T500 DIODE MATRIX PCB
T500-26	T500-26 TCXO -10 TO +60 C
240-00100-10	PLUG COAXIAL BNC CORD MTG CAPTIVE & CLAMPED
240-02100-11	SOCKET COAXIAL BNC 3.5MM BULKHEAD LESS EARTH TA
252-00010-12	MICROPHONE 600 OHM WITH HANGER CONNECTION FOSTE
303-30047-00	CRADLE A2M1920 A3M1955 RUGGED ASSEMBLY T500
303-30049-00	CLIP A2M1922 RUGGED CRADLE T500
303-30052-00	KEY A4M1925 RUGGED CRADLE T500
308-13071-00	HEATSINK A1M1931 DIECAST 500 SERIES
316-06359-00	PANEL FRONT MTLSD COMPLETE SERIES 2 A4M2295 T5X
316-85094-00	PLATE A4M2160 BNC MTG UK 5X5 SERIES
319-01160-00	SHIELD A4M2372 FRONT EARTHING 5X5 SERIES
359-00010-37	RIVET 3*5MM FLAT HD ST TINMENS NO 7
400-00020-01	SLEEVEING 0.7MM SILICONE RUBBER
409-50000-00	HANDBOOK 500 SERIES OPERATORS HANDBOOK
410-00010-37	SLEEVE CARD 500 SERIES A1A361 A4M1814

### VARIANT T555-32 22 TRANSCEIVER FM 400-470MHZ 2.5K DEV CTCSS RC AUST

T500	LED/DIODE MATRIX PCB
T500-11	CTCSS DECODER 2CHAN TX INHIBIT ALERT 500 SERIES
240-00100-35	PLUG COAXIAL UHF CORD MTG
240-02100-35	SOCKET COAXIAL UHF PANEL MOUNTING OPEN TERMINATIO
252-00010-12	MICROPHONE 600 OHM WITH HANGER CONNECTION FOSTE
303-30047-00	CRADLE A2M1920 A3M1955 RUGGED ASSEMBLY T500
303-30049-00	CLIP A2M1922 RUGGED CRADLE T500
303-30052-00	KEY A4M1925 RUGGED CRADLE T500
308-13071-00	HEATSINK A1M1931 DIECAST 500 SERIES
316-06359-00	PANEL FRONT MTLSD COMPLETE SERIES 2 A4M2295 T5X
359-00010-37	RIVET 3*5MM FLAT HD ST TINMENS NO 7
400-00020-01	SLEEVEING 0.7MM SILICONE RUBBER
409-50000-00	HANDBOOK 500 SERIES OPERATORS HANDBOOK
410-00010-37	SLEEVE CARD 500 SERIES A1A361 A4M1814

### VARIANT T555-33 18 TRANSCEIVER FM 400-470MHZ 2.5KHZ DEV RC

T500	LED/DIODE MATRIX PCB
240-00100-13	PLUG COAXIAL BNC CORD MTG CRIMP URM76
240-02100-11	SOCKET COAXIAL BNC 3.5MM BULKHEAD LESS EARTH TA
252-00010-12	MICROPHONE 600 OHM WITH HANGER CONNECTION FOSTE
303-30047-00	CRADLE A2M1920 A3M1955 RUGGED ASSEMBLY T500
303-30049-00	CLIP A2M1922 RUGGED CRADLE T500
303-30052-00	KEY A4M1925 RUGGED CRADLE T500
308-13071-00	HEATSINK A1M1931 DIECAST 500 SERIES
316-06359-00	PANEL FRONT MTLSD COMPLETE SERIES 2 A4M2295 T5X

IPN	DESCRIPTION
316-85094-00	PLATE A4M2160 BNC MTG UK 5X5 SERIES
359-00010-37	RIVET 3*5MM FLAT HD ST TINMENS NO 7
400-00020-01	SLEEVEING 0.7MM SILICONE RUBBER
409-50000-00	HANDBOOK 500 SERIES OPERATORS HANDBOOK
410-00010-37	SLEEVE CARD 500 SERIES A1A361 A4M1814

### VARIANT T555-35 18 TRANSCEIVER FM 450-520MHZ 2.5K DEV TCXO RC

T500-22	T500 DIODE MATRIX PCB
T500-26	T500-26 TCXO -10 TO +60 C
240-00100-10	PLUG COAXIAL BNC CORD MTG CAPTIVE & CLAMPED
240-02100-11	SOCKET COAXIAL BNC 3.5MM BULKHEAD LESS EARTH TA
252-00010-12	MICROPHONE 600 OHM WITH HANGER CONNECTION FOSTE
303-30047-00	CRADLE A2M1920 A3M1955 RUGGED ASSEMBLY T500
303-30049-00	CLIP A2M1922 RUGGED CRADLE T500
303-30052-00	KEY A4M1925 RUGGED CRADLE T500
308-13071-00	HEATSINK A1M1931 DIECAST 500 SERIES
316-06359-00	PANEL FRONT MTLSD COMPLETE SERIES 2 A4M2295 T5X
316-85094-00	PLATE A4M2160 BNC MTG UK 5X5 SERIES
319-01160-00	SHIELD A4M2372 FRONT EARTHING 5X5 SERIES
359-00010-37	RIVET 3*5MM FLAT HD ST TINMENS NO 7
409-50000-00	HANDBOOK 500 SERIES OPERATORS HANDBOOK
410-00010-37	SLEEVE CARD 500 SERIES A1A361 A4M1814

### VARIANT T555-80 22 TRANSCEIVER FM 400-470MHZ 5K DEV XTAL HTR SC CMC

T500	LED/DIODE MATRIX PCB WITH XTAL HEATER PARTS
240-00100-35	PLUG COAXIAL UHF CORD MTG
240-02100-35	SOCKET COAXIAL UHF PANEL MOUNTING OPEN TERMINATIO
252-00010-23	MICROPHONE 600 OHM CMC LABEL LOW TEMP CURLY COR
303-30043-00	CLIP A3M1656 PLASTIC CRADLE T500
303-30044-00	CLAMP A3M1657 PLASTIC CRADLE LOCK T500
303-30046-00	CRADLE A3M1887 BRACKET SHORT T500
308-13071-00	HEATSINK A1M1931 DIECAST 500 SERIES
316-06342-00	PANEL FT COMP MARCONI CANADA METALISD A4M2296 T50
400-00020-01	SLEEVEING 0.7MM SILICONE RUBBER
410-00010-34	SLEEVE CARD BLANK 500 SERIES A4M1814

### VARIANT T555-70 20 TRANSCEIVER FM 400-470MHZ 5KHZ DEV INTRON RC

T500	LED/DIODE MATRIX PCB
240-00100-10	PLUG COAXIAL BNC CORD MTG CAPTIVE & CLAMPED
240-02100-11	SOCKET COAXIAL BNC 3.5MM BULKHEAD LESS EARTH TA
252-00010-12	MICROPHONE 600 OHM WITH HANGER CONNECTION FOSTE
303-30047-00	CRADLE A2M1920 A3M1955 RUGGED ASSEMBLY T500
303-30049-00	CLIP A2M1922 RUGGED CRADLE T500
303-30052-00	KEY A4M1925 RUGGED CRADLE T500
308-13071-00	HEATSINK A1M1931 DIECAST 500 SERIES
312-01035-00	LENS COMPLETE A4A630 A4M1586 T500 SERIES
316-06362-00	PNL FNT MET COMP INTRON-402 T500 A4A597 A4M2298
316-85094-00	PLATE A4M2160 BNC MTG UK 5X5 SERIES
359-00010-37	RIVET 3*5MM FLAT HD ST TINMENS NO 7



T555 PARTS LIST MECHANICAL & MISCELLANEOUS

IPN	DESCRIPTION
365-00012-36	LABEL INTRON T500 MIC A4A440
400-00020-01	SLEEVEING 0.7MM SILICONE RUBBER
410-00010-34	SLEEVE CARD BLANK 500 SERIES A4M1814

IPN	DESCRIPTION
400-00020-01	SLEEVEING 0.7MM SILICONE RUBBER
409-50000-00	HANDBOOK 500 SERIES OPERATORS HANDBOOK
410-00010-37	SLEEVE CARD 500 SERIES A1A361 A4M1814

### VARIANT T555-71 19 TRANSCEIVER FM 400-470MHZ 15KHZ DEV RC

	T500 LED/DIODE MATRIX PCB
240-00100-10	PLUG COAXIAL BNC CORD MTG CAPTIVE & CLAMPED
240-02100-11	SOCKET COAXIAL BNC 3.5MM BULKHEAD LESS EARTH TA
252-00010-12	MICROPHONE 600 OHM WITH HANGER CONNECTION FOSTE
303-30047-00	CRADLE A2M1920 A3M1955 RUGGED ASSEMBLY T500
303-30049-00	CLIP A2M1922 RUGGED CRADLE T500
303-30052-00	KEY A4M1925 RUGGED CRADLE T500
308-13071-00	HEATSINK A1M1931 DIECAST 500 SERIES
316-06333-00	PANEL FRONT COMPLETE METALISED T500 A4M2488
316-85094-00	PLATE A4M2160 BNC MTG UK 5X5 SERIES
359-00010-37	RIVET 3*5MM FLAT HD ST TINMENS NO 7
400-00020-01	SLEEVEING 0.7MM SILICONE RUBBER
409-50000-00	HANDBOOK 500 SERIES OPERATORS HANDBOOK
410-00010-37	SLEEVE CARD 500 SERIES A1A361 A4M1814

### VARIANT T555-73 18 TRANSCEIVER FM 450-520MHZ 2.5K DEV RC TAIWAN

	GSA2210J5 TONE CTCSS PCB
	T500 LED PCB
T500-22	T500 DIODE MATRIX PCB
240-00100-35	PLUG COAXIAL UHF CORD MTG
240-02100-35	SOCKET COAXIAL UHF PANEL MOUNTING OPEN TERMINATION
252-00010-12	MICROPHONE 600 OHM WITH HANGER CONNECTION FOSTE
303-30047-00	CRADLE A2M1920 A3M1955 RUGGED ASSEMBLY T500
303-30049-00	CLIP A2M1922 RUGGED CRADLE T500
303-30052-00	KEY A4M1925 RUGGED CRADLE T500
308-13079-00	HEATSINK A4M2584 DIECAST 500 SERIES
316-06359-00	PANEL FRONT MTLSD COMPLETE SERIES 2 A4M2295 T5X
319-01160-00	SHIELD A4M2372 FRONT EARTHING 5X5 SERIES
359-00010-37	RIVET 3*5MM FLAT HD ST TINMENS NO 7
409-50000-00	HANDBOOK 500 SERIES OPERATORS HANDBOOK
410-00010-37	SLEEVE CARD 500 SERIES A1A361 A4M1814

### VARIANT T555-80 22 TRANSCEIVER FM 400-470MHZ 5K DEV CTCSS XTAL HTR RC

	T500 LED/DIODE MATRIX PCB WITH XTAL HEATER PARTS
T500-11	CTCSS DECODER 2CHAN TX INHIBIT ALERT 500 SERIES
240-00100-35	PLUG COAXIAL UHF CORD MTG
240-02100-35	SOCKET COAXIAL UHF PANEL MOUNTING OPEN TERMINATIO
252-00010-24	MICROPHONE 600 OHM TAIT LABEL LOW TEMP CURLY COR
303-30047-00	CRADLE A2M1920 A3M1955 RUGGED ASSEMBLY T500
303-30049-00	CLIP A2M1922 RUGGED CRADLE T500
303-30052-00	KEY A4M1925 RUGGED CRADLE T500
308-13071-00	HEATSINK A1M1931 DIECAST 500 SERIES
316-06359-00	PANEL FRONT MTLSD COMPLETE SERIES 2 A4M2295 T5X
359-00010-37	RIVET 3*5MM FLAT HD ST TINMENS NO 7

# T555 PARTS LIST MECHANICAL & MISCELLANEOUS

## PARTS COMMON TO ALL VARIANTS

IPN	DESCRIPTION	IPN	DESCRIPTION
012-04100-01	CAPACITOR CERAMIC FEEDTHRU 1N LESS LEAD CFL 1 CFL 2	319-01120-00	SHIELD A4M1813 RF 550 555
012-04100-02	CAPACITOR CERAMIC FEEDTHRU 1N 300V LEADED CFL 3	319-01129-00	SHIELD A2M1937 WALL T555
051-00006-03	LEAD FEEDTHRU 0.7MM TCW A4M2230	319-01130-00	SHIELD A2M1938 LID COMPONENT SIDE T555
065-00010-04	BEAD FERRITE F8 4X2X5MM	319-01132-00	SHIELD A4M1951 POWER SKT 5X5 SERIES
065-00010-13	BEAD FERRITE 7D 1.9*0.9*3.8MM STACK POLE Leg of L13	319-01133-00	SHIELD A4M2011 DIVIDER T555
065-00020-03	BEAD GLASS 4*3*1.2MM	319-01137-00	SHIELD A2M2119 BOTTOM T555
200-00010-04	WIRE TINNED COPPER 0.7MM L65 50mm	319-01149-00	SHIELD BOX A1M2229 VCO T5X5 SERIES
200-00010-04	WIRE TINNED COPPER 0.7MM	340-00010-10	FUSEHOLDER INLINE BOOK HOUSING
200-00010-05	WIRE TINNED COPPER 0.5MM L70 40mm L73 40mm	340-00010-11	TERMINAL CRIMP BOOK FUSEHOLDER
205-00010-06	CABLE TWIN AUTO 153 2/28/0.3 RED & BLAC	345-00040-08	SCREW M3*12MM PAN POZI ST BZ IC4
220-01113-01	PRINTED CIRCUIT BOARD T555 CCT CS93	345-00040-11	SCREW M3X10MM PAN POZI ST BZ Q3
232-00010-19	SWITCH PUSH DPDT LATCHING PCB MOUNT SW1 On/Off SW3 Chan	349-00010-25	SCREW NO.4*3/8 PAN SUPA POLYMATE cover assembly
232-00010-20	SWITCH PUSH DPDT MOMENTARY PCB MOUNT SW2 Call	349-00010-49	SCREW SELFTAP NO 10X1/2 IN TYPE AB PAN POZI B
240-00010-60	PLUG HOUSING 4 WAY MOLEX	349-00020-31	SCREW TAPTITE M3X10MM PAN POZI BZ VCO box/lid
240-00010-61	PLUG TERMINAL MALE SOLDER TAG MOLEX	349-00020-31	SCREW TAPTITE M3X10MM PAN POZI BZ cover assembly
240-02010-60	SOCKET HOUSING 4 WAY MOLEX	349-00020-32	SCREW TAPTITE M3X8MM PAN POZI BZ
240-02010-61	SOCKET RECEPTACLE 152 AUTO CRIMP MOLEX	352-00010-08	NUT M3 COLD FORM HEX ST BZ Q3 and IC4
240-02010-62	SOCKET RECEPTACLE 7/0.2 WIRE CRIMP MOLEX	352-00010-35	NUT 8-32 UNC HEX RF POWER TRANSISTOR MOUNTING Q46 mounting
240-04020-64	SOCKET JACK AN 0.98MM PCB MTG 64 WAY SIL STRIP ICS	353-00010-10	WASHER M3 FLAT ST BZ 6.75MM OD A4M1215 Q3
240-04020-72	SOCKET HOUSING 2 WAY CORD MTG ULTREX	353-00010-11	WASHER M3 FLAT ST BZ 9.5MM OD A4M1216 IC4
240-04020-74	SOCKET HOUSING 4 WAY CORD MTG ULTREX	353-00010-13	WASHER M3 SHAKEPROOF INT BZ Q3 and IC4
240-04020-76	SOCKET RECEPTACLES WIRE CRIMP FOR ULTREX HOUSING	353-00010-32	WASHER M5 SHAKEPROOF EXT BZ
250-00010-14	SPEAKER 8 OHM 92MM SQ A3M1799	356-00010-01	TAG SOLDER 3MM SHORT M6132/3.2 Q47 x 2, IC4
252-00010-02	CLIP MICROPHONE MTG	356-00010-01	TAG SOLDER 3MM SHORT M6132/3.2 screw to component side P.A. lid and solder to power socket
265-00010-17	FUSE 10A CARTRIDGE 6*32MM 32V NON SPEC	357-00010-09	FIX PUSH ON 8FP 3253
302-40042-00	BUTTON A3M1585 PUSH MOULDED PLASTIC T500 switches 1 2 & 3	362-00010-20	MICA INSULATOR 10*14MM LESS HOLE Q44
302-45035-00	BOSS A4M2148 THREADED M5 OD M3 ID 5X5 SERIES heatsink solder side of P.A.	365-00011-54	LABEL WHITE QUIKSTIK RW1556/2 SPECIAL ADHESIVE
303-20042-00	COVER TOP COMPLETE A1M2375 TEXTURED METALISED 5X5	365-00013-46	LABEL A4A590 T555 SCREW INFO
303-20044-00	COVER BTM COMPLETE A1M2376 TEXTURED METALISED 5X	365-00100-04	LABEL BLANK 30X6.7MM S/A METALLISED POLYESTER
303-50068-00	CLIP A4M1941 TRANSISTOR MTG T555 Q44	365-00100-10	BARCODE LABEL & LAMINATE 2 PARTS 3/8 WIDE
303-50071-00	CLIP A4M2008 FEEDTHRU MTG 5*5 SERIES	365-00100-20	LABEL WHITE 6/A 28X11MM QUIKSTIK RW718/4
306-01041-00	CLIP - PLASTIC WIRE HARNESS	369-00010-27	TIE CABLE NYLON 140*2.6MM
311-01033-00	KNOB COMPLETE WITH DOT A4M1831 T500 SERIES	369-00020-35	TAPE PVC FOAM 1 SIDE S/A 9*10MM INSEAL 5375
312-01014-00	LID A2M1932 DIECAST PA SOLDER SIDE 5X5 SERIES	399-00010-56	BAG PLASTIC 200*250MM
312-01015-00	LID A2M1933 DIECAST PA COMPONENT SIDE 5X5 SERIES	400-00020-01	SLEEVING 0.7MM SILICONE RUBBER L70 x 12mm, L73 x 18mm
312-01035-00	LENS COMPLETE A4M1586 A4A630 T500 SERIES	409-50001-00	INSTALLATION GUIDE T500 SERIES 2
319-01097-00	SHIELD A2M1589 FRONT 505 SERIES	410-00010-50	PACKAGING POLY FOAM 2 PCS 5*5 SERIES A1M2027
319-01109-00	SHIELD A2M1655 VCO LID 500/5X5 SERIES	410-00010-55	PACKAGING CARTON 10 T500 RADIOS UEB 31561
319-01110-00	SHROUD A4M1587 INDICATOR 500/5X5 SERIES		

# T500 MEMORY & LED PARTS LISTS

## T500 DIODE MATRIX/LED PCB

REF	IPN	DESCRIPTION
D302	008-00010-11	LED 3MM RED HLMP1385 DIFFUSED 2.2V 10MCD LESS MTG
D303	008-00010-11	LED 3MM RED HLMP1385 DIFFUSED 2.2V 10MCD LESS MTG
D304	008-00010-11	LED 3MM RED HLMP1385 DIFFUSED 2.2V 10MCD LESS MTG
D305	008-00010-11	LED 3MM RED HLMP1385 DIFFUSED 2.2V 10MCD LESS MTG
D1-D64	001-50012-05	DIODE AUTO INSERT 1N4531 SI SMALL SIG
PL-4	240-00020-57	HEADER 10 WAY 1 ROW PCB MTG
SKT-3	240-04020-60	SOCKET 18 WAY 1ROW PCB MTG TOP ENTRY
SK-7	240-04020-69	SOCKET 3WAY 1ROW PCB MTG GOLD PLATE SKTS TOP ENTRY
	220-01198-01	PCB COMBINED T500 DIODE MATRIX AND LED BOARD

### PARTS TO BE ADDED FOR XTAL HEATER

D300	001-50012-05	DIODE AUTO INSERT 1N4531 SI SMALL SIG
D301	001-50012-05	DIODE AUTO INSERT 1N4531 SI SMALL SIG
D306	001-50015-09	DIODE ZENER AUTOINSERT 3V9 0.4W BZX79/C3V9
Q300	000-50011-10	TRANSISTOR AUTO INSERT BC547B NPN TO-92 AF S/SIG
Q301	000-00011-70	TRANSISTOR BD136 PNP TO-126 AF POWER
R300	030-55270-20	RESISTOR FILM AUTOINSERT 27K 5% 0.4W 4X1.6MM
R301	045-04470-01	RESISTOR NTC 4K7 20% 5MM DISC
R302	030-55150-20	RESISTOR FILM AUTOINSERT 15K 5% 0.4W 4X1.6MM
R303	030-53560-20	RESISTOR FILM AUTOINSERT 560E 5% 0.4W 4X1.6MM
R304	030-51220-20	RESISTOR FILM AUTOINSERT 2E2 5% 0.4W 4X1.6MM
R305	030-51220-20	RESISTOR FILM AUTOINSERT 2E2 5% 0.4W 4X1.6MM
	303-50063-00	CLIP A4M1648 TRANSISTOR HEAT TRANSFER T500-24
	369-00020-36	TAPE VINYL FOAM 2 SIDE S/A 25.4*3MM 3M 4408

## T500-22 DIODE MATRIX PCB

REF	IPN	DESCRIPTION
D1-D32	001-10000-70	DIODE SMD BAV70 DUAL SWITCH SOT-23 COMMON CATHODE
PL1	240-00020-57	HEADER 10 WAY 1 ROW PCB MTG
SK1	240-04020-57	SOCKET 10 WAY 1ROW PCB MTG TOP ENTRY
	225-01171-00	PRINTED CIRCUIT BOARD T500 SMD DIODE 2CH MATRIX

## T500 LED PCB

REF	IPN	DESCRIPTION
D302	008-00010-11	LED 3MM RED HLMP1385 DIFFUSED 2.2V 10MCD LESS MTG
D303	008-00010-11	LED 3MM RED HLMP1385 DIFFUSED 2.2V 10MCD LESS MTG
D304	008-00010-11	LED 3MM RED HLMP1385 DIFFUSED 2.2V 10MCD LESS MTG
D305	008-00010-11	LED 3MM RED HLMP1385 DIFFUSED 2.2V 10MCD LESS MTG
SKT1	240-04020-69	SOCKET 3WAY 1ROW PCB MTG GOLD PLATE SKTS TOP ENTRY
SKT2	240-04020-61	SOCKET 7 WAY 1 ROW PCB MTG TOP ENTRY
	225-01138-00	PRINTED CIRCUIT BOARD T500 SERIES LED & XTAL MTG
	369-00020-36	TAPE VINYL FOAM 2 SIDE S/A 25.4*3MM 3M 4408

# GSA2210J 5 TONE/CTCSS PARTS LIST

## GSA2210J 5 TONE/CTCSS PCB

IPN	DESCRIPTION
	5 WAY CONNECTOR PLUG
	5 WAY CONNECTOR PLUG & LOOM
	15 WAY CONNECTOR PLUG & LOOM
	DOUBLE SIDED FOAM TAPE
005-00000-10	MODULE GSA 2210-J 5 TONE SELCAL BOARDS COM
205-00010-38	CABLE DATA 8 CORE SHIELDED B2108CS
240-00010-34	PLUG 8 WAY DIN INLINE
240-04020-72	SOCKET HOUSING 2 WAY CORD MTG ULTREX
316-85113-00	PLATE A4M2581 T500 GSA 5-TONE MOUNTING PLAT
316-87057-00	PILLAR A4M1600 11.5MM TAPPED M3 500 SERIES
345-00040-07	SCREW M3*8MM CSK PAN POZI ST BZ
345-00040-10	SCREW M3*6MM PAN POZI ST BZ
349-00020-32	SCREW TAPTITE M3X8MM PAN POZI BZ
352-00010-28	NUT M3 NYLOC HEZ
353-00010-11	WASHER M3 FLAT ST BZ 9.5MM OD A4M1216
356-00010-03	TAG SOLDER 3MM LONG M6248/3.2
357-00010-46	CLAMP CABLE 6.3MM P CLIP NYLON

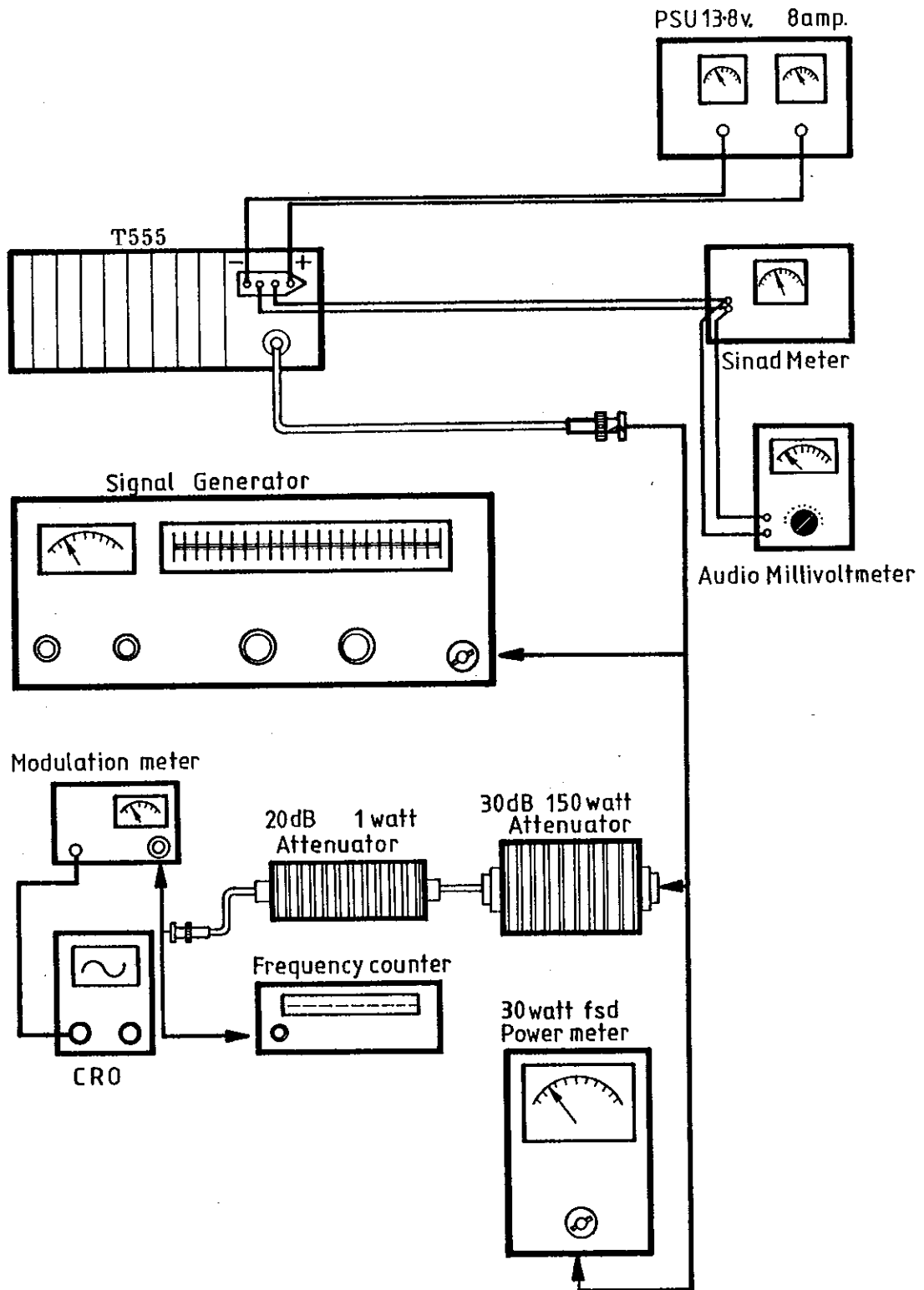


Diagram 1 Suggested Test Equipment Set-Up



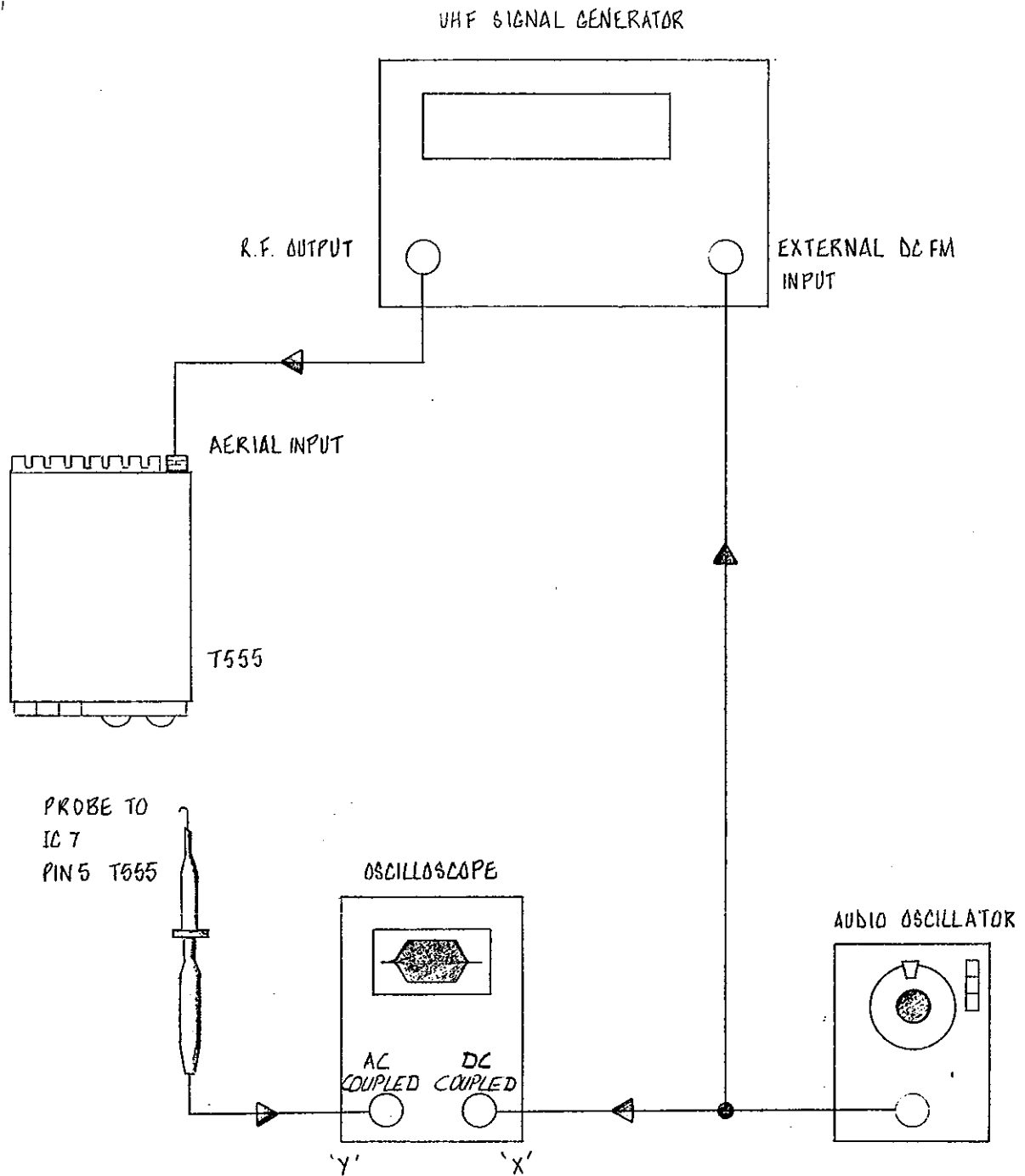


Diagram 2 IF Alignment Test Set-Up





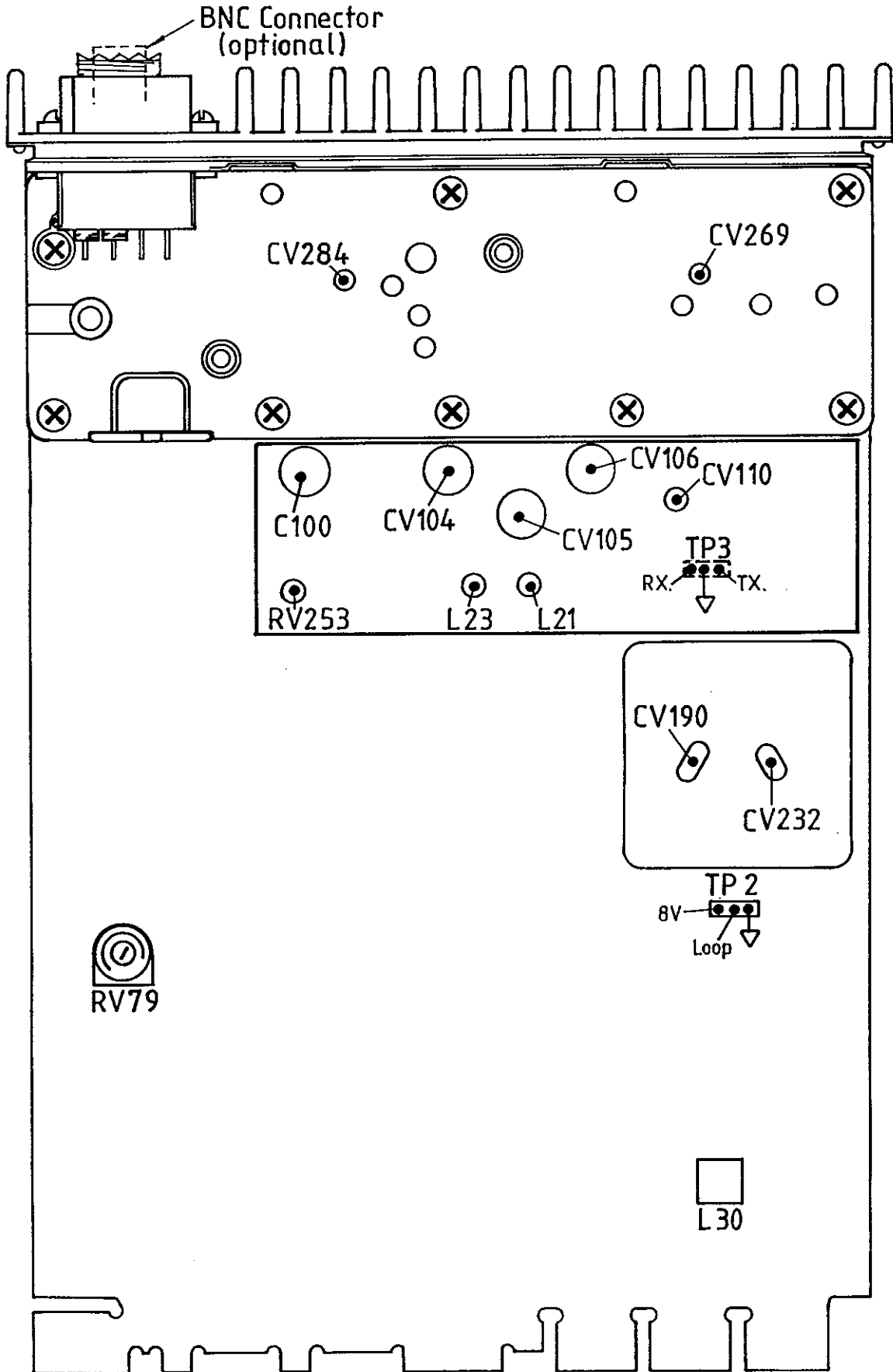
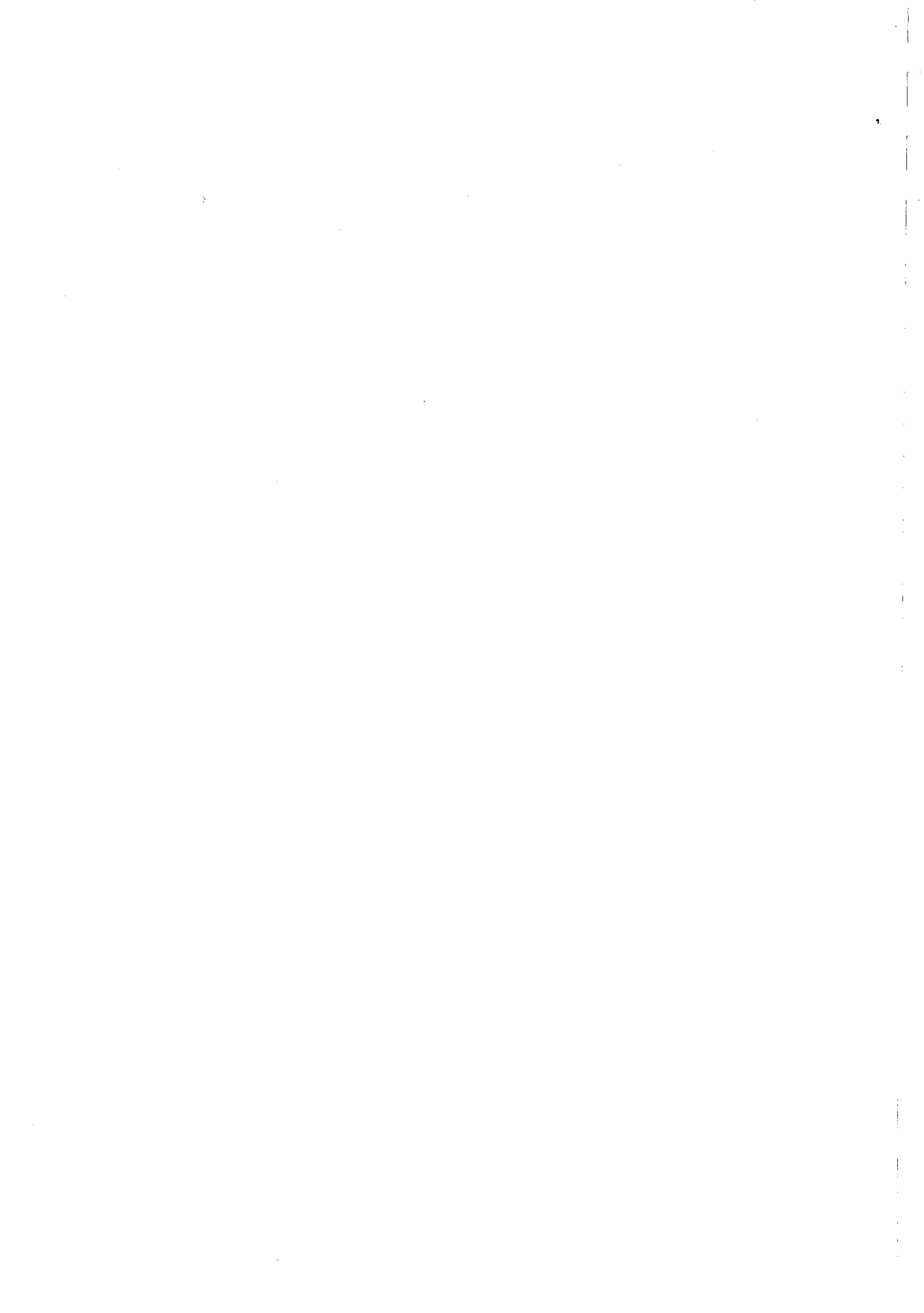


Diagram 3 T555 Tuning Points



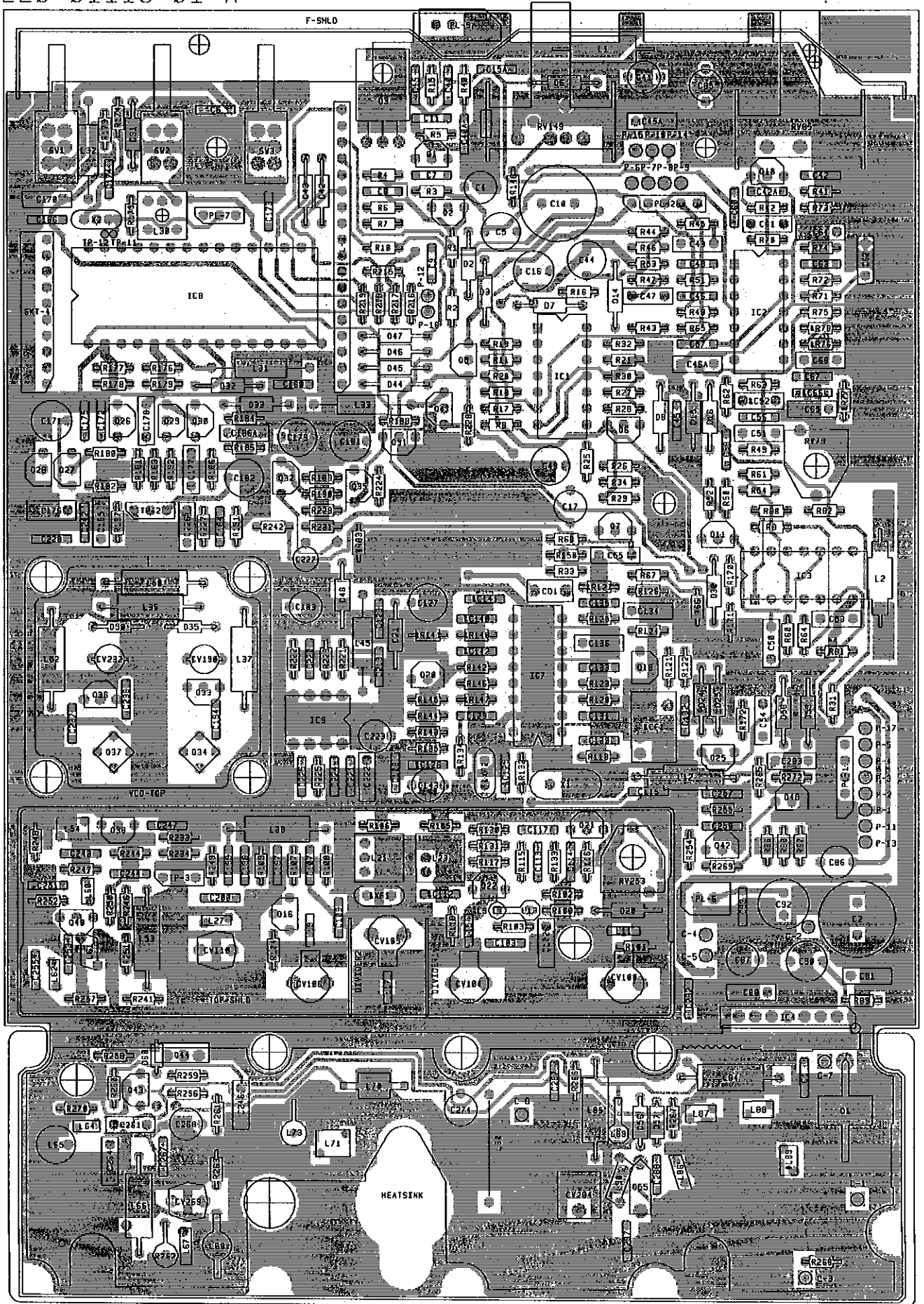


DIAGRAM 4 - T555 PCB LAYOUT - TOP SIDE.

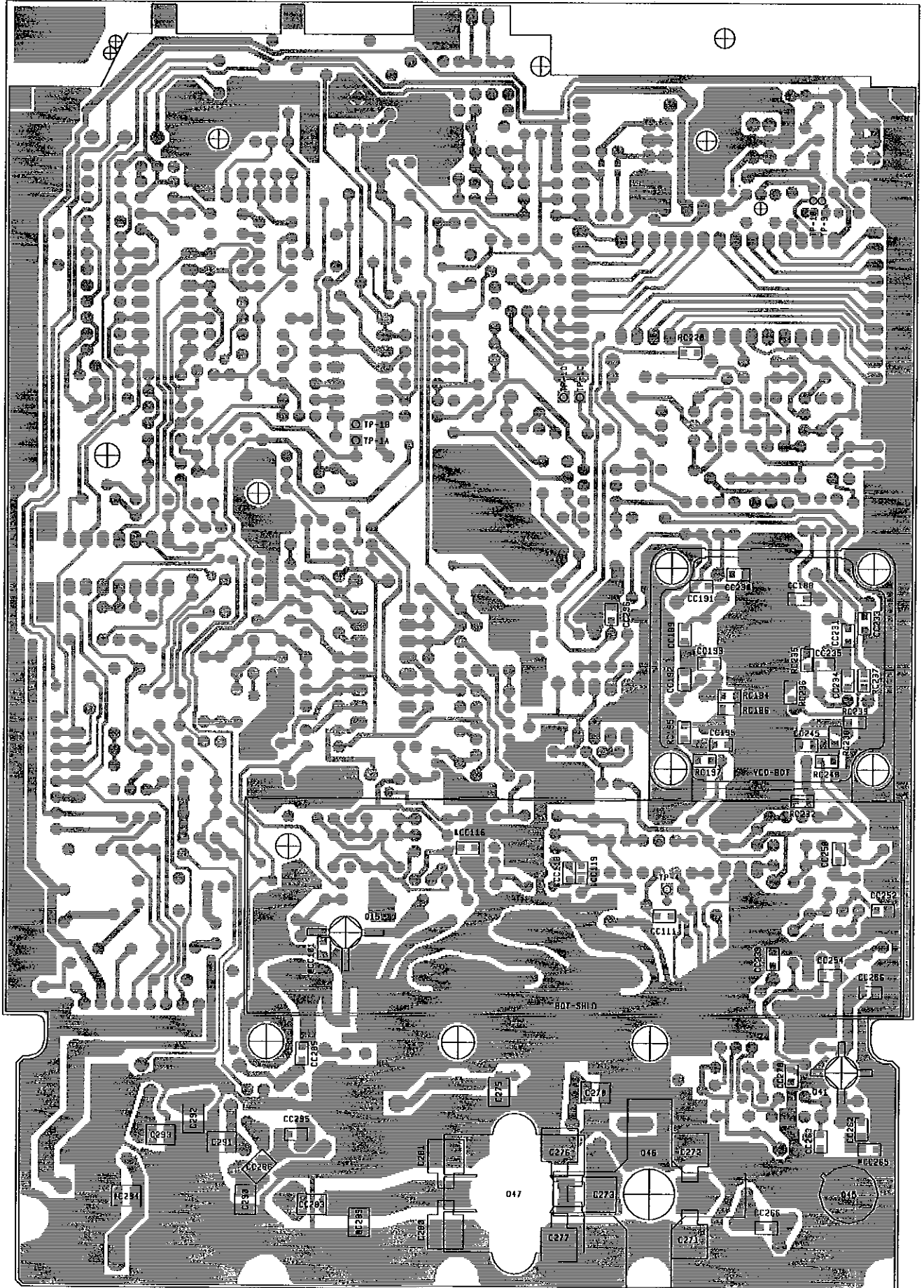
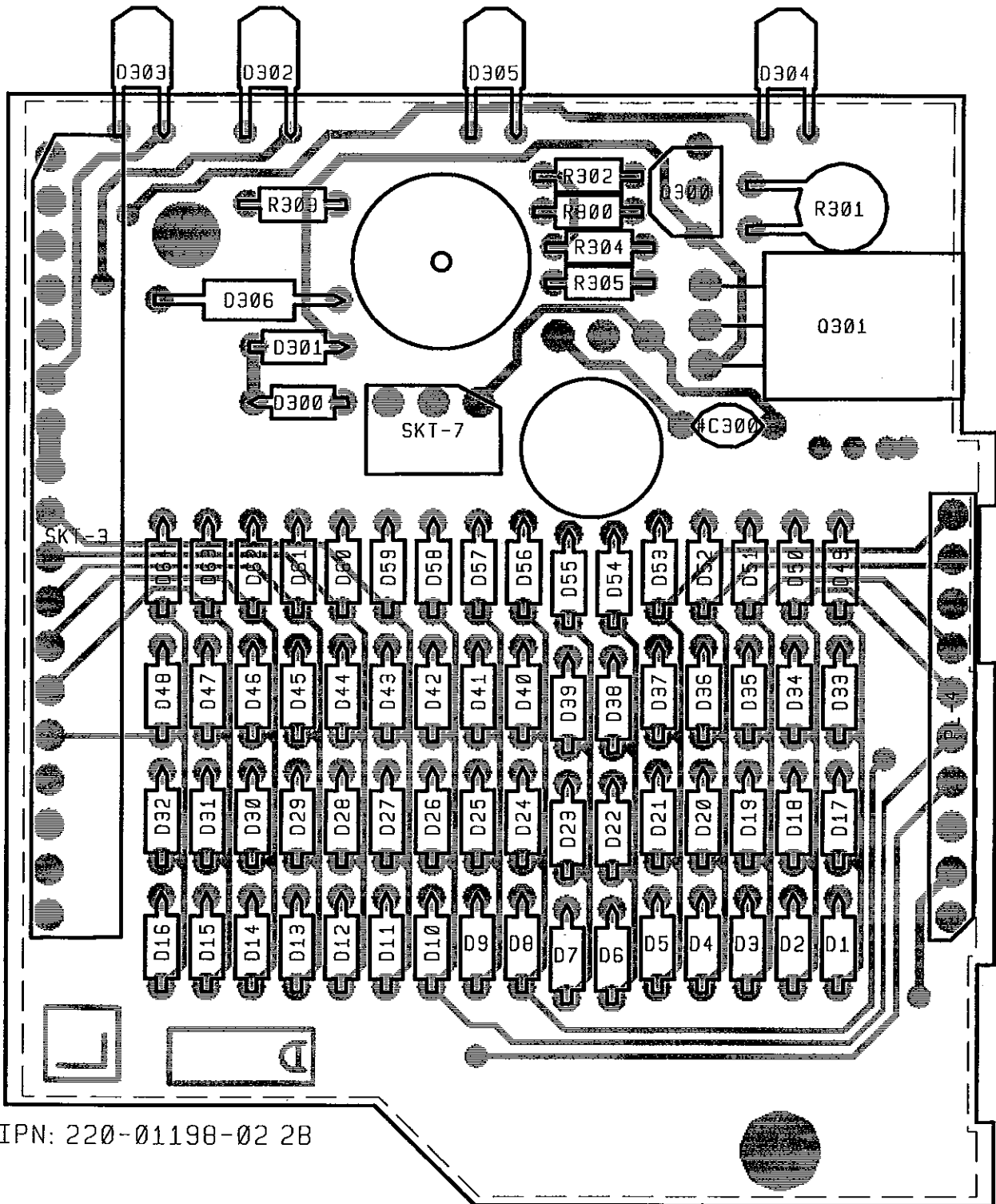


DIAGRAM 5 - T555 PCB LAYOUT - BOTTOM SIDE.



IPN: 220-01198-02 2B

Diagram 6 T500 Diode Matrix/LED/Crystal Heater PCB Layout - Top Side

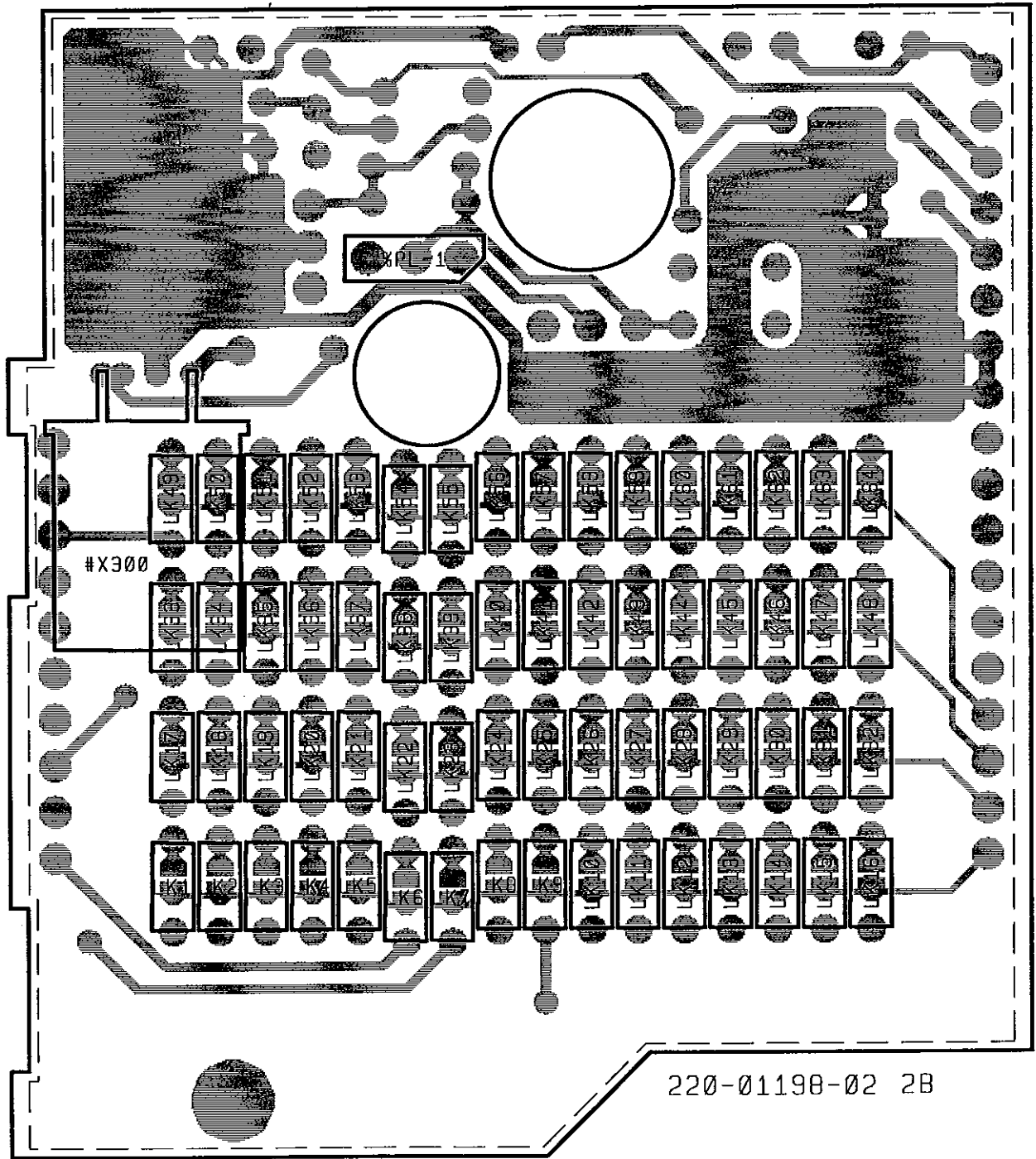


Diagram 7 T500 Diode Matrix/LED/Crystal Heater PCB Layout - Bottom Side

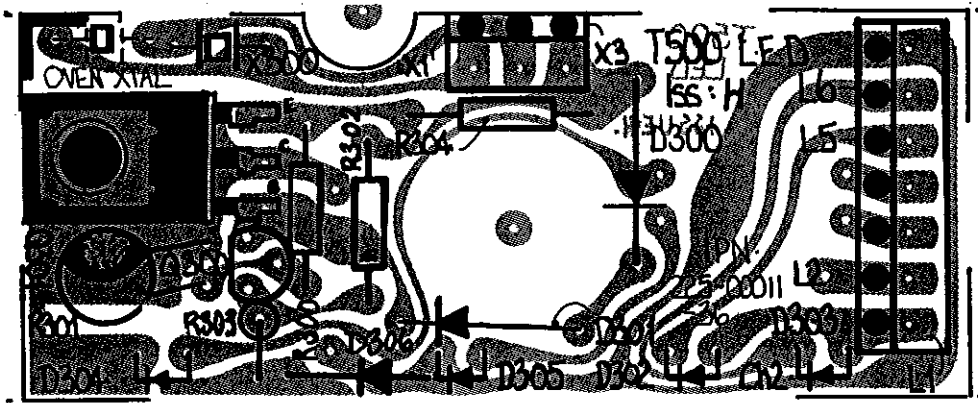
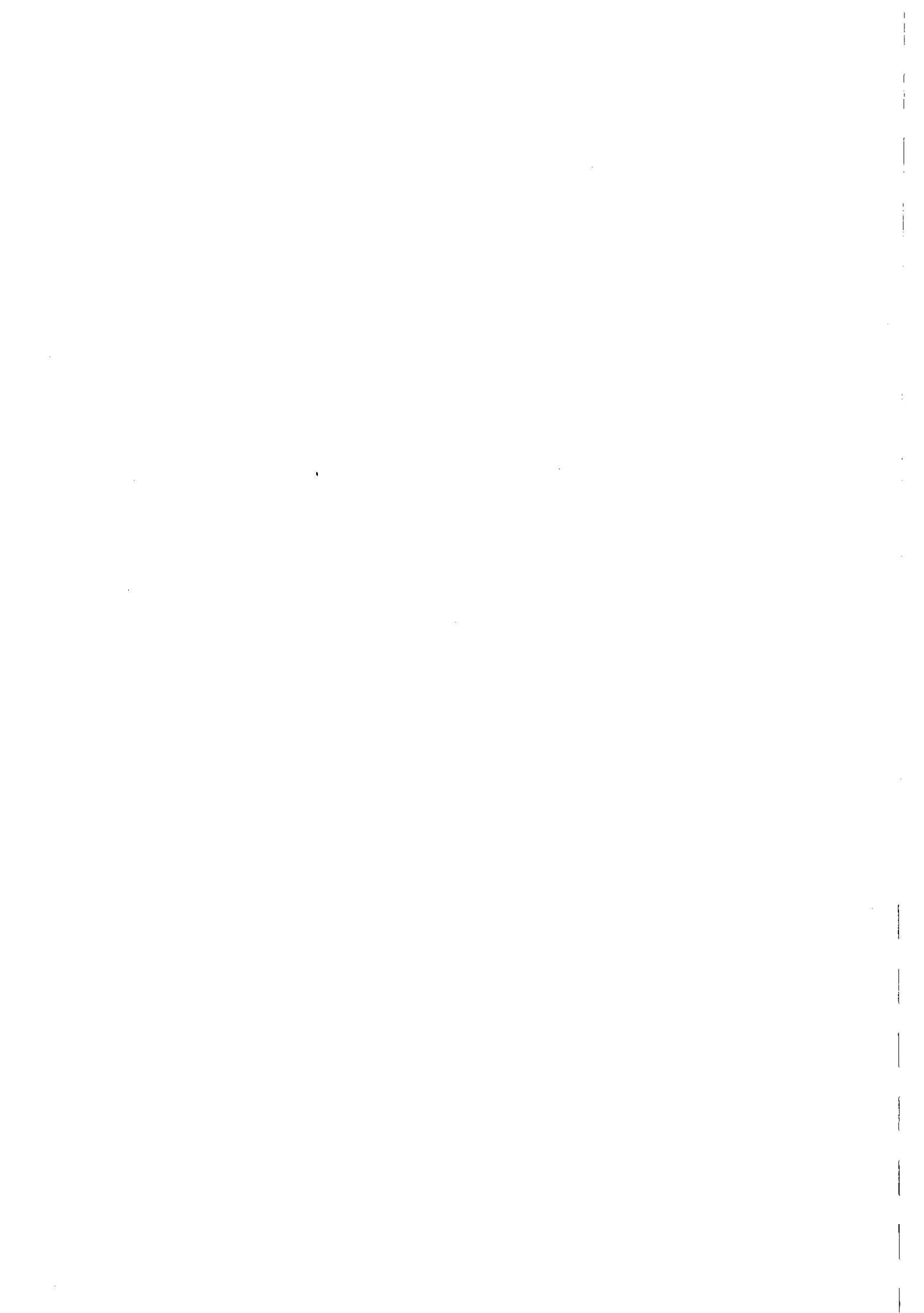


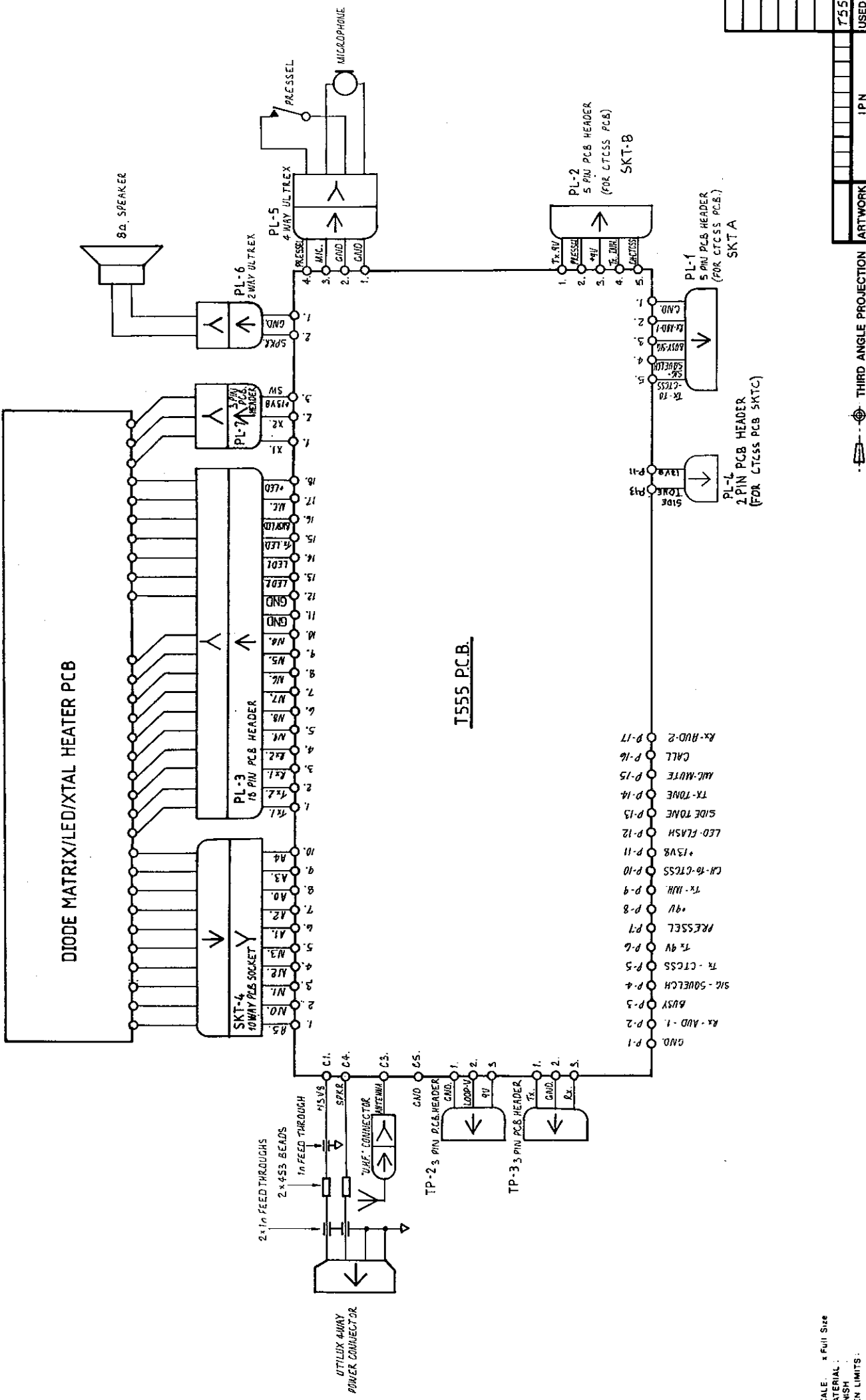
Diagram 8 T500 LED & Crystal Heater PCB Layout











**T555 WIRING DIAGRAM**

THIRD ANGLE PROJECTION

SCALE: \* Full Size  
 MATERIAL:  
 FINISH:  
 GEN LIMITS:

ISSUE	AMENDMENTS	DRN	CHKD	APVD	DATE	ISSUE
1					18-12-83	

AMENDMENTS	DRN	CHKD	APVD	DATE

DRAWING NUMBER **A2 C 620**

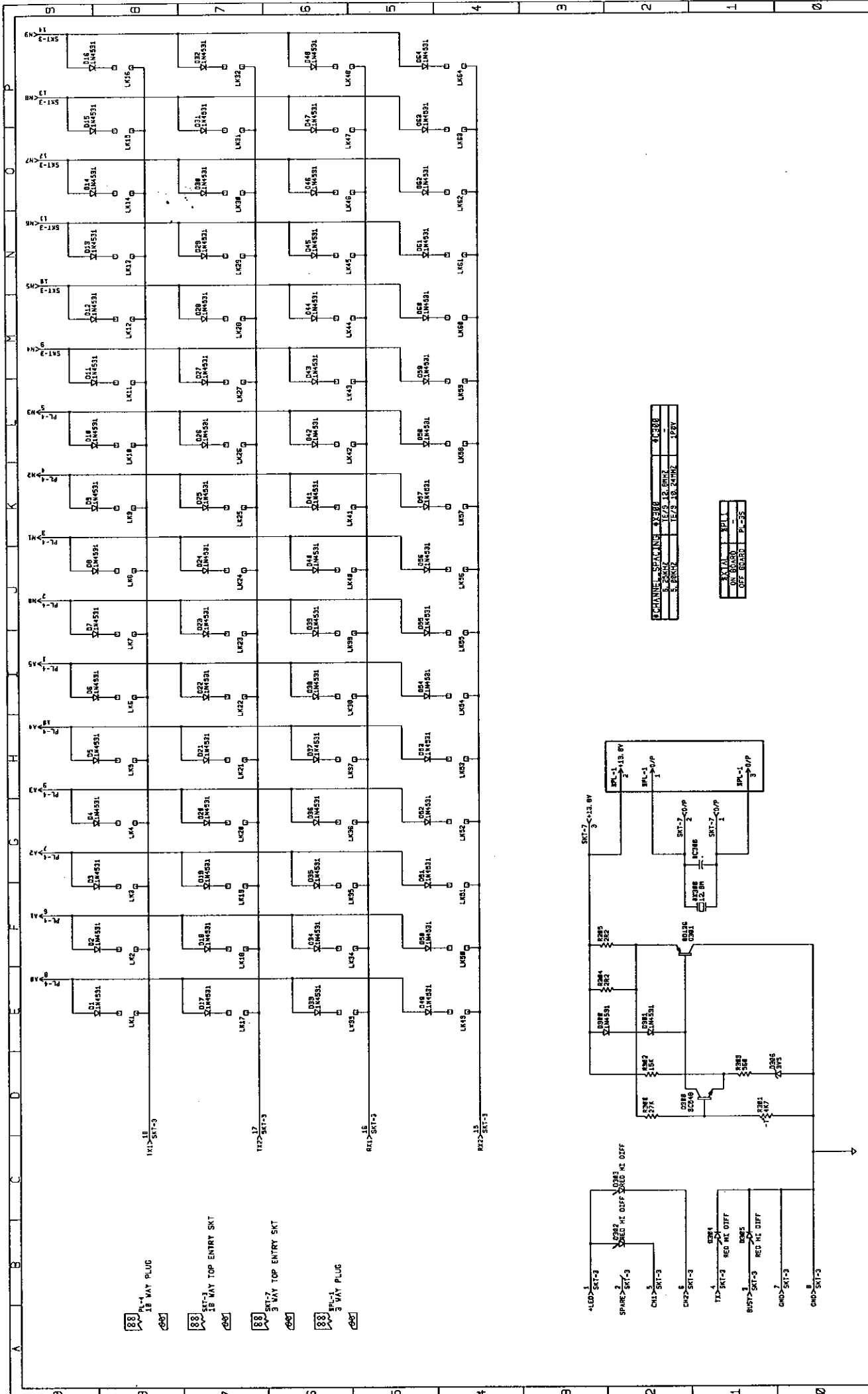
IPN **T555**

USED ON

TAIT ELECTRONICS Ltd.  
 Christchurch New Zealand

ISSUE





REF	DESCRIPTION	QTY	UNIT
1	DIODE	256	DIODE
2	LED	256	LED
3	RESISTOR	16	RES
4	CAPACITOR	16	CAP
5	IC	1	IC
6	CONN	1	CONN

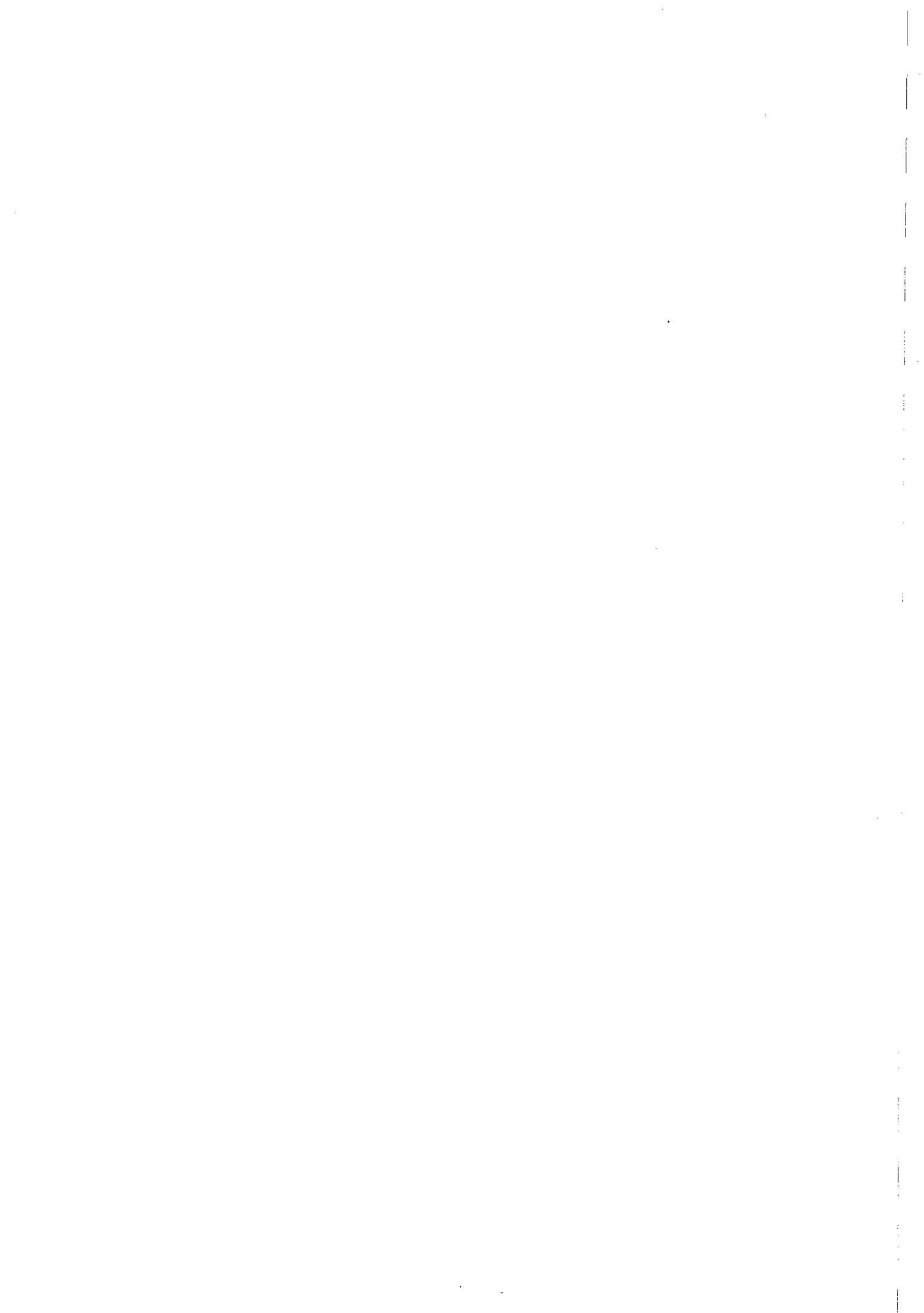
1	IC	1	IC
2	CONN	1	CONN
3	RES	16	RES
4	CAP	16	CAP

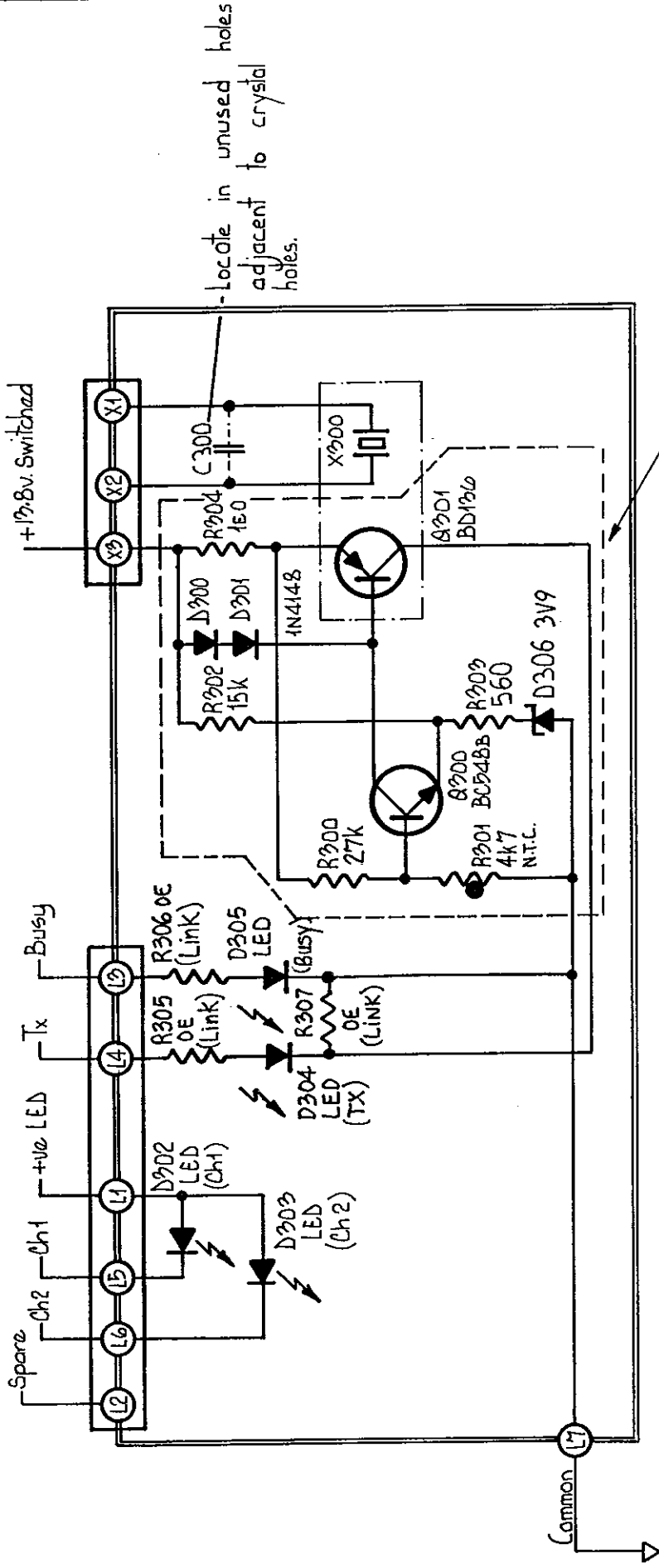
TAIT ELECTRONICS NEW ZEALAND  
 DRAWING NO: C726 SHEET 1 OF 1 ISSUE  
 IPN: 220-01198-02 FILE DATE: 14/11/91  
 FILE NAME: 5981D1.ZA

TITLE  
 1500  
 DIODE MATRIX, LED, XTAL HEATER

DATE	10/07/91	BY	JH
DESIGNED BY	JH	CHECKED BY	JH
DRAWN BY	JH	APPROVED BY	JH
DATE	11/11/91	BY	JH
DESIGNED BY	JH	CHECKED BY	JH
DRAWN BY	JH	APPROVED BY	JH

REVISIONS:  
 1. CHANGE SIZE OF BOARD  
 2. REVISED BOARD DRAWINGS  
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 100. REVISED BOARD DRAWINGS





These Components fitted only to low temperature versions.

USED ON	
T510	
T520	
T530	
T540	
T550	

CH. SPACE	X300	C300
6.25 KHz	12.8	not fitted
5kHz	10.24	1p0

E	Ch/N: 86-12-279	date	S.C.	S.C.	19.1.82
F	Ch/N: 88/05-237	16.5.88	AM	S.C.	9.5.88

SCALE:  
MATERIAL:  
FINISH:  
GEN. LIMITS:

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ISS	AMENDMENTS	DRN	CHKD	APVD	DATE
A	ORIGINAL	W.A.M.	AM		20.10.82
B	Ch/N: 85/08 304.09 353	D.H.	H.O.	S.C.	21.10.82
C	10 374 10 384				
D	Ch/N: 86-07-175				5.3.86
	Ch/N: 86-07-165				7.10.86

DO NOT SCALE OFF DRAWING

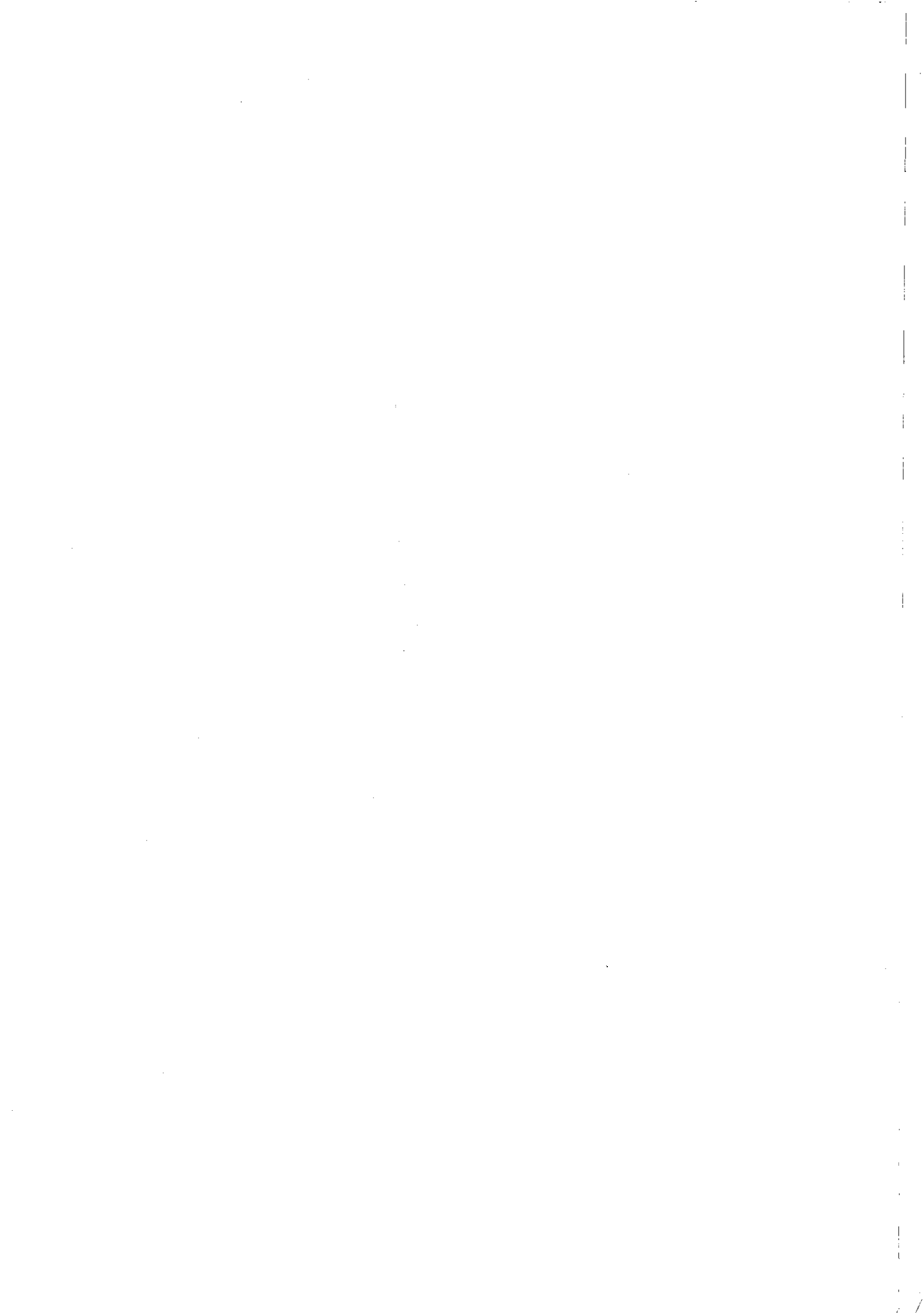
CIRCUIT DIAGRAM - T500/LED & OPTIONAL CRYSTAL HEATER.

TAIT ELECTRONICS LTD.

DRAWING NUMBER A4C509

ISSUE

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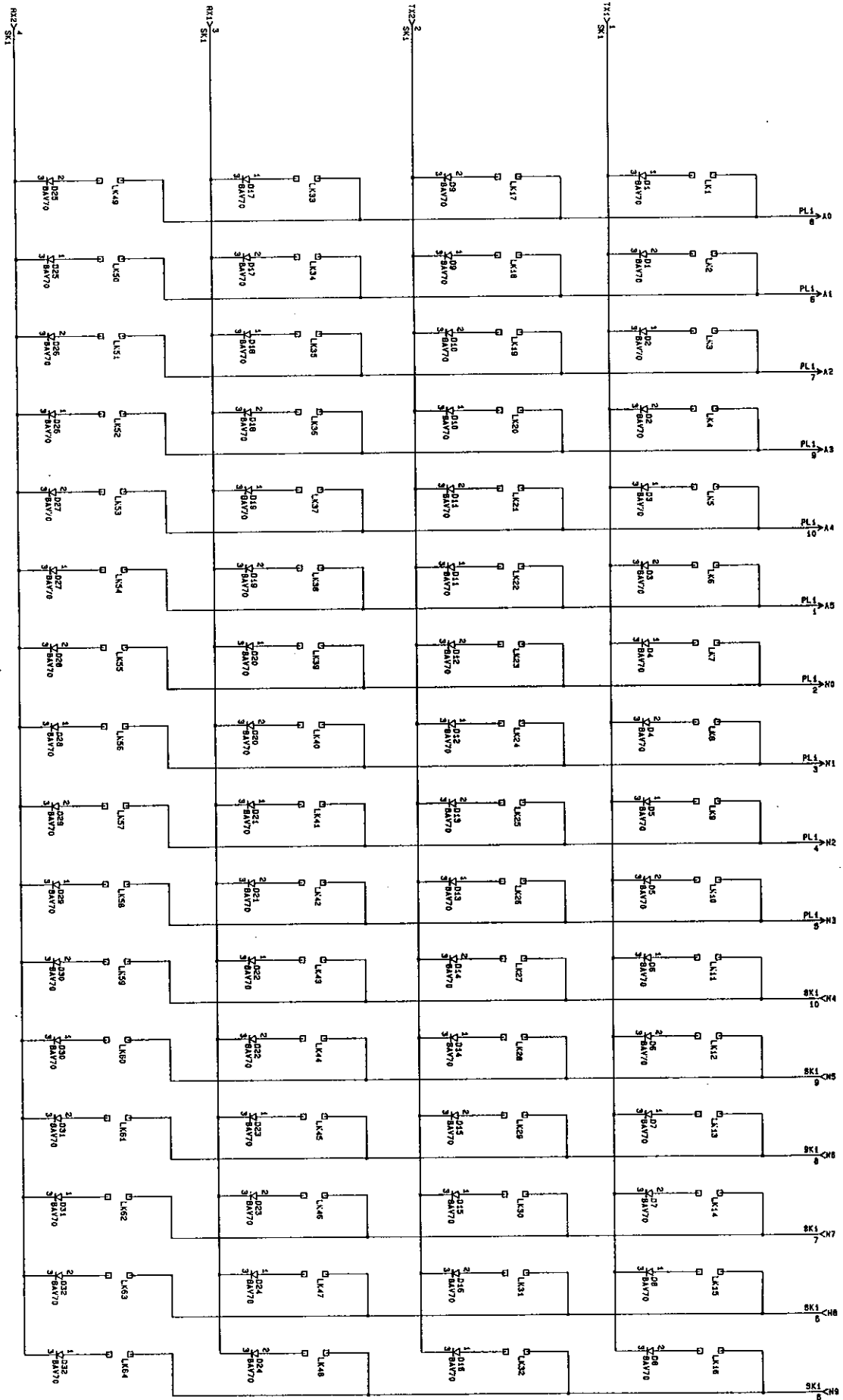


Diagram 13 T500-22 Diode Matrix Circuit Diagram

