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T530 Mobile Two Way Radio

VHF FM 136-174MHz

(TM-530)

Issue C

TECHNICAL INFORMATION

For further information about this Manual or the equipment it describes, contact 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 T530 mobile two way radio.

Ordering Tait Service Manuals

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

Date Of Issue

IPN TM-530 T530 Service Manual (All Versions)

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SECTION 1 GENERAL INFORMATION

1.1 INTRODUCTION

The T530 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 136 to 174MHz frequency range with 25kHz channel spacing at ±5kHz deviation, or 12.5kHz channel spacing and 2.5kHz deviation. The standard set has a two channel capacity.

Operation of the T530 is by hand held microphone and press-to-talk switch, plus five front panel mounted controls: 'Volume', 'Squelch', 'Channel Change', 'Call' and an 'On/Off' switch. Visual indication of 'Channel Selected', 'Transmit', 'Busy' and 'Call' (if Selcall is fitted) is by illuminated front panel display.

Provision is made for Selcall and CTCSS to be incorporated within the case of the T530.

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 T530 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 pair of diagonal cutters.

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 a 4 ohm speaker.

The VCO provides about 10 milliwatts of frequency modulated RF drive to the four stage broad band RF power amplifier. An audio processor provides the modulation level control and deviation limiting and a transmit timer returns the T530 to receive after approximately one and a half minutes of transmission.

The T530 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 T530 is used with the Tait T508 power supply.

The DC supply to the T530 must be negative earth and must be between 10.8 and 16 volts. The T530 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).

Two versions of the T530 are available (Wide Band and Narrow Band) and separate performance figures are provided for several parameters.

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 System	.. Frequency Modulation
Frequency Range	.. 136 to 174MHz
Channel Separation:	
Narrow Band (T530C)	.. 12.5kHz
Wide Band (T530B)	.. 25kHz
Frequency Increment:	
Versions /1, /3, /4, /5, /8	.. 6.25kHz
Versions /2, /6, /9	.. 5kHz
Number Of Channels	.. 2
Switching Range:	
Receiver	.. 4MHz
Transmitter	.. 6MHz
Supply Voltage:	
Operating Range	.. 10.8 to 16 volts DC
Standard Test Voltage	.. 13.8 volts DC
Polarity	.. negative earth only
Protection	.. internal crow-bar diode
Supply Current:	
Receiver - Squelched	.. 200mA
Receiver - Full Audio	.. 700mA
Transmitter	.. 4.5A (at 25W)
Antenna Impedance	.. 50 ohms
T/R Changeover Switching	.. relay
Operating Temperature Range	
Versions /1, /2, /3, /4, /5, /8	.. -10°C to +60°C
Versions /6, /9	.. -30°C to +60°C
Dimensions:	
Length	.. 225mm
Width	.. 150mm
Height	.. 45mm

Weight	.. 1.2kg

1.2.2 RECEIVER

Type	.. dual conversion superhet
Intermediate Frequencies	.. 455kHz and 21.4MHz
I.F. Bandwidth:	
Narrow Band	.. 7.5kHz
Wide Band	.. 15kHz
Sensitivity (12dB Sinad)	.. -120dBm (0.22µV pd)

Signal-to-Noise Ratio:
(RF: -107dBm, modulated at 1kHz to full system deviation)

Narrow Band	.. 32dB
Wide Band	.. 35dB

Selectivity:
(adjacent channel)

Narrow Band	.. 75dB
Wide Band	.. 80dB
Spurious Response Attenuation	.. 85dB
Intermodulation Response Attenuation	.. 75dB

Spurious Emissions:

Conducted	.. -65dBm
Radiated (½-wavelength dipole)	.. -47dBm

Audio:

Output into internal 8 ohm speaker	.. 2 watts
Output into external 4 ohm speaker only	.. 4 watts
Distortion (at 4 watts)	.. 2%
Minimum Load Impedance	.. 2 ohms

Audio Response:

All Versions	.. within +1, -3dB of a 6dB/octave de-emphasis characteristic (ref. 1kHz)

Audio Bandwidth:

Versions /1, /2, /3, /9	.. 450Hz to 3kHz
Versions /4, /5, /6	.. 300Hz to 3kHz
Version /8	.. 450Hz to 2.5kHz

Squelch:

Threshold	.. -120dBm (0.22µV pd)/6dB Sinad
Hard Setting	.. -104dBm (1.4µV pd)/26dB Sinad
Ratio	.. 70dB

1.2.3 TRANSMITTER

Power Output	.. 25 watts
Transmit Timer	.. 1.5 minutes

Frequency Stability	.. (ref. 1.2.4)
Mismatch Capability:	
Stability	.. VSWR <5:1 (all phase angles)
Ruggedness	.. 2 minute transmit into infinite VSWR (all phase angles)
Spurious Emissions:	
Conducted	.. -30dBm
Radiated ($\frac{1}{2}$-wavelength dipole)	.. -26dBm
Adjacent Channel Power:	
Narrow Band (in 7.5kHz bandwidth)	.. 70dB below carrier
Wide Band (in 15kHz bandwidth)	.. 80dB below carrier
Modulating System	.. direct FM
Deviation Response:	
In limiting	.. within +0,-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
Bandwidth:	
Versions /1, /2, /3, /9	.. 500Hz to 3kHz
Versions /4, /5, /6	.. 300Hz to 3kHz
Version /8	.. 500Hz to 2.5kHz
Deviation Limiting	.. ±5kHz (peak) maximum adjustable to ±5kHz
Audio Input For Maximum Deviation	.. 1mV rms at 1kHz
Audio Distortion (Modulated at 1kHz to 60% of maximum deviation)	.. 2%
Hum & Noise (Below 60% of full system deviation)	.. 45dB

1.2.4 FREQUENCY REFERENCE

Stability:	
± 5ppm (-10°C to +60°C)	.. TE/9
± 5ppm (-30°C to +60°C)	.. TE/9 + crystal heater (after 1 minute)
Heater Warm-Up Time (below 0°C)	.. 1 minute
Oscillator frequency:	
Versions /1, /3, /4, /5, /8	.. 12.8MHz
Versions /2, /6, /9	.. 10.24MHz

1.3 VERSIONS

1.	T530B/1	136-174MHz Frequency Range 15kHz IF Bandwidth 6.25kHz Frequency Increments
2.	T530B/2	136-174MHz Frequency Range 15kHz IF Bandwidth 5kHz Frequency Increments CTCSS Fitted
3.	T530B/2X	136-174MHz Frequency Range 15kHz IF Bandwidth 5kHz Frequency Increments No CTCSS Fitted
4.	T530B/3	136-174MHz Frequency Range 15kHz IF Bandwidth 6.25kHz Frequency Increments CTCSS Fitted
5.	T530B/4	136-174MHz Frequency Range 15kHz IF Bandwidth 6.25kHz Frequency Increments AF Response No. 1 CTCSS Fitted
6.	T530B/5	136-174MHz Frequency Range 15kHz IF Bandwidth 6.25kHz Frequency Increments AF Response No. 1
7.	T530B/6	136-174MHz Frequency Range 15kHz IF Bandwidth 5kHz Frequency Increments AF Response No. 1 Crystal Heater Fitted
8.	T530B/7	136-174MHz Frequency Range 15kHz IF Bandwidth 6.25kHz Frequency Increments AF Response No. 1 CTCSS Fitted
9.	T530B/9	136-174MHz Frequency Range 15kHz IF Bandwidth 5kHz Frequency Increments Crystal Heater Fitted
10.	T530C/3	136-174MHz Frequency Range 7.5kHz IF Bandwidth 6.25kHz Frequency Increments CTCSS Fitted
11.	T530C/3X	136-174MHz Frequency Range 7.5kHz IF Bandwidth 6.25kHz Frequency Increments No CTCSS Fitted

12. T530C/8

136-174MHz Frequency Range
7.5kHz IF Bandwidth
6.25kHz Frequency Increments
AF Response No. 2

1.4 OPERATING INSTRUCTIONS

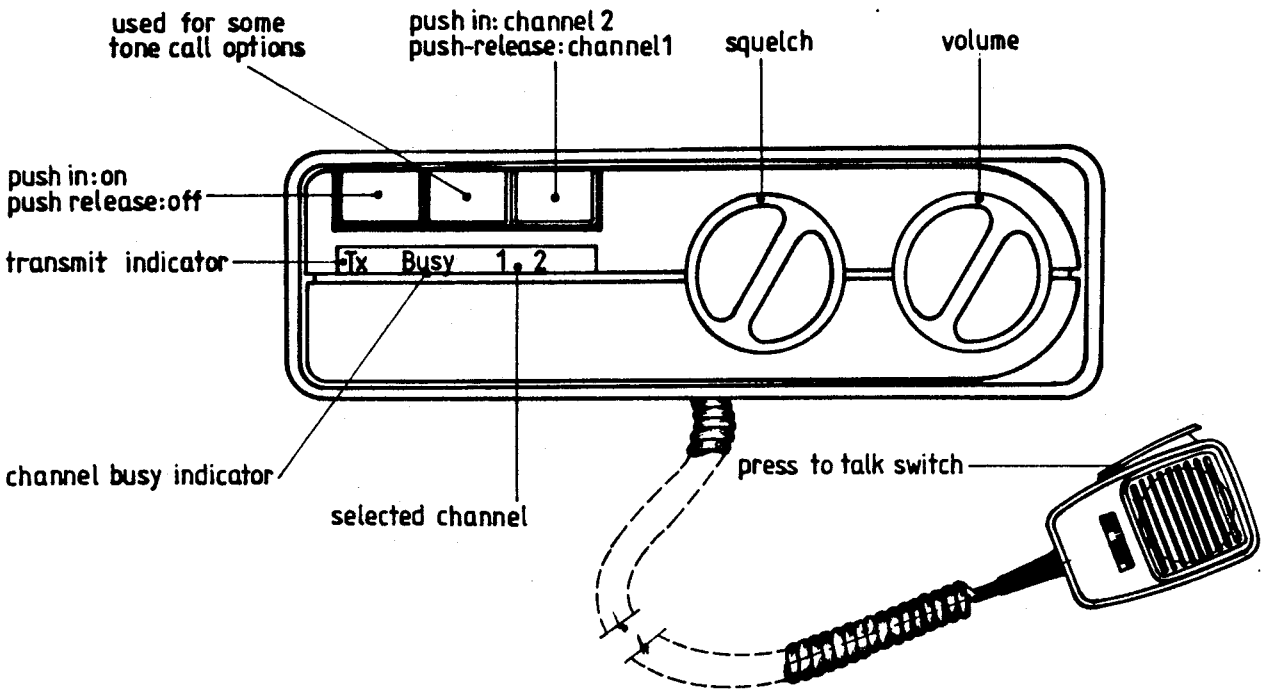


Figure 1 Front Panel Layout

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 T530 will automatically revert to receive after one and a half 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 T530 employs the dual modulus system of frequency synthesis. The voltage controlled oscillator (VCO, Q35 and buffer Q36) output is directed to the receiver or to the transmitter by the switching diodes D47 and D48 respectively. CV208 and D36 provide the receive injection frequency offset while the varicap diode (D37) is used to frequency modulate the VCO when the T530 is in the transmit mode.

A crystal provides a stable reference frequency of 12.8MHz (10.24MHz) which is divided down to 6.25kHz (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 40/41 prescaler, IC9, and then further divided within IC8 to provide the other input to the phase comparator. The division ratio in IC8, and hence the channel frequency, is determined by the diode matrix board.

The phase comparator output (pins 7 & 8 of IC8) is fed to the VCO tuning varicap via the speedup circuit (Q27, Q28) and the loop filter (R180, C180, R185, C181, R190 and C205).

2.2 RECEIVER

The RF signal from the relay is amplified by Q15 and fed to the balanced mixer (Q16, Q17) via a double tuned circuit. 10mW from the VCO is fed in antiphase to the gates of the two mixer J-FETs.

The IF output from the mixer passes through the 21.4MHz crystal filter and is amplified by Q18 before being fed to IC6.

IC6 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 IC6 is de-emphasised by R68 and C55 and is fed through the audio processor (see Section 2.4.2) to the audio output amplifier, IC4a.

2.3 SQUELCH

An input signal to the squelch circuit is obtained from the audio output of IC6 via RV150. 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 IC6 is used in a band pass filter configuration to select and amplify noise frequencies above the audio band. The centre frequency is approximately 8kHz in the wide band T530 and 4.5kHz in the narrow band T530.

This signal is rectified by Q20 to give a positive going DC voltage which is an inverse function of the RF signal strength.

This DC voltage is then fed to a threshold detector within IC6, in such a way that pin 14 of IC6 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 VCO is amplified to a level of 25 watts by a 4 stage broad band amplifier (Q40, Q44, Q45, Q46). High level RF then passes via the relay through the low pass filter to the aerial connector.

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

Transistor Q41 prevents the transmitter turning on when the synthesizer is out of lock.

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 Selcall options are shown on the Circuit Diagram.

2.5 POWER SUPPLY

2.5.1 GENERAL

Note: The T530 is suitable for negative earth applications only.

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

DC is connected to the audio output IC and the transmitter final and driver whenever the T530 is connected to a supply.

2.5.2 CONTINUOUS SUPPLIES

DC from the on/off switch supplies the audio output IC enable, the power turn down stage 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 offset
D47
Receiver
Squelch control
IC3b

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
D48
Low power transmitter stages
IC3a and IC3d
Aerial changeover relay

Closing the PTT switch also initiates a timer circuit around IC1 which will return the T530 to receive after 1½ minutes of transmission.

2.5.5 FREQUENCY INFORMATION

The diode matrix board has four rows of diodes. A row is selected by D42 to D45 and R218 to R220 according to the channel switch position and whether the T530 is in the receive or transmit mode. The channel frequency is selected by removing diodes as described in Table 1 such that the correct pattern of '0's and '1's is presented to IC8.

SECTION 3 ANCILLARY EQUIPMENT

3.1 T508 POWER SUPPLY

The T508 Power Supply will allow operation of a T500 Series two way radio from a 230V (nominal) 50Hz or a 115V (nominal) 60Hz mains supply (specify voltage when ordering):

Type Numbers:

115V Supply	.. T508/115
230V Supply	.. T508

The T508 is an attractively styled unit which matches the T500 Series two way radios. 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 6.5A (intermittent) regulated supply for the T500 Series two way radios and incorporates current limiting and thermal protection.

3.2 T220/2 REMOTE SPEAKER ASSEMBLY

The T220/2 remote speaker assembly may be used with the T530. It comprises a heavy duty 3 watt speaker mounted in a rugged enclosure which pivots on its mounting bracket. The 3.5 ohm voice coil of the speaker is connected by a short lead terminated in a 2 pin cord mounted connector. The enclosure is compact and easily mounted in any convenient position.

3.3 TA-500/2 TONE

The TA-500/2 Tone is a two tone signalling unit which allows a T500 Series two way radio to be selectively called by a suitably equipped base radio, and also to selectively call one other two way radio.

The TA-500/2 Tone is programmed for one transmit code and one receive code from a total of 200 possible codes and is mounted within a T500 Series two way radio.

For further details refer to the Telcall System Service Manual (TM-Telcall).

3.4 TA-101S

The TA-101S is a two tone signalling unit which allows a T500 Series two way radio to be selectively called by a suitably equipped radio, and also to selectively call other radios on the same RF channel.

The TA-101S is programmed for one receive code, and 200 transmit codes are selectable via a keyboard.

The TA-101S is mounted externally to a T500 Series two way radio with an interfacing cable.

For further details refer to the Telcall System Service Manual (TM-Telcall).

3.5 TA-500/5 TONE

The TA-500/5 Tone is a five tone signalling unit which allows a T500 Series two way radio to be selectively called by a suitably equipped radio, and also to selectively call another radio and/or transmit status information.

The TA-500/5 Tone is programmed for one receive code and two transmit codes from 100,000 possible codes, and is mounted within a T500 Series two way radio.

For further details refer to the TA-500/5 Tone Service Manual.

3.6 TA-500/CTCSS

3.6.1 INTRODUCTION

The TA-500/CTCSS unit is a plug-in option and requires no wiring to install. It will encode and decode CTCSS tone frequencies within the range 67Hz to 250.3Hz with separate adjustment for each channel. Hook switch monitoring and transmit inhibit on 'Busy' may be field selected.

The unit can be plugged into the T530 two way radio PCB using plug and sockets A and B. The metal pillar enables the unit to be bolted to the two way radio PCB, preventing it from becoming detached due to vibration, etc.

3.6.2 SPECIFICATIONS

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

Fully Tunable	.. over all Group A & B frequencies
Encode Stability	.. ±0.125% typical
Temperature Range -30°C to +60°C Supply Voltage = 8.1V to 9.9V DC	±0.5% maximum
Opening Sinad	.. 4dB typical 6dB maximum
Opening Time (Sinad >20dB)	.. 130ms typical 250ms maximum
Encoded Tone Distortion	
At 67Hz	.. 3.5% typical
At 250Hz	.. 1.0% typical
Maximum All Frequencies	.. 10%
Decoder Bandwidth	.. 8Hz typical
Over temperature -30°C to +60°C and supply voltage 8V1 to 9V9	.. Accept >5Hz Reject >9Hz

The TA-500/CTCSS may be used with interleaved tone frequencies by changing R423 to 1M ohm (1% ±50ppm MF) and R430 to 270K. This reduces the decode bandwidth to 3Hz typical, and increases opening time to 190ms typical.

3.6.3 CIRCUIT DESCRIPTION

Refer to Circuit Diagram A2C500 at the rear of this Manual.

Receiver audio is AC coupled to the unit via C405. IC401b then amplifies and buffers the signal, DC bias being provided by R407. The receiver audio is then filtered by a 3 pole low pass filter (centred around IC401d) to remove audio frequencies over 300Hz. The signal is then amplified until the waveform is hard clipped by limiter IC401c. The filtered and limited signal is then applied to the detect filter.

The detect filter consists of the four amplifiers found in IC402 and their associated components. The centre frequency is determined by the gain of IC402d which is set by either RV428 or RV429 depending upon which transmission gate, IC404a or IC404d, is on.

The detect filter is DC biased from the half rail voltage source based around IC401a.

The outputs of the detect filter (both DC and AC components) are attenuated by R445 and R446. The resultant level is then compared against half rail voltage by IC403a. A negative switching pulse at IC403a will then result for the period that the AC waveform at the output of the detect filter is greater than Vref (1-y)/y, where y = R446/(R446 & R445) and Vref = ½ reg.

A small amount of hysteresis in the comparator prevents 'chatter' and ensures a minimum output pulse width from the comparator.

R446 and R445 are 1% metal film resistors chosen to give a detect pulse from the output of the comparator when the incoming CTCSS tone is within the 3dB bandwidth of the detect filter. The output of the comparator, IC403a, is of the open collector type and so a 100k pull up resistor is required. C418 provides a fall-out time to prevent squelch 'chatter' in fading situations. IC403d buffers the comparator output and compares it against half rail. At the output of IC403d, R457 and C419 provide an acquisition time to prevent detection on spurious transitions of IC403a due to noise and transient shifts in the detect filter.

The detect time for the whole TA-500/CTCSS is dependent therefore on the rise time of the detect filter and acquisition time of the detect comparators. IC403c buffers R457 and C419 to provide a detect output. The detect output is then wire OR'd with the hang up detect circuit (when link is fitted) and inverted via Q405 to control the radio squelch.

The detect signal of IC403c pin 14 also prevents transmit inhibit (when D407 is fitted) when attempting to access a repeater just vacated by another user belonging to the same CTCSS tone group. Note that where hook switch monitoring is required, Tx inhibit is not necessary. Therefore the link should be fitted and D407 removed.

Where no hookswitch monitoring is allowed and Tx inhibit is required, the link must be removed and D407 fitted.

The hook switch function is integral with the PTT line on T500 Series two way radios (in common with the Tait T190 Series mobiles). On hook is detected by Q403 sensing the path to ground via the 12k ohm resistor fitted in the microphone.

When transmitting, the TA-500/CTCSS unit is made to oscillate by feeding the output of the detect filter back to the limiter input stage via IC404c transmission gate. Any noise present in the detect filter when IC404c is turned on causes transients in the limiter output. This makes the detect filter 'ring' at its tuned frequency. Positive feedback maintains the oscillation.

The rise time of the filter is constant for all tuned frequencies (due to variable Q factor) and would be about 60-80ms were R430 not used. During encoding, IC404b transmission gate turns on and shunts R423 with R430.

Varying R423 only affects the Q of the circuit and not the tuned frequency or gain. Hence, upon transmit, the Q of the detect filter is halved and so the rise time of the output is halved to 30-40ms. If the detect bandwidth of the TA-500/CTCSS is required to be lower, then R423 may be increased, resulting in a higher Q. A better noise performance will also result, but at the cost of increased detect time.

During encoding, Q401 is turned on to prevent noise from the radio feeding through to the limiter input and so causing a frequency jitter on the encode tone.

The encode tone is fed to the radio transmitter circuitry via C417 and RV447. RV447 is used to set up transmitter deviation.

3.6.4 ADJUSTMENTS

1. Set the CTCSS tone frequencies by connecting a counter to the 'tone output' (blue) wire (A5 of T530). Close the press-to-talk switch for the tone to be encoded. Adjust the appropriate potentiometer (RV429, Channel 1; RV428, Channel 2).

Note 1: For sets with CTCSS requirements for only one of two used channels, see Section 3.6.6 'Modifications To TA-500/CTCSS'.

Note 2: For accurate CTCSS tone adjustment, it is recommended that either a rate multiplier be used with the counter, or alternatively that the output be compared with a known frequency source on an oscilloscope, using the Lissajous Figures Method.

2. Modulation levels (refer also to Section 5.7.2 Modulation Adjustment)

   (a) Adjust RV447 to set the CTCSS tone deviation between ±500Hz and ±1kHz. For a ±5kHz system deviation, the recommended CTCSS deviation is ±750Hz. For a ±2.5kHz system, the CTCSS deviation may need to be greater than ½ of 750Hz for acceptable reliability.

   (b) Reset the transmitter deviation in accordance with Section 5.7.2 of this Service Manual so that the full rated system deviation (±5kHz or ±2.5kHz) is not exceeded when both normal and CTCSS modulation are present.

3.6.5 TESTING

If retrofitting a TA-500/CTCSS unit into a T530, the following tests should be carried out:

1. Set the squelch control fully clockwise.
   Earth the microphone button to check the hook switch operation.
   Ensure that the receiver reverts to a muted condition with the microphone button earthed, and unmutes when the microphone button is not earthed.

2. Set the squelch control to normal muted condition.
   Connect an RF signal generator to the aerial input connector at an output of -107dBm.

Modulate with the correct CTCSS tone for that particular channel and deviated ±500Hz.

Apply the signal from signal generator.

Ensure that the receiver unmutes while the signal is present.

3. (a) Disconnect the signal generator & replace it with an RF load.

Rotate the squelch control until the 'Busy' LED is illuminated.

Close the press-to-talk switch.

Ensure that the transmitter does not come on or the Tx LED illuminate, indicating that Tx inhibit is operational.

(b) Insert reverse protection between the signal generator and the two way radio (see Section 5.4.1, item 15).

With the unit detecting tone and 'Busy' lamp lit, press the PTT.

Check that the two way radio Tx lamp illuminates.

3.6.6 MODIFICATIONS TO TA-500/CTCSS

After testing:

If the hook switch monitoring is not required - cut the disable wire link.

If the Tx inhibit is not required - cut D407.

Where a 2 channel requirement with only one channel CTCSS control arises, a 1N4148 diode must be soldered between IC402d pin 12 (diode anode) and IC404a/d pin 12 (no tone on channel 2), or, pin 13 (no tone on channel 1). This will:

(a) prevent an encode tone being produced on Transmit;

and

(b) there will be no mute control from the CTCSS unit on Receive.

To allow Tx inhibit on the non-CTCSS channel - cut D406; but note that on the CTCSS channel the user can no longer access the repeater on the squelch tail of the same group CTCSS mobile.

3.7 TA-500/MEM

The TA-500/MEM is a replacement, plug-in memory unit complete with all diodes.

3.8 TA-500/CRDL

The TA-500/CRDL is a mounting cradle supplied with microphone clip and mounting screws to mount T500 Series two way radios.

3.9 TA-500/RC

The TA-500/RC is a rugged cradle affording a higher level of environmental and mounting security than the standard cradle. It is available in either black or white and comes complete with mounting screws and cradle unlocking key.

3.10 TA-500/10/40 MULTICHANNEL

The TA-500/10 or /40 is an add-on kit which converts a T500 Series 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.

For further details refer to TI-292A.

3.11 TA-500MC/CTCSS

The TA-500MC/CTCSS is a high performance CTCSS encoder/decoder for use with T500 Series radios equipped with a TA-500/10/40 multichannel conversion kit. It will encode and decode all 37 standard tones from groups A, B & 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.

For further details refer to TI-292A.

SECTION 4 INSTALLATION

CAUTION: The T530 is suitable for negative earth installation only.

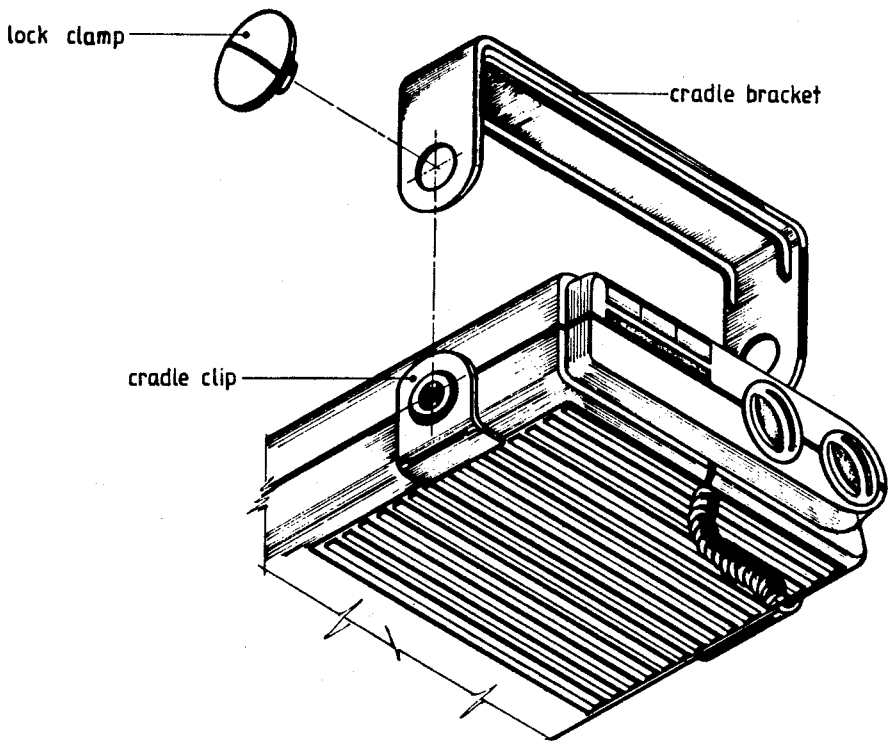


Figure 2 T530 Mounting System

4.1 MOUNTING SYSTEM

4.1.1 STANDARD MOUNTING CRADLE

The T530 is supplied complete with a versatile mounting system. The mounting hardware includes one bracket, two clamps, two clips, and an assortment of self tapping screws.

To detach the bracket, rotate each clamp ¼ turn anticlockwise with a suitable coin. The two clips which mesh into the speaker grill are now free to be removed and refitted anywhere along the sides of the T530. The bracket can be attached in any position above or below the T530.

4.1.2 RUGGED MOUNTING CRADLE

The rugged cradle kit includes the cradle assembly, 2 cradle clips, 2 plastic keys and 4 self tapping screws.

To mount the T530 in the cradle, fasten the 2 cradle clips as indicated in Figure 3, then slide the radio (heatsink first) into the cradle. The spring clips in the cradle assembly will lock into the cradle clip grooves, holding the radio securely in place. It can then be released only with the cradle unlocking key.

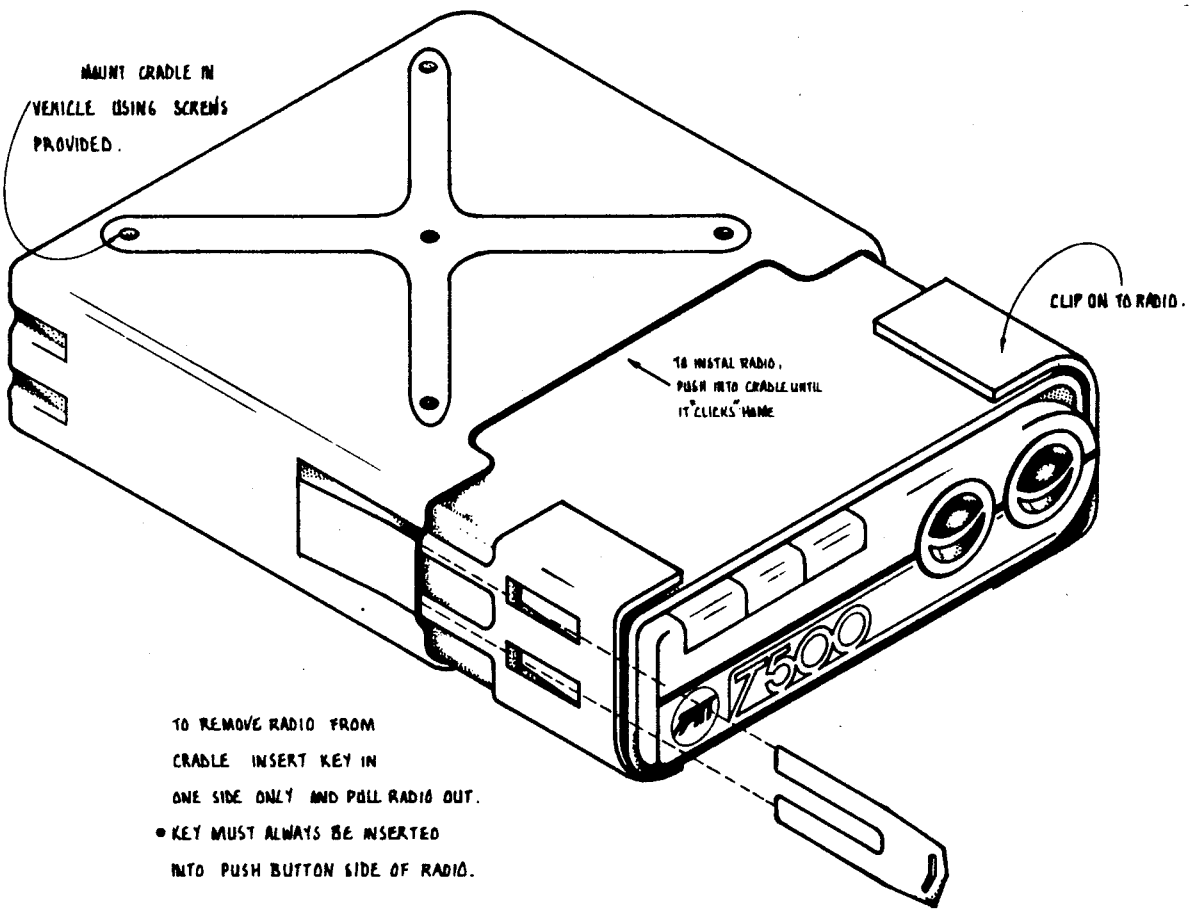


Figure 3 T530 Rugged Mounting System

4.2 VEHICLE INSTALLATION

Consider the following when looking for a suitable mounting position:

If the speaker grill is obscured an external speaker will be necessary.

The aerial and power connectors protrude beyond the heatsink fins.

The versatility of the mounting system allows the T530 to be inclined and/or moved back and forth once the bracket is mounted.

4.3 EXTERNAL SPEAKER

An external speaker may be necessary when the T530 is used is noisy conditions. Use Tait speaker type T220/2, 3.5 ohms.

Mount the speaker as close to the operator as is practicable.

Connect the speaker cable to the T530 4 way connector socket as shown in Figure 4.

The T530 speaker can be disconnected internally or may remain connected provided that the impedance presented to the audio output stage does not fall below 2 ohms.

4.4 DC SUPPLY

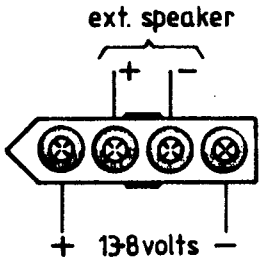


Figure 4 T530 Power Socket

The pins for the four way connector should be attached to the wires using an appropriate crimping tool.

Take both the positive (red) and the negative (black) from the 4 way socket directly to the vehicle battery (see Figure 4).

Fit an in-line fuse in the positive cable close to the battery. The fuse rating is 10 amps.

4.5 AERIAL

4.5.1 GENERAL

A quarter wave whip will be suitable for many applications, but consider a bottom loaded 2.5dB gain aerial or a centre loaded 3.5dB gain aerial where better coverage is required or when the aerial is fender mounted.

Note: The use of gain aerials is prohibited in some countries. The Tait agent can advise.

Mount the aerial in the centre of the vehicle roof where possible.

Use 50 ohm coax, eg. RG58 or UR76.

Use the connector supplied to connect the aerial to the T530. Otherwise use a similar good quality UHF connector such as a Greenpar GE 40001, plus GE 40008 (see Figure 5).

Tune the aerial by connecting a VSWR indicator or a thru-line wattmeter (eg. Bird 43) between the T530 and aerial cable.

4.5.2 AERIAL CONNECTOR

Remove the coupling nut from the body of the connector and place it over the cable.

Prepare the cable, with the braid folded back over the outer sheath, to the dimensions given in Figure 5.

Screw the body sub-assembly onto the cable so that the braid is visible through the two holes made accessible by removal of the coupling nut.

Solder the braid to the body sub-assembly via the two holes in the centre, then solder the centre conductor to the centre contact.

Screw the coupling nut forward over the body sub-assembly.

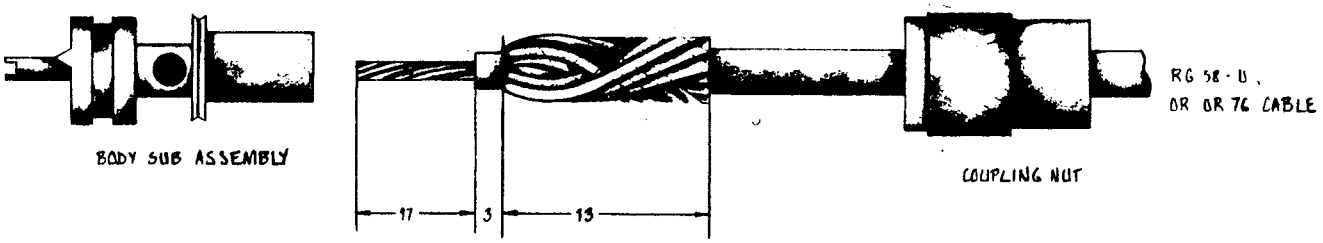


Figure 5 Aerial Connector Assembly

4.6 MICROPHONE CLIP

The mic. clip must be earthed (to negative) if the CTCSS hook monitoring facility is required.

Ensure that the mic clip is mounted in a position where the PTT switch can not be inadvertantly jammed on.

Refer to Section 1.4 for operating instructions.

SECTION 5 SERVICING

5.1 GENERAL

5.1.1 NOTES

If further information is required about the T530 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. T530C/3), 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. TM-530, Issue C.

CAUTION: CLEANING

This is a plastic based product with a secondary finish on the outer case. 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.

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 POSIDRIV RECESS HEAD SCREWS

Posidriv 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.

Posidriv No 1 screwdrivers will fit the posidriv screws used in the T530. Philips cross-head screwdrivers are not satisfactory for use on these screws.

5.2.2 DISASSEMBLY INSTRUCTIONS

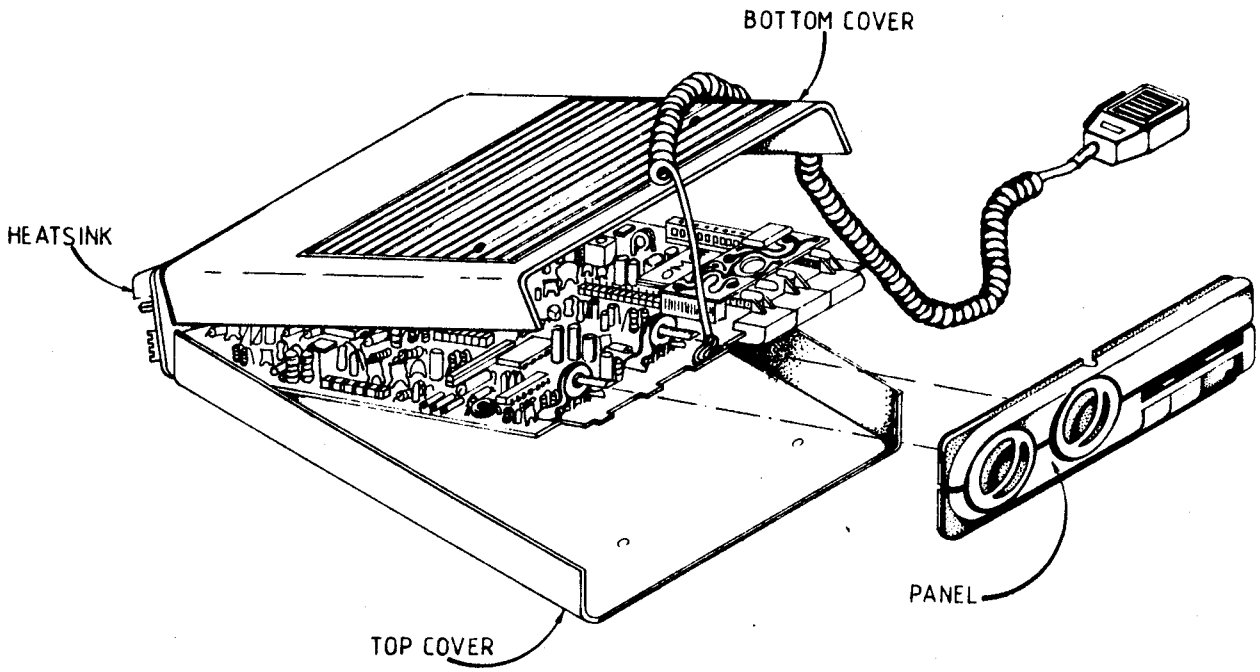


Figure 6 T530 Exploded View

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

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

5.2.2.1 To Gain Access To The Component Side Of The PCB

Place the T530 upside down on the bench.

Remove the 2 bottom cover retaining screws.

Gently lift the front end of the bottom cover until it clears the front panel.

Pull the cover forward to disengage the four small plastic lugs at the rear of the bottom cover.

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 T530 over on the bench.

Gently raise the front end of the top cover until it clears the front panel.

Pull the cover forward to disengage the 4 lugs at the rear of the cover.

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 shield cover from its position forward of the heatsink.

5.2.2.5 Speaker Removal/Refitting

The speaker in the T530 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

Note: If the PCB has been removed, it must be refitted hard up against the heatsink along its entire length, as shown in Figure 7.

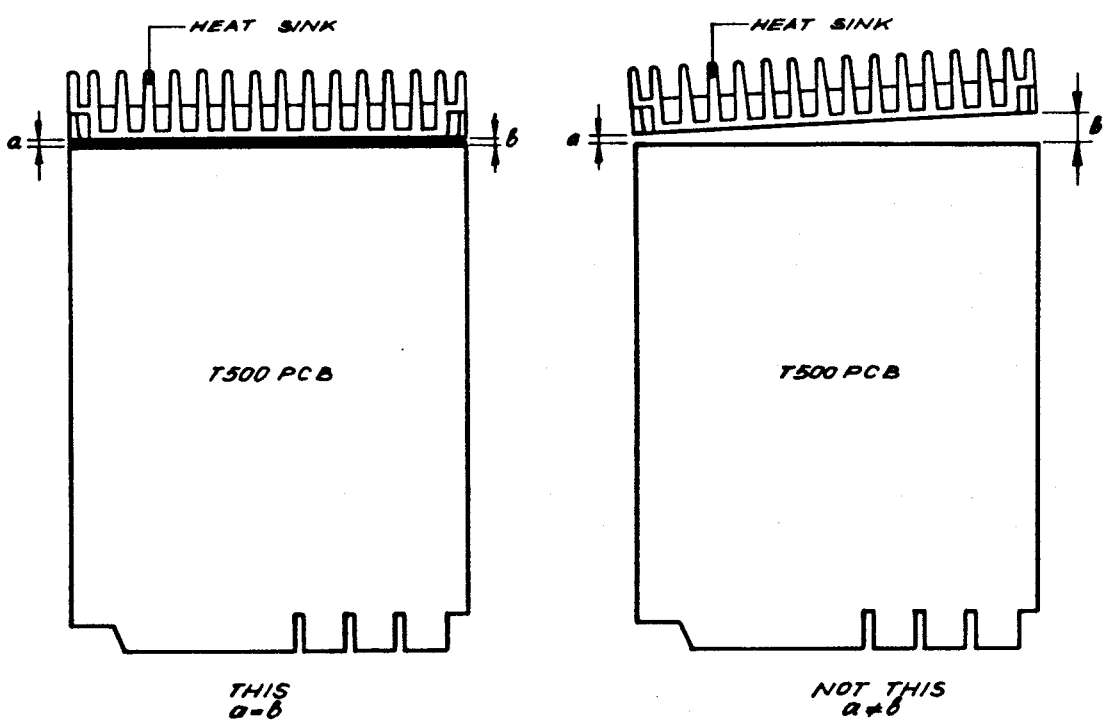


Figure 7 Fitting The Heatsink

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

Replace the PA shield.

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:

With the top cover at an angle of about 20°, slide the 4 plastic lugs at the rear of the cover into their respective slots in the heatsink.

Gently press the cover into position, taking care not to damage the 4 lugs. Ensure that the rim of the front panel fits into the groove round the front of the top cover.

Fit the bottom cover:

Invert the T530.

With the bottom cover at an angle of about 20°, slide the 4 plastic lugs into their respective slots in the heat sink.

Gently press the cover into position, taking care not to damage the 4 lugs. Ensure that the rim of the front panel fits into the groove round the front of the bottom cover.

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

5.2.5 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.

5.2.5.1 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 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 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 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. Observe polarity when fitting.

5.3.4 CHIP COMPONENT REMOVAL/REPLACEMENT

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

5.3.4.1 Component Removal

1. Place the soldering iron tip directly on the component in order to melt the solder and glue as shown in Figure 8. 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.

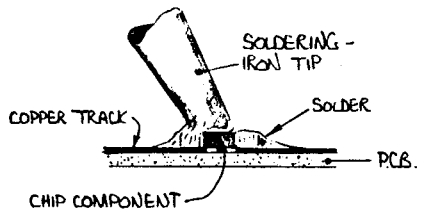


Figure 8

5.3.4.2 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 9.

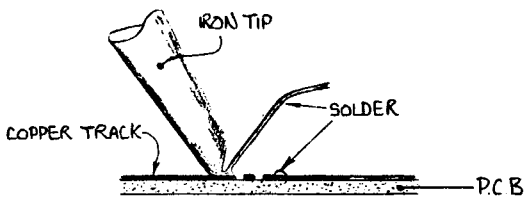


Figure 9

2. Insert the new components and apply the soldering iron tip to the PC pattern as shown in Figure 10 (a), (b) and (c).

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

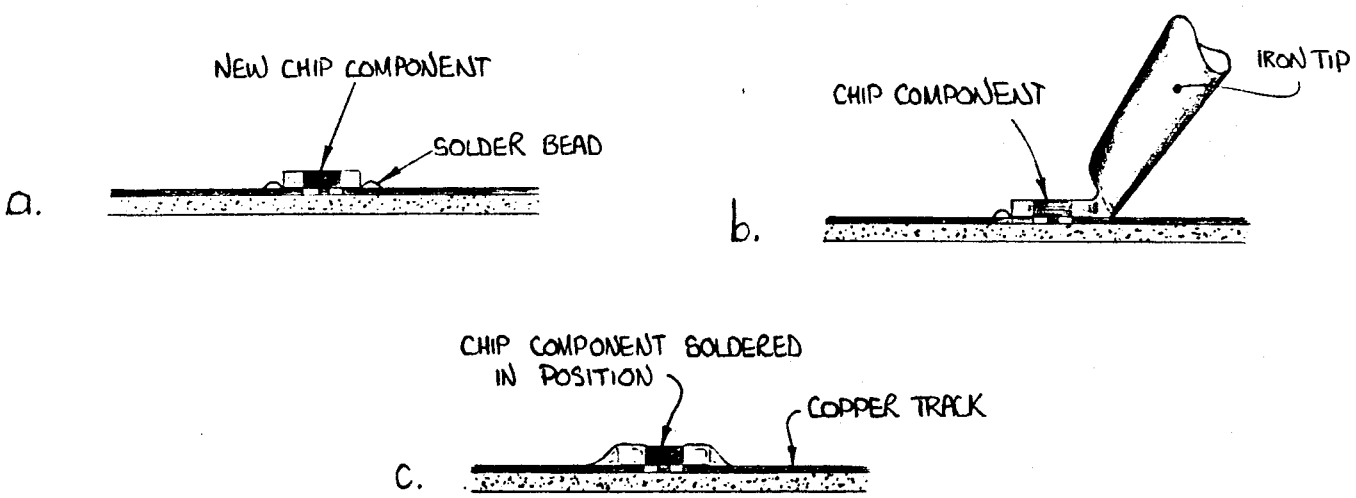


Figure 10

5.3.5 INTER BOARD CONNECTIONS

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

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 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. VHF signal generator. Good quality FM. Useable from 0.1µV (-127dBm) to 200mV (0dBm) pd. (eg. HP 8640B).
8. VHF frequency counter accurate to within 2ppm.
9. 10.7MHz Crystal marker (second harmonic gives beat for 21.4MHz IF)
10. Audio oscillator, 10Hz to 10kHz (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 T530 microphone. An adaptor should be made whch will hold the speaker and microphone close together.
12. AC millivoltmeter
13. Calibrated oscilloscope
14. Speaker 4 ohm voice coil
15. RF power attenuator, total attenuation 50dB
(eg. Weinschel 40-40-33 30dB 150W, plus Coline 1200 85 20dB 1w)
16. RF diode probe (eg.Greenpar GE 88202)

5.4.2 TUNING HINTS

1. Diagram 1 shows the test set-up for receiver and transmitter alignment.
2. For accurate tuning, the test cable connecting the signal generator or power meter to the T530 should be as short as practical and fitted with a 'mating' UHF connector. Do not use adaptors, 'sniffer' couplings, etc, which introduce changes to cable impedance and errors in test results.
3. Non-metallic tuning tools must be used for the alignment of all coil slugs to avoid the tuning errors introduced by the use of metallic tools. Tuning tools need to be of correct size to avoid the damage to slugs which results from the use of incorrect tuning tools.

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

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

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

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

7. Check the printed fuse on the PCB. Its rating is about 2 amps, and it can be replaced by a 0.1mm diameter copper link.

5.4.3 OPERATION BELOW 150MHz - VCO

When operating the T530 on frequencies below 150MHz, connect C204 (1p8) in circuit by shorting the pads.

For frequencies above 150MHz, leave C204 out of circuit.

5.4.4 CHANNEL PROGRAMMING

5.4.4.1 Reference Frequency Selection

For 12.5kHz or 25kHz channel spacing (versions /1, /3, /4, /5, /8) use a 6.25kHz reference (12.8MHz crystal).

For 30kHz channel spacing (versions /2, /6, /9) use a 5kHz reference (10.24MHz crystal).

Note: A 1p8 capacitor must be fitted in parallel with the 10.24MHz crystal.

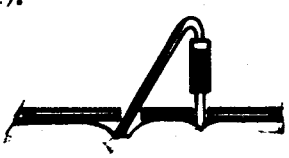
5.4.4.2 Programming

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

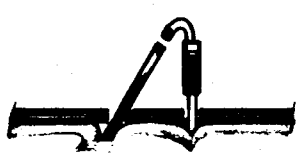
The switching range is defined by the minimum change in frequency for loop voltages between 1.75 and 6.5 volts; ie, 4MHz at the bottom of the band.

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

The programming of each of the two transmit and receive channels is accomplished by clipping diodes from each of the columns of diodes as required (see Figure 11).



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



A cut diode allows IC8 input to go high and adds the frequency increment.

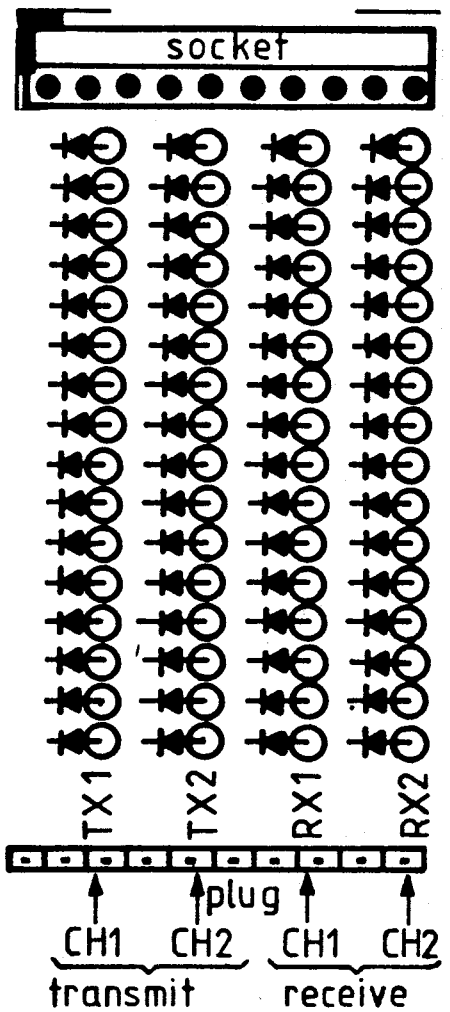
Figure 11

Table 1 shows how, when starting with A0, each successive diode influences the synthesizer frequency by a multiple of 6.25kHz or 5kHz in an ascending binary sequence. (Note that it is sometimes possible to have two correct solutions for one particular frequency).

Table 1

Frequency Increment		Code
6.25kHz Ref.	5kHz Ref.	
128MHz	102.4MHz	N9
64MHz	51.2MHz	N8
32MHz	25.6MHz	N7
16MHz	12.8MHz	N6
8MHz	6.4MHz	N5
4MHz	3.2MHz	N4
2MHz	1.6MHz	N3
1MHz	800kHz	N2
500kHz	400kHz	N1
250kHz	200kHz	N0
200kHz	160kHz	A5
100kHz	80kHz	A4
50kHz	40kHz	A3
25kHz	20kHz	A2
12.5kHz	10kHz	A1
6.25kHz	5kHz	A0

When a diode is clipped, its corresponding frequency is added to the VCO frequency.



(Viewed from component side of diode board.)

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

Example 1

Tx frequency = 153.0MHz, 6.25kHz reference frequency.

VCO frequency:	153	
Subtract	128	cut diode N9
	25	
subtract	16	cut diode N6
	9	
subtract	8	cut diode N5
	1	
subtract	1	cut diode N2
	0	

In each case subtract the largest value from Table 1 which yields a positive result.

Continue the process until zero is reached.

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

N9 + N6 + N5 + N2 = VCO
128 + 16 + 8 + 1 = 153

Example 2

Rx frequency = 147.865, 5kHz reference frequency. The receiver has a 21.4MHz IF and low side injection.

$f_{VCO} = f_{Rx} - 21.4 = 126.465$

	VCO frequency:	126.465	
	subtract	102.4	cut diode N9
		24.065	
	subtract	12.8	cut diode N6
In each case subtract		11.265	
the largest value from	subtract	6.4	cut diode N5
Table 1 which yields a		4.865	
positive result.	subtract	3.2	cut diode N4
		1.665	
	subtract	1.6	cut diode N3
Continue the process		0.065	
until zero is reached.	subtract	0.040	cut diode A3
		0.025	
	subtract	0.020	cut diode A2
		0.005	
	subtract	0.005	cut diode A0
		0.000	

Check:
N9 + N6 + N5 + N4 + N3 + A3 + A2 + A0 = VCO
102.4 + 12.8 + 6.4 + 3.2 + 1.6 + 0.040 + 0.020 + 0.005 = 126.465
126.465 + 21.4 = 147.865

Once the correct diode programme has been calculated, remove the diode matrix board from the T530 and clip diodes as required. Figure 11 shows where to cut the diode leads, and Table 1 shows the diode position on the matrix board.

Replace the diode matrix board in the T530.

5.5 VCO ALIGNMENT

5.5.1 GENERAL

Connect the T530 to the RF power meter.

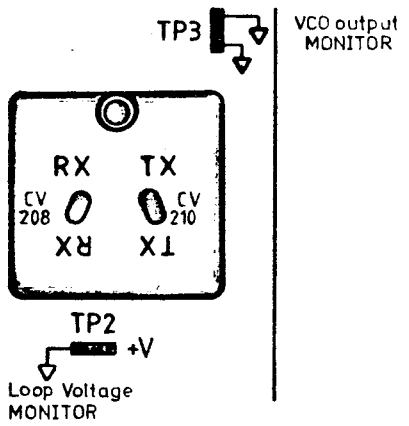
Ensure that a correctly programmed diode matrix PCB is fitted.

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).

Note: It is always necessary to set transmit (CV210) before setting the receive offset (CV208).

5.5.2 SINGLE CHANNEL OPERATION



Transmit mode (PTT switch closed):

Adjust CV210 for 4 volts at TP2.

Check the frequency at TP3.

Receive mode:

Adjust CV208 for 4 volts at TP2.

Check the frequency at TP3.

5.5.3 DUAL CHANNEL OPERATION

Transmit mode: (PTT switch closed):

Adjust CV210 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.

Receive mode:

Adjust CV208 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.

Note: A loop voltage of less than 0.5V or more than 7.5V indicates the VCO is out of lock.

5.6 REFERENCE FREQUENCY ADJUSTMENT

The 6.25kHz (5kHz) reference frequency must be accurately set. This is measured indirectly by monitoring the VCO frequency.

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

Select channel 1.

Adjust L30 for the correct VCO frequency (±100Hz).

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

5.7 TRANSMITTER ADJUSTMENTS

5.7.1 ALIGNMENT

Note 1: 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 [ ].

Note 2: On T530 PCB's prior to Issue "H", CV281 is CC281, a fixed value chip capacitor.

5.7.1.1 Single Channel Alignment

Remove the component side PA shield.

Connect a power meter to the aerial socket.

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

Close the PTT switch.

Tune CV281, CV289 and CV290 for maximum power.

Repeat the above tuning.

Set RV260 for 25W output.

Increase the capacitance of CV290 to set the total current to between 4.0 and 4.5 amps.

Readjust RV260.

Replace the PA shield.

5.7.1.2 Dual Channel Alignment

Carry out the single channel alignment procedure on the lowest frequency channel.

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

Check that the power output on the lowest frequency channel has not dropped significantly.

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

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

5.7.2 MODULATION ADJUSTMENT

Connect the T530 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 -40dBm (8mV rms) at the microphone pads.

Set the channel switch to the lowest frequency channel.

Set the modulation meter to read '-' 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 ±5kHz [±2.5kHz] deviation is not exceeded for any modulation frequency.

Remove the short from C49.

5.8 RECEIVER ALIGNMENT

Connect a signal generator modulated to ±5kHz [±2.5kHz] at 1kHz AF.

Connect a Sinad meter across the speaker terminals.

Select the lowest frequency channel.

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

Tune L19, L15, L13, L12 and L10 for best Sinad while reducing the signal generator output level to maintain approximately 12dB Sinad.

Note: The signal generator frequency must be accurately set when tuning L19.

Repeat the above tuning.

Reduce the signal generator deviation to ±3kHz [±1.5kHz].

Check that the signal generator output does not exceed -117dBm for 12dB Sinad.

For dual channel operation, readjust L10, L12 and L13 for equal sensitivity on both channels.

Note: Sensitivity will degrade towards -117dBm (worst case) as the channel separation extends to 4MHz.

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 (shown in blue), a fault can be readily pinpointed.

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 VHF signal generator to the aerial input terminal.

Set the signal generator output level to zero and the modulation to ±3kHz [±1.5kHz] 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 at about 6 to 8dB Sinad.

(b) TO CHECK THE SQUELCH RATIO

Set the signal generator output level to -107dBm (1µV), modulated to ±5kHz [±2.5kHz] deviation at 1kHz.

Replace the Sinad meter with a 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 mV/meter.

Reduce the signal generator output level to zero.

The fall in output is the 'squelch ratio' and this should be at least 70dB.

5.9.2.2 To Check The Audio Output Level

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

Connect a VHF signal generator to the aerial input socket, with the output set to -107dBm (1µV) modulated to ±5kHz [±2.5kHz] deviation at 1kHz.

Set the volume control to the onset of clipping.

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

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

The distortion should not exceed 5%.

5.9.2.3 To Check The Sinad Sensitivity

Connect a Sinad meter across the speaker terminals.

Connect the signal generator to the aerial input terminal.

Set the signal generator accurately on receive frequency. (Couple a 10.7MHz 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 ±3kHz [±1.5kHz] at 1kHz.

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

Set the signal generator output level to zero.

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

The signal generator output should not be greater than -119dBm and is typically -121dBm for single channel use or two channels separated by less than 1MHz. As the channel separation extends towards 4MHz, the Sinad sensitivity will degrade towards -117dBm.

5.9.2.4 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 0.8V ('0'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 30dB [27dB] for single channel use or two channels separated by less than 1MHz. As the channel separation extends towards 4MHz, the signal + noise to noise ratio will degrade towards 27dB [24dB].

5.9.2.5 To Check The Ultimate Signal To Noise Ratio

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

Set the signal generator to give an 'on channel' signal, modulated to ±5kHz [±2.5kHz] with a 1kHz tone.

Set the signal generator output level to -47dBm.

Connect an AC mV/meter across the speaker terminals.

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

Turn the signal generator modulation off.

Note the reading on the mV/meter.

The fall in reading when the modulation is switched off should be at least 45dB. (A low reading could be caused by a faulty IC6 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 IC2d.

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 IC2a.

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 T530 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 ±3kHz [±1.5kHz] is reached.

Check that the mV/meter reads approximately 1mV 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 T530 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 the specified bandwidth for the version of T530 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.

Within the specified bandwidth for the version of T530, the deviation should increase at the rate of 6dB/octave (+1 -3dB relative to 1kHz).

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

5.9.3.3 To Check The Power Control Circuit

Connect an RF power meter to the transmitter output.

Close the PTT switch.

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

Vary the supply voltage between 10 and 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 T530 reverts to 'receive' after approximately 1.5 minutes (+15, -45 seconds) of transmission time .

The transmission time may be set accurately by changing the value of either C16 (100µF) and/or R18 (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 8MHz.

5.9.4 SYNTHESIZER FAULT FINDING

5.9.4.1 If The VCO Gives No Output

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

Check the supply voltages at L39 (6.5V) and L48 (7.5V) for the 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 Synthesiser 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 8MHz, 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 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/D31 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 $f_{prescaler} = f_{VCO}/40$

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

Check that the input voltage of the synthesizer (pin 1) is more than 500mV pp around half-rail voltage.

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 28) 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, Q41).

5.9.4.5 Microphonics

If the set shows a high level of microphonics:

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

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

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

(d) Ensure that all screws are securely tightened.

SECTION 6 PARTS LIST

6.1 GENERAL

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 parts list printed below is for all versions of the T530. Different versions have different sub-groups. Check the version of your T530 (printed on a label on the back of the set). To find the correct part refer to the sub-groups listed for your version of the T530. The same circuit reference may be listed in more than one sub-group, but it will only be correct in the sub-group listed for your version.

VERSION	SUB-GROUPS	
1. T530B/1:	B530	T530 PCB Assembly Parts
	B530/V	T530 Preformed Vertical Parts
	C530	Add To B530 For Normal Radio
	C530/B	Add With C530/BV For 15kHz Bandwidth
	C530/BV	T530 15kHz IFBW Vertical Parts
	C530/STD	T530 Standard Audio Response Parts
	B530/MECH	T530 Mechanical Parts
	C530/M	Add To B530/MECH For Normal Radio
	C530B/1	Add To T530 For B/1 Version
	B500/LED	T500 Series LED/Xtal Assembly Parts
	C500/12.5	Parts For 12.5kHz Channel Increment
	B/TA-500/MEM	T500 Series Diode Memory Parts
	B500/MISC	T500 Series Cradle Parts
2. T530B/2:	B530	T530 PCB Assembly Parts
	B530/V	T530 Preformed Vertical Parts
	C530	Add To B530 For Normal Radio
	C530/B	Add With C530/BV For 15kHz Bandwidth
	C530/BV	T530 15kHz IFBW Vertical Parts
	C530/STD	T530 Standard Audio Response Parts
	B530/MECH	T530 Mechanical Parts
	C530/M	Add To B530/MECH For Normal Radio
	C530B/2	Add To T530 For B/2 Version
	B500/LED	T500 Series LED/Xtal Assembly Parts
	C500/5	Parts For 5kHz Channel Increment
	B/TA-500/MEM	T500 Series Diode Memory Parts
	B500/MISC	T500 Series Cradle Parts
3. T530B/2X:	B530	T530 PCB Assembly Parts
	B530/V	T530 Preformed Vertical Parts
	C530	Add To B530 For Normal Radio
	C530/B	Add With C530/BV For 15kHz Bandwidth
	C530/BV	T530 15kHz IFBW Vertical Parts
	C530/STD	T530 Standard Audio Response Parts
	B530/MECH	T530 Mechanical Parts
	C530/M	Add To B530/MECH For Normal Radio
	C530B/2X	Add To T530 For B/2X Version
	B500/LED	T500 Series LED/Xtal Assembly Parts
	C500/5	Parts For 5kHz Channel Increment
	B/TA-500/MEM	T500 Series Diode Memory Parts
	B500/MISC	T500 Series Cradle Parts

4. T530B/3:	B530	T530 PCB Assembly Parts
	B530/V	T530 Preformed Vertical Parts
	C530	Add To B530 For Normal Radio
	C530/B	Add With C530/BV For 15kHz Bandwidth
	C530/BV	T530 15kHz IFBW Vertical Parts
	C530/STD	T530 Standard Audio Response Parts
	B530/MECH	T530 Mechanical Parts
	C530/M	Add To B530/MECH For Normal Radio
	C530B/3	Add To T530 For B/3 Version
	B500/LED	T500 Series LED/Xtal Assembly Parts
	C500/12.5	Parts For 12.5kHz Channel Increment
	B/TA-500/MEM	T500 Series Diode Memory Parts
	B500/MISC	T500 Series Cradle Parts
5. T530B/4:	B530	T530 PCB Assembly Parts
	B530/V	T530 Preformed Vertical Parts
	C530	Add To B530 For Normal Radio
	C530/B	Add With C530/BV For 15kHz Bandwidth
	C530/BV	T530 15kHz IFBW Vertical Parts
	C530/AF1	T530/5 & /6 Audio Response Parts
	B530/MECH	T530 Mechanical Parts
	C530/M	Add To B530/MECH For Normal Radio
	C530B/4	Add To T530 For B/4 Version
	B500/LED	T500 Series LED/Xtal Assembly Parts
	C500/12.5	Parts For 12.5kHz Channel Increment
	B/TA-500/MEM	T500 Series Diode Memory Parts
	B500/MISC	T500 Series Cradle Parts
6. T530B/5:	B530	T530 PCB Assembly Parts
	B530/V	T530 Preformed Vertical Parts
	C530	Add To B530 For Normal Radio
	C530/B	Add With C530/BV For 15kHz Bandwidth
	C530/BV	T530 15kHz IFBW Vertical Parts
	C530/AF1	T530/5 & /6 Audio Response Parts
	B530/MECH	T530 Mechanical Parts
	C530/M	Add To B530/MECH For Normal Radio
	C530B/5	Add To T530 For B/5 Version
	B500/LED	T500 Series LED/Xtal Assembly Parts
	C500/12.5	Parts For 12.5kHz Channel Increment
	B/TA-500/MEM	T500 Series Diode Memory Parts
	B500/MISC	T500 Series Cradle Parts
7. T530B/6:	B530	T530 PCB Assembly Parts
	B530/V	T530 Preformed Vertical Parts
	C530	Add To B530 For Normal Radio
	C530/B	Add With C530/BV For 15kHz Bandwidth
	C530/BV	T530 15kHz IFBW Vertical Parts
	C530/AF1	T530/5 & /6 Audio Response Parts
	B530/MECH	T530 Mechanical Parts
	C530/M	Add To B530/MECH For Normal Radio
	C530B/6	Add To T530 For B/6 Version
	B/TA-500/XO	T500 Series LED, Xtal Heater Parts
	C500/5	Parts For 5kHz Channel Increment
	B/TA-500/MEM	T500 Series Diode Memory Parts
	B500/MISC	T500 Series Cradle Parts

8. T530B/7:	B530	T530 PCB Assembly Parts
	B530/V	T530 Preformed Vertical Parts
	C530	Add To B530 For Normal Radio
	C530/B	Add With C530/BV For 15kHz Bandwidth
	C530/BV	T530 15kHz IFBW Vertical Parts
	C530/AF1	T530/5 & /6 Audio Response Parts
	B530/MECH	T530 Mechanical Parts
	C530/M	Add To B530/MECH For Normal Radio
	C530B/7	Add To T530 For B/7 Version
	B500/LED	T500 Series LED/Xtal Assembly Parts
	C500/12.5	Parts For 12.5kHz Channel Increment
	B/TA-500/MEM	T500 Series Diode Memory Parts
	B500/MISC	T500 Series Cradle Parts
9. T530B/9:	B530	T530 PCB Assembly Parts
	B530/V	T530 Preformed Vertical Parts
	C530	Add To B530 For Normal Radio
	C530/B	Add With C530/BV For 15kHz Bandwidth
	C530/BV	T530 15kHz IFBW Vertical Parts
	C530/STD	T530 Standard Audio Response Parts
	B530/MECH	T530 Mechanical Parts
	C530/M	Add To B530/MECH For Normal Radio
	C530B/9	Add To T530 For B/9 Version
	B/TA-500/XO	T500 Series LED, Xtal Heater Parts
	C500/5	Parts For 5kHz Channel Increment
	B/TA-500/MEM	T500 Series Diode Memory Parts
	B500/MISC	T500 Series Cradle Parts
10. T530C/3:	B530	T530 PCB Assembly Parts
	B530/V	T530 Preformed Vertical Parts
	C530	Add To B530 For Normal Radio
	C530/C	Add With C530/CV For 7.5kHz Bandwidth
	C530/CV	T530 7.5kHz IFBW Vertical Parts
	C530/STD	T530 Standard Audio Response Parts
	B530/MECH	T530 Mechanical Parts
	C530/M	Add To B530/MECH For Normal Radio
	C530C/3	Add To T530 For C/3 Version
	B500/LED	T500 Series LED/Xtal Assembly Parts
	C500/12.5	Parts For 12.5kHz Channel Increment
	B/TA-500/MEM	T500 Series Diode Memory Parts
	B500/MISC	T500 Series Cradle Parts
11. T530C/3X:	B530	T530 PCB Assembly Parts
	B530/V	T530 Preformed Vertical Parts
	C530	Add To B530 For Normal Radio
	C530/C	Add With C530/CV For 7.5kHz Bandwidth
	C530/CV	T530 7.5kHz IFBW Vertical Parts
	C530/STD	T530 Standard Audio Response Parts
	B530/MECH	T530 Mechanical Parts
	C530/M	Add To B530/MECH For Normal Radio
	C530C/3X	Add To T530 For C/3X Version
	B500/LED	T500 Series LED/Xtal Assembly Parts
	C500/12.5	Parts For 12.5kHz Channel Increment
	B/TA-500/MEM	T500 Series Diode Memory Parts
	B500/MISC	T500 Series Cradle Parts

12. T530C/8:

B530	T530 PCB Assembly Parts
B530/V	T530 Preformed Vertical Parts
C530	Add To B530 For Normal Radio
C530/C	Add With C530/CV For 7.5kHz Bandwidth
C530/CV	T530 7.5kHz IFBW Vertical Parts
C530/AF2	T530/8 Audio Response Parts
B530/MECH	T530 Mechanical Parts
C530/M	Add To B530/MECH For Normal Radio
C530C/8	Add To T530 For C/8 Version
B500/LED	T500 Series LED/Xtal Assembly Parts
C500/12.5	Parts For 12.5kHz Channel Increment
B/TA-500/MEM	T500 Series Diode Memory Parts
B500/MISC	T500 Series Cradle Parts

6.2 B530 T530 PCB ASSEMBLY BASIC PARTS

6.2.1 TRANSISTORS

	INTERNAL PART NO.	QTY/SET	DESCRIPTION	REFERENCE		CH/N
	CCT DIAGRAM A1C506					
	0 0 0 0 0 0 1 0 6 0	2	BC327 TRANSISTOR	Q4, Q5		
	0 0 0 0 0 0 1 1 1 0	11	BC548B TRANSISTOR	Q1, Q2, Q7, Q10, Q19, Q20 Q27, Q29, Q32, Q41, Q42		
	0 0 0 0 0 0 1 1 3 0	7	BC557B TRANSISTOR	Q6, Q11, Q25, Q26, Q28, Q30 Q31		
	0 0 0 0 0 0 1 1 7 0	2	BD136 TRANSISTOR	Q3, Q43		
	0 0 0 0 0 0 2 2 3 0	1	2N4427 TRANSISTOR	Q44		
*	0 0 0 0 0 0 2 3 1 3	1	MRF237 TRANSISTOR 2 3 4 Q45	Q45		
	0 0 0 0 0 0 2 3 2 3	1	SRFH1001 TRANSISTOR	Q46		
	0 0 0 0 0 0 3 1 1 0	1	BF961 TRANSISTOR	Q18		
	0 0 0 0 0 0 3 1 7 5	1	3SK97K TRANSISTOR	Q36		
	0 0 0 0 0 0 3 1 9 5	1	MPS 3646 TRANSISTOR	Q40		
	0 0 0 0 0 0 3 3 1 0	4	J310 TRANSISTOR	Q15, Q16, Q17, Q35		

6.2.2 DIODES

	0 0 1 0 0 0 1 0 2 6	2	BA482 DIODE	D47, D48		
	0 0 1 0 0 0 1 1 6 0	1	SR2607 DIODE	D1		
	0 0 1 0 0 0 1 2 0 0	7	1N4148 DIODE	D8, D20, D31, D42, D43 D44, D45		
	0 0 1 0 0 0 1 2 5 3	2	BB405 VARICAP DIODE	D35, D37		
	0 0 8 0 0 0 1 0 1 3	1	LED TLY124 YELLOW LESS MTG	L10		15/5-86

6.2.3 INTEGRATED CIRCUITS

	0 0 2 0 0 0 1 3 7 0	1	TDA 1020 INT CCT	IC4		
	0 0 2 0 0 0 1 4 4 0	1	MLM324 INT CCT	IC2		

0	0	2	0	0	0	1	4	7	0	1	MC 3357 INT CCT	Ic6		
0	0	2	0	0	0	1	4	9	1	1	400173 INT CCT	Ic1		
0	0	2	0	0	0	1	5	7	0	1	4066 INT CCT	Ic3		
0	0	2	0	0	0	1	7	5	5	1	SP 8793 INT CCT	Ic9		
0	0	2	0	0	0	1	7	6	0	1	MC145152 INT CCT	Ic8		

6.2.4 CAPACITORS

0	1	1	0	0	5	0	0	0	1	2	0P5 CAP P100 ±0.25P 50V CERAMIC	, C209, C288		86/01-197
0	1	1	0	1	1	8	0	0	1	1	1P8 CAP NPO ±0.25P 50/63V CERAMIC	C204		
0	1	1	0	1	2	7	0	0	1	1	2P7 CAP NPO ±0.5 P 50/63V CERAMIC	C115		
0	1	0	0	2	1	8	0	0	1	1	18P CAP NPO 500V 5% CERAMIC	C299		86/10-317
0	1	1	0	1	3	3	0	0	1	1	3P3 CAP NPO ±0.5P 50/63V CERAMIC	C191		
0	1	1	0	1	4	7	0	0	1	5	4P7 CAP NPO ±0.5P 50/63V CERAMIC	C101, C107, C211, C213 C251		
0	1	1	0	1	6	8	0	0	1	1	6P8 CAP NPO ±0.5P 50/63V CERAMIC	C103		
0	1	1	0	1	8	2	0	0	1	1	8P2 CAP NPO ±0.5P 50/63V CERAMIC	C100	REF	C530/5???
0	1	1	0	1	8	2	0	0	6	1	8P2 CAP N750 ±0.5P 50/63V CERAMIC	C206		
0	1	1	0	2	1	0	0	0	1	2	10P CAP NPO ±0.5P 50/63V CERAMIC	, C117, C255,		
0	1	1	0	2	1	2	0	0	1	1	12P CAP NPO 5% 50/63V CERAMIC	C116		
0	1	1	0	2	1	5	0	0	1	2	15P CAP NPO 5% 50/63V CERAMIC	C250, C118		
0	1	1	0	2	1	5	0	0	6	1	15P CAP N750 5% 50/63V CERAMIC	C174		
0	1	1	0	2	1	8	0	0	1	4	18P CAP N150 5% 50/63V CERAMIC	C281A, C109, C273, C102		85/12-428
0	1	1	0	2	2	2	0	0	1	2	22P CAP N150 5% 50/63V CERAMIC	C132, ... C274		
0	1	1	0	2	2	2	0	0	6	1	22P CAP N750 5% 63V CERAMIC	C173		84/11-324
0	1	1	0	2	2	7	0	0	1	4	27P CAP N150 5% 50/63V CERAMIC	C110, C111, , C257, C229		86/10-299
0	1	1	0	2	3	3	0	0	1	2	33P CAP N150 5% 50/63V CERAMIC	C63, C228		85/9-346
0	1	1	0	2	3	9	0	0	1	2	39P CAP N150 5% 50/63V CERAMIC	C258, C259		
0	1	1	0	2	4	7	0	0	1	2	47P CAP N150 5% 50/63V CERAMIC	C48, C133,		85/9-346
0	1	1	0	2	5	6	0	0	1	1	56P CAP N150 5% 50/63V CERAMIC	C67		
0	1	1	0	2	6	8	0	0	1	1	68P CAP N150 5% 50/63V CERAMIC	C57		85/12-435
0	1	1	0	3	1	0	0	0	1	4	100P CAP N150 5% 50/63V CERAMIC	C45, C46, C135, C183		85/7-247 382-016
0	1	1	0	3	1	2	0	0	1	2	120P CAP N150 5% 50/63V CERAMIC	C119, C120		
0	1	1	0	3	1	5	0	0	1	4	150P CAP N150 5% 50/63V CERAMIC	C15, C40, C137, C261		
0	1	1	0	3	2	2	0	0	1	4	220P CAP N750 10% 50/63V CERAMIC	C129, C122, C172, C262		86/07-162
0	1	1	0	3	4	7	0	0	2	3	470P CAP T/C B 10% 50/63V CERAMIC	C83, C114, C175		
0	1	1	0	4	1	0	0	0	1	13	1n CAP T/C B, 10% 63V CERAMIC	C7, C190, C207, C212, C214 C223, C227, C254, C246, , C271, C277 C215, C11		85/12-428 86/10 3:7 85/01-012

0 1 1 0 4 4 7 0 1 3	28	4n7 CAP T/C B 10% 50V CERAMIC DISC	C1, C3, C6, C8, C42, C65, , C104, C106, C121 C126, C127, C128 C131, C134, , C179, C185, C188 C220, C222, C225, C226 C252, C256, C260, C268 C286, C287, C56		85/1-008 86/09-162 85/07-249 86/04-087 85/01-011
0 1 5 0 2 4 7 0 0 1	2	47P CAP N150 5% CHIP 3.2×1.6mm	CC276, CC280,		85/12-428
0 1 5 0 3 1 0 0 0 1	1	100P CAP N150 5% CHIP 3.2×1.6mm	CC275		
0 1 5 0 3 2 7 0 0 2	1	270P CAP NP0 5% 100V CHIP HiQ. 3.2×2.54mm	CC282,		
0 1 5 0 4 1 0 0 0 4	2	1n CAP T/C B 10% 50V CHIP 3.2×1.6mm	CC272, CC265		85/12-428
0 1 5 1 2 1 5 0 0 1	2	15P CAP 200V WEDGE 5×0.9mm	C293, C297		
0 1 5 1 2 1 8 0 0 1	1	18P CAP 200V WEDGE 5×0.9mm	C291		
0 1 5 1 2 3 0 0 0 1	2	30P CAP 200V WEDGE 5×0.9mm	C294, C296		
0 1 5 1 2 3 3 0 0 1	1	33P CAP 200V WEDGE 5×0.9mm	C295		
0 1 5 1 4 1 0 0 0 1	1	1n CAP 200V WEDGE 5×0.9mm	C292		
0 1 7 1 5 4 7 0 0 1	1	47N CAP 50V SURFACE BARRIER	C298		86/10 317
0 2 0 0 7 1 0 0 0 2	6	1µ CAP 50V ELECTRO 5×11mm	C4, C17 C41, C75, C76, C77		86/4-073 85/8-270
0 2 0 0 7 3 3 0 0 1	1	3µ3 CAP 50V ELECTRO 5×11mm	C143		
0 2 0 0 8 1 0 0 0 3	4	10µ CAP 50V ELECTRO 5×11mm	C113, C186, C189, C253,		
0 2 0 0 8 4 7 0 0 2	11	47µ CAP 16V ELECTRO 6×11mm	C5, C44, C49, C80, C130 C171, C177, C178, C182, C285 C269		
0 2 0 0 9 1 0 0 0 3	1	100µ CAP 16V ELECTRO 8×11mm	C16		
0 2 0 0 9 2 2 0 0 1	1	220µ CAP 16V ELECTRO 10×12.5mm	C82		
0 2 0 1 9 1 0 0 0 2	2	1000µ CAP 16V ELECTRO 12×25mm	C2, C9		
0 2 2 0 4 2 2 0 0 1	2	2n2 CAP 50V MYLAR	C50, C78		85/1-008
0 2 2 0 4 4 7 0 0 1	1	4n7 CAP 50V MYLAR	C181		
0 2 2 0 5 1 0 0 0 1	5	10n CAP 50V MYLAR	C66, C187 C209, C270, C267	REF	86/10 317 C530/61D
0 2 2 0 5 1 5 0 0 1	1	15n CAP 50V MYLAR	C53		85/1-008
0 2 2 0 5 2 2 0 0 1	2	22n CAP 50V MYLAR	C47, , C61		85/1-008 85/3-091
0 2 2 0 5 4 7 0 0 1	10	47n CAP 50V MYLAR	C43, C54, C55, C68, C112 C136, C144, C170, C180, C221		
0 2 2 0 5 6 8 0 0 2	1	68n CAP 50V MYLAR	C62		85/1-008
0 2 2 0 6 1 0 0 0 1	2	100n CAP 50V MYLAR	C81, C284		
0 2 2 0 7 1 0 0 0 2	1	1µ CAP 50V MYLAR	C176		
0 2 8 0 1 7 0 0 0 2	2	2-7P TRIM CAP, TOP ADJUST, BLUE (MUR TZ)	CV208, CV210		
0 2 8 0 2 3 0 0 0 3	1	5-30P TRIM CAP N750 GREEN MURATA TZ	CV281		85/12-428
0 2 8 0 2 6 0 0 0 1	2	5-60P TRIM CAP 2TTG PHILIPS	CV289, CV290		

6.2.5 RESISTORS

0300247000	2	47E RESISTOR 5% C/F 7x2.5mm	TR101, R232	
0300310000	2	100E RESISTOR 5% C/F 7x2.5mm	TR186, R234	
0300315000	1	150E RESISTOR 5% C/F 7x2.5mm	R110	
0300322000	1	220E RESISTOR 5% C/F 7x2.5mm	TR15	
0300347000	1	470E RESISTOR 5% C/F 7x2.5mm	R197	
0300368000	1	680E RESISTOR 5% C/F 7x2.5mm	R40,	86/06-157
0300410000	6	1K RESISTOR 5% C/F 7x2.5mm	TR17, TR177, R225, R231 R43, R264	86/11-530 85/8-294 86/10-317
0300415000	1	1K5 RESISTOR 5% C/F 7x2.5mm	TR220	
0300418000	1	1K8 RESISTOR 5% C/F 7x2.5mm	R198	85/3-075
0300422000	2	2K2 RESISTOR 5% C/F 7x2.5mm	TR11, TR118,	
0300447000	5	4K7 RESISTOR 5% C/F 7x2.5mm	TR27, TR29, TR226, R273 R66	85/3-075 86/11-530 85/1-008
0300510000	5	10K RESISTOR 5% C/F 7x2.5mm	TR119, R146, R176, R179 , TR121	
0300522000	2	22K RESISTOR 5% C/F 7x2.5mm	R20, TR195,	
				85/1-008
				86/06-157
0300547000	7	47K RESISTOR 5% C/F 7x2.5mm	TR25, TR46, R67, R68, R120 R181, R185	
0300610000	2	100K RESISTOR 5% C/F 7x2.5mm	TR64, TR205	
0300615000	1	150K RESISTOR 5% C/F 7x2.5mm	R70	85/8-294
0300710000	1	1M RESISTOR 5% C/F 7x2.5mm	TR28	
0323210000	1	10 E RESISTOR 5% M/F 10x 4 mm	TR271 (MOUNTED UNDER PCB)	86/10-317
0323318000	1	180 E RESISTOR 5% M/F 10x4mm	R269	86/10-317
0400510013	1	10K LOG POT, LESS SW, PCB MTG	RV85 (VOL) (POT MARKED '10KA')	
0400510014	1	10K LIN POT, LESS SW, PCB MTG	RV150 (SQUELCH) (POT MARKED '10KB')	
0420422001	2	2K2 PRE-SET RES 10mm FLAT C/F	RV79, RV260	

6.2.6 COILS

0520813215	1	COIL A/W 1.5T/2.3mm HOR	L58	
0520813015	2	COIL A/W 1.5T/3mm HOR	L38, L70	86/10-317
0520813045	1	COIL A/W 4.5T/3mm HOR	L64	
0520813055	1	COIL A/W 5.5T/3mm HOR	L55	
0520813515	1	COIL A/W 1.5T/3.5mm HOR	, L77	
0520813555	2	COIL A/W 5.5T/3.5mm HOR	L79, L80	
0520813565	1	COIL A/W 6.5T/3.5mm HOR	L56	
0520814015	1	COIL A/W 1.5T/4.0mm HOR	L65	85/9-319
0520814025	1	COIL A/W 2.5T/4.0mm HOR	L57	85/7-250
0520814035	1	COIL A/W 3.5T/4mm HOR	L74, L63	86/10-317

052081602 5	2	COIL A/W 2.5T/6mm HOR	L78, L81
052081604 5	1	COIL A/W 4.5T/6mm HOR	L48
050000016 1 7	1	COIL TAIT No 617	L30
050000016 2 3	4	COIL TAIT No 623	L10, L12, L13, L15
050000016 3 3	1	COIL TAIT No 633	L37
056000010 1 7	1	FXD IND TAIT NO. 17 6T 38	L75 (VERT MTG)
056000021 0 0	2	FXD IND 3.3μH (HOR)	L18, L32
056000021 0 1	5	FXD IND 1.5μH (HOR)	L11, L35, L36, L39, L46, (L1 refer to C530)
056000021 0 2	1	FXD IND 100μH (HOR)	L45
056000021 0 7	1	FXD IND 33μH (HOR)	L20
056000021 1 0	2	FXD IND 3.3μH VERT MTG.	L14, L31
056000021 1 1	1	FXD IND 1.5μH VERT MTG.	L47
065000100 1	1	FERRITE BEAD 3B	L69
065000100 4	2	FERRITE BEAD 4×2×5mm F8	, , L67, L68

6.2.7 MISCELLANEOUS

200000100 4	30mm	TINNED COPPER WIRE 0.7mm	LINK IN P.A FROM 13.8V TO COLLECTOR OF FINAL TRANSISTOR
220000109 6	1	PRINTED CCT BOARD	ISSUE 'I'
	2	~~SWITCH, PUSH, DPDT, LATCHING, PCB MTG~~	~~SW1 – 3~~ refer C530
	1	~~SWITCH, PUSH, DPDT MOMENTARY LESS BUTTON~~	~~SW2~~ refer C530
237000102 3	1	RELAY, DPDT. 9V 14PIN DIL	P/2.
240000205 8	2	PLUG 5WAY HEADER	
240000205 9	2	PLUG 3 WAY HEADER	TEST POINTS (Also refer C530)
	1	~~PLUG 10 WAY HEADER~~	refer C530
240040205 7	1	SOCKET 10WAY TOP ENTRY, PCB MTG.	
274000100 2	1	CRYSTAL 20.945MHZ TO-15	
276000101 2	1	CERAMIC DISCRIMINATOR CDB455C7	CD1
356000102 7	100	HARWIN TRACK PINS	
	17	~~PIN 1.3mm PCB MOUNTING~~	refer to C530
362000100 8	1	SIL PAD	UNDER Q44
400000200 5	7mm	SLEEVING 1.5mm SILICON RUBBER	REQUIRED FOR LINK

6.3 B530V T530 VERTICALLY MOUNTED PARTS

6.3.1 DIODES

001000120 0	12	1N4148 DIODE	D2, D6, D7, D15, D16, D23, D24, D25, D26, D30, D40, D41

0010001266	1	HP5082-3080 PIN LO PWR DIODE	D36		85/12-447
0010001345	1	1S597-2 DIODE	D50		
0010001509	1	BZX79/C3V9 ZENER	D3		
0010001511	1	BZX79/C5V1 ZENER	D46		
0010001513	1	BZX79/C6V2 ZENER	D22		

6.3.2 RESISTORS

0300000000	2	0E RESISTOR 5% C/F 7x2.5mm	(D9), R60		86/8-209 86/4-073
0301220000	1	2E2 RESISTOR 5% C/F 7x2.5mm	R89		
0301820000	1	8E2 RESISTOR 5% C/F 7x2.5mm	R251		
0302330000	2	33E RESISTOR 5% C/F 7x2.5mm	R256, R267		
0302470000	4	47E RESISTOR 5% C/F 7x2.5mm	R100, R229, R233, R257		
0303180000	2	180E RESISTOR 5% C/F 7x2.5mm	R265, R266		
0303330000	4	330E RESISTOR 5% C/F 7x2.5mm	R103, R109, R201, R230		
0303470000	1	470E RESISTOR 5% C/F 7x2.5mm	R206		84/11-530
0303560000	2	560E RESISTOR 5% C/F 7x2.5mm	R250, R252		
0303680000	5	680E RESISTOR 5% C/F 7x2.5mm	R35, R10, R44, , R262 R263		86/06-167
0304100000	7	1K RESISTOR 5% C/F 7x2.5mm	R8, R52, R173, , R188 R258, R3, R84		86/5-008 85/3-027 84/11-530 85/8-294
0304120000	3	1K2 RESISTOR 5% C/F 7x2.5mm	R2, R253, R259		
0304150000	5	1K5 RESISTOR 5% C/F 7x2.5mm	R115, R116, R218, R219 R221		
0304220000	11	2K2 RESISTOR 5% C/F 7x2.5mm	R9, R16, R41, R45, R73, R145, R226, R255 R261, R104, R105		85/1-008
0304330000	1	3K3 RESISTOR 5% C/F 7x2.5mm	R175		86/05-104
0304390000	1	3K9 RESISTOR 5% C/F 7x2.5mm	R7		
0304470000	9	4K7 RESISTOR 5% C/F 7x2.5mm	R1, R6, R21, R63, R80 R148, R170, R174, R254		
0304560000	1	5K6 RESISTOR 5% C/F 7x2.5mm	R71		85/1-008
0304680000	1	6K8 RESISTOR 5% C/F 7x2.5mm	, R199	REF	C530/STD
0304820000	3	8K2 RESISTOR 5% C/F 7x2.5mm	R183, R184, R227		
0305100000	10	10K RESISTOR 5% C/F 7x2.5mm	R30, R42, R47, R53, R54 , R142, R144 R176, R187, R196	REF	C530/STD 85/1-008
0305150000	2	15K RESISTOR 5% C/F 7x2.5mm	R75, , R275	REF	C530/STD
0305220000	9	22K RESISTOR 5% C/F 7x2.5mm	R61, R102, R172, R190 R200, R207, R208, R272 R274		
0305330000	1	33K RESISTOR 5% C/F 7x2.5mm	R50		

0	3	0	0	5	3	9	0	0	0	2	39K RESISTOR 5% C/F 7×2·5mm	, R86, R180	Ref	C530/STD
0	3	0	0	5	4	7	0	0	0	4	47K RESISTOR 5% C/F 7×2·5mm	R4, R31, R83, R88		85/3-071
0	3	0	0	6	1	0	0	0	0	3	100K RESISTOR 5% C/F 7×2·5mm	R19, R82, R97		
0	3	0	0	6	1	2	0	0	0	1	120K RESISTOR 5% C/F 7×2·5mm	R26		
														85/3-284
0	3	0	0	6	2	2	0	0	0	1	220K RESISTOR 5% C/F 7×2·5mm	R117		
0	3	0	0	6	4	7	0	0	0	8	470K RESISTOR 5% C/F 7×2·5mm	R48, R49, R51, R65, R72, R143, R171, R189		
0	3	0	0	7	1	0	0	0	0	2	1M RESISTOR 5% C/F 7×2·5mm	R18, R62		
0	3	2	3	2	1	0	0	0	0	1	10E RESISTOR 5% M/F 10×4mm	R270		

6.4 C530 ADD TO B530 FOR STANDARD RADIO

0	1	1	0	0	5	0	0	0	1	1	0P5 CAP P100 50V TOL ·25P CER	C108	86/06-151
0	3	0	0	3	6	8	0	0	0	2	680E RES. 7×2·5mm 5% C/F	R32, R215	86/06-153
0	3	0	0	5	3	9	0	0	0	1	39K RES. 7×2·5mm 5% C/F	R81	86/06-157
0	5	6	0	0	0	2	1	0	1	1	FXD IND 1·5μH (HOR)	L1	
2	3	2	0	0	0	1	0	1	9	2	SWITCH, PUSH, DPDT, LATCHING, PCB MTG	SW1, SW3 (POWER CHANNEL)	
2	3	2	0	0	0	1	0	2	0	1	SWITCH, PUSH, DPDT, MOMENTARY, PCB MTG	SW2 (CALL)	
2	4	0	0	0	0	2	0	5	9	1	PLUG 3WAY 1ROW PCB MTG HEADER		
2	4	0	0	0	0	2	0	6	0	1	PLUG 18WAY 1ROW PCB MTG HEADER		
3	5	6	0	0	0	2	0	2	3	17	PIN 1·5mm PCB MTG		

6.5 C530/B T530 15kHz BANDWIDTH PARTS

0	1	1	0	1	6	8	0	0	1	1	6P8 CAP ±0·5P NP0 50/63V CERAMIC	C125	
0	1	1	0	4	1	0	0	0	1	1	1n CAP T/C B 10% 63V CERAMIC	C142	
0	2	2	0	4	3	3	0	0	1	2	3n3 CAP 50V MYLAR	C140, C141	
0	3	0	0	4	5	6	0	0	0	1	5K6 RESISTOR 5% C/F 7×2·5mm	R106	
0	3	0	0	4	8	2	0	0	0	1	6K2 RESISTOR 5% C/F 7×2·5mm	R149	
0	5	0	0	0	0	1	6	3	0	1	COIL TRIT No 630	L19	
2	7	6	0	0	0	1	0	1	4	1	CERAMIC FILTER CFW465E	CF1	
2	7	6	0	0	0	1	0	4	3	1	CRYSTAL FILTER 21·4MHz 15KHz B/W	XF1	

6.6 C530/BV T530 15kHz IFBW VERTICALLY MOUNTED PARTS

0	3	0	0	3	3	3	0	0	0	1	330E RESISTOR 5% C/F 7×2·5mm	R141	
0	3	0	0	3	6	8	0	0	0	1	680E RESISTOR 5% C/F 7×2·5mm	R122	
0	3	0	0	4	2	2	0	0	0	1	2K2 RESISTOR 5% C/F 7×2·5mm	R108	

0304700	1	4K7 RESISTOR 5% C/F 7×2.5mm	R107	
0306200	1	120K RESISTOR 5% C/F 7×2.5mm	R140	
0306700	1	270K RESISTOR 5% C/F 7×2.5mm	R147	

6.7 C530/C T530 7.5kHz BANDWIDTH PARTS

0110215001	1	15P CAP NPO 5% 50/63V CERAMIC	C125
0104703	3	4n7 CAP T/C 8 10% 50V CERAMIC	C140, C141, C142
0304700	1	2K7 RESISTOR 5% C/F 7×2.5mm	R106
0305200	1	12K RESISTOR 5% C/F 7×2.5mm	R149
0500016 29	1	COIL TRIT No 629	L19
2760001013	1	CERAMIC FILTER CFW455G	CF1
2760001044	1	CRYSTAL FILTER 21.4MHz 7.5KHz B/W	XF1

6.8 C530/CV T530 7.5kHz IFBW VERTICALLY MOUNTED PARTS

0303900	1	390E RESISTOR 5% C/F 7×2.5mm	R141
0304100	1	1K RESISTOR 5% C/F 7×2.5mm	R122
0304200	1	1K2 RESISTOR 5% C/F 7×2.5mm	R108
0304700	1	2K7 RESISTOR 5% C/F 7×2.5mm	R107
0306500	1	150K RESISTOR 5% C/F 7×2.5mm	R140
0306800	1	180K RESISTOR 5% C/F 7×2.5mm	R147

6.9 C530/STD T530 STANDARD AUDIO RESPONSE PARTS

0118201	1	8P2 CAP NPO ±0.5P 50/63V CERAMIC	C66
0220510001	2	10n CAP 50V MYLAR	C51, C52
0304680	1	6K8 RESISTOR 5% C/F 7×2.5mm	R74
0305100	1	10K RESISTOR 5% C/F 7×2.5mm	R76
0305150	1	15K RESISTOR 5% C/F 7×2.5mm	R77
0305390	1	39K RESISTOR 5% C/F 7×2.5mm	R78

6.10 C530/AF1 T530/5 & /6 AUDIO RESPONSE PARTS

0220510001	1	10n CAP 50V MYLAR	C51	35/11-417
0220522001	1	22n CAP 50V MYLAR	C52	35/11-417
0304680	2	6K8 RESISTOR 5% C/F 7×2.5mm	R74, R76	35/11-417
				35/11-417

0300512000	1	12K RESISTOR 5% C/F 7x2.5mm	R77	85/11-417
0300547000	1	47K RESISTOR 5% C/F 7x2.5mm	R78	85/11-417

6.11 C530/AF2 T530/8 AUDIO RESPONSE PARTS

0110215001	1	15p CAP NPO 5% 50/63V CERAMIC	C66	85/11-417
0220510001	2	10n CAP 50V MYLAR	C51, C52	
0300482000	1	8K2 RESISTOR 5% C/F 7x2.5mm	R74	
0300512000	1	12K RESISTOR 5% C/F 7x2.5mm	R76	
0300518000	1	18K RESISTOR 5% C/F 7x2.5mm	R77	
0300556000	1	56K RESISTOR 5% C/F 7x2.5mm	R78	

6.12 C500/5 T530 5kHz CHANNEL INCREMENT PARTS

2740001008	1	CRYSTAL 10.24MHz TE9	X3 FITTED TO 'LED ASSY'	
0110118001	1	18p CAP P100 ±.25P 50/63V CERAMIC	C300 - MOUNT IN ADJACENT UNUSED XTAL HOLES	86/07-195 85/4-309

6.13 C500/12.5 T530 12.5kHz CHANNEL INCREMENT PARTS

2740001007	1	CRYSTAL 12.8MHz TE9	X3 FITTED TO 'LED ASSY'	

6.14 B530/MECH T530 MECHANICAL PARTS

0120410001	2	1n CAP, CERAMIC FEED THRU, LEADLESS	C298, C299	
0650001007	2	FERRITE BEAD 5x2x4mm 4S3 RED	L98, L99	
2010000304	90mm	WIRE 7/0.2mm PVC YELLOW	90mm PCB/SPKR CONNECTOR	
2010000401 2	80mm	WIRE 0.5mm² PVC RED (16/0.2 OR 10/0.25)	80mm PCB/POWER CONNECTOR	86/7-227
2400001060	1	PLUG HOUSING, 4 WAY, PNL MTG		
2400001061	4	PLUG TERMINALS, SOLDER TAIL		85/3-030 86/5-153 86/7-227
2400210035	1	SKT, COAXIAL, UHF, PNL MTG		
3020005175	1	BRACKET, FEED THRU A3M1597		
3080013065	1	HEATSINK, DRIVER A4M1816		85/3-096
3190001100	1	SHIELD PA, COMPONENT SIDE A2M1592		
3190001101	1	SHIELD PA, SOLDER SIDE A3M1593		
3190001104	1	SHIELD PA, COVER A2M1594		

3190001108	1	SHIELD BOX, VCO. A3M1654			
3190001109	1	SHIELD LID, VCO A3M1655			
3190001114	1	SHIELD, PA COVER, SOLDER SIDE A3M1675			86/7-181 85/3-066
3490001022	2	SCREW No4 x 3/8 PAN POZI PLASTITE 2-50	COVER		86/2-047
3490002030	4	SCREW M3 x 6mm PAN POZI TAPTITE	UHF SKT 2, Ic4 1, Q43 1		85/4-112
3490002031	4	SCREW M3 x 10mm PAN POZI TAPTITE	VCO 4.		85/5-139
3490002032	3	SCREW M3 x 8mm PAN POZI TAPTITE	Q3 MTG 1, HEATSINK 2		85/5-139
3520001008	5	NUT M3	Q3 1, Q43 1, Ic4 1, H/S 2.		85/4-112
3530001010	1	WASHER M3 FLAT	Q43 MTG.		86/10-294
3530001013	3	WASHER M3 SHAKEPROOF	Q3 1, Q43 1, Ic4 1.		
3570001009	4	PUSH ON FIX SFP3253	SPKR MTG		
3650010002	1	LABEL, BLANK METALISED POLYESTER 12.7 x 26.4mm	FOR 'TITLE' LABEL. PRINTED IN HOUSE.		
3690001012	1	FURNITURE FOOT R/C R3579	FITTED IN VCO.		85/7-249
3990001056	1	PLASTIC BAG 200 x 250mm			
4000002007	55mm	SLEEVING, 2mm SILICON RUBBER	4 x 13mm		85/11-408

6.15 C530/M ADD TO B530/MECH FOR STANDARD RADIO

2010003004	150mm	WIRE 7/0.2 PVC YELLOW	150mm PCB TO SPKR		
2010003010	150mm	WIRE 7/0.2 PVC BLACK	150mm PCB TO SPKR		
2500010114	1	SPEAKER 8 OHM A3M1799			84/12-552
					85/11-406
3020004004 2	3	PUSH BUTTON, PLASTIC A3M1585			
3080013055	1	HEATSINK, DIECAST A1M1572			
3111001033	2	KNOB A3M1584			
3120001035	1	LENS A3M1586			
3190001110	1	SHROUD, INDICATOR, PLASTIC A4M1587			
3560002014	6	RECEPTACLE 1.5mm, 10.1 WIRE	MICROPHONE 4, SPKR 2		85/8-273 85/9-345
409TM500HB	1	T500 SERIES OPERATORS HANDBOOK	PACK WITH EACH SET		85/8-034

6.16 C530B/1 T530B/1 VERSION PARTS

3650001191	1	LABEL T530B/1 TITLE A4A3874	PRINTED IN HOUSE, REFER B530/MECH FOR BLANK		
2520010112	1	MICROPHONE 600E			85/12-425

3160006303	1	PANEL FRONT T500	A1M1583			86/9-356
3033002001 4	1	COVER TOP PLASTIC	A1M1581			86/9-247
3033002001 5	1	COVER BOTTOM PLASTIC	A1M1582			86/9-247

6.17 C530B/2 T530B/2 VERSION PARTS

2520001012	1	MICROPHONE 600E				86/12-425
3650001192	1	LABEL T530B/2 TITLE	A4A385	(PRINTED IN HOUSE, REFER BS30/MECH FOR BLANK)		
3650011160	1	LABEL T530B AUST DOC T/A	A4A367	(PRINTED IN HOUSE.)		
3650100002	1	LABEL, BLANK METALISED POLYESTER 12.7×25.4mm.		(FOR ABOVE LABEL)		
3160006303	1	PANEL FRONT T500	A1M1583			86/9-356
3033002001 4	1	COVER TOP PLASTIC	A1M1581			86/9-247
3033002001 5	1	COVER BOTTOM PLASTIC	A1M158			86/9-247
5380001002	1	TA-500/CTCSS				

6.18 C530B/2X T530B/2X VERSION PARTS

2520001012	1	MICROPHONE 600Ω				
3160006303	1	FRONT PANEL T500	A1M1583			
3650011160	1	LABEL T530B AUST DOC T/A	A4A367	(PRINT IN HOUSE)		
3650100002	1	LABEL, BLANK METALISED POLYESTER, 12.7×25.4mm		(FOR ABOVE LABEL)		
3650011192	1	LABEL T530B/2 TITLE	A4A385	(PRINTED IN HOUSE, REFER BS30/MECH FOR BLANK)		
3033002001 4	1	COVER TOP PLASTIC	A1M1581			86/9-247
3033002001 5	1	COVER BOTTOM PLASTIC	A1M1582			86/9-247

6.19 C530B/3 T530B/3 VERSION PARTS

3650011193	1	LABEL T530B/3 TITLE	A4A386	(PRINTED IN HOUSE, REFER BS30/MECH FOR BLANK)		
3033002002 4	1	COVER TOP METALISED	A1M1581			86/9-247
3033002002 5	1	COVER BOTTOM METALISED	A1M1582			86/9-247
2520001012	1	MICROPHONE 600E				86/12-425
3160006333	1	PANEL FRONT METALISED	A1M1583			86/9-247
5380001002	1	TA-500/CTCSS				

6.20 C530B/4 T530B/4 VERSION PARTS

2520001012	1	MICROPHONE 600E		85/12-425
3160006303	1	PANEL FRONT T500 A1M1583		85/9-356
3650001208	1	LABEL T530B/4 TITLE A4A401	(PRINTED IN HOUSE, REFER B530/MECH FOR BLANK)	
5380001002	1	TA-500/CTCSS		
3030020014	1	COVER TOP PLASTIC A1M1581		86/9-247
3030020015	1	COVER BOTTOM PLASTIC A1M1582		86/9-247

6.21 C530B/5 T530B/5 VERSION PARTS

3650001194	1	LABEL T530B/5 TITLE A4A387	(PRINTED IN HOUSE, REFER B530/MECH FOR BLANK)	
3160006303	1	PANEL FRONT T500 A1M1583		85/9-356
2520001012	1	MICROPHONE 600E		85/12-425
3030020014	1	COVER TOP PLASTIC A1M1581		86/9-247
3030020015	1	COVER BOTTOM PLASTIC A1M1582		86/9-247

6.22 C530B/6 T530B/6 VERSION PARTS

2520001023	1	MICROPHONE FOSTER 600E LO TEMP CORD		85/11-406
3160006323	1	PANEL FRONT T500 MARCONI		85/01-356
3650001218	1	LABEL T500 MARCONI CANADA MIC A4A416		85/10-368
3650001234	1	LABEL T530B/6 TITLE/DOC A4A433	(PRINTED IN HOUSE, REFER B530/MECH FOR BLANK)	86/02-038
4100001034	1	CARDBOARD SLEEVE BLANK T500 A4M1814		85/12-438
3030020014	1	COVER TOP PLASTIC A1M1581		86/9-247
3030020015	1	COVER BOTTOM PLASTIC A1M1582		86/9-247

6.23 C530B/7 T530B/7 VERSION PARTS

3030020014	1	COVER TOP PLASTIC A1M1581		86/9-247
2520001012	1	MICROPHONE 600Ω		
3030020015	1	COVER BOTTOM PLASTIC A1M1582		86/9-247
3160006329	1	FRONT PANEL INTRON I-102 A4A439, A1M1583		
3650001239	1	LABEL I-102B/7 TITLE A4A443	(PRINTED IN HOUSE, REFER B530/MECH FOR BLANK)	
3650001236	1	LABEL, 'INTRON' MICROPHONE A4A440		
3990001080	1	BAG, FOIL/PAPER 190x340mm	PCB ASSY PACKING.	
4100001034	1	PACKAGING, BLANK CARD SLEEVE A4M1814	[illegible]	
5380001002	1	TA-500/CTCSS		

3160080030	1	PRESSURE PAD	PACKAGING	
3990001052	1	PLASTIC BAG 100 x 150mm	(KNOBS, PUSHBUTTONS & LOCKCLAMPS)	86/06-152
3990001059	1	PLASTIC BAG 225 x 300mm	TOP AND BOTTOM COVER	86/06-152
3990001067	2	PLASTIC BAG 100 x 250mm	FRONT PANEL AND BRACKET	86/06-152

6.24 C530B/9 T530B/9 VERSION PARTS

3650001181	1	LABEL T530B FCC ID A4A368	MOVE FCC ID LABEL TO OPPOSITE END HEATSINK FIN, REPLACING TITLE LABEL.	
3030020014	1	COVER TOP PLASTIC A1M1581		86/9-247
3030020015	1	COVER BOTTOM PLASTIC A1M1582		86/9-247
3160006303	1	PANEL FRONT T550 A1M1583		85/9-856
2520001012	1	MICROPHONE 600E		86/12-425

6.25 C530C/3 T530C/3 VERSION PARTS

3650001197	1	LABEL T530C/3 TITLE A4A390	(PRINTED IN HOUSE, REFER B530/MECH FOR BLANK)	
3030020024	1	COVER TOP METALISED A1M1581		86/9-247
3030020025	1	COVER BOTTOM METALISED A1M1582		86/9-247
2520001012	1	MICROPHONE 600E		85/12-425
3160006333	1	PANEL FRONT METALISED A1M1583		86/9-247
5380001002	1	TA-500/CTCSS		

6.26 C530C/3X T530C/3X VERSION PARTS

2520001012	1	MICROPHONE 600Ω.		
3160006333	1	FRONT PANEL METALISED A1M1583		86/9-247
3650001266	1	LABEL T530C/3X TITLE A4A480	(PRINTED IN HOUSE, REFER B530/MECH FOR BLANK)	
3030020024	1	COVER TOP METALISED A1M1581		86/9-247
3030020025	1	COVER BOTTOM METALISED A1M1582		86/9-247

6.27 C530C/8 T530C/8 VERSION PARTS

3030020014	1	COVER TOP PLASTIC A1M1581		86/9-247
3030020015	1	COVER BOTTOM PLASTIC A1M1582		86/9-247

365000119 8	1	LABEL T530C/8 TITLE A4A391	(PAINTED IN HOUSE, REFER BS3/MESH FOR BLANK)
316000630 3	1	PANEL FRONT T500 A3M1583	85/9-356
252000101 2	1	MICROPHONE 600E	85/12-425

6.28 B500/LED T500 LED/CRYSTAL ASSEMBLY PARTS

008000113 2	4	LED 3mm, RED, HIGH INTENSITY	D302, D303, D304, D305 84/8-365
030000000 0	3	ZERO OHM 5% 7x2·5mm C/F	R309, R306, R307 86/12-379 TO REPLACE LINKS CONNECTED TO L3 & L4 86/07-165
240040205 9	1	SKT 3WAY 1 ROW, PCB MTG, TOP ENTRY	
240040206 1	1	SKT 7WAY 1 ROW, PCB MTG, TOP ENTRY	
			XTAL - RCRB C600/12·5 OR C600/5
225000113 6	1	PRINTED CCT BOARD	

6.29 B500/MISC T500 CRADLE PARTS

205000106	3·2M	AUTO CABLE 153 2/28/0·3 RED/BLK	86/1-013
240001003 5	1	PLUG, COAXIAL, UHF	
240020106 0	1	SKT HOUSING	
240020106 1	2	SKT RECEPTACLE, 152 AUTO.	
240020106 2	2	SKT RECEPTACLE, 7/0.2	
252000101 6	1	CLIP, MIC MTG A3M1888	85/8-275
265000101 7	1	FUSE 10 CARTRIDGE 6x32 NON SPEC	86/3-062
303003004 6	1	CRADLE, BRACKET, SHRT PLASTIC A3M1887	86/1-009
303003004 3	2	CRADLE CLIP, PLASTIC A3M1656	
303003004 4	2	CRADLE LOCKING CLAMP PLASTIC A3M1657	
340000101 0	1	FUSEHOLDER INLINE BOOK HOUSING	86/3-062
340000101 1	2	BOOK FUSEHOLDER CRIMP TERMINAL	86/3-062
349000103 9	2	SCREW No 6 x 5/16" PAN POZI SELFTAP	MIC CUP MTG 85/8-275
349000104 9	2	SCREW No 10 x 1/2" PAN POZI SELFTAP	
353000102 0	2	WASHER M4 SHAKEPROOF	MIC CUP MTG 85/8-275
353000103 2	2	WASHER M5 SHAKEPROOF, EXTERNAL	
369000101 4	2	CABLE TIE NYLON 100MM x 2·6MM	BATTERY LEAD TIE 86/04-010
399000105 1	1	PLASTIC BAG 75x100mm	
410000103 7	1	T500 PACKAGING SLEEVE A4M1814	
410000104 8	1	T500 PACKAGING, POLYSTYRENE 2 PCS. A1M1787	86/01-012

6.30 B/TA-500/XO T500 LED/CRYSTAL HEATER PARTS

000 000 11 10	1	BC548B TRANSISTOR	Q300	
000 000 11 70	1	BD136 TRANSISTOR	Q301	
001 000 12 00	2	1N4148 DIODE	D300, D301	
001 000 15 09	1	BZX79/C3V9 DIODE	D306	85/9-353
008 000 11 32	4	LED 3mm RED, HIGH INTENSITY	D302, D303, D304, D305	
030 000 00 00	2	RES ZERO OHM 5% 7x2.5mm C/F	R305, R306	84/12-379
030 011 00 01	1	1E RESISTOR 5% 10x4mm C/F	R304	86/01-007
030 035 60 00	1	560E RESISTOR 5% C/F 7x2.5mm	R303	85/9-353
030 051 50 00	1	15K RESISTOR 5% C/F 7x2.5mm	R302	85/9-353
030 052 70 00	1	27K RESISTOR 5% C/F 7x2.5mm	R300	88/10-344 85/9-353
045 047 00 01	1	4K7 RESISTOR NTC 20% 5mm DISC	TR301	85/10-374
200 000 10 04	25mm	TINNED COPPER WIRE 0.7mm	1 x 25mm LINK (REPLACES R307)	86/01-007
240 040 20 59	1	SOCKET 3WAY 1ROW, PCB MTG, TOP ENTRY		
240 040 20 61	1	SOCKET 7WAY 1 ROW, PCB MTG, TOP ENTRY		
225 000 11 36	1	PRINTED CCT BOARD	CCT DIAGRAM A4C509	
369 000 20 04	1mm	TAPE S/A POLY FILM UHMW 5421	5mm x 10mm (REFER TO P.A.N A4P544)	86/01-007
303 005 00 63	1	CLIP, XTAL/XISTOR A4M1648		

6.31 B/TA-500/MEM T500 DIODE MEMORY PARTS

001 000 12 00	64	1N4148 DIODE	
225 000 11 35	1	PRINTED CCT BOARD TA-500/MEM	
240 000 20 57	1	PLUG 10WAY 1ROW PCB MTG HEADER	
240 040 20 57	1	SKT 10WAY 1ROW PCB MTG, TOP ENTRY	

6.32 B/TA-500/RC T500 RUGGED CRADLE

303 003 00 47	1	CRADLE ASSEMBLY A2M1920, A3M1921, A3M1955	
303 003 00 49	2	CLIP, PLASTIC. A2M1922	
303 003 00 52	2	KEY, PLASTIC A4M1925	
349 000 10 49	4	SCREW No10 x ½" PAN POZ SELFTAP	
353 000 10 32	4	WASHER M5 SHAKEPROOF	
359 000 10 37	4	RIVET 3x5mm ST FLAT HD. TINMENS No7	SUPPLY TO MANUFACTURER OF CRADLE ASSEMBLY.
399 000 10 54	1	PLASTIC BAG 175 x 225 mm	
399 000 10 56	1	PLASTIC BAG 200 x 250mm	
409 TM500 RC	1	OPERATORS INSTRUCTIONS TA-500RC	86/9-268

6.33 B/TA-500/CTCSS TA-500/CTCSS PCB ASSEMBLY PARTS

0	0	0	0	0	0	1	1	1	0	3	BC548B TRANSISTOR	Q401, Q405, Q402	
0	0	0	0	0	0	1	1	3	0	1	BC557B TRANSISTOR	Q403	
0	0	1	0	0	0	1	2	0	0	2	1N4148 DIODE	, D406, D407	
0	0	2	0	0	0	1	0	6	0	1	LM339 INT CCT	Ic403	
0	0	2	0	0	0	1	4	4	0	2	MLM324 INT CCT	Ic401, Ic402	
0	0	2	0	0	0	1	5	7	0	1	4066 INT CCT	Ic404	
0	1	1	0	3	2	2	0	0	1	1	220P CAP NPO 10% CER CHIP RH	C404 (Across pins 5 & 6 of IC401b)	86/06-150
0	1	1	0	3	6	8	0	0	1	2	680P CAP 10% N1500 63V CER	C408, C416	
0	1	9	0	5	1	0	0	0	1	2	10n CAP 5% COG 50V MONO CER	C414, C415	
0	2	0	0	7	1	0	0	0	2	2	1µ CAP 50V ELECTRO 5x11mm VERT	C409, C418	
0	2	0	0	8	1	0	0	0	3	4	10µ CAP 50V ELECTRO 5x11mm VERT	C401, C402, C417, C403	86/08-306
0	2	2	0	5	2	2	0	0	1	3	22n CAP 50V MYLAR VERT	C405, C406, C407	
0	3	0	0	4	1	0	0	0	0	4	1K RESISTOR 5% C/F 7x2.5mm	R443, R448, R455, R458 (R443, R455 HORIZONTAL)	
0	3	0	0	5	1	0	0	0	0	12	10K RESISTOR 5% C/F 7x2.5mm	R408, R415, R416, R418, R440, R442, R451, R457, R459, R460, R436 (R456, R418 HORIZONTAL)	85/10-380
0	3	0	0	5	4	7	0	0	0	4	47K RESISTOR 5% C/F 7x2.5mm	R403, R410, R433, R435	
0	3	0	0	6	1	0	0	0	0	9	100K RESISTOR 5% C/F 7x2.5mm	R405, R406, R432, R434, R441, R461, R462, R424, R427	84/10-468 85/10-380 86/02-021
0	3	0	0	6	1	5	0	0	0	5	150K RESISTOR 5% C/F 7x2.5mm	R407, R409, R411, R412, R426	
0	3	0	0	6	4	7	0	0	0	2	470K RESISTOR 5% C/F 7x2.5mm	R454, R430	85/02-021 84/10-468
0	3	0	0	7	1	0	0	0	0	4	1M RESISTOR 5% C/F 7x2.5mm	R417, R444, R449, R463	
0	3	2	0	4	8	2	0	0	0	2	8K2 RESISTOR 1% M/F 7x2.5mm	R420, R445	
0	3	2	0	5	4	7	0	0	0	2	47K RESISTOR 1% M/F 7x2.5mm	R421, R446 (R446 HORIZONTAL)	
0	3	2	0	6	1	2	0	0	0	2	120K RESISTOR 1% M/F 7x2.5mm	R425, R431	
0	3	2	0	6	1	5	0	0	0	4	150K RESISTOR 1% M/F 7x2.5mm	R401, R402, R419, R422 (R422 HORIZONTAL)	
0	3	2	0	6	4	7	0	0	0	1	470K RESISTOR 1% M/F 7x2.5mm	R423	
0	4	2	0	4	2	2	0	0	3	1	2K2 PRESET RES. 10mm VERT C/F	RV447	85/9-334
0	4	4	0	6	1	0	0	0	2	2	100K PRESET RES, MULTITURN, 10mm sq. VERT.	RV428, RV429	

T530 Parts List

200000105	0.02gm	1/0.5mm T/C WIRE	LINK (15mm)	
225000113 8	1	PRINTED CIRCUIT BOARD TA-500 CTCSS		
240040205 8	2	SKT 5WAY 1 ROW PCB MTG MOLEX		
309000103 9	1	INSULATOR TA-500/CTCSS A4M1828		86/03-080
316008705 7	1	PILLAR 11.5mm M3 A4M1600		
349000203 0	2	SCREW M3x6mm PAN POZI TAPTITE		
356000102 7	29	HARWIN TRACK PINS		86/7-184
365000113 8	1	LABEL, STATIC WARNING, YELLOW A4A315		
399000105 5	1	PLASTIC BAG 150 x 300mm		84/4-132
365000115 4	1	LABEL QUIKSTIK RW2365/1	PRODUCT IDENTIFICATION LABEL	87/3-055

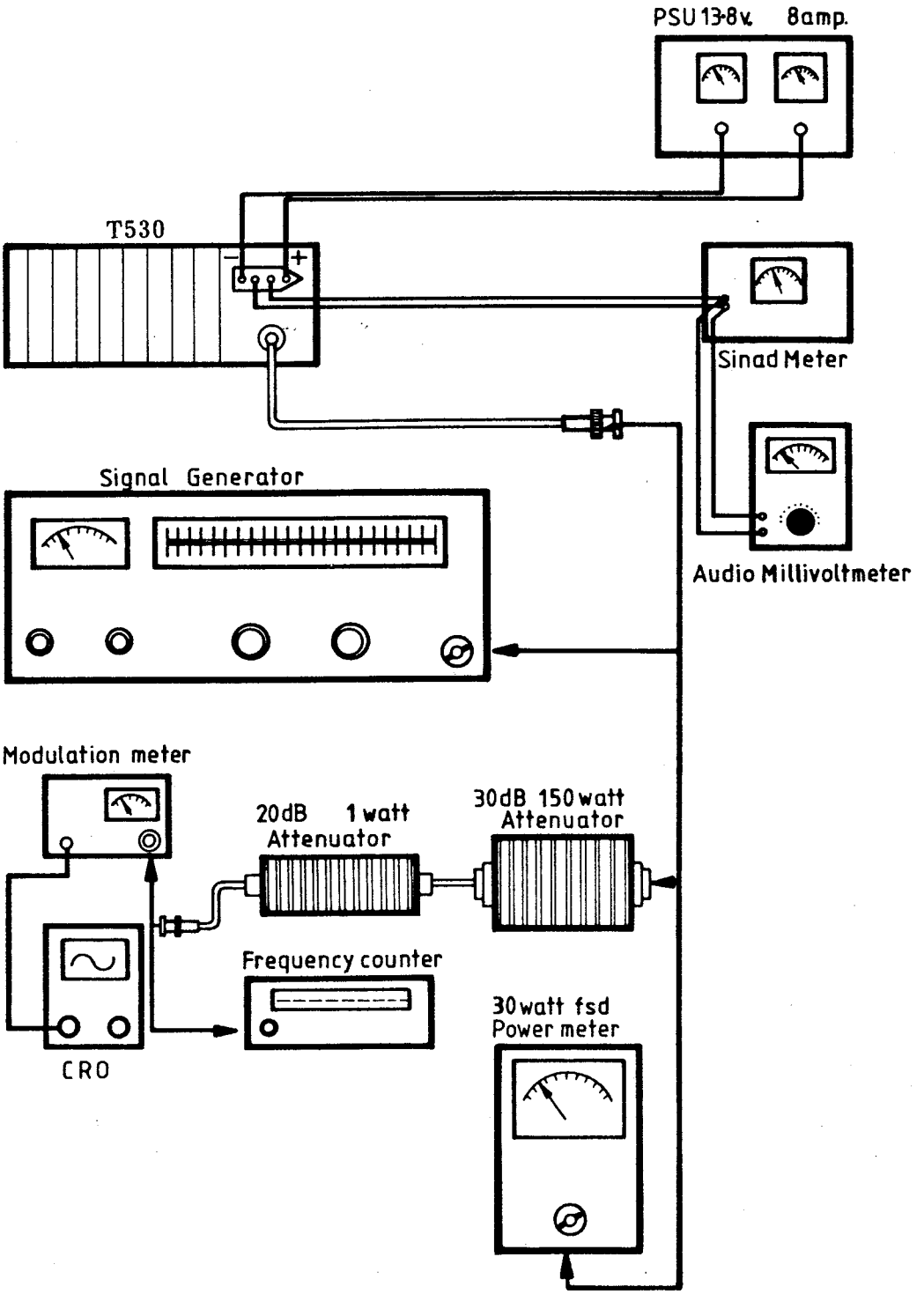


Diagram 1 Suggested Test Equipment Set-Up

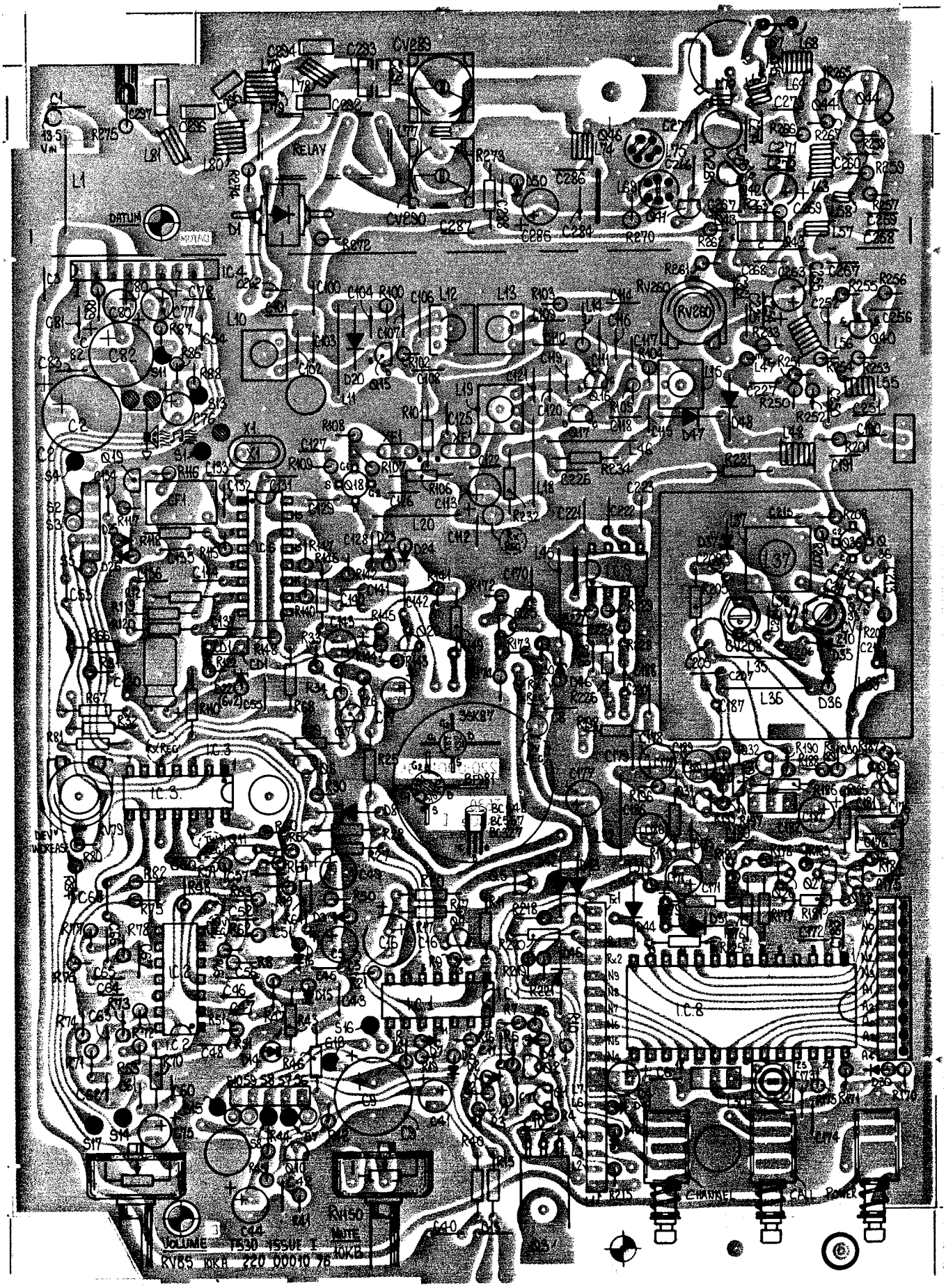


Diagram 2 T530 PCB Encoding

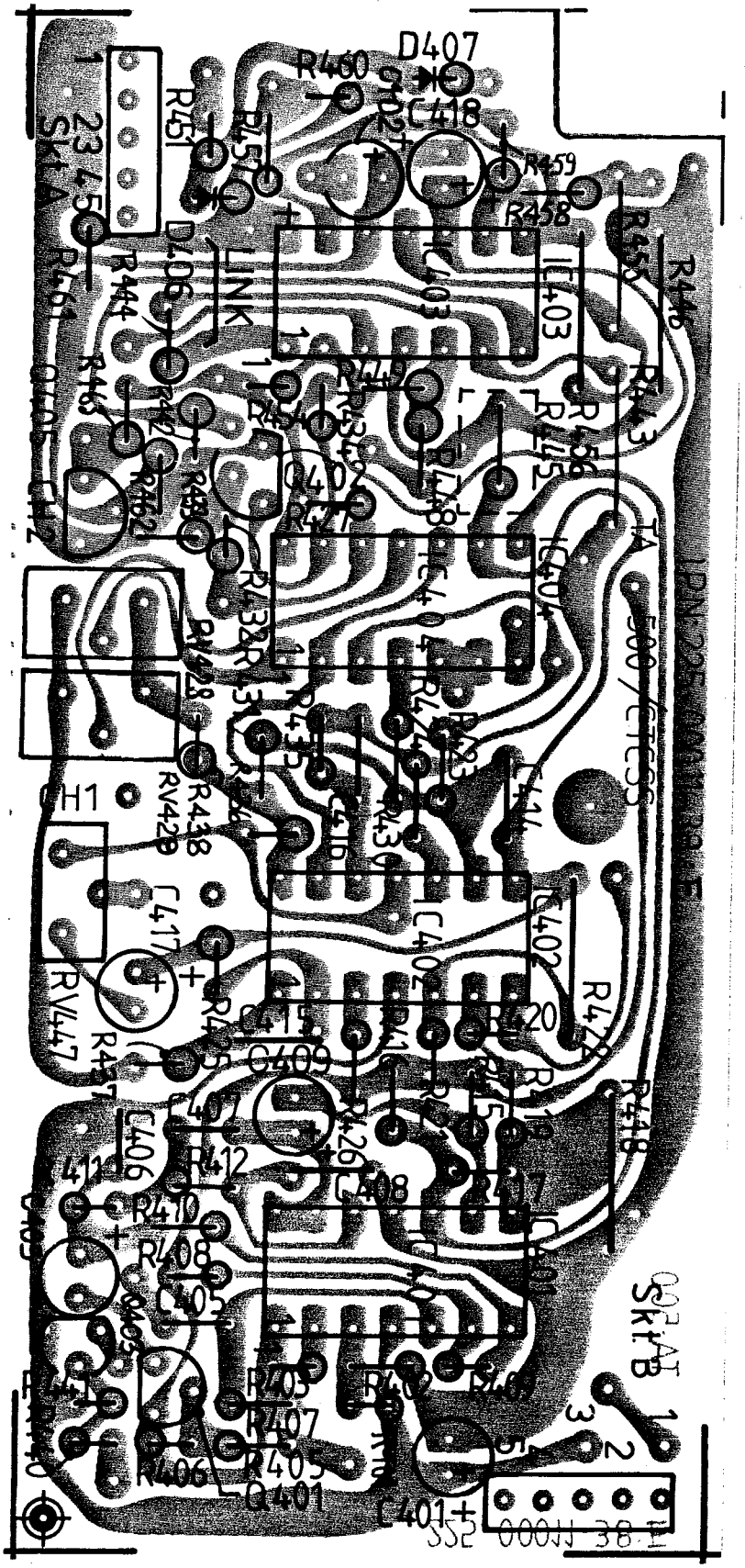


Diagram 3 TA-500/CTCSS PCB Encoding

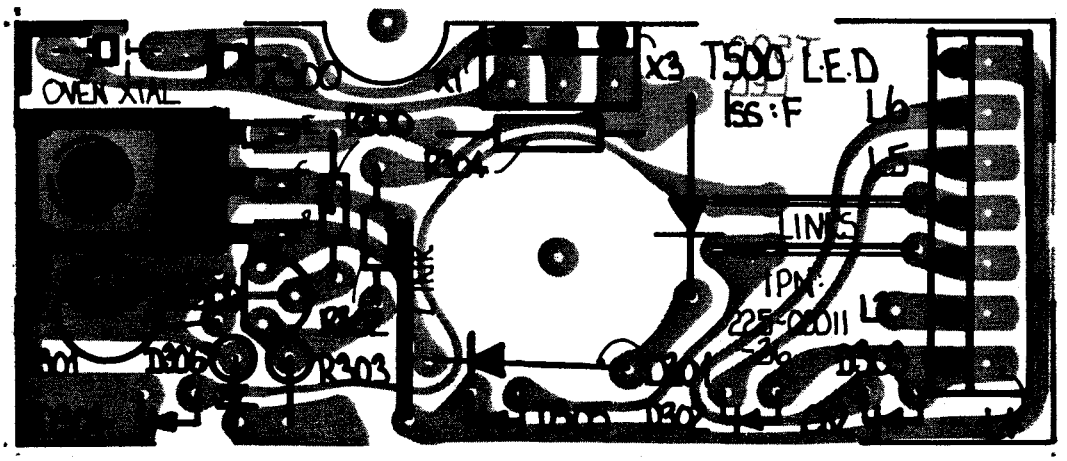
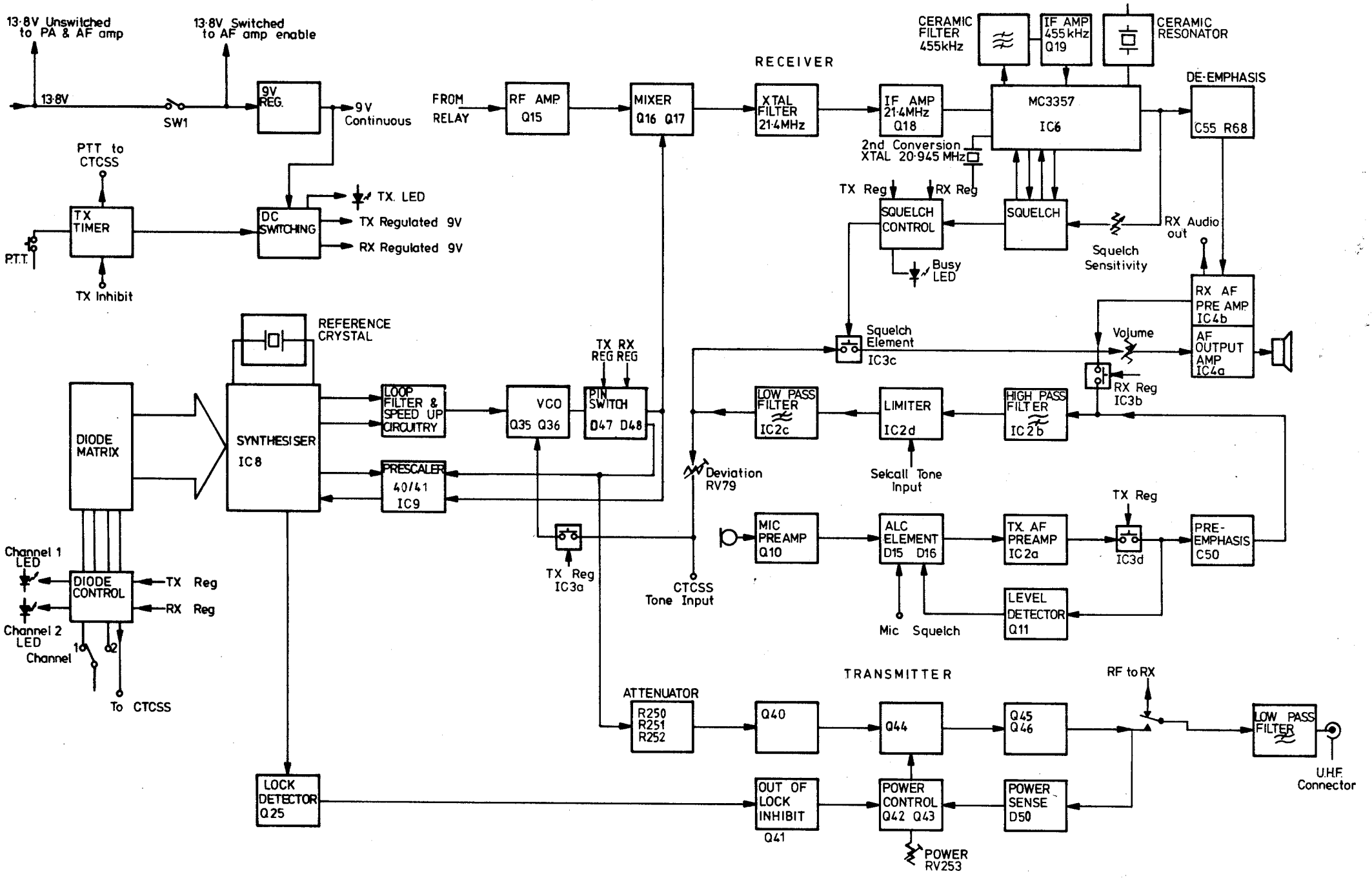


Diagram 4 T500/LED & Crystal Heater PCB Encoding



ISSUE	AMENDMENTS	DRN.	CHKD	APVD	DATE
A	ORIGINAL				

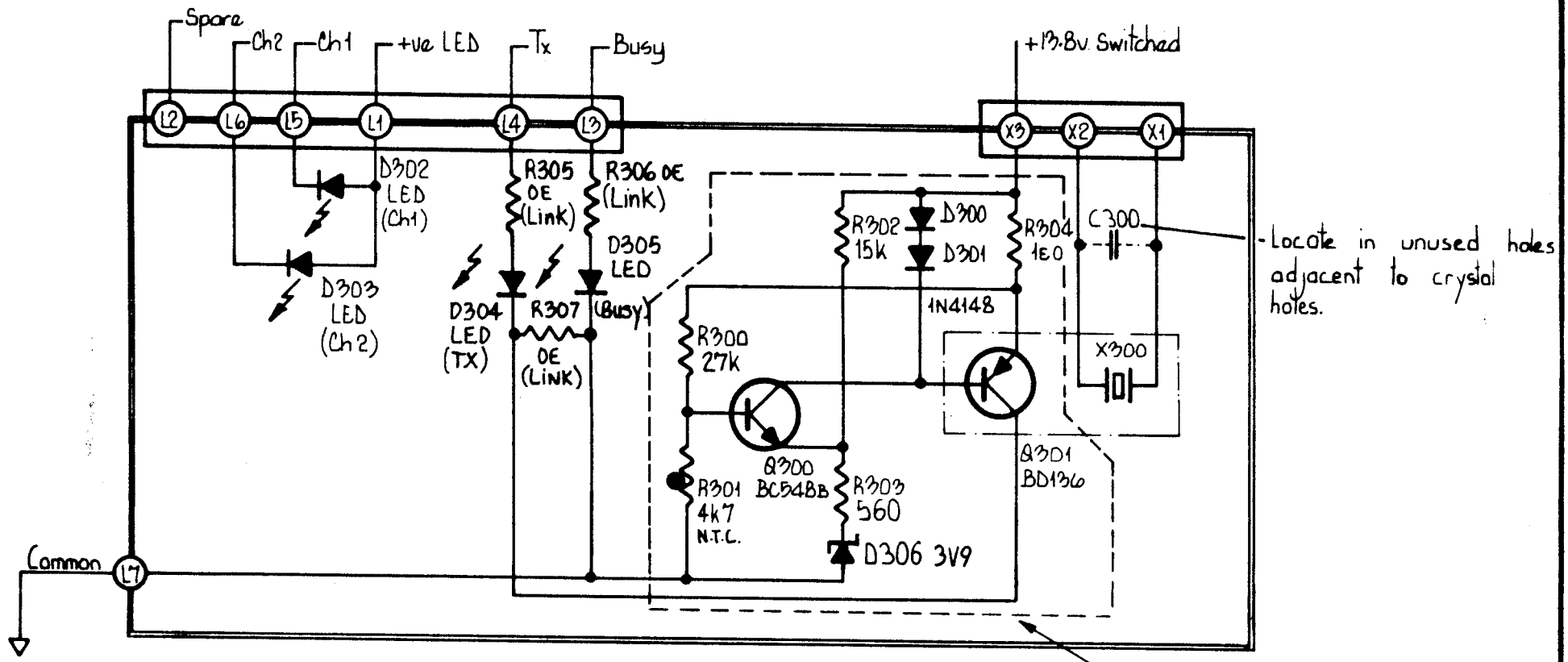
ISSUE	AMENDMENTS	DRN.	CHKD	APVD	DATE

BLOCK DIAGRAM T530

TAIT ELECTRONICS Ltd.
Christchurch New Zealand

DRAWING NUMBER A3M1821

ISSUE



CH. SPACE	X300	C300
6.25 KHz	12.8	not fitted
5kHz	10.24	1p8

USED ON
T510
T520
T530
T540
T550

SCALE :
MATERIAL :
FINISH :
GEN. LIMITS :

E	ChN: 86-12-379		S.C.	S.C.	19.1.87

IPN

ISS	AMENDMENTS	DRN	CHKD	APVD	DATE
A	ORIGINAL	W.W.	M.M.		20.11.85
B	Ch/N 85/08 304, 09 353 10 374, 10 384	D.H.	H.O.	S.C.	21.10.87
C	Ch/N 86-07-175		D.C.	S.C.	5.9.90
D	Ch/N 86-07-165		D.C.	S.C.	7.10.87

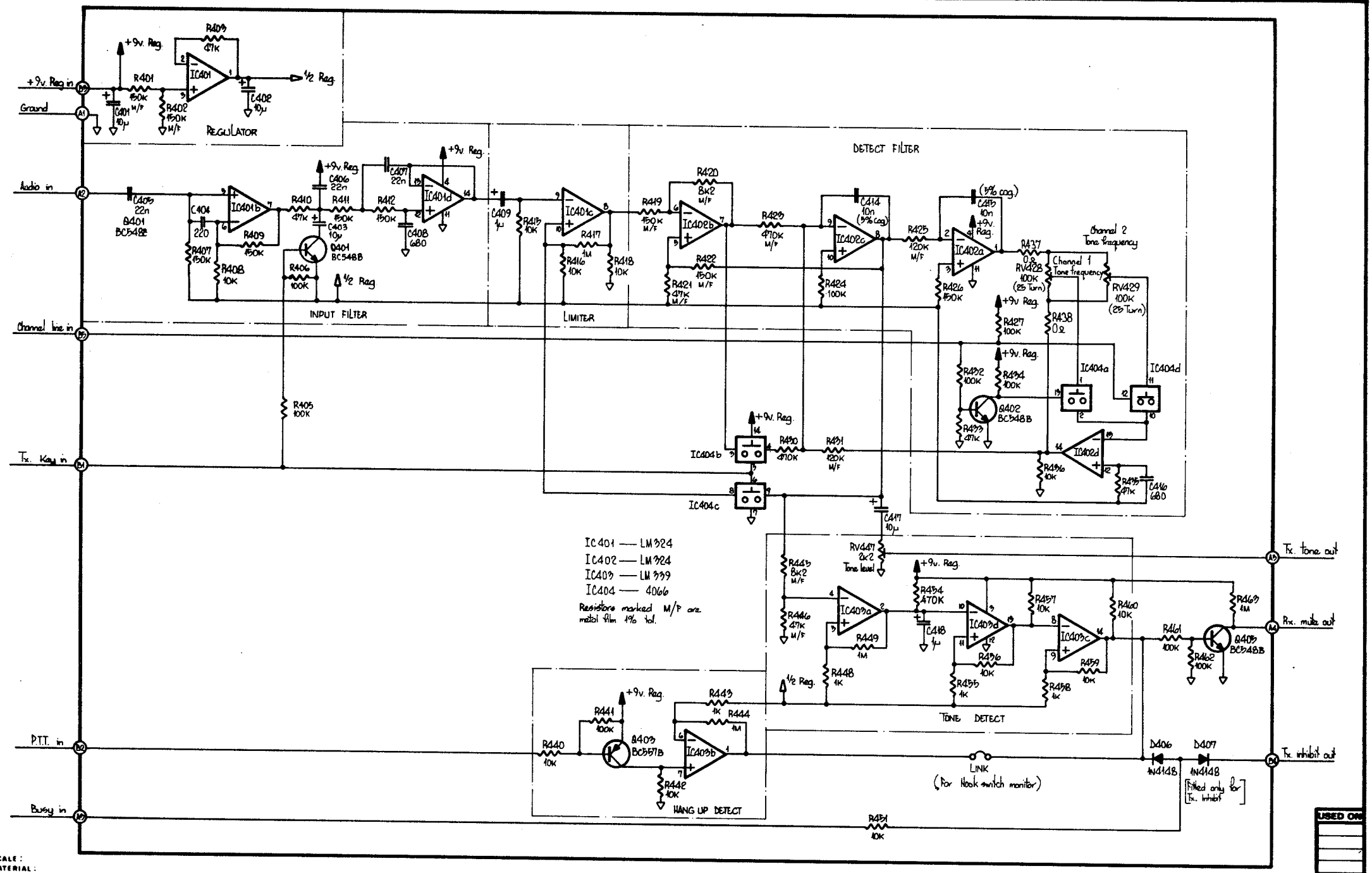
CIRCUIT DIAGRAM—T500/LED & OPTIONAL CRYSTAL HEATER.

TAIT ELECTRONICS LTD.

DRAWING NUMBER A4 C509

ISSUE A B C D E

DO NOT SCALE OFF DRAWING



ISSUE	AMENDMENTS	DRN.	CHKD	APVD	DATE
A	ORIGINAL	W.W.	MM	S.G.B.	24/11/86
B	CH/N 86/02 021	A.G.	S.C.	S.C.	15.9.86
C	CH/N 86/06 150, 07/182	D.E.	A.C.	S.C.	5.9.86
D	CH/N 86-08-208	[illegible]	B.G.	S.C.	2.9.86

ISSUE	AMENDMENTS	DRN.	CHKD	APVD	DATE

CIRCUIT DIAGRAM: TA-500/CTCSS

TAIT ELECTRONICS Ltd.
Christchurch New Zealand

DRAWING NUMBER A2C500

ISSUE D

IPN

USED ON

SCALE :
MATERIAL :
FINISH :
GEN. LIMITS :