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T377/Ex VHF FM Exciter
And
T377/PA VHF FM Power Amplifier

(TM-377)

Issue B

TECHNICAL INFORMATION

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

UPDATING EQUIPMENT & 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 General, Technical and Servicing Information for all versions of the Tait T377/Ex VHF FM Exciter and T377/PA VHF FM Power Amplifier.

Ordering Service Manuals

When ordering the T377/Ex and T377/PA Service Manual, quote the Tait Internal Part Number (IPN), e.g. TM-377, and give full details of the version of your equipment, e.g. T377/Ex/05 & T377/PA/02.

Date of Issue

IPN TM-377 T377/Ex & T377/PA Service Manual

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Manual Revisions

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

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

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SECTION 1 GENERAL INFORMATION

1.1 INTRODUCTION

The T377/Ex is a synthesized base station FM exciter, for single or multi-channel operation within the frequency range from 135MHz to 225MHz, with a nominal 0.5 watt output. It is designed to drive the T377/PA RF power amplifier.

The T377/PA is an FM base station power amplifier designed for single or multi-channel operation within the frequency range from 135MHz to 225MHz, with an output power capability of between 10 and 60 watts.

The circuitry of the T377/Ex is built on two printed circuit boards (PCB's): the exciter PCB, and the audio processor PCB.

The exciter PCB comprises a dual-modulus frequency synthesizer which provides about 20mW of frequency modulated RF drive to a three-stage, wideband output amplifier. The signal is generated at actual operating frequency, so there are no multiplier stages.

A wide selection of modulating characteristics may be obtained from the audio processor, whose circuits include an audio compression circuit, deviation limiting, and filtering.

The circuitry of the T377/PA is built on a single PCB.

The PA assembly incorporates a broad band three-stage amplifier and a harmonic filter. Monitoring and alarm signals are available for both forward and reverse power. The PA has VSWR and thermal protection. The T377/PA PCB is mounted inside an efficient heatsink for optimum cabinet radiation performance.

Where required, up to six T377/PA's can be monitored by a single T339/01 Transmit Monitor (see Section 3, Ancillary Equipment).

Each unit has a width of 60mm, occupying a single module in a Tait rack shelf (T99-770) which will accomodate up to 7 standard modules to give an attractive and convenient installation.

1.2 SPECIFICATIONS

1.2.1 INTRODUCTION

The performance figures given below are typical figures, unless otherwise indicated, for equipment operating under standard test conditions (13.8V DC supply and ambient temperature 22°C to 28°C); unless otherwise indicated, the figures apply to all versions.

Where applicable, the test methods used to obtain the following performance figures are those described in the New Zealand Post Office Specification RTA25.

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

1.2.2 GENERAL

Modulation Type	.. angle telephony
Frequency Range	.. 135 to 225MHz
Frequency Increments	.. 5.0kHz or 6.25kHz
Number of Channels	.. one (four to order)
Switching Range:	.. 8MHz
Supply Voltage:	
Operating Range	.. 10.8 to 16 volts DC
Standard Test Voltage	.. 13.8 volts DC
Polarity	.. negative earth only
Keying Supply (if required)	.. -50 volts DC
Supply Current:	
Transmit:	
T377/Ex for 0.8W	.. 500mA max, 400mA typical
T377/PA for 50W	.. 10.5A max, 9A typical
Standby:	
T377/Ex	.. less than 120mA
T377/PA	.. less than 50mA
Antenna Impedance	.. 50 ohms (nominal)
Operating Temperature Range	.. -30°C to +60°C
Dimensions & Weight:	
Height	.. 191mm
Width	.. 60mm each
Length	.. 310mm
Weight:	
T377/Ex	.. 1.25kg
T377/PA	.. 3.40kg

1.2.3 TRANSMITTER RF SECTION

Power Output (at 13.8V):

Rated Power	.. 50W
Maximum Power	.. 60W
Range of Adjustment	.. 10W to 60W

Note: Actual power used will depend on regulatory requirements.

Duty Cycle Rating (Continuous)	.. 50W to +40°C without fan
	.. 50W to +60°C with fan
	.. 35W to +60°C without fan

Front Panel Facilities:

Frequency Monitor Output Level	.. -10dBm (50 ohms)
Frequency Adjustment Range (relative to true crystal frequency)	.. ±10ppm

Spurious Emissions:

Conducted	.. -30dBm
Radiated	.. -40dBm

Adjacent Channel Power:

Narrow Band (±12.5kHz)	.. -70dBc
Wide Band (±25kHz)	.. -90dBc

Mismatch Capability:

Ruggedness	.. infinity:1 VSWR at temperature and voltage extreme
Stability	.. 5:1 VSWR plus duplexer

Hum and Noise (below 60% of maximum deviation)	.. 55dB

Intermodulation:
(3rd order)

PA Version /02	.. -45dBc
PA Versions /03, /12:	
25dB External Isolation	.. -70dBc
40dB External Isolation	.. -85dBc

Modulator Type	.. direct FM

1.2.4 AUDIO PROCESSOR

Inputs Available	.. line & local mic. (pressel switched)

Line Input:

Impedance	.. 600 ohm balanced
Sensitivity for 60% of limiting deviation at 1kHz:	
With Compressor	.. -40dBm
Without Compressor	.. -25dBm

Audio Frequency Responses

Line and Mic. Inputs:

Below Limiting	.. within +1, -3dB of a 6dB/octave pre-emphasis characteristic (ref. 1kHz)
Above Limiting	.. within ±1.0dB of a flat response (ref. 1kHz)
Bandwidth	.. 300Hz to 3.4kHz (refer to Section 1.3)
Distortion	.. 1%

CTCSS Input:

Bandwidth	.. 65Hz to 260Hz
Response	.. within ±1dB of a flat response (ref. 150Hz)

Audio AGC:

Input Level Range	.. 50dB
Attack Time	.. 20ms
Decay Time	.. 800ms

Deviation Limiting:

Maximum	.. ±5kHz
Range Of Adjustment	.. 0 to 5kHz

1.2.5 FREQUENCY STABILITY

Crystal Frequency:

12.5kHz or 25kHz Channel Spacing	.. 12.8MHz
30kHz Channel Spacing	.. 10.24MHz

Standard Version:

Operating Temperature Range	.. -10°C to +60°C
Frequency Stability	.. ±4ppm
Crystal Type	.. TE/24

Low Temperature Version:

Operating Temperature Range	.. -30°C to +60°C
Frequency Stability	.. ±2.5ppm
Crystal Frequency	.. 12.8MHz
TCXO Type (refer TI-293A)	.. TO 909A

1.3 VERSIONS

The following versions of the T377/Ex and T377/PA are covered by this Manual:

T377/Ex/02	FM Exciter 135-174MHz Designed to drive the T377/PA/02 or T377/PA/03 Frequency increment 6.25kHz minimum Nominal 0.5 watt output Front panel frequency output & trim B3536S/02 audio processor Single channel

T377/Ex/05
FM Exciter 135-174MHz
Designed to drive the T377/PA/02
Frequency increment 5.0kHz minimum
Nominal 0.5 watt output
Front panel frequency output & trim
B3536S/02 audio processor
Single channel

T377/Ex/12
FM Exciter 174-225MHz
Designed to drive the T377/PA/12
Frequency increment 6.25kHz minimum
Nominal 0.5 watt output
Front panel frequency output & trim
B3536S/02 audio processor
Single channel

T377/Ex/15
FM Exciter 174-225MHz
Designed to drive the T377/PA/12
Frequency increment 5kHz minimum
Nominal 0.5 watt output
Front panel frequency output & trim
B3536S/02 audio processor
Single channel
16 174 225 2·5kHz 6·25 ch low · 4 ch.

T377/Ex/22
FM Exciter 135-174MHz
Designed to drive the T377/PA/02 or T377/PA/03
Frequency increment 6.25kHz minimum
Nominal 0.5 watt output
Front panel frequency output & trim
B3536S/02 audio processor
Four channels

T377/Ex/42
FM Exciter 174-225MHz
Designed to drive the T377/PA/12
Frequency increment 6.25kHz minimum
Nominal 0.5 watt output
Front panel frequency output & trim
B3536S/02 audio processor
Four channels

T377/Ex/55
FM Exciter 135-174MHz
Designed to drive the T377/PA/02 or T377/PA/03
Frequency increment 5.0kHz minimum
Nominal 0.5 watt output
Front panel frequency output & trim
B3536S/07 audio processor
Four channels

T377/PA/02
FM 50 Watt Power Amplifier 135-174MHz
Designed to be monitored by the T339/01 monitor
Front panel power adjust

T377/PA/03 FM 50 Watt Power Amplifier 135-174MHz
Designed to be monitored by the T339/01 monitor
Front panel power adjust
Optimised IM performance

T377/PA/12 FM 50 Watt Power Amplifier 174-225MHz
Designed to be monitored by the T339/01 monitor
Front panel power adjust
Optimised IM performance

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Note: All versions of the T377/Ex should be used only with a steel rack guide (IPN 538-00010-03).

SECTION 2 CIRCUIT OPERATION

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

2.1 T377/Ex

2.1.1 EXCITER PCB

Refer to Circuit Diagram A1C542.

2.1.1.1 Exciter Circuit

The T377/Ex employs the dual modulus system of frequency synthesis. The voltage controlled oscillator (VCO, Q20 and buffers Q21 & Q22) runs at actual operating frequency; ie, there are no multiplier stages. CV49 pretunes the VCO, while the loop control voltage on varicap D35 determines the VCO frequency over its switching range. The varicap diode D36 is used to frequency modulate the VCO.

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 IC1. Fine tuning trim consists of a varicap diode and a front panel multiturn preset control. A second varicap (D16), together with an NTC resistor (R38), temperature compensates the oscillator. For applications which require better frequency stability over the temperature range, a temperature compensated crystal oscillator (TCO-909) may be fitted.

The VCO frequency is divided by the 40/41 prescaler, IC3, and then further divided within IC1 to provide the other input to the phase comparator. The division ratio in IC1, and hence the channel frequency, is determined either by the onboard DIP switches for single channel applications, or by a diode matrix board for multi-channel applications.

The phase comparator output (pins 7 & 8 of IC1) is fed to the VCO tuning varicap via an active loop filter (IC2b). The loop filter runs from a +19 volt supply rail, generated by a switching converter (Q8). This provides a greater usable switching range.

The synthesizer is kept running continuously so that there are no lock-up delays when the exciter is keyed. Only the first two stages of the output amplifier are powered down on standby.

The three-stage, wideband output amplifier (Q25, Q26, Q27) delivers typically 800mW into 50 ohms, and requires no adjustment to cover the full 135-225MHz range.

2.1.1.2 Transmit Switch And Tail Timer

When the 'Tx enable' line is taken low and Q14 is turned on, C38 is thus discharged, pulling low the input to a Schmitt trigger (formed by Q17, Q18) and ultimately turning on the Tx switch, Q19.

When the 'low' is removed, R61 pulls the 'Tx enable' line high, thus inhibiting the audio and turning off Q14. C38 is now allowed to charge until, at a time preset by RV63 and C38, Schmitt trigger threshold is crossed and the Tx switch disabled. Thus, a silent tail is provided at the end of each transmission.

Should the synthesizer go out of lock, a lock-detect output (IC2a) forces the input of the Schmitt trigger high, thus inhibiting transmission.

2.1.1.3 Regulated Supplies

There are two regulated 9V supplies on the exciter PCB. One regulator (Q4, Q5, Q6, Q7) is continuous and is applied to the audio processor PCB, the final stages of the output amplifier (Q26, Q27), the transmit tail-timer and switch (Q14, Q17, Q18, Q19) and the synthesizer, with the exception of the loop filter. The second regulated supply is the Tx switch, Q19. It is derived from the main 9V rail and powers the first stage (Q25) of the output amplifier.

The loop filter and lock-detect circuitry (IC2a, Q12) is powered from a 20V rail, generated by a switching converter (Q8, D8) and regulated by Q9, D9 & D10.

2.1.2 AUDIO PROCESSOR

Refer to Circuit Diagram A1C549.

2.1.2.1 General

The transmitter audio processor contains circuits for processing the audio inputs to produce a wide variety of modulation characteristics to suit individual customer requirements. The characteristics may be obtained by selecting the order of appropriate sections by means of 'wire-in' links.

Each section is designed to have a standard output to allow interconnection of the sections in any order. A brief description of each section follows.

2.1.2.2 Microphone Pre-Amplifier

Audio signals from the local 600 ohm microphone are amplified by Q1.

2.1.2.3 Audio Switch

The audio switch (IC1) selects either the local microphone or the line signals as the audio input source. It also provides the inhibit facility which is used to obtain a 'silent tail' at the end of each transmission.

2.1.2.4 Constant Volume Amplifier

Q3, in conjunction with R22, forms a variable potential divider to hold the audio level constant, at its collector, for a wide range of input amplitudes. The control loop consists of a precision rectifier (D7, D8, IC2b), a comparator (IC2a) which compares the rectified output with a DC level (preset by RV27), and an inverter (Q5) which feeds the amplified error current to the emitter follower (Q4) and the control element (Q3). RV27 sets the reference level and thus the output level. Q6 and Q7 form a low noise, common emitter pair amplifier. The gain is set to bring its output level to the standard interconnection level (approximately equal to 12mV RMS).

2.1.2.5 Pre-Emphasis

IC3a and its associated circuit components provide a pre-emphasised response from 60 to 3400Hz.

2.1.2.6 Limiter/Low Pass Filter

A two stage limiter (IC3b and IC4a) is employed to achieve the desired clean limiting consistent with sufficient gain. RV54 sets the maximum peak deviation.

The low pass filter suppresses unwanted modulation products and an emitter follower (Q8) is used to provide a low impedance drive to the modulators on the exciter board. Either a 3kHz or 3.4kHz 'cut' frequency is available.

2.1.2.7 Transmitter Keying

The transmitter keying circuit consists of an optional 'opto-coupler' (for isolation between the keying circuits and the transmitter), and a 3 input OR gate formed with D1, D2 and D3 so that any of four inputs will key the transmitter, viz:

(i) Tx key line from a receiver or line - when the appropriate line is earthed;

(ii) carrier on/off switch - a push button for test purposes which inhibits the audio switch if required;

(iii) microphone pressel - which switches IC1 to select the microphone input and disconnect the line input;

(iv) by applying a suitable potential across the 'opto-coupler' input (-50 volt nominal).

2.2 T377/PA

2.2.1 RF POWER AMPLIFIER

Refer to Circuit Diagram A1C543.

The RF from the exciter (approximately 800mW) is fed to the power controlled stage Q8. The following stage, Q9, boosts the power to greater than 10 watts. A power divider network feeds the two final devices, Q12 and Q14. The outputs of these devices are combined and passed via a harmonic filter to a 'wire-line' directional coupler.

2.2.2 METERING AND ALARMS

Refer to Circuit Diagram A1C543.

A quad comparator (IC1) is used to provide alarm signals for forward and reverse power, a temperature shutdown facility and power control functions. The forward and reverse power levels are sensed by the 'wire-line' directional coupler. These levels are used to provide a metering output, to maintain the output power at a constant level via the power control loop, and to activate the power alarms. An NTC (R37) senses the internal temperature of the PA close to the output balance resistor (R69). IC2 regulates the supply to the alarm circuitry and provides a reference voltage for power control.

The alarm outputs are open collector with up to 500mA sink capability, providing the internal power dissipation is kept below 500mW. Internal diode protection makes them suitable for driving relays. However, to prevent damage to the unit, the maximum externally applied voltage must not exceed 50V.

SECTION 3 ANCILLARY EQUIPMENT

3.1 T339/01 TRANSMIT MONITOR

3.1.1 INTRODUCTION

The T339/01 is designed to monitor the supply voltage and forward and reverse power of up to six T377/PA amplifiers. It is constructed as a standard Tait 60mm base station module which fits into a Tait 484mm (19 inch) rack shelf.

3.1.2 SPECIFICATIONS

Meter Ranges:

Supply Voltage	.. 0 - 15V DC
Forward Power	.. 0 - 60W
Reverse Power	.. 0 - 60W

Dimensions:

Length	.. 295mm
Width	.. 60mm
Height	.. 190mm
Weight	.. 500g

3.1.3 CIRCUIT OPERATION

Refer to Wiring Diagram A3C 344.

The three pole Transmitter Select Switch determines which of up to six transmitters is being monitored. The Function Selector Switch determines whether forward power, reverse power or supply voltage of the selected transmitter is currently being displayed.

The preset calibration of the forward and reverse powers is incorporated in each transmitter. The supply voltage is calibrated by the two resistors in series with the meter. The meter movement is nominally 200µA, and 225 ohms.

Note that there is no printed circuit board in this unit.

3.1.4 METERING CALIBRATION

Connect an RF wattmeter to the PA output (using short coax lead).

Note: The PA cover shield should be in position when the meter and power control are set up.

(a) VOLTAGE

No adjustment. This position is factory preset.
(1% resistors fitted to the switch)

(b) FORWARD POWER

Set the meter selector switch to 'Forward Power'.

Key the transmitter on.

Adjust RV16 on the T377/PA PCB until the front panel meter indication is the same as the RF wattmeter reading.

(c) REVERSE POWER

Connect a 50 ohm 3dB pad (with the output open circuit) to the PA output. (This will give a return loss of 6dB.)

Adjust RV8 on the T377/PA PCB for a front panel meter reading of quarter of the forward power reading.

SECTION 4 INSTALLATION

4.1 GENERAL

Tait Base Station transmitters and receivers may be assembled into a wide variety of base station systems, from a simple 'land mobile base' to a complex 'linking system'.

4.2 TALK THROUGH REPEATER

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

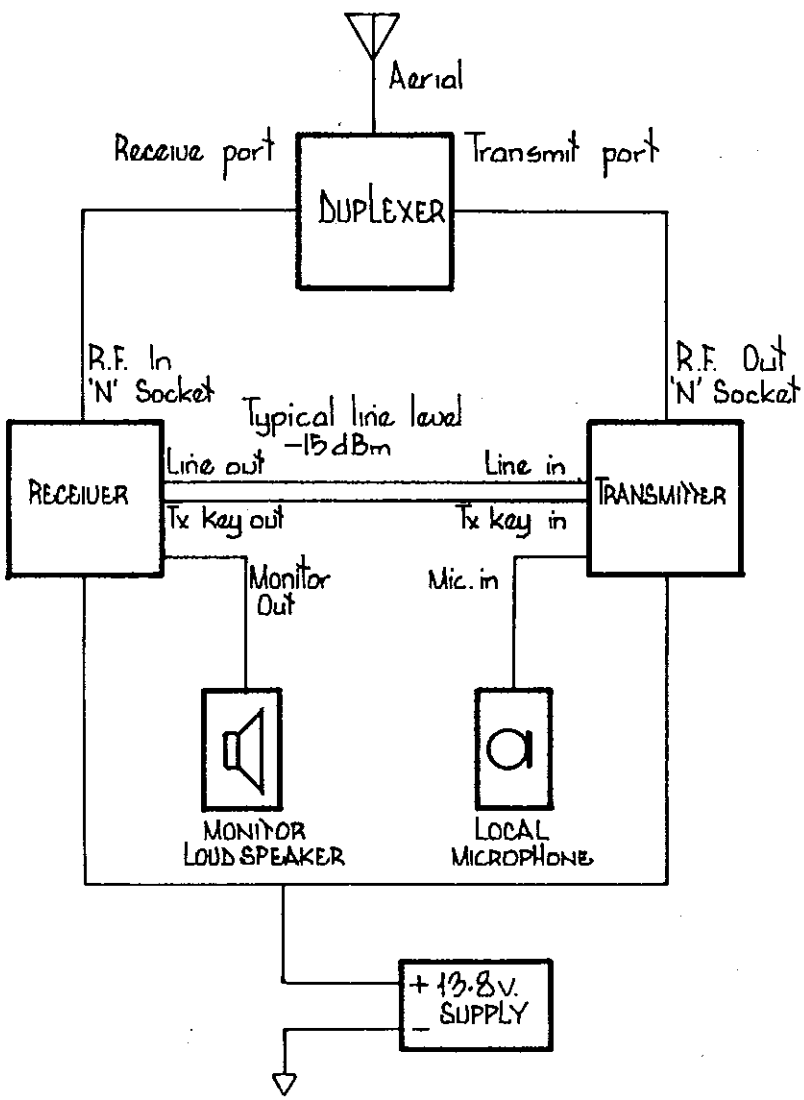


Figure 1 Talk Through Repeater

4.3 LINE CONTROLLED BASE STATION (Without Talk Through)

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

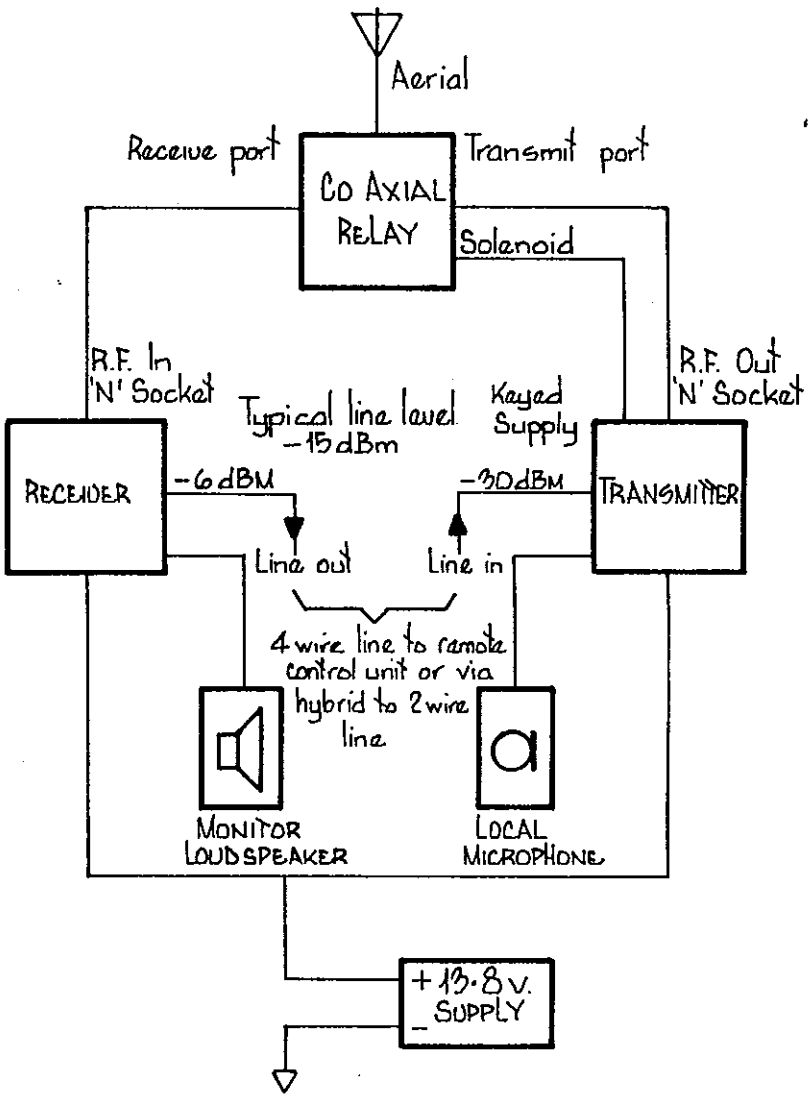


Figure 2 Line Controlled Base Station

4.3.1 4-WIRE TO 2-WIRE CONVERTER (HYBRID)

One way in which a base station may be line controlled by a two-wire line is by providing a 4-wire to 2-wire converter (hybrid). The line transformers may be interconnected to form such a hybrid by the following method.

1. Interconnect the windings of the line transformers as shown in Figure 3.

Note: Although the turns ratios of the transformers are not optimum for correct impedance match, the configuration performs adequately for most applications.

2. RV1, which controls the hybrid balance, may be adjusted for maximum isolation or for a specific talk through level as required. When maximum isolation is required, the slope of the average audio response between the two 4-wire ports may be improved by slight adjustment of RV1, sacrificing 1 or 2dB of total isolation between the 4 wire ports. This adjustment can be carried out audibly by listening to the re-transmitted white noise output of an open receiver with no signal input, and observing the relative response slope while making the adjustment.

3. The hybrid balance may be improved by fitting a capacitor (C1) in series with RV1. This will depend on the line characteristics and whether a capacitor is fitted in the line path. Some experimentation may be necessary to find the value of C1 (usually 1 or 2µF).

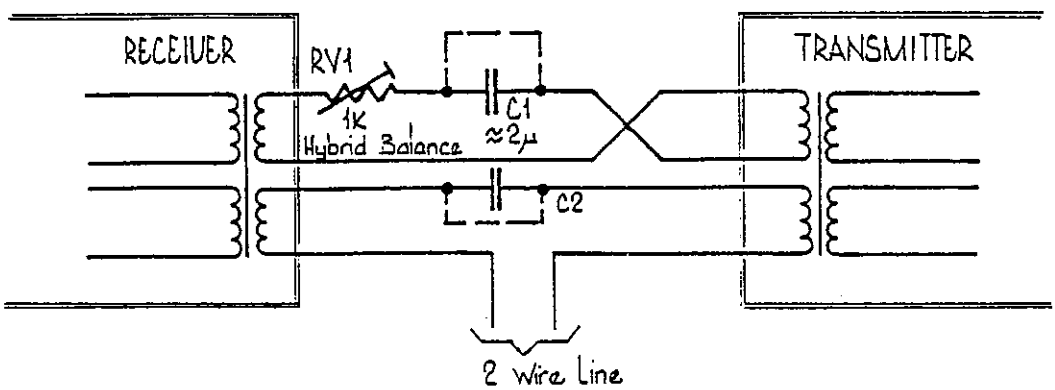


Figure 3 4-Wire to 2-Wire Converter

Note: (a) It is important that the two windings of each transformer are phased as shown.

(b) C2 may be fitted to allow DC signalling on the line.

SECTION 5 SERVICING

5.1 GENERAL

5.1.1 NOTES

If further information is required about the T377 or this Manual, it may be obtained from Tait Electronics Ltd or accredited agents. When requesting this information, please quote either the equipment serial number or works order number (found on a label at the back of the set). In the case of the Service Manual quote the Tait Internal Part Number (IPN) and Issue and for Circuit Diagrams quote the 'Title' and 'Issue'.

CAUTION: CMOS DEVICES

This equipment contains CMOS Devices which are highly susceptible to damage from static charges. Extreme care when handling these devices is essential. For correct handling procedures, refer to manufacturers' data books covering CMOS devices, e.g. Philips Data Handbook covering CMOS devices; Motorola CMOS Data Book, Section 5 (Handling Procedures).

CAUTION: AERIAL LOAD

The equipment has been designed to operate safely under a wide range of aerial loading conditions. However, it is strongly recommended that the transmitter should not be operated in the absence of a suitable load. Failure to observe this warning may result in damage to the transmitter output power 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 broken open, mutilated, filed, machined, or physically damaged in any way that can produce dust particles.

5.1.2 TECHNICAL INSTRUCTIONS (TI's)

From time to time 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. Relevant TI's are available from the Product Support Group, Tait Electronics Ltd, Christchurch.

5.2 MECHANICAL

5.2.1 POSIDRIV RECESS HEAD SCREWS

Posidriv recess head 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.

Note: Philips cross-head screws are used in some locations which require very small screws. A Philips cross-head driver must be used on these screws.

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). A 20k ohm/V or better multimeter should be used for taking the measurements, using only the medium or low resistance ranges.

The collector current drawn by multi-junction transistors is a further guide to their performance.

If an integrated circuit 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 Diagrams 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.

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.

5.4 SETTING UP

5.4.1 TEST EQUIPMENT REQUIRED	CALIBRATION TOLERANCE (Where Applicable)
1. DC power supply capable of delivering 15 amps at 13.8 volts (eg. Tait T348).	
2. Oscilloscope (CRO) 10MHz bandwidth (eg. Trio 1566a, Telequipment D61A).	
3. Multimeter or DMM (eg. Fluke 77).	
4. AC millivolt meter (eg. Trio VT106).	±0.5dB at 0dBm
5. RF power meter usable 135 to 225MHz (eg. Bird 43 with 5, & 100W elements).	
6. VHF frequency meter (eg. Opto 8010-S) accurate to better than 1ppm.	1ppm

7. FM modulation meter - high resolution usable to 250MHz with at least 10kHz audio bandwidth (eg. Marconi TF2304, HP8901, or Sayrosa 252).

8. Audio oscillator, 10Hz to 10kHz (eg. HP204C, Trio AG203). Distortion <0.2% Frequency ±3%

9. 'BNC' to 'N' type adaptors (eg. Amphenol, Greenpar).

10. Microphone and stereo jack plug for T377 mic. input.

11. Tone box consisting of an audio amplifier of approx. 1.5 watts output driving a speaker. This can be coupled to the T377/Ex local microphone via an adaptor that holds the speaker and microphone close together.

12. Trimming tools:

WT9	Tait IPN 936-0110
WT10	Tait IPN 936-0111
WT11	Tait IPN 936-0112

13. Special connector 50 ohm BNC to SMC female.

14. BNC 'T' Connector.

5.4.2 CHANNEL PROGRAMMING

5.4.2.1 Reference Frequency Selection

For 12.5kHz or 25kHz channel spacing, use a 6.25kHz reference (12.8MHz crystal).

For 30kHz channel spacing, use a 5kHz reference (10.24MHz crystal).

5.4.2.2 Programming

For single channel applications, the synthesizer may be programmed using the two 8-bit switches positioned at the base of the exciter PCB.

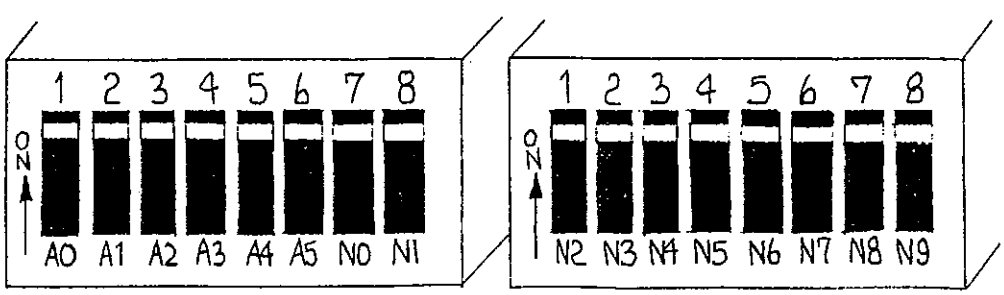


Figure 4 8-Bit Switches

16 bits (numbered A0-N9) are required to programme a frequency, which will be a multiple of the reference frequency. Note that a particular bit will add its frequency increment to the programmed frequency only when its corresponding switch is in the off position.

Table 1 shows the frequency increments represented by each of the 16 bits, A0-N9. Note the discontinuity between A5 and N0.

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

The following example shows a simple method of calculating the correct programme code.

Example

Tx frequency = 153.0MHz, 6.25kHz reference frequency.

VCO frequency:	153	
Subtract	128	switch 'off' N9
	25	
Subtract	16	switch 'off' N6
	9	
Subtract	8	switch 'off' N5
	1	
Subtract	1	switch 'off' 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

The DIP switches would therefore be arranged as shown in Figure 5.

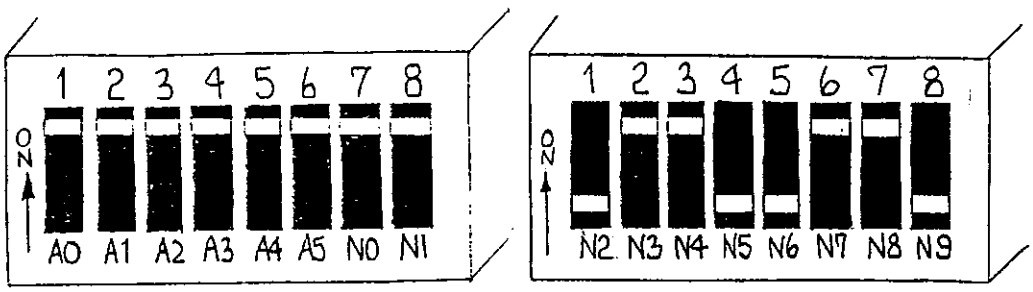


Figure 5 DIP Switch Positions

5.4.3 MULTI-CHANNEL PROGRAMMING

A plug-in diode matrix board (TA-500/M2) can be used to programme the exciter for up to 4 channels. Channel selection is achieved by pulling low one of four lines via a 'D' range connector.

Note 1: Only one line may be pulled low at any one time, and the PCB mounted DIP switches must all be in the off position.

Note 2: The supplied diode programming PCB will have several low value chip resistors fitted as standard for production testing. These must be removed (from all channels) before any programming is attempted.

Note 3: VCO operation is restricted to an 8MHz switching range within the bands 136-174MHz or 174-225MHz. Do not programme frequencies outside these limits.

The switching range is defined as the change in frequency for loop voltages between 2 and 15 volts.

The programming of each of the four channels is accomplished by soldering between the required pads on each row of surface mount diodes (see Figure 6).

A connected pad pulls IC1 input low and deletes the frequency increment.

An unconnected pad allows IC1 input to go high and adds the frequency increment.

Figure 6

The diode board is shown with its corresponding bit codes in Figure 7.

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

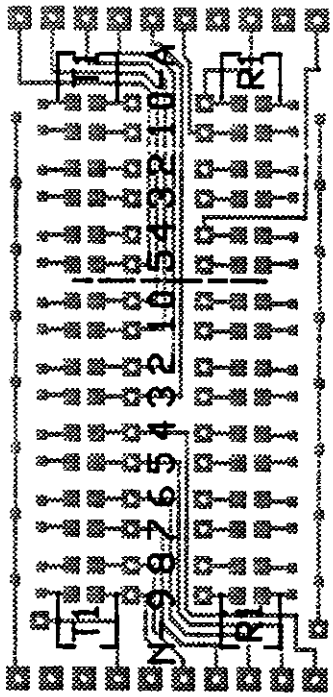


Figure 7

The four programmable channels on the diode matrix board correspond to channels 1-4 in the T377 as follows:

TA-500/M2	T377
T1	Channel 1
T2	Channel 2
R1	Channel 3
R2	Channel 4

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

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

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

Example

Tx frequency = 155.0MHz, 5kHz reference frequency.

VCO frequency:	155.0	
Subtract	102.4	pad N9 unconnected
	52.6	
subtract	51.2	pad N8 unconnected
	1.4	
subtract	0.8	pad N2 unconnected
	0.6	
subtract	0.4	pad N1 unconnected
	0.2	
subtract	0.2	pad N0 unconnected
	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 + N8 + N2 + N1 + N0 = VCO
102.4 + 51.2 + 0.8 + 0.4 + 0.2 = 155

Note: All these N values have pads left open. The remainder, i.e. N7, N6, N5, N4, N3, A5, A4, A3, A2, A1 & A0, are all solder shorted.

5.5 EXCITER ADJUSTMENTS

5.5.1 PRELIMINARY CHECKS

Check that the correct components are fitted for operation in the required frequency band.

Check for short circuits between the positive rail and earth ('D' range pins 9 and 15), and between the +9V regulated rail and earth.

Set up the test equipment as shown in Diagram 1.

Connect the bench test plug to the exciter while monitoring the supply current. This should be approximately 100mA.

5.5.2 VCO ALIGNMENT

Ensure that the synthesizer is correctly programmed.

Monitor the loop voltage (centre pin of TP1) with a high impedance volt meter (0-25V range).

Note: It is not necessary to key the exciter when aligning the VCO.

5.5.2.1 Single Channel Operation

Adjust CV49 for 10V at TP1.

Check the frequency.

5.5.2.2 Multi-Channel Operation

Adjust CV49 so that, when switching between channels, the loop voltages are symmetrically placed about 10 volts, but within the limits of 2 and 15 volts.

Check each frequency.

Note: A loop voltage of 0V or 18V indicates the VCO is out of lock.

It should now be possible to key the exciter by earthing the key line (pin 13). Approximately 800mW should be indicated on the RF power meter.

5.5.3 REFERENCE FREQUENCY ADJUSTMENT (standard option only)

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

Key the exciter.

Adjust the front panel mounted frequency trim pot for the correct VCO frequency (±100Hz).

Note: CV17 provides coarse frequency adjustment to compensate for variances in crystal characteristics and is set as follows:

Set the voltage on the wiper of the crystal trim pot. to approximately 5 volts and adjust CV17 to the nominal frequency.

Fine trim as above.

Repeat this measurement for any other channels to verify the programming.

5.5.4 TO CHECK THE TRANSMIT TAIL TIMER

Adjust RV63 ('tail time' preset) fully clockwise.

Make and then break the key line from earth and check that the exciter remains on for at least 1.5 seconds.

Reset RV63 fully anticlockwise.

Make and then break the key line, checking that the exciter turns off immediately the key line is broken.

Readjust RV63 for the required tail time.

5.5.5 AUDIO PROCESSOR ADJUSTMENTS

5.5.5.1 Deviation

The deviation figures given in the following Sections are for ±5kHz deviation (25kHz channel spacing); for ±2.5kHz deviation (12.5kHz channel spacing), use half these figures.

5.5.5.2 Compressor

In current production runs the compressor has been removed from the line input circuit, but retained for use with the microphone.

The B3536S audio processor Circuit Diagram (A1C549) will give the appropriate linking details.

5.5.5.3 Line Input Adjustment

Set up the test equipment as in Diagram 1.

Set the audio signal generator output to 1kHz at 0dBm into the line.

Set RV64 (line sensitivity control) fully clockwise.

If the set is multichannel, select the centre frequency channel.

Earth the key line.

Set RV54 (modulation adjust) for a peak reading on the modulation meter of ±5kHz deviation (this sets up the limiter for maximum deviation).

Sweep the audio frequency range and adjust RV54 to ensure that the maximum deviation does not exceed ±5kHz on any channel.

Reduce the audio input to -15dBm.

Turn the line level control on the front panel until the modulation meter reads ±3kHz deviation.

The transmitter line sensitivity has now been set.

5.5.5.4 Microphone Input Adjustment

Plug the microphone jack into the front panel socket.

Turn RV27 (compression adjustment) fully clockwise to remove compression.

Acoustically couple the microphone to a tone box and close the PTT switch.

Set the tone box oscillator to 1kHz.

Increase the audio level until the demodulated waveform shows signs of clipping.

Turn RV27 until the deviation reduces and the waveform just starts clipping.

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

5.6 RF POWER AMPLIFIER

5.6.1 PRELIMINARY CHECKS

Check for short circuits between the positive rail and earth.

Check that the correct components are fitted for the frequency band in use; refer to the appropriate Circuit Diagram (A1C543).

Set up the test equipment as in Diagram 1.

Connect the bench 13.8V DC supply to the PA while monitoring the supply current. This should be about 45mA while the PA is not being driven.

To key the transmitter, earth the key line pin 13 on the exciter.

Check that the power supply is still at 13.8V under load.

Check that the regulated power control supply is approximately 7V.

5.6.2 OPTIMISING INTERMODULATION PERFORMANCE

TL1 and TL2 are phasing lines supplied cut for best performance in the middle of the band, giving approximately -60dBc worst case.

If it is necessary to minimise IM products, TL1 and TL2 may be cut to suit the operating frequency, using the formula:

$$L\,(cm) = \frac{5250}{f}$$

The stripping dimensions are as shown in Figure 8, with "L" being the length of the centre conductor.

Note: Coaxial phasing lines are fitted as standard only to the T377/PA/03 (135-174MHz) and T377/PA/12 (174-225MHz). The T377/PA/02 has two short lengths of 2.5mm slot car track to bridge the gap where the lines are normally mounted.

TL1 ; TL2

COILED
3·5TURNS
ON ~ 20mm I.D.

Material: RG-316-U coaxial cable

Version	L
03	340 mm
12	260 mm
02	10mm slot car track

Figure 8 Phasing Line Details

5.6.3 CAPACITOR POSITIONING

The position and spacing of cased mica and chip capacitors around the final transistors Q12 and Q14 is critical (refer to Figure 9).

Note: The position of C75 and C95 is dependent on the frequency range of the PA.

T377/PA/02 & T377/PA/03 (135-174MHz)

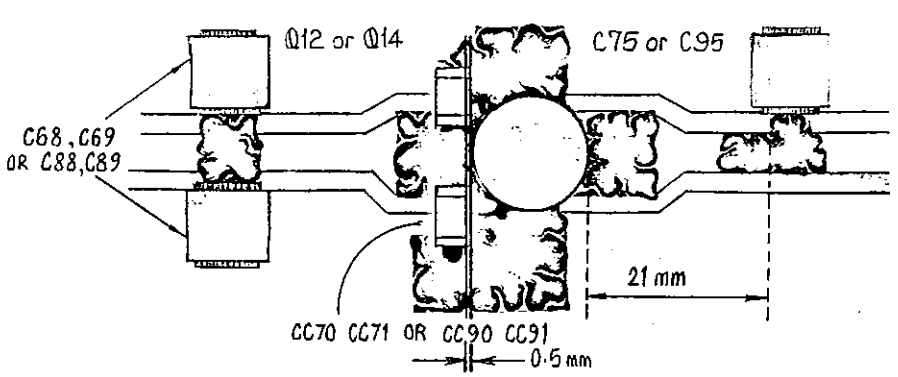


Figure 9 Final Transistor Capacitor Spacing

T377/PA/12 (174-225MHz)

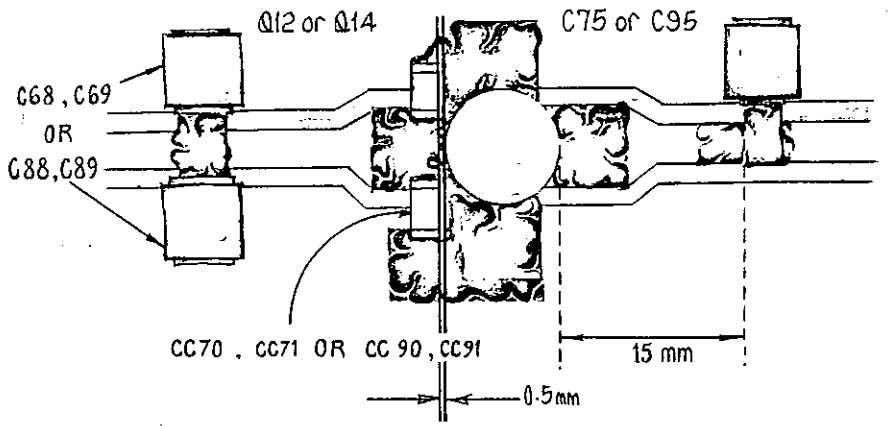


Figure 9 (continued)

5.6.4 ALIGNMENT PROCEDURE

Refer to Circuit Diagram A1C543.

Note 1: The power amplifier circuit is 'broad band'. If the T377 is being retuned to a frequency less than 8MHz from the frequency already set up, there will be no need to retune the PA circuit.

For operation over a segment of the band, tune the PA to the centre frequency of the band of interest. If only two channels are programmed, use the highest frequency channel.

Note 2: Cables and connectors can easily cause a power loss of several watts if either too long or poorly terminated. Always use the shortest possible lead between the T377 and power meter.

Note 3: With the T377/PA partially withdrawn from the rack frame for tuning, the TA-068 lead is required to connect the T377/PA to the T377/Ex.

Connect the exciter output to the PA input via a thru-line wattmeter with a 5 watt full scale reading. Special SMC/BNC leads will be required.

Connect the RF power meter to the PA output. Set the front panel power control preset (RV32) fully clockwise.

Set CV57, CV76 and CV96 to the half-meshed position.

In the T377/PA/12 version, also set CV48 to the half-meshed position.

Key the transmitter.

Check that there is at least 0.5 watts input to the PA.

Tune CV76 & CV96 for maximum output power, then tune CV57 for maximum output power.

In the T377/PA/12 version, also tune CV48 for maximum output power.

Readjust CV76 and CV96 for maximum output power (60 to 70 watts). Some slight readjustment of CV57 may be necessary.

5.6.5 SETTING THE OUTPUT POWER

Note: The PA cover shield should be in position when the metering and power controls are set up.

Once the PA has been tuned to full power, the output power may be set by adjusting RV32 (the front panel power adjust control) to any desired output power between 10 and 60 watts. The actual power used may be limited by regulatory requirements (e.g. NZ 33W, Australia 50W).

5.6.6 FORWARD & REVERSE POWER METERING CALIBRATION

Refer to Section 3.1.4 of this Manual if a T339/01 transmit monitor is to be used in conjunction with the T377.

5.6.7 SETTING ALARM LEVELS

Note: The PA cover shield should be in position when setting the forward and reverse power alarm levels.

5.6.7.1 Forward Power

Power up the T377/PA and adjust the power output pot. (RV32) so that the output power is at the alarm level required (e.g. 40 watts if the PA normally operates at 50 watts).

Adjust the forward power alarm set pot. (RV10) so that the forward power alarm LED lights.

Check the alarm level setting by adjusting the power up and down and observing the alarm LED. A few watts hysteresis can be expected.

Readjust the power control (RV32) for the normal operating level.

5.6.7.2 Reverse Power

Power up the T377/PA and adjust the power control pot. (RV32) for the normal operating power level.

Place a known mismatch of the required value (e.g. 5:1 VSWR) and adjust the reverse power alarm set pot. (RV6) so that the reverse power alarm LED lights.

5.6.7.3 Temperature Shutdown

Note: The temperature shutdown circuit is factory set to approximately 130°C and 5 watts. RV35 and RV39 should not be readjusted if normal operation is required.

Power up the T377/PA and adjust the power control pot. (RV32) for the normal operating power level.

Turn the temperature set pot. (RV35) fully anticlockwise.

Apply heat to the NTC (R37) with the tip of a soldering iron.

Adjust the shutdown power level pot. (RV39) to the desired level.

For continuous operation during fault conditions, the shutdown power should be set in the range 0 to 5 watts.

For normal operation, i.e. shutdown under extreme PA internal temperatures (approx. 130°C) or excessive dissipation in the combiner balance resistor (R69), the temperature set pot. (RV35) should be adjusted for a voltage reading of 150mV on pin 8 of the LM339 (IC1).

5.7 FAULT FINDING

5.7.1 GENERAL

If a fault is apparent, first check for simple causes such as shorts under the PCB, incorrect polarity or voltage, or trouble with the test set-up and ancillary equipment.

If a component failure is suspected, in most cases locating it will require little more than the usual systematic approach with the aid of the information given in this section.

A Block Diagram is included with all relevant information, as is a voltage table giving the DC conditions around each transistor measured with a 20k ohm/volt moving-coil meter and the supply rail to the set at 13.8 volts.

Refer to Sections 5.3.1 and 5.3.2 before attempting the removal of any components.

5.7.2 PA MODULE - SPECIAL NOTES

5.7.2.1 PA Faults

If a PA fault has occured, or is suspected, it is easier to isolate if the PA is split into three separate amplifiers.

The first two stages can be observed by removing R56 on the 135-174MHz version, or the copper strap after C58 on the 174-225MHz version, and attaching a power meter via a flying lead.

Q12 and Q14 can be observed individually by using a flying lead input before L41 or L26 and a flying lead output after C97 or C77 (i.e. remove R69, L34 and L49).

The first two stages should produce 10 watts for 0.5 watt drive. Each of the SRF1001's (Q12 & Q14) should produce approx. 40 watts for 4 watts drive.

When the fault has been cleared, reassemble the PA and carry out the setting-up procedures given in Section 5.6.3.

5.7.2.2 To Replace The PA Transistors

Unsolder the tabs by heating with a soldering iron and lifting away from the PCB with a thin stainless steel spike, or screwdriver. Unscrew the transistor stud nut and remove the device.

Trim the tabs of the replacement device to make them similar to the faulty device, and tin the underside lightly. Smear the face of the device with heatsink compound and tighten it securely (torque setting 5lb-in.) to the heatsink. Then solder the tabs.

Caution: Do not solder the tabs before torquing down otherwise the device may be broken.

5.7.2.3 To Remove The PCB From The Heatsink

Most components are soldered topside only, but in some cases access to the underside of the PCB is necessary.

Remove the 8 PCB retaining screws.

Remove the transistor stud nuts.

Remove the output 50 ohm coaxial connector by unscrewing it from the heatsink casting and unsoldering it from the PCB.

Disconnect the input 50 ohm coaxial cable from the heatsink casting.

Disconnect the battery positive and negative feed wires from the D-range connector.

Disconnect the alarm and metering wires from the D-range connector.

Lift the PCB gently from the heatsink to gain access to the underside of the PCB.

Caution: Do not operate the PA with the PCB detached as the heatsink is used for earthing and for the dissipation of heat generated within the transistors.

To replace the PCB, reverse the order of removal taking care that the wiring is correctly routed and is not subjected to 'pinching'.

5.7.2.4 To Remove Cased Mica Capacitors

Cased Mica capacitors can be removed by heating the top with a heavy-duty soldering iron and gently lifting the capacitor off the PCB with a solder-resistant spike or equivalent.

5.7.3 VOLTAGE CHART

Test Conditions:

- typical DC voltages measured with Fluke 77 DVM
- supply voltage 13.8V at socket
- VCO locked up
- transmitter unkeyed
- allow ±20% for spread of transistor characteristics.

Power Amplifier			
Device	Emitter	Base	Collector
Q1	8.7V	7.0V	6.6V
Q2	0V	0.5V	5.5V
Q5	13.8V	13.0V	13.8V
Q8	0V	0V	13.8V
Q9	0V	0V	13.8V
Q12	0V	0V	13.8V
Q14	0V	0V	13.8V

SECTION 6 PARTS LIST

6.1 GENERAL

The 10 digit numbers (000-00000-00) in this parts list are 'Internal Parts Numbers' (IPN's).

Your spare parts orders can be handled more efficiently if you quote equipment type, circuit reference, IPN and give a brief description of the part.

The parts list printed below is for all versions of the T377. Different versions have different sub-groups. Check the model of your equipment (printed on a label on the back of the equipment). To find the correct part refer to the sub-groups listed for your equipment. 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.

This section contains a list of the various T377 versions and their sub-groups.

	VERSION	SUB-GROUPS	
1.	T377/EX/02	B377/EX	T377/Ex PCB Assembly Parts
		B377/EX/MECH	T377/Ex Mechanical Parts
		C377/EX/M	T377/Ex Single D Plug Fitting
		C377/EX/WIRE	T377/Ex Wire List
		C377/EX/6.25	T377/Ex 6.25kHz Increment Parts
		C377/EX/XO	T377/Ex Crystal Oscillator Parts
		C377/EX/02	T377/Ex 136-174MHz Parts
		B3536S	B3536S Synthesised Audio Processor Parts
		C3536S/02	Add To B3536S For /02 Version
2.	T377/EX/05	B377/EX	T377/Ex PCB Assembly Parts
		B377/EX/MECH	T377/Ex Mechanical Parts
		C377/EX/M	T377/Ex Single D Plug Fitting
		C377/EX/WIRE	T377/Ex Wire List
		C377/EX/5	T377/Ex 5kHz Increment Parts
		C377/EX/XO	T377/Ex Crystal Oscillator Parts
		C377/EX/02	T377/Ex 136-174MHz Parts
		B3536S	B3536S Synthesised Audio Processor Parts
		C3536S/02	Add To B3536S For /02 Version
3.	T377/EX/12	B377/EX	T377/Ex PCB Assembly Parts
		B377/EX/MECH	T377/Ex Mechanical Parts
		C377/EX/M	T377/Ex Single D Plug Fitting
		C377/EX/WIRE	T377/Ex Wire List
		C377/EX/6.25	T377/Ex 6.25kHz Increment Parts
		C377/EX/XO	T377/Ex Crystal Oscillator Parts
		C377/EX/12	T377/Ex 174-225MHz Parts
		B3536S	B3536S Synthesised Audio Processor Parts
		C3536S/02	Add To B3536S For /02 Version

4. T377/EX/15	B377/EX	T377/Ex PCB Assembly Parts
	B377/EX/MECH	T377/Ex Mechanical Parts
	C377/EX/M	T377/Ex Single D Plug Fitting
	C377/EX/WIRE	T377/Ex Wire List
	C377/EX/5	T377/Ex 5kHz Increment Parts
	C377/EX/XO	T377/Ex Crystal Oscillator Parts
	C377/EX/12	T377/Ex 174-225MHz Parts
	B3536S	B3536S Synthesised Audio Processor Parts
	C3536S/02	Add To B3536S For /02 Version
5. T377/EX/42	B377/EX	T377/Ex PCB Assembly Parts
	B377/EX/MECH	T377/Ex Mechanical Parts
	C377/EX/M2	T377/Ex Double D Plug Fitting
	C377/EX/WIRE	T377/Ex Wire List
	C377/EX/6.25	T377/Ex 6.25kHz Increment Parts
	C377/EX/XO	T377/Ex Crystal Oscillator Parts
	C377/EX/12	T377/Ex 174-225MHz Parts
	B3536S	B3536S Synthesised Audio Processor Parts
	C3536S/02	Add To B3536S For /02 Version
	B/TA-500/M2	T500 Series Memory SMD Parts
6. T377/EX/55	B377/EX	T377/Ex PCB Assembly Parts
	B377/EX/MECH	T377/Ex Mechanical Parts
	C377/EX/M2	T377/Ex Double D Plug Fitting
	C377/EX/WIRE	T377/Ex Wire List
	C377/EX/5	T377/Ex 5kHz Increment Parts
	C377/EX/XO	T377/Ex Crystal Oscillator Parts
	C377/EX/02	T377/Ex 136-174MHz Parts
	C377/EX/55	Add To T377/Ex For /55 Version
	B3536S	B3536S Synthesised Audio Processor Parts
	C3536S/07	Add To B3536S For /07 Version
	B/TA-500/M2	T500 Series Memory SMD Parts
7. T377/PA/02	B377/PA	T377/PA PCB Assembly Parts
	B377/PA/MECH	T377/PA Mechanical Parts
	B377/PA/WIRE	T377/PA Wire List
	C377/PA/02	Add To T377/PA For /02 Version
8. T377/PA/03	B377/PA	T377/PA PCB Assembly Parts
	B377/PA/MECH	T377/PA Mechanical Parts
	B377/PA/WIRE	T377/PA Wire List
	C377/PA/02	Add To T377/PA For /02 Version
	C377/PA/03	Add To T377/PA For /03 Version
9. T377/PA/12	B377/PA	T377/PA PCB Assembly Parts
	B377/PA/MECH	T377/PA Mechanical Parts
	B377/PA/WIRE	T377/PA Wire List
	C377/PA/12	Add To T377/PA For /12 Version

6.2 B377/EX T377/EX PCB ASSEMBLY PARTS

6.2.1 TRANSISTORS

INTERNAL PART NO.	QTY/SET	DESCRIPTION	REFERENCE		CH/N
0000001060	1	BC327 TRANSISTOR	Q19		
0000001066	2	BC337 TRANSISTOR	Q8, Q12		
0000001110	6	BC548B TRANSISTOR	Q4, Q5, Q9, Q16, Q17, Q18		
0000001130	2	BC557B TRANSISTOR	Q7, Q14		
0000022330	2	2N4427 TRANSISTOR	Q26, Q27		
0000030955	1	2N6107 TRANSISTOR	Q6		
0000031755	1	3SK87K TRANSISTOR	Q21		
0000031955	2	MPS3646 TRANSISTOR	Q22, Q25		
0000033110	1	J310 TRANSISTOR	Q20		

6.2.2 DIODES

0010000102 6	5	BA482 DIODE	D20, D21, D22, D23, D38		
0010000116 0	1	SR2607 DIODE	D2		
0010000120 0	11	1N4148 DIODE	D5, D7, D8, D15, D24 D25, D26, D27, D30, D31, D32		
0010001253	1	BB405 VARICAP DIODE	D36		
0010000 _ _ _					
0010000 _ _ _					
0010001509	1	BZX79/C3V9 ZENER	D6		
0010001511	1	BZX79/C5V1 ZENER	D40		
0010001516	1	BZX79/C8V2 ZENER	D19		
0010001515	2	BZX79/C10 ZENER	D9, D10		

6.2.3 INTEGRATED CIRCUITS

0020001240	1	MLM358 INT CCT	IC2		
0020001755	1	SP8793/MC12016 INT CCT	IC3		
0020001760	1	MC145152 INT CCT	IC1		

6.2.4 CAPACITORS

0111012200 1	1	2P2 CAP NPO ± 0.25P 50/63V CER	C51		
0111 _ _ _ _ _		± 0.25P 50/63V CER			
0111013900 1	1	3P9 CAP NPO ± 0.5P 50/63V CER	C66		

0110182001	1	8P2 CAP NPO ±0.5P 50/63V CER	C74	
0111202001	1	12P CAP NPO 5% 50/63V CER	C68	
0111802001	1	18P CAP N150 5% 50/63V CER	, C73	
0110		5% 50/63V CER		
0112470001	2	47P CAP N150 5% 50/63V CER	C61, C63	
0110		5% 50/63V CER		
0113150001	4	150P CAP N150 5% 50/63V CER	C62, C67, C69, C72	
0114100006	6	1n CAP T/C B 10% 63V CER	C7, C50, C53, C55, C60, C82	
0114470003	11	4n7 CAP T/C B 10% 50V CER DISC	C5, C8, C14, , C22, C36 C37, C52, C66, C71, C80, C81	
0200710002	1	1µ CAP 50V ELECTRO 5×11mm VERT	C11	
0200747002	1	4µ7 CAP 50V ELECTRO 5×11mm VERT	C38	
0200810003	5	10µ CAP 50V ELECTRO 5×11mm VERT	C45, C46, C14A, C24, C23	86/02-030
0200847002	1	47µ CAP 16V ELECTRO 6×11mm VERT	C6,	86/02-030
0200947002	2	470µ CAP 16V ELECTRO 10×20mm VERT	C4, C9	
0220410001	1	1n CAP 50V MYLAR	C29	
0220447001	3	4n7 CAP 50V MYLAR	C25, C27, C78	86/05-133 86/02-030
0220510002	2	10n CAP 50V MYLAR	C30, C40	
0220547001	3	47n CAP 50V MYLAR	C15, , C31, C83	
0220610004	4	100n CAP 50V MYLAR	C10, C13, C64, C70	
0220710002	3	1µ CAP 50V MYLAR	C12, C26, C28	

6.2.5 RESISTORS

0302100002	2	10E RESISTOR 5% FILM 7×2.5mm	R22 (HOR) R95 (VERT)
0302470002	2	47E	R65, R101 (VERT)
0302560001	1	56E	R91 (VERT)
0302390001	1	39E	R87 (VERT)
0303100002	2	100E	R74, , R98 (HOR)
0303120002	2	120E RESISTOR 5% C/F 7×2.5mm	R88 HOR, R89 VERT
0303150001	1	150E	R94 (VERT)
0303220001	1	220E	R80 (VERT)
0303390001	1	390E	R97 (HOR)
0303470001	1	470E	R90 (VERT)

030035600	1	560E	R100 (HOR)	
030036800	2	680E	R15, R67 (VERT)	
030041000	8	1K RESISTOR 5% FILM 7x2.5mm	R24, R50, R62, R93, R96 (HOR) R14, R72, R92 (VERT)	
030041200	2	1K2	R12, R85 (VERT)	
030041800	2	1K8	R105 (HOR) R71 (VERT)	
030042200	2	2K2	R102 (HOR) R77 (VERT)	
030042700	1	2K7	R73 (VERT)	
030043300	3	3K3	R75, R78, R84 (VERT)	
030043900	1	3K9	R17 (VERT)	
030044700	9	4K7	R103 (HOR) R11, R13, R16, R25, R29, R55, R61 R76 (VERT)	
030045600	2	5K6	R43, R35 (VERT)	
030046800	2	6K8	R44, R52. (VERT)	
030048200	2	8K2	R39, R104 (VERT)	
				86/2-030
030051200	2	12K RESISTOR 5% FILM 7x2.5mm	R46, R49 (HOR)	
030052200	3	22K	R64 (HOR) R81, R83 (VERT)	
030053300	1	33K	R42 (VERT)	
030054700	7	47K	R70 (HOR) R41, R45, R51, R60, R66, R82 (VERT)	
030061000	1	100K	R40 (VERT)	
030061500	2	150K	R79 (HOR) R23 (VERT)	
030062200	2	220K	R47, R48 (HOR)	
030064700	2	470K	R53 (HOR) R54 (VERT)	
030071000	1	1M	R28 (VERT)	
042064701	1	470K PRE-SET RES. 10mm VERT	RV63	
045061001	1	100K NTC RES. 5mm DISC	R18	

6.2.6 COILS

050000163 1	1	COIL TAIT No 631	L2
050000163 3	1	COIL TAIT No 633	L12
051000055	2	RF TXFMR TAIT No 515	L17, L18
052081304 5	3	COIL A/W 4.5T/3mm HOR	L22, L26, L27
052081403 5	1	COIL A/W 3.5T/4mm HOR	L16
052081404 5	1	COIL A/W 4.5T/4mm HOR	L20

052081406 5	2	COIL A/W 6.5T/4mm HOR	L21, L24	
056000021 00	1	3µ3 FXD IND	L19	
056000021 01	1	1µ5 FXD IND	L8	
056000021 02	2	100µ FXD IND	L7, L30	
056000021 09	2	0.82µ FXD IND	L11, L13	

6.2.7 MISCELLANEOUS

065000104	2	FERRITE BEAD F8 4×2×5mm	L25, L25A
065000108	1	FERRITE BEAD 4S3 3×0.7×10mm	L23
220000109 9	1	PCB T377/EX	
230000101 9	2	SWITCH 8×SPST DIP	
240000205 7	1	HEADER 1 ROW 10WAY	
240000205 9	1	HEADER 1 ROW 3WAY	TP1
240040205 7	1	SKT, PCB MTG, 1 ROW 10WAY	
356000102 7	0.06	1 THOUSAND HARWIN TRACK PINS	
362000100 8	2	SIL-PAD TO-5 & TO-39	UNDER Q26, Q27 (2N4427)

6.3 B377/EX/MECH T377/EX MECHANICAL PARTS

008000101 1	1	LED 3mm RED (TLR124 LESS MTG)	'ON'
008000101 5	1	LED 3mm GREEN (TLG 124 LESS MTG)	'SUPPLY'
012041501	15	1n5 CAP, CERAMIC FEEDTHRU', LEADLESS	
040051001 2	1	10K LOG POT L/S. SLOTTED SHAFT (AMPOC)	'LINE SENSITIVITY'
065000101 3	15	FERRITE BEAD 1.9×.9×3.8 SP 7D	86/87-199
232000101 0	1	SWITCH, PUSH 'ON' SPDT	'CARRIER'
240000105 5	1	PLUG 15 WAY 'D' RANGE WIRE WRAP PINS.	
240000020 02	1	PLUG, STEREO	MICROPHONE LEAD.
240001004 6	1	PLUG, COAX, BULKHEAD JACK (SUHNER)	EX O/P
240020204	1	SOCKET, STEREO PHONE 2P C/O	MICROPHONE IN
240021001 7	1	SOCKET, COAX, BNC, PNL JACK	'FREQUENCY OUT'
240021004 6	2	SOCKET, COAX, ELBOW, CORD MTG (SUHNER)	O/P CONNECTOR TO PA [illegible] 81/9-276

T377 Parts List

2	5	2	0	0	0	1	0	1	2	1	MICROPHONE 600Ω	(REMOVE THE 12K RESISTOR WHICH IS MOUNTED ON THE PRESSEL SWITCH CONTACTS).	
3	0	2	0	0	0	5	1	8	6	1	BRACKET, FEEDTHRU MTG A2M1855		
3	0	2	0	0	4	5	0	1	8	1	BUSH, CONN RETAINING A4M1026		
3	0	3	0	0	1	1	1	4	0	2	CHASSIS SIDE PLATE A2M1195		
													87/7-227
3	0	6	0	0	0	1	0	1	0	2	FERRULE A4M948		
3	0	8	0	0	0	1	0	0	7	1	HANDLE A4M949		
3	0	8	0	0	1	2	0	2	8	1	HEATSINK, REDPOINT 5F	Q27 (1N4427)	
3	0	8	0	0	1	3	0	6	7	1	HEATSINK A4M1852	Q6 (2N6107)	
3	1	6	0	0	0	6	3	2	0	1	FRONT PANEL A2A403, A3M1853		
3	1	6	0	0	2	1	1	0	0	1	CHASSIS REAR PANEL A2M952		
3	1	6	0	0	2	1	1	6	6	1	CHASSIS FRONT PANEL A2M1854		
3	1	6	0	0	8	5	0	1	5	2	LOCATING PIN A4M775	'D' RANGE	
3	1	9	0	0	0	1	1	4	9	1	SHIELD, VCO BOX, ALLOY NO.5 A1M2229		88/5-269
3	1	9	0	0	0	1	1	0	9	1	SHIELD, VCO LID A3M1655		
3	1	9	0	0	0	1	1	2	3	1	SHIELD, RF SOLDER SIDE A2M1850		
3	1	9	0	0	0	1	1	2	4	1	SHIELD, RF, COMPONENT SIDE A2M1851		
3	1	9	0	0	2	0	0	4	5	1	SLEEVE A2M970		
3	1	9	0	0	3	0	0	2	8	1	SPACER, BNC A4M1033		
3	4	5	0	0	0	1	0	0	2	12	SCREW M2x6mm PAN POZI ST BZ	RF SHIELDS	
3	4	5	0	0	0	1	0	0	6	4	SCREW M2 x16mm CH HD ST BZ	BNC MTG	
3	4	5	0	0	0	4	0	0	6	2	SCREW M3x8mm PAN POZI ST BZ	HEATSINK TO CHASSIS SIDEPLATE	84/10-313
3	4	5	0	0	0	4	0	0	9	8	SCREW M3x6mm CSK POZI ST BZ	SLEEVE	
3	4	5	0	0	0	4	0	1	0	6	SCREW M3x6mm PAN POZI ST BZ	SIDES/CHASSIS REAR 4, FEEDTHRU BRKT 2	
3	4	5	0	0	0	4	0	1	1	1	SCREW M3x10mm PAN POZI ST BZ	MTG Q6 (2N6107) 1	
3	4	5	0	0	0	4	0	2	0	4	SCREW M3x8mm BUTTON SKT BLACK	FRONT PANEL 4	
3	4	9	0	0	0	2	0	0	2	4	SCREW 4-40 x 1/4 CSK POZI TAPTITE	SIDES/CHASSIS FRONT 4	
3	4	9	0	0	0	2	0	0	3	8	SCREW 4-40 1/4 PAN POZI TAPTITE	PCB/CHASSIS 8	87/7 227
3	4	9	0	0	0	2	0	3	1	4	SCREW M3x10mm PAN POZI TAPTITE	VCO BOX/LID 4	
3	5	2	0	0	0	1	0	0	1	12	NUT M2 MACH ST BZ	RF SHIELDS	
3	5	2	0	0	0	1	0	0	1	4	NUT M2 MACH. ST BZ	BNC	
3	5	2	0	0	0	1	0	0	8	5	NUT M3 COLD FORM	FEEDTHRU BRKT 2, H/S 2, Q6 1	
3	5	2	0	0	0	1	0	2	9	2	NUT M4 NYLOC	HANDLE	
3	5	2	0	0	0	1	0	4	3	2	NUT, LOCATING PIN A4M793		
3	5	3	0	0	0	1	0	0	6	12	WASHER M2.5 SPRING ZINC PLATED	RF SHIELDS	87/7-211
3	5	3	0	0	0	1	0	0	2	4	WASHER M2 SHAKEPROOF	BNC	77-332

3	5	3	0	0	0	1	0	1	0	1	WASHER M3 FLAT	MTG Q6 (2N6107)		
3	5	3	0	0	0	1	0	1	2	3	WASHER M3 SPRING	MTG Q6 (2N6107) 1, LOCATING PINS 2		
3	5	3	0	0	0	1	0	1	3	4	WASHER M3 SHAKEPROOF	FEEDTHRU BRKT 2, H/S 2.		
3	5	3	0	0	0	2	0	4	4	1	WASHER, FIBRE A4M779	STEREO JACK SKT		
3	5	4	0	0	0	1	0	3	3	16	M3 PEM FASTENER	SUPPLIED TO MANUFACTURER OF METALWORK		
3	5	6	0	0	0	1	0	0	3	2	M3 SOLDER TAG LONG	SECURES COMX UNDER PCB		
3	6	0	0	0	0	1	0	4	0	1	SNAP BUSH			
3	6	0	0	0	0	1	0	4	1	1	SHORTY BUSH			
3	6	2	0	0	0	1	0	0	7	1	SIL PAD TO-220	Q6		
3	6	2	0	0	0	1	0	1	3	1	INSULATING BUSH TO-220	Q6		
3	6	2	0	0	0	1	0	3	0	2	GROMMET LED MTG.			
3	6	5	0	0	0	1	1	0	3	1	LABEL 'TEST REPORT INSIDE' AHA267			87/- 407
3	6	9	0	0	0	1	0	1	4	10	CABLE TIES NYLON 100mm x 2.6mm	FOR LOOM		86/10-315
3	6	9	0	0	0	1	0	1	2	1	FURNITURE FOOT BLACK R/C 357	FITTED IN V.C.O COIL, CUT BOTTOM END OFF		86/7-352 87/7 227
4	1	0	0	0	0	1	0	4	2	1	CARTON, 60mm F&D EQUIV UEB15096			88/1-025

6.4 C377/EX/M T377/EX SINGLE D PLUG FITTING PARTS

3	0	3	0	0	2	3	0	9	1	1	COVER, 'D' RANGE HOLE A4M1230			
3	4	9	0	0	0	2	0	0	3	2	SCREW 4-40 x 1/4 PAN POZI TAPTITE	HOLD COVER		
5	3	8	0	0	0	1	0	0	3	1	STEEL GUIDE, SINGLE SKT.			

6.5 C377/EX/M2 T377/EX DOUBLE D PLUG FITTING PARTS

0	1	2	0	4	1	5	0	0	1	15	1n5 CAP, CERAMIC FEED THRU', LEADLESS			
0	6	5	0	0	0	1	0	1	3	15	FERRITE BEAD 1.9 x 0.9 x 3.8mm 7D			
2	0	1	0	0	0	3	0	0	5	160mm	WIRE 7/0.2mm PVC GREEN			
2	0	1	0	0	0	3	0	0	6	160mm	WIRE 7/0.2mm PVC BLUE			
2	0	1	0	0	0	3	0	0	7	160mm	WIRE 7/0.2mm PVC VIOLET			
2	0	1	0	0	0	3	0	0	8	160mm	WIRE 7/0.2mm PVC GREY			
2	4	0	0	0	0	1	0	5	5	1	PLUG 15WAY 'D' RANGE W/W PINS			
3	0	2	0	0	0	5	1	8	6	1	FEEDTHRU BRACKET A2M1855			
3	1	6	0	0	8	5	0	1	5	2	LOCATING PIN A4M776			
3	4	5	0	0	0	4	0	0	9	2	SCREW M3 x 6mm PAN POZI ST BZ	BRKT MTG		
3	5	2	0	0	0	1	0	0	8	2	NUT M3 HEX	BRKT MTG		
3	5	2	0	0	0	1	0	4	3	2	NUT, LOCATING PIN A4M793			
3	5	3	0	0	0	1	0	1	2	2	WASHER M3 SPRING	LOCATING PINS		
3	5	3	0	0	0	1	0	1	3	2	WASHER M3 SHAKEPROOF	BRKT MTG		
3	6	9	0	0	0	1	0	1	4	3	NYLON CABLE TIE 100 x 2.5 mm			

4	0	0	0	0	0	2	0	0	3	40mm	1mm SILICON SLEEVING	
5	3	8	0	0	0	1	0	0	7	1	STEEL GUIDE WITH 2 'D' RANGE SKTS.	

6.6 C377/EX/WIRE T377/EX WIRE LIST

2	0	0	0	0	0	1	0	0	5	150mm	WIRE 1/0.5mm TINNED COPPER	
2	0	1	0	0	0	3	0	0	1	585mm	WIRE 7/0.2mm PVC BROWN	170mm, 195mm, 220mm
2	0	1	0	0	0	3	0	0	2	825mm	WIRE 7/0.2mm PVC RED	30mm, 40mm, 140mm, 180mm, 215mm, 220mm
2	0	1	0	0	0	3	0	0	3	695mm	WIRE 7/0.2mm PVC ORANGE	30mm, 215mm, 220mm, 230mm
2	0	1	0	0	0	3	0	0	4	250mm	WIRE 7/0.2mm PVC YELLOW	30mm, 220mm
												87/7-208
2	0	1	0	0	0	3	0	0	6	mm	WIRE 7/0.2mm PVC BLUE	60mm, & 170mm TX ENABLE TO PIN 6 'D' RANGE (PIN 12 EX 6D) 31/7-208 38/1-030
2	0	1	0	0	0	3	0	0	7	435mm	WIRE 7/0.2mm PVC VIOLET	190mm, 245mm 87/7-208
2	0	1	0	0	0	3	0	0	8	1.160mm	WIRE 7/0.2mm PVC GREY	245mm, 315mm 87/7-208
												1 x 500mm FRONT PANEL CONTROLS 88/7-255
2	0	1	0	0	0	3	0	0	9	165mm	WIRE 7/0.2mm PVC WHITE	165mm
2	0	1	0	0	0	3	0	1	0	120mm	WIRE 7/0.2mm PVC BLACK	30mm, 40mm, 50mm
2	0	6	0	0	0	1	0	1	1	900mm	CABLE, COAXIAL RG316-U	100mm-LINK TO MOD-IN/STRIPPING DETAIL 390mm, 410mm REFER A4M781/39 A4M781/40 86/07-192
4	0	0	0	0	0	2	0	0	3	100mm	1mm SILICON SLEEVING.	LEDS

6.7 C377/EX/5 T377/EX 5kHz FREQUENCY INCREMENT PARTS

2	7	4	0	0	0	1	0	0	6	1	CRYSTAL 10.24 MHz TE9	X1
3	6	5	0	0	0	1	2	7	4	1	LABEL T377 AUST DOC A4A489	PRINTED IN HOUSE 88/10-324
3	6	5	0	0	1	0	0	0	2	1	LABEL, BLANK METALISED ALYESTER, 12.7×25.4mm	FOR LABEL ABOVE

6.8 C377/EX/6.25 T377/EX 6.25kHz FREQUENCY INCREMENT PARTS

2	7	4	0	0	0	1	0	0	7	1	CRYSTAL 12.8MHz TE9	X1

6.9 C377/EX/XO T377/EX CRYSTAL OSCILLATOR PARTS

0	0	1	0	0	0	1	2	5	7	1	BB212 VARICAP DIODE	D16
0	0	1	0	0	0	1	2	6	3	1	BB409 VARICAP DIODE	D17
0	0	1	0	0	0	1	5	1	6	1	BZX79/C6V2 ZENER	D18
0	1	1	0	1	2	7	0	0	1	1	2P7 CAP NPO ±0.25P 50/63V CER	C17
0	1	1	0	2	1	8	0	0	1	1	18P CAP N150 5% 50/63V CER	C19

0110227001	1	27P CAP N150 5% 50/63V CER	C16
0110256001	1	56P CAP N150 5% 50/63V CER	C18
0110447003	1	4n7 CAP T/C B 10% 50V CER	C20
0220547001	1	47n CAP 50V MYLAR	C21
0300356000	1	560E RESISTOR 5% C/F 7x2.5mm	R34
0300410000	1	1K RESISTOR 5% C/F 7x2.5mm	R30
0300510000	2	10K RESISTOR 5% C/F 7x2.5mm	R31, R37
0300515000	2	15K RESISTOR 5% C/F 7x2.5mm	R36, R33
0440550003	1	50K PRE-SET RES. MULTITURN. PNL MTG	RV32 'FREQUENCY TRIM'.
0450447001	1	4K7 NTC 5mm DISC	R38
0560002102	1	100µH FXD IND	L5

6.10 C377/EX/TCXO T377/EX TCXO PARTS

0010000151	1	BZX79/C5V1 ZENER	D1
0110147001	1	4P7 CAP NPO ±.5P 50/63V CER	C3
0110447003	1	4n7 CAP T/C B 10% 50V CER	C2
0220547001	1	47n CAP 50V MYLAR	C1
0300333000	1	330E RESISTOR 5% C/F 7x2.5mm	R1
0300522000	1	22K RESISTOR 5% C/F 7x2.5mm	R2
			86/02-120
0560002102	1	100µH FXD IND	L1
5390001040	1	TCXO TOYOCOM TCO-909A 12.8MHz	

6.11 C377/EX/02 T377/EX 136-174MHz PARTS

0010001263	1	BB409 VARICAP DIODE	D35
0110110001	1	1P CAP P100 ±0.25P 50/63V CER	C48
0110182001	1	8P2 CAP NPO ±0.5P 50/63V CER	C47
0110210001	1	10P CAP NPO ±0.5P 50/63V CER	C54
0280210006	1	3/10P CAP TRIM NPO BLUE TOPPAT	CV49 86/02-030
0300715000	1	1M5 RESISTOR 7x2.5mm 5% C/F	R56 86/02-143

6.12 C377/EX/12 T377 174-225MHz PARTS

001000012531	1	BB405 VARICAP DIODE	D35	
011005000141	1	0P5 CAP P100 ±0.25P 50V DISC CER	C48	
011014700131	2	4P7 CAP NPO ±0.5P 50/63V CER	C47, C54	
028015000141	1	1.5/5P CAP TRIM BLUE MURATA TZ	CV49	86/02-030
030072203041	1	2M2 RESISTOR 7x2.5mm 10% C/F	R56	86/03-373

6.13 C377/EX/55 T377/EX/55 VERSION PARTS

365000124622	LABEL T377/EX/55 FCC ID A4A455	1 LABEL FOR EX, 1 FOR PA.	

6.14 B377/PA T377/PA PCB ASSEMBLY PARTS

6.14.1 TRANSISTORS

000000110532	BC547 TRANSISTOR	Q1, Q2		87/9-316
000000117041	BD136 TRANSISTOR	Q5		
000000202042	BS170 TRANSISTOR	Q3, Q4		87/9-316
000000232332	SRFH1001 TRANSISTOR	Q12, Q14		
000000306551	2N6080 TRANSISTOR	Q8		
000000305331	2N5590 TRANSISTOR	Q9		

6.14.2 DIODES

001000124002	1N4148 DIODE	D4, D5		
001000134554	1SS97 DIODE	D6, D7, D8, D9		
008000101142	LED 3mm RED (TLR124)	D1, D3		
008000101551	LED 3mm GREEN (TLG124)	D2		

6.14.3 INTEGRATED CIRCUITS

002000106041	LM339 INT CCT	IC1		
002000146232	LM317L INT CCT	IC2		

6.14.4 CAPACITORS

011031505012	150P CAP N150 5% 50/63V CERAMIC	C67, C87		
011032202012	220P CAP N750 10% 50/63V CERAMIC	C2, C4, C5, C6, C9, C10, C19, C20, C22, C24, C25, C29, C31, C33, C45, C54, C74, C94, C16		88/5-193

0110410001	4	1n CAP T/C B 10% 63V CERAMIC	C8, C12, C13, C15,	
0150322002	4	220P CAP NPO 5% 100V HiQ CHIP 3.2x2.54	CC70, CC71, CC90, CC91	
0150368002	4	680P CAP NPO 10% 50V HiQ CHIP 3.2x2.54	CC58, CC77, CC97	86/08-210
0150410004	1	1n CAP T/C B 50V CHIP	CC20A	86/05-124
0171547001	4	47n CAP 20% 50V DISC. CER. SURFACE BARRIER	C43, C52, C72, C92	
0200747004	1	4µ7 CAP 25V ELECTRO 13x8mm SOLID AL	C21	
0200847007	3	47µ CAP 16V ELECTRO 10x13mm HiTEMP	C46, C55, C99	
0220447001	3	4n7 CAP 50V MYLAR	C1, C3, C23	
0220510001	8	10n CAP 50V MYLAR	C7, C11, C14, C26, C32, C30, C93, C73	86/05-124
0220547001	2	47n CAP 50V MYLAR	C44, C53,	
0220568002	1	68n CAP 50V MYLAR	C28	86/05-124
0220610001	1	100n CAP 50V MYLAR	C27	
0280260001	3	5/60P TRIM CAP. FILM. PHILIPS	CV57, CV76, CV96	
0290222002	1	22P CAP 5% 5mm CASE MICA	C40	
				86/08-210 86/05-124
0290268002	5	68P CAP 5% 5mm CASE MICA	C56, C68, C88, C69, C89	86/05-124
0290282002	1	82P CAP 5% 5mm CASE MICA	C41	
0290310002	2	100P CAP 5% 5mm CASE MICA	C75 C95	86/08-210 86/05-124
0290318002	1	180P CAP 5% 5mm CASE MICA	C42	
0290322002	1	220P CAP 5% 5mm CASE MICA	C51	

6.14.5 RESISTORS

0302330000	2	33E RESISTOR 5% C/F 7x2.5mm	R19, R24
0302470000	2	47E RESISTOR 5% C/F 7x2.5mm	R20, R25
0303120000	2	120E RESISTOR 5% C/F 7x2.5mm	R21, R26
0303220000	1	220E RESISTOR 5% C/F 7x2.5mm	R31
0303680000	4	680E RESISTOR 5% C/F 7x2.5mm	R1 R2; R3, R40
0304100000	1	1K RESISTOR 5% C/F 7x2.5mm	R30
0304470000	5	4K7 RESISTOR 5% C/F 7x2.5mm	R18, R23, R34, R36, R33
0305100000	4	10K RESISTOR 5% C/F 7x2.5mm	R4, R7, R13, R15 (VERTICAL MTG).
0305470000	3	47K RESISTOR 5% C/F 7x2.5mm	R9, R17, R22
0306100000	1	100K RESISTOR 5% C/F 7x2.5mm	R38
0307100000	3	1M RESISTOR 5% C/F 7x2.5mm	R11, R12. R5 (VERTICAL MTG)
0308100301	1	10M RESISTOR 10% C/F 7x2.5mm	R14

0323147000	4	4E7 RESISTOR 5% M/F 12×4.5mm	R60, R54, R67, R77	
0323210000	2	10E RESISTOR 5% M/F 12×4.5mm	R48, R52	
				86/05-124
0323247000	3	47E RESISTOR 5% M/F 12×4.5mm	R65, R75, R49	87/10-378
0323310002	2	100E RESISTOR 5% M/F 33×9mm	R69, R74	
0323318000	2	180E RESISTOR 5% M/F 12×4.5mm	R51, R53	86/05-124
0323330000	5	330E RESISTOR 5% M/F 12×4.5mm	R55, R66, R68, R76, R78	
0420422002	1	2K PRE-SET RES. CERMET, FLAT	RV35	
0420510010	1	10K PRE-SET RES. CERMET. FLAT	RV39	
0420547009	4	50K PRE-SET RES CERMET FLAT	RV6, RV8, RV10, RV16	
0440420003	1	2K PRE-SET RES, MULTITURN. (SHROUDED VARIETY)	RV32	
0450447001	1	4K7 NTC RES. 5mm DISC	R37	

6.14.6 COILS

0520813025	2	COIL A/W 2.5T/3.0mm HOR	L10, L21	
0520813565	2	COIL A/W 6.5T/3.5mm HOR	L46, L31	86/05-124
0520814055	1	COIL A/W 5.5T/4.0mm HOR	L19	
0520833510	1	COIL A/W 1T/3.5mm SMD. HOR	L11	
0520833520	2	COIL A/W 2T/3.5mm SMD HOR	L48, L33	86/05-124
0560002101	3	FXD IND 1.5μH	L1, L2, L5	

6.14.7 MISCELLANEOUS

0650001004	3	FERRITE BEAD 4×2×5mm F8	L13, L30, L45	
0650001006	5	FERRITE BEAD 3×·7×10mm 4S3	L6, L12, L17, L28, L43	
0650001011	3	FERRITE BEAD 3×1×4mm 4S3	L18, L29, L44	
0650001022	2	F14 BALUN CORE	L26, L41 Refer A4P180/10	
2060001012	250mm	COAXIAL CABLE RG178	4×60mm FOR L26, L41	
2060001017	0.013	20mm WIRELINE COUPLER	TL3 (20mm = 0.79in = 0.013 of 5ft)	(TL1)
2200001100	1	PRINTED CCT BOARD T377/PA		
2400402030	1	IC SKT 14 PIN DIL		
3560001027	.137	1K HARWIN TRACK PINS	TRACK PIN OUT [illegible]	87/02-011
3520001035	4	TRANSISTOR MOUNTING NUT 8·32UNC	TRANSISTOR SD6080 SEH1001, 2N5590	87/4-038

6.15 B377/PA/MECH T377/PA MECHANICAL PARTS

0120415001	15	1n5 CAP, CERAMIC FEED THRU, LESS LEAD			
0650001013	15	FERRITE BEAD 1.9 x 9 x 3.8 SP 70			86/05-124
2400001055	1	PLUG, 15 WAY 'D' RANGE, WIRE WRAP PINS			
2400010046	1	PLUG, COAXIAL, SMC BULKHEAD JACK			
2400201054	1	SOCKET 15 WAY 'D' RANGE			
2400210006	1	SOCKET, COAXIAL, 'N' TYPE, OPEN TERMINATION			
2400601014	1	LATCHING CLAMP FOR 'D' RANGE (SKT)			
2400601015	1PR	LATCHING BLOCKS FOR 'D' RANGE (PLUG)			87/5-155
3020005188	1	BRACKET, FEED THRU MTG. A3M1871			
3020005190	1	BRACKET, ADJUSTABLE STOP A4M1892			
3030023108	1	SIDE COVER A3M1874			
3010050072	1	EARTHING SPRING CUP A4M2016	FOR EARTHING C106		86/11-347
3060001010	2	FERRULE A4M948			
3080001007	1	HANDLE A4M949			
3080013068	1	HEATSINK CASTING A1M1868, A1M1869			
3080130073	1	HEATSINK Q5 A4M2015	FOR HEATSINKING Q5 XISTOR		86/11-347
3160006321	1	FRONT PANEL A3M1870			
3160085018	1	PIN, 'N' SKT COAX EXTENDER A4M1397			
3450004016	2	SCREW M3 x 20mm PAN POZI ST BZ	'D' RANGE PLUG		
3450040020	4	SCREW M3 x 6mm BTTN HD BLACK	FRONT PANEL		
3450040111	1	SCREW M3 x 10mm PAN POZI ST BZ	Q5 MTG		87/12-069 87/8-295
3490002032	32	SCREW M3 x 8mm PAN POZI TAPTITE BZ	COVER 18, PCB 8, COAX SKT 4,		
			STOP BRKT 2,		86/10-214
3520010088	1	NUT M3 COLD FORM	FOR MTG Q5 TRANSISTOR		86/02-164
3520010299	2	NUT M4 NYLOC	HANDLE		
3530010104	4	WASHER M3 FLAT	FEEDTHRU BRKT MTG, Q5 MTG 1		87/9-275 86/10-214
3530010113	1	WASHER M3 SHAKEPROOF INT BZ	FOR MTG Q5 TRANSISTOR		86/02-164
3560010032	2	SOLDER TAG 3mm H6249/3-2 LONG			86/11-333
3600010041	1	SHORTY BUSH, BLACK, HEYCO	FRONT PANEL		
3620010062	1	INSULATOR MICA TO-126 SOT-32	FOR MTG Q5 TRANSISTOR		87/10-349
3620010303	3	GROMMET, 3mm LED MTG	FRONT PANEL		
3690010144	15	CABLE TIES, NYLON 100 x 2.5mm.			
3180001011	1	GUIDE, BOTTOM RAIL A2M1872			
3180001012	1	GUIDE, TOP RAIL A3M1873			
3450040006	2	SCREW M3 x 8mm PAN POZI ST BZ	FRONT PNL TO BACK	PACK WITH EACH PA	
3450040009	4	SCREW M3 x 6mm CSK POZI ST BZ	TOP/BOTTOM RAILS		
3990010655	1	PLASTIC BAG 375 x 500mm	GUIDES AND RAILS		86/12-366
4100010422	1	CARTON, 60mm F&D EQUIP UE615096			88/1-025

6.16 B377/PA/WIRE T377/PA WIRE LIST

200 000 105	150mm	TINNED COPPER WIRE 0·5mm		86/07-164
201 000 301	375mm	WIRE 7/0·2 PVC BROWN		
201 000 302	60mm	WIRE 7/0·2 PVC RED		
201 000 303	280mm	WIRE 7/0·2 PVC ORANGE		
201 000 304	275mm	WIRE 7/0·2 PVC YELLOW		
201 000 305	295mm	WIRE 7/0·2 PVC GREEN		
201 000 306	680mm	WIRE 7/0·2 PVC BLUE	300mm + 380mm TX ENABLE INPUT ON P.C.B TO PIN 13 'D' RANGE	88/·03c
201 000 307	375mm	WIRE 7/0·2 PVC VIOLET		
201 000 310	315mm	WIRE 7/0·2 PVC BLACK		86/07-164
201 000 512	140mm	WIRE 28/0·3 PVC RED 152 AUTO		86/07-164
201 000 520	250mm	WIRE 28/0·3 PVC BLACK 152 AUTO		
206 000 111	150mm	COAX CABLE RG316-U		86/07-124 86/05-124
206 000 112	260mm	COAX CABLE RG178	TEMP SENSE	86/05-124
400 020 005	188mm	SLEEVING 1·5mm SILICON RUBBER	FOR LED'S, SOLDER TAGS	86/07-164
400 020 009	20mm	SLEEVING 3mm SILICON RUBBER	FOR 'D'-RANGE PINS	86/07-164

6.17 C377/PA/02 ADD TO T377/PA FOR /02 VERSION

010 012 201	2	2P2 CAP NPO ±0·25P 500V CERAMIC	C106A, C110A	
010 013 901	2	3P9 CAP NPO ±0·25P 500V CERAMIC	C107A, C109A	88/3-121 86/08-210 86/05-124
015 036 801	1	680P CAP NPO HI-Q 50V 1210 CHIP	CC49	86/06-210
029 021 203	2	12P CAP 2% CASE MICA 10mm (T102)	C106, C110	
029 021 502	4	15P CAP 5% CASE MICA 5mm	C65, C78, C95, C98	
029 022 702	2	27P CAP 5% CASE MICA 5mm	C59, C105	
029 022 703	2	27P CAP 2% CASE MICA 10mm	C107, C109	
029 023 901	1	39P CAP 5% CASE MICA 5mm	C47	88/03-121 86/08-210
029 023 304	1	33P CAP 2% CASE MICA 10mm	C108	
029 031 002	1	100P CAP 5% CASE MICA 5mm	C50	86/08-210 86/05-124
032 314 701	1	4E7 RESISTOR 5% M/F 17×5mm	TR56	
032 321 000	1	10E RESISTOR 5% M/F 10×4mm	R47	86/05-124
032 338 201	2	820E RESISTOR 5% M/F 17×5mm	TR57, TR58	
052 083 355 0	2	COIL A/W 5T/3·5mm SMD HOR	L52, L55,	
052 083 405 0	7	COIL A/W 5T/4mm SMD HOR	L25, L34, L40, L49, L53, L54, L14	86/08-210
365 001 000 2	1	LABEL, BLANK METRUSED POLYESTER 12·7×15·4mm	FOR AUST DOC LABEL A4A489	
209 000 102 5	20mm	SLOT CAR TRACK 3mm×·35mm	REPLACES TL1 & TL2 /02 VERSION ONLY	86/05-124
365 001 274	1	LABEL T377 AUST DOC A4A489	PRINTED IN HOUSE	86/10-324

6.18 C377/PA/03 ADD TO T377/PA FOR /03 VERSION

206 000 111	680mm	COAX CABLE RG316-U	2×340mm TL1, TL2. Refer A4P180/11	87/4-096
369 000 104	6	CABLE TIE NYLON 100×2·6mm	TL1, TL2 (REF A4D180/11)	87/4-096

6.19 C377/PA/12 ADD TO T377/PA FOR /12 VERSION

0	1	1	0	2	1	0	0	0	1	1	10P CAP NPO 63V CER	C60 (TO COLLECTOR & EMITTER OF Q8, REFER MARKED UP P.A.H. FOR POSITION A4P180/6a)	88/3-121
0	1	0	0	1	1	0	0	0	1	1	1P CAP NPO ±0.25P 500V CERAMIC	C106A, C110A	
0	1	0	0	2	1	0	0	0	1	1	10P CAP NPO 500V 5% CERAMIC	C49A	86/8-210
0	1	0	0	1	3	3	0	0	1	3	3P3 CAP NPO ±0.5P 500V CERAMIC	C107A, C108A, C109A	
0	2	8	0	2	1	8	0	0	1	1	2/18P CAP TRIM 6x8mm PH 06003	CV48	86/8-210
0	2	9	0	2	1	0	0	0	2	4	10P CAP 5% CASE MICA 5mm	C65, C78, C85, C98	
0	2	9	0	2	1	0	0	0	3	2	10P CAP 2% CASE MICA 10mm	C106, C110	
0	2	9	0	2	2	2	0	0	2	2	22P CAP 5% CASE MICA 5mm	C59, C105	
0	2	9	0	2	2	2	0	0	3	3	22P CAP 2% CASE MICA 10mm	C107, C108, C109	
0	2	9	0	2	1	5	0	0	2	1	150P CAP 5% CASE MICA 5mm	C47A	86/8-210 86/09-124
0	5	2	0	8	1	3	0	1	5	1	COIL A/W 1.5T/3.0mm HOR	C14A	86/08-210
0	5	2	0	8	1	3	0	5	5	2	COIL A/W 5.5T/3.0mm HOR	L53, L54	
0	5	2	0	8	1	5	0	2	5	2	COIL A/W 2.5T/5.0mm HOR	L52, L55	
0	5	2	0	8	3	3	0	5	0	2	COIL A/W 5T/3.0mm SMD HOR	L34, L49	86/09-124
0	5	2	0	8	3	3	0	6	0	2	COIL A/W 6T/3.0mm SMD HOR	L25, L40	86/09-124
0	5	2	0	8	3	3	0	2	0	1	COIL A/W 2T/3.0mm SMD HOR	L15	86/8-210
2	0	6	0	0	0	1	0	1	1	520mm	COAX 50Ω RG316-U	2x260mm FOR TL1 & TL2 (SEE A4P180/11)	87/4-096
2	0	9	0	0	0	1	0	2	5	40mm	SLOT CAR TRACK 3mm x 1.35mm x 100FT	REPLACES R56 & R47.	86/09-124
3	6	9	0	0	0	1	0	1	4	6	CABLE TIE NYLON 100 x 2.6mm	TL1, TL2 (REF A4P180/11)	87/04-096

6.20 B3536S B3536S AUDIO PROCESSOR PARTS

6.20.1 TRANSISTORS

0	0	0	0	0	0	1	0	6	6	1	BC337 TRANSISTOR	Q3	
0	0	0	0	0	0	1	1	1	0	3	BC548B TRANSISTOR	Q1, Q4, Q6	
0	0	0	0	0	0	1	1	3	0	4	BC557B TRANSISTOR	Q2, Q5, Q7, Q8	

6.20.2 DIODES

0	0	1	0	0	0	1	1	7	0	4	1N4001 DIODE	D1, D2, D3, D4	
0	0	1	0	0	0	1	2	0	1	0.005	1K 1N4148 DIODES	D4A, D5, D6, D7, D8	

6.20.3 INTEGRATED CIRCUITS

0	0	2	0	0	0	1	2	4	0	3	MLM358 INT CCT	IC2, IC3, IC4	
0	0	2	0	0	0	1	5	3	0	1	4053 INT CCT	IC1	
0	0	2	0	0	0	2	0	5	0	1	4N25A INT CCT (OPTO COUPLER)	IC5	

6.20.4 CAPACITORS

0	1	1	0	1	2	2	0	0	1	1	2P2 CAP NPO ±.25P 50/63V CERAMIC	C31	
0	1	1	0	2	4	7	0	0	1	9	47P CAP N150 5% 50/63V CERAMIC	C10A, C25A, C26B, C27A, C28A, C29, C35A, C42, C43	
0	1	1	0	3	1	0	0	0	1	5	100P CAP N150 5% 50/63V CERAMIC	C14, C16, C24, C25, C40	

0	1	1	0	3	2	2	0	0	1	1	220P CAP N750 10% 50/63V CERAMIC	C19	
0	1	1	0	4	1	0	0	0	1	7	1n CAP T/C B, 10% 63V CERAMIC	C2A, C4, C5, C6, C6A, C10 C13	
0	2	0	0	7	1	0	0	0	2	4	1µ CAP 50V ELECTRO 5x11mm VERT	C12, C15, C32, C34	
0	2	0	0	7	4	7	0	0	2	1	4µ7 CAP 50V ELECTRO 5x11mm VERT	C41	
0	2	0	0	7	4	7	0	9	0	3	4µ7 CAP 50V ELECTRO NON POLARIZED VERT	C7, C7A, C20	
0	2	0	0	8	1	0	0	0	3	4	10µ CAP 50V ELECTRO 5x11mm VERT	C1, C14A, C23, C44	
0	2	0	0	8	2	2	0	0	1	3	22µ CAP 16V ELECTRO 5x11mm VERT	C3, C9, C22	
0	2	0	0	9	1	0	0	0	3	1	100µ CAP 16V ELECTRO 8x11mm VERT	C17	
0	2	2	0	4	1	5	0	0	1	1	1n5 CAP 50V MYLAR	C27	
0	2	2	0	4	2	2	0	0	1	1	2n2 CAP 50V MYLAR	C2	
0	2	2	0	5	1	0	0	0	1	3	10n CAP 50V MYLAR	C26, C28, C30	87/1-309
0	2	2	0	5	4	7	0	0	1	1	47n CAP 50V MYLAR	C21	
0	2	2	0	6	1	0	0	0	1	1	100n CAP 50V MYLAR	C18,	87/9-309
0	2	2	0	6	4	7	0	0	1	2	470n CAP 100V PETP	C8, C11	

6.20.5 RESISTORS

0	3	0	0	3	3	3	0	0	0	1	330E RESISTOR 5% C/F 7x2.5mm	R11	
0	3	0	0	3	5	6	0	0	0	3	560E RESISTOR 5% C/F 7x2.5mm	R1, R14, R44	
0	3	0	0	3	6	8	0	0	0	2	680E RESISTOR 5% C/F 7x2.5mm	R23, R63	
0	3	0	0	4	1	0	0	0	0	4	1K RESISTOR 5% C/F 7x2.5mm	R4, R22A, R36, R62	
0	3	0	0	4	1	2	0	0	1	2	1K2 RESISTOR 5% C/F 10x4mm	R9, R10	
0	3	0	0	4	2	2	0	0	0	2	2K2 RESISTOR 5% C/F 7x2.5mm	R2, R24	
0	3	0	0	4	2	7	0	0	0	2	2K7 RESISTOR 5% C/F 7x2.5mm	R46, R66	
0	3	0	0	4	3	3	0	0	0	1	3K3 RESISTOR 5% C/F 7x2.5mm	R59	
0	3	0	0	4	3	9	0	0	0	1	3K9 RESISTOR 5% C/F 7x2.5mm	R5	
0	3	0	0	4	4	7	0	0	0	1	4K7 RESISTOR 5% C/F 7x2.5mm	R29	
0	3	0	0	4	6	8	0	0	0	2	6K8 RESISTOR 5% C/F 7x2.5mm	R43, R53A	
0	3	0	0	5	1	0	0	0	0	8	10K RESISTOR 5% C/F 7x2.5mm	R3, R6, R7, R22, R23A(UNK G-H) R40, R41, R50	
0	3	0	0	5	1	2	0	0	0	2	12K RESISTOR 5% C/F 7x2.5mm	R45, R44A	
0	3	0	0	5	1	5	0	0	0	1	15K RESISTOR 5% C/F 7x2.5mm	R42	
0	3	0	0	5	1	8	0	0	0	1	18K RESISTOR 5% C/F 7x2.5mm	R55	
0	3	0	0	5	2	2	0	0	0	1	22K RESISTOR 5% C/F 7x2.5mm	R57A	
0	3	0	0	5	3	9	0	0	0	1	39K RESISTOR 5% C/F 7x2.5mm	R39	
0	3	0	0	5	4	7	0	0	0	5	47K RESISTOR 5% C/F 7x2.5mm	R16, R21, R33, R48, R58	
0	3	0	0	5	6	8	0	0	0	2	68K RESISTOR 5% C/F 7x2.5mm	R31, R38	

030058200	1	82K RESISTOR 5% C/F 7x2.5mm	R26
030061000	7	100K RESISTOR 5% C/F 7x2.5mm	R13, R15, R16, R19, R20 R20A, R28
030061200	1	120K RESISTOR 5% C/F 7x2.5mm	R51
030061800	1	180K RESISTOR 5% C/F 7x2.5mm	R47
030062200	1	220K RESISTOR 5% C/F 7x2.5mm	R35
030063900	2	390K RESISTOR 5% C/F 7x2.5mm	R12, R49
030071000	3	1M RESISTOR 5% C/F 7x2.5mm	R32, R34, R57
030072203	3	2M2 RESISTOR 10% C/F 7x2.5mm	R37, R52, R53
032048200	1	8K2 RESISTOR 1% M/F 7x2.5mm	R17
032051000	1	10K RESISTOR 1% M/F 7x2.5mm	R8
032054700	2	47K RESISTOR 1% M/F 7x2.5mm	R25, R30
042045008	1	5K PRE-SET RES. FLAT CERMET	RV54
042054709	1	50K PRE-SET RES FLAT CERMET	RV27

6.20.6 MISCELLANEOUS

053000102	1	TRANSFORMER TMT T4030	T1
056000222	1	FXD IND 68mH SHIELDED	L1
220000106	1	PRINTED CCT BOARD B3536	

6.21 C3536S/02 ADD TO B3536S FOR /02 VERSION

022043301	1	3n3 CAP 50V MYLAR	C45
022054701	1	47n CAP 50V MYLAR	C33A
022056802	2	68n CAP 50V MYLAR	C36, C39
030038200	1	820E RESISTOR 5% C/F 7x2.5mm	R60
030041200	1	1K2 RESISTOR 5% C/F 7x2.5mm	R61
030061500	1	150K RESISTOR 5% C/F 7x2.5mm	R56A

6.22 C3536S/07 ADD TO B3536S FOR /07 VERSION

022052201	2	22n CAP 50V MYLAR	C37, C38
022054701	1	47n CAP 50V MYLAR	C33A
022056802	2	68n CAP 50V MYLAR	C36, C39
030036800	1	680R RESISTOR 5% C/F 7x2.5mm	R60

0	3	0	0	4	1	2	0	0	0	1	1K2 RESISTOR 5% C/F 7x2.5mm	TR61		
0	3	0	0	6	1	5	0	0	0	1	150K RESISTOR 5% C/F 7x2.5mm	TR56A		

6.23 B/TA-500/M2 T500 SERIES MEMORY SMD PARTS

0	0	1	1	0	0	0	0	7	0	32	BAV70 DIODE			
0	3	6	1	0	0	0	0	0	0	9	ZERO OHM RESISTOR 0805 CHIP			38/6-198
2	2	5	0	0	0	1	1	7	1	1	PCB TA-500/M2 (6 PCBSPER ARRAY)	STENCIL REQUIRED FOR PRODUCTION ISSUE A.		
2	4	0	0	0	0	2	0	5	7	1	HEADER, 10WAY 1 ROW PCB MTG.			
2	4	0	0	4	0	2	0	5	7	1	SKT 10 WAY, 1 ROW, PCB MTG. TOP ENTRY			

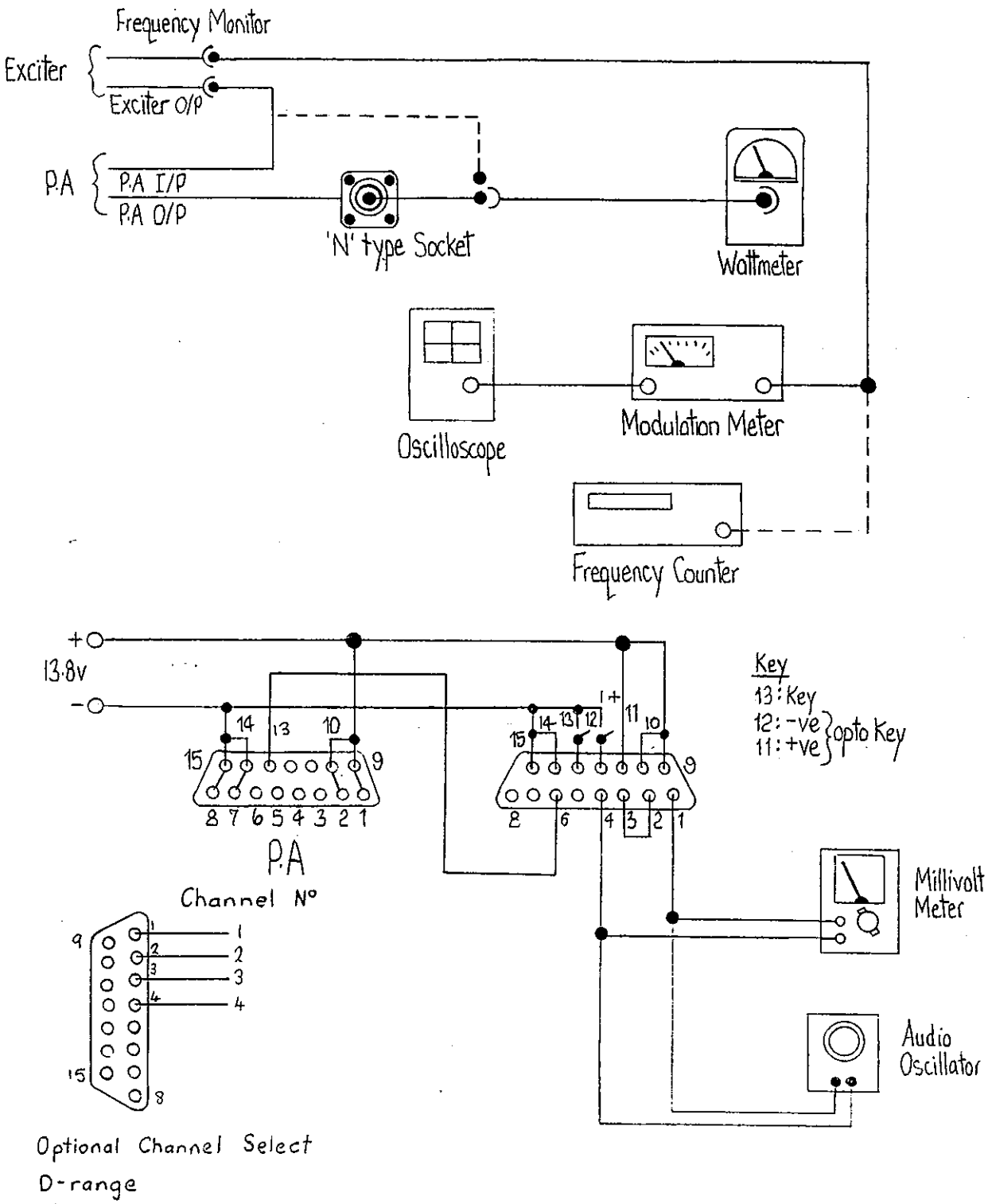


Diagram 1 Test Equipment Set-Up

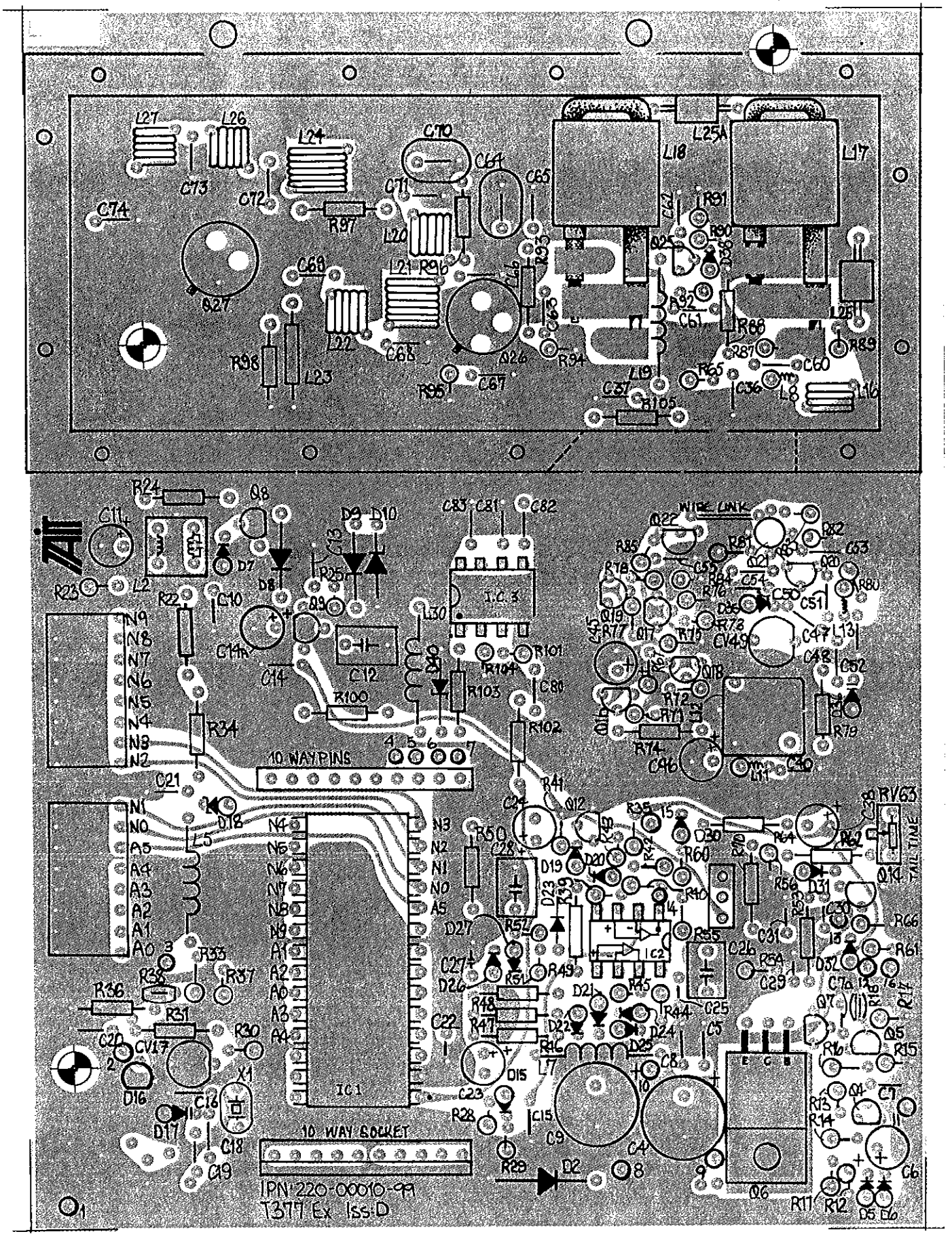


Diagram 2 Exciter PCB Encoding

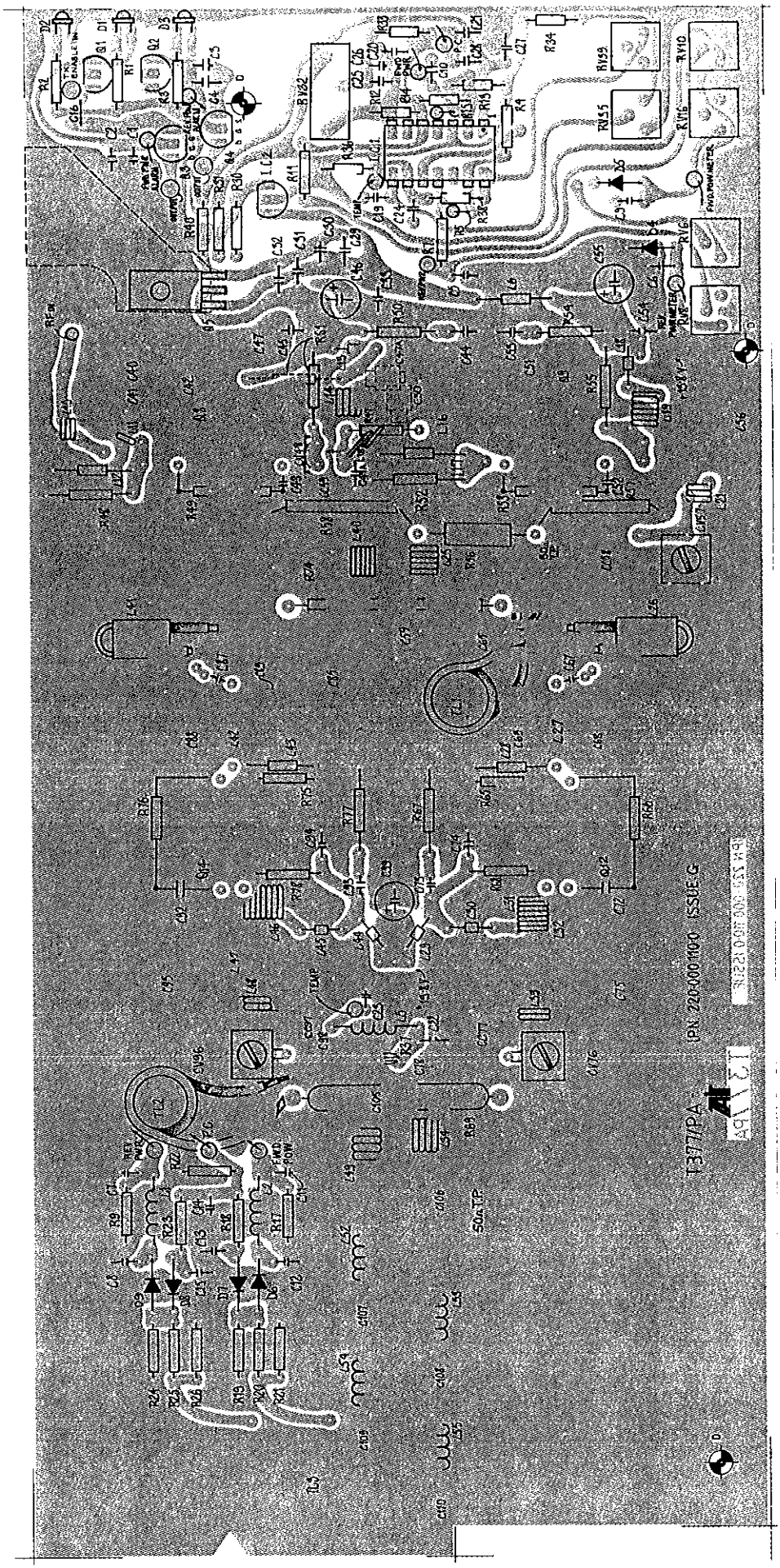


Diagram 3 RF PA PCB Encoding

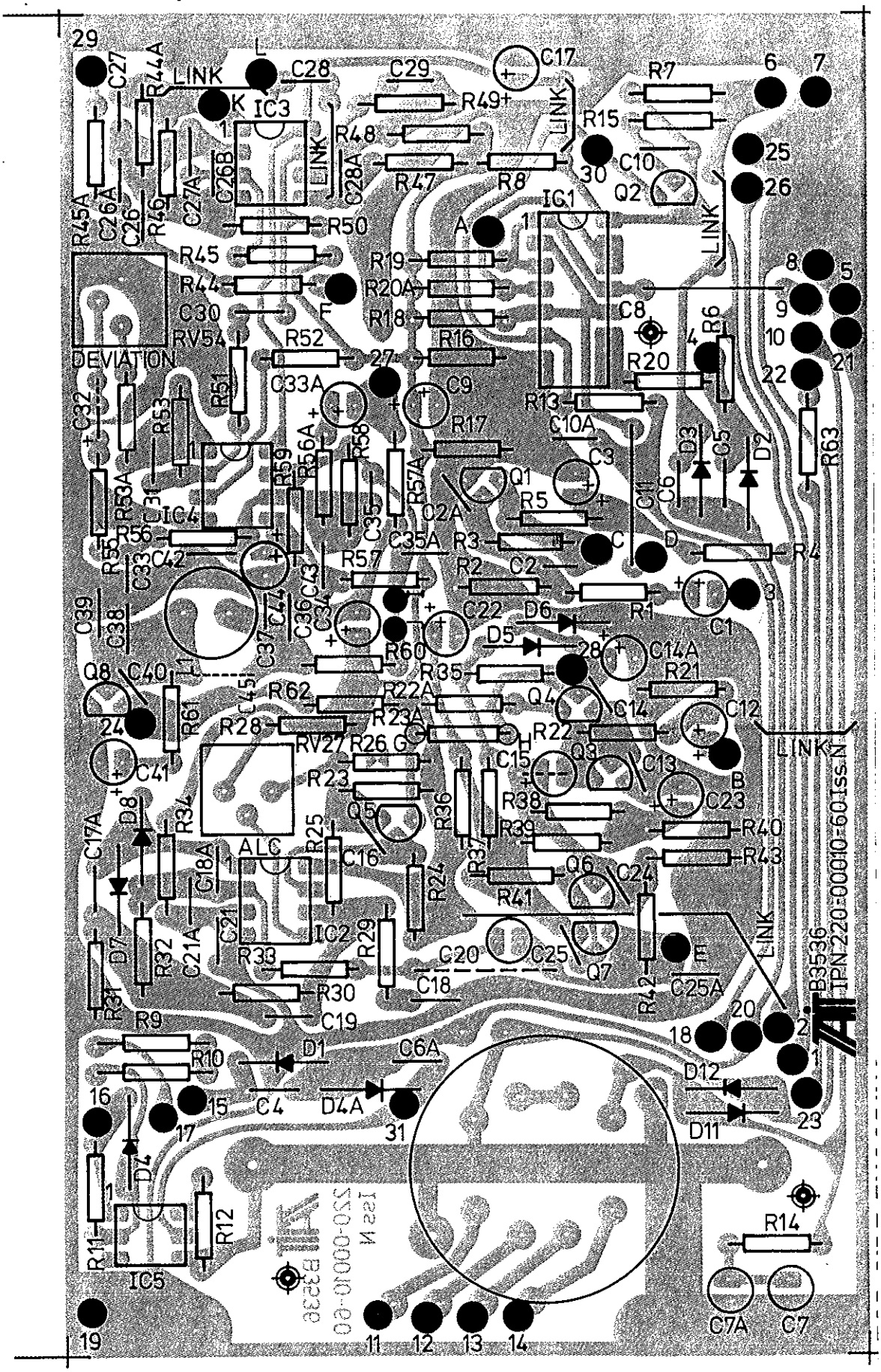
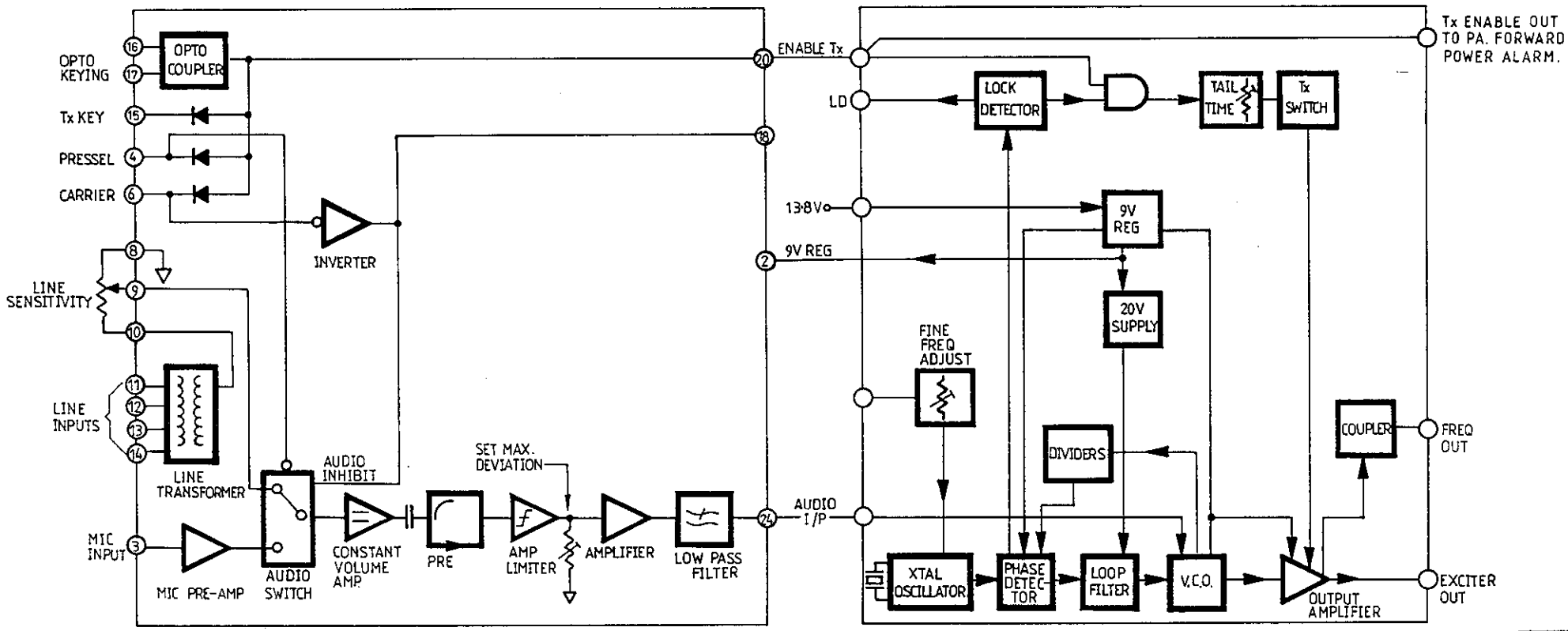


Diagram 4 Audio Processor PCB Encoding



AUDIO BOARD

SCALE: x Full Size
MATERIAL :
FINISH :
GEN LIMITS :

THIRD ANGLE PROJECTION

ARTWORK	IPN	USED ON

ISSUE	AMENDMENTS	DRN	CHKD	APVD	DATE
A	Original	A.G.	[illegible]	MSK	5.4.84
B	CHIN 88-01-030	[illegible]	[illegible]	[illegible]	[illegible]

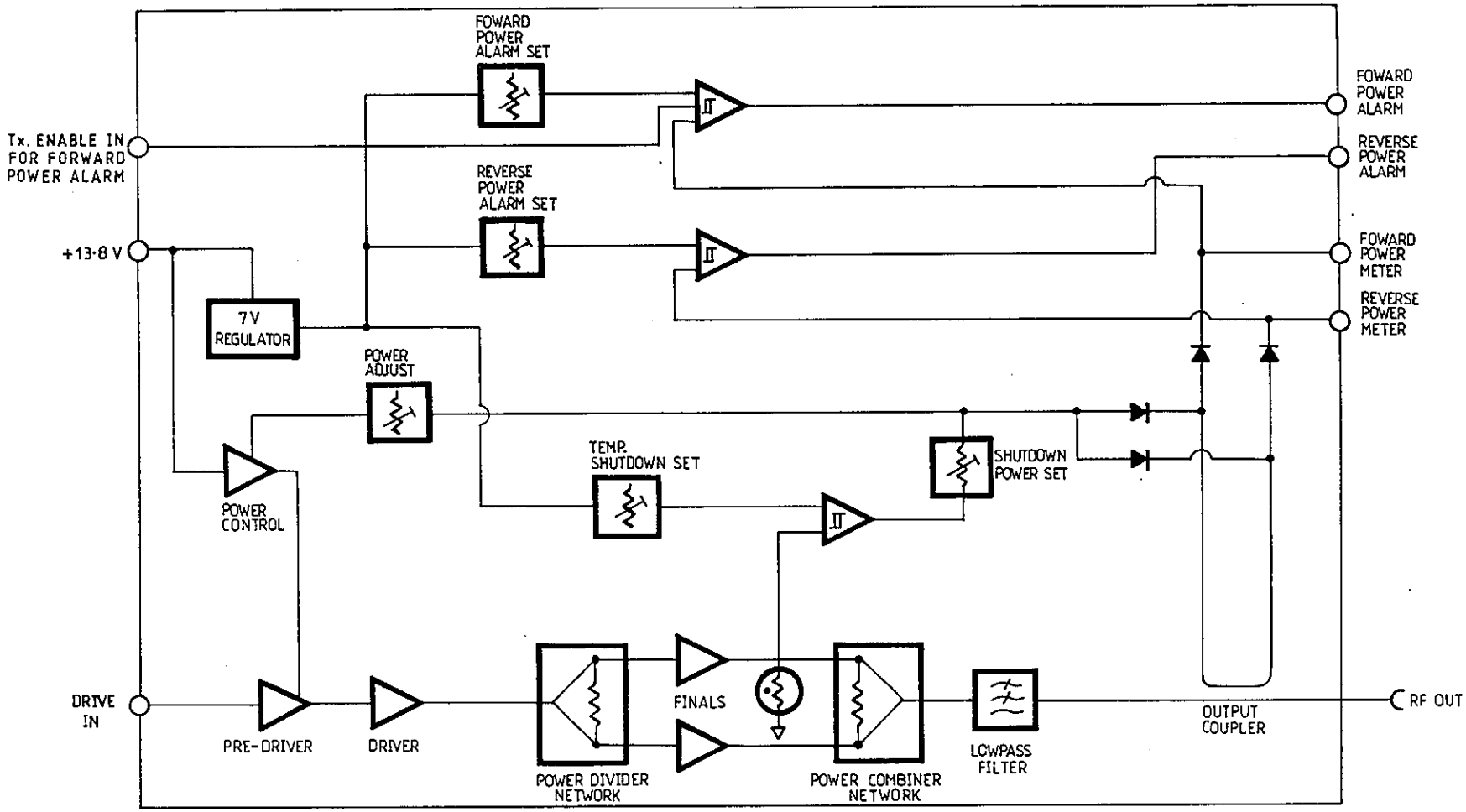
T377/EX BLOCK DIAGRAM

TAIT ELECTRONICS Ltd.
Christchurch New Zealand

DRAWING NUMBER A3 C547

ISSUE A B

All dimensions in m.m. DO NOT SCALE OFF DRG.



SCALE: x Full Size
MATERIAL :
FINISH :
GEN LIMITS :

THIRD ANGLE PROJECTION

ARTWORK	IPN	USED ON

ISSUE	AMENDMENTS	DRN	CHKD	APVD	DATE
A	Original	A.G.			5.4.86
B	CR/N88-01-030				6.2.89

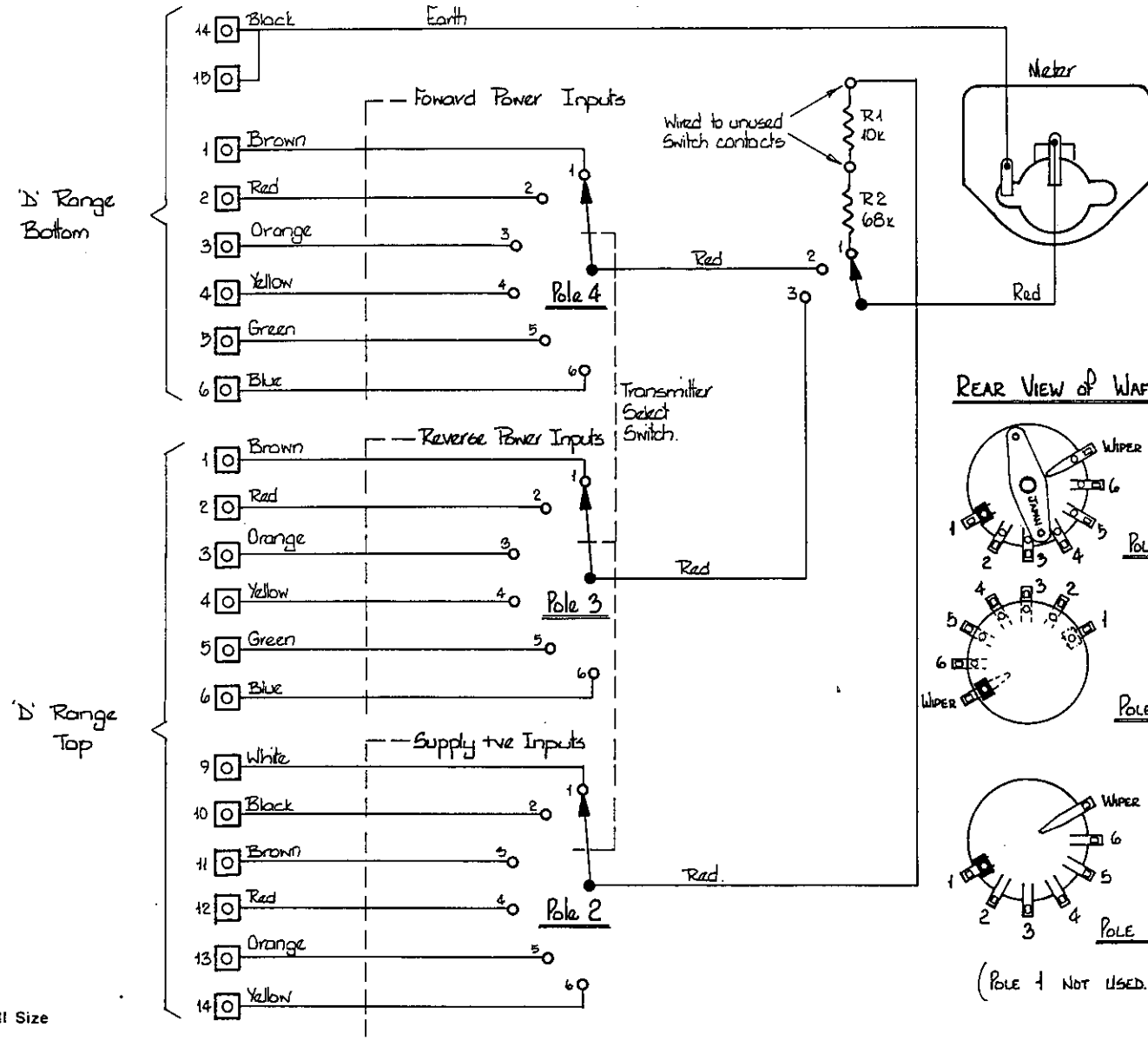
T377/PA BLOCK DIAGRAM

TAIT ELECTRONICS Ltd.
Christchurch New Zealand

DRAWING NUMBER A3 C548

ISSUE A B

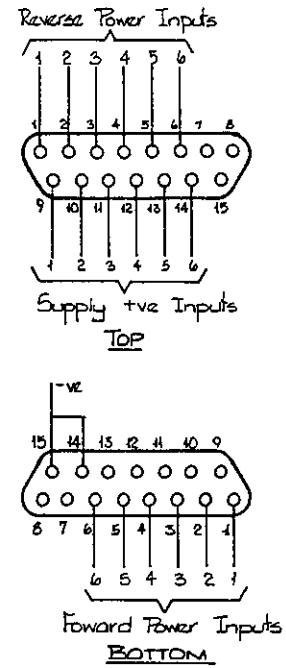
All dimensions in m.m. DO NOT SCALE OFF DRG.



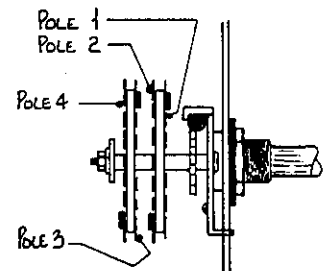
REAR VIEW of WAFERS.

'D' RANGE CONNECTORS

EXTERNAL REAR VIEW.



SIDE VIEW of SWITCH



THIRD ANGLE PROJECTION

USED ON
T339/01

SCALE: x Full Size
MATERIAL :
FINISH :
GEN LIMITS :

W/O | IPN

ISSUE	AMENDMENTS	DRN.	CHKD	APVD	DATE
A	Original	G.A.H.	RS	[illegible]	19/7/82
B	CH/N 11-445	Simon.	[illegible]	[illegible]	16/2/83

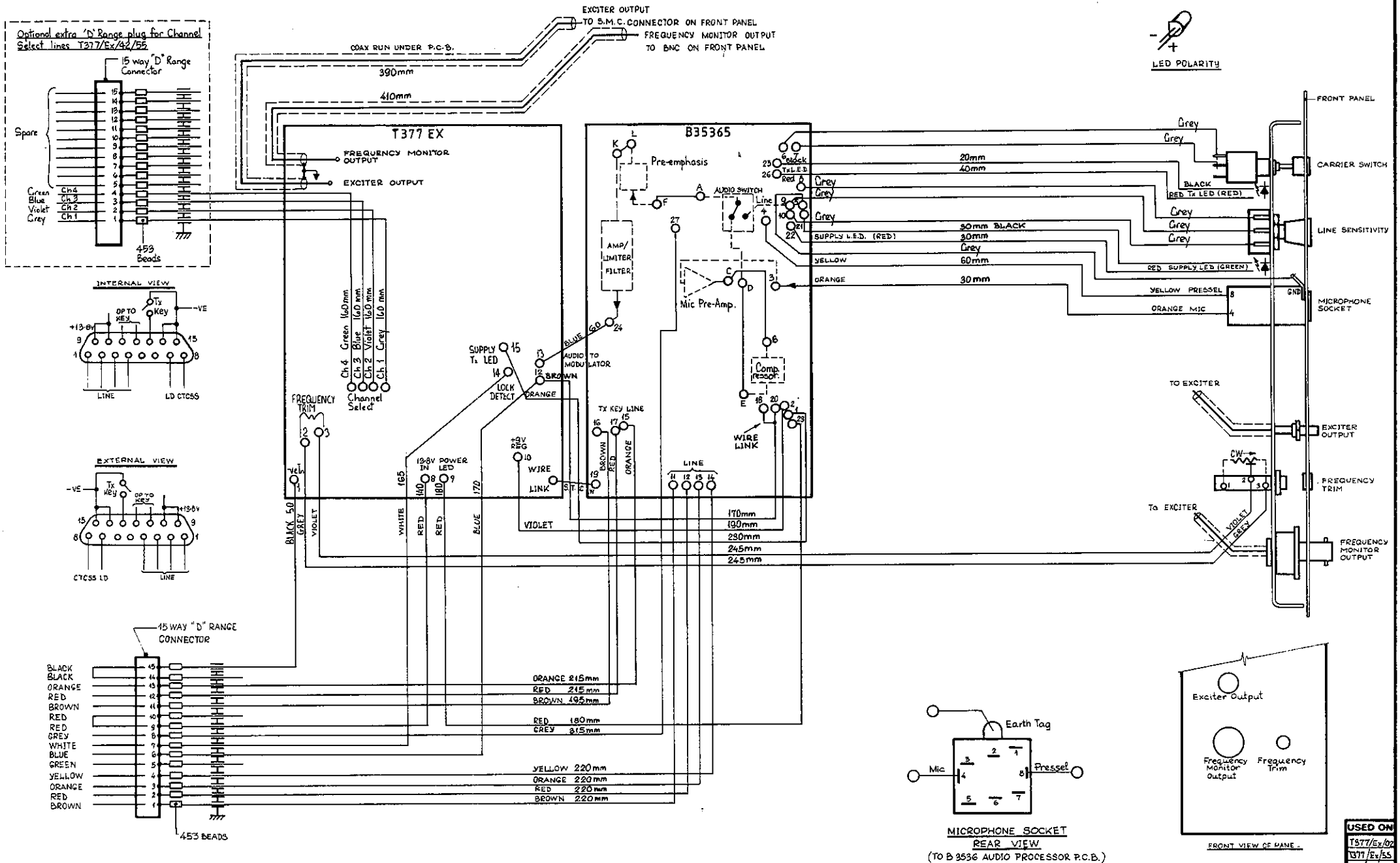
WIRING DIAGRAM - T339/01 Tx Monitor

TAIT ELECTRONICS Ltd.
Christchurch New Zealand

DRAWING NUMBER A3 C 344-

ISSUE A B

All dimensions in m.m. DO NOT SCALE OFF DRG.



ISSUE	AMENDMENTS	DRN.	CHKD	APVD	DATE
A	ORIGINAL	A.G.			15.9.86
B	Ch/N 86/07/192	D.H.			16.12.86
C	Ch/N 86-09-256				13.1.87
D	Ch/N 87-07-208				9.7.87
E	Ch/N 88-01-030				6.2.88

ISSUE	AMENDMENTS	DRN.	CHKD	APVD	DATE

WIRING DIAGRAM T377/Ex

TAIT ELECTRONICS Ltd.
Christchurch New Zealand

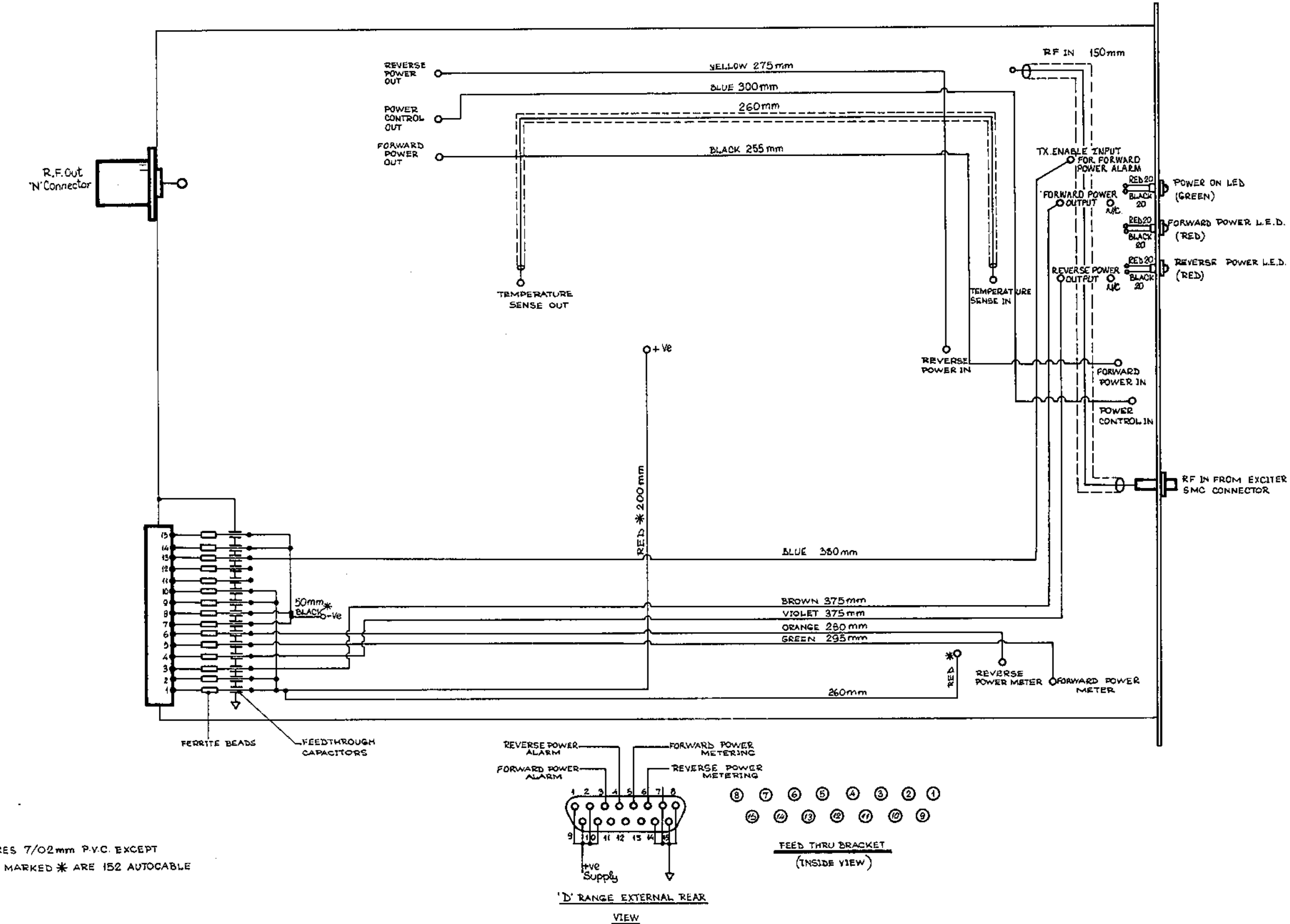
DRAWING NUMBER A2C540

ISSUE A B C D E

USED ON
T377/Ex/02
T377/Ex/55

SCALE :
MATERIAL :
FINISH :
GEN. LIMITS :

DO NOT SCALE OFF DRAWING



NOTE: ALL WIRES 7/0.2mm P.V.C. EXCEPT
WHERE MARKED ✱ ARE 152 AUTOCABLE

SCALE:
MATERIAL:
FINISH:
GEN. LIMITS:

THIRD ANGLE PROJECTION

IPN

USED ON
T377/PA.

ISSUE	AMENDMENTS	DRN.	CHKD	APVD	DATE
A	ORIGINAL	A.G.			
B	Ch/N: 86-07-164	[illegible]	[illegible]	[illegible]	[illegible]
C	Ch/N: 88-01-050	[illegible]	[illegible]	[illegible]	[illegible]
D	Ch/N: 86106-522	[illegible]	[illegible]	[illegible]	[illegible]

ISSUE	AMENDMENTS	DRN.	CHKD	APVD	DATE

WIRING DIAGRAM – T377/P.A.

TAIT ELECTRONICS Ltd.
Christchurch New Zealand

DRAWING NUMBER A2C541

ISSUE A B C D

DO NOT SCALE OFF DRAWING