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T355 Receiver

V.H.F (138 To 174MHz)

Frequency Modulated

(TM-355)

Issue C

TECHNICAL INFORMATION

For further information about this manual or the equipment it describes, contact Customer Services Department, 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 on Tait T355/02, and T355/05 VHF FM Receivers.

Additional information specific to the T355/01 version is contained in a separate supplement to this manual.

Date Of Issue

T355 Service Manual Issue C First publication November 1983.

Ordering Service Manuals.

When ordering the T355 Service Manual quote the Tait IPN and the version required viz:

IPN TM-355 Version T355/02, T355/05 etc.

CONTENTS

ILLUSTRATIONS

SECTION 1 GENERAL INFORMATION

1.1 INTRODUCTION

The T355 is a high performance FM Base Station Receiver designed for single channel operation in the 138 to 174MHz frequency range.

The RF section of the receiver is a single conversion superhet in which a balanced mixer provides the 10.7MHz IF. The IF amplifier contains 10.7MHz crystal filters which determine the band-pass characteristics. Amplitude limiting, detection and an audio pre-amplifier are contained in a single integrated circuit.

The IF section also drives carrier and noise level detectors for signal strength indication and gating of audio outputs.

The audio section delivers up to +10dBm to a 600 ohm balanced output and 1 watt to a local monitor speaker. Provision is also made to monitor the 600 ohm balanced output.

Front panel controls include 'gate sensitivity', 'line level', 'monitor volume' and 'mute disable' switch. This switch disables the mute (squelch) signal to the monitor amplifier, as an aid to servicing.

All components are mounted on two printed circuit boards which are secured in a metal frame. The frame fits into a robust metal sleeve which gives mechanical and environmental protection.

The T355 may be housed together with up to six similar modules in a Tait rack shelf which in turn may be mounted in a standard 484mm (19 inch) rack frame or a lockable cabinet, to provide an attractive and convenient installation.

1.2 SPECIFICATIONS

1.2.1 INTRODUCTION

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

The performance figures given are worst-case figures unless otherwise indicated.

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

1.2.2 GENERAL

Type	.. Single conversion superheterodyne
Intermediate Frequency	.. 10.7MHz
Frequency Range	.. 134 to 174MHz
System Channel Separation	.. 25kHz or 12.5kHz (to order)
Number of Channels	.. One
Supply Voltage:	
Operating Range	.. 10.8 to 16 Volts DC
Standard Test Voltage	.. 13.8 Volts DC
Supply Current:	
Gate Off, Monitor On	.. 180mA
Gate On, Monitor On, full audio	.. 500mA
Operating Temperature Range	.. -10°C to +60°C
Dimensions:	
Height	.. 191mm
Length	.. 300mm
Width	.. 60mm
Weight (nominal):	
In Sleeve	.. 1.2kg
In Sleeve & Guide	.. 1.6kg

1.2.3 RF & IF SECTIONS

Input Impedance	.. 50 ohm (nominal)
I.F. Bandwidth	.. 15kHz or 7.5kHz (to order)
12dB SINAD Sensitivity (15kHz Bandwidth)	.. -117dBm (0.32µV pd)

Signal+Noise To Noise Ratio:	
RF Level -107dBm (1µV pd)	.. 20dB
RF Level -47dBm (1000µV pd)	.. 60dB
Selectivity (Adjacent Channel)	.. 90dB
Spurious Response Attenuation	.. 90dB
Intermodulation Response Attenuation	.. 80dB (85dB typical)
Gating Sensitivity	.. 12dB sinad to -57dBm
Oscillator Fine Frequency Trim Range (When Fitted)	.. ±500Hz

1.2.4 AUDIO OUTPUTS

Outputs Available	.. Line and Monitor
Audio Frequency Response	.. Flat or de-emphasised characteristics
Flat Response:	
67 to 3400Hz	.. Within +1, -2dB of output level at 1kHz
De-emphasised Response:	
67 to 260Hz	.. Within +1, -2dB of output level at 100Hz
300 to 3400Hz	.. Within +1, -2dB of a 6dB/octave de-emphasis characteristic. (Referenced to 1kHz)
Output Power:	
Monitor (Into 3 Ohms)	.. 1 watt
Line (Into 600 Ohms Balanced)	.. +10dBm
Distortion (RF input: -47dBm, modulated 1kHz to 60% of full system deviation at 1 watt output.	.. 3%
Load Impedance:	
Monitor	.. 3 ohms
Line	.. 600 ohms

1.2.5 CRYSTALS

Tait Electronics Ltd Specification Numbers:

Wire-in Type (Frequency Stability ±5ppm)	.. TE/11
Plug-in Type (Frequency Stability ±4ppm)	.. TE/14
Crystal Frequency (f_X)	.. $f_X = 1/3\ (f_r - 10.7)$

1.3 VERSIONS

T355/01 **Rx FM 138-174MHz**

FM Receiver NZPO Landmobile
25kHz channel spacing (15kHz bandwidth)
B3535 audio processor
Front panel frequency trim, sample output and line monitor output
For use with the T319 receiver monitor unit.

T355/02 **Rx FM 138-174MHz 25kHz CHAN**

FM Receiver, standard landmobile
25kHz channel spacing (15kHz IF bandwidth)
AF bandwidth 60-3400Hz, De-emphasis/CTCSS frequency response
B3535/02 audio processor used.

T355/05 **Rx FM 138-174MHz 12.5kHz CHAN**

T335 not T355/05 → FM Receiver 66-88MHz, (138-174) 12.5kHz landmobile
12.5kHz channel spacing (7.5kHz IF bandwidth)
AF bandwidth 60-3400Hz, De-emphasis/CTCSS frequency response
Uses B3535/02 audio processor.

SECTION 2 CIRCUIT OPERATION

Refer to: T355 Block Diagram A2M1202 (Fold-Out 1)
T355 Circuit Diagram A1C277 (Fold-Out 2)
B3535 Circuit Diagram A2C279 (Fold-Out 3)

2.1 RF & IF SECTIONS

The signal enters the receiver via the N-type female connector mounted on the rear chassis panel, and feeds down a 50 ohm miniature coaxial cable to the P.C. Board.

It passes through a two-section inductively-coupled band-pass filter to the base of the common-emitter RF amplifier (Q103), mounted on the underside of the board. From the collector, the signal is further filtered by a 4-section inductively coupled band-pass filter before being presented to the emitters of the balanced mixer transistors (Q104 & Q105).

Transistors Q110 & Q111 form a Colpitts type crystal controlled RF source and a common-emitter tripler stage, followed by a resonant circuit tuned to three times the crystal frequency. A vari-cap diode (D109) may be fitted to allow fine frequency trimming of the crystal oscillator. A buffer stage (Q112) amplifies the signal to the required level in its output tuned circuit. The signal is applied in anti-phase via a further tuned circuit to the bases of the balanced mixer transistors (Q104, Q105). Q104 & Q105 base voltages are held at about 0.6V by R112 & D106. The DC drive current drawn by the balanced mixer under normal drive conditions is about 75mA.

An optional oscillator monitor output is provided by the divider network (R159 R160) at a level of approximately 0dBm into 50 ohms suitable for driving a counter.

The IF signal appears in anti-phase at the collectors of the mixer transistors and is combined in the tuned circuit before being presented to the first IF crystal filter (XF101), which provides the required high selectivity. The filter passes only the 10.7MHz component of the mixer output to the input of the first IF amplifier (Q106, Q107),

A rectified sample is taken from the output of this amplifier and after amplification and smoothing (by IC1a) is applied to PIN diodes (D105, D105A) connected across the second section of the input filter. When sufficient signal is present to achieve the ultimate signal to noise ratio, the diodes begin to attenuate the input signal which significantly improves the high-level intermodulation rejection.

A second IF filter is placed between the first and second IF amplifiers to band-limit the noise and spurious signals from the first IF amplifier into the second. The signal is fed from the output of the second IF amplifier to the demodulator and carrier level detector sections. The demodulator section consists of an integrated circuit (IC2) which contains the amplitude limiter, quadrature detector and audio pre-amplifier circuits. NTC Resistor R142 provides temperature compensation to stabilise the IF gain. The quadrature phase-shift is provided by a tuned circuit consisting of C150, CV150A and L124. The audio from the demodulator is taken via the potential divider (R144, R145) to the audio pre-amplifier, the value of R145 various between versions (details are given on the circuit diagram). The output from the pre-amplifer is taken to the audio

processor PCB. The carrier level detector consists of: a buffer amplifier (Q113), a 10.7MHz rectifier (D110, D111) and a DC amplifier (IC1b). One part of the output from IC1b is smoothed and applied to a comparator (IC1d) as a voltage proportional to the energy in the 10.7MHz pass-band. A second part (IC1b) output is re-rectified by a precision rectifier (IC1c) and the DC voltage produced is a function of the AM noise present on the IF signal. This DC voltage is also presented to the comparator (IC1d) in correct proportion to give some noise compensation to the signal level output appearing at the output of IC1d. This signal strength output goes both to the rear 'D' range connector and to the audio section to operate the 'gate'.

2.2 9-VOLT REGULATOR

The 9-volt regulator is included on the IF-RF board and consists of a two transistor circuit (Q101, Q102) using a zener diode (D102) as a reference source. D104 compensates for Q101 base-emitter voltage, thus maintaining the output at the zener voltage (+9.1V). D103 and R103 sense a short circuit condition and reduce the reference voltage, hence limiting the dissipation in Q102 making the regulator short-circuit proof.

D101 prevents any current flow if power is accidentally applied with the wrong polarity.

2.3 AUDIO PROCESSOR (B3535)

The signal level voltage from the comparator (IC1d) on the RF-IF board is compared with a reference voltage (set by the gate sensitivity control RV38) by a Schmitt amplifier (IC1c) giving a 'snap-action' to the 'gate' characteristic with hysteresis (hold-on, hold-off) which varies according to the setting. The Schmitt output is fed to a buffer inverter (Q1) whose collector current flows through the 'gate' LED on the front panel to the bases of Q2 and Q5.

Q1A provides a receiver 'disable' function by clamping the base of Q1 to its emitter. An 'enable' delay may be provided by RV1a, R1b, R2b and C1b when the receiver is to be used in a semi-duplex two frequency linking system to prevent interaction.

When the base of Q2 is driven, its collector clamps the bases of both gating transistors (Q3 and Q4) to their emitters, thus allowing audio to pass to the the line and monitor outputs. Q4 may be held in the unmuted condition by closing the front panel 'Monitor Mute' toggle switch (S1) as a servicing aid.

Applying drive to the base of Q5 also causes its collector to clamp to the 0V line providing an open-collector output which may be used to key a transmitter. If a relay is fitted, the pull-in coil is also driven by Q5. (Q5 may be a medium or high power device depending upon its application).

The audio signal is applied to the op. amps (IC1a and IC1b) which, depending upon the associated components, provide either a CTCSS-compensated function, or a totally 'flat' function, both having unity gain at 1kHz. A bridged T network (C7, C8, C9, R13 & R15) connected in a feedback loop gives a broad resonance at about 280Hz. When combined with the de-emphasis network (R19, C10) the circuit complies with the requirements for a flat response at CTCSS frequencies, but retaining the de-emphasized response at audio frequencies.

When a totally flat response is required (eg in linking systems) the de-emphasis components are effectively eliminated by the changes set out in Section 4.5.

The signal is presented to a low pass filter (R21, C12 to C15, L1 & R22) which limits the upper audio response, then passes to the individual line and monitor level controls (RV39 & RV40). The signal is taken from the sliders of the potentiometers past the muting transistors (Q3 & Q4) to IC2 which contains two power amplifier sections. One section provides an output to drive a speaker, the other provides the line output via transformer T1. The output impedance is set at 600 ohms by two feedback loops around the line amplifier - one proportional to the output current, the other proportional to the output voltage.

A monitor output is also available from the 'hot' end of the line transformer primary, via R41, which may be taken to a monitor module.

SECTION 4 INSTALLATION

4.1 GENERAL

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

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.

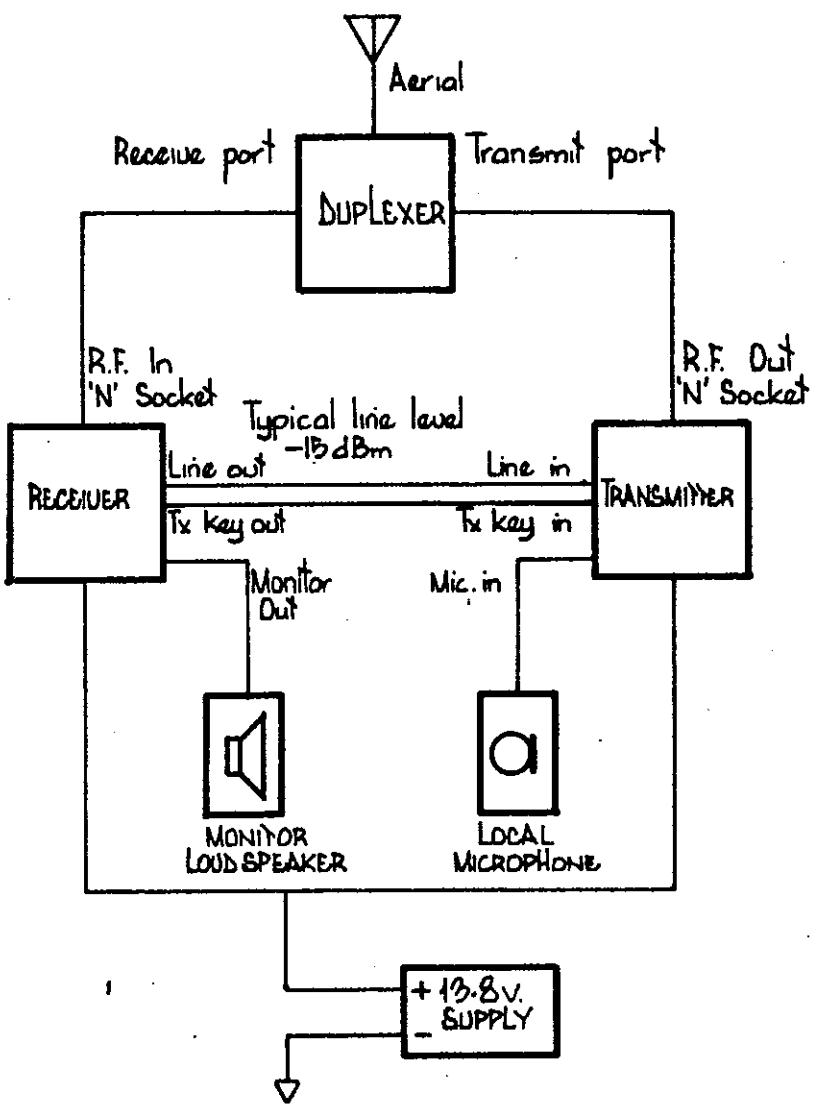

Figure 1: Talk Through Repeater

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.

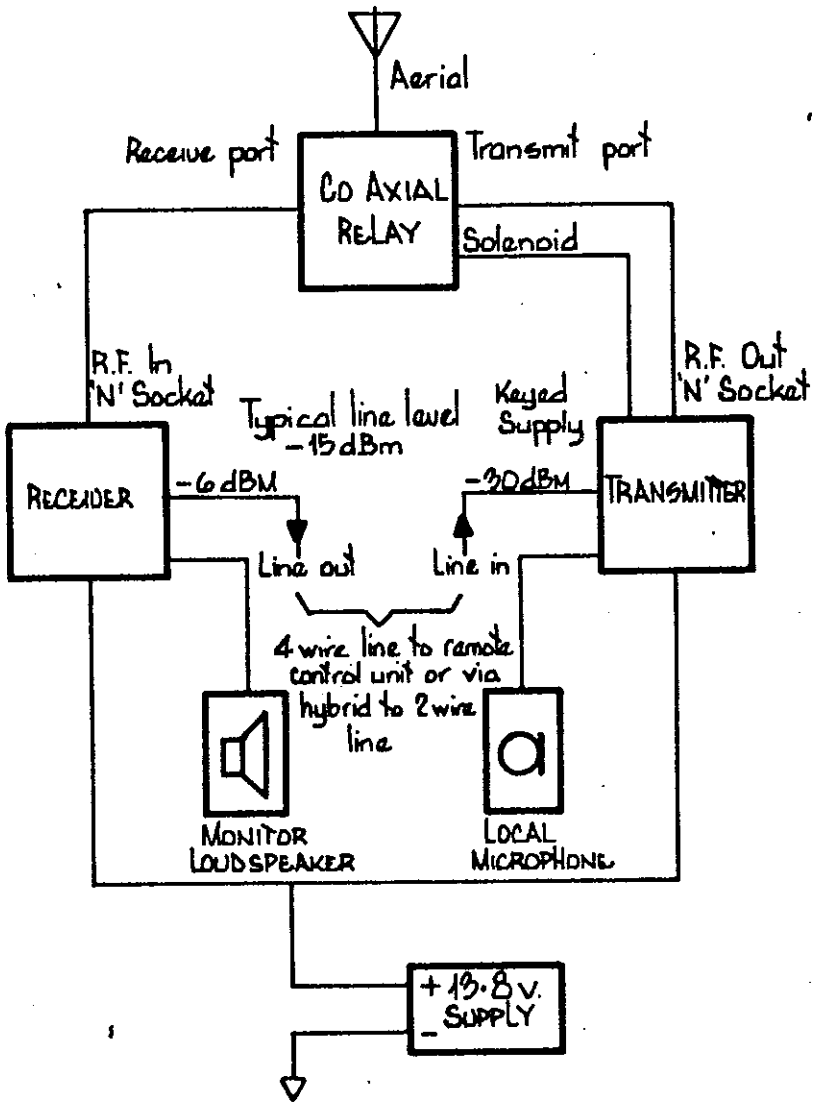

Figure 2: Line Controlled Base Station

4.4 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 the diagram below.

   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 and sacrificing 1 or 2dB of total measured audio energy loss 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.)

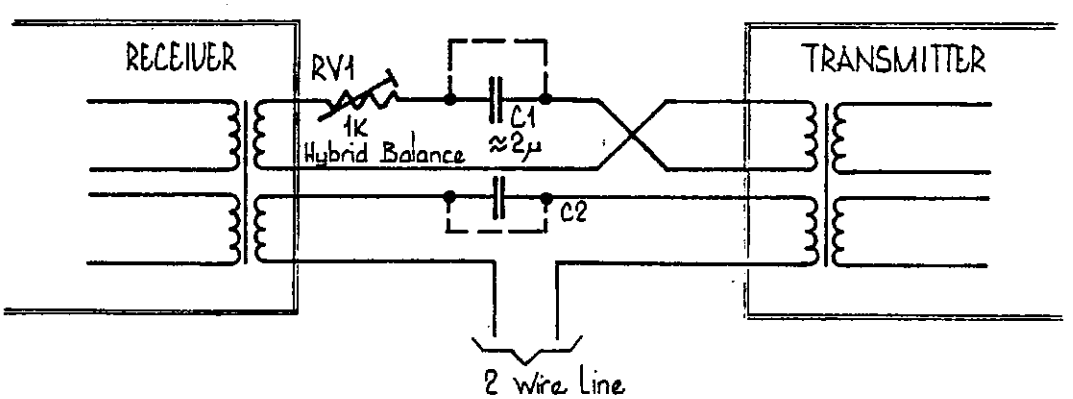

Figure 3: 4-Wire to 2-Wire Converter

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.

4.5 AUDIO PROCESSOR FLAT RESPONSE

(Refer to the Circuit Diagram A2C 279, Fold-Out 3).

The B3535 audio processor links are set to give a CTCSS de-emphasis response. If a flat response is required (e.g. in linking systems), the following circuit changes should be carried out:

(a) Fit an insulated wire link across C8 on the underside of the PCB.

(b) Remove the link which connects the junction of 'C11,R20' to the junction of 'C10, R19 & IC1b pin 8'.

(c) Fit an insulated wire link between the junction of 'C11, R20' and point 'B' which is connected to pin 14 of IC1a.

Note: No components are removed, so the de-emphasis can be restored by removing the links (a) and (c) and refitting the link (b) as given above.

SECTION 5 SERVICING

5.1 GENERAL

5.1.1 NOTES

If further information is required about the T355 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 susceptible to damage from static charges. 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), etc.

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.

The following TI's which relate to the T355 have already been issued:

TI-165	Gain variation with supply voltage (refers to equipment with serial numbers prior to 150285).
TI-185	To reduce gate sensitivity to impulse noise.
TI-188	To improve sensitivity at the top end of the band (refers to equipment with serial numbers prior to 162516).
TI-212	To reduce receiver current consumption.
TI-220	Modifications to provide compatability with the T319/11.
TI-221A	Fitting a TA-076 crystal oven.

5.2 MECHANICAL

5.2.1 POSIDRIV & SUPADRIV RECESS HEAD SCREWS

Posidriv, or the improved Supadriv 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. Posidriv screwdrivers will fit both posidriv and supadriv recess head screws. Phillips cross-head screwdrivers are not satisfactory for use on these screws. The table below gives the recommended driver sizes for the screws most commonly used on Tait equipment:

Thread size	Driver size
M 2.5	1
M 3	1
M 4	2
M 5	2
M 6	3

Note: Phillips cross-head screws are used in some locations which require very small screws. A Phillips 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 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. The recommended values can be obtained from either the circuit diagram or the component data catalogue.

5.3.2 COMPONENT REPLACEMENT

To avoid damaging the printed circuit track, the removal and replacement of components requires careful attention. If it is necessary to remove a component from the PCB, the recommended procedure is to first clear all solder from the component leads using a solder sucker or solder wick. The lead should then be free in the hole so that it can be withdrawn from the PCB.

Any component which is suspected of damage or faults should be replaced, and in doing so soldering operations should be kept to a minimum.

Printed circuit tracks should be cleaned before applying the soldering iron or solder, and the amount of heat and solder applied kept to a minimum. A fine-tip thermally controlled soldering iron and the use of solder wick or a solder sucker is strongly recommended. Do not attempt to withdraw any component or lead from the PCB while the solder is still molten.

Ensure that the soldering iron is earthed back to the frame of the set.

5.3.3 INTER - BOARD WIRING

To assist circuit tracing all plugs and connections are shown on the outer edge of the circuit diarams.

5.4 SETTING UP

5.4.1 TEST EQUIPMENT REQUIRED

1. Oscilloscope good quality, 0-10MHz (eg Trio 1566A, Telequipment D61A)
2. VHF FM generator capable of providing 138-174MHz at 0dBm to -120dBm frequency modulated to ±3.5kHz deviation at 1kHz. (eg HP8654)
3. VHF frequency counter (accuracy better than 1ppm).
4. Sinad meter (e.g. Helper Instruments Sinadder).
5. Audio oscillator (eg Trio AG 203)
6. Multimeter or DMM (eg AVO model 8 or Fluke 8012A)
7. AC millivoltmeter (eg Trio VT106)
8. DC millivoltmeter (eg Trio VT120, Tech.Inst. TE65)
9. RF diode probe (See Figure 6 Page 5.5)
10. External speaker 3 ohm voice coil
11. DC power supply capable of delivering 1 amp at 13.8V
12. 'N' to 'BNC' adaptors (2)
13. Trimming tools (available from Tait Electronics Ltd)

WT 9	Tait IPN 9360110
WT 10	9360111
WT 11	9360112

13. Bench test plug (refer to Wiring Diagram Fold-Out 4 for connections).

5.4.2 TUNING HINTS

1. When using an RF probe, the ground return lead should be kept as short as possible, and connected as close as possible to the point at which the measurement is being made. This is to minimize stray pick-up, which may affect readings. A suitable RF probe circuit is given in Figure 6, Page 5.5.

2. When tuning coils on the Receiver PCB all adjustments must be made from the top (component side) of the PCB. A non-metallic tuning tool should be used.

5.4.3 COIL TAP CONNECTIONS

(a) General

The T355 uses RF coils with taps which permit the set to operate over a wide frequency range. Connections to these taps may have to be altered if the tuning is changed.

(b) Oscillator Trim Coil Type 617

A type 617 coil is used in the crystal oscillator circuit and during manufacture pins 1 and 4 are brought into circuit. This covers a wide frequency range. If it is desired to operate the T355 at the low frequency end of the band it may be necessary to bring more of the coil into circuit by cutting the copper track to pin 4 and connecting pin 3 in its place (see Figure 4 below).

(c) RF Coils Type 618

Three type 618 coils are used in the oscillator chain and during manufacture the winding taps are connected in circuit thus permitting operation over a wide frequency range. If it is desired to operate the T355 at the low frequency end of the band, then the connection to the tap should be cut and the whole coil brought into circuit (see Figure 5).

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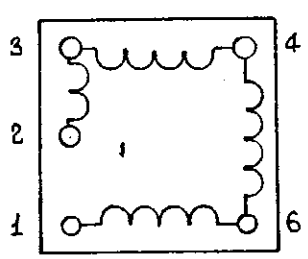
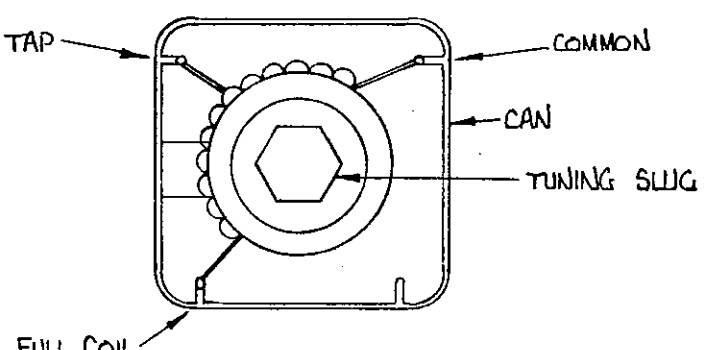
5.4.4 SETTING-UP DIAGRAMS



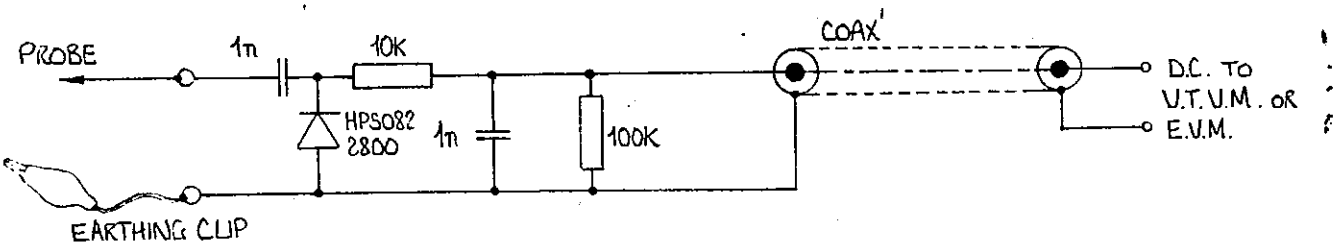
Pin Connections
Bottom View

Figure 4 Coil Type 617



Pin Connections
Bottom View

Figure 5 Coil Type 618



This unit is not suitable for use on high voltage circuits.

Figure 6 RF Diode Probe Circuit.

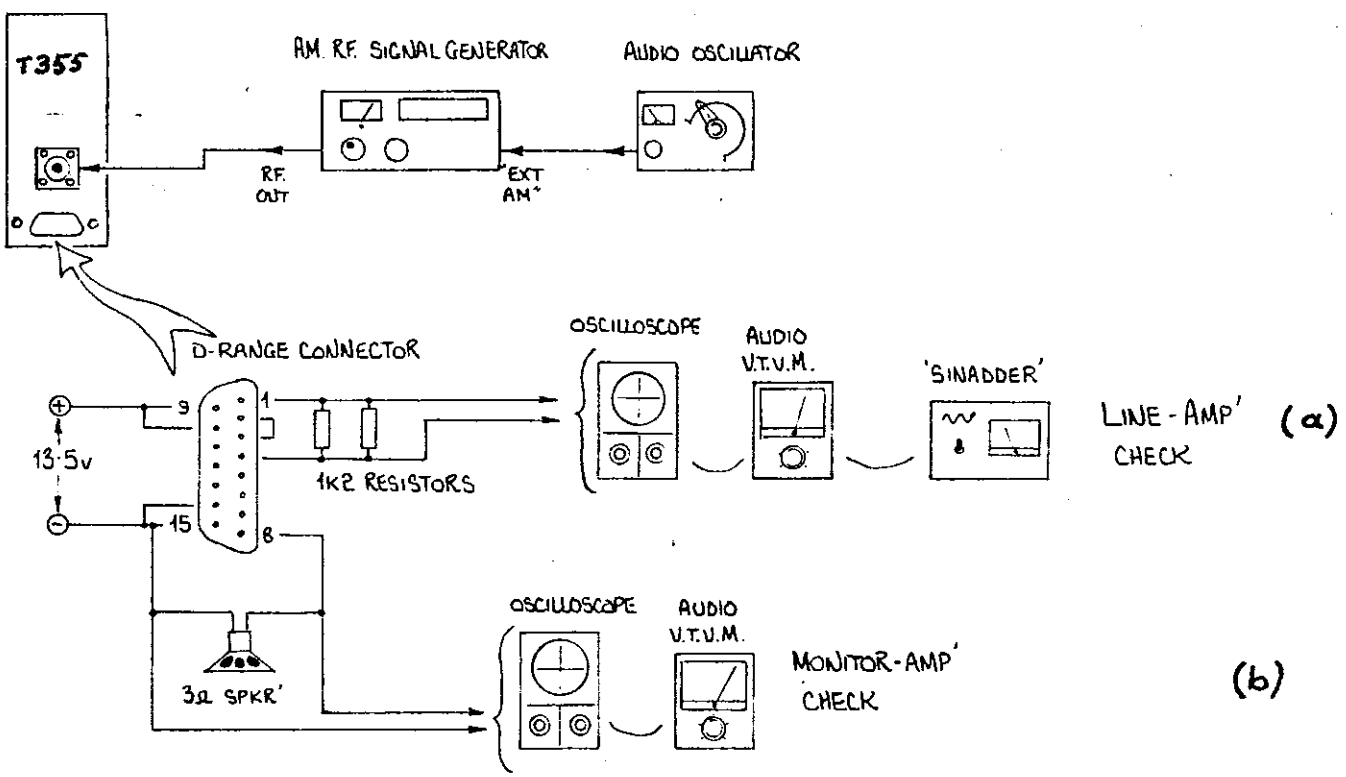


Figure 7 Test Equipment Set-Up

5.5 RECEIVER ADJUSTMENTS

5.5.1 GENERAL

Set-up the test equipment as in Figure 7 (a).

Set the gating sensitivity control (RV38) fully anti-clockwise (this should open the gate).

Set the line level control (RV39) and monitor level control (RV40) at levels suitable for driving Sinadder, speaker etc.

Ensure that the correct crystal if fitted ($f_x = 1/3(f_r - 10.7MHz)$

155.75

5.5.2 LOCAL OSCILLATOR ALIGNMENT

Set the slug of L125 to its mid-position (ie. the slug is half-way out of the coil).

Note: 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 made. This is to minimise stray pick-up which may affect the reading.

Connect an EVM with diode probe to TP1 (Q110 emitter). The meter should read about 0.5 volts.

Connect the probe to TP2.

Adjust L128 for a maximum reading, about 0.5V.

Connect a DC voltmeter (1V range) between TP3 (Q104, Q105 emitters) and earth.

Adjust L130 & L117 for a peak reading.

Readjust L128 for a peak reading - at least 0.3 volts.

5.5.3 LOCAL OSCILLATOR FREQUENCY ADJUSTMENT

Connect a frequency counter to the oscillator injection monitor output on the RF PCB (across R160).

Adjust L125 for the exact oscillator injection frequency (f_r -10.7MHz).

5.5.4 RF ALIGNMENT

Note: **The following assumes that the IF alignment is correct and should not be touched unless there is clear evidence of malfunction (see Section 5.5.5 for IF alignment procedure).**

Set the gating sensitivity control (RV38) fully anti-clockwise.

Set the RF signal generator to give an accurate 'on channel' signal modulated to ±3kHz deviation at 1kHz and the output level to give a 12dB sinad.

Set the line level control to give 0dBm.

Note: If there is no output from the line amplifier, this may be due to the RF input filter (L104 to L107, CV108 & CV109) being too far off tune. The remedy is to inject the signal directly to Q103 base using a coaxial lead with a 1nF blocking capacitor in series with the centre conductor.

Adjust CV116 to CV119 for the best possible 12dB sinad sensitivity.

Note: The signal generator output level should be progressively reduced to maintain the 12dB sinad output.

Remove the coaxial lead from the base of Q103.

Reconnect the signal generator to the aerial terminal.

Adjust CV108 & CV109 for best 12dB sinad.

Re-adjust CV116 to CV119 for the best possible 12dB sinad sensitivity.

For a correctly operating set the signal generator output level for 12dB sinad sensitivity should be less than -115dBm, a typical value being -118dBm.

5.5.5 IF ALIGNMENT

Note: **The IF sections have been correctly aligned during manufacture and should not require re-adjustment unless repairs have been carried out, or there is clear evidence of malfunction.**

Ensure that sections 5.5.1 to 5.5.4 (inclusive) have been completed. This will ensure a correct intermediate frequency and that the desired high signal level to the IF can be achieved.

Set-up the test equipment as in Figure 7.

Set the RF signal generator to give an accurate 'on channel' signal modulated to ±3kHz deviation at 1kHz and the output level to give a 12dB sinad.

Set the gating sensitivity control fully anti-clockwise (gate open).

Set the line level control to give 0dBm.

Adjust CV150A for maximum audio at the line output terminals.

Adjust CV131 for best 12dB sinad. Progressively reduce the signal generator output level to maintain 12dB sinad output.

Connect a DC voltmeter (1 volt range) between the signal strength output terminal (D range connector pin 5) and earth. (for D range connector pin assignment refer to Fold-out 4 Wiring Diagram).

Adjust L122, L123 & L131 for a maximum signal strength voltage. This adjustment for L131 should closely coincide with the best 12dB sinad adjustment.

For a correctly operating set the signal generator output level for 12dB sinad sensitivity should be less than -115dBm, a typical value is 118dBm.

5.5.6 CARRIER LEVEL DETECTOR ADJUSTMENT

(a) Connect a DC voltmeter (10V range) to pin 5 of the D range connector (signal strength output).

Set RV180 fully anti-clockwise.

(b) Set the signal generator to give an 'on channel' signal with the output level set to -110dBm, and the modulation switched off.

Adjust L131 for maximum signal strength voltage.

(c) Set the signal generator output level to -120dBm.

Adjust RV180 for a signal strength voltage of 0.15V.

(d) Set the signal generator output level to -100dBm.

Adjust L131 for a signal strength voltage of 4 volts.

(e) Repeat steps (c) & (d) to satisfy both requirements.

(f) Check that the signal strength voltage reaches a maximum of 7 to 8 volts at -80dBm.

5.6 FAULT FINDING

5.6.1 GENERAL

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

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

A block diagram is included with all the relevant information plus a voltage table giving the DC conditions around each transistor. These were measured with a 20k ohms/volt moving coil meter, with the supply rail at 13.8V and an 'on-channel' signal of -107dBm (1µV) at the aerial input with the gate 'open'.

5.6.2 VOLTAGE TABLE

Transistor	Emitter Volts	Base Volts	Collector Volts
RF & IF Section			
Q101	8.2	8.8	12.2
Q102	12.8	12.2	8.9
Q103	0.0	0.7	8.7
Q104, Q105	0.33	0.55	9.8
Q106	2.6	3.2	6.0
Q107	6.7	6.0	2.6
Q108	2.6	3.2	6.0
Q109	6.7	6.0	0.0
Q110	1.2	1.7	3.5
Q111	4.8	3.5	7.7
Q112	0.0	0.4	6.8
Q113	2.6	3.2	8.6
Audio Section			
Q1	8.7	8.0	8.6
Q1A	8.7	8.7	8.0
Q2	0.0	0.7	0.02
Q3	0.0	0.02	0.0
Q4	0.0	0.02	0.0
Q5	0.0	0.75	0.02

5.6.3 GATE OPERATION

Connect the RF signal generator modulated to ±3kHz with 1kHz tone to the receiver input.

Vary the signal generator output level over the range -117 to -77dBm checking the operation of the gate sensitivity control (RV38) at various input levels within that range.

For several gate sensitivities within the range -117 to -77dBm check the gate hysteresis, ie, the difference in RF level between the point at which the gate opens as the level is increased, and where the gate closes as the level is decreased. Hysteresis should be between 2 and 7dB for all gate settings. The hysteresis will vary with the setting of the gate sensitivity control.

5.6.4. CARRIER LEVEL DETECTOR OPERATION

Connect the RF signal generator to the receiver input.

Set the signal generator to the receive frequency, modulated to ±3kHz at 1kHz.

Connect the DC voltmeter (set to the 10V range) to Pin 5 of the D range connector.

Vary the input signal level over the range -70dBm to -120dBm recording the output voltage.

Note that the signal strength output voltage should approximate the figures given in the following table:

Signal Strength Output Voltage	Input Signal Level
-80dBm	7 - 8V. 6V
-100dBm	4.0V
-120dBm	0.15V

5.6.5 LINE AMPLIFIER OUTPUT LEVEL

Set up the test equipment as in Figure 7(a).

Apply RF input signal at a level of -50dBm with modulation on.

Set the receiver line level control to give an indicated output of 0dBm.

While monitoring the waveform on the oscilloscope, increase the output to ensure that at least +10dBm is available before clipping occurs.

Set the line level control to give an output of 0dBm.

5.6.6 MONITOR AMPLIFIER OUTPUT LEVEL

Set up the test equipment as in Figure 7(b), including a 3 ohm speaker (capable of handling 1 watt) connected between pins 8 and 15 of the 'D' range connector.

Connect the audio EVM in parallel wiith the speaker and apply the RF signal generator at -60dBm modulated to ±3kHz with a 1kHz tone.

Check that at least 1.73 volts RMS is available into the speaker before clipping occurs.

5.6.7 SIGNAL+NOISE TO NOISE RATIO

Set up the test equipment as in the line amplifier test Figure 7(a).

Set the RF signal generator output modulated to ±3kHz with a 1kHz tone, at -50dBm. Adjust line level to 0dBm.

Switch the modulation off.

Check that the residual noise is less than -55dBm at the line output.

Note: it may be necessary to increase the meter sensitivity to get a satisfactory reading.

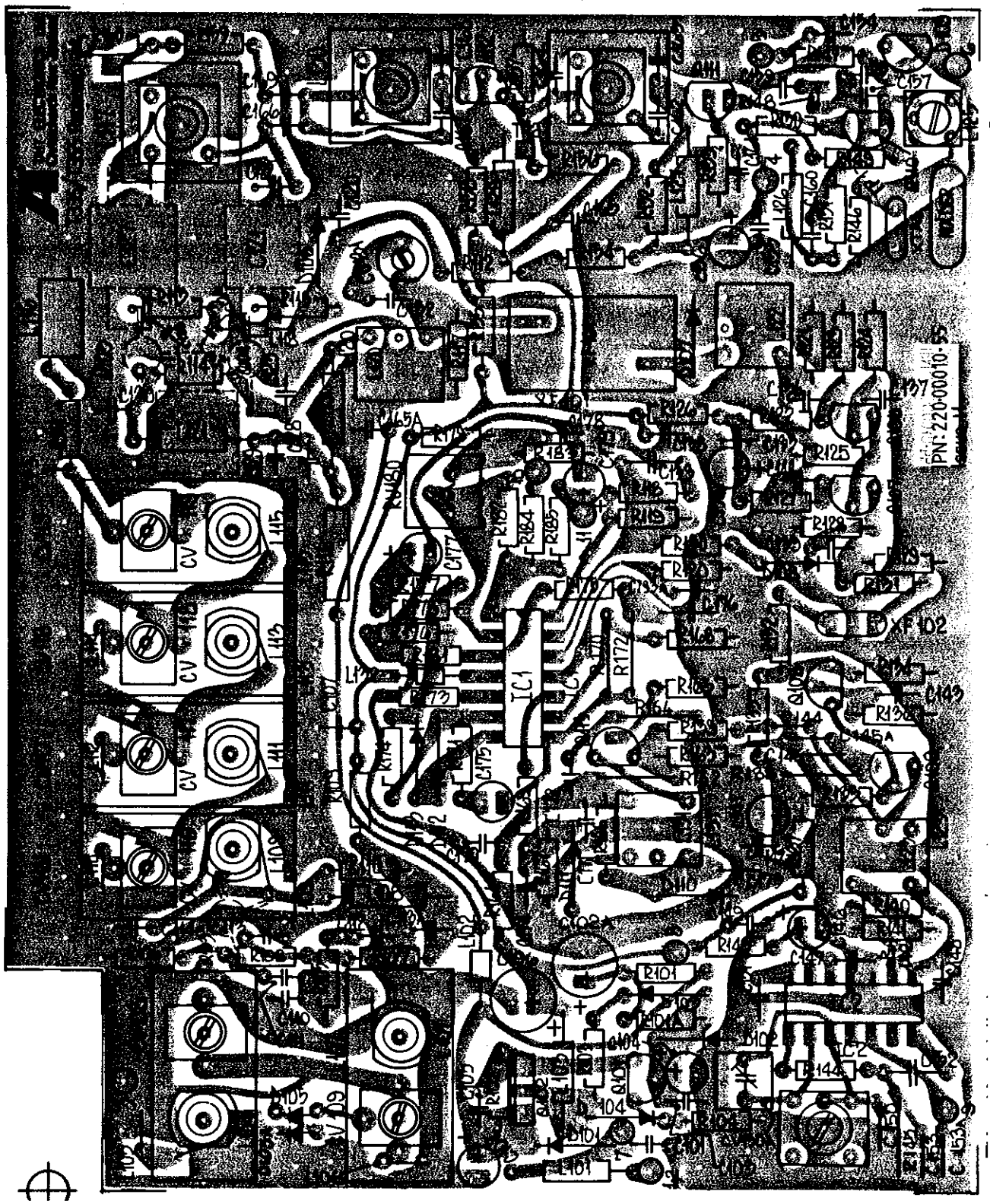


Figure 8 T355 Receiver PCB Encoding

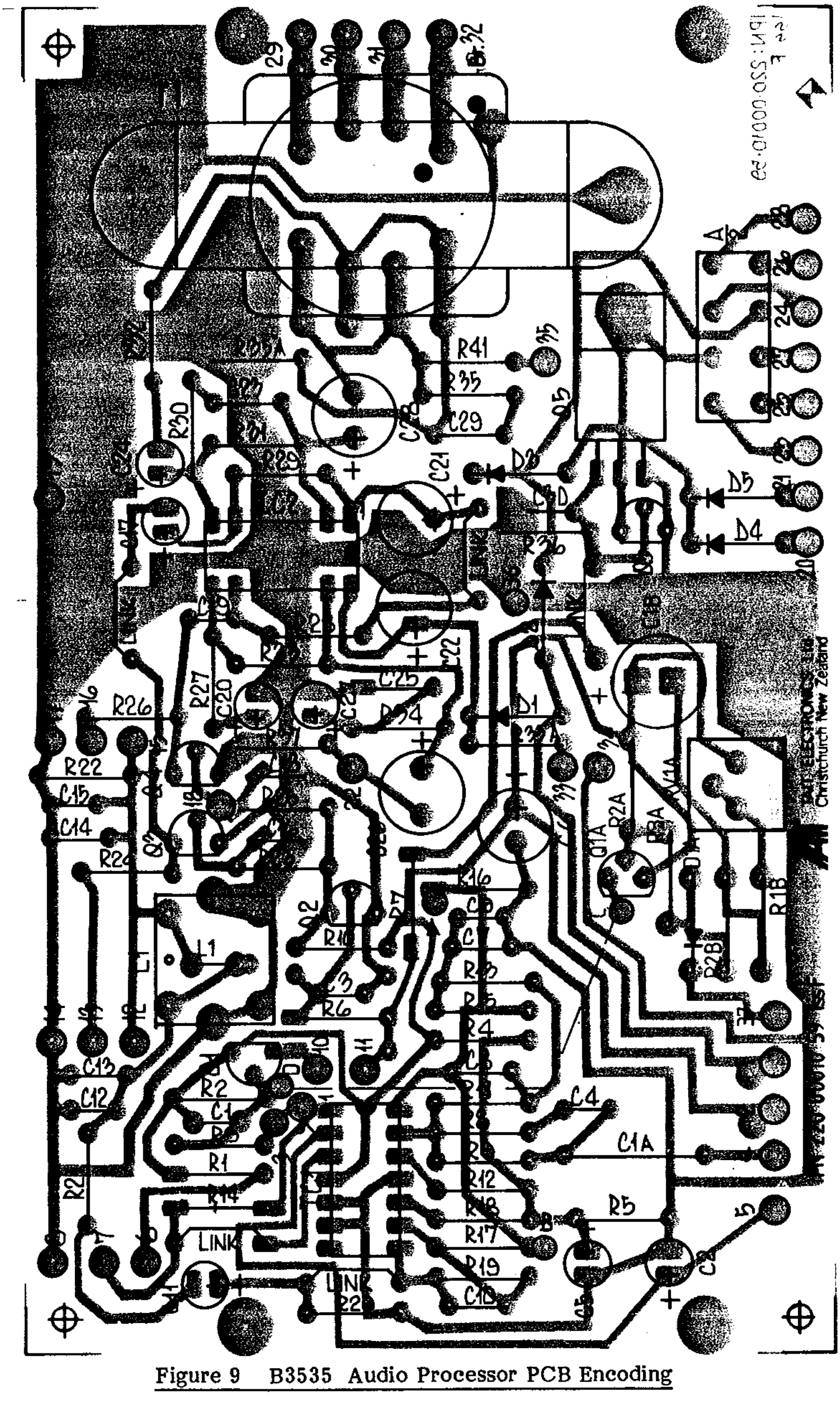


Figure 9 B3535 Audio Processor PCB Encoding

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 T355. Different versions have different sub-groups. Check the version of your T355 (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 T355. 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	
T355/02		
	B355	T355 Basic PCB Parts
	B355/MECH	T355 Mechanical Assembly Parts
	C355/15 IFBW	T355 15kHz Bandwidth Parts
	C355/INT TRIM	T355 Internal Crystal Trim Parts
	B355/WIRE	T355 Wire List
	B3535	B3535 Audio Processor Parts
	C35353/02	B3535/02 3.4kHz Filter Parts
	B/GUIDE	T355 Basic Guide Parts
T355/05		
	B355	T355 Basic PCB Parts
	B355/MECH	T355 Mechanical Assembly Parts
	C355/7.5 IFBW	T355 15kHz Bandwidth Parts
	C355/INT TRIM	T355 Internal Crystal Trim Parts
	B355/WIRE	T355 Wire List
	B3535	B3535 Audio Processor Parts
	C3535/02	B3535/02 3.4kHz Filter Parts
	B/GUIDE	T355 Basic Guide Parts

6.2 B355 T355 BASIC PCB PARTS

6.2.1 TRANSISTORS

item	internal part NO.	quantity issued	check	description	circuit reference	Qty per set
				CCT DIAGRAM B16 377		
	0000001110			BC548B TRANSISTOR	Q101	1
	0000001170			BD136 "	Q102	1
	0000002011			BF494 "	Q106, Q108, Q113	3
	0000002035			BF324 "	Q107, Q109	2
	0000031900			MPSH11	Q110, Q111	2
	0000032300			2SC1730	Q112	1
	0000032450			MRF961	Q103, Q104, Q105	3

6.2.2 DIODES

	0010001268	S/N 3166 C/N 1758		MA47600 PIN DIODE	D105, D105A	2
	0010001170			1N4001 DIODE	D101	1
	0010001200			1N4148 "	D103, D104, D106, D107, D108, D110, D111, D112, D113.	9
	0010001517			BZX79/C9V1 ZENER	D102	1

6.2.3 INTEGRATED CIRCUITS

	0020001190			MC1375P / CA3075 INT CCT	IC2	1
	0020001440			MLM324P "	IC1	1

6.2.4 CAPACITORS

	0110050001			0P5 CAP P100 50V TOL ±0.25P	C166, C169	2
	0110133001			3P3 CAP NP0 63V TOL D	C150	1
	0110147001			4P7 CAP NP0 63V TOL D	C124, C126, C167	3
	0110156001			5P6 CAP NP0 63V TOL D	C122	1
	0110168001			6P8 CAP NP0 63V TOL D	C168	1
	0110210001			10P CAP NP0 63V TOL D	C162	1
	0110218001			18P CAP N150 63V 5%	C163,	1
	0110233001	1		33P CAP N150 63V 5%	C114	1
	0110256001			56P CAP N150 63V 5%	C144	1
	0110268001			68P CAP N150 63V 5%	C110, C133, C164	3
	0110310001			100P CAP N150 63V 5%	C153, C174	2
	0110315001			150P CAP N150 63V 5%	C157	1
	0110322001			220P CAP N750 63V 5%	C151	1
	0110347002			470P CAP T/C B 63V 10%	C123, C130	2

	0	1	1	0	4	4	7	0	0	2	C/N 1177 C/N 2177	4n7 CAP T/C B 63V 10%	C101, C103, C105, C107, C111, C112, C113, C153A C120, C129, C135, C136, C137, C138, C139, C140 C142, C143, C145, C147, C148, C149, C155, C160 C161, C165, C170, C171, C172, C173, C178, C165A, C113A 33
	0	1	7	0	5	4	7	0	0	1	83/5-724	47n CAP 50V SURFACE BARRIER DISC CER	C128, C145A 2
	0	2	0	0	7	1	0	0	0	2	83/9-929	1µ CAP 50V ELECTRO 5x11mm VERT	C175, C177, C179 3
	0	2	0	0	8	1	0	0	0	3	83/9-929	10µ CAP 50V ELECTRO 5x11mm VERT	C134, C141, C146, C156 4
	0	2	0	0	8	2	2	0	0	1		22µ CAP 16V ELECTRO 5x11mm VERT	C102 1
	0	2	0	0	8	4	7	0	0	2		47µ CAP 16V ELECTRO 6 x 11mm VERT	C106 1
	0	2	0	0	9	1	0	0	0	3		100µ CAP 16V ELECTRO 8 x 11 VERT	C102A 1
	0	2	2	0	5	2	2	0	0	1	C/N 1933	22n CAP 50V MYLAR VERT	C133A 1
	0	2	2	0	6	1	0	0	0	1	C/N 02/065	100n CAP 50V MYLAR VERT	C133, C152 2
	0	2	5	0	7	3	3	0	0	1		3µ3 CAP 35V TANT	C104 1
	0	2	8	0	2	1	0	0	0	2		2-10P TRIM CAP MATSUSHITA ECV-1TY10P17	CV108, CV109, CV116, CV117 CV118, CV119 6
	0	2	5	0	6	4	7	0	0	1	C/N 02/065	470n CAP 35V TANTALUM	C176 1
	0	2	8	0	2	3	0	0	0	2	C/N 1664	4-30P TRIM CAP MATSUSHITA ECV-12W30X32	CV131, 1
	0	2	8	0	2	1	8	0	0	1	C/N 1664	2-18P TRIM CAP PHILIPS 2222-809-05003 (300V FILM 2 TAG)	CV150A 1
	0	2	9	0	3	1	0	0	0	1		100P CAP CASE MICA UNELCO T102	C121, C125 2
	0	2	9	0	3	1	5	0	0	1		150P CAP CASE MICA UNELCO T102	C127 1

6.2.5 RESISTORS

	0	3	0	0	1	4	7	0	0	0		4E7 RESISTOR 7x2.5mm 5% C/F	TR111 1
	0	3	0	0	2	1	5	0	0	0		15E " " " "	TR143 1
	0	3	0	0	2	4	7	0	0	0		47E " " " "	TR126, TR137, TR160, TR161 4
	0	3	0	0	2	4	7	0	0	1		47E " 10x4mm " "	TR116 1
	0	3	0	0	3	1	0	0	0	0		100E " 7x2.5mm " "	TR103, TR107, TR109, TR154 4
	0	3	0	0	3	1	5	0	0	0		150E " " " "	TR141 1
	0	3	0	0	3	2	2	0	0	0	C/N 2120	220E " " " "	TR113, TR115, TR159, R164 4
	0	3	0	0	3	2	7	0	0	0		270E " " " "	TR140 1
	0	3	0	0	3	3	3	0	0	0		330E " " " "	TR151, 1
	0	3	0	0	3	3	9	0	0	0	3-603	390E RESISTOR 7x2.5mm 5% C/F	R155 1
	0	3	0	0	3	4	7	0	0	0	C/N 2094	470E " " " "	TR101, TR101A 2
	0	3	0	0	3	6	8	0	0	0		680E " " " "	TR138 1
	0	3	0	0	4	1	0	0	0	0	C/N 2094 C/N 3-603	1K " " " "	, TR106, TR118, TR146 TR153, TR157, TR184, TR185 R121 8

0300412000		1K2 RESISTOR 7x2.5mm 5% C/F	R150	1
0300415000		1K5 " " " " "	R127, R131, R132	3
0300422000		2K2 " " " " "	R104, R105, R110, R112, R114, R124, R125, R128, R135, R136, R139, R158, R165	14
0300433000		3K3 " " " " "	R149	1
0300439000	C/N 1910	3K9 " " " "	R108	1
0300447000		4K7 " " " " "	R102, R176	2
	C/N 2014			
0300510000	C/N 1910	10K " " " " "	R144, R156, R167 R168, R171, R183	6
0300533000		33K " " " " "	R123, R134, R163, R170	4
0300547000		47K " " " " "	R122, R133, R162, R166	4
0300610000		100K " " " " "	R120, R129, R130, R169 R172, R173, R174, R175 R177, R179,	10
0300622000		220K RESISTOR 7x2.5mm 5% C/F	R181, R182	2
0300633000		330K " " " " "	R178	1
0300710000		1M " " " " "	R119	1
0420710008		1M PRESET RES CERMET FLAT 63P	RV180	1
0450315001		NTC 150E TH2322-642-12151	R142	1

6.2.6 COILS

	0500001602		COIL TAIT No 602	L132, L131	2
	0500001617		COIL TAIT No 617	L125	1
	0500001618		COIL TAIT No 618	L117, L128, L130	3
	0500001620		COIL TAIT No 620	L123	1
*	0500001627		COIL TAIT No 627 (FXD coil) 3.5µH	L120, L124	2
	0510000356	C/N 02/065	COIL TAIT No 356	L113, L115, L109, L111,	4
	0510000358	C/N 02/065	COIL TAIT No 358	L104, L107	2
	0510001013	C/N 1641	COIL A/W 1.5T/3.5mm NOR	L105	1
	0560001015		CHOKE TAIT No 15	L116	1
	0560002100		IND FXD TAIT No 100 3.3µH	L108, L126, L127, L129	4
	0560002102		IND FXD TAIT No 102 100µH	L101, L103, L119, L121	4
	0620001006		CAN 13x26mm NEOSID		6
	0620001011		CAN 14mm x 19mm SANWA		3
	0650001004		FERRITE BEAD 4x2x5 FB	L102, L118, L132	3

6.2.7 PCB MISCELLANEOUS

2200001055	PRINTED CCT BOARD T355		1
2400040202O	SKT XTAL MTG. N2/WC/PC.		1
2760001020	XTAL FILTER NDK 10F15A	XF102	1
3560001026	HARWIN TRACK PINS		55

6.3 C355/7.5 IFBW — T355 7.5kHz BANDWIDTH PARTS

0300527000	27K RESISTOR 7x2.5mm 5% C/F	R145	1
2760001032	XTAL FILTER NDK 10F7.5DH	XF101	1
INT 2760001031	NDK 10F7.5EA.		

6.4 C355/15 IFBW — T355 15kHz BANDWIDTH PARTS

0300466000	6K8 RESISTOR 7x2.5mm 5% C/F	R145	1
2760001022	XTAL FILTER NDK 10F15D	XF101	1
NO 2760001021	NDK 10F15E		

6.5 C355/INT TRIM — T355 INTERNAL TRIM PARTS

0112150001	1	15P CAP NPO 63V 5%	C158	
0400510006	1	10K LOG POT L/S V16	MONITOR VOLUME	
3111000101 5	1	KNOB 15mm SILVER SATO K34		
3160006253	1	FRONT PANEL A4A136 A3M1224		1990
3160021129	1	CHASSIS FRONT PANEL A2M1225		1990
3160021091	1	CHASSIS REAR PANEL A2M1251		1916

6.6 B355/MECH — T355 MECHANICAL ASSEMBLY PARTS

0080001011	LED TIL209A RED	(MUTE OPEN)	1
0080010115	LED TLG 124A GREEN		1
0120410001	CAP 1n FEED THRU EY28/A1		15
~~POT 10K LOG L/S~~		~~MONITOR LEVEL~~ Part of C355/02	1
0400510012 C/N M50	POT 10K LOG L/S (SHAFT A4M906)	MUTE SCNS', LINE LEVEL	2
0650001004	FERRITE BEAD F8 4x2.5 NEOSID		15
0650002003	GLASS BEADS 3.5x2.9x1.2 ID		16
2300001003	SWITCH TOGGLE SPDT MS247		1
2400002055	PLUG 15WAY D RANGE DA15P		1
2400210004	COAX SKT TYPE N PANEL JACK (GREEN PAR 15057-A10H)		1

T355 Parts List

302000300 7		1	BRACKET FEED THRU' A2M956		
302004501 8		1	BUSH COAX RETAINING. A4M1024		
303001114 0		2	CHASSIS SIDE PLATE A2M1195		1990
					1990
303002309 1		1	'D' RANGE HOLE COVER CRCT A4M1230		1816
306001010		2	FERRULE A4M948		
308000100 7		1	HANDLE A4M949		
		1	~~KNOB 15mm SILVER CP10 K24~~	Part of C355/02	
		1	~~FRONT PANEL A4A336 A4M 69~~	Part of C355/02	
		1	~~CHASSIS FRONT PANEL A2M966~~	Part of C355/02	
		1	~~CHASSIS REAR PANEL A2M1142~~	Part of C355/02	
316008501 5		2	PIN LOCATING A4M 775		
319000103 5		1	SHIELD MIXER A4M1132		
319000107 2		1	SHIELD FILTER EARTHING A4M1309		
319002004 5		1	SLEEVE A2M970		
345004006		4	SCREW M3 x 8mm PAN POZI ST BZ.	'N' CONNECTOR MTG	83/5-879
345000409		8	SCREW M3 x 6mm CSK POZI ST BZ	SLEEVE	
345000401 0		5	SCREW M3 x 6mm PAN POZI ST BZ	SIDE PLATES TO CHASSIS, FEED THRU BKT	83/5-879
345000402 0		4	SCREW M3 x 8mm BUTTON SKT BLACK	FRONT PANEL	
349000200 2		4	SCREW 4-40 x 1/4 CSK POZI TAPTITE	CHASSIS SIDES TO FRONT	
349000200 3		12	SCREW 4-40 x 1/4 PAN POZI TAPTITE	PCB TO CHASSIS, COAX SKT	1816
352000100 8		5	NUT M3 HEX COLD FORM		83/5-879
352000102 9		2	NUT M4 NYLOC	HANDLE	
352000104 3		2	NUT M3 LOCATING PIN A4M793		
					1776
353000101 2		2	WASHER M3 SPRING	LOCATING PIN	
353000101 3		5	WASHER M3 SHAKEPROOF	BRACKET	83/5-879
354000103 3		16	PEM INSERT		
360000104 0		2	SNAP BUSHING BLACK, HEYCO SB-375-4	(2080)	
302004501 3	ALT.	2	BUSH PLASTIC BLACK DEUTSCHER 3-336-001		
362000103 0		2	GROMMET LED MTG		
365000103 1		1	LABEL WHITE REMOVEABLE		1625
365000107 9		0·1	LABEL, VERSION NUMBERS, 4 BLOCKS PER SHEET	A4A217	82/08-358
369000101 4		10	CABLE TIE NYLON REX CTBP		82/06-232
400000010 7 0		20 mm	SLEEVING 7mm PVC	2 x 10 mm (HARNESS)	
400000020 0 1		320mm	SLEEVING 0·7mm SILICON RUBBER		

6.7 B355/WIRE T355 WIRE LIST

2000001005	270 mm	WIRE 0.5mm TCW	40 x 3, 30 x 3, 20 x 3 mm		
2010003001	650 mm	WIRE 7/0.2 PVC BROWN	270, 260 mm		
2010003002	1.25 M	WIRE 7/0.2 PVC RED	270, 240, 190 x 3, 90, 80 mm		
2010003003	620mm	WIRE 7/0.2 PVC ORANGE	270, 260, 90 mm		
2010003004	440mm	WIRE 7/0.2 PVC YELLOW	170, 270 mm		
2010003005	350mm	WIRE 7/0.2 PVC GREEN	350 mm		
2010003006	260 mm	WIRE 7/0.2 PVC BLUE	260 mm		
2010003007	260mm	WIRE 7/0.2 PVC VIOLET	260 mm		
2010003008	540mm	WIRE 7/0.2 PVC GREY	190, 350 mm		
2010003009	190mm	WIRE 7/0.2 PVC WHITE	190mm		
2010030110	660mm	WIRE 7/0.2 PVC BLACK	40, 90, 110, 120, 300 mm		
2060001011	100 mm	COAX RG316/U			

6.8 B3535 B3535 AUDIO PROCESSOR PCB PARTS

6.8.1 TRANSISTORS

0000001066		BC337-40 TRANSISTOR	Q3, Q4, Q5	3
0000001110		BC548B	Q2	1
0000001130	82/09-371	BC557B	Q1, Q1A	2

6.8.2 DIODES

0010001170		1N4001 DIODE	D1, D2, D3, D4, D5	5
0010001200	82/09-371	1N4148 DIODE	D1A	1

6.8.3 INTEGRATED CIRCUITS

0021000141 0		LM377 INT CCT	Ic2	1
0021000144 0		MLM324P INT CCT	Ic1	1

6.8.4 CAPACITORS

011031500 1		150P CAP N150 63V 5%	C4	1
011041000 1		1m CAP T/C B 63V 10%	C1, C3	2
011047002		4m7 CAP T/C B 63V 10%	C16, C18, C30	3
020071000 2	82/11-5030 82/03-080	1µ CAP 50V ELECTRO 5 x 11mm VERT	(C2 is not installed when T355/04 is assembled) C17, C20, C27	3
020081000 3		10µ CAP 50V ELECTRO 5x11mm VERT	C5, C11, C24	3
020091000 3		100µ CAP 16V ELECTRO 8x11mm VERT	C6, C21, C22	3
020092200 1		220µ CAP 16V ELECTRO 10x12.5mm VERT	C26, C28	2
022047001		4m7 CAP 50V MYLAR VERT	C9	1
022051000 1		10m CAP 50V MYLAR VERT	C12, C19	2
022054701		47m CAP 50V MYLAR VERT	C7 C8, C10,	
022061000 1		100m CAP 50V MYLAR VERT	C23, C25, C29	3
022064701		470m CAP 100V PETP VERT	C1A	1

6.8.5 RESISTORS

030012200		2E2 RESISTOR 7x2.5mm 5% C/F	R34	1
030013300		3E3 " " " "	R35A	1
030023900		39E " " " "	R35	1
030033300		330E " " " "	R7	1
030036800		680E " " " "	R33A	1
030039100		910E " " " "	R32	1
030041000	82/09-371 C/N 2094	1K " " " "	R2A R2, R20, R23, R25 R36, R37, R41	8
030042200	C/N 2094 82/03-080	2K2 " " " "	R1 (Do not install R1 when T355/04 is assembled)	1
030043900		3K9 " " " "	R17	1
030044700		4K7 " " " "	R27	1
030045600		5K6 " " " "	R16	1
030046800	82/09-371	6K8 " " " "	R3, R6, R10, R3A	4
030048200		8K2 " " " "	R5	1
030051000		10K RESISTOR 7x2.5mm 5% C/F	R4, R13, R15	3
030051200	82/03-080	12K " " " "	R14, R18, R19 (Do not install R14 when T355/04 is assembled).	3
030053900		39K " " " "	R30	1
030054700		47K " " " "	R24, R26	2

030061000		100K	R33	1
030061800		180K	R9, R11, R12	3
030064700		470K	R8, R28, R29, R31	4

6.8.6 B3535 PCB MISCELLANEOUS

400000200 1	82/09-371	SILICON SLEEVING 0·7		50mm
053000101 7		TRANSFORMER T4030	T1	1
200000100 5	82/09-371	TINNED COPPER WIRE 0·5		60mm
220000100 9		PCB T3535 RX AUDIO PROCESSOR		1
237000101 8		RELAY HIG FS3-2A-112 PCB MTG		1
308001302 4		HEATSINK FOR LM377 A4M 1131		1

6.9 C3535/02 3.4kHz FILTER PARTS

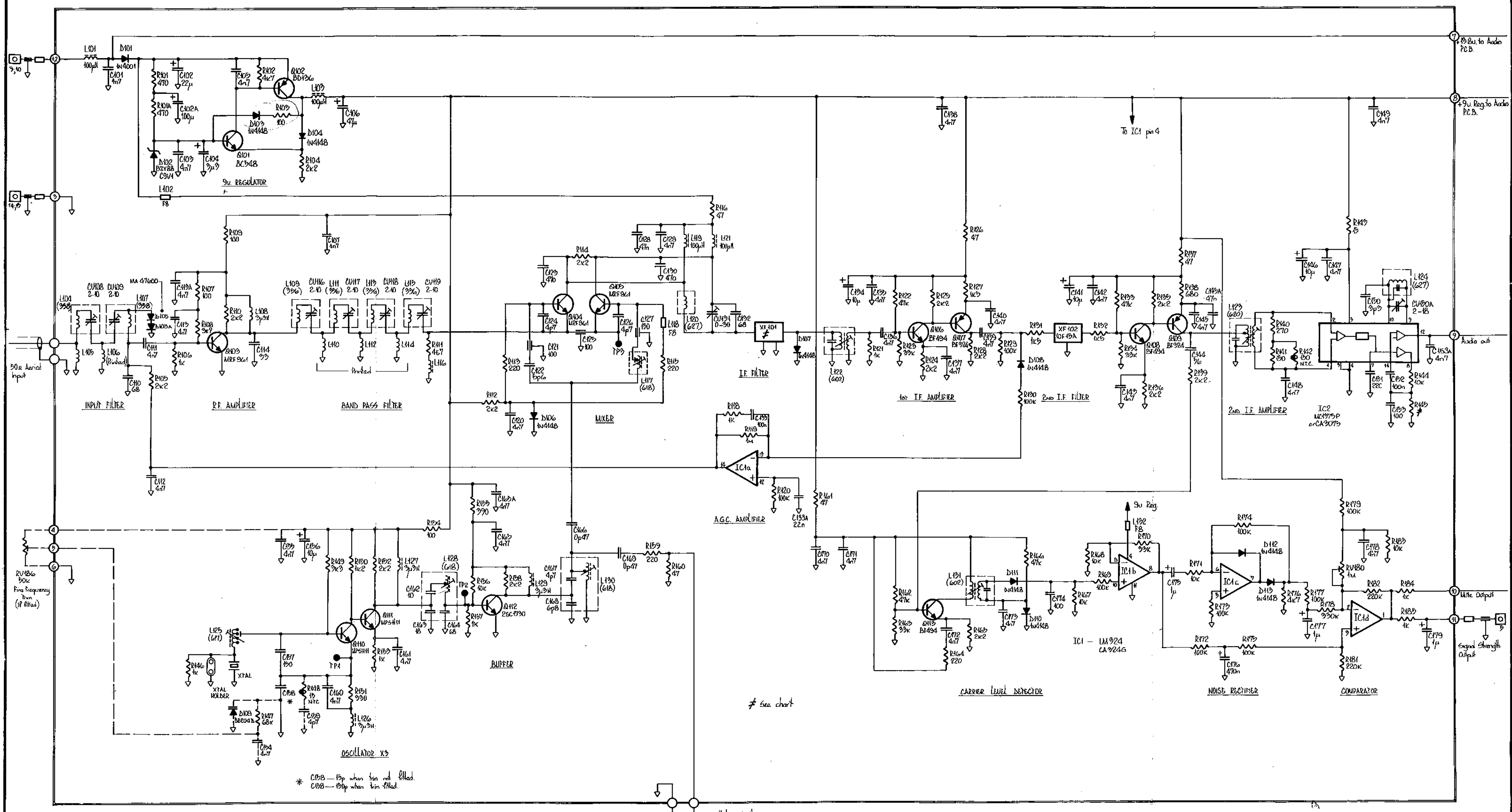
022043300 1		3n3 CAP 50V MYLAR VERT	C15	1
022054700 1		47n CAP 50V MYLAR VERT	C13, C14	2
030038200 0		820E RESISTOR 7x2·5mm 5% C/F	R21	1
056000222 0 2	82/03-087	FXD IND 68mH TYPE 202 SHIELDED	L1	1
030042200 0	C/N 1704	2K2 RESISTOR 7x 2·5mm 5% C/F	R 22	1

6.10 B/GUIDE T355 BASIC GUIDE PARTS

240020105 4		SOCKET 15 WAY D RANGE DAF 155		1
307000961 2		GUIDE (STANDARD) A2M250		1
316008506 8		FRONT PLATE A2M210	SKT BOX	1
316008507 1		FLOAT PLATE A2M211		1
	C/N 1979			
345000400 9		SCREW M3x6 CSK POZI ST BZ		2
345000401 1	C/N 1979	SCREW M3x10 PAN POZI ST BZ		4
349000200 2		SCREW 4-40x¼ CSK POZI TAPTITE		4
349000200 3	C/N 2007	SCREW 4-40x¼ PAN POZI TAPTITE		4
	C/N 2022			
353000101 1		WASHER M3 FLAT ST BZ 5·5ODx3·2		2
	C/N 2028·7			
399000105 1	C/N 2045	PLASTIC BAG 75 x 100mm		1

6.11 B355/01 T355/01 PARTS

0010001255	1	BB204B VARI CAP DIODE	D109		
0110315001	1	150P CAP N150 63V 5%	C158		
0110447002	1	4n7 CAP T/C B 63V 10%	C154		
0300568000	1	68K RESISISTOR 7x2.5mm 5% C/F	R147		
0440550003	1	50K PRESET RES. 10T PANEL MTG (43P T601)	RV186		
2060001011	300 mm	COAX CABLE RG316-U			
2400210017	1	SKT BNC PANEL MTG. BE35057 C10H	feed sample o/p		
2650001001	1	FUSE 250mA CARTRIDGE			
3020045018	1	BUSH COAX RETAINING A4M1024			
3160006281	1	FRONT PANEL A2A222 A3M1253			
3160021139	1	CHASSIS FRONT PANEL A2M1264			
3160021122	1	CHASSIS REAR PANEL A2M1160			
3190030028	1	SPACER BNC A4M1033			
3400001002	1	FUSE HOLDER PANEL MTG.			
3450002008	4	SCREW M2.5 x 16mm PAN POZI ST BZ	BNC MTG		03/091
3520001004	4	NUT M2.5 HEX MACHINE			03/091
3530001004	4	WASHER M2.5 SHAKEPROOF			
3560001003	2	SOLDER TOG 3mm M6249/			03/609
3600001041	1	SHORTY BUSHING HEYCO 8-127-125			02/643



* C158 — 15p when trim not fitted.
C158 — 150p when trim fitted.

≠

MODEL	DESCRIPTION	XF101	R145
T355/02	15kHz I.F. Bandwidth 25/30 kHz Channel Spacing	10F 15D IPN: 276-00010-20 10F 15L IPN 276-00010-21	6K8
T355/05	7.5kHz I.F. Bandwidth 12.5 kHz Channel spacing	10F 7.5 E IPN: 276-00010-91	27k

USED ON: T355/02, T355/05

IPN

SCALE:
MATERIAL:
FINISH:
GEN. LIMITS:

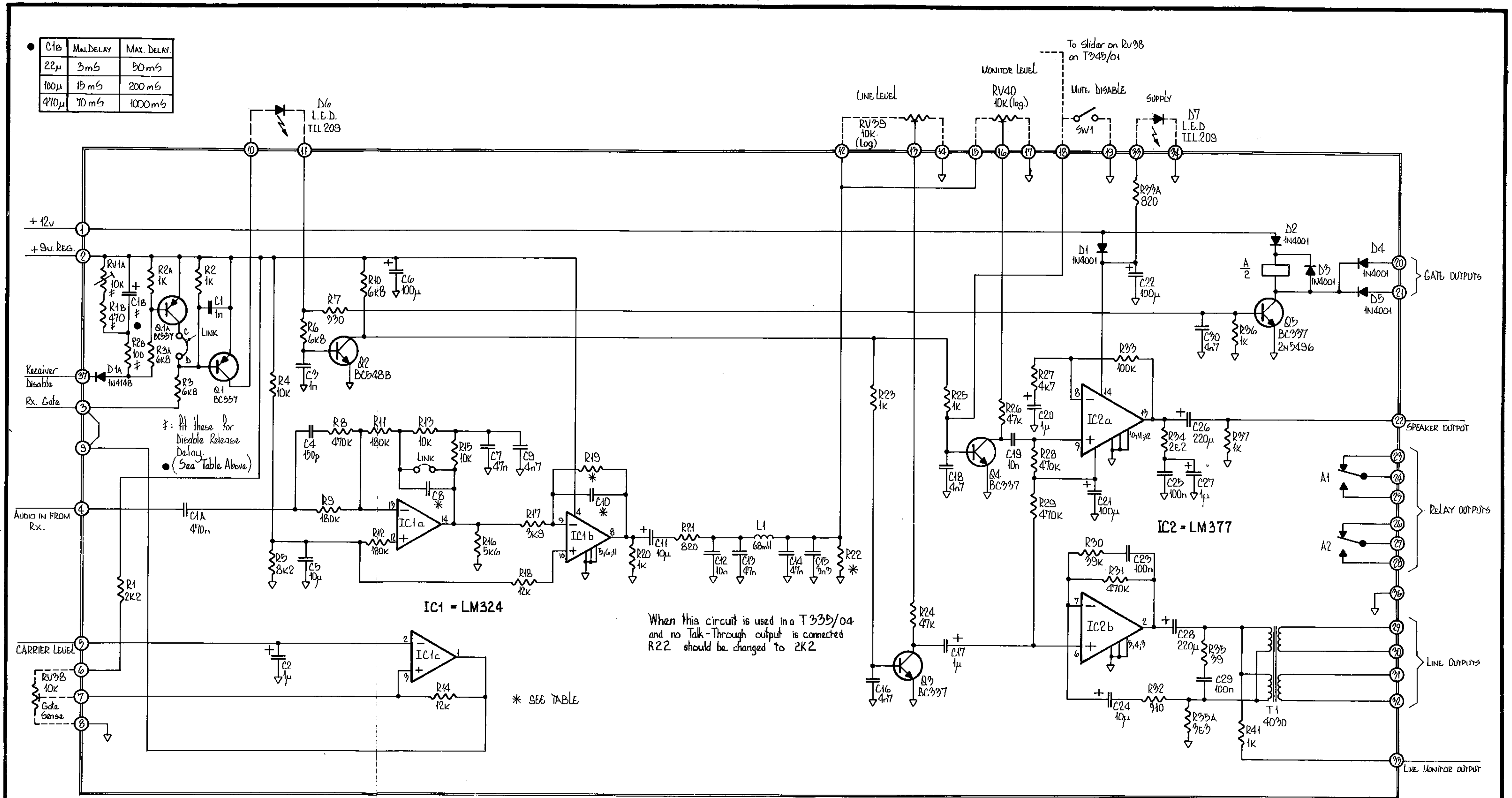
ISSUE / AMENDMENTS / DRN. / CHKD. / APVD. / DATE

CIRCUIT DIAGRAM: T355
BASE STATION RECEIVER — R.F. SECTION

TAIT ELECTRONICS LTD

DRAWING NUMBER A1 C277

ISSUE



● C1B	Min. Delay	Max. Delay
22µ	3mS	50mS
100µ	15mS	200mS
470µ	70mS	1000mS

When this circuit is used in a T335/04 and no Talk-Through output is connected R22 should be changed to 2K2

* Version	Used On :	Description	C8	C10	R19	R22
B3535/02	T345/01 T355/01	De-Emphasis. Relay wired as one set change over & 1 contact make to ground. No speaker output available but has output for monitor unit. Mute disable switch to affect line output.	47n	47n	12K	2K2
B3535/02	T335/02;05 T355/02;05 T345/02;12;22	De-Emphasis. Relay wired as 2 pairs of closing contacts Speaker output available. Mute disable switch to affect speaker output only.	47n	47n	12K	2K2

* Version	Used On :	Description	C8	C10	R19	R22
B3535/04	T335/04	De Emphasis Relay wired as 1 set change over & 1 contact make with ground. Speaker output available Mute disable switch to affect speaker output only. Talk-Thru output provided.	47n	47n	12K	2K7

When Used in a T345 : Mute Input connected to Pad 5.
Cut P.C.B. track between Pads 3 & 9.
RV38 connected to T345 R.F. P.C.B.

SCALE :
MATERIAL :
FINISH :
GEN. LIMITS :

ISSUE	AMENDMENTS	DRN.	CHKD	APVD	DATE
A	ORIGINAL	W.W.	MF	[illegible]	18/3/81
B	CH/N 1704	SB	[illegible]	[illegible]	10/4/81
C	CHART T345/01 MODIFIED. C8 Link; C10 Not Fitted; R19-3K9	W.W.	MF	[illegible]	25/4/81
D	CH/N 1765 T345/01 MODIFIED	SB.	MRF	[illegible]	6/5/81
E	CH/N 2094 - R1 was 1K	W.W.	[illegible]	[illegible]	2/11/81
F	CH/N 09-311	SIMON.	MM	[illegible]	[illegible]

ISSUE	AMENDMENTS	DRN.	CHKD	APVD	DATE

DO NOT SCALE OFF DRAWING

CIRCUIT DIAGRAM — B3535

RECEIVER AUDIO PROCESSOR

USED ON

THIRD ANGLE PROJECTION

W/O

IPN

TAIT ELECTRONICS Ltd.
Christchurch New Zealand

DRAWING NUMBER A2 C279

ISSUE A B C D F

T335/355 RECEIVER

B3535/02 AUDIO PROCESSOR

FRONT PANEL

GATING SENSITIVITY

LINE LEVEL

MONITOR VOLUME

MONITOR MUTE ON / OFF

Black
White
Grey
Violet
Green
Yellow
Orange
Red
Brown
Blue

S.T.C.W.
GATE OPEN
SUPPLY ON

15 WAY 'D' RANGE CONNECTOR

In Feed Thro's.

F8 Beads
Glass Beads

'D' RANGE EXTERNAL REAR VIEW

LINE OUTPUT
SIGNAL STRENGTH OUTPUT
MUTE RELAY CONTACTS
SPEAKER OUTPUT
+VE SUPPLY
TX. KEY OUTPUT
-VE
MUTE RELAY CONTACTS

FEED 'THRU' BRACKET
(INSIDE VIEW)

NOTES:

1. To ease confusion with wire colours to the connector, those wires leading to pins 11;12;13. may be trace wires with parent colours: Brown; Red; Orange.
2. S.T.C.W —— Silicon Sleeved Tinned Copper Wire
3. To use Receiver Disable (if required): Connect D Range Pin 7 (or other as required) to B3535 Pad 37. ie: Shift violet wire from: B3535 Pad 28 to: B3535 Pad 37.

USED ON

SCALE :
MATERIAL :
FINISH :
GEN. LIMITS :

ISSUE	AMENDMENTS	DRN.	CHKD	APVD	DATE
A	ORIGINAL	W. W.	MF	[illegible]	23/3/83
B	CHN 09-962. Add C-D, Note 3. & Pad 37	GAH	JH	[illegible]	10-11-83

WIRING DIAGRAM — T335/02 T355/02 T355/05

IPN

TAIT ELECTRONICS LTD

DRAWING NUMBER A2C287

ISSUE A B