T373 RADIO TELEPHONE (Figure i)

T373 RADIO-TELEPHONE OVERHAUL MANUAL

MANUAL CHANGES/CORRECTIONS

Date	Designation	Issue Status
1978	Original Issue	Circuit Diagram. Board Issue B&C
1980	2nd Issue	Circuit Diagram. Board Issue D&E
1982	3rd Issue	Circuit Diagram. Board Issue F&G
1983	4th Issue	Circuit Diagram. Board Issue F&H
1986	5th Issue	Circuit Diagram. Board Issue J&L

Pages Issued Since Original		Contents	Action Required On Equipment
i.	1980/83	Photograph correction	NIL
ii.	1982/83/84/86	Issue Status page	NIL
iii.	1986	Additional Issue Status page	NIL
iv.	1986	Page numbering changed	NIL
v.	1980/82/83/84/86	List of effective pages	NIL
vi.	1986)	Page numbering changed	NIL
vii.	1986)	due to creation of new	NIL
viii.	1986)	Issue Status Page (Page iii)	NIL
ix.	1986)		NIL
1	1986	Improved technical description	NIL
2	1980/84	Broader specifications	NIL
3	1982/84	Broader specifications description	NIL
4	1984	Broader specifications description	NIL
5	1986	Improved technical description	NIL
9	1986	Improved technical description	NIL
11	1986	Improved technical description	NIL
12	1986	Text correction	NIL
14	1986	Deletion of 9-pin test socket	NIL
101	1986	Improved technical description	NIL
401	1986	Parts list additions	NIL
402	1982/83/86	Parts list additions	NIL
501	1982	Text corrections - modulation transformer connections reversed (red and black leads)	On all stocks issued 'B' to 'E' these connections should be reversed to improve modulation characteristics. Action during routine service if desired.
502	1986	Text additions	NIL
601	1982	Crystal specification	NIL
701	1986	Improved technical description	NIL
702	1982	Text corrections	NIL
703	1986	Text corrections	NIL
704	1986	Text corrections	NIL
706	1986	Text corrections	NIL
707	1986	Text corrections	NIL
708	1980	Text corrections	NIL
710	1986	Text corrections	NIL
712	1982/83	Bottom layout additions	Check during routine service & add C317/C335 for improved stability & modulation see page 804.
	1986	Amended wiring loom	NIL

MANUAL CHANGES/CORRECTIONS

Pages Issued Since Original		Contents	Action Required On Equipment
713	1982/83/86	Layout corrections	NIL
714	1982/83/86	Layout corrections	NIL
716	1982/83/86	Layout corrections	NIL
717	1982/86	Circuit diagram for circuit boards from Issue J	NIL
			NIL
803	1986	Text corrections	NIL
804	1980	Additional troubleshooting	NIL
1002	1986	Text corrections	NIL
1101	1982/83/86	Parts list correction	NIL
1102	1982)	Substituted components apply from	NIL
1103	1982)	S/No. 206847 (Issue F&G) *For equipment prior to 206847 refer to pages 1102/1103 1/80 and 1109 11/78	
1104	1982	Parts list correction	NIL
1105	1982	Parts list correction	NIL
1106	1982/84	Parts list correction	NIL
1107	1982	Parts list correction	NIL
1108	1982/84/86	Parts list correction	NIL
1109	1982	Component substitution BA482 for BA182 diodes. Applies to all equipment from S/No. 206847	NIL
	1986	Parts list correction	NIL
1110	1982/86	Parts list correction	NIL
1111	1982	Parts list correction	NIL
1112	1982	Parts list corrections	NIL
1113/4	1983	Layout corrections	NIL
1202	1986	Improved technical description	NIL

REVISION NUMBER	ISSUE DATE	DATE INSERTED	BY

LIST OF EFFECTIVE PAGES

The TOTAL number of pages in this publication is 81, consisting of:

Note: The portion of text affected by changes is indicated by a vertical line in the outer margins of the page. Changes to illustrations are indicated by miniature pointing hands, shading or legend.

Page No.	Issue	Page No.	Issue
i	31/10/83	705	Original
ii	3/3/86	706	3/3/86
iii	3/3/86	707	3/3/86
iv	3/3/86	708	1/5/80
v	3/3/86	709	Original
vi	3/3/86	710	3/3/86
vii	3/3/86	711	Original
viii	3/3/86	712	3/3/86
ix	3/3/86		
1	3/3/86	713	3/3/86
2	3/3/86	714	3/3/86
3	31/5/84	715	Original
4	31/5/84	716	28/1/86
5	3/3/86	717	27/11/85 (Pull-out)
6	Original	718	Blank
7	Original	801	Original
8	Original	802	Original
9	3/3/86	803	3/3/86
10	Original	804	1/5/80
11	3/3/86	901	Original
12	3/3/86	902	Blank
13	Original	1001	Original
14	3/3/86	1002	3/3/86
15	Original	1101	3/3/86
16	Blank	1102	31/3/82
101	3/3/86	1103	31/10/83
102	Original	1104	31/3/82
201	Original	1105	31/3/82
202	Blank	1106	31/5/84
301	Original	1107	31/3/82
302	Blank	1108	3/3/86
401	3/3/86	1109	3/3/86
402	3/3/86	1110	3/3/86
501	31/3/82	1111	31/3/82
502	3/3/86	1112	31/3/82
601	31/3/82	1113	31/10/83 (Pull-out)
602	Blank	1114	Blank
701	3/3/86	1201	Original
702	31/3/82	1202	3/3/86
703	3/3/86	1203	Original
704	3/3/86	1204	Original

T373 RADIO-TELEPHONE OVERHAUL MANUAL

TABLE OF CONTENTS

TABLE OF CONTENTS

TABLE OF CONTENTS

TABLE OF CONTENTS

ILLUSTRATIONS LIST OF FIGURES

DESCRIPTION AND OPERATION

1. INTRODUCTION

The T373 is a V.H.F., solid-state, amplitude modulated Radio-Telephone designed for operation in the 118 to 136MHz Aviation Band at a nominal ten-watt R.F. output power. It is Approved by the Australian Department of Transport for use up to 10,000 feet in Australian Aircraft under Visual Flight Rules, and in New Zealand is Type Approved to Level 2 by the Civil Aviation Department of the Ministry of Transport.

Intended applications for the T373 are Vehicle to Vehicle, ground to ground, ground to air, and where there are limited channel requirements, Aircraft to Ground Communications.

For Mobile use Aircraft or Vehicle, the T373 plugs into the T173U Cradle. The T373 can be removed from the Cradle without disconnection of wires or cables. For Fixed Station use, the T373 can be plugged into a T286/AM Power Supply (or T158A, now obsolete), which may be adjusted to the required 13.5 Volt D.C. output from the 230 Volt A.C. mains. The T286/AM is available for use with 230V A.C., 115V A.C. or 12V D.C. input.

Crystal Selection is carried out by switching diodes controlled by the six-position Channel Switch, which also controls variable-capacitance diodes which carry out the necesary tuning of Receiver and Transmitter circuits. The higher level Transmitter stages have broad-band characteristics, and do not require re-tuning when changing channels.

The receiver of the T373 is equipped with a noise-compensated mute (squelch) circuit, which holds the receiver muted under noisy no-signal conditions, or when weak, unreadable signals are present in high-noise conditions.

The modulator of the T373 Transmitter is equipped with an efficient speech compressor which ensures that a high level of modulation is maintained in the presence of varying speech levels. This compressor has a fast-attack, slow-decay characteristic.

The T373 is switched from "Receive" to "Transmit" by means of the microphone pressel-switch. Indication of the "Transmit" condition is given by a front-panel Light-Emitting Diode.

Receiver output can be applied to a separate 15 ohm Loudspeaker which is connected to the Cradle. Provision has been made for headphone output, either from a front-panel jack (to special order) or routed to the rear socket. This output also provides transmitter side-tone.

The T373 is built on a single Printed Circuit Board. To gain free access to all components, both on the top and bottom side of the P.C. Board, a screw is removed from the rear of the Sleeve, which can then be slid off the chassis. All operating controls are available on the front panel.

DESCRIPTION AND OPERATION

2. SPECIFICATIONS

A. GENERAL

Name and Address of Manufacturer	.. Tait Electronics Ltd, Christchurch, New Zealand.
Model and Description	.. T373 Aviation Band Radio Telephone
Mode of Operation	.. Amplitude Modulation
Frequency Range	.. 118MHz to 136MHz
Number of Channels	.. Up to six
Channel Bandwidth	.. 6 channels may be spaced 25kHz, 50kHz, or greater within 118 to 136MHz Bandwidth
Operating Voltage	.. 13.75 Volts nominal
Supply Current	.. Receive - 110mA .. Transmit (unmodulated) - 2.3 Amperes
Aerial Matching	.. 50 Ohms
Polarity	.. Floating, positive or negative E.
Protection Against Supply Polarity Reversal	.. Series diode (also crowbar diode in Cradle)
Voltage Regulation	.. Zener diode controlled transistor regulator
Operating Temperature Range	.. -10°C to +60°C
Shockmount Requirements	.. Nil
Vibration Rating	.. New Zealand Level II, Australian AN0103, Category N
Type Acceptance	.. Meets or exceeds Australian AN0103 Specifications, Sections 103.24, 103.25, Category V10(N)S. New Zealand C.A.D. Level II. Canada Cert. No. B8809 USA Cert. IDCAS81PT373 Singapore GER/L3/L2/01, Vol 4 (184)
Test Report References	.. N.Z. D.S.I.R. Report 78/C/111 N.Z. C.A.D. Aust. D.O.T 16/38/885
Weight	.. 1.6kg
Dimensions	.. 15.5 x 5.3 x 24.5cm
Compass Safe Distance	.. 19cm

DESCRIPTION AND OPERATION

B. TRANSMITTER

Power Output to 50 Ohm Load	.. 7 to 10 Watts
Modulation	.. Collector modulation of R.F. Driver and Power Output stages
Compressor Dynamic Range	.. 30dB increase in input, over input that produces 50% modulation
Compressor Attack Time	.. 10ms or less for +12dB step
Compressor Decay Time	.. 0.5 to one second for -12dB step
Modulator Sensitivity	.. 5mV at 1kHz across microphone pads produces 15% modulation
Modulation Capability	.. Greater than 85%
Spurious Emissions	.. 10µW or less
Crystal Multiplication	.. Three times Crystal Frequency
Frequency Tolerance	.. ±2kHz of tune frequency. Not greater than ±1.5kHz variation over temperature extremes

C. RECEIVER

Signal to Noise Ratio	.. 10dB or better with 1µV p.d. input 30% modulated at 1000Hz
Image and Spurious Rejection	.. -60dB or greater
Channel Spacing	.. 25kHz or 50kHz
I.F. Conversion	.. To 10.7MHz
Selectivity	.. (25kHz channelling) greater than 80dB at ±25kHz (50kHz channelling) greater than 70dB at ±35kHz
Receiver I.F. Bandwidth	.. 25kHz 6dB points ±7.5kHz nominal 50kHz 6dB points ±18kHz nominal
A.G.C. Characteristics	.. Audio rise of 6dB or less from 1µV p.d. to 100mV input
Noise Limiter	.. Series Diode Noise Limiter
Muting	.. Fully noise-compensated diode gate operates at fractional microvolt input levels

+3 - 10.7
129.4
+3
140-1
108

DESCRIPTION AND OPERATION

Output Impedance	.. 15 Ohms
Sensitivity	.. 5µV p.d. input for greater than 3 Watts output to 15 Ohm speaker load
Receiver Quieting	.. At +40dBm above 10dB Signal to Noise Ratio, greater than -30dB Signal to Noise Ratio
Audio Distortion	.. -40dBm at 85% modulation, less than 10% THD at 1 to 3 Watts output
Frequency Response	.. -6dB at 300 and 3000Hz (nominal)
Frequency Tolerance	.. ±2kHz of tune frequency. No greater than ±1.5kHz at temperature extremes
Crystal Injection	.. High side
Crystal Frequency	.. $\frac{f_{signal} + 10.7}{3}$, where f_{signal} is in MHz

DESCRIPTION AND OPERATION

3. CIRCUIT OUTLINE

A. RECEIVER

The signal-frequency circuits of the single conversion receiver are tuned to the channel frequency by vari-cap diodes, controlled by the six-position switch, which also selects the channel crystal by means of diode switches.

The transistors in the R.F., mixer and first I.F. stages are dual-gate MOSFET's which provide protection against cross-modulation interference, and a high low-level signal to noise ratio.

High-side mixer injection is supplied by a crystal oscillator-tripler and a buffer. The output circuit of the buffer is tuned by a vari-cap diode, controlled by the channel switch.

Mixer output is applied to a 10.7MHz crystal filter, followed by a four stage aperiodic I.F. amplifier, the output of which supplies input to the diode detector via an I.F. transformer.

The detector provides input to the A.G.C. and muting amplifiers, as well as audio, through a series-diode noise limiter, to two cascaded emitter-followers.

Delayed A.G.C is applied to the front-end of the receiver, separate A.G.C control being applied to the higher level I.F. stages.

Low-level audio signals are applied, via a carrier-keyed and noise-compensated diode muting gate, to the audio amplifier stages. The output audio stage is switched to function either as the receiver audio output stage, or the transmitter modulator.

B. TRANSMITTER

The frequency of the oscillator-tripler is controlled by a third-overtone crystal. The channel crystal is selected by means of diode switches, controlled by the channel switch. The oscillator is followed by a buffer amplifier having an output circuit consisting of three top-coupled varactor tuned circuits controlled by the channel switch. Four cascaded broad-band R.F. amplifier stages following the buffer raise the output power to its nominal value of 10 Watts. A low-pass harmonic filter is interposed between the matching circuit of the final R.F. amplifier stage and the aerial.

A compressor-controlled microphone pre-amplifier, which holds the modulation level constant over a wide range of speech input levels, supplies speech signals to the common audio amplifier.

Both the R.F. driver and power amplifier are modulated, the secondary of the modulation transformer being in series with the D.C. collector supply to both driver and R.F. stages.

Transmit-Receiver switching is by means of a change-over relay A/4 having four change-over contact sets. This relay is controlled by the microphone pressel-switch.

DESCRIPTION AND OPERATION

4. CIRCUIT DESCRIPTION

A. RECEIVER

(1) R.F. STAGE

Received signals are applied to the input tuned circuit (L101) via the aerial harmonic filter, relay contact set A4, and C101. C101 is tapped down on L101 to provide a match to the gate of dual-gate cascode R.F. amplifier, Q101. Vari-cap diodes within L101 are reverse-biased by positive voltage applied to their cathodes via the channel switch. RV208 to RV203 are pre-set to apply the appropriate tuning voltage to the vari-cap diodes in each position of the channel switch.

A capacitor within L102 couples the drain of Q101 to a tap on the tuning indicator of the first of three top-coupled tuned circuits, L102, L103 and L104. Each of these tuned circuits is resonated by a pair of vari-cap diodes, each of which has the tuning voltage appropriate to the channel selected by the channel switch applied to its cathode. A tap on L104 applies input to gate 1 of mixer Q102, a dual gate MOSFET.

(2) MIXER

Oscillator injection at signal frequency plus 10.7MHz is applied to gate 2 of the mixer, dula gate FET Q102, via C170, from a tap on L111.

The drain of Q102 is tuned to 10.7MHz and matched to the 10.7MHz crystal filter by L105, C118 and C121.

(3) LOCAL OSCILLATOR AND BUFFER

Local oscilator Q109 is a modified Colpitts, tripling the crystal frequency in its collector tuned circuit L110, C165 and C166. C165 and C166 match Q109 collector to the base of "Class A" amplifier Q110.

The collector of Q110 is tuned by L111 and a pair of vari-cap diodes which are supplied appropriate tuning voltages selected by the channel-switch. A tap on L111 is coupled to gate 2 of mixer Q102 by C170.

Diodes D109 to D114 are reverse biased from the regulated +0 Volt line via resistors R153 - R154, R156 - R157, R159 - R160, R162 - R163, R165 - R166 and R168 - R169 respectively. This reverse bias causes the diodes to isolate the crystals from the base of the oscillator on all but the selected channel. The channel switch earths the junction of the resistor pair appropriate to the selected channel. In the position shown, the channel-switch is earthing the junction of R168 and R169 so that D114 conducts, connecting X106 to the base of Q109 via L109.

DESCRIPTION AND OPERATION

Crystal trimming inductors L107, L108 and L109 are each shared by a pair of crystals. These inductors are adjusted to bring the receiver frequency within tolerance.

(4) I.F. STAGES

I.F. output from the mixer is applied, via the crystal filter and matching sections, to gate 1 of Q103, the first I.F. amplifer. Delayed A.G.C. is applied to gate 2 of Q103, via R116.

Q103, Q104, Q105 and Q106 are cascaded aperiodically coupled I.F. amplifiers. A.G.C. from the I.F. A.G.C. line is applied to the bases of Q104 and Q105. This A.G.C. takes effect at very low input signal levels. RV183 enables the control characteristic of this A.G.C. to be pre-set.

(5) DETECTOR & NOISE LIMITER

The I.F. signal from Q106 is coupled by I.F. transformer L106 to the diode detector, D106. Signal obtained from the top of the diode load (R138-R139) is applied to the anode of D107, the series noise limiter. A D.C. voltage proportional to carrier amplitude is obtained from the top of the diode load and applied to D107 cathode, via a long time-constant circuit (R140-C148), to bias D107 into conduction. D107 becomes non-conducting during negative noise-spikes, disconnecting the diode detector from the audio stages.

To provide forward base-bias for D.C. amplifier Q112, the detector circuit is "floated" at about +4 Volts by D.C. obtained from voltage divider R136-R137.

(6) EMITTER-FOLLOWERS AND MUTING

The cascaded emitter-followers, Q107 and Q108, provide a high impedance load to the detector and noise limiter. Their low impedance output at Q108 emitter is applied to muting diode D108. The cathode of D108 is held at Q108 emitter potential, Q108 anode being keyed above and below this potential by D.C. amplifier Q114.

Manual control of the mute threshold is provided by front-panel control RV198. The muting range is pre-set by RV196.

(7) CARRIER CONTROL OF MUTING

Voltage developed across the diode load is applied to the base of Q112, taking Q112 base more negative. Q112 emitter follows, and a proportion of this emitter voltage is applied to the base of D.C. amplifier Q114. A reduction in the base voltage of Q114 reduces Q114 collector current, causing Q114 collector voltage to rise. This increased collector-voltage is applied to the anode of mute diode D108, biasing it into conduction. Audio signals from Q108 emitter are then applied to the "Volume" control, RV202. Removal of the input signal drops Q114 collector voltage, biasing D108 to its non-conducting state.

DESCRIPTION AND OPERATION

(8) NOISE COMPENSATION OF MUTING

Under noisy conditions, the noise-compensating circuit offsets the mute opening point and balances this point against carrier-control. The result is a muting-circuit which holds the receiver muted under noisy no-signal conditions, or when weak unreadable signals are present in high-noise conditions.

Noise-voltage, obtained from the top of the detector diode-load, is applied via C177 (470pF) to the base of the noise-amplifier, Q113. Q113 output is developed across R192, which is in series with the feed supplying carrier-control D.C. to Q114 base. The voltage developed across R192 due to noise is of opposite polarity to that derived from carrier-control, tending to oppose the "un-muting" effect of carrier control.

The proportion of noise-control, relative to carrier control, applied to Q114 base is pre-set by RV186, which serves as a noise-gain control in the base circuit of Q114, the noise-amplifier.

(9) A.G.C. SYSTEMS

A.G.C. is derived from the negative-going D.C. voltage developed across the detector diode-load by the carrier. This voltage is applied to the base of Q112. The voltage developed at the emitter of Q112 provides A.G.C. for Q104 and Q105, via an I.F. gain-setting potentiometer, RV183.

The delayed A.G.C. applied to Q101 and Q103 comes into effect at an input signal level of about 1.5µV p.d. The requirements for control of Q101 and Q103 are such that, for maximum gain, the control voltage should be in the region of +4 Volts. At zero Volts, the gain is reduced by about 10dB; the gain reduction increases to about 60dB when the control voltage is taken to about -2 Volts.

In the absence of an input signal, the A.G.C. emitter follower, Q112, will draw maximum current, because its base is at its most positive voltage under these conditions. Q112 obtains its collector current through the base-emitter junction of Q111 and R112 in parallel. This Q112 collector-current drives Q111 into collector saturation, so that its collector-voltage is about +8 Volts. A voltage divider in Q111 collector-circuit supplies approximately +4 Volts to the R.F. A.G.C. line, via R125 and R121.

When the input signal level rises to about 1.5µV p.d., the voltage on the base of Q112 is much reduced, and Q112 collector current falls to a value insufficient to hold Q111 in saturation. The voltage across Q111 collector-load is then reduced, lowering the voltage on the R.F. A.G.C. line. Further increases in the input signal level cause Q111 collector voltage to fall towards zero Volts.

At the same time the junction of R121 and R125 is made negative with respect to the junction of R125 and R127 by the rectified current flow through D105, which is coupled to I.F. transformer L106 by C142. The combined effect of Q111 and D105 is to provide the required range of A.G.C. voltage from +4 Volts to -2 Volts (voltages approximate).

The overall A.G.C characteristic achieved with this composite A.G.C. system limits the rise is audio output to approximately 4dB, over the input range of 1µV to 10mV p.d.

(10) AUDIO AMPLIFIER SECTION

Audio output from the mute diode is applied to "Volume" control RV202, which sets the input level to the audio amplifier Q115. The output of Q115 is applied to the base of Q408, the common emitter-follower. Q408 input is from Q115 on "Receive", and from Q409 on "Transmit". Q115 and Q409 also serve as switches. On "Receive" Q409 is "Off", because its forward bias is disconnected by relay contact set A3.

The emitter of common emitter-follower Q408 is coupled, via the audio shaping filter (C425-L401-C424-C423), to the base of Q407. Q407 collector is direct-coupled to the base of phase-splitter Q406. The driver emitter-followers, Q403 and Q404, are driven in anti-phase by Q406 collector and emitter respectively. Q403 is D.C. coupled to the base of Q401, and Q404 is D.C. coupled to the base of Q402. The outputs of Q401 and Q402 are combined in the primary of push-pull output transformer, T401.

The quiescent currents of the output push-pull pair, Q401 and Q402, (20mA each), are set by adjustment of RV411. RV411 sets the collector-emitter voltage drop across "V_{BE} multiplier" Q405, and hence the base-bias of Q403 and Q404.

The collector currents of Q401 and Q402 are balanced by adjustment of RV418, which provides a base-to-base centre-tap on the input to the driver transistors.

A.C. negative feedback loops from Q402 collector to Q407 emitter and from Q406 emitter to Q407 base provide good linearity.

Relay contact set A1 switches the audio section to function as the Transmitter modulator on "Transmit". (See 4.B.(3) and 4.B.(5).)

DESCRIPTION AND OPERATION

Headphone output is obtained from the primary of T401 via R403 and C401. This optional output is supplied, either to a panel mounted headphone socket, or wired to the rear socket via pin 5. Sidetone on "Transmit" and receiver audio output is obtained from this point.

Speaker output on "Receive" is obtained from the secondary of T401 and applied, via relay contact set A2 and C430, to pin 13 of 16-way connector SKT1.

B. TRANSMITTER

(1) TRANSMITTER OSCILLATOR

Modified Colpitts oscillator, Q301, triples the crystal-frequency to the working frequency in its collector tuned circuit, L304-C311-C314. C311 and C314 match the collector of Q301 to the base of the buffer transistor, Q302.

The channel-crystal is selected by diode switching. All diodes D301 to D306, except that for the selected channel, are reverse-biased from the +9 Volt regulated line via resistors R154-R302, R157-R304, R160-R306, R163-R308, R166-R310 and R169-R306 respectively. The Channel-Switch earths the junction of the resistor pair for the selected channel, removing the reverse bias from the appropriate diode and completing the circuit from the selected crystal to the base of Q301. In the switch position shown, the junction of R169 and R312 is earthed by the channel-switch, so that X306 is connected to the base of Q301, via D306 and L203.

The crystal-trimming inductors L301, L302 and L303 are each shared by a pair of crystals.

(2) AMPLIFIERS

The collector of the buffer amplifier, Q302, is tapped into L305 of the three top-coupled tuned circuits L305, L306 and L307. Each of these circuits is tuned by a pair of vari-cap diodes, the correct tuning-voltage for each channel being selected by the channel-switch, and pre-set by RV208 to RV213. A tap on L307 is coupled to the base of Q203 via C238.

Q303 collector is series fed via R.F. chokes Z302 and L308. A tap on L308 provides low impedance input to a broad-band matching network, C332, C333 and L309, which provides base input to Q304.

D.C. supply to Q301, Q302, Q303 and the base of Q304 is from the "Transmit" regulated supply, and is disconnected by relay contact set A3 on "Receive". Q303 and Q304 are forward biased for increased gain.

Q304 collector is series fed via R.F.C. Z304 and matched to the base of Q305 by the two-stage broad-band matching network C340-L310-C341-L311. The two-stage network allows the required impedance transformation to be obtained with low-Q circuits. R.F.C. Z305 maintains the base of Q305 at D.C. earth potential.

The driver (Q305) collector is series fed via R.F.C. Z307 and matched to the base of the final amplifier (Q306) by two-stage matching network L312-C345-C346-L313. R.F.C. Z308 maintains the base of Q306 at D.C. common potential.

Q306 collector is series fed via R.F.C. Z310 and matched to the 50 Ohm input of the aerial filter by L314, CV355 and series capacitor C354. Relay contact set A2 connects the output of this matching circuit to the input of the aerial filter on "Transmit". L201, together with lead inductance, forms the input section of the aerial filter.

(3) MODULATION

The collectors of the R.F. Driver and Final transistors (Q305 and Q306) are both amplitude modulated by audio output from T401 secondary, applied via relay contact set, A1.

Zener diode D310 limits the positive voltage swings at the secondary of the modulation transformer to +33 Volts to prevent transient voltage over-swings from damaging the modulated stages.

(4) SPEECH COMPRESSION

The compressor circuit ensures that a high average level of modulation is maintained in the presence of varying speech input levels, and has a fast-attack, slow-decay characteristic.

Compression is applied at the microphone input circuit, and is achieved by means of a variable potentiometer circuit, the series resistor of which is R444. The shunt element of the potentiometer is made up of two series diodes, D401 and D402. These diodes are brought into varying conduction states by the control transistor, Q411.

Audio control voltage for the compressor circuit is obtained from the primary of the modulation transformer via the preset potentiometer RV405, and applied to the cathode of diode rectifier D404. R.F. filtering is provided by R.F.C. Z402, R450, C433 and Z401.

DESCRIPTION AND OPERATION

In the absence of modulation, D404 has zero D.C. output, so that Q411 is biased "Off" (Q411 emitter and base are at the same positive potential), and draws no collector current through its load, R446. In this condition, the collector end of R446 is at negative rail; no forward bias is applied to D401 and D402, and these diodes present exceedingly high resistance. The microphone voltage is then applied to the base of Q411 without attenuation by the compressor.

Note that C440 effectively by-passes the anode of D402 to common negative for audio frequencies, so that any reduction in the effective resistance of D401 and D402 would reduce the microphone input to the audio pre-amplifier, Q410 and Q409.

With RV405 set correctly, rectified output from D404 anode will be applied to the base of Q411 as the modulation level is increased, taking Q411 base less positive. Q411 will then draw collector current through R446 and apply forward bias to D401 and D402, reducing their resistance. The lowered resistance of D401 and D402 results in voltage division of the microphone voltage with R444, so that attenuated microphone voltage is applied to the input of the audio pre-amlifier.

The effective resistance of D401 and D402 depends on the forward bias applied to these diodes. This forward bias varies with the level of modulating voltage at the modulation transformer. As the modulating voltage tends to increase, the attenuation of the microphone voltage at Q410 by D401 and D402 increases.

When compression is correctly set up, the modulation level should not increase by more than 2dB for an increase in audio level of 30dB at the microphone.

When modulation is applied to the compressor, C441 and C440 are charged on a short time-constant from the collector of Q411, giving the compressor a fast attack. When modulation is removed, C440 and C441 discharge on a long time-constant via R446, giving the compressor a slow-decay characteristic.

Transients generated by rapidly switching between "Transmit" and "Receive" several times are prevented from affecting the compressor by D403. C440 and C441 are discharged on a short time-constant via D403 and the "Transmit" 9 Volt regulated line, each time the T373 is switched to "Receive". (In the "Receive" condition, relay contact set A3 disconnects the +9V "Transmit" regulated line and the forward bias from the base of Q409.)

DESCRIPTION AND OPERATION

(5) MICROPHONE PRE-AMPLIFIERS

Compressor controlled audio voltage from the microphone is applied to the base of Q410, which is D.C. coupled to Q409 base. D.C. feedback from Q409 emitter to Q410 base provides D.C. stabilization. The value of R441 in the A.C. feedback loop from Q409 collector to Q410 emitter sets the gain of the pre-amplifiers.

Q409 shares its collector load with Q115. On "Transmit", forward bias is removed from Q115 by relay contact set A3, and Q115 is "Off". Q409 is forward biased from the "Transmit" regulated line, and is D.C. coupled to the base of emitter-follower Q408.

The audio amplifier is common to "Transmit" and "Receive" from this point. (See 4.A.(10).)

(6) CONTROL CIRCUITS

Transmit/Receive switching is carried out by relay A/4, which carries four change-over contact sets. The contact sets carry out the following functions:

"A1" switches the output of the common audio amplifier from the speaker on "Receive" to the modulated stages on "Transmit".

"A2" switches the aerial from Receiver to Transmitter.

"A3" switches +9 Volts D.C. regulated from Receiver to Transmitter.

"A4" short-circuits the Receiver aerial input on "Transmit".

The relay is operated by the pressel-switch contacts in the hand-held microphone. The pressel-switch also completes the circuit of L.E.D. D201, which indicates the "Transmit" condition.

(7) CIRCUIT PROTECTION

Some protection against reversed supply polarity is provided by D202, which is in series with the supply to the relay coil and Q304. In addition, the T173U Cradle contains a protective diode which is permanently connected across the incoming L.T. lines to provide "Crow-Bar" fuse-blowing protection in case of supply polarity reversal. The "Crow-Bar" diode is normally non-conducting. If the supply polarity is reversed, this diode is forward biased and conducts heavily, so that the fuse or circuit-breaker open-circuits. The rating of the circuit-breaker or fuse should not exceed 5 Amps for the "Crow-Bar" diode to be fully effective.

DESCRIPTION AND OPERATION

(8) TEST FACILITIES

A probe point is provided for checking the receiver mixer injection level. The R.F. levels at the transmitter stages can be checked by applying an R.F. Probe directly to the transistor base leads. Provision is made on the P.C.B. for a 9-pin Noval test plug to be fitted if desired. Figure 1101 shows the location.

(9) VOLTAGE REGULATION

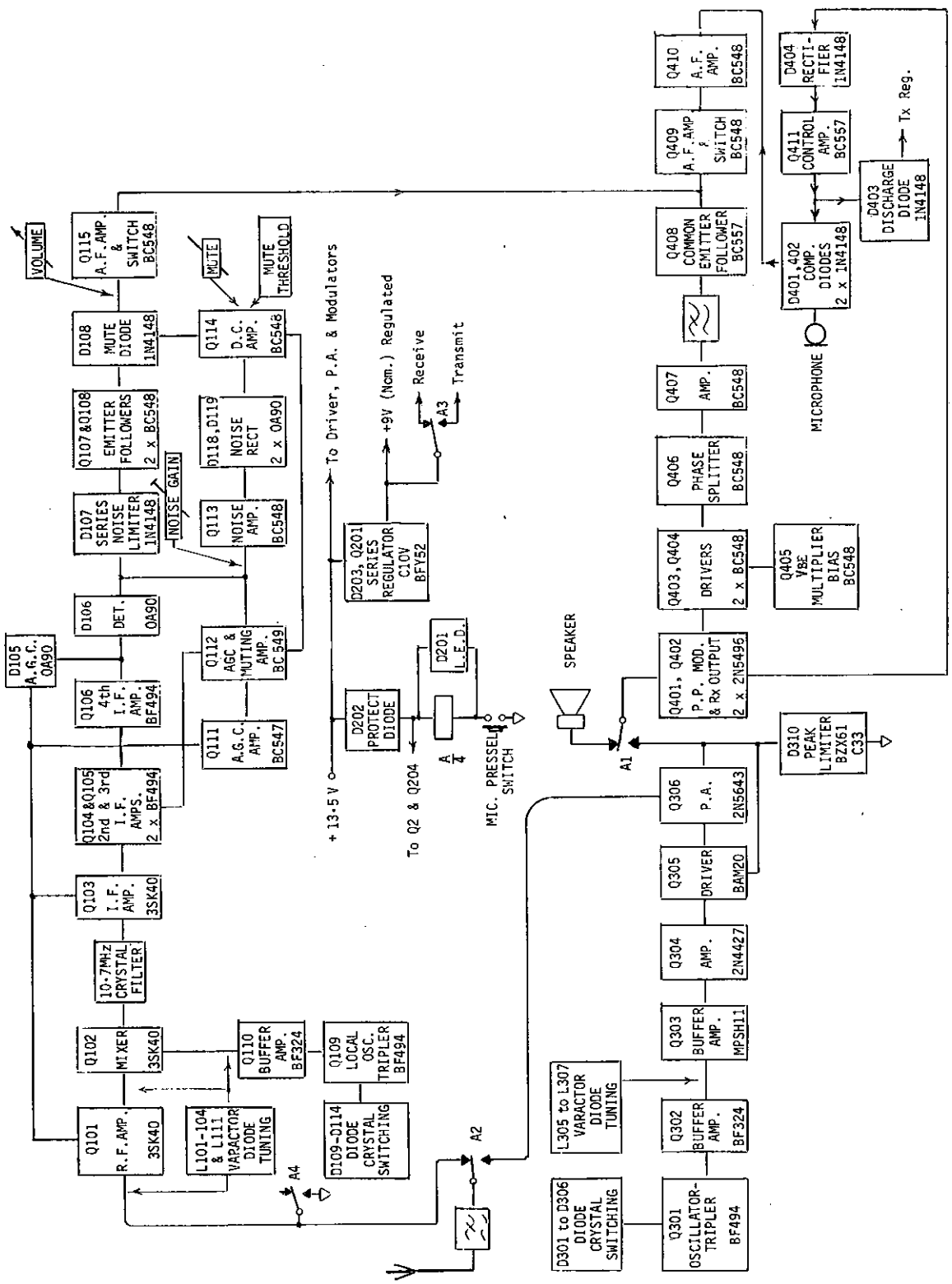
A Zener-diode controlled voltage regulator, D203 and Q201, provides a regulated supply at a nominal +9 Volts to:

(a) All receiver stages

(b) All low-level stages in the common audio amplifier

(c) Q310, Q302, Q303 and the base of Q304 in the Transmitter.

DESCRIPTION AND OPERATION



DISASSEMBLY

1. GENERAL

The following procedure should be followed to remove the major components from the T373 chassis.

Reference should be made to Assembly Drawing A1M791 (Fig. 1 of Illustrated Parts Breakdown). [Square brackets enclosing numbers denote item numbers on this drawing.]

2. TRANSISTORS

A. MODULATOR UNIT, Q401, Q402

(1) Remove screws, washers and nuts [16A], [16], [17], from each transistor.

(2) Carefully slide the mica insulation strip from beneath each transistor.

(3) Use "Solder Sucker" or solder-soak braid, and remove solder from transistor connections. Carefully ease the transistors free from the printed circuit board, taking care not to damage the printed track.

B. R.F. OUTPUT STAGES, Q305, Q306

(1) Remove the retaining nuts.

(2) Unsolder the flange lead, and carefully bend it clear of the printed circuit board.

(3) Remove the transistors from the heatsinks [15]. (Note orientation of leads.)

3. MODULATION TRANSFORMER [22]

A. Unsolder leads at points O, P, Q, R, S and T. Note the colour of the leads and their terminating points. Points "S" and "T" terminate near the modulator transistors, Q401 and Q402.

B. Remove retaining screws, washers and nuts [26].

4. FRONT PANEL UNIT

A. Remove knobs [1], [2], by gently prising them off. Retain spring [3].

B. Remove the two Allen head (2mm) screws [7], and remove the panel [4]. Push L.E.D. [5] clear of panel and ease the L.E.D. [5a] from the channel indicator lens [32].

C. Remove four Posidrive screws [8] and remove Escutcheon [6].

5. FRONT PANEL CONTROLS

A. Proceed as in A. and B. of 4. "Front Panel Unit" (above).

B. VOLUME CONTROL

(1) Unsolder two power leads and three connecting leads.

(2) Remove retaining nut and washer, and remove control.

DISASSEMBLY

C. CHANNEL SWITCH

(1) Note colour coding of leads and unsolder each wire to top-print connections. Remove the six leads to the pre-set potentiometers at the switch terminals. Remove one lead at switch wiper (Varicap supply lead).

(2) Remove retaining-nut and washer, and carefully remove switch.

D. MUTE CONTROL

(1) Unsolder three connecting leads. Note orientation.

(2) Remove retaining nut and washer and withdraw control.

6. 16-PIN SOCKET [20]

A. Remove relay by releasing retaining clip and withdrawing from socket.

B. Remove capacitors C209 and C211, situated near Q201, the regulator transistor.

C. Unsolder the power leads, C212, C213, the aerial coaxial lead, and the leads to pin 9 and 13.

D. Remove the two socket-retaining screws, washers and nuts.

E. Withdraw the socket from inside the T373.

CLEANING

1. GENERAL

When fully assembled, the T373 should remain relatively free of dirt and moisture because of its enclosure.

2. CLEARANCE OF INTERNAL DUST

If clearance of internal dust is considered necessary, a soft brush can be used to lightly brush the interior of the set. Care should be taken not to disturb any preset controls; in any case, the equipment should be subjected to an electrical check after brushing. In particular, the audio output stage quiescent current should be checked (see page 702, Paragraph 2.C.).

The front panel may be cleaned with a damp cloth.

INSPECTION /CHECK

1. CONNECTING LEADS

For a T373 installed in a Vehicle or Aircraft, check the Battery and Microphone leads for security and signs of damage. Check the aerial coaxial lead for fraying or other damage.

2. SECURITY

Check the Cradle mounting for security of attachment to the Mobile.

3. INTERCONNECTING PLUG AND SOCKET

Release the two thumb screws on either side of the Cradle and remove the T373 from the Cradle. Check the 16-way connector for signs of damage.

4. INTERNAL COMPONENTS

Remove the Sleeve by removing the securing screw at the centre back and sliding the sleeve off the chassis.

Check for obvious mechanical faults in Chassis, Printed Circuit Board, Controls, Microphone, etc. Look for broken or discoloured components and loose connections.

5. REASSEMBLY

Insert the T373 into its sleeve and replace the screw at centre rear. Ensure that the T373 is the right way up, and insert it into the Cradle. Replace the two thumb screws at either side of the front of the Cradle.

Test the T373 by calling another User on the channel fitted.

REPAIR

1. GENERAL

To avoid damaging the printed circuit track, the removal and replacement of components requires careful attention. Most small components have their leads cut and crimped during manufacturer's assembly, and it is generally impossible to withdraw these components from the top of the P.C. Board. If component removal is necessary, recommended procedure is to first clear solder from the component lead, then snip the crimped section clear with a pair of sidecutters, thus enabling the component to be removed. If insufficient length of component is available, the component lead should be cut from the top of the P.C. Board. The cut lead can then be unsoldered and withdrawn from beneath the P.C. Board. A replacement component must then be fitted.

2. SMALL COMPONENT REPLACEMENT

A. RESISTORS

All resistors are ±5% tolerance and can be replaced by other manufacturers' equivalents.

B. CAPACITORS

It is recommended that capacitors as listed in the Illustrated Parts Breakdown should be used, particularly in transmitter and aerial-filter circuits.

C. TRANSISTORS

Manufacturers' equivalents are generally suitable, but the following transistors should be as listed in the Illustrated Parts Breakdown:

Q101, Q102, Q103	-	3SK40, 3SK85 or 3SK74
Q303	-	MPSH11
Q305	-	BAM20

D. COILS - TRANSFORMERS

The Manufacturer should be consulted if substitution coils and transformers are required.

E. RECOMMENDED SPARES

For workshops maintaining 25 units or more, the following spares are recommended. Small components, such as resistors and capacitors, are not included.

TABLE 1

DESCRIPTION	QUANTITY	I.P.N.
Knob - Volume/Mute/Channel	6	311 00010 03
Channel Indicator	2	309 00020 01
Lens - channel indicator	2	312 00010 30
Spring - knob retaining	6	357 00010 02

REPAIR

TABLE 1 (CONTINUED)

DESCRIPTION	QUANTITY	I.P.N.
Panel, Front	1	316 00062 84
Microphone, 50k Ohm Blue	2	252 00010 11
Potentiometer, 10k Ohm "Volume"	4	040 05100 04
Potentiometer, 1k Ohm "Mute"	2	040 05100 04
Switch - 6-way "Channel"	2	231 00010 04
Socket 16-way	2	536 00010 04
Transformer T4005	1	319 00200 04
L.E.D. - red	4	008 00010 11
L.E.D. - green	4	008 00010 15
Relay 4-pole change over	4	237 00010 07
Neosid coil cans	6	062 00010 04
Coil, Varicap tune, L101 etc	4	051 00044 50
Coil, Varicap tune, L102	2	051 00044 51
Coil L105, Tait coil 600	2	050 00016 00
Coil L106, Tait coil 602	2	050 00016 02
Coil L401, Tait coil 605	1	050 00016 05
Coil, oscillator trimming, Tait coil 615	4	050 00016 15
Crystal Filter, 25kHz channel spacing	2	276 00010 04
Crystal Filter, 50kHz channel spacing	2	276 00010 07
3SK40, 3SK85 or 3SK74 Transistor	4	000 00031 71
BF494 Transistor	6	000 00020 11
BF324 Transistor	4	000 00020 35
BC548 Transistor	6	000 00011 10
BC549 Transistor	2	000 00011 20
BC557 Transistor	4	000 00011 30
BFY52 Transistor	2	000 00020 40
MPSH11 Transistor	2	000 00031 90
2N4427 Transistor	2	000 00022 30
BAM20 Transistor	2	000 00010 20
2N5643 Transistor	2	000 00030 60
2N5496 Transistor	4	000 00030 30
BZX61, 33V Zener	4	001 00010 40
BZX79/C10, 10V Zener	4	001 00015 18
1N4148 diode	4	001 00012 00
OA90 diode	4	001 00011 40
BA482 diode	4	001 00010 26
Ferrite slug, F29	10	165 00010 06
Ferrite slug, 3mm F29	10	066 00010 07
Ferrite bead, F8	6	005 00010 04
470 Ohm Trimpot	4	042 03470 01
5k Ohm Trimpot TRW	4	042 04500 09
10k Ohm Trimpot	4	042 05100 01
47k Ohm Trimpot	4	042 05470 01

ASSEMBLY

1. GENERAL

Reference should be made to Exploded View Figure 1101 of Illustrated Parts Breakdown. Square brackets enclosing numbers denote item numbers on this drawing.

2. TRANSISTORS

A. MODULATOR OUTPUT, Q401, Q402

(1) Clear P.C. Board holes mounting these transistors of excess solder.

(2) Smear a small amount of Silicon heat-sink compound on the mica insulators to be used with the transistors.

(3) Fit the transistors, using the mica washers and appropriate screws, washers and nuts [16A], [16], [17].

(4) Solder transistor lead connections.

B. R.F. OUTPUT STAGES

(1) Smear a small amount of Silicon heat-sink compound on transistor body.

(2) Fit the transistors to the heatsinks [15], and tighten retaining nuts. Ensure correct orientation of transistors. A black dot marks the collector of Q306. 'CTC' marks the collector of Q305.

(3) Carefully bend the transistor flange legs down to the printed circuit board and solder them. Check for short circuits.

3. MODULATION TRANSFORMER

A. Feed leads 'S' and 'T' through P.C. Board hole access.

B. Mount the transformer by its retaining screws, washers and nuts [26].

C. Connect the transformer leads as follows:

Red to point 'P'
Adjacent Black to point 'O'
Blue to point 'R'
Adjacent Black to point 'Q'
Yellow to point 'T'
Green/Brown to point 'S'

ASSEMBLY

FRONT PANEL UNIT

A. Fit Escutcheon [6], and four Posidriv screws [8].

B. Fit panel [4], and secure with two Allen-head screws [7].

C. Fit Knobs [1], [2], by locating spring [3], at flat on control shaft.

FRONT PANEL CONTROLS

A. Reassemble in reverse order to disassembly - see DISASSEMBLY, Paragraph 5.

B. Push the red L.E.D. [5], into the plastic mount and the green L.E.D. [5a] into the channel indicator lens [32].

16-PIN SOCKET

A. Fit the socket from inside the set. Note orientation, the numbers appear upside down, i.e. Pins 1 to 8 are uppermost.

B. Reassemble in reverse order to disassembly. See DISASSEMBLY, Paragraph 6.

FITS AND CLEARANCES

1. CRYSTAL SPECIFICATION TE/1

Frequency Range	.. 6.0 - 63.0MHz
Holder Type	.. HC-43/U (Ref MIL Spec: MIL-H-10056/30B)
Oscillation Mode:	
1. 6.0 - 20.0MHz	.. Fundamental
2. 20.0 - 63.0MHz	.. Third Overtone
Calibration Tolerance	.. ±10ppm at 25°C (±3°C) with a drive level of 1mW
Frequency Variation With Temperature	.. ±10ppm over the range -10°C to +60°C
Activity:	
1. Calibrated Response	.. ESR less than 40 ohms
2. Spurious Responses	.. ESR greater than double the calibrated response
3. Measurement	.. ESR of the calibrated response must not exceed 40 ohms for drive levels between 10^{-8}W and 1mW
Marking:	
1. Top of can	.. Frequency in MHz to four decimal places
2. One side of can	.. Manufacturer's logo
3. Other side of can	.. TE/1 plus date code or lot number

TESTING

1. TEST EQUIPMENT

For complete testing of the T373, the following equipment is recommended.

ITEM 1: Multimeter, having a 1 volt or 1.2 volt F.S.D. D.C. range.

ITEM 2: D.C. Electronic Voltmeter, with R.F. Diode Probe.

ITEM 3: A V.H.F. Signal Generator, having a lower limit of 10.7MHz, a suitably calibrated attenuator, and an output impedance of 50 ohms.

ITEM 4: A V.H.F. Frequency Meter (preferably digital).

ITEM 5: 10.7MHz Reference Crystal Oscillator.

ITEM 6: Bench D.C. Supply. 13.75 Volts at up to 3 amperes with regulation unaffected by proximity to operating V.H.F. transmitters. A suitable Power Supply is the Tait T286/AM (or T158A, now obsolete). A low resistance Ammeter, with switched ranges from 0.3 to 3 Amperes, should be connected in series with the positive D.C. Supply Lead.

ITEM 7: A 1000Hz Audio Generator, with at least 1.5 Watts output, to drive a small speaker which can be coupled to the T373 microphone for checking compressor operation. An Adaptor Unit, to hold speaker and microphone close together, should be made.

ITEM 8: A Thermo-couple type R.F. Power Meter.

ITEM 9: A correctly shaped tuning tool for Neosid ferrite-core adjustment.

ITEM 10: Tuning wand, of 3mm inside diameter plastic tubing, having an F29 slug in one end and a brass screw in the other end.

ITEM 11: Speaker with 15 ohm voice-coil impedance.

ITEM 12: A.C. Voltmeter, suitable for Signal to Noise Ratio measurement; connect this meter across the speaker.

ITEM 13: An Oscilloscope. This instrument should be suitable to the display of modulation envelopes and audio waveforms.

ITEM 14: Modulation Meter (eg. Sayrosa 252).

ITEM 15: Bench Test Plug. 16-way McMurdo to fit T373, wired D.C. supply positive to pins 7 & 8, negative to pins 15 & 16. The speaker is connected between pins 13 & 15. The 50 ohm aerial coaxial lead 'inner' connects to pin 2 and the outer braid is split into two pigtails connected to pins 1 & 3. A 5.6pF capacitor should be terminated between pins 1 & 2. The other end of this coaxial lead is terminated to suit test equipment and should be cut to one or more $\frac{1}{2}$ wavelengths in length.

($\frac{1}{2}$ wavelength in cm = $10{,}000/f$MHz.)

TESTING

2. TEST PROCEDURE - GENERAL

A. FACTORY PRE-DELIVERY ALIGNMENT

Before despatch from the factory, the T373 is normally pre-aligned on 127.05MHz (unless it has been oredered on a specific channel), this frequency corresponding to position 1 of the channel selector switch. For alignment on other channels, see 2.B., 3.C. to H., 4.C. to F.

B. PRE-ALIGNMENT CHECKS

Install correct crystals in receiver and transmitter sections.

The transmit crystal frequency is $1/3f_t$, where f_t is the transmit frequency.

The receive crystal frequency is $1/3(f_r + 10.7)$, where f_r is the receive frequency in MHz.

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

Plug the Bench Test Plug into the rear of the T373.

Connect the aerial coaxial lead to a V.H.F. Signal Generator.

Connect an A.C. voltmeter across the speaker load.

C. AUDIO OUTPUT STAGE QUIESCENT CURRENT

Set and balance the quiescent collector currents of the push-pull audio output stage as follows:

Unsolder the links across R401 and R402; switch D.C. supply 'ON'.

Measure the voltage across R401. The reading should be 0.2 Volts. If it is not, adjust RV418 to obtain a reading of 0.2 Volts.

Measure the voltage across R402. The reading should also be 0.2 Volts.

Again measure the voltage across R401 and, if necessary, adjust RV411 to obtain 0.2 Volts. It may take two or three repeats of the last two steps to obtain 0.2 Volts across both R401 and R402. This procedure sets and balances the quiescent current of the audio output stage to 20mA for each transistor.

Switch the D.C. supply 'OFF'.

ON COMPLETION OF THIS TEST, REPLACE THE LINKS ACROSS R401 AND R402.

3. RECEIVER TESTS

A. LOCAL OSCILLATOR PRELIMINARY ALIGNMENT

Fit a crystal corresponding to 127.05MHz (±100kHz) at X101 position (crystal frequency 45.91666MHz), and switch the channel switch to position 1. Adjust the tuning slugs in the oscillator trimming inductors (L107, L108, L109) to their 'out' positions.

TESTING

Switch the D.C. supply 'ON', and with an R.F. diode probe, check for R.F. voltage at the collector of Q109 (the oscillator). The presence of R.F. voltage at Q109 collector verifies that Q109 is oscillating.

Measure the D.C. voltage on the control line to the Varicap tuning diodes. This is available at several points on the P.C. board track, eg. at C111 and C324.

Set the Channel 1 preset potentiometer (RV208) to obtain 1.5V.

Connect the R.F. diode probe to the test point at gate 2 of mixer Q102 and tune L111 for maximum R.F. voltage at this point (1 or 2 Volts). This completes preliminary alignment of the oscillator.

B. PRELIMINARY R.F. - I.F. ALIGNMENT

Select Channel 1 (127.05MHz or near this frequency). See Tuning Control Chart, Page 705, 3.E. of "Testing".

Ensure that the crystal frequency is trimmed by adjustment of L107 (refer to paragraph 3.F.). Turn mute control fully clockwise.

Set the Signal Generator to the receiver frequency. The Sig. Gen. must be 30% modulated at 1kHz, and its level should be set fairly high (500 to 700 mV p.d.). The signal should be heard at the output of the receiver.

Reduce the Signal Generator output until the signal starts to disappear into the noise, then increase its output 3 or 4dB.

Switch the 10.7MHz Reference Crystal Oscillator 'ON', and loosely couple it to the I.F. section of the T373.

Tune the Signal Generator to zero-beat, and switch the 10.7MHz Reference Crystal Oscillator 'OFF'.

Adjust L105 and L106 cores for maximum audio output.

Then tune the R.F. coils L101, L102, L103 and L104 for maximum output. As the coils come into tune, progressively reduce the Signal Generator output, to maintain the signal 3 or 4dB above the level at which rapid degradation of the Signal to Noise Ratio occurs.

Finally, re-tune L101, L102 and L103 carefully at minimum signal input. This completes preliminary R.F./I.F. alignment.

C. A.G.C. OPERATION (R.F. GAIN)

Set the Signal Generator, modulated 30% at 1000Hz, to apply 1.0µV p.d. to the receiver input.

Monitor the audio output level at the speaker, setting the output well below the overload point, at approximately 1 Volt R.M.S.

Increase the Signal Generator output to 16mV p.d.

TESTING

The audio rise should be between 2 and 5dB. If the rise is outside these limits, adjust the I.F. gain pot., RV183, and recheck. (Turning RV183 clockwise increases the I.F. gain and reduces the rise in dB.)

D. ON-CHANNEL RECEIVER ALIGNMENT

The following alignment steps are undertaken when fitting the Channel crystals to the equipment and assumes the preliminary alignment of 3.A., B & C has been carried out.

(1) FITTING CHANNEL CRYSTALS

Fit channel crystals in the positions X101 to X106; the channel frequencies must lie between 118.0 and 136.0MHz.

It is desirable that the channels should be grouped in pairs that are close in frequency, because of the common oscillator trimming inductors shared by each pair of channels. As an example:

Channel 1	118.1MHz
Channel 2	118.3MHz
Channel 3	119.1MHz
Channel 4	119.7MHz
Channel 5	134.5MHz
Channel 6	135.1MHz

Wide spacing between pairs, such as Channel 1 = 118.1MHz and Channel 2 = 135.1MHz, should be avoided in order to achieve the most accurate frequency trimming (see "Troubleshooting" Section of this Manual.

(2) SETTING CHANNEL TUNING PRESET POTENTIOMETERS

With the R.F. probe on the test point at Q102 gate 2, select Channel 1 and adjust the associated pre-set tuning control (RV208) for maximum R.F. voltage.

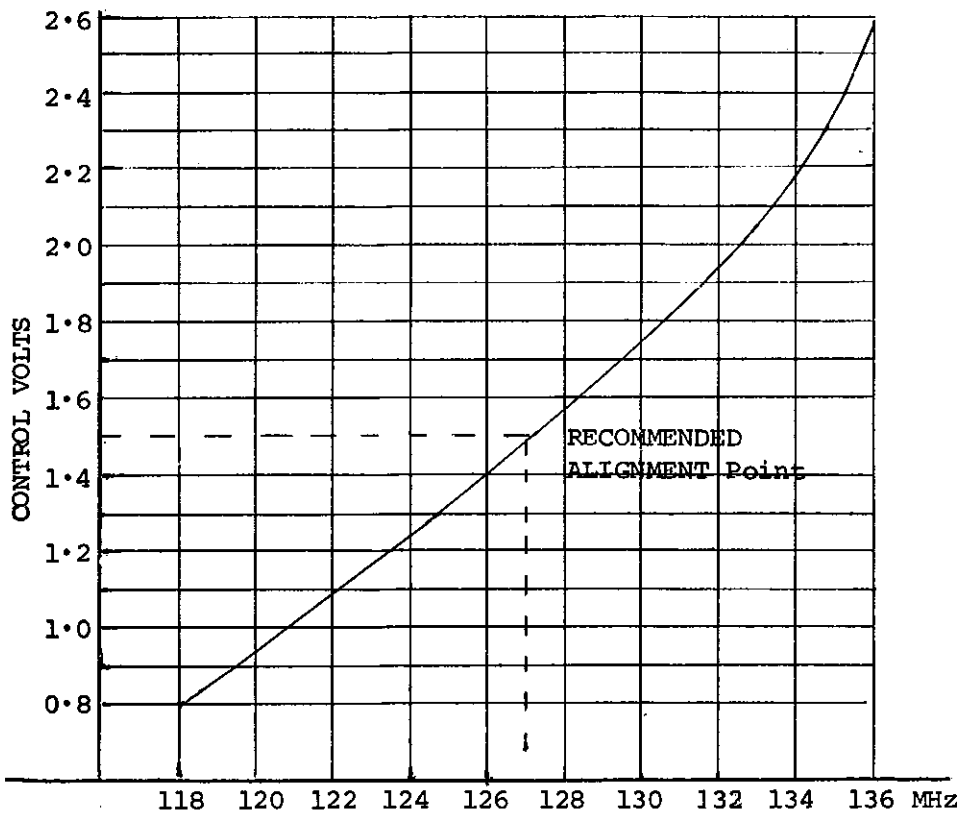
Select each channel in turn and carry out the same procedure with the appropriate tuning control (i.e. for Channel 2, adjust RV209, Channel 3 RV210, Channel 4 RV211, Channel 5 RV212 and Channel 6 RV213).

With the Signal Generator on the Channel 1 frequency, re-adjust RV208 for maximum receiver output at the Voltmeter across the speaker, reducing the Signal Generator input progressively to 1µV p.d. At this level, a signal to noise ratio of 10dB should be obtainable with the Signal Generator 30% modulated.

Repeat this retuning for each channel in turn by adjusting the appropriate tuning control (RV208 to RV213). Note that L101, L102, L103 and L111 were set up in 3.A and 3.B., and MUST NOT be re-adjusted.

TESTING

Figure 701, T373 TUNING CONTROL CHART.



E. FREQUENCY CONTROL CHART

The above chart shows the approximate tuning voltages required over the bandwidth 118-136MHz. It is highly recommended that, if a complete realignment is required, this be carried out at 127MHz.

If alignment has been disturbed, and no crystals are available on or near 127MHz, then a realignment may be carried out by utilizing the above chart to determine the preset tuning control voltage versus channel frequency.

Determine from the chart the preset voltage corresponding to the channel frequency, and set the appropriate channel preset control to this voltage. Carry out the R.F. adjustment for the receiver and transmitter as per Paragraphs 3.B. and 4.B. of "Testing".

TESTING

F. Care should be taken to ensure that the crystal frequencies are trimmed to within 1kHz of the correct frequency before the receiver is aligned. The trimming inductors (L107-L108-L109), have large tuning ranges and if mis-aligned could cause erratic crystal oscillation.

Connect a Digital Frequency Meter to the mixer test point at gate 2 of Q102.

By adjustment of the slug in the appropriate trimming inductor (of L107, L108 and L109), bring the frequency of each crystal within tolerance. Note that L107 is shared by Channel 1 and Channel 2, L108 is shared by channels 3 and 4, and L109 is shared by channels 5 and 6. It should be possible to adjust each trimming inductor so that each of the pair of crystals associated with that trimming inductor is within $\pm$1kHz of three-times crystal frequency. (Crystal frequency = 1/3($f_{channel}$ + 10.7MHz).

EXAMPLE: Check Channel 1 frequency and adjust L107 to exactly correct it. Switch to Channel 2 and note frequency. If the frequency is 500Hz low, re-adjust L107 to bring Channel 2 to within 250Hz of the correct frequency, then recheck Channel 1 frequency, which should not be greater than 250Hz high.

Crystals to Tait TE1 Specifications are recommended.

G. SIGNAL PLUS NOISE TO NOISE RATIO

Set the Signal Generator to apply 1µV p.d. input, modulated 30% at 1000Hz, to the receiver input.

Turn the 'Mute' control, RV198, fully clockwise.

Set the 'Volume' control, RV202, to obtain an output voltage of about 1 Volt R.M.S. across the speaker load.

Switch the 1000Hz modulation 'OFF', and observe the remaining noise-level across the speaker. This level should be at least 10dB below the level produced by signal plus noise input on all channels fitted.

H. MUTE TEST

Reduce the Signal Generator output to zero. Advance 'Mute Gain' preset RV196 fully clockwise. Turn the panel 'Mute' control, RV198, fully anticlockwise.

Set the Signal Generator input at 2µV p.d. (-101dBm).

Adjust 'Mute Gain' preset in anticlockwise direction until the receiver just goes into the completely muted condition.

TESTING

I. MUTE NOISE COMPENSATION

Connect the aerial input to a 50 ohm load.

Turn the panel mute control slowly clockwise until the receiver is just balancing on the verge of muting.

Connect the aerial input to a White Noise Generator, or alternatively, to an outside aerial for maximum noise pickup. There must be no actual carrier signal present.

Adjust the noise amplifier preset RV186 until the receiver just goes cleanly into the muted condition. Noise pulses should now no longer open the mute gate. The mute threshold should be able to be controlled by the front panel 'Mute' control, RV198. Reset the 2μV level as per Paragraph 3.H. of "Testing".

J. AUDIO OUTPUT

Set the Signal Generator to 5μV p.d. output, modulated 30% at 1000Hz, and apply this signal to the receiver input.

Turn 'Volume' and 'Mute' controls (RV202 and RV198) fully clockwise.

The R.M.S. voltage across the 15 ohm speaker should be at least 6V, and at 6V should not show obvious distortion on an Oscilloscope connected across the speaker.

4. TRANSMITTER TESTS

A. GENERAL

Transmitter alignment is normally straightforward, even if a major change in frequency is to be made.

Experience has shown that the most useful aid to transmitter alignment is a series Ammeter in the positive L.T. supply line. As the stages are peaked to the correct frequency, collector-current increases are easily observed in the series Ammeter.

An E.V.M., with R.F. Diode Probe, can be used to measure the R.F. drive levels on the test-points at the emitter of the oscillator and the base of each amplifier stage.

All T373 equipment is factory pre-aligned on 127.05MHz unless ordered for specific channels. For alignment on other channels when a pre-aligned T373 on 127.05MHz has been received, proceed straight to 4.C.

B. PRELIMINARY ALIGNMENT

Fit a crystal corresponding to 127.05MHz (or near this frequency, see Tuning Control Chart, Figure 701, Page 705) at X301 position (Crystal frequency 42.35MHz) and set Channel Switch to position 1.

TESTING

Measure the D.C. tuning voltage of the varicaps. This is available at several points on the top track of the printed circuit board, eg. at C311 and C324. Adjust RV208, the Channel pre-set potentiometer, to obtain 1.5 Volts.

NOTE: If the receiver tuning procedure outlined in sections 2.A. and 2.B. has already been carried out, then it will NOT be necessary to adjust RV208.

With a suitable R.F. Power Meter connected to the aerial lead of the T373, close the microphone pressel-switch, and with the R.F. Diode Probe connected to the collector of oscillator Q301, check that this stage is oscillating. Note that the slugs in the oscillator trimming inductors, L301, L302 and L303, should be adjusted to their 'out' positions. The oscillator trimming inductors have a large tuning range, and mis-adjustment at this stage could cause erratic oscillation.

Set the Ammeter to its 1 ampere range, and adjust L305, L306 and L307. If little or no current change occurs, connect the diode probe to the collector of Q303, and adjust L305, L306 and L307 for maximum. The Transmitter should now draw current, switch to a higher current range. Tune capacitor CV355 for maximum R.F. output. Carefully re-tune L305, L306, L307 for maximum D.C. current. The D.C. current should now be between 1.9 and 2.5 Amperes, and the R.F. power output approximately 10 Watts.

A more positive indication can be obtained by tuning these stages with the transmitter under about 70% modulation.

If the power output and D.C. current are low, then the inductance of the interstage broad-band networks should be checked with the tuning wand (Paragraph 1, Item 10). Insertion of either end can determine whether more or less inductance is required. In particular, check L313 and P.A. coil L314.

To check L313, hold the brass screw near it. If the output power and D.C. current increase, the hairpin coil should be shortened by unsoldering and moving it closer to the printed circuit board. If the D.C. current and power increases are apparent with the F29 slug near L313, then the hairpin length should be increased slightly.

To check L314, hold the brass slug near the coil and retune CV355. If power output increases, the turns of L314 should be spread slightly apart and CV355 retuned.

C. MULTI-CHANNEL ALIGNMENT

This alignment is carried out with the equipment pre-aligned according to Paragraphs 4.A. and 4.B., and is straightforward.

TESTING

Fit the required channel crystals to crystal positions X301 to X306. It is desirable that channels should be grouped together in pairs which are close together in frequency, because each pair of channels shares a common trimming inductor. For a numerical example, see Paragraph 3.D.(1) of Receiver Alignment.

If the receiver has been pre-aligned to the channels fitted, further alignment of the transmitter should be unnecessary.

Adjustment of the tuning presets RV208 to RV213 aligns receiver and low-level transmitter stages simultaneously.

Output power should be adjusted by selecting the highest frequency channel and peaking CV355 for maximum power output. If at the highest frequency the R.F. power output and D.C. supply current are low, check the tuning of hairpin L313 and L314 using a tuning wand (Paragraph 1, Item 10). Hold the brass end near L313. If the current drawn by the transmitter increases, then less inductance is required, and L313 should be shortened by unsoldering it and pushing it closer to the printed circuit board. Hold the brass end near L314 and retune CV355. If the power output increases, spread the turns of L314 slightly and retune CV355.

If instead, the output power increases when the ferrite end of the tuning wand is substituted, lengthen hairpin L313 and bring the turns of L314 closer together, retuning CV355.

With wide-band coverage (118 to 136MHz), power variations from 7 to 10 Watts may occur in the output obtained from the channels.

To prevent unwanted oscillation, turn all unused preset potentiometers to zero voltage (fully clockwise).

D. FREQUENCY ADJUSTMENT

Couple a Digital Frequency Meter to the output of the transmitter via a suitable attenuator.

Switch to Channel 1 and align L301 exactly on frequency. Switch to Channel 2 and note the frequency. If Channel 2 frequency is low, re-adjust L301 until its frequency is low by half the amount it was low, ie. if 500Hz low, adjust for 250Hz low. Switch back to Channel 1 and check its frequency. It should be possible to adjust L301 to bring both channels within ±1kHz of the centre frequency. Proceed in similar fashion for the other channels fitted, adjusting L302 for channels 3 and 4, and L303 for channels 5 and 6.

Crystals to Tait TE/1 Specification are recommended.

E. TRANSMITTER COLLECTOR CURRENTS

The final stage (Q306) collector current (1.1 to 1.3 Amperes), can be measured by inserting an Ammeter in the tinned copper lead to C351, below the printed circuit board.

TESTING

The driver stage (Q305) collector current (400 to 500mA), can be measured by inserting an Ammeter in the tinned copper lead to C342, beneath the printed circuit board.

The pre-driver (Q304) collector current (60 to 75mA quiescent, 120 to 150mA with drive), can be measured by connecting a Voltmeter across R336 (10 ohms).

F. MODULATION AND COMPRESSION ADJUSTMENT

Modulator operation is best checked by exciting the microphone from an audio power-driven transducer.

An audio sine-wave generator, capable of 1½ Watts output into a small loudspeaker, will suffice to drive the microphone.

An adapter should be made, to hold the microphone and speaker closely coupled.

The audio source level must be adjustable over a continuous range, and must be metered for output level. A Voltmeter across the loudspeaker will be adequate to monitor this audio level.

The Modulation Meter should be coupled to the transmitter R.F. output via a 50 ohm pad giving 20dB of attenuation. A suitable connection point is at the input of the R.F. Power Meter.

After making the above connections, carry out the following steps:

STEP 1: Ensure that the D.C. supply to the T373 is switched OFF.

STEP 2: Rotate the compression preset potentiometer, RV405, fully anticlockwise. This removes all input to the compressor stage, Q411.

STEP 3: Connect the T373 aerial lead to a Thermo-Couple R.F. Power Meter.

STEP 4: Close the microphone pressel-switch line with a shorting jumper lead.

STEP 5: Couple the microphone to the audio source transducer. Set the output frequency to 1000Hz.

STEP 6: Adjust the output of the audio source to produce 5mV R.M.S. across the microphone pads on the T373 printed circuit board (5mV R.M.S. sine-wave = 14.14mV peak-to-peak on Oscilloscope).

STEP 7: Switch the D.C. supply 'ON', and check that between 15 and 30% modulation is obtained.

STEP 8: Increase the Audio Source Level 30dB and adjust RV405 to obtain a mean modulation percentage of not less than 75%. Check for distortion on the R.F. envelope with the oscilloscope.

TESTING

STEP 9: Reduce the Audio Source Level to 20dB above the level set in Step 6. Check that the mean modulation percentage remains at approximately 75%, as the Audio Source Level is increased 10dB (ie. to the level set in Step 8).

STEP 10: Apply speech input to the T373, and check for any signs of faulty modulation on the envelope with the oscilloscope.

STEP 11: Switch the D.C. supply to the T373 'OFF'. Remove the jumper lead from the microphone pressel line, and disconnect all test equipment.

An alternative method, which does not take the microphone into account, is the direct Audio Generator test, which is carried out as follows:

Connect the 600 ohm output from an Audio Generator directly across the microphone pads 'W' and 'K'. Set the frequency to 1000Hz and the level to 5mV output.

STEPS 1, 2 and 3 as for the transducer method given previously.

STEP 4: Close the microphone pressel switch.

STEP 5: Switch the D.C. supply 'ON' and check that the modulation percentage is between 15 and 30%.

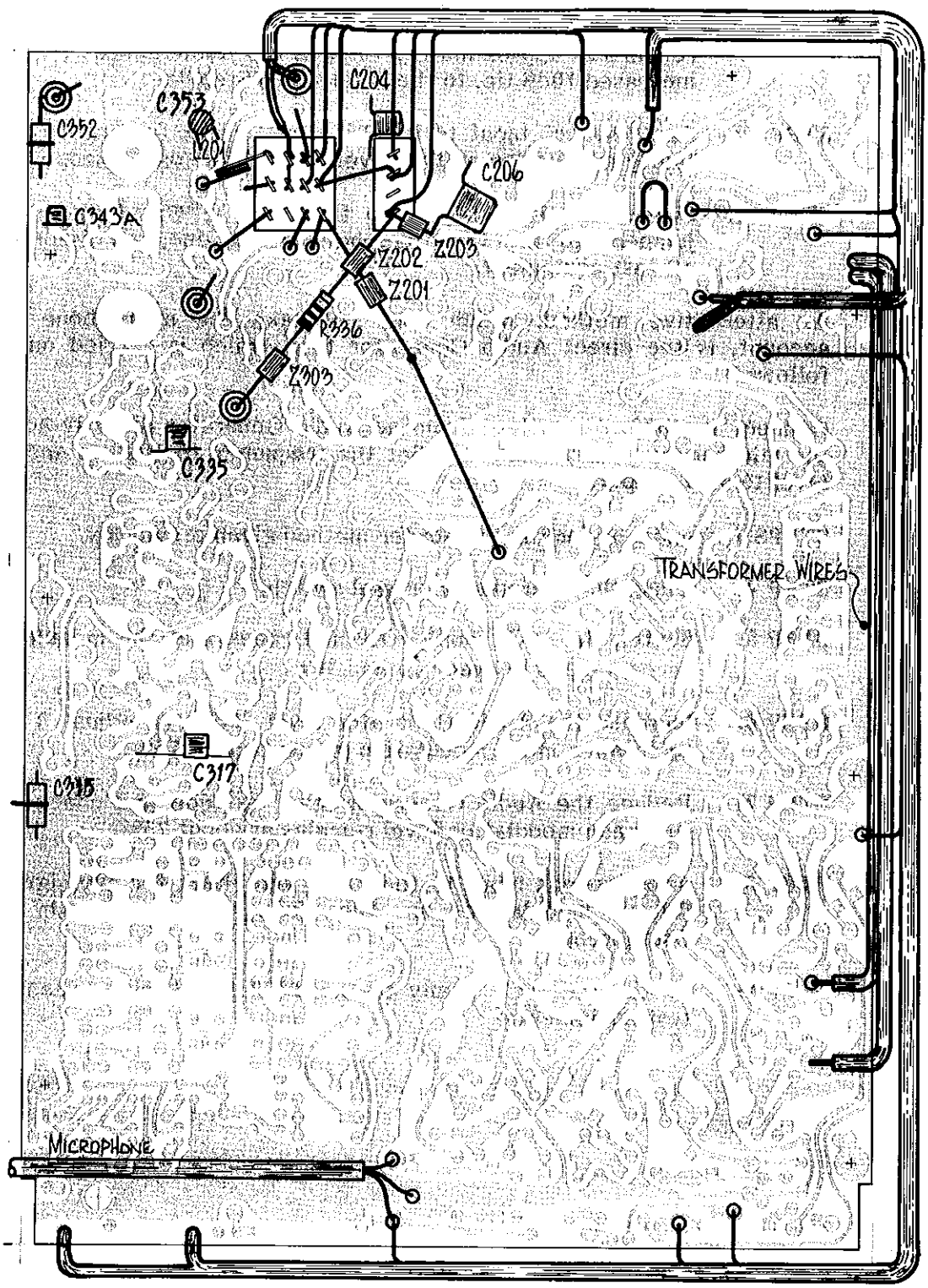
STEP 6: Increase the Audio Generator level 30dB and adjust RV405 to obtain a mean modulation percentage of 75%.

STEP 7: Reduce the Audio Generator level by 10dB and check that the mean modulation level remains at about 75%.

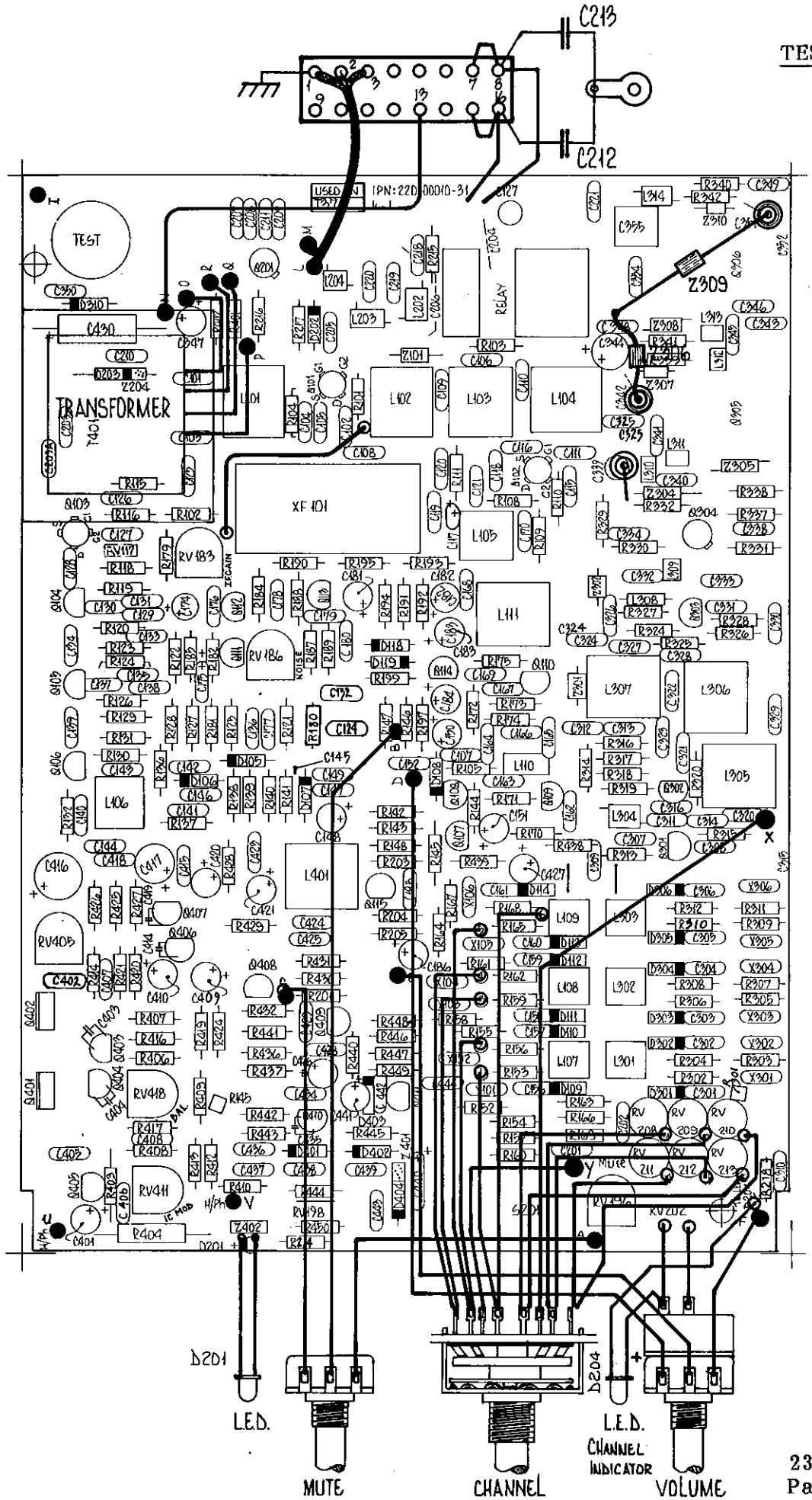
STEP 8: Apply speech input to the T373, and check for any signs of faluty modulation on the R.F. envelope with the Oscilloscope.

STEP 9: Switch the D.C. supply to the T373 'OFF', and disconnect test equipment.

TESTING



◎	Feed thru Capacitor
▭	Ferrite bead


C213
C212
TEST
TRANSFORMER
T401
RELAY
Z309
XF 401
L401
L402
L403
L404
L405
L406
L407
L408
L409
L410
L411
L301
L302
L303
L304
L305
L306
L307
RV183
RV186
RV405
RV418
RV411
RV198
D201
D204
L.E.D.
MUTE
CHANNEL
L.E.D.
CHANNEL
INDICATOR
VOLUME

TESTING

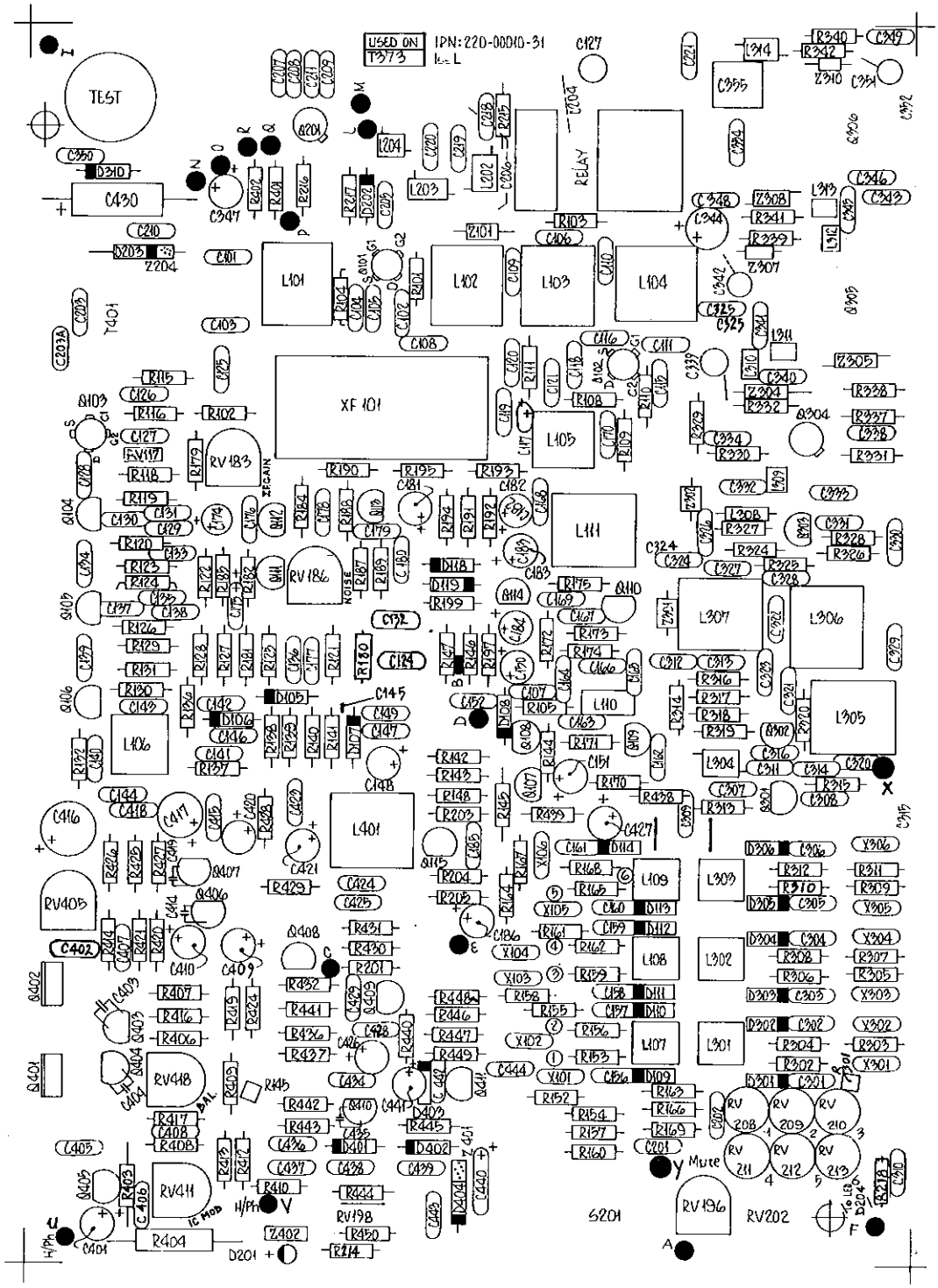


FIGURE 704, TEST POINTS AND ADJUSTMENTS

TESTING

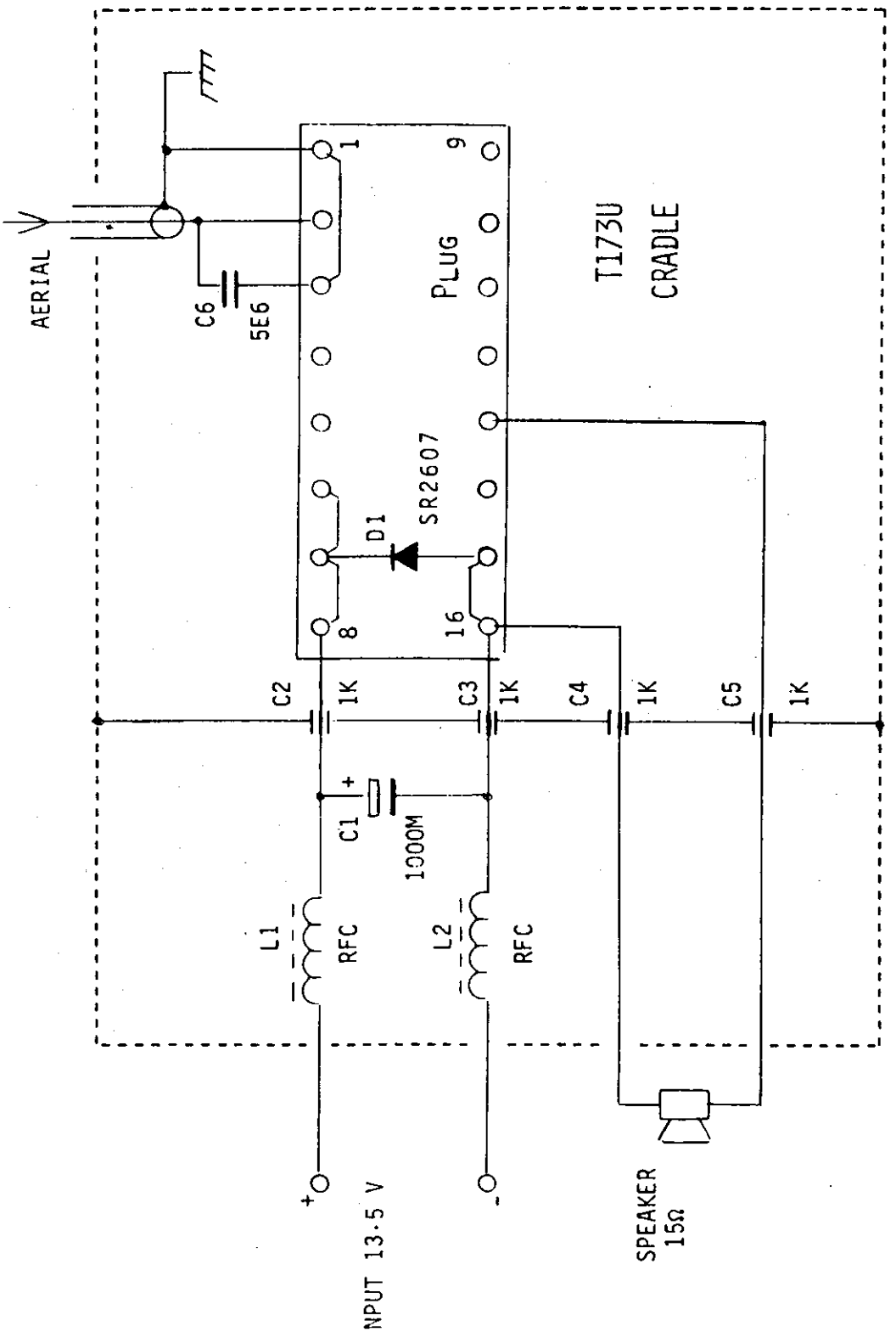


FIGURE 705, T173U VEHICLE CRADLE, CIRCUIT DIAGRAM

TESTING

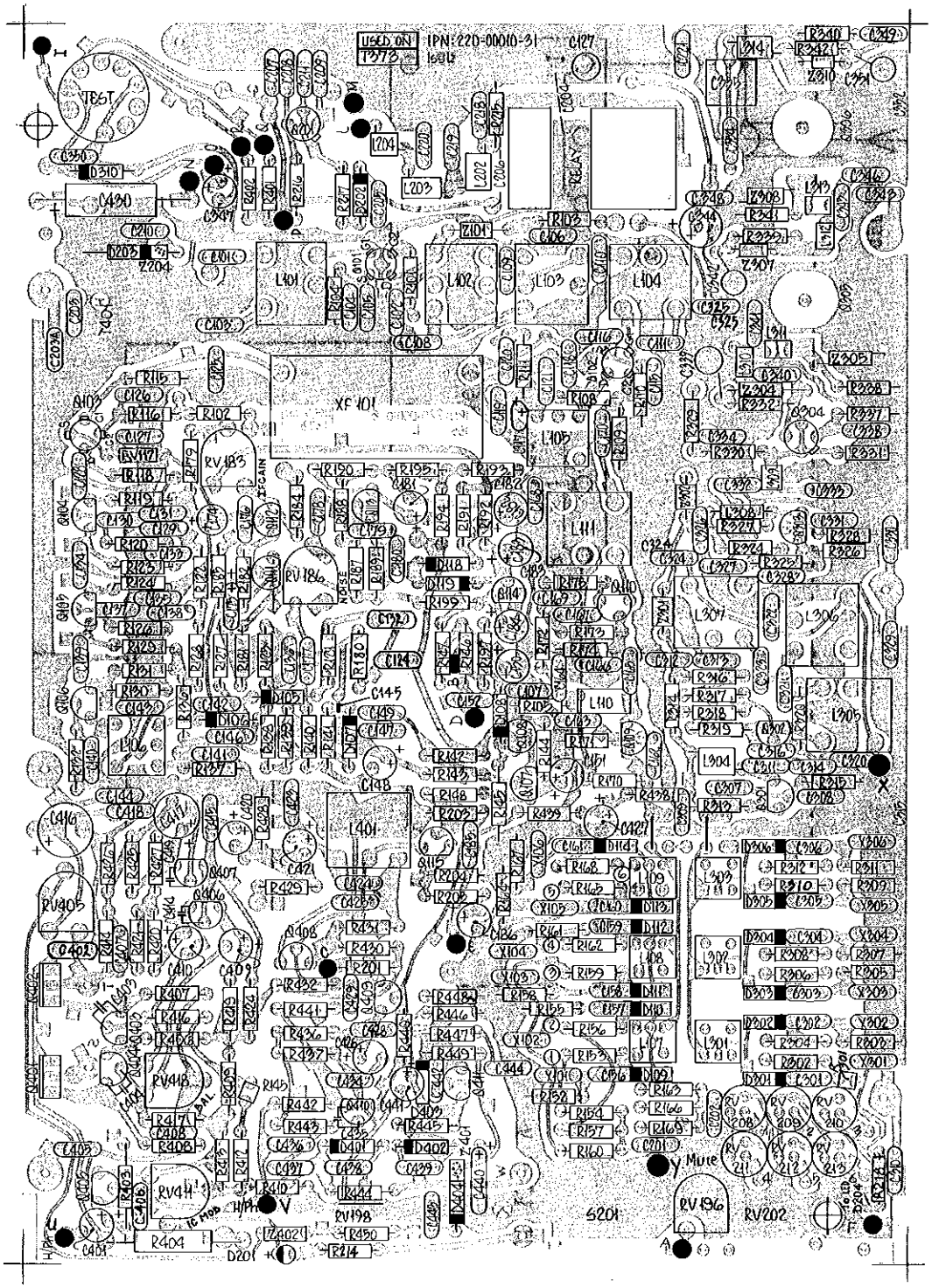


FIGURE 706, TOP VIEW PCB

TROUBLESHOOTING

1. GENERAL

For voltage measurements, reference should be made to the Circuit Diagram. The voltage values given on the Circuit Diagram are a general guide, and are within ±10% when measured with a high-impedance (>10 Megohm), D.C. Voltmeter. No channel crystal should be oscillating while D.C. measurements are being taken.

R.F. measurements taken with an R.F. Probe should be interpreted with discretion. These R.F. Voltages are shown within brackets on the Circuit Diagram. During a measurement, the earth connection of the R.F. Probe must be taken to the nearest available earth-point.

TABLE 1, RECEIVER

FAULT SYMPTOM	CAUSE	REMEDY
No output with set unmuted	Supply failure	Check fuse or supply.
	Regulator failure	Check Q201 output and Zener diode D203.
	Relay	Check relay contacts.
High receiver current	Modulator unbalanced	Rebalance RV418 & RV411
Modulator transistor failure		Check Q401, Q402, Q403 and Q404.
Weak or no signal	Tuning slugs shifted	WARNING: DO NOT retune ferrite slugs without carrying out the FULL tuning procedure as per Page 703, Para. 3.B.
	Varicap supply failure	Check preset-control voltage at Varicap tuned coils. NOTE: this voltage may also be measured on the spare pin at the base of each coil.
	Q101 or Q102 failure	Check source voltages.
	Relay contact	Check by short-circuiting pins 8 and 9 together.
	Open circuit L101, L102 L104 or L111	Remove coil cans and check tap connections.
	Low Oscillator injection	Check tuning voltage on Coil L111.

TROUBLESHOOTING

TABLE 1 (CONTINUED)

FAULT SYMPTOM	CAUSE	REMEDY
Weak or no signal (Continued)	No mixer injection voltage	Check Q110 voltages.
	Oscillator failure	Check diode-switching (0V), on selected channel at "Channel" switch.
		Check crystal connections.
		Adjust oscillator trimming coil.
		Replace crystal.
	Low-gain oscillator transistor.	Replace transistor.
Incorrect oscillator frequencies	Adjacent channels too far apart	Re-allocate channels. See Page 704, Para. 3.D. NOTE: If it is desired to have adjacent channels on widely spaced frequencies (eg. channel 1 & 2), fit the second channel to position 3, and interchange the channel wiring of channels 2 & 3. L107/L301 will then trim channel 1, L108/L302 will trim channel 2.
	Erratic or unstable oscillation	Short-circuit on crystal connections.
		Incorrectly adjusted Oscillator trimming inductor.
Signal cut-off under noise	Muting fault	Reduce "Noise-Gain", RV186.
"Break-thru" under noise		Increase "Noise-Gain", RV186. See Para. 3.H. of "TESTING" (Page 706).

TROUBLESHOOTING

TABLE 2, TRANSMITTER

FAULT SYMPTOM	CAUSE	REMEDY
No R.F. Output	Supply failure	Check Fuse/Power Source.
	Relay not operating	Microphone switch faulty. Relay armature blocked. Relay coil open circuited, D202 open-circuit.
	Oscillator failure	See Table 1, Receiver
Low R.F. Output	L305, L306, L307 slugs shifted	Check R.F. voltage at base of Q303. WARNING: Do NOT retune ferrite slugs without carrying out full tuning procedure as per Para. 4.B. of TESTING (Page 708).
	Erratic or unstable	Check frequency.
		Readjust crystal trimming inductors.
		Replace Crystal
	Faulty diode switching	Check the voltage (0V) on the selected channel at "Channel" switch.
	Transistor failure	Check R.F. levels with R.F. Diode Probe.
	Relay contacts faulty	Replace Relay.
Distorted Modulation	Overmodulation	Check setting of Preset RV405 in compressor. (Refer to TESTING, Para. 4.F., Page 710).
		Check the voltage at the junction of R445 and D402 under modulation.
	Modulator faulty, quiescent current out of balance	Rebalance (Refer TESTING Para. 2.C., Page 702).
	Q401/Q402 failure	Check the input and output waveforms with an Oscilloscope.

TROUBLESHOOTING

TABLE 2 (CONTINUED)

FAULT SYMPTOM	CAUSE	REMEDY
Downward modulation at lower band edge (118MHz)	Interstage matching variations	Check that ceramic capacitor between collector of Q304 (2N4427) and earth is from 5.6 to 6.7pF.
Suspected misalignment	Good receiver sensitivity but low transmitter output	CHECK LOW R.F. OUTPUT SYMPTOMS Tune appropriate preset control for maximum transmitter output, If R.F. output is satisfactory the receiver may be off-tune, indicating incorrect tracking between transmitter and receiver. Realignment required.

STORAGE AND SHIPMENT

1. STORAGE

Equipment should be stored in a clean, dry environment.

The following environmental conditions apply to storage and shipment.

Temperature	-40°C to +75°C
Humidity	<95% relative
Altitude	<25,000 feet

2. PACKAGING

When repackaging, where possbile use the original container. Otherwise wrap the equipment in heavy paper or cardboard. If shipping to a Tait Depot or Service Agent, be sure to include a tag bearing Serial Number, return address and service required.

Unless it is faulty, it is not necessary to return the Cradle with the T373 when it is returned for servicing.

SPECIAL TOOLS

1. SCREWDRIVERS

The heads of the screws fitted to the T373 can be either Philips or Posidriv. For the Posidriv heads, use a PZD21 screwdriver.

2. BLADE TUNING TOOLS

The Neosid tuning slugs should be adjusted by the use of a correctly fitting, brass-tipped adjusting tool. The brass tip should fit easily into the slug slots to avoid breakage.

The same instrument can generally be used for preset potentiometer adjustments, with the exception of the channel-frequency adjustment controls. The channel-frequency controls should be adjusted by use of a wider bladed instrument or a small screwdriver.

3. TUNING WAND

The tuning wand is used when determining the correct inductance values of coils. This can be constructed in accordance with the diagram given below. (Figure 1).

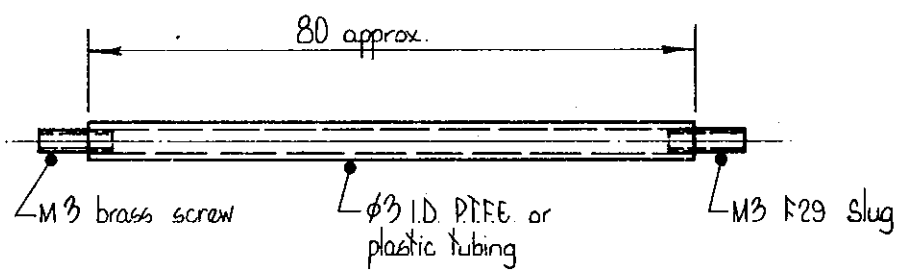


Figure 1001 TUNING WAND

4. BENCH CONNECTING LEAD

A 16-way McMurdo Red Range Plug with cover is used to construct the Bench Power Supply connection to the T373. The plug cover should be used, and a BNC socket may be mounted on this for the aerial connection.

A. PARTS LIST

Plug McMurdo Red Range	240 00010 43
Socket BNC, Panel	240 02100 11
Plug Cover	240 06010 02
5.6pF capacitor, NPO 63V, Murata RD870-4	011 01560 01

SPECIAL TOOLS

B. PIN CONNECTIONS

Positive Pins 7 & 8
Negative Pins 15 & 16
Coaxial braid, split into two pigtails to pins 1 & 3
Coaxial cable centre conductor, Pin 2
Speaker Common Pins 15 & 16
Speaker Output Pin 13
5.6pF capacitor, connected between pins 1 & 2

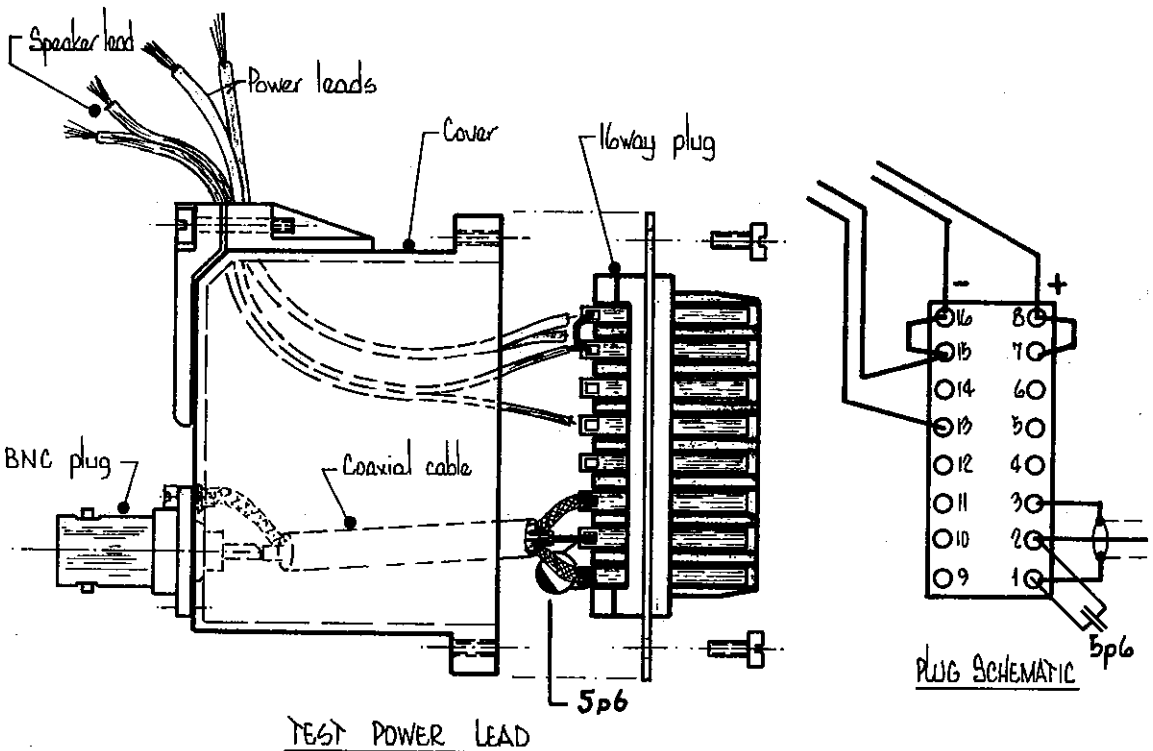


Figure 1002

5. GENERAL

For a complete list of Test Equipment, see TESTING, Paragraph 1 (Page 701).

ILLUSTRATED PARTS BREAKDOWN

TABLE 1, COMPONENTS ON DRAWING A1M 791 (Figure 1101, page 1113/1114)

ITEM No.	QTY/ SET	PART No.	DESCRIPTION
1	2	311 00010 03	Knob plastic moulded (Volume & Mute)
2	1	311 00010 03	Knob plastic moulded (Channel Selector)
3	3	357 00010 02	Spring, Knob retaining, Spire Clip SCD2296
4	1	316 00210 39	Panel, Front (anodized aluminium)
5	1	008 00010 10	D201, L.E.D., Red
5a	1	008 00010 15	D204, L.E.D., Green
6	1	305 00010 16	Escutcheon, plastic moulded
7	2	347 00010 01	Screw Button Head, 6/32 UNC x 3/8"
8	4	349 00020 08	Screw 4-40 x 3/8" Csk. Pozi, Taptite
9	1	252 00010 11	Microphone, MO95D40, 50k Ohms, Blue
10	1	360 00010 02	Grommet, Plastic, 5/16" diameter
10a	4	349 00020 02	Screw, 4-40 x ¼" Csk. Pozi, Taptite
11	1	040 05100 04	R202, Potentiometer, 10k Ohm log. with switch (Volume)
12	1	231 00010 04	Switch, 6-way Channel Change
13	1	040 04100 04	R198, Potentiometer 1k Ohm linear (Mute)
14	8	345 00020 04	Screw, M2.5 x 10mm Csk. Pozi. bright zinc plate
15	2	308 00100 06	Heatsink, R.F., Drawing A4M 110
16	15	353 00010 04	Washer, Shakeproof, M2.5/M3
16a	4	345 00040 10	Screw, M3, 6mm Pan Pozi
17	13	352 00010 04	Nut, M2.5 Pressed Hex. bright zinc plate
18	1	308 00100 19	Heatsink, Audio, Drawing A4M 262
19	1	316 00210 39	Panel, Chassis Front, Drawing A4M 745
20	1	240 02010 44	Socket, 16-way, Red Range McMurdo
21	2	356 00010 03	Solder Tag, Tucker G721
22	1	053 00010 03	T301, Transformer Type 4005 (Tait)
23	1	319 00200 04	Sleeve, Drawing A2M 177
24	1	353 00010 20	Washer, Shakeproof, M4
25	1	345 00050 08	Screw, M4 x 6mm Pan Pozi, bright zinc plate
26	5	345 00020 06	Screw, M2.5 x 8mm csk. Pozi bright zinc plate
27	1	303 00110 44	Surround (Chassis), Drawing A1M 731
28	5	349 00020 03	Screw, 4-40 x ¼" pan Pozi bright zinc plate
29	3	352 00010 08	Nut, M3 hex. bright zinc plate
30	1	220 00010 31	Printed Circuit Board, T373
31	1	530 00010 12	Wiring Loom
32	1	312 00010 30	Lens, channel indicator. Drawing A4M 1218
33	1	309 00020 01	Channel indicator disc

TABLE 2, COMPONENTS ON PRINTED CIRCUIT BOARD (ITEM 30)

A. RESISTORS (All resistors 7 x 2.5mm, 5% carbon film unless otherwise stated.)

CCT. REF.	PART No.	VALUE	CCT. REF.	PART No.	VALUE
R101	030 05100 00	10k	R104	030 02470 00	47E
R102	030 05220 00	22k	R105	030 02470 00	47E
R103	030 02470 00	47E	R106	not allocated	

TABLE 2A, RESISTORS (Continued) *Applies from S/N's 206847.

CCT REF.	PART No.	DESCRIPTION	CCT REF.	PART No.	DESCRIPTION
R107	not allocated		R150	not allocated	
R108	030 04820 00	8k2	R151	not allocated	
R109	030 03470 00	470E	R152	030 03680 20	680E
R110	030 03120 00	120E			4x1.6mm 5% C/F
R111	030 02470 00	47E	*R153	030 04220 00	2k2
R112	not allocated		R154	030 07100 00	1M
R113	not allocated		R155	030 03680 20	680E
R114	not allocated				
R115	030 03910 00	910E	*R156	030 04220 00	2k2
R116	030 05220 00	22k	R157	030 07100 00	1M
RV117	042 04470 02	4k7	R158	030 03680 20	680E
R118	030 04100 00	1k			
R119	030 05100 00	10k	*R159	030 04220 00	2k2
R120	030 03470 00	470E	R160	030 07100 00	1M
R121	030 06470 00	470k	R161	030 03680 20	680E
R122	030 02470 00	47E			
R123	030 04150 00	1k5	*R162	030 04220 00	2k2
R124	030 05100 00	10k	R163	030 07100 00	1M
R125	030 06470 00	470k	R164	030 03680 20	680E
R126	030 03270 00	270E			
R127	030 06100 00	100k	*R165	030 04220 00	2k2
R128	030 02470 00	47E	R166	030 07100 00	1M
R129	030 03820 00	820E	R167	030 03680 20	680E
R130	030 04680 00	6k8			
R131	030 05220 00	22k	*R168	030 04220 00	2k2
R132	030 03270 00	270E	R169	030 07100 00	1M
R133	not allocated		*R170	030 04560 00	5k6
R134	not allocated		R171	030 03470 00	470E
R135	not allocated		R172	030 02470 00	47E
R136	030 04390 00	3k9	R173	030 03820 00	820E
R137	030 04270 00	2k7	R174	030 04220 00	2k2
R138	030 05150 00	15k	R175	030 03220 00	220E
R139	030 04680 00	6k8	R176	not allocated	
R140	030 05470 00	47k	R177	not allocated	
R141	030 05390 00	39k	R178	not allocated	
R142	030 07100 00	1M	R179	030 04220 00	2k2
R143	030 07100 00	1M	R180	030 05120 00	12k
R144	030 04470 00	4k7	R181	030 04820 00	8k2
R145	030 04220 00	2k2	R182	030 05270 00	27k
R146	030 05100 00	10k	RV183	042 05100 01	10k preset pot
R147	030 05100 00	10k			
R148	030 06220 00	220k	R184	030 05100 00	10k
R149	not allocated		R185	030 06330 00	330k

TABLE 2A, RESISTORS (Continued) *Applies from S/N's 206847

CCT. REF.	PART No.	DESCRIPTION
RV186	042 05470 01	47k preset pot.
R187	030 06100 00	100k
R188	030 05220 00	22k
R189	030 04470 00	4k7
R190	030 04100 00	1k
R191	030 04470 00	4k7
R192	030 05100 00	10k
R193	030 05100 00	10k
R194	030 05100 00	10k
R195	030 04100 00	1k
RV196	042 03470 01	470E preset pot.
R197	030 03220 00	220E
RV198	040 04100 04	1k linear pot. less SW
R199	030 05220 00	22k
R200	not allocated	
R201	030 04680 00	6k8
RV202	040 05100 04	10k log. pot. S.P.S.T. SW
R203	030 05470 00	47k
R204	030 04470 00	4k7
R205	030 04390 00	3k9
R206	not allocated	
R207	not allocated	
RV208	042 04500 09	5k Trimpot TRW170 (IRH)
RV209	RV208 to	second source
RV210	RV213	Helitrim
RV211	identical	82PR5K (ex
RV212		Beckman
RV213		Instruments)
R214	030 03680 00	680E
R215	030 05100 00	10k
R216	030 02100 00	10E
R217	030 03470 00	470E
R218	030 04100 00	1k
R301	030 03680 20	680E
*R302	030 04220 00	2k2
R303	030 03680 00	680E
*R304	030 04220 00	2k2
R305	030 03680 20	680E
*R306	030 04220 00	2k2
R307	030 03680 20	680E
*R308	030 04220 00	2k2
R309	030 03680 20	680E
*R310	030 04220 00	2k2
R311	030 03680 20	680E
*R312	030 04220 00	2k2
*R313	030 04560 00	5k6
R314	030 02220 00	22F
R315	030 03470 00	470E
R316	030 02220 00	22E
R317	030 03820 00	820E
R318	030 04220 00	2k2
R319	030 03220 00	220E
R320	030 06100 00	100k
R321	not allocated	
R322	not allocated	
R323	not allocated	
R324	030 03220 00	220E
R325	030 04330 00	3k3
R326	030 03680 00	680E
R327	030 03680 00	680E
R328	030 02470 00	47E
R329	030 03120 00	120E
R330	030 04150 00	1k5
R331	030 03180 00	180E
R332	030 03680 00	680E
R333	not allocated	
R334	not allocated	
R335	not allocated	
R336	030 02100 00	10E
R337	030 01220 00	2E2
R338	030 02220 00	22E
R339	030 03220 00	220E
R340	030 02100 00	10E
R341	030 02220 00	22E
R342	030 04100 00	1k
R401	030 02100 00	10E

TABLE 2A, RESISTORS (Continued)

CCT REF.	PART No.	DESCRIPTION	CCT REF.	PART No.	DESCRIPTION
R402	030 02100 00	10E	R424	030 04390 00	3k9
R403	030 04100 00	1k	R425	030 04100 00	1k
R404	039 00150 90	0E15	R426	030 02390 00	39E
		IW 10% W.W.	R427	030 05100 00	10k
RV405	042 03470 01	470E	R428	030 04220 00	2k2
		preset pot.	R429	030 05100 00	10k
R406	030 03120 00	120E	R430	030 03820 00	820E
R407	030 04100 00	1k	R431	030 04100 00	1k
R408	030 04100 00	1k	R432	030 05220 00	22k
R409	030 04180 00	1k8	R433	not allocated	
R410	030 03470 00	470E	R434	not allocated	
RV411	042 05100 01	10k	R435	not allocated	
		preset pot.	R436	030 04680 00	6k8
R412	030 04150 00	1k5	R437	030 04680 00	6k8
R413	030 03680 00	680E	R438	030 04330 00	3k3
R414	030 04220 00	2k2	R439	030 06100 00	100k
R415	045 03500 01	500E NTC	R440	030 04220 00	2k2
R416	030 03680 00	680E	R441	030 06180 00	180k
R417	030 03680 00	680E	R442	030 05100 00	10k
RV418	042 05100 01	10k	R443	030 05470 00	47k
		preset pot.	R444	030 05470 00	47k
R419	030 03680 00	680E	R445	030 03220 00	220E
R420	030 03270 00	270E	R446	030 06220 00	220k
R421	030 03390 00	390E	R447	030 03680 00	680E
R422	not allocated		R448	030 05100 00	10k
R423	not allocated		R449	030 06100 00	100k
			R450	030 05150 00	15k

TABLE 2B, CAPACITORS

CCT. REF.	PART No.	VALUE	DESCRIPTION
C101	011 03220 01	220E	N750, 63V
C102	011 04100 01	1k	Temperature Characteristic 'B', 63V
C103	011 04100 01	1k	Temperature Characteristic 'B', 63V
C104	011 04100 01	1k	Temperature Characteristic 'B', 63V
C105	011 02220 01	22E	N150, 63V
C106	011 04100 01	1k	Temperature Characteristic 'B', 63V
C107	011 05100 02	10k	Hi-k, 63V
C108	011 04100 01	1k	Temperature Characteristic 'B', 63V
C109	014 01100 01	1E0	P100, 100V
C110	014 01100 01	1E0	P100, 100V
C111	011 04100 01	1k	Temperature Characteristic 'B', 63V

TABLE 2B, CAPACITORS (Continued)

CCT. REF.	PART No.	VALUE	DESCRIPTION
C112	not allocated		
C113	not allocated		
C114	not allocated		
C115	011 04100 01	1k	Temperature Characteristic 'B', 63V
C116	011 04100 01	1k	Temperature Characteristic 'B', 63V
C117	025 07330 01	3M3	Tantalum Bead, 35V
C118	011 02680 01	68E	N150, 63V
C119	011 05100 02	10k	Hi-k, 63V
C120	011 05100 02	10k	Hi-k, 63V
C121	023 03220 01	220E	Polystyrene tubular, 125V
C122	not allocated		
C123	not allocated		
C124	011 05100 02	10k	Hi-k, 63V
C125	011 02180 01	18E	N150, 63V
C126	011 05100 02	10k	Hi-k, 63V
C127	011 05100 02	10k	Hi-k, 63V
C128	011 03220 01	220E	N750, 63V
C129	011 05100 02	10k	Hi-k, 63V
C130	011 04100 01	1k	Temperature Characteristic 'B', 63V
C131	011 05100 02	10k	Hi-k, 63V
C132	022 05470 01	47k	Mylar, 50V Vertical Mounting
C133	011 05100 02	10k	Hi-k, 63V
C134	011 03220 01	220E	N750, 63V
C135	011 05100 02	10k	Hi-k, 63V
C136	011 01560 01	5E6	NPO, 63V
C137	011 04100 01	1k	Temperature Characteristic 'B', 63V
C138	011 05470 02	47k	Hi-k, 63V
C139	011 03220 01	220E	N750, 63V
C140	011 05100 02	10k	Hi-k, 63V
C141	011 05470 02	47k	Hi-k, 63V
C142	011 03220 01	220E	N750, 63V
C143	011 05470 02	47k	Hi-k, 63V
C144	011 05470 02	47k	Hi-k, 63V
C145	011 05100 02	10k	Hi-k, 63V
C146	011 02560 01	56E	N150, 63V
C147	011 04100 01	1k	Temperature Characteristic 'B', 63V
C148	020 07100 02	1M	Electrolytic, 50V
C149	022 04220 01	2k2	Mylar, 50V, vertical mounting
C150	020 07100 02	1M	Electrolytic, 50V
C151	020 07100 02	1M	Electrolytic, 50V
C152	022 05470 01	47k	Mylar, 50V, vertical mounting
C153	not allocated		
C154	not allocated		
C155	not allocated		

TABLE 2B, CAPACITORS (Continued)

CCT. REF.	PART No.	VALUE	DESCRIPTION
C156	011 03100 01	100E	N150, 63V
C157	011 03100 01	100E	N150, 63V
C158	011 03100 01	100E	N150, 63V
C159	011 03100 01	100E	N150, 63V
C160	011 03100 01	100E	N150, 63V
C161	011 03100 01	100E	N150, 63V
C162	011 02680 01	68E	N150, 63V
C163	011 02470 01	47E	N150, 63V
C164	011 05100 02	10k	Hi-k, 63V
C165	011 01680 01	6E8	NPO, 63V
C166	011 02270 01	27E	N150, 63V
C167	011 03100 01	100E	N150, 63V
C168	011 04100 01	1k	Temperature Characteristic 'B', 63V
C169	011 04100 01	1k	Temperature Characteristic 'B', 63V
C170	011 03100 01	100E	N150, 63V
C171	not allocated		
C172	not allocated		
C173	not allocated		
C174	020 07100 02	1M	Electrolytic, 50V
C175	025 06220 01	220k	Tantalum, 35V
C176	022 05220 01	22k	Mylar, 50V vertical mounting
C177	011 03470 01	470E	N1500, 63V
C178	022 04100 01	1k	Mylar, 50V vertical mounting
C179	011 02220 01	22E	N150, 63V
C180	022 05100 01	10k	Mylar, 50V vertical mounting
C181	020 07100 02	1M	Electrolytic, 50V
C182	020 07100 02	1M	Electrolytic, 50V
C183	020 07100 02	1M	Electrolytic, 50V
C184	020 07100 02	1M	Electrolytic, 50V
C185	022 05220 01	22k	Mylar, 50V vertical mounting
C186	020 07330 01	3M3	Electrolytic, 50V
C201	011 04100 01	1k	Temperature Coefficient 'B', 63V
C202	011 04100 01	1k	Temperature Coefficient 'B', 63V
C203	011 05470 02	47k	Hi-k, 63V
C203A	011 02180 01	18E	N150, 63V
C204	011 05100 02	10k	Hi-k, 63V
C205	011 05100 02	10k	Hi-k, 63V
C206	011 03100 01	100E	N150, 63V
C207	011 05100 02	10k	Hi-k, 63v
C208	011 05100 02	10k	Hi-k, 63v
C209	011 05100 02	10k	Hi-k, 63v
C210	011 05100 02	10k	Hi-k, 63v
C211	011 05100 02	10k	Hi-k, 63v
C212	011 05100 02	10k	Hi-k, 63v

TABLE 2B, CAPACITORS (Continued)

CCT. REF.	PART No.	VALUE	DESCRIPTION
C213	011 05100 02	10k	Hi-k, 63V (At Red Range Socket)
C214	not allocated		
C215	not allocated		
C216	not allocated		
C217	012 04100 02	1k	feedthru
C218	011 02270 01	27E	N150, 63V
C219	011 02330 01	33E	N150, 63V
C220	011 02270 01	27E	N150, 63V
C221	011 05470 02	47k	Hi-k, 63V
C301	011 03100 01	100E	N150, 63V
C302	011 03100 01	100E	N150, 63V
C303	011 03100 01	100E	N150, 63V
C304	011 03100 01	100E	N150, 63V
C305	011 03100 01	100E	N150, 63V
C306	011 03100 01	100E	N150, 63V
C307	011 02680 01	68E	N150, 63V
C308	011 02470 01	47E	N150, 63V
C309	011 04100 01	1k	Temperature Coefficient 'B', 63V
C310	011 05470 02	47k	Hi-k, 63V
C311	011 02100 01	10E	NPO, 63V
C312	011 04100 01	1k	Temperature Coefficient 'B', 63V
C313	011 04100 01	1k	Temperature Coefficient 'B', 63V
C314	011 02820 01	82E	N150, 63V
C315	012 04100 02	1k	feedthru
C316	011 03220 01	220E	N750, 63V
C317	011 04100 01	1k	Temperature Coefficient 'B', 63V
C318	not allocated		
C319	not allocated		
C320	011 04100 01	1k	Temperature Coefficient 'B', 63V
C321	014 01180 02	1E8	NPO, ±0.25, 100V
C322	011 04100 01	1k	Temperature Coefficient 'B', 63V
C323	014 01180 02	1E8	NPO, ±0.25, 100V
C324	011 04100 01	1k	Temperature Coefficient 'B', 63V
C325	011 04100 01	1k	Temperature Coefficient 'B', 63V
C326	011 04100 01	1k	Temperature Coefficient 'B', 63V
C327	011 04100 01	1k	Temperature Coefficient 'B', 63V
C328	011 02150 01	15E	NPO, 63V
C329	011 05100 02	10k	Hi-k, 63V
C330	011 05100 02	10k	Hi-k, 63V
C331	011 03220 01	220E	N750, 63V
C332	011 02560 01	56E	N150, 63V
C333	011 02220 01	22E	N150, 63V
C334	011 04100 01	1k	Temperature Coefficient 'B', 63V
C335	011 01820 01	8E2	NPO, 63V

TABLE 2B, CAPACITORS (Continued)

CCT. REF.	PART No.	VALUE	DESCRIPTION
C336	not allocated		
C337	not allocated		
C338	011 03470 01	470E	N1500, 63V
C339	012 04100 02	1k	feedthru
C340	010 03100 01	100E	N750, 500V
C341	010 02680 02	68E	N750, 500V
C342	012 04100 02	1k	feedthru
C343	011 05470 02	47k	Hi-k, 63V
C343A	011 02180 01	18E	N150, 63V
C344	020 07330 01	3M3	Electrolytic, 50V
C345	010 02680 02	68E	N750, 500V
C346	010 03100 01	100E	N750, 500V
C347	025 07100 01	1M	Tantalum, 35V
C348	011 04100 01	1k	Temperature Characteristic 'B', 63V
C349	011 05470 02	47k	Hi-k, 63V
C350	011 05100 02	10k	Hi-k, 63V
C351	012 04100 02	1k	feedthru
C352	012 04100 02	1k	feedthru
C353	010 02270 02	27E	N750, 500V (Beneath Printed Circuit Board)
C354	010 02680 02	68E	N750, 500V
C355	028 02600 01	5/60E	trimmer (Philips)
C401	020 08100 01	10M	Electrolytic, 50V
C402	011 05470 02	47k	Hi-k, 63V
C403	014 04100 02	1k	Hi-k, 63V miniature Philips, 2222 629 02102
C404	014 04100 02	1k	Hi-k, 63V miniature Philips, 2222 629 02102
C405	011 05470 02	47k	Hi-k, 63V
C406	011 05100 02	10k	Hi-k, 63V
C407	011 03220 01	220E	N750, 63V
C408	022 05220 01	22k	Mylar, 50V
C409	020 07330 01	3M3	Electrolytic, 50V
C410	020 07330 01	3M3	Electrolytic, 50V
C411	not allocated		
C412	not allocated		
C413	not allocated		
C414	014 04100 02	1k	Hi-k, 63V miniature Philips, 2222 629 02102
C415	022 04330 01	3k3	Mylar, 50V
C416	020 09220 01	220M	Electrolytic, 16V
C417	020 08470 01	47M	Electrolytic, 16V
C418	011 05100 02	10k	Hi-k, 63V
C419	014 04100 02	1k	Hi-k, 63V miniature Philips, 2222 629 02102
C420	025 06220 01	220k	Tantalum, 35V
C421	020 07330 01	3M3	Electrolytic, 35V
C422	not allocated		
C423	022 06100 01	100k	Mylar, 50V
C424	022 05100 01	10k	Mylar, 50V

TABLE 2B, CAPACITORS (Continued)

CCT. REF.	PART No.	VALUE	DESCRIPTION
C425	022 06100 01	100k	Mylar, 50V
C426	020 07330 01	3M3	Electrolytic, 50V
C427	020 07100 02	1M	Electrolytic, 50V
C428	011 02330 01	33E	N150, 63V
C429	022 05220 01	22k	Mylar, 50V
C430	021 09100 01	100M	Electrolytic, 25V, axial leads
C431	not allocated		
C432	not allocated		
C433	not allocated		
C434	011 04100 01	1k	Temperature Characteristic 'B', 63V
C435	014 04100 02	1k	Hi-k, 63V miniature Philips, 2222 629 02102
C436	011 03220 01	220E	N750, 63V
C437	022 04330 01	3k3	Mylar, 50V
C438	011 04100 01	1k	Temperature Characteristic 'B', 63V
C439	011 04100 01	1k	Temperature Characteristic 'B', 63V
C440	021 07470 01	4M7	Electrolytic, 50V, axial leads
C441	020 08100 03	10M	Electrolytic, 50V
C442	011 05100 02	10k	Hi-k, 63V
C443	011 03220 01	220E	N750, 63V
C444	011 05470 02	47k	Hi-k, 63V

TABLE 2C, DIODES *Applies from S/N's 206847

CCT. REF.	PART No.	DESCRIPTION	CCT. REF.	PART No.	DESCRIPTION
D101	not allocated		D119	001 00011 40	OA90
D102	not allocated		D201	008 00010 11	TIL209A (Table 1)
D103	not allocated		D202	001 00011 70	1N4001
D104	not allocated		D203	001 00015 18	BZX79/C10
D105	001 00011 40	OA90	D204	008 00010 15	
			*D301	001 00010 26	BA482
D106	001 00011 40	OA90	*D302	001 00010 26	BA482
D107	001 00012 00	1N4148	*D303	001 00010 26	BA482
D108	001 00012 00	1N4148	*D304	001 00010 26	BA482
*D109	001 00010 26	BA482	*D305	001 00010 26	BA482
*D110	001 00010 26	BA482	*D306	001 00010 26	BA482
*D111	001 00010 26	BA482	D307	not allocated	
*D112	001 00010 26	BA482	D308	not allocated	
*D113	001 00010 26	BA482	D309	not allocated	
*D114	001 00010 26	BA482	D310	001 00010 40	BZX61/C33
D115	not allocated		D401	001 00012 00	1N4148
D116	not allocated		D402	001 00012 00	1N4148
D117	not allocated		D403	001 00012 00	1N4148
D118	001 00011 40	OA90	D404	001 00012 00	1N4148

TABLE 2D, TRANSISTORS

CCT. REF.	PART No.	TYPE	CCT. REF.	PART No.	TYPE
+Q101	000 00031 71	3SK85/74	Q304	000 00022 30	2N4427
+Q102	000 00031 71	3SK85/74	Q305	000 00010 20	BAM20
+Q103	000 00031 71	3SK85/74	Q306	000 00030 60	2N5643
Q104	000 00020 11	BF494			
Q105	000 00020 11	BF494	Q401	000 00030 30	2N5496
Q106	000 00020 11	BF494	Q402	000 00030 30	2N5496
Q107	000 00011 10	BC548B	Q403	000 00011 10	BC548B
Q108	000 00011 10	BC548B	Q404	000 00011 10	BC548B
Q109	000 00020 11	BF494	Q405	000 00011 10	BC548B
Q110	000 00020 35	BF324	Q406	000 00011 10	BC548B
Q111	000 00011 30	BC557B	Q407	000 00011 10	BC548B
Q112	000 00011 20	BC549C	Q408	000 00011 30	BC557B
Q113	000 00011 10	BC548B	Q409	000 00011 10	BC548B
Q114	000 00011 10	BC548B	Q410	000 00011 10	BC548B
Q115	000 00011 10	BC548B	Q411	000 00011 30	BC557B
Q201	000 00010 66	BC337			
Q301	000 00020 11	BF494			
Q302	000 00020 35	BF324			
Q303	000 00031 90	MPSH11			

+ denotes 3SK40/45 (IPN 000 00031 70) no longer available.

TABLE 2E, COILS (Tait Part)

CCT. REF.	PART No.	TYPE	CCT. REF.	PART No.	TYPE
L101	051 00004 50	No. 450	L301	050 00016 15	No. 615
L102	051 00004 51	No. 451	L302	050 00016 15	No. 615
L103	051 00004 50	No. 450	L303	050 00016 15	No. 615
L104	051 00004 50	No. 450	L304	051 00003 74	No. 374
L105	050 00016 25	No. 625	L305	051 00004 50	No. 450
L106	050 00016 26	No. 626	L306	051 00004 50	No. 450
L107	050 00016 15	No. 615	L307	051 00004 50	No. 450
L108	050 00016 15	No. 615	L308	051 00003 75	No. 375
L109	050 00016 15	No. 615	L309	051 00003 76	No. 376
L110	051 00003 73	No. 373	L310	051 00003 77	No. 377
L111	051 00004 50	No. 450	L311	051 00003 78	No. 378
L201	051 00003 81	No. 381	L312	051 00003 78	No. 378
L202	051 00003 82	No. 382	L313	051 00003 79	No. 379
L203	051 00003 82	No. 382	L314	051 00003 80	No. 380
L204	051 00003 83	No. 383	L401	050 00016 05	No. 605

TABLE 2F, INDUCTORS

CCT REF.	PART No.	DESCRIPTION
Z101	056 00010 06	Choke No. 6
Z201	065 00010 04	F8 Bead (Under P.C.B.)
Z202	065 00010 04	F8 Bead (Under P.C.B.)
Z203	065 00010 04	F8 Bead (Under P.C.B.)
Z204	065 00010 04	F8 Bead
Z301	056 00010 05	Choke No. 5
Z302	056 00010 04	Choke No. 4
Z303	065 00010 04	Choke F8 Bead (Under P.C.B.)
Z304	056 00021 01	Choke No. 101, 1.5µH
Z305	056 00010 15	Choke No. 15
Z306	065 00010 04	Choke F8 Bead (Top of P.C.B.)
Z307	056 00010 02	Choke No. 2
Z308	056 00010 15	Choke No. 15
Z309	065 00010 04	Choke F8 Bead (Top of P.C.B.)
Z310	056 00010 10	Choke No. 10
Z401	065 00010 04	Choke F8 Bead
Z402	056 00010 05	Choke No. 5
XF101	276 00010 04	Crystal Filter 25kHz Channel Spacing QMF107B, etc.
	276 00010 07	Crystal Filter 50kHz Channel Spacing Piezo 1560 etc.

TABLE 3, VEHICLE CRADLE T173U

CCT REF.	PART No.	DESCRIPTION
D1	001 00011 60	SR2607 Diode (or 001 00011 30 MR751)
C2	012 04100 02	1kpF Capacitor, NPO, 500V, Murata DD35
C3	012 04100 02	1kpF Capacitor, NPO, 500V, Murata DD35
C4	012 04100 02	1kpF Capacitor, NPO, 500V, Murata DD35
C5	012 04100 02	1kpF Capacitor, NPO, 500V, Murata DD35
C6	010 01560 01	5.6pF Capacitor, NPO, 500V, Murata DD35
-	206 00010 08	Coaxial Cable, URM76
-	240 00010 44	Plug, 16-way Amphenol 26 4100 16P
-	303 00230 05	Rear Cover, Drawing A2M 121
-	303 00300 07	Cradle Body, Drawing A2M 166
-	357 00010 20	Saddle 210/259, Pyrotenax
-	360 00010 02	Grommet 5/16" Plastic

ILLUSTRATED PARTS BREAKDOWN

TABLE 4, HASH FILTER T104 (Part of T173U)

CCT REF.	PART No.	DESCRIPTION
C1	021 19100 01	1000µF Electrolytic Capacitor, 16V, Axial Leads
L1	056 00010 08	Choke No. 8
L2	056 00010 08	Choke No. 8
-	225 00010 02	T104 P.C. Board, complete with M3 Hank-Bushes

TABLE 5, MECHANICAL PARTS ATTACHED TO PCB

QTY/ SET	PART No.	DESCRIPTION
1	237 00010 27	Relay, plug-in, long stud, 12V
1	237 00020 03	Relay, Skt 4P, Zettler 141-A1
1	237 00020 11	Earth Clip, Zettler 140-2
1	237 00020 14	Retaining Clip, Zettler 141-1
2	362 00010 05	Mica insulator, DF103B
2	362 00010 13	Bush insulator, DF137A

INSTALLATION

1. VEHICLE INSTALLATION OF THE T373

Mount the Vehicle Cradle Type T173U in any convenient position in the Vehicle. Three recessed holes in the top of the Cradle accept the self-tapping screws provided.

Connect the Auto Cable from the Cradle to the Battery circuit, including the 'in-line' fuse-holder in the 'live' lead. The fuse rating is 5 Amperes. Because the Cradle is isolated to D.C., both leads must be connected. Ensure that the RED lead goes to Battery positive. For noise suppression purposes, it is desirable that both leads are taken directly to the battery.

Mount the Speaker Enclosure by its bracket in any convenient location. Connect the 2/7/0.2mm plastic lead from the Cradle to the two-pin parallel socket provided, and plug the Speaker in.

The aerial coaxial lead should be cut to a multiple of one half-wave in length, at the operating frequency. The length of one half-wavelength of coaxial cable is given by:

$$\text{Co-ax. } \tfrac{1}{2} \text{ wavelength in cm} = \frac{10{,}007}{\text{frequency in MHz}}$$

Cut the $\frac{1}{4}$-wavelength Vehicle aerial rod to the correct length for the frequency in use. The sum of rod length and base height can be obtained from:

$$\tfrac{1}{4} \text{ wavelength Aerial in cm} = \frac{7124}{\text{frequency in MHz}}$$

For the Tait Fixed (Non Tip-Down) aerial, deduct 2.6cm from the length obtained from the formula to allow for the height of the aerial base.

Mount the Vehicle Aerial in its desired location (see Para. 4).

The T373 should be correctly tuned on the bench, and this tuning should not be disturbed during installation.

Plug the T373 into the Cradle and secure it by means of the two thumb-screws, one on each side of the Cradle at the front of the set.

After the installation of the set is completed, transmitter operation can be checked by calling someone on the channel, or by checking the radiated power by means of a Field Strength Meter.

2. AIRCRAFT INSTALLATION

Aircraft installation of the T373 must be carried out by an authorized Aircraft Engineer. Installation is straightforward. A 5 Ampere circuit breaker or fuse should be inserted in series with the 12 Volt D.C. supply. The auto-cable provided with the T173U Cradle should be replaced with Aircraft Approved cable, and the Cradle should be mounted to the Aircraft with machine screws and self-locking nuts. (For reference, see top of Page 1202.)

INSTALLATION

For detailed information, see AC43.13-2, U.S.A. Federal Aviation Regulations, Acceptable Methods, Techniques & Practices, Chapter 2, Radio Installations.

3. FIXED (BASE-STATION) INSTALLATION OF THE T373

The Base Station T373 plugs into either the T286/AM (T158A now obsolete) Power Supply or, if 230 or 115 Volt A.C. mains are not available, the D.C. Plinth Type T286/AM/12 (Type 178 now obsolete). The T286/AM or the obsolete T158A Power Supplies also serve as a mounting plinth for the T373.

The T373 may be local or remote controlled as desired. For remote control, the Tait T223/02 (T223 now obsolete) Remote Control Unit and the TA-085 (T188/1 now obsolete) Line Matching Unit may be used. These units are described in separate manuals.

After arranging a suitable location for the equipment and its aerial, the coaxial cable should be cut to the correct length for the frequency in use. See Paragraph 1, Page 1201.

The T373 should be tuned as described in the Chapter on TESTING, then installed in the desired location.

Any suitable type of aerial, giving low-angle radiation, may be used. The Skirted Dipole, available from Tait Electronics, is simple and easy to install.

Information on mounting the Skirted Dipole is given in Tait Technical Information Leaflet Number TI-30.

4. MOUNTING FIXED (NON TIP-DOWN) V.H.F. AERIALS

STEP 1: Drill mounting holes.

STEP 2: Thread co-ax. from Vehicle Cradle up through drilled hole.

STEP 3: Strip outer insulation of co-ax. for approximately 5cm.

STEP 4: Fan out co-ax. braiding and trim it to fit under the brass mounting-base insert.

STEP 5: Mount brass mounting-base insert, clamping fanned-out braid between brass mounting-base insert and mounting surface.

STEP 6: Strip insulation off centre conductor to within approximately 3mm of brass mounting-base insert.

STEP 7: Screw on aerial mounting base.

Check to ensure that the cavity under the insulated aerial mounting base is completely sealed by the rubber gasket. Entry of moisture into this cavity will produce corrosion problems around the brass mounting base insert.

It is advisable to use a suitable rubber lubricant to assist sealing. If using a rubber lubricant, take care not to overtighten the seal, as excess pressure will squeeze the rubber gasket out.

INSTALLATION

STEP 8: Solder centre conductor on to mounting base boss.

Make sure the soldering iron is adequate before commencing this step.

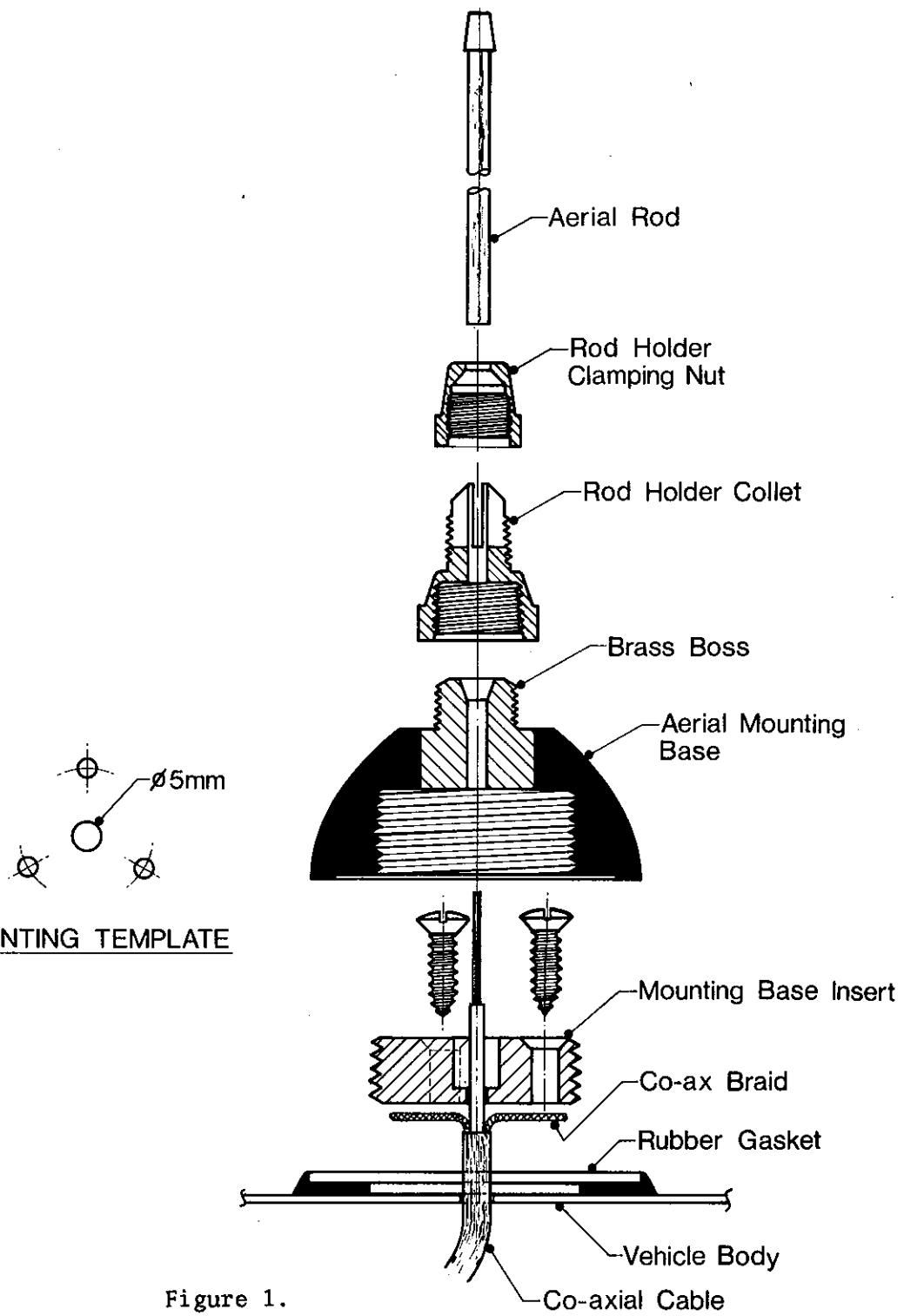
It is most important that the soldered joint between the cable centre conductor and the mounting-boss be perfect. If this joint is poorly made, faulty aerial operation is certain to occur after a short period, due to seepage of moisture down the joint into the base.

STEP 9: Screw rod-holder collet tightly on to mounting base boss.

STEP 10: Screw on rod-holder clamping nut and adjust until the aerial rod is tightly clamped.

(See Figure 1 on Page 1204.)

INSTALLATION



MOUNTING TEMPLATE

Figure 1.

METHOD OF MOUNTING FIXED V.H.F AERIALS