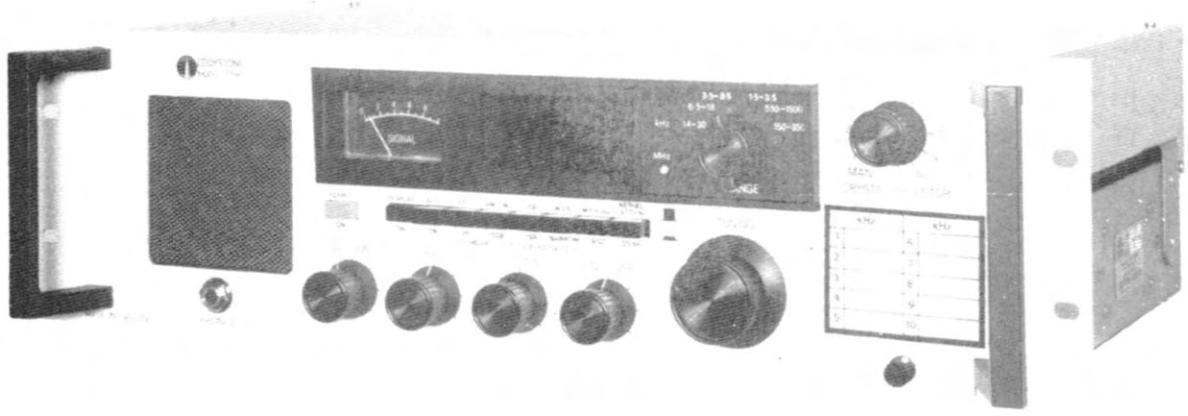
Eddystone

AM/SSB/CW

General Purpose Communication

Receiver

MODEL 1590



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AMENDMENT RECORD

Amend No.	Pages subject to change	Amended by	Date
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The Manufacturer reserves the right to modify the content of this publication as necessary to accommodate modifications, design improvements etc. Relevant Amendment Sheets will be incorporated at date of issue.

Contents List

1590 Receiver

Amendment Number 1

Page 2 of Section 3 should read as follows:

Audio Output

2.5 watts maximum into 4Ω. 1 watt at 3% distortion.
10mW into 600Ω preset level. 10mW with headset.

Audio Response

Within 6dB, 300Hz to 3.5kHz.

June, 1983.

SECTION 1

Introduction

General Description

The Eddystone Model 1590 is a low cost, fully solid state AM/SSB/CW general purpose communication receiver, with a choice of free tune or ten preset crystal controlled channels.

The 1590 utilises advanced techniques and components of the type normally found in professional communication receiver equipment. Added features include such facilities as unambiguous digital readout display of the tuned frequency, LED array indicator for the display of the selected range band, wide frequency range coverage of long, medium and four short-wave bands, plus a ten channel front panel switched crystal facility, an 'S' meter for peaking-in on weak reception signals, BFO and Product Detector for CW and SSB reception.

The receiver is compact, lightweight and elegantly styled in the modern trend. Provision is made for side tone and external muting and densitising inputs from an associated transmitter. Power for the receiver can either be derived from the AC Mains Supply (100V-125V and 200V-260V 40Hz-60Hz) or from an external 12V DC supply of negative earthed polarity.

Guarantee

All Model 1590 Series receivers are suitable for continuous use under arduous operating conditions and should require very little routine maintenance over long periods of operation. With the exception of the semi-conductors, all components are guaranteed by the Manufacturer for a period of one year from the date of purchase. The semi-conductors are all covered by a separate guarantee.

Servicing

Spares for user servicing can be supplied and helpful advice will be freely given when required. Any enquiries relating to service matters should be directed to the "Sales and Service Department" at our usual address.

Should major servicing become necessary, the receiver can, by prior arrangement, be returned to the Manufacturer for attention. Extreme care should be taken to ensure that the equipment is well protected against possible damage during transit.

General Data Summary

Frequency Coverage.
150kHz - 350kHz and 580kHz - 30MHz in six ranges.

Frequency Ranges

Range 1	14MHz	-	30MHz
Range 2	8.5MHz	-	18MHz
Range 3	3.5MHz	-	8.5MHz
Range 4	1.5MHz	-	3.5MHz
Range 5	580kHz	-	1500kHz
Range 6	150kHz	-	350kHz

Intermediate Frequency

455kHz

Reception Modes

A1A and A2A telegraphy
A3E telephony and R3E, J3E with upper and lower sideband use in SSB mode
F1A frequency shift keying

Display Resolution

1kHz

Aerial Input

Nominal 50Ω-75Ω on all ranges. BNC connector, Aerial Attenuator and Desensitising Relay.

Power Supplies

DC - External 12V: Consumption 500mA at 1W output
150mA quiescent.
With display illuminated, the above consumption figures are increased by approximately 250mA.

AC - 100V-125V and 200V-260V(40Hz-60Hz.)
Consumption 20VA approximately.

Dimensions

Rack Mounting Style

Height	:	133mm	Width	:	483mm
Intrusion into rack	:	330mm	Weight	:	10Kg

Cabinet version to special order.

Other Facilities

Sidetone Input)	
Line Output)	
External Speaker)	15 Pin 'D' Style Connector
Muting Relay)	
IF AGC Line Output)	
De-Sense Input)	
+12V DC Output	
AFC providing efficient	control of AM signals
BFO	Range $\pm$3kHz nominal
Headset	Low/Medium Impedance

SECTION 2

Installation

Accessory Kit

1	Mains Connector And Lead	D4815
1	6-Way Socket Assembly*	D5499
1	Fuse 2A (20mm)	10577P
1	Fuse 0.5A Anti-Surge (200V-260V) or	9714P
(1	Fuse 1A Anti-Surge (100V-125V)	9816P
1	15 Way Socket with cover (Linked Pin 5-9)	D5727

*NOTE: Socket assembly supplied ready linked for AC operation.

Operating Voltages

AC - 100V-125V and 200V-260V (40Hz-60Hz)
DC - 12V from external battery (negative earth).

Mains Transformer Voltage Adjustment

The receiver is normally set for operation on 200V-260V when despatched. For operation on 100V-125V supply it is necessary to set the slide switch on the power unit accordingly. This is accessible after removing the receiver covers.

NOTE: For AC operation, the DC SUPPLY CONNECTOR must be fitted, wired with links as shown in Figure 2.1 (a). (*SEE NOTE ABOVE).

Fuse Complement

AC : 1 at 0.5A Anti-Surge for 200V-260V
1 at 1A Anti-Surge for 100V-125V

DC : 3 at 2A (Two off also in circuit for AC operation).

Installation For AC Working

The DC SUPPLY connector is used for both AC and DC operation : for AC operation, the connector should be linked as shown in figure 2.1 (a). The connector is normally supplied with the relevant links fitted. The connector is supplied as part of the accessory kit.

Check that the mains transformer voltage adjustment switch is set for the appropriate supply voltage range (refer to paragraph headed Mains Transformer Voltage Adjustment).

Connect AC SUPPLY CONNECTOR to AC INPUT socket on the rear panel of the receiver, and connect the mains lead to the local supply.

LINE	=	BROWN
NEUTRAL	=	BLUE
EARTH	=	GREEN/YELLOW

NOTE: AC MAINS CONNECTOR

The following information is issued in compliance with British Standard BS415:-

If the colours of the wires in the mains lead of this apparatus do not correspond with the coloured markings identifying the terminals in your mains connector (or plug) proceed as follows:-

1 The GREEN/YELLOW wire must be connected to the plug terminal marked "E" or " ⏚ " or coloured GREEN/YELLOW.

2 The BLUE wire must be connected to the plug terminal marked "N" or coloured either BLUE or BLACK.

3 The BROWN wire must be connected to the plug terminal marked "L" or coloured either BROWN or RED.

4 If a 13amp (BS1363) FUSED PLUG is used to facilitate connection to the supply outlet, the plug MUST be protected by a 3 AMP FUSE unless expressly declared otherwise. If another type of plug is used, a fuse of the appropriate rating must be fitted either in the plug, or the adaptor, OR AT THE DISTRIBUTION BOARD.

It is essential to note that in the switching arrangement illustrated below, the switch is to be externally mounted and is NOT an integral part of the Receiver circuitry.

Note also that the switch is NOT supplied as part of the accessory kit.

Figure 2.1 (c) shows the 3 pole 2 way switch set to the AC working position and the 6 way DC supply connector viewed on the wiring side.

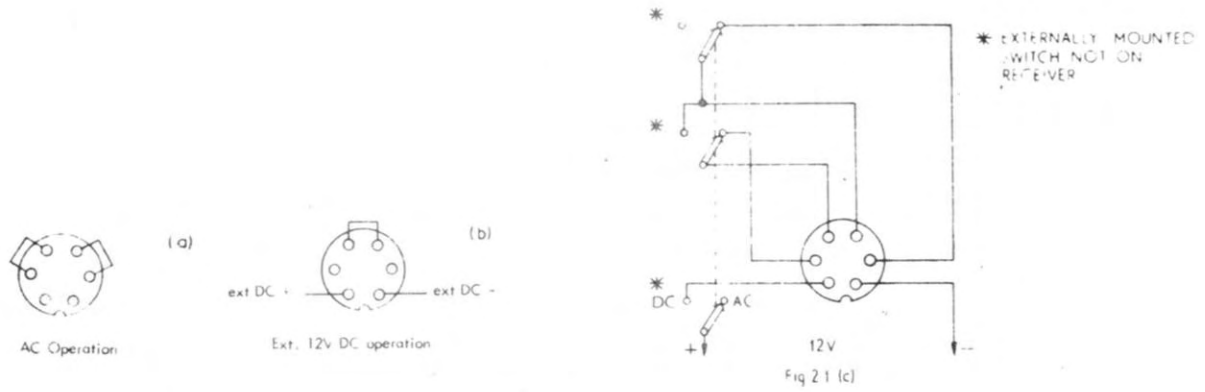


Figure 2.1 DC Supply Connector viewed on wiring side.

Earth

It may be desirable for safety reasons or to improve reception to use a local earth in addition to the earth normally provided with the AC mains supply. In this case, connection may be made to the terminal marked " ⏚ "on the rear panel of the receiver.

Headset

Connect to PHONES socket on panel. This output is primarily intended for use with telephone headsets of 8Ω-600Ω impedance. The internal loudspeaker circuits are interrupted when the headset is connected. Eddystone headsets LP3242 and LP3301 are recommended for use with Model 1590 receivers.

The external loudspeaker may also be interrupted by the headset if desired. See wiring details under ancillaries.

Installation For DC Working

For maximum working time from a fully charged battery the following points should be observed:-

a) Keep the AF GAIN control adjusted to the lowest level possible.
b) Set the DISPLAY switch to the OFF position, when the receiver is not being tuned.

For permanent DC operation, wire the DC SUPPLY connector as shown in Figure 2.1 (b).

NOTE: The external battery must either be fully floating or have negative earth.

Alternatively, the wiring can be arranged as shown in Figure 2.1 (c) to obviate the need for changing the connector wiring when switching between external battery and mains. The switch is to be mounted externally and is NOT an integral part of the receiver. Note also that the switch is NOT supplied as part of the accessory kit.

Aerial Input

The input impedance is nominally 50Ω/75Ω on all ranges. Diode protection against high induced aerial voltages is incorporated. The input is via a BNC socket.

Ancillaries Connector

Pin 1	Audio return for internal and external speakers (switched via Phones Socket).
Pin 2	Receiver internal +12V supply.
Pin 3	Sidetone input.
Pin 4	Earth for Pin 3.
Pin 5	Internal speaker.
Pin 6	Line output.
Pin 7	Line output tap.
Pin 8	Line output.
Pin 9	External speaker.
Pin 10	Muting relay +ve.
Pin 11	Muting relay -ve.
Pin 12	Earth for Pin 13.
Pin 13	IF AGC line output.
Pin 14	De-sense input.
Pin 15	Earth.

Loudspeakers

The loudspeakers can be arranged either to mute when the headphone plug is inserted or to remain operational as required. The options and connection arrangements are shown in Table 2.2.

600Ω Line

Connect to Pins 6 and 8. The transformer centre tap is Pin 7 which may be earthed to Pin 15 if required. The output is adjustable by means of a pre-set control through the rear panel; the rated output is +10dBm.

Sidetone Input

An audio signal from an associated transmitter may be connected to Pin 3 (earth to Pin 4). The signal required for full output (AF Gain control at Maximum) is approximately 5V into 300kΩ.

Muting

The receiver can be muted by connecting an earth to Pin 11 (in which case link Pin 10 to Pin 2) or by connecting an external +12V supply to Pin 10 (in which case link Pin 11 to Pin 15).

De-sense Input

The receiver may be de-sensitised (IF Gain reduced to minimum) by connecting a supply greater than +6V (up to +15V) to Pin 14. This facility may be wired in conjunction with the aerial muting circuit if desired.

Earths

All earths on the ancillaries connector are ultimately connected to the chassis and hence to the supply earth. No additional earthing is required.

Both speakers operate	Link 5-9, Link 1-15,	Ext. LS to 9 and 15
Internal mutes, external operates	Link 5-9,	Ext. LS to 9 and 15
Internal operates, external mutes	Not Available	
Both speakers mute	Link 5-9,	Ext. LS to 9 and 1
External speaker only, muting		Ext. LS to 9 and 1
External speaker only, non-muting		Ext. LS to 9 and 15
Internal speaker only, muting	Link 5-9	
Internal speaker only, non-muting	Link 5-9, Link 1-15	

Table 2-2 Loudspeaker Muting

Crystal Control Facility

Up to ten crystals may be fitted behind the removable cover on the front panel. Fundamental crystals must be used and the crystal frequency is calculated as follows:-

CRYSTAL FREQUENCY = SIGNAL FREQUENCY $^{+}$ 455kHz

Crystal Specification

AT Cut. Fundamental Mode.
$\pm$10ppm initial tolerance at 25^{o}C.
$\pm$5ppm frequency variation over 0^{o}C to +40^{o}C.
To tune with 15pf.
Frequencies below 20MHz Style HC-6/U or HC-36/U (Cold Weld).
above 20MHz Style HC-25/U or HC-42/U (Cold Weld).
Above 20MHz, fit with adapter PCB assembly. LP3712/10
Crystal frequency = Carrier frequency +455kHz.

SECTION 3

Operation And Technical Data Summary

TYPICAL PERFORMANCE

(Not to be interpreted as a test specification)

Sensitivity

AM - 3μV for 12dB S/N with 30% modulation in narrow bandwidth
CW - 1μV for 12dB S/N in narrow bandwidth
SSB - 1μV for 12dB S/N
FSK - 1μV for 12dB S/N in narrow bandwidth

Selectivity

AM Narrow - 4kHz at -6dB; 12kHz at -40dB
AM Wide - 10kHz at -6dB; 28kHz at -40dB
SSB - -6dB 300Hz and 2.5kHz
-60dB 5kHz maximum bandwidth

Image Rejection

AM - >70dB at 2MHz;>25dB at 22MHz

IF Breakthrough

AM - > -70dB at 2MHz

AGC Performance on AM

Less than 8dB change in output for 80dB increase in input.

BFO Range

±3kHz

Audio Output

2.5watts maximum into 4Ω; 1watt at 1% distortion.
10mW into 600Ω preset level. 10mW with headset.

Audio Response

Within 6dB 100Hz - 12kHz

Radiation : Less than 400pW (typically 20pW)

Blocking

With a wanted signal 60dB above 1μV, an unwanted carrier 20kHz off-tune must exceed 100dB above 1μV to affect the output by 3dB.

Cross Modulation

With a wanted carrier 60dB above 1μV, an unwanted signal 20kHz off-tune must exceed 85dB above 1μV to produce an output greater than 30dB below standard output.

Intermodulation

The level of third-order intermodulation products produced by two signals of equal strength lying at carrier + 1kHz and carrier +1.6kHz will be at least 30dB below the level of either signal. With a wanted signal 30dB above 1μV producing standard output, two unwanted signals removed by greater than 30kHz and adjusted to produce a third order intermodulation product at the wanted frequency, must each be of a level 80dB above 1μV to produce standard output.

SWITCH FUNCTIONS

Range Switch	-	Selects the required frequency range.
Crystal Selector	-	Selects one of ten crystals for crystal control of local oscillator or allows full manual control.
Supply	-	Pushbutton switch controls the AC and DC supplies to the receiver
Display	-	Pushbutton switch which, when pressed, permanently illuminates the digital display
AFC	-	Pushbutton switch which, when pressed, brings the automatic frequency control circuits into operation. When receiving a weak signal adjacent to a strong local transmission the switch should be set to OFF. Suitable for AM signals only.
BFO	-	Pushbutton switch which brings the Beat Frequency/Carrier Insertion Oscillator into circuit, when SSB/CW/AM switch is set to CW/AM.
SSB/CW/AM	-	Pushbutton switch which sets the receiver for AM or CW operation in conjunction with the BFO controls or for SSB reception in conjunction with the built in upper or lower sideband filters. When set for SSB reception the BFO/CIO is automatically brought into operation.
USB/LSB	-	Pushbutton switch which allows selection of upper or lower sideband filters when the receiver is adjusted for SSB reception.
Filter Wide/Narrow	-	Two interlocked pushbutton switches which select the appropriate IF filter for CW/AM use.
AGC	-	Pushbutton switch which brings the automatic gain control into operation on the IF amplifier stages.
Attenuator/-20dB	-	Pushbutton switch which attenuates the aerial input by 0dB or -20dB.

CONTROL FUNCTIONS

Tuning	-	In conjunction with the range switch, enables the tuned frequency to be set.
Fine Tune	-	Gives fine control of the tune frequency set by the Tuning control.
AF Gain	-	Adjusts the level of the audio output of the internal loudspeaker, the external loudspeaker and headphones. Does not affect the LINE OUTPUT level.

BFO	-	Adjusts the pitch of the BFO/CIO on CW and acts as a clarifier control for SSB reception.
IF Gain	-	Adjusts the gain of the Intermediate Frequency amplifier, provided the AGC switch is not pressed.
Line Level	-	Adjusts the level of the 600Ω line output channel independently from the main audio output of the receiver.

Carrier Level Meter

The panel meter gives an indication of relative signal strength only.

TUNING THE RECEIVER WITH CRYSTAL CONTROL OF THE LOCAL OSCILLATOR

Since the digital display shows the oscillator fundamental frequency minus the intermediate frequency of 455kHz care is necessary when setting up the receiver with crystal control.

Reference to the crystal cover will show the tune frequency applicable to each crystal channel. With CRYSTAL SELECTOR set to MANUAL adjust receiver in the normal way so that the wanted frequency is displayed, and then set the crystal selector to the required channel.

NOTE: The RF circuits must be tuned to the wanted frequency each time a different crystal is selected to obtain maximum sensitivity.

SECTION 4

Circuit Description

Tunable Stages - AM

The aerial input signal is applied to aerial socket 1SK1. Input protection is provided by 11D1 to 11D8. When the aerial is connected to1SK1 the input signal is fed to the primary windings of the tuned circuits 3L1-3L6 and 3C11 selected by RANGE switch 3S1a. Switch wafer 3S1b connects the tuned secondaries to the RF amplifier 3TR1 via 3C12.

A 20dB attenuator is connected between aerial input and the primary windings and controlled by relays operated from a front panel switch. A further relay operated from an external DC voltage via the ancillaries socket mutes the receiver by earthing the aerial input.

The RF Amplifier 3TR1 is a dual gate MOSFET and the signal input is applied to gate 1. Delayed AGC is permanently connected to gate 2. A feed from the source is taken to one input of the metering circuit. The amplified signal at the drain of the RF Amplifier is then taken via 3L7-3L12, tuned by 3C30 to gate 1 of the dual gate MOSFET used in the Mixer position 3TR2. Range selection is by 3S1c and 3S1d. The IF output at 455kHz is taken from the mixer via 3L19 and 3L20 to the IF stages.

Local oscillator injection applied to gate 2 of 3TR2 is derived from 3TR3 with isolation provided by the FET source follower 3TR4. The oscillator stage 3TR3 employs a single-gate MOSFET using the tuned gate configuration with the feedback winding in the drain circuit. The tuned circuits 3L13-3L18 selected by 3S1e and 3S1f and tuned by 3C57 are tracked to tune 455kHz above the signal frequency. A second output from the source follower 3TR4 is taken via an emitter follower 3TR5 to provide the drive for the digital frequency counter.

The oscillator circuits 3L13-3L18 in addition to being tuned by 3C57 are also tuned by variable capacitance diodes 3D4 and 3D5. Vari-cap diode 3D4 is used to provide a fine tuning facility in conjunction with the FINE TUNE control 1RV2. Normally with this type of circuit the fine tune control has considerably more effect at the HF end of each range than at the LF end. To overcome this, the potentiometer 1RV1 which forms part of the three section tuning gang capacitor, is connected into the earthy end of the FINE TUNE control and maintains the control range reasonably constant over each range. 'Vari-cap' diode 3D5 is used to provide automatic frequency control (AFC) of the oscillator when the receiver is tuned to a wanted signal. This facility is particularly useful when using the receiver for short-wave reception when it assists in maintaining the tune frequency even when drifting is present. The operation of the AFC circuit is described later, under the appropriate heading.

Crystal Control Unit

As an alternative to manual tuning of the local oscillator a crystal oscillator unit is provided giving a choice of ten preset channels. 9TR1 forms the oscillator with 9TR2 providing ALC and 9TR3 is an emitter follower output stage which feeds 3TR2 and 3TR5 on main board.

IF Amplifier Stages - AM (3IC1, 3IC2 and 3TR6)

The 455kHz IF signal from the mixer 3TR2 is fed to Pin 13 of 3IC2. After amplification and gain control, the signal is taken from Pin 15 of 3IC2 to the IF filter circuit.

AGC derived within 3IC2 is applied to Pin 16 and manual gain control, when selected, grounds this pin and applies a variable DC voltage to Pin 14 of 3IC2 in place of the fixed bias normally present.

3IC1 is a DC controlled 4 pole switch which selects one of two filters 3FL1 and 3FL2, taking the output from Pin 15 of 3IC2 through the selected filter to an emitter follower 3TR6 and thence to Pin 3 of 3IC2. The signal at this point is also taken to the AM AFC circuits 3TR8, 3TR9 and 3IC3.

The output of Pin 15 3IC2 also feeds switch 10IC1 which selects the SSB lower or upper sideband filters 10FL1 and 10FL2 respectively, the output of which is returned via switch 10IC2 to 3TR6.

After further amplification by 3IC2 the AM signal is demodulated by a synchronous demodulator also contained in 3IC2 and the AF output taken from Pin 7. An unmodulated IF signal is taken from Pin 8 to drive the BFO/Carrier Insertion Oscillator - Product Detector 3IC6 via emitter follower 3TR7.

AFC-AM (3TR8, 3TR9, 3IC3 and 3IC5)

The 455kHz IF signal from 3IC2 Pin 3 is taken to transistor amplifier 3TR8. This stage has a ceramic resonator in its emitter circuit to limit the frequency response and the amplified signal is taken from the collector to 3IC3 Pin 13. After further amplification the signal is taken from 3IC5 Pin 15 through emitter follower 3TR9 and fed back into 3IC3 Pin 3. 3L22 is the detector coil which is tuned to 455kHz by 3C103 and the AFC output is taken from 3IC3 Pin 7. From here, it is taken to 3IC5 Pin 6. The amplified DC from 3IC5 Pin 5 is then taken via 'AFC' switch 4S2 to 'vari-cap' diode 3D5 and is used to control the frequency of oscillator 3TR3. When the 'AFC' switch 4S2 is set to 'OFF' a reference voltage adjusted by 3RV1 is applied to 3D5.

BFO/Carrier Insertion Oscillator - Product Detector

The IF signal from emitter follower 3TR7 is taken to Pin 2 of the dual balanced demodulator 3IC6 used as a Product Detector. BFO/C1O injection is at Pins 4 and 5 of 3IC6 from the drain of 3TR12. This stage uses a J FET operating in the tuned gate configuration with the feedback winding in the drain circuit. Tuning is by means of 'vari-cap' diode 3D15 controlled by a DC voltage derived from 2IC4 via the BFO switch 4S3 and BFO pitch control 1RV4. AF output is taken from Pins 13 and 14 of 3IC6.

Metering - AM (3IC5)

The DC appearing at 3IC2 Pin 7 is taken to 3IC5 Pin 13. After amplification, the DC is taken from 3IC5 Pin 9 and is connected into 3IC5 Pin 2.

The non-inverted input at 3IC5 Pin 3 is derived from the source of the AM RF amplifier 3TR1. The output at 3IC5 Pin 4 is taken to one side of the meter 1ME1. The other side of meter 1ME1 is returned to a DC point determined by 3RV4.

Audio Switching (2IC3)

2IC1 is a quad analog switch used to feed one of two audio inputs via the AF gain control to the AF amplifier circuit, and line output curcuit.

The AM detector output from 3IC2 Pin 7 is applied to Pin 1 and is switched through to the following stages when Pin 13 is taken to +12V by 'BFO' switch 4S3 being set to 'OFF'.

The product detector output from 3IC6 Pins 13 and 14 is applied to Pin 4 and is switched through to the following stages when Pin 5 is taken to +12V by 'BFO' switch 4S3 being set to 'ON', or SSB switch 4S4 being set to 'ON'.

The output of the switch at Pins 2 and 3 is commoned and the output is taken via 2C6 to the AF gain control.

2IC2 is used as the main audio amplifier and its output serves the internal LS the external LS and the headphone socket.

A separate LINE level control parallel with the AF gain control feeds the line output amplifier IC3.

Power Unit

The AC mains supply from 1PL1 is routed via the AC fuse 1FS1, supply switch 1S1 and voltage selector 5S1 to the mains transformer 5T1. This has two primary windings which may be connected in series or parallel to cover the 240V or 110V ranges.

Two secondary windings each drive a bridge rectifier circuit and 12V regulator 5D1-5D4/5IC1 protected by 5FS1 and 5D5-5D8/5IC2 protected by 5FS2 respectively. 5IC2 provides +12V for the counter display unit only while 5IC1 provides +12V for the remainder of the receiver.

For operation from an external DC supply, both DC lines are connected together and the external supply from 1PL2 is fed via 1S2 and DC fuse 5FS3. Reverse polarity protection is provided by 5D9.

Frequency Display Module

Introduction

This module contains all the digital circuitry used to measure and display the tuned frequency of the receiver. The oscillator frequency is measured by a gated counter which is pre-loaded so that the resulting count is equal to the tune frequency. This is displayed on five seven

segment LED displays giving a resolution of 1kHz on MF/HF ranges. The module also contains a 3.2768MHz crystal which is used by the counter as a reference.

Pre-Scaler/Input Amplifiers

The HF oscillator signal is routed via amplifier 6TR2 and emitter follower 6TR3 to the pre-scaler 6IC4 input Pins 2 and 6. The pre-scaler 6IC4 contains an STTL decade divider for the HF oscillator signal. Frequencies below 1500kHz are not pre-scaled and are routed straight through the device. The pre-scaler 6IC4 contains circuitry to select any of the previous two modes and these are controlled in conjunction with the frequency display 6IC5 by the receiver range switch 3S1h. The pre-scaler 6IC4 output is 5V peak to peak square wave which is 'pulled up' by 2k2 6R19 as the device is essentially TTL. The pre-scaling ratios are:-

1)	HF	-	10
2)	Below 1500kHz	-	1

Range Selection

Data from the receiver range switch puts the Frequency Display Module into one of two modes. These are:-

HF	1.9MHz-32MHz	) Input frequency
MF	Less than 1.9MHz	)

The above modes are enabled by grounding either 6SKA9 or 6SKA10 for, HF or MF. The ground is available within the module at 6SKA7. Frequency indication is by LED 6D17 (kHz) and 6D18 (MHz) which are supplied via the 12V line and enabled during the appropriate mode. Diodes 6D19 and 6D20 form a negative logic 2 input OR gate, via a positive logic 2 input AND gate, in order to select MHz LED 6D18 in HF modes. Diodes 6D3, 6D4, 6D5 and 6D6 couple the range switch via 6SKA7, 6SKA8, 6SKA9 and 6SKA10 to the S1 and S2 inputs on pre-scaler 6IC4 and to the S1 and S2 inputs on the frequency display 6IC5. These inputs are 'pulled up' within 6IC4 and 6IC5 and diodes 6D3, 6D4, 6D5 and 6D6 perform logic level conversion from 12V to 5V.

The operation of S1 and S2 in 6IC4 and 6IC5 is set out in Table 4-1.

MODE	S1	S2	DIVISION RATIO	DISPLAY RANGE
MF	1	1	1/1	0 ---- 3999
HF	1	0	1/10	0.000 ---- 39.999

1 = 5V
0 = 0V

TABLE 4-1

This display range shows the maximum and minimum that can be displayed by frequency display 6IC5 and not by the 1590 receiver itself. This illustrates the leading zero suppression on each range.

IF Offsets

Before the start of each counting period it is necessary to subtract a quantity numerically equal to the receiver IF so that the digital display shows tune frequency. The IF offset is handled by frequency display 6IC5 as follows, $\overline{IOS1}$ Pin 18 being selected for HF/MF modes. The IF offset diode matrix allows 6D7, 6D9, 6D11, 6D13 and 6D15 to sequentially program $\overline{IOS1}$ Pin 18 from the 10^4-10^0 digit select lines Pins 2-6 6IC5. 6D8, 6D10, 6D12, 6D14 and 6D16 sequentially program the IOS2 Pin 19. Table 4-2 shows the diode fitted for 455kHz offset.

RANGE	IF OFFSET	D7	D8	D9	D10	D11	D12	D13	D14	D15	D16
HF/MF	-455kHz	0	0	0	0	0	0	1	0	0	0

Diode = 1
No Diode = 0

TABLE 4-2

Digital Display System and Interface

Frequency readout is by a 5 digit common anode LED display. The display is time division multiplexed in a single frame mode being scanned from MSD-LSD. Segments A-G are driven by transistors 6TR5-6TR11 and digits 6DS5-6DS1 being driven by the 10^0-10^4 output, Pins 6-2 6IC5 via TR12-TR16. The 10^0-10^4 outputs, Pins 6-2 IC5, go low sequentially. The decimal point is multiplexed into LED display 6DS3 and 6DS4 via 6TR4, this being enabled by the internal logic of the frequency display 6IC5 and the mode selected.

Crystal Oscillator

Quartz crystal 6XL1, 6C32, 6C33 and 6C33a form an oscillator circuit with an inverter in 6IC5. The frequency 3.2768MHz is adjusted by 6C33 and 6C33a. In order to ensure correct operation at power up $\overline{AC}$, Pin 23 6IC5 is taken low momentarily by 6C34. This resets all counters in 6IC5.

SECTION 5

Maintenance

General

1590 receiver has been designed for maximum reliability and should require very little in the way of routine maintenance even when used continuously under arduous operating conditions. Any faults which may develop should be within the capabilities of properly trained technicians equipped with a reasonable range of test equipment.

This section of the Handbook gives guidance for simple operations such as changing fuses and indicator lights, and more detailed instructions on re-alignment etc. Also included is a comprehensive analysis of all circuit voltages for reference when carrying out fault finding. A full circuit diagram is bound at the rear. Spares for user-servicing can be supplied ex-stock, subject to availability and helpful advice will be freely given if required.

All sub-assemblies and modules are arranged so that they can be removed where necessary to give access to components which would otherwise be inaccessible. In most cases the procedure for removal is obvious from visual inspection. As a general rule, should it be necessary to unsolder any leads from modules or printed circuit boards, a careful note should be made of the wire colour or other coding and the point to which it is attached to facilitate correct reconnection.

WHEN WORKING ON THE RECEIVER, IT WILL BE NECESSARY FOR THE POWER TO BE CONNECTED. IT IS RECOMMENDED THAT THE RECEIVER IS FED FROM AN ISOLATED POWER SUPPLY AND THAT NORMAL PRECAUTIONS FOR SAFETY UNDER THESE CONDITIONS ARE OBSERVED.

Refer to Appendix A for standard instructions regarding Static Sensitive Devices and all general component handling at rear of book.

This receiver is constructed generally to METRIC dimensions. Any IMPERIAL screws used will be marked with a red dye.

If major servicing should become necessary, or the user considers a complete overhaul to be desirable, the receiver can be returned to the manufacturer for specialised attention. It can be sent either direct or via the local Eddystone Agent, care being taken to ensure that packing is adequate to prevent damage during transit. Prior arrangements should be made if the equipment is sent direct, all communications being directed to the 'Sales and Service Department' at our usual address. The Receiver Type and Serial Number should be quoted when writing.

AC Fuse Replacement

A fuse is provided in the Line connection to the AC supply. This is accessible through the rear panel of the receiver in the appropriately marked fuse holder. The fuse is rated at 0.5A for 200V-260V operation and at 1A for 100V-125V operation. The fuse is of the 'anti-surge' type.

Access To Receiver

Access to the receiver is gained by removal of top and bottom covers. The top cover is retained by ten 2.5mm screws and two 3mm screws.

The bottom cover is retained by ten 2.5mm screws.

DC Fuse Replacement

Three DC fuses are located on the Power Supply printed board. All fuses are of 2A rating. 5FS1 controls the DC supply to all sections of the receiver, with the exception of the Frequency Display Module which is controlled by 5FS2.

Both 5FS1 and 5FS2 are only operative when the receiver is running from an AC supply. 5FS3 controls all DC supplies when the receiver is operating from an external 12V DC supply.

Frequency Display Module

This module contains Static Sensitive Devices - please refer to Appendix A - Component Handling.

The Frequency Display Module is fixed by brackets to the drive plate and the mounting plate. Separate the drive plate bracket from the module (one M3 screw) and the bracket from the mounting plate (two M3 screws). Disconnect PLA and the HF/MF input, this now allows the module to be removed from the receiver. The box is of a sleeved chassis construction and after removing ten fixing screws the chassis may be slid out of the front of the box. A hole in the rear of the box assists this. The HF/MF input lead may be slid out of the U slots in the chassis and four M2.5 screws will release the PCB, the mounting pillars of which are retained in the board.

Component Replacement

Component replacement should only be attempted after extensive fault diagnosis and by persons familiar with PCB repair. In the event of 6IC4 or 6IC5 being replaced it is recommended that the component is cut out of the PCB pin by pin. This will permit the removal of individual pins with a solder pump. Work of this nature should be carried out in an anti-static area.

Removal Of SSB Filter PCB

The SSB filter board is fixed by four M3 screws into pillars on top of the main PCB.

It is also necessary to unsolder six leads to allow removal of the PCB. Careful note should be taken of the position of these leads to enable correct replacement.

Removal Of Audio Board

The audio PCB is retained to the lower side of the main PCB by plastic pillars. All leads are connected via 10 way and 20 way sockets 2SKA, 2SKB mounted on the PCB and free plugs 1PLA4 and 1PLA5.

Removal Of Aerial Attenuator/Muting PCB

The Aerial attenuator/muting PCB is attached to the inside of the RH side plate by four M2.5 mm screws. The leads to the PCB are long enough to allow work to be carried out. To completely remove the PCB from the receiver it is necessary to unsolder three leads and two co-axial cables. Take care to note the position of these leads to facilitate replacement.

Removal Of IF Output PCB

The IF Output PCB is located on the inside of the rear plate and is retained by four M3 screws through the rear plate into pillars screwed to the PCB. The leads to the PCB are sufficiently long enough to allow work to be carried out. For complete removal of the PCB from the receiver it is necessary to unsolder one lead, two screened cables and two co-axial cables. Note the position of these leads to facilitate replacement.

Removal Of Front Panel

The knobs are of the collet-fixing type. Prising out the centre cap of the knob will reveal the fixing nut. Using a suitable box spanner (11mm with a maximum outside diameter of 14.5mm) turn the nut anti-clockwise whilst holding the body of the knob stationary. The phone socket is released by using a 13mm spanner.

A small tongue cut in the side of the phone jack aperture in the mounting plate allows the phone jack to be temporarily retained by replacing the fixing nut after removal of the front panel.

Removal of the eight M2.5 screws in the upper and lower edge of the mounting plate will now allow the front panel to be removed from the receiver.

Replacement Of Front Panel Components

Having removed the front panel, access is now gained to the potentiometers, meter, speaker, meter illumination board, supply switch and switch board assembly.

The speaker is retained by four M4 screws. The supply switch is retained by two M2.5 screws. To remove the switch board assembly it is necessary to remove three M3 screws holding the

assembly to the mounting plate and also to remove one M3 screw holding the board support bracket to the centre rail at the rear of the assembly. The board may now be removed after unplugging the 20 way connector.

The meter illumination board consists of 2-wire ended lamps attached to a small printed board.

Replacement Of Lever Switch

The DC lever switch 1S2 which is operated by a spring attached to the push-button of the supply switch is mounted on a bracket attached to the mounting plate, adjacent to the supply switch and may be released by removing two M3 screws.

Removal Of Range Indicator

The range indicator is mounted on the shaft of the range switch and may be removed by turning the range switch to give access to two M4 screws in the coupling hub immediately in front of the range switch clicker mechanism. It is only necessary to slacken the screws at the front panel end of the coupling hub which will then allow the shaft to be turned independently of the switch clicker mechanism. Rotate the shaft to give access to the fixing screw in the bush of the range indicator. This is an M4 grub screw and is released with a 2mm A/F allen key. The shaft may now be drawn forward, clear of the coupling hub, allowing the range indicator to be removed.

When refitting it is necessary to ensure the correct orientation of the range indicator with the switch clicker mechanism and the front panel marking.

During the above operation, it will be found helpful in rotating and withdrawing the shaft if the range knob is temporarily replaced on the shaft.

Re-Alignment

General

Close tolerance components are used in all tuned circuits throughout the receiver and realignment is not likely to be required unless coils and/or associated capacitors have been changed. Detailed instructions for re-aligning all pre-set circuits are given below on the assumption that the necessary adjustments will be carried out by skilled technicians with a sound knowledge of the basic procedures involved. An adequate range of test equipment must be available if the task is to be performed satisfactorily. Receivers may be returned to the manufacturer for re-alignment if this course of action is preferred.

Reference should be made to the paragraphs on Performance Testing which should be read in conjunction with the instructions which follow.

NOTE: ALL CORES AND TRIMMERS ARE SELF-LOCKING. SEALING COMPOUNDS SHOULD NOT BE USED.

Test Gear Required

AM Standard signal generator covering 150kHz to 31MHz with output matched to 50Ω/75Ω and 30% modulation at 1kHz. Able to be set accurately to 455.000kHz.

AF Standard signal generator covering 100Hz to 10kHz with low distortion. 600Ω output.
Power output meter matched to 4Ω, and 600Ω.
High impedance voltmeter to measure 40mV to 12V DC.
Oscilloscope to measure 1V DC.
Testmeter 20,000Ω/V.

AM IF Alignment

Connect AM generator, set to 455.000kHz with 30% mod. at 1kHz to the mixer (middle) section of the main tuning gang. Stop the local oscillator by shorting to earth the oscillator (front) section of the main tuning gang. Set controls as follows:-

Aerial Attenuator Switch	to	Off
Range Switch	to	Range 4 (1.5MHz-3.5MHz)
BFO	to	Off
Filter Switch	to	Narrow
Gain Switch	to	Manual
AM/CW - SSB Switch	to	AM/CW
IF Gain Control	to	Maximum clockwise
BFO Control	to	Mid-range
AF Gain Control		As required

Adjust 3/L19, 3/L20, 3/L21 for maximum output, reducing generator level as necessary to prevent overload. Repeat the adjustment until no further improvement is obtained.

BFO Alignment

With the controls set as for AM IF alignment above, remove the modulation from the generator. Set the BFO switch to ON. Adjust 3/L25 for zero beat.

RF AGC Alignment

Connect the high impedance voltmeter to Pin 3/90 and earth (+ve to earth). With conditions as for AM IF alignment above, set the generator level to +60dBμV. Adjust 3/L23 and 3/L24 for maximum reading on the voltmeter. Repeat the adjustment until no further improvement is obtained.

AM AFC Alignment

Connect the oscilloscope, set to 1V/cm DC coupled to Pin 3/19 and earth. With conditions as for AM IF alignment above, set the AFC switch to ON and turn the IF GAIN

control to minimum. Adjust the oscilloscope so that the trace is centralised on the Y-axis. Note this point as reference.

Set the AFC switch to OFF and adjust 3RV1 to give the reference voltage.

Set the AFC switch to ON and the IF GAIN control to maximum. Tune 3/L22 to give the reference voltage. Check that adjustment of 3/L22 will swing the voltage either side of the reference.

Remove the short circuit on the oscillator section of the main tuning gang.

AM Oscillator Circuits Alignment

Set the FINE TUNE control to mid-range. Adjust the cores and trimmers shown in Table 5-1 at the LF end (maximum anti-clockwise rotation of the TUNING control) and HF end (maximum clockwise rotation of the TUNING control) respectively for each range to give the frequencies shown on the counter/display unit.

Range	Core	Frequency	Trimmer	Frequency
1	3/L13	13.7MHz	3/C40	30.3MHz
2	3/L14	8.4MHz	3/C41	18.2MHz
3	3/L15	3.45MHz	3/C42	8.6MHz
4	3/L16	1.45MHz	3/C43	3.55MHz
5	3/L17	545 kHz	3/C44	1510 kHz
6	3/L18	145 kHz	3/C45	355 kHz

TABLE 5-1

Alignment Of AM RF And Mixer Circuits

Set the controls as follows:

Aerial Attenuator Switch	to	Off
AFC Switch	to	Off
BFO Switch	to	Off
Filter Switch	to	Narrow
Gain Switch	to	Manual
AM/CW - SSB Switch	to	AM/CW

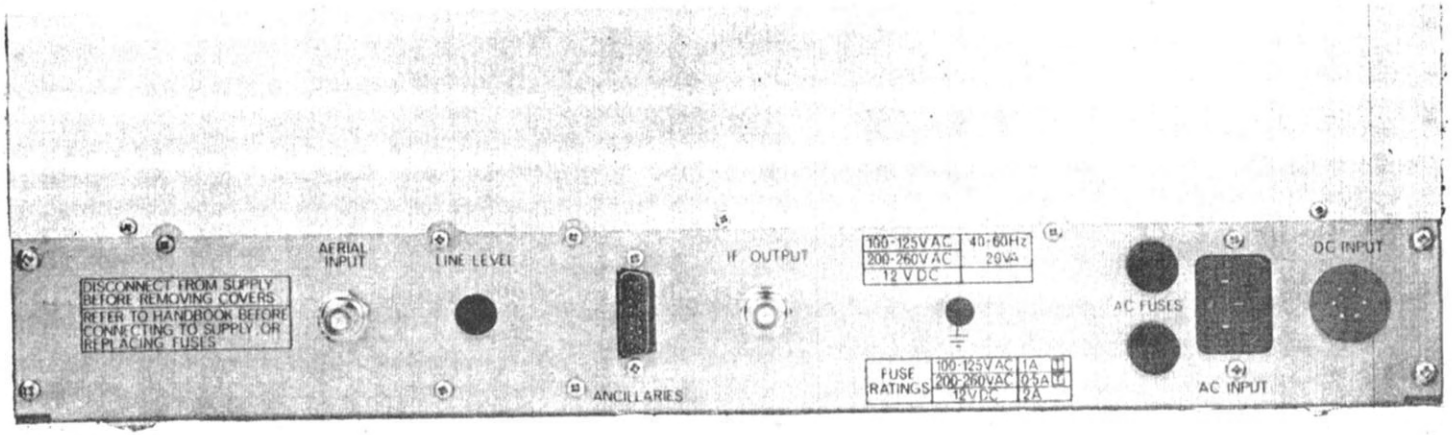
IF Gain Control	to	Maximum clockwise
BFO Control	to	Mid-range
AF Gain Control		As required

Connect the AM generator, modulated 30% at 1kHz to aerial socket SK1. Adjust the cores and trimmers shown in Table 5-2 at the LF and HF ends respectively for each range at the frequencies given, for maximum AF output. Reduce the signal level as necessary to prevent overloading.

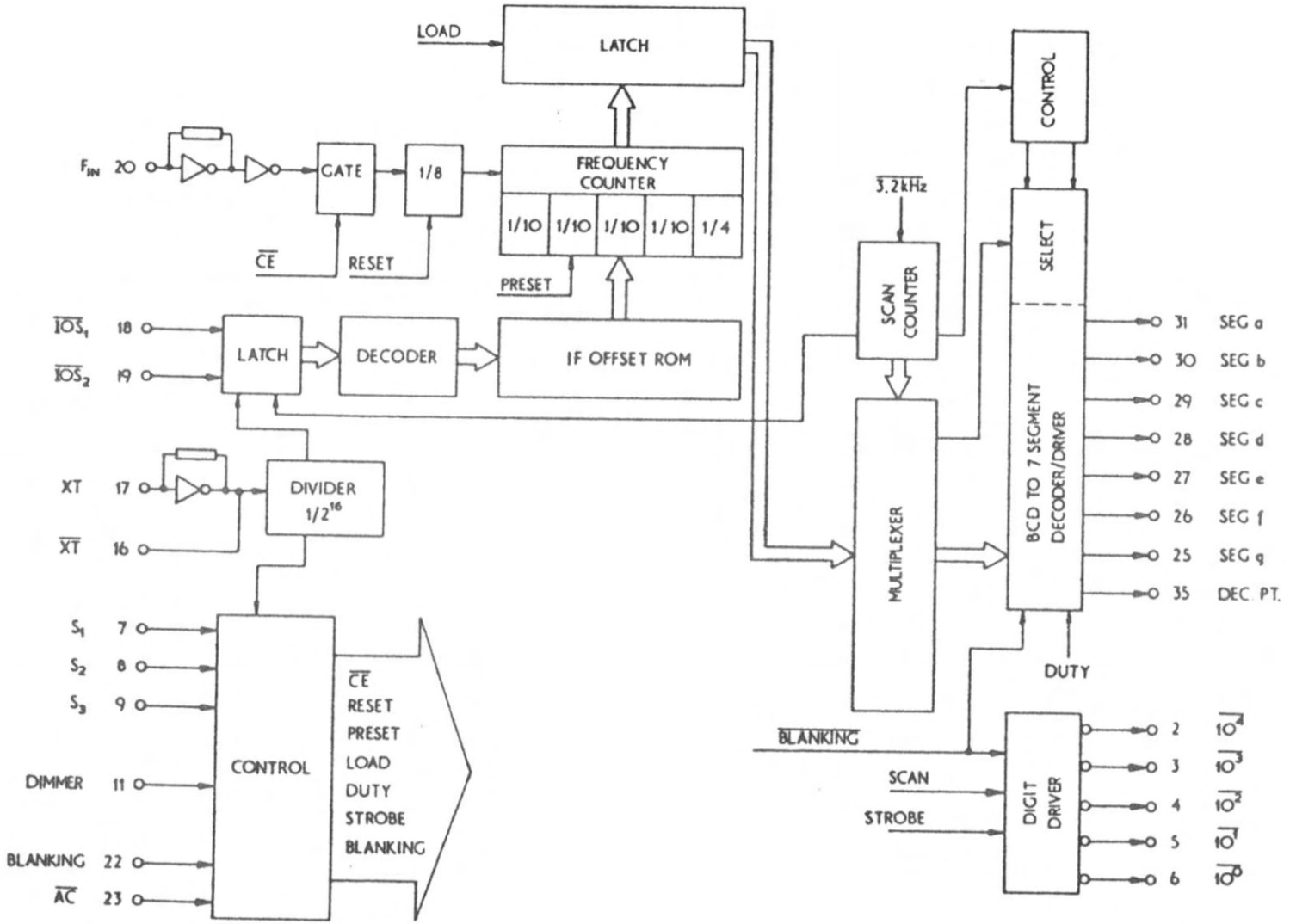
Range	Frequency	Core		Frequency	Core	
		RF	Mixer		RF	Mixer
1	17.0MHz	3/L1	3/L 7	27.0MHz	3/C2	3/C18
2	8.7MHz	3/L2	3/L 8	17.5MHz	3/C3	3/C19
3	3.7MHz	3/L3	3/L 9	8.3MHz	3/C4	3/C20
4	1.6MHz	3/L4	3/L10	3.3MHz	3/C5	3/C21
5	570 kHz	3/L5	3/L11	1450 kHz	3/C6	3/C22
6	155 kHz	3/L6	3/L12	330 kHz	3/C7	3/C23

TABLE 5-2

RECEIVER FRONT VIEW

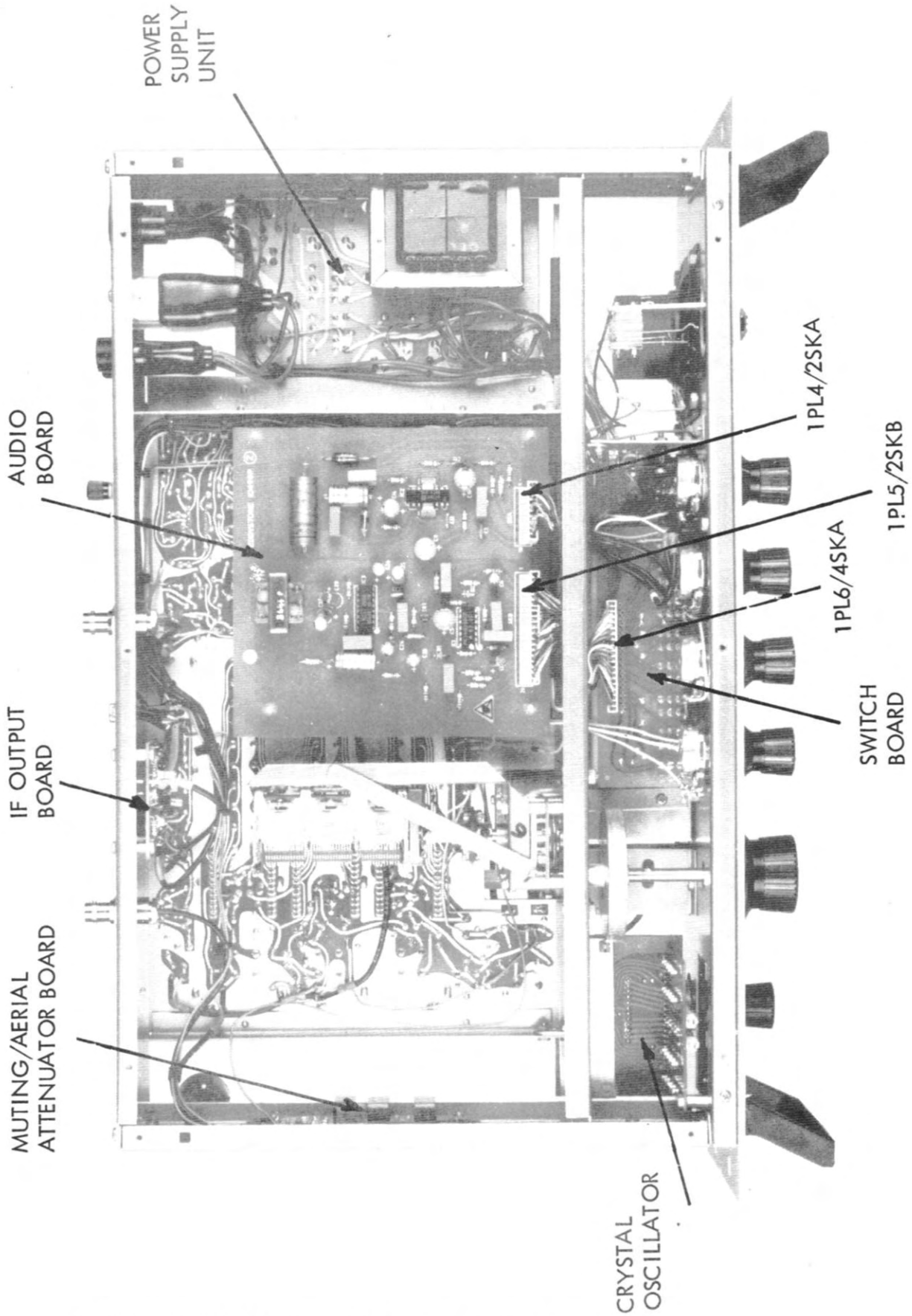


REAR PANEL VIEW

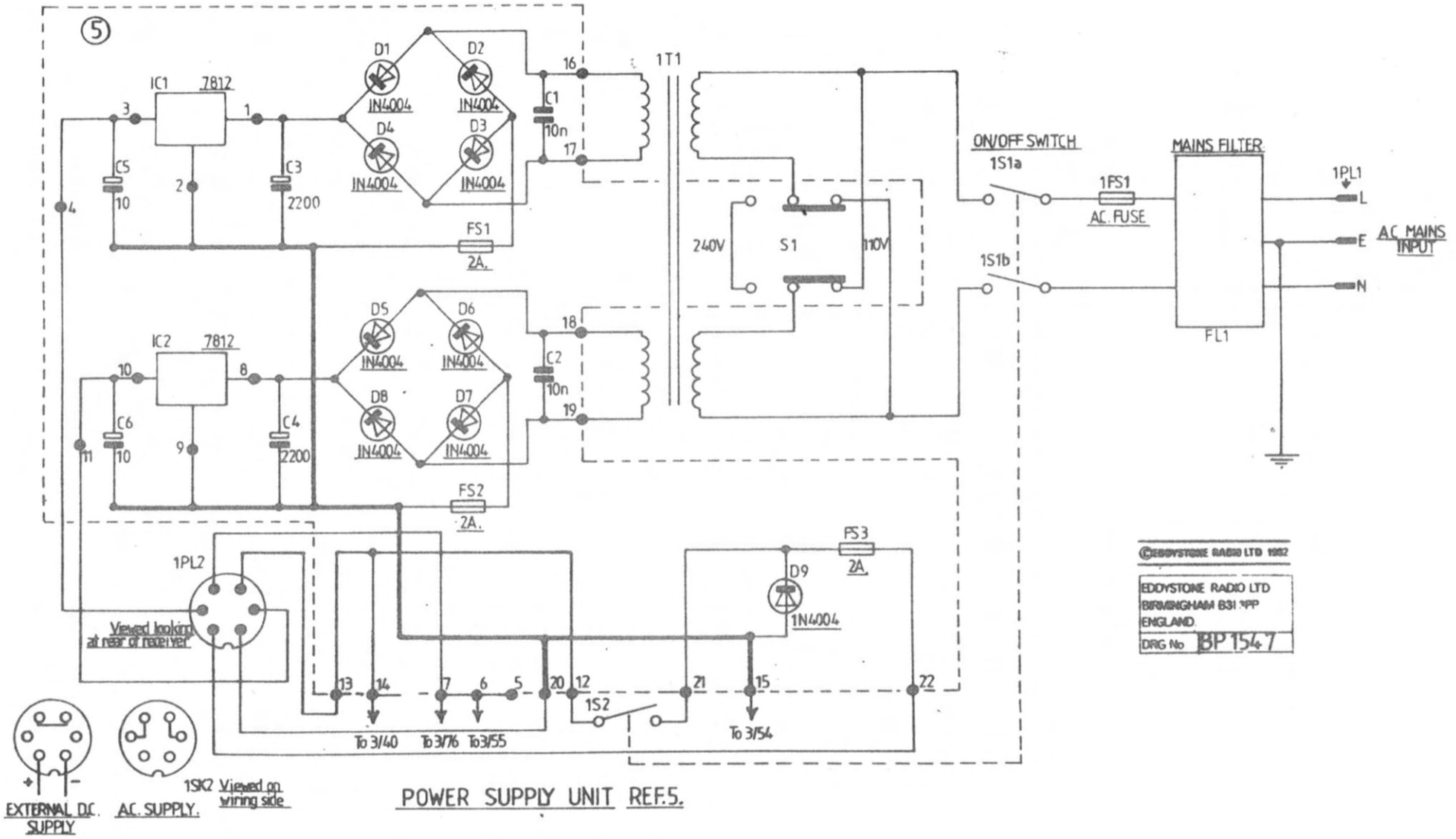


BLOCK SCHEMATIC - FREQUENCY DISPLAY CIRCUIT 6IC5

[USE IN CONJUNCTION WITH CIRCUIT DIAGRAM - FREQUENCY DISPLAY MODULE BP1464]



BOTTOM INTERNAL VIEW


5
IC1 7812
IC2 7812
D1 IN4004
D2 IN4004
D3 IN4004
D4 IN4004
D5 IN4004
D6 IN4004
D7 IN4004
D8 IN4004
D9 1N4004
C1 10n
C2 10n
C3 2200
C4 2200
C5 10
C6 10
FS1 2A.
FS2 2A.
FS3 2A.
1T1
240V
S1
110V
ON/OFF SWITCH
1S1a
1S1b
1FS1
AC. FUSE
MAINS FILTER
FL1
1PL1
L
E
N
AC MAINS INPUT
1PL2
Viewed looking at rear of receiver
1SK2 Viewed on wiring side
EXTERNAL DC. SUPPLY
AC. SUPPLY.
To 3/40
To 3/76
To 3/55
To 3/54
1S2
POWER SUPPLY UNIT REF.5.
©EDDYSTONE RADIO LTD 1982
EDDYSTONE RADIO LTD
BIRMINGHAM B31 3PP
ENGLAND.
DRG No BP1547

Set RANGE switch to range 4 (1.5MHz to 3.5MHz) and set controls as follows:-

Gain	:	Switch to Manual
IF Gain	:	Control to Minimum
AF Gain	:	Control to Maximum
BFO	:	Control to Mid-Range

With the BFO switch set to OFF, connect audio generator set to 1kHz to Pins 3/68 and 3/69 (earth). Adjust generator level to give 0.5watt output at the power meter and check that the input level is of the order of 5mV.

With the BFO switch set to ON, connect audio generator set to 1kHz to Pins 3/74 and 3/73 (earth). Adjust generator level to give 0.5watt output at the power meter and check that the input level is of the order of 5mV.

AM IF Sensitivity Check

Overall Check

Connect the AM generator, set to 455kHz, modulated 30% at 1kHz to the mixer (middle) section of the main tuning gang. Stop the local oscillator by shorting to earth the oscillator (front) section of the main tuning gang.

RANGE switch to range 4 (1.5MHz to 3.5MHz) and set controls as follows:-

AM/CW - SSB	:	Switch to AM/CW
BFO	:	Switch to Off
Filter	:	Switch to Narrow
Gain	:	Switch to Manual
IF Gain	:	Control to Maximum
BFO	:	Control to Mid-Range
AF Gain	:	Control as required

Adjust generator level to give 15dB signal + noise/noise ratio at the AF output and check that the input level is of the order of 5µV.

Stage Checks

Connect the generator to Pins 3/59 and 3/58 (earth) and adjust the generator level to give 15dB signal + noise/noise ratio at the AF output. Check that the input level is of the order of 18µV.

Repeat the test with the generator connected to Pin 3 on 3/IC2 (via a 100n blocking capacitor) and earth. Check that the input level required for 15dB signal + noise/noise ratio is of the order of 130µV.

APPENDIX A

Component Handling

Lead bending. Component leads need in general, to be bent to enable the device to be fitted. The bend should be made so that the radius of the bend is not less than the diameter of the lead (or the thickness of the lead in the case of flat leads), and the lead should be supported between the body of the component and the bend. The bend should be at least 2mm (approx 1/16") from the component.

Soldering. A soldering iron having a bit temperature not exceeding 245°C may be used. The soldered joint should be completed within 5 seconds. Overheating may damage the component.

Heat Sinks. Certain devices which are required to dissipate power are fitted with heat sinks. When replacing these devices, the heat sinking arrangement should be carefully reproduced, eg thermal conducting compound may be used. If an insulating washer has been used, this should be replaced and thermal conducting compound applied to both sides.

MOS Devices. These have an exceptionally high input resistance and they are susceptible to damage when exposed to high static electrical charges. To avoid possible damage the following procedures should be followed:

1. Devices should be stored and transported in contact with a conductive material.
2. Soldering iron, bench surface, tools etc., should all be earthed. The operator should be earthed using a 1MΩ series resistor.
3. The equipment should be switched off when devices or boards are inserted or removed.
4. Nylon clothing should not be worn.

Anti-static precautions take on added importance in dry weather (relative humidity less than 30%).

IC5 WAVE FORMS

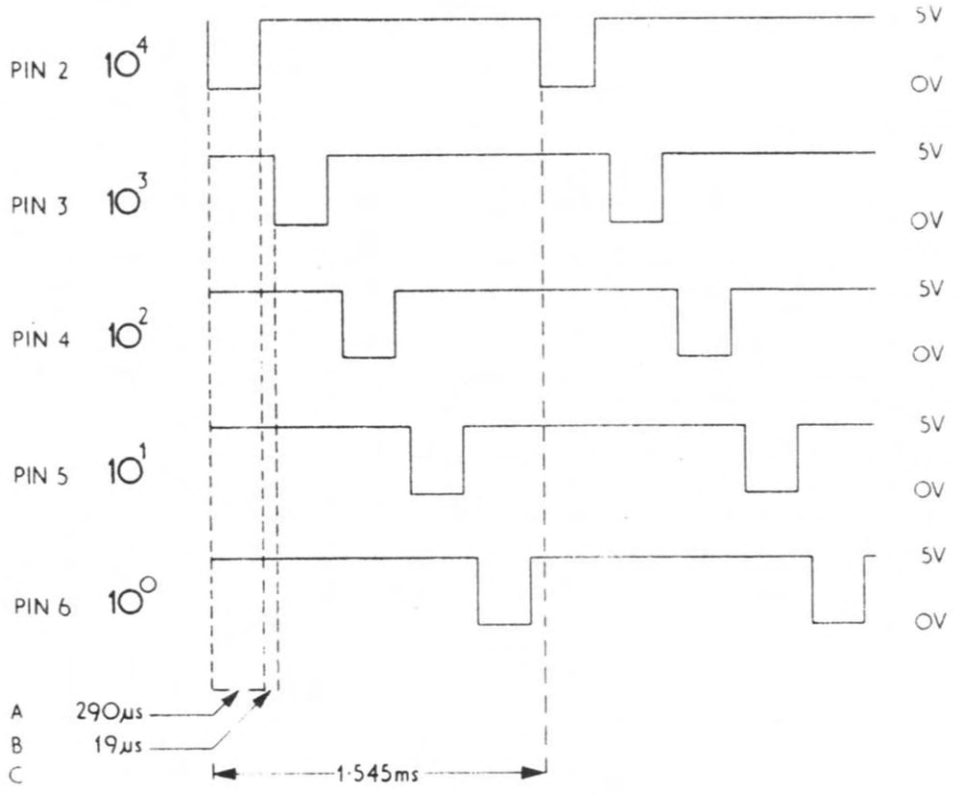
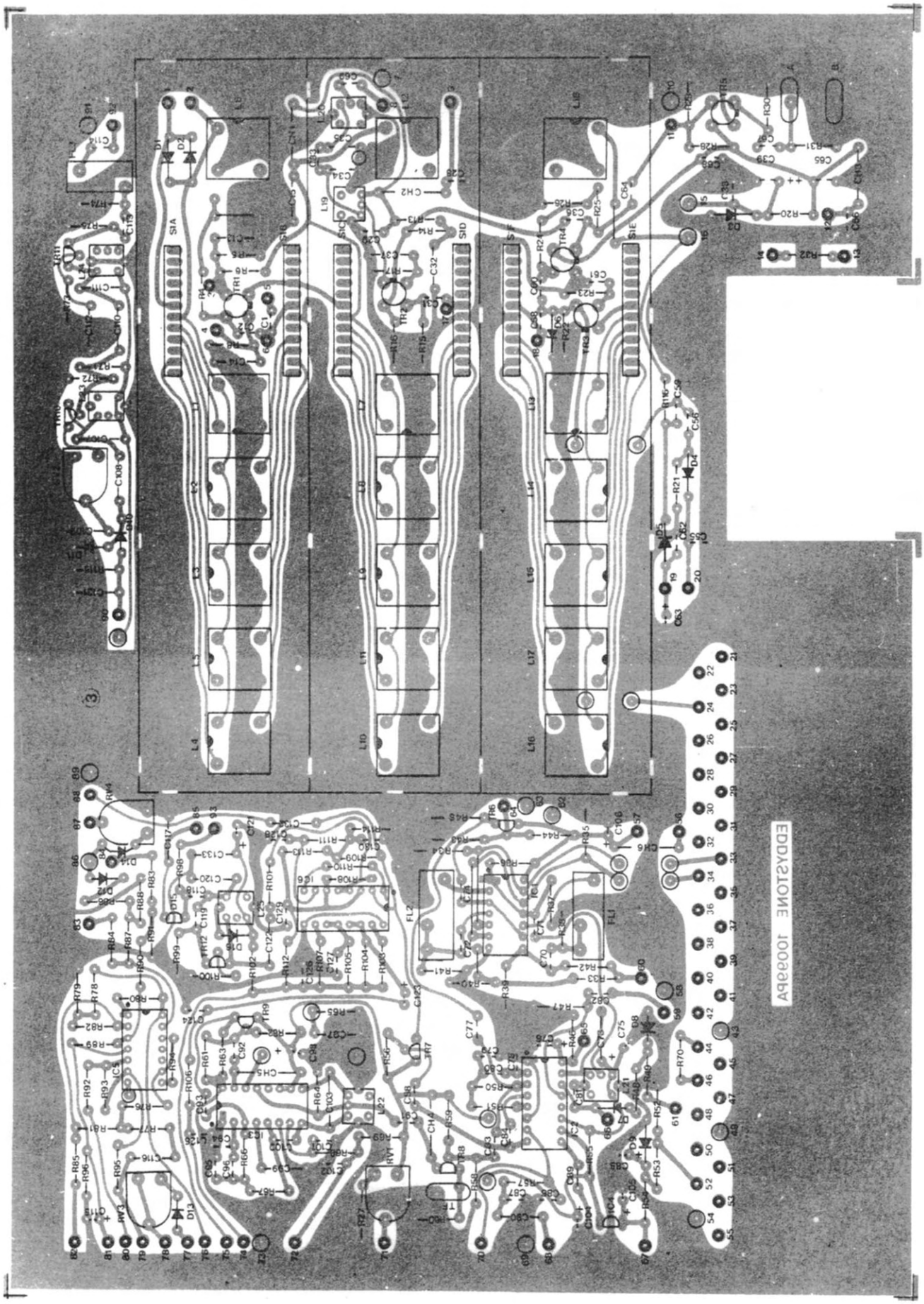


DIAGRAM ONE

Voltage Analysis

In the event of the receiver failing to operate normally first check all voltages at the board terminations listed in Table 5-5. If these voltages check out normally, refer to Tables 5-6 and 5-7 and carry out a detailed check of the individual semi-conductor voltages. The readings given in the Tables were taken with a standard 20,000Ω/V testmeter such as AVO Model 8. 10% variation should be allowed to cover the usual zener/semi-conductor spreads. All voltages are taken relative to earth.

Voltage readings should be taken with the SUPPLY switch set to ON and the essential receiver controls adjusted as shown in the relevant column in the Tables.



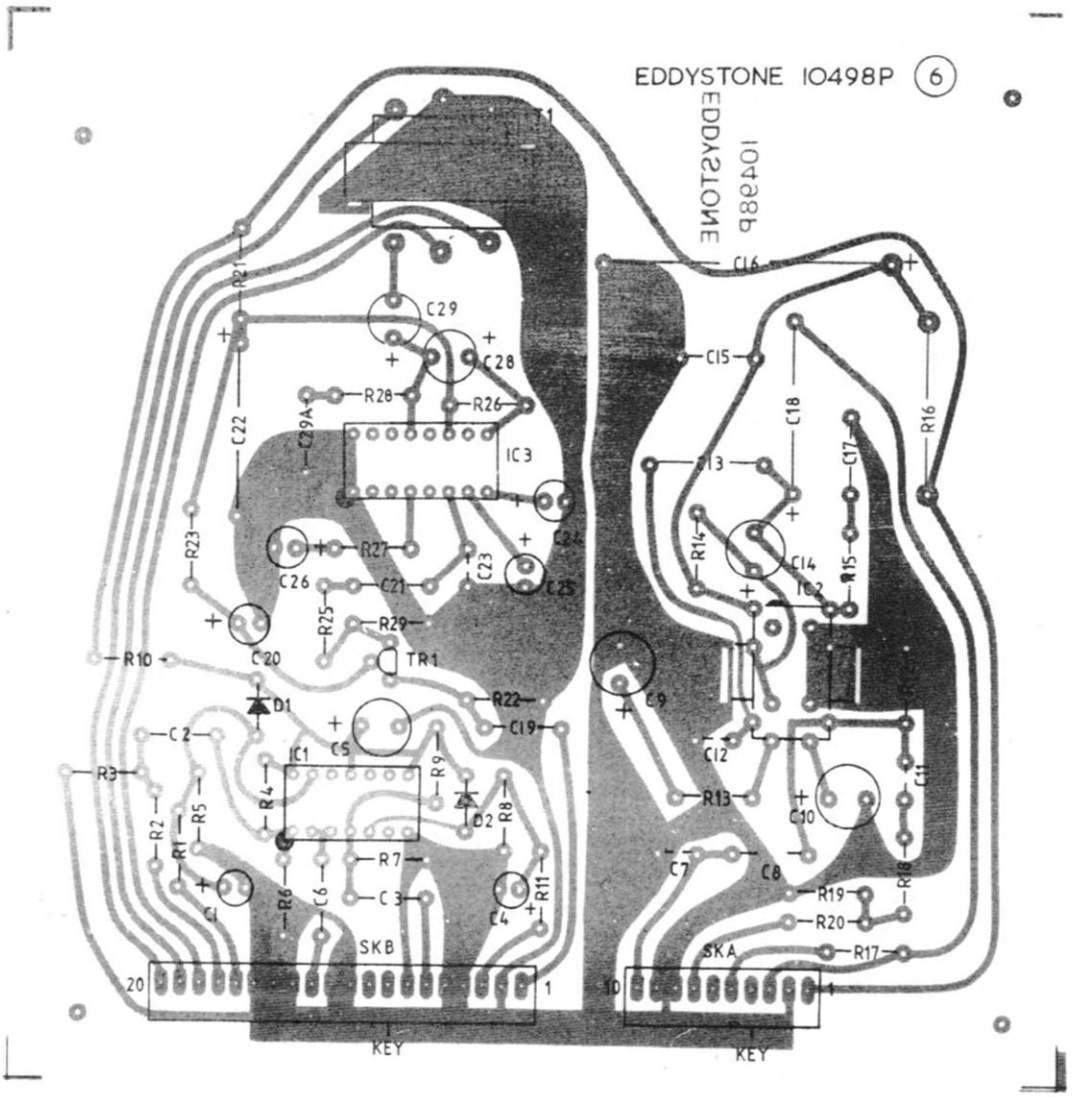
Main Board

Module/Board	Ref. No.	Pin	Voltage	Remarks
AM continued..		9) 12) 56) 86)	+12V	
		33	+12V	
		34	+12V	
Frequency Display	6	5	+12V	

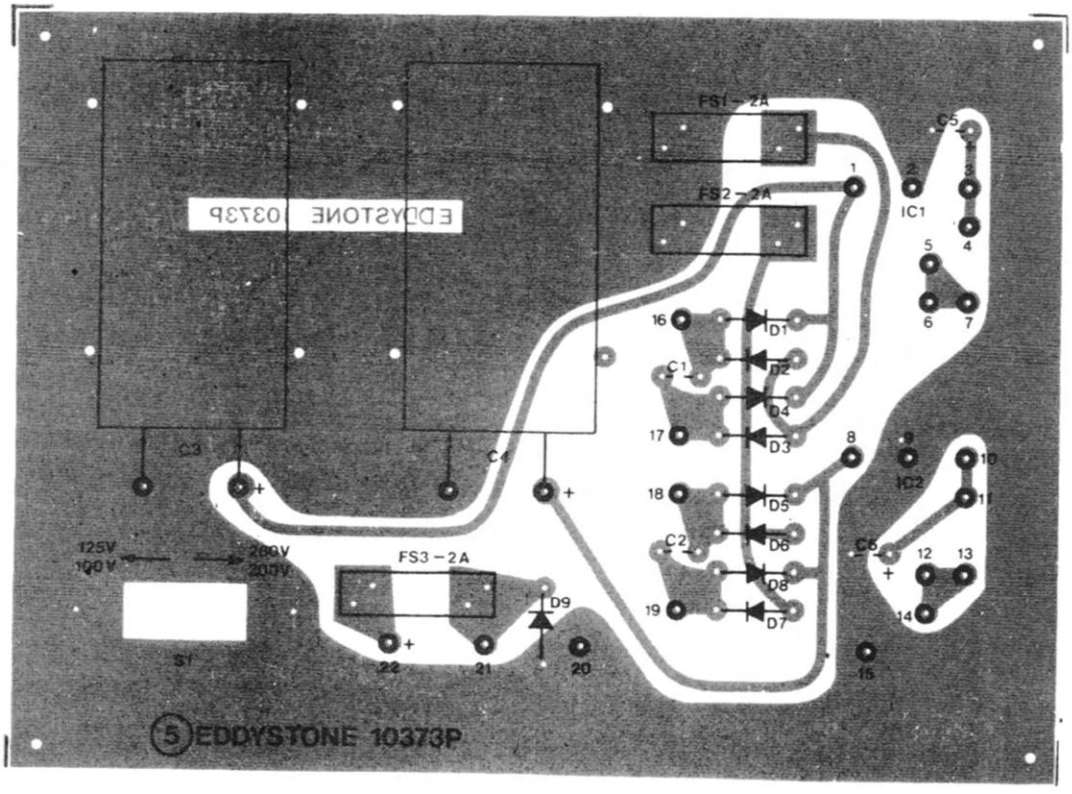
TABLE 5-5 Board Supplies

Notes on Table 5-5

1 Voltage present for all control and switch settings.



Audio Board

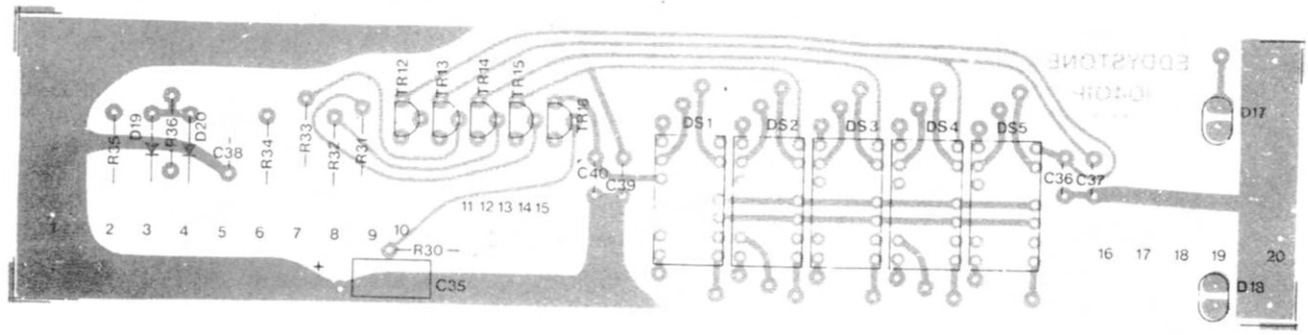


Power Unit Board

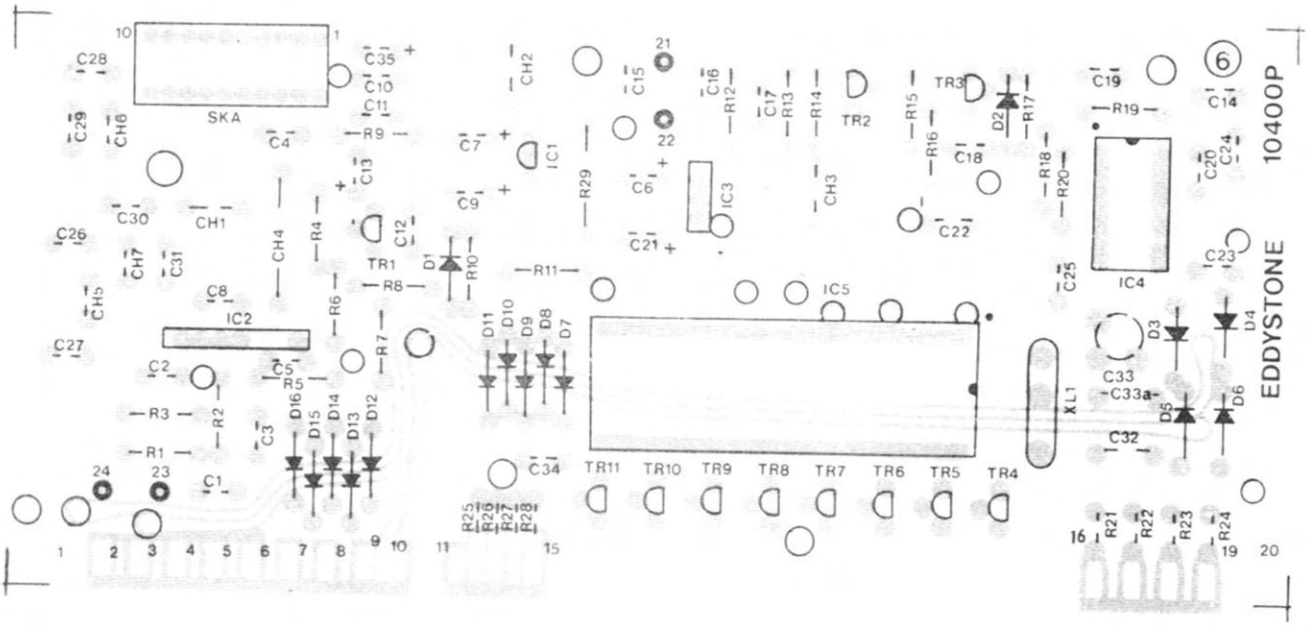
Board Ref. No.	Transistor	Emitter/ Source	Base/Gate/ Gate 1	Gate 2	Collector/ Drain	Remarks
A.M. 3	TR 1	+ 0.3V*	0V	+0.7V*	+10V	Range to 1-6
	TR 2	+ 0.4V*	0V	+0.5V*	+11.4V	Range to 1-6
	TR 3	+0.25V*	0V	-	+ 9.1V	Range to 1-6
	TR 4	+ 2.7V	+0.4V*	-	+ 10V	Range to 1-6
	TR 5	+ 5.7V	+6.4V	-	+ 10V	Range to 1-6
	TR 6	+ 2.4V*	+3.0V	-	+ 12V	Range to 1-6
	TR 7	+ 4.3V	+4.7V	-	+ 5V	Range to 1-6
	TR 8	+ 2.3V*	+2.9V	-	+ 5V	Range to 1-6
	TR 9	+ 1.2V*	+1.9V*	-	+ 5V	Range to 1-6
	TR10	+ 2.5V	+3.1V	-	+ 12V	Range to 1-6
	TR11	+ 1.6V*	0V	-	+ 12V	Range to 1-6
	TR12	+ 1.0V*	0V	-	+ 3.9V	Range to 1-6; BFO selected

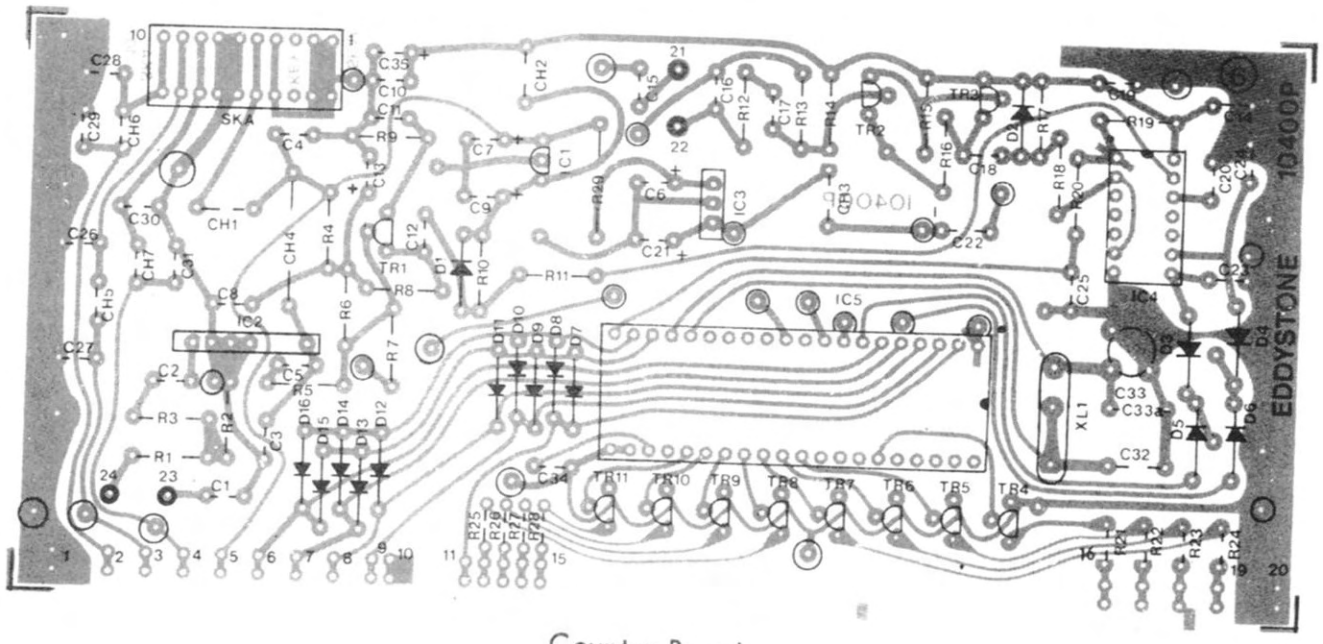
* 2.5V range.

Table 5-6 TRANSISTOR VOLTAGES



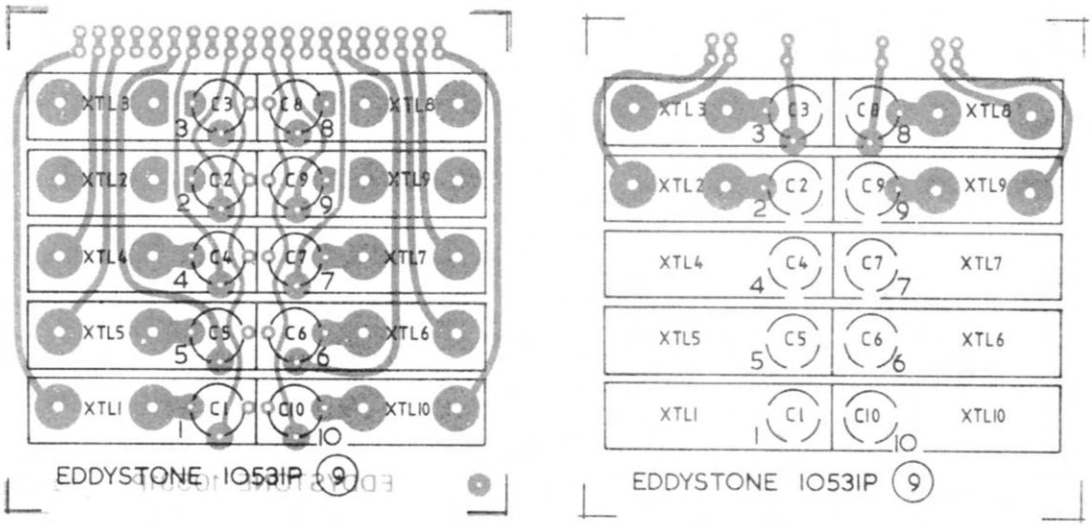
Display Board



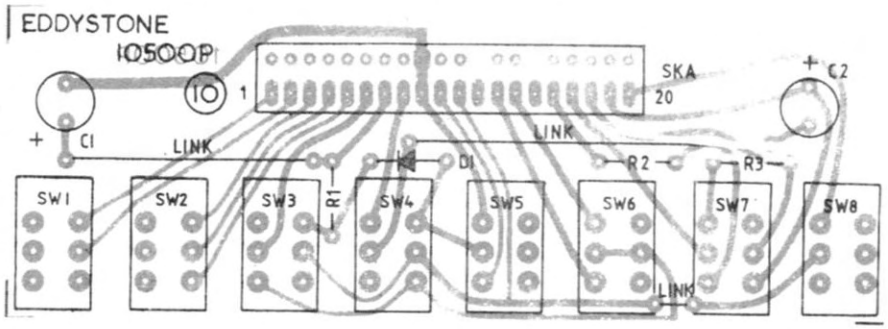


Counter Board

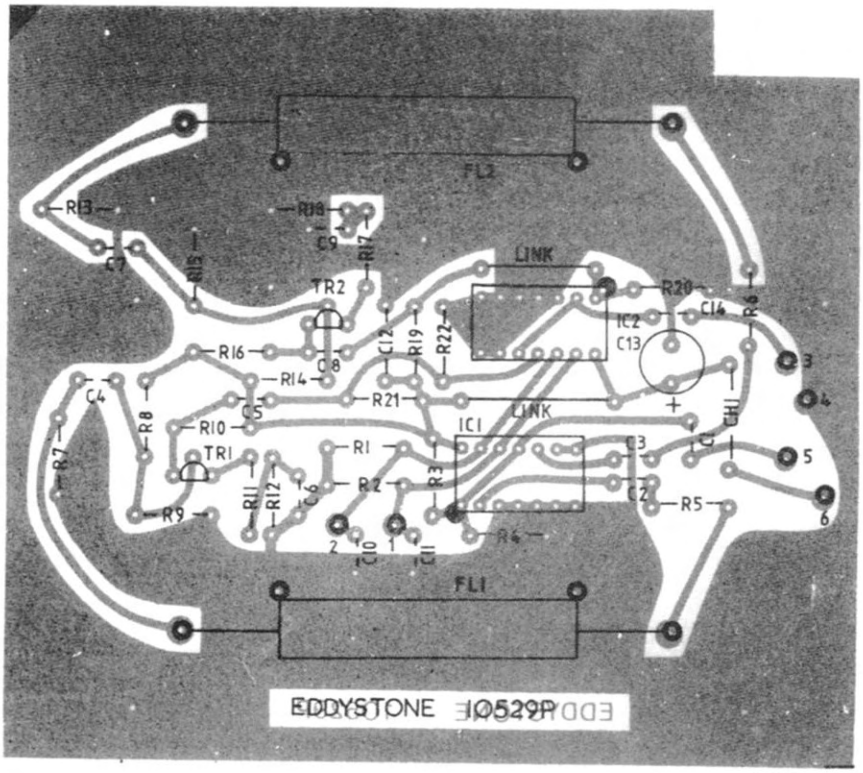
Module/Board Ref. No.	I.C.	Pin	Voltage	Remarks
		2	+1.9V	
		3	+1.9V	
		4	+1.3V	
		5	+2.1V	
		6	0V	
		7	+1.5V	
		8	+3.7V	
		9	+3.7V	
		10	+ 5V	
		11	+4.5V	
		12	+3.7V	
		13	+1.3V	
		14	+0.7V	
		15	+4.5V	
		16	0V	
	3	1	0V	
		2	+1.9V	
		3	+1.9V	
		4	+1.5V	
		5	+2.2V	
		6	0V	
		7	+1.6V	
		8	+3.7V	
		9	+3.7V	
		10	+ 5V	
		11	+ 5V	
		12	+4.1V	
		13	+1.3V	
		14	+0.7V	
		15	+ 5V	
		16	0V	



Crystal Board (2)



Switch Board



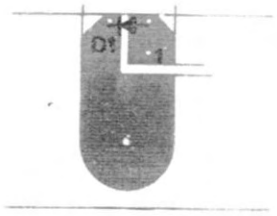
SSB Filter Board

Module/Board Ref. No.	I.C.	Pin	Voltage	Remarks
		14	+8.1V	BFO selected
		15	+4.2V	BFO selected
		16	+3.6V	BFO selected

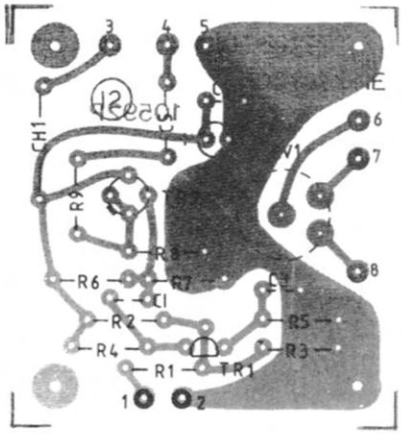
Table 5-7 INTEGRATED CIRCUIT VOLTAGES

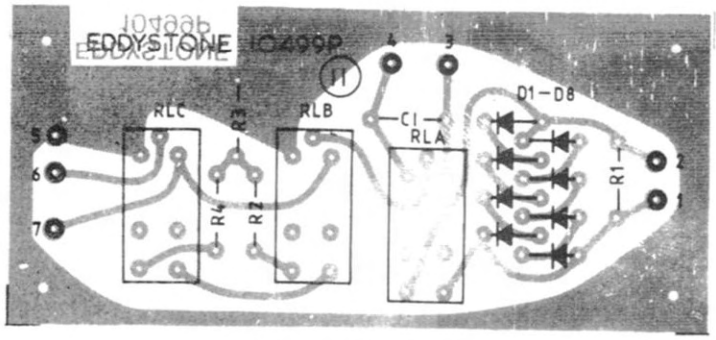
*2.5V Range

Range Switch Board

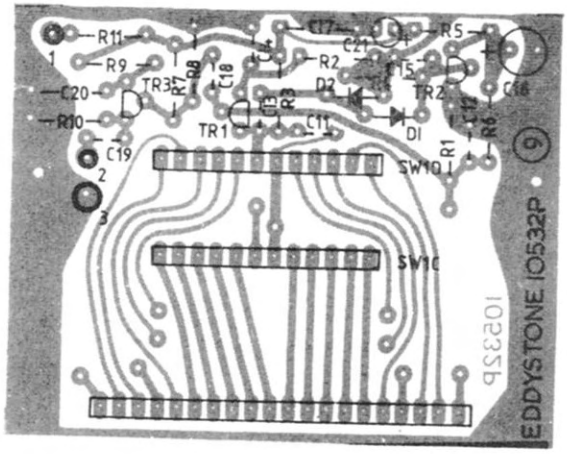


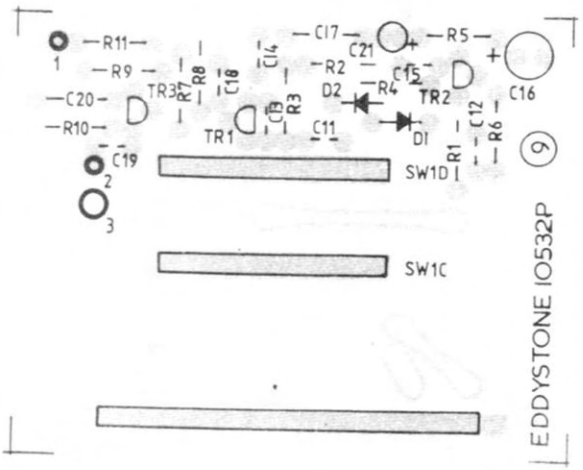
IF Output Board





Aerial Attenuator Board





Crystal Board (1)

SECTION 6

Component list and Major Spares

Location Code

Each component reference in the tables which follow is prefixed by a number which will assist in component location. Coding is as follows:-

1 Miscellaneous - front and rear panels, side plates, items not appearing under any other heading.
2 Audio Board
3 AM Board
4 Switch Board
5 PSU Module
6 Frequency Display Module
7 Range Indicator Board
8 Meter Illumination Board
9 Crystal Oscillator
10 SSB Filter Board
11 Muting/Attenuator Board
12 IF Output Board

Capacitors

Ref	Value	Type	Tolerance	Wkg. Voltage
1C1	100µ	Electrolytic	+50% -20%	16V
2C1	10µ	Electrolytic	+50% - 20%	16V
2C2	100n	Polycarbonate	20%	100V
2C3	100n	Polycarbonate	20%	100V
2C4	10µ	Electrolytic	+50% -20%	16V
2C5	100µ	Electrolytic	+50% -20%	16V
2C6	100n	Polycarbonate	20%	100V
2C7	10n	Ceramic	+80% -20%	63V
2C8	100n	Polycarbonate	20%	100V
2C9	220µ	Electrolytic	+50% -20%	6V3
2C10	100µ	Electrolytic	+50% -20%	16V
2C11	10n	Ceramic	+80% -20%	63V
2C12	10n	Ceramic	+80% -20%	63V
2C13	1n8	Polystyrene	5%	63V
2C14	100µ	Electrolytic	+50% -20%	10V

Spares should be ordered by quoting the complete Circuit Reference including the module prefix (where applicable), the description and the part number given in the list. From time to time, components of the type listed may be unavailable and equivalent types may be fitted or supplied as spares. All orders and enquiries should be directed to the address below, quoting the Type and Serial Numbers of the receiver in all communications.

EDDYSTONE RADIO LIMITED,
SALES AND SERVICE DEPARTMENT,
ALVECHURCH ROAD,
BIRMINGHAM B31 3PP,
ENGLAND.

TELEPHONE: 021-475-2231
TELEX: 337081
CABLES: EDDYSTONE BIRMINGHAM

Capacitors Continued.....

Ref	Value	Type	Tolerance	Wkg. Voltage
3C27	15p	Polystyrene	5%	125V
3C27A	10n	Ceramic	+80% - 20%	63V
3C28	10n	Ceramic	+80% -20%	63V
3C29	10n	Ceramic	+80% -20%	63V
3C29A	10µ	Electrolytic	+50% -20%	16V
3C30	11-437p	Air spaced variable	-	-
3C31	100p	Ceramic	2%	100V
3C32	100n	Polycarbonate	20%	100V
3C33	100p	Ceramic	2%	100V
3C34	1n	Polystyrene	2%	125V
3C35	1n	Polystyrene	2%	125V
3C36	100p	Ceramic	2%	100V
3C37	100n	Polycarbonate	20%	100V
3C38	10n	Ceramic	+80% -20%	63V
3C39	68µ	Electrolytic	+50% -10%	16V
3C39A	22n	Polycarbonate	20%	100V
3C40	7-35p	Ceramic trimmer	-	- (8468P)
3C41	7-35p	Ceramic trimmer	-	- (8468P)
3C42	7-35p	Ceramic trimmer	-	- (8468P)
3C43	7-35p	Ceramic trimmer	-	- (8468P)
3C44	7-35p	Ceramic trimmer	-	- (8468P)
3C45	7-35p	Ceramic trimmer	-	- (8468P)
3C46	18p	Polystyrene	5%	125V
3C47	6n8	Polystyrene	1%	63V
3C48	39p	Polystyrene	5%	125V
3C49	6n4	Polystyrene	1%	125V
3C50	2n8	Polystyrene	1%	63V
3C51	1n38	Polystyrene	1%	63V
3C52	530p	Polystyrene	1%	160V
3C53	18p	Polystyrene	5%	125V
3C54	148p	Polystyrene	5%	125V
3C55	10n	Ceramic	+80% -20%	63V
3C56	100p	Ceramic	2%	100V
3C57	11-437p	Air spaced variable	-	-
3C58	100p	Ceramic	2%	100V
3C59	100p	Ceramic	2%	100V
3C60	100p	Ceramic	2%	100V
3C61	10n	Ceramic	+80% -20%	63V
3C62	10n	Ceramic	+80% -20%	63V
3C63	1µ	Electrolytic	+50% -10%	63V

Filters

Ref	Description	Part Number
3FL1	455kHz 4kHz bandwidth AM Narrow	10599P
3FL2	455kHz 10kHz bandwidth AM Wide	10598P
3FL3	455kHz 10kHz bandwidth AM RF AGC	10600P
3TF1	455kHz ceramic resonator	10601P
10FL1	455kHz SSB Filter Lower Sideband	11423P
10FL2	455kHz SSB Filter Upper Sideband	11422P

Plugs and Sockets

Ref	Description	Part Number
1JK1	Phones socket	8463P
1SK1	Coaxial socket Aerial	6087P
1PL1	Chassis plug 3-way AC SUPPLY	8730P
	Socket and lead 3-way AC SUPPLY	D4815
1PL2	Chassis plug 6-way EXT DC	10606P
	Socket 6-way EXT DC	D4599
1PL3	15 way Ancillary fixed plug	7772P
2SKA	Socket printed board mounting 10 way	9867P
2SKB	Socket printed board mounting 20 way	9863P
4SKB	Socket printed board mounting 20 way	10609P
6SKA	Socket printed board mounting 10 way	9865P
	Plug moulding, 10 way to mate with 2SKA, 6SKA	10736P
	Plug moulding, 20 way to mate with 2SKB, 4SKB	10737P
	Single crimp pin for plug moulding	10738P
2/1, 2/2	Spade tab, printed board mounting	10739P
3/A, 3/B	Spade connector, female	10740P
	Key for socket printed board mounting 10 & 20 way	10790P

Capacitors Continued.....

Ref	Value	Type	Tolerance	Wk. Voltage
3C107	3n3	Polystyrene	2%	125V
3C107A	10µ	Electrolytic	+50% -10%	16V
3C108	100n	Polycarbonate	20%	100V
3C109	100n	Polycarbonate	20%	100V
3C110	100n	Polycarbonate	20%	100V
3C111	270p	Polystyrene	2%	63V
3C112	100n	Polycarbonate	20%	100V
3C113	10n	Ceramic	+80% -20%	63V
3C114	10n	Ceramic	+80% -20%	63V
3C115	1µ	Electrolytic	+50% -10%	63V
3C116	100n	Polycarbonate	20%	100V
3C117	100n	Polycarbonate	20%	100V
3C118	150p	Polystyrene	2%	63V
3C119	100p	Ceramic	2%	100V
3C120	1n2	Polystyrene	2%	125V
3C121	10µ	Electrolytic	+50% -10%	16V
3C122	270p	Polystyrene	2%	63V
3C123	10µ	Electrolytic	+50% -10%	16V
3C124	10n	Ceramic	+80% -20%	63V
3C125	10n	Ceramic	+80% -20%	63V
3C126	22n	Ceramic	+80% -20%	63V
3C127	22n	Ceramic	+80% -20%	63V
3C128	22n	Ceramic	+80% -20%	63V
3C129	22n	Ceramic	+80% -20%	63V
3C130	22n	Ceramic	+80% -20%	63V
3C131	100n	Polycarbonate	20%	100V
3C131A	10µ	Electrolytic	+50% -10%	16V
3C132	100n	Polycarbonate	20%	100V
3C133	100n	Polycarbonate	20%	100V
4C1	100µ	Electrolytic	+50% -10%	16V
4C2	100µ	Electrolytic	+50% -10%	16V
5C1	10n	Ceramic	+80% -20%	63V
5C2	10n	Ceramic	+80% -20%	63V
5C3	2200µ	Electrolytic	+50% -10%	40V
5C4	2200µ	Electrolytic	+50% -10%	40V
5C5	10µ	Electrolytic	+50% -10%	16V
5C6	10µ	Electrolytic	+50% -10%	16V
6C1				Not allocated
6C2				Not allocated
6C3				Not allocated

Coils Continued.....

Ref	Description	Part Number
3L16	Range 4 Oscillator	D5449
3L17	Range 5 Oscillator	D5450
3L18	Range 6 Oscillator	D5451
3L19	Mixer	D5486
3L20	Mixer	D5486
3L21	AM IF	D5452
3L22	AGC Amplifier	D5485
3L23	AGC Amplifier	D5485
3L24	AGC	D5453
3L25	BFO	D5454

Chokes

Ref	Description	Part Number
3CH1	100m	7350P
3CH2	10m	9379P
3CH3	4m7	7472P
3CH4	2m2	9382P
3CH5	10m	9379P
3CH6	100µ	9039P
6CH1	220µ	D5484
6CH2	220µ	D5484
6CH3	470µ	D5483
6CH4		Not allocated
6CH5	400n	D5475
6CH6	400n	D5475
6CH7	400n	D5475
10CH1	10m	9379P
12CH1	4m7	7472P

Capacitors Continued.....

Ref	Value	Type	Tolerance	Wk. Voltage
9C3	7-35p	Ceramic Trimmer		8468P
9C4	7-35p	Ceramic Trimmer		8468P
9C5	7-35p	Ceramic Trimmer		8468P
9C6	7-35p	Ceramic Trimmer		8468P
9C7	7-35p	Ceramic Trimmer		8468P
9C8	7-35p	Ceramic Trimmer		8468P
9C9	7-35p	Ceramic Trimmer		8468P
9C10	7-35p	Ceramic Trimmer		8468P
9C11	47p	Ceramic Plate	2%	100V
9C12	22p	Ceramic Plate	2%	100V
9C13	10n	Ceramic	+80% -20%	63V
9C14	10n	Ceramic	+80% -20%	63V
9C15	10n	Ceramic	+80% -20%	63V
9C16	100µ	Electrolytic	+50% -20%	25V
9C17	100n	Polyester	20%	100V
9C18	10n	Ceramic	+80% -20%	63V
9C19	10n	Ceramic	+80% -20%	63V
9C20	100n	Polyester	20%	100V
9C21	10µ	Electrolytic	+50% -20%	25V
10C1	10n	Ceramic	+80% -20%	63V
10C2	10n	Ceramic	+80% -20%	63V
10C3	10n	Ceramic	+80% -20%	63V
10C4	10n	Ceramic	+80% -20%	63V
10C5	10n	Ceramic	+80% -20%	63V
10C6	10n	Ceramic	+80% -20%	63V
10C7	10n	Ceramic	+80% -20%	63V
10C8	10n	Ceramic	+80% -20%	63V
10C9	10n	Ceramic	+80% -20%	63V
10C10	10n	Polyester	20%	100V
10C11	10n	Electrolytic	+50% -20%	25V
10C12	100n	Ceramic	+80% -20%	63V
10C13	100µ	Ceramic	+80% -20%	63V
10C14	10n	Ceramic	+80% -20%	63V
11C1	100n	Polyester	20%	100V
12C1	10n	Ceramic	+80% -20%	63V
12C2	10n	Ceramic	+80% -20%	63V

Transistors Continued.....

Ref	Type	Manufacturer	Circuit Function
3TR7	BC547B	Mullard	Emitter follower
3TR8	BC547B	Mullard	AFC Amplifier
3TR9	BC547B	Mullard	Emitter follower
3TR10	BC547B	Mullard	AGC Amplifier
3TR11	BF245B	Mullard	AGC Amplifier
3TR12	BF245B	Mullard	BFO
6TR1			Not allocated
6TR2	BFR54	Mullard	Amplifier
6TR3	BFR54	Mullard	Amplifier
6TR4	BC547B	Mullard	Decimal Point Driver
6TR5	BC547B	Mullard	Segment driver
6TR6	BC547B	Mullard	Segment driver
6TR7	BC547B	Mullard	Segment driver
6TR8	BC547B	Mullard	Segment driver
6TR9	BC547B	Mullard	Segment driver
6TR10	BC547B	Mullard	Segment driver
6TR11	BC547B	Mullard	Segment driver
6TR12	BC560B	Mullard	Digit driver
6TR13	BC560B	Mullard	Digit driver
6TR14	BC560B	Mullard	Digit driver
6TR15	BC560B	Mullard	Digit driver
6TR16	BC560B	Mullard	Digit driver
9TR1	BFR54	Mullard	Oscillator
9TR2	BC547B	Mullard	ALC
9TR3	BFR54	Mullard	Buffer
10TR1	BC547B	Mullard	Filter Amplifier
10TR2	BC547B	Mullard	Filter Amplifier
12TR1	BC547B	Mullard	IF Amplifier
12TR2	BFW30	Mullard	Emitter follower

Integrated Circuits

Ref	Type	Manufacturer	Circuit Function
11C1	MC7812CT	Motorola	Voltage regulator
11C2	MC7812CT	Motorola	Voltage regulator

Resistors Continued.....

Ref	Value (Ω)	Ref	Value (Ω)	Ref	Value (Ω)
3R34	10k	3R77	27k	4R3	1k
3R35	10k	3R78	10k		
3R36	100k	3R79	1k	6R1	Not allocated
3R37	100k	3R80	680k	6R2	Not allocated
3R38	4k7	3R81	220k	6R3	Not allocated
3R39	100k	3R82	390k	6R4	Not allocated
3R40	100k	3R83	15k	6R5	Not allocated
3R41	1k5	3R84	560k	6R6	Not allocated
3R42	100k	3R85	390k	6R7	Not allocated
3R43	10k	3R86	10k	6R8	Not allocated
3R44	27k	3R87	1M	6R9	Not allocated
3R45	390	3R88	2k7	6R10	18k
3R46	15k	3R89	390k	6R11	10
3R47	15k	3R90	39k	6R12	470
3R48	4k7	3R91	22k	6R13	4k7
3R49	330	3R92	1M	6R14	18k
3R50	390	3R93	1M	6R15	330
3R51	8k2	3R94	1M	6R16	470
3R52	15k	3R95	100k	6R17	18k
3R53	15k	3R96	220k	6R18	10
3R54	15k	3R97	3k9	6R19	2k2
3R55	150	3R98	1M	6R20	10
3R56	10k	3R99	100k	6R21	100
3R57	2k2	3R100	1k	6R22	100
3R58	10k	3R101	120	6R23	100
3R59	6k8	3R102	820	6R24	100
3R60	1k5	3R103	10k	6R25	100
3R61	10k	3R104	3k3	6R26	100
3R62	27k	3R105	3k3	6R27	100
3R63	390	3R106	1k	6R28	100
3R64	15k	3R107	10k	6R29	18
3R65	1k	3R108	47	6R30	3k3
3R66	390	3R109	47	6R31	3k3
3R67	8k2	3R110	100	6R32	3k3
3R68	2k2	3R111	47	6R33	3k3
3R69	47k	3R112	1k	6R34	3k3
3R70	180	3R113	1k	6R35	560
3R71	27k	3R114	1k	6R36	560
3R72	10k	3R115	100k		
3R73	1k	3R116	1M	9R1	470k
3R74	4k7			9R2	1k
3R75	470k	4R1	47R	9R3	4k7
3R76	100k	4R2	1k	9R4	47k

Diodes

Ref	Type	Manufacturer	Circuit Function
1D1	BAX13	Mullard	Diode switch
2D1	BAX13	Mullard	Diode Switch
2D2	BAX13	Mullard	Diode Switch
3D3	BZX79 C9V1	Mullard	Zener regulator
3D4	BA111	ITT	Fine tune control
3D5	BA111	ITT	AFC control (AM)
3D6	BAX13	Mullard	Oscillator protection
3D7	BAX13	Mullard	Switching Diode
3D8	BZX79C8V2	Mullard	Zener Diode
3D9	BZX79 C3V3	Mullard	Zener regulator
3D10	BAX13	Mullard	AGC detector
3D11	BAX13	Mullard	AGC detector
3D12	BAX13	Mullard	Diode switch
3D13			Not allocated
3D14	BAX13	Mullard	Diode switch
3D15	MVAM115	Motorola	BFO tuning
3D16	BZX79 C3V9	Mullard	Zener regulator
4D1	BAX13	Mullard	Diode switch
5D1	1N4004	ITT	Rectifier
5D2	1N4004	ITT	Rectifier
5D3	1N4004	ITT	Rectifier
5D4	1N4004	ITT	Rectifier
5D5	1N4004	ITT	Rectifier
5D6	1N4004	ITT	Rectifier
5D7	1N4004	ITT	Rectifier
5D8	1N4004	ITT	Rectifier
5D9	1N4004	ITT	Reverse polarity protection
6D1	BAX13	Mullard	Diode clamp
6D2	BAX13	Mullard	Diode clamp
6D3	BAX13	Mullard	Diode switch
6D4	BAX13	Mullard	Diode switch
6D5	BAX13	Mullard	Diode switch
6D6	BAX13	Mullard	Diode switch
6D7			Not allocated
6D8			Not allocated
6D9			Not allocated
6D10			Not allocated

Diodes

Ref	Type	Manufacturer	Circuit Function
1D1	BAX13	Mullard	Diode switch
2D1	BAX13	Mullard	Diode Switch
2D2	BAX13	Mullard	Diode Switch
3D3	BZX79 C9V1	Mullard	Zener regulator
3D4	BA111	ITT	Fine tune control
3D5	BA111	ITT	AFC control (AM)
3D6	BAX13	Mullard	Oscillator protection
3D7	BAX13	Mullard	Switching Diode
3D8	BZX79C8V2	Mullard	Zener Diode
3D9	BZX79 C3V3	Mullard	Zener regulator
3D10	BAX13	Mullard	AGC detector
3D11	BAX13	Mullard	AGC detector
3D12	BAX13	Mullard	Diode switch
3D13			Not allocated
3D14	BAX13	Mullard	Diode switch
3D15	MVAM115	Motorola	BFO tuning
3D16	BZX79 C3V9	Mullard	Zener regulator
4D1	BAX13	Mullard	Diode switch
5D1	1N4004	ITT	Rectifier
5D2	1N4004	ITT	Rectifier
5D3	1N4004	ITT	Rectifier
5D4	1N4004	ITT	Rectifier
5D5	1N4004	ITT	Rectifier
5D6	1N4004	ITT	Rectifier
5D7	1N4004	ITT	Rectifier
5D8	1N4004	ITT	Rectifier
5D9	1N4004	ITT	Reverse polarity protection
6D1	BAX13	Mullard	Diode clamp
6D2	BAX13	Mullard	Diode clamp
6D3	BAX13	Mullard	Diode switch
6D4	BAX13	Mullard	Diode switch
6D5	BAX13	Mullard	Diode switch
6D6	BAX13	Mullard	Diode switch
6D7			Not allocated
6D8			Not allocated
6D9			Not allocated
6D10			Not allocated

Resistors Continued.....

Ref	Value (Ω)	Ref	Value (Ω)	Ref	Value (Ω)
3R34	10k	3R77	27k	4R3	1k
3R35	10k	3R78	10k		
3R36	100k	3R79	1k	6R1	Not allocated
3R37	100k	3R80	680k	6R2	Not allocated
3R38	4k7	3R81	220k	6R3	Not allocated
3R39	100k	3R82	390k	6R4	Not allocated
3R40	100k	3R83	15k	6R5	Not allocated
3R41	1k5	3R84	560k	6R6	Not allocated
3R42	100k	3R85	390k	6R7	Not allocated
3R43	10k	3R86	10k	6R8	Not allocated
3R44	27k	3R87	1M	6R9	Not allocated
3R45	390	3R88	2k7	6R10	18k
3R46	15k	3R89	390k	6R11	10
3R47	15k	3R90	39k	6R12	470
3R48	4k7	3R91	22k	6R13	4k7
3R49	330	3R92	1M	6R14	18k
3R50	390	3R93	1M	6R15	330
3R51	8k2	3R94	1M	6R16	470
3R52	15k	3R95	100k	6R17	18k
3R53	15k	3R96	220k	6R18	10
3R54	15k	3R97	3k9	6R19	2k2
3R55	150	3R98	1M	6R20	10
3R56	10k	3R99	100k	6R21	100
3R57	2k2	3R100	1k	6R22	100
3R58	10k	3R101	120	6R23	100
3R59	6k8	3R102	820	6R24	100
3R60	1k5	3R103	10k	6R25	100
3R61	10k	3R104	3k3	6R26	100
3R62	27k	3R105	3k3	6R27	100
3R63	390	3R106	1k	6R28	100
3R64	15k	3R107	10k	6R29	18
3R65	1k	3R108	47	6R30	3k3
3R66	390	3R109	47	6R31	3k3
3R67	8k2	3R110	100	6R32	3k3
3R68	2k2	3R111	47	6R33	3k3
3R69	47k	3R112	1k	6R34	3k3
3R70	180	3R113	1k	6R35	560
3R71	27k	3R114	1k	6R36	560
3R72	10k	3R115	100k		
3R73	1k	3R116	1M	9R1	470k
3R74	4k7			9R2	1k
3R75	470k	4R1	47R	9R3	4k7
3R76	100k	4R2	1k	9R4	47k

Transistors Continued.....

Ref	Type	Manufacturer	Circuit Function
3TR7	BC547B	Mullard	Emitter follower
3TR8	BC547B	Mullard	AFC Amplifier
3TR9	BC547B	Mullard	Emitter follower
3TR10	BC547B	Mullard	AGC Amplifier
3TR11	BF245B	Mullard	AGC Amplifier
3TR12	BF245B	Mullard	BFO
6TR1			Not allocated
6TR2	BFR54	Mullard	Amplifier
6TR3	BFR54	Mullard	Amplifier
6TR4	BC547B	Mullard	Decimal Point Driver
6TR5	BC547B	Mullard	Segment driver
6TR6	BC547B	Mullard	Segment driver
6TR7	BC547B	Mullard	Segment driver
6TR8	BC547B	Mullard	Segment driver
6TR9	BC547B	Mullard	Segment driver
6TR10	BC547B	Mullard	Segment driver
6TR11	BC547B	Mullard	Segment driver
6TR12	BC560B	Mullard	Digit driver
6TR13	BC560B	Mullard	Digit driver
6TR14	BC560B	Mullard	Digit driver
6TR15	BC560B	Mullard	Digit driver
6TR16	BC560B	Mullard	Digit driver
9TR1	BFR54	Mullard	Oscillator
9TR2	BC547B	Mullard	ALC
9TR3	BFR54	Mullard	Buffer
10TR1	BC547B	Mullard	Filter Amplifier
10TR2	BC547B	Mullard	Filter Amplifier
12TR1	BC547B	Mullard	IF Amplifier
12TR2	BFW30	Mullard	Emitter follower

Integrated Circuits

Ref	Type	Manufacturer	Circuit Function
1IC1	MC7812CT	Motorola	Voltage regulator
1IC2	MC7812CT	Motorola	Voltage regulator

Capacitors Continued.....

Ref	Value	Type	Tolerance	Wk. Voltage
9C3	7-35p	Ceramic Trimmer		8468P
9C4	7-35p	Ceramic Trimmer		8468P
9C5	7-35p	Ceramic Trimmer		8468P
9C6	7-35p	Ceramic Trimmer		8468P
9C7	7-35p	Ceramic Trimmer		8468P
9C8	7-35p	Ceramic Trimmer		8468P
9C9	7-35p	Ceramic Trimmer		8468P
9C10	7-35p	Ceramic Trimmer		8468P
9C11	47p	Ceramic Plate	2%	100V
9C12	22p	Ceramic Plate	2%	100V
9C13	10n	Ceramic	+80% -20%	63V
9C14	10n	Ceramic	+80% -20%	63V
9C15	10n	Ceramic	+80% -20%	63V
9C16	100µ	Electrolytic	+50% -20%	25V
9C17	100n	Polyester	20%	100V
9C18	10n	Ceramic	+80% -20%	63V
9C19	10n	Ceramic	+80% -20%	63V
9C20	100n	Polyester	20%	100V
9C21	10µ	Electrolytic	+50% -20%	25V
10C1	10n	Ceramic	+80% -20%	63V
10C2	10n	Ceramic	+80% -20%	63V
10C3	10n	Ceramic	+80% -20%	63V
10C4	10n	Ceramic	+80% -20%	63V
10C5	10n	Ceramic	+80% -20%	63V
10C6	10n	Ceramic	+80% -20%	63V
10C7	10n	Ceramic	+80% -20%	63V
10C8	10n	Ceramic	+80% -20%	63V
10C9	10n	Ceramic	+80% -20%	63V
10C10	10n	Polyester	20%	100V
10C11	10n	Electrolytic	+50% -20%	25V
10C12	100n	Ceramic	+80% -20%	63V
10C13	100µ	Ceramic	+80% -20%	63V
10C14	10n	Ceramic	+80% -20%	63V
11C1	100n	Polyester	20%	100V
12C1	10n	Ceramic	+80% -20%	63V
12C2	10n	Ceramic	+80% -20%	63V

Coils Continued.....

Ref	Description	Part Number
3L16	Range 4 Oscillator	D5449
3L17	Range 5 Oscillator	D5450
3L18	Range 6 Oscillator	D5451
3L19	Mixer	D5486
3L20	Mixer	D5486
3L21	AM IF	D5452
3L22	AGC Amplifier	D5485
3L23	AGC Amplifier	D5485
3L24	AGC	D5453
3L25	BFO	D5454

Chokes

Ref	Description	Part Number
3CH1	100m	7350P
3CH2	10m	9379P
3CH3	4m7	7472P
3CH4	2m2	9382P
3CH5	10m	9379P
3CH6	100µ	9039P
6CH1	220µ	D5484
6CH2	220µ	D5484
6CH3	470µ	D5483
6CH4		Not allocated
6CH5	400n	D5475
6CH6	400n	D5475
6CH7	400n	D5475
10CH1	10m	9379P
12CH1	4m7	7472P

Capacitors Continued.....

Ref	Value	Type	Tolerance	Wk. Voltage
3C107	3n3	Polystyrene	2%	125V
3C107A	10µ	Electrolytic	+50% -10%	16V
3C108	100n	Polycarbonate	20%	100V
3C109	100n	Polycarbonate	20%	100V
3C110	100n	Polycarbonate	20%	100V
3C111	270p	Polystyrene	2%	63V
3C112	100n	Polycarbonate	20%	100V
3C113	10n	Ceramic	+80% -20%	63V
3C114	10n	Ceramic	+80% -20%	63V
3C115	1µ	Electrolytic	+50% -10%	63V
3C116	100n	Polycarbonate	20%	100V
3C117	100n	Polycarbonate	20%	100V
3C118	150p	Polystyrene	2%	63V
3C119	100p	Ceramic	2%	100V
3C120	1n2	Polystyrene	2%	125V
3C121	10µ	Electrolytic	+50% -10%	16V
3C122	270p	Polystyrene	2%	63V
3C123	10µ	Electrolytic	+50% -10%	16V
3C124	10n	Ceramic	+80% -20%	63V
3C125	10n	Ceramic	+80% -20%	63V
3C126	22n	Ceramic	+80% -20%	63V
3C127	22n	Ceramic	+80% -20%	63V
3C128	22n	Ceramic	+80% -20%	63V
3C129	22n	Ceramic	+80% -20%	63V
3C130	22n	Ceramic	+80% -20%	63V
3C131	100n	Polycarbonate	20%	100V
3C131A	10µ	Electrolytic	+50% -10%	16V
3C132	100n	Polycarbonate	20%	100V
3C133	100n	Polycarbonate	20%	100V
4C1	100µ	Electrolytic	+50% -10%	16V
4C2	100µ	Electrolytic	+50% -10%	16V
5C1	10n	Ceramic	+80% -20%	63V
5C2	10n	Ceramic	+80% -20%	63V
5C3	2200µ	Electrolytic	+50% -10%	40V
5C4	2200µ	Electrolytic	+50% -10%	40V
5C5	10µ	Electrolytic	+50% -10%	16V
5C6	10µ	Electrolytic	+50% -10%	16V
6C1				Not allocated
6C2				Not allocated
6C3				Not allocated

Filters

Ref	Description	Part Number
3FL1	455kHz 4kHz bandwidth AM Narrow	10599P
3FL2	455kHz 10kHz bandwidth AM Wide	10598P
3FL3	455kHz 10kHz bandwidth AM RF AGC	10600P
3TF1	455kHz ceramic resonator	10601P
10FL1	455kHz SSB Filter Lower Sideband	11423P
10FL2	455kHz SSB Filter Upper Sideband	11422P

Plugs and Sockets

Ref	Description	Part Number
1JK1	Phones socket	8463P
1SK1	Coaxial socket Aerial	6087P
1PL1	Chassis plug 3-way AC SUPPLY	8730P
	Socket and lead 3-way AC SUPPLY	D4815
1PL2	Chassis plug 6-way EXT DC	10606P
	Socket 6-way EXT DC	D4599
1PL3	15 way Ancillary fixed plug	7772P
2SKA	Socket printed board mounting 10 way	9867P
2SKB	Socket printed board mounting 20 way	9863P
4SKB	Socket printed board mounting 20 way	10609P
6SKA	Socket printed board mounting 10 way	9865P
	Plug moulding, 10 way to mate with 2SKA, 6SKA	10736P
	Plug moulding, 20 way to mate with 2SKB, 4SKB	10737P
	Single crimp pin for plug moulding	10738P
2/1, 2/2	Spade tab, printed board mounting	10739P
3/A, 3/B	Spade connector, female	10740P
	Key for socket printed board mounting 10 & 20 way	10790P

Capacitors Continued.....

Ref	Value	Type	Tolerance	Wkg. Voltage
3C27	15p	Polystyrene	5%	125V
3C27A	10n	Ceramic	+80% - 20%	63V
3C28	10n	Ceramic	+80% -20%	63V
3C29	10n	Ceramic	+80% -20%	63V
3C29A	10µ	Electrolytic	+50% -20%	16V
3C30	11-437p	Air spaced variable	-	-
3C31	100p	Ceramic	2%	100V
3C32	100n	Polycarbonate	20%	100V
3C33	100p	Ceramic	2%	100V
3C34	1n	Polystyrene	2%	125V
3C35	1n	Polystyrene	2%	125V
3C36	100p	Ceramic	2%	100V
3C37	100n	Polycarbonate	20%	100V
3C38	10n	Ceramic	+80% -20%	63V
3C39	68µ	Electrolytic	+50% -10%	16V
3C39A	22n	Polycarbonate	20%	100V
3C40	7-35p	Ceramic trimmer	-	- (8468P)
3C41	7-35p	Ceramic trimmer	-	- (8468P)
3C42	7-35p	Ceramic trimmer	-	- (8468P)
3C43	7-35p	Ceramic trimmer	-	- (8468P)
3C44	7-35p	Ceramic trimmer	-	- (8468P)
3C45	7-35p	Ceramic trimmer	-	- (8468P)
3C46	18p	Polystyrene	5%	125V
3C47	6n8	Polystyrene	1%	63V
3C48	39p	Polystyrene	5%	125V
3C49	6n4	Polystyrene	1%	125V
3C50	2n8	Polystyrene	1%	63V
3C51	1n38	Polystyrene	1%	63V
3C52	530p	Polystyrene	1%	160V
3C53	18p	Polystyrene	5%	125V
3C54	148p	Polystyrene	5%	125V
3C55	10n	Ceramic	+80% -20%	63V
3C56	100p	Ceramic	2%	100V
3C57	11-437p	Air spaced variable	-	-
3C58	100p	Ceramic	2%	100V
3C59	100p	Ceramic	2%	100V
3C60	100p	Ceramic	2%	100V
3C61	10n	Ceramic	+80% -20%	63V
3C62	10n	Ceramic	+80% -20%	63V
3C63	1µ	Electrolytic	+50% -10%	63V

Spares should be ordered by quoting the complete Circuit Reference including the module prefix (where applicable), the description and the part number given in the list. From time to time, components of the type listed may be unavailable and equivalent types may be fitted or supplied as spares. All orders and enquiries should be directed to the address below, quoting the Type and Serial Numbers of the receiver in all communications.

EDDYSTONE RADIO LIMITED,
SALES AND SERVICE DEPARTMENT,
ALVECHURCH ROAD,
BIRMINGHAM B31 3PP,
ENGLAND.

TELEPHONE: 021-475-2231
TELEX: 337081
CABLES: EDDYSTONE BIRMINGHAM

SECTION 6

Component list and Major Spares

Location Code

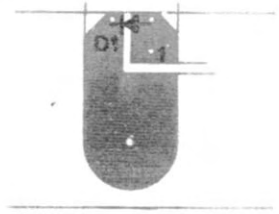
Each component reference in the tables which follow is prefixed by a number which will assist in component location. Coding is as follows:-

1 Miscellaneous - front and rear panels, side plates, items not appearing under any other heading.
2 Audio Board
3 AM Board
4 Switch Board
5 PSU Module
6 Frequency Display Module
7 Range Indicator Board
8 Meter Illumination Board
9 Crystal Oscillator
10 SSB Filter Board
11 Muting/Attenuator Board
12 IF Output Board

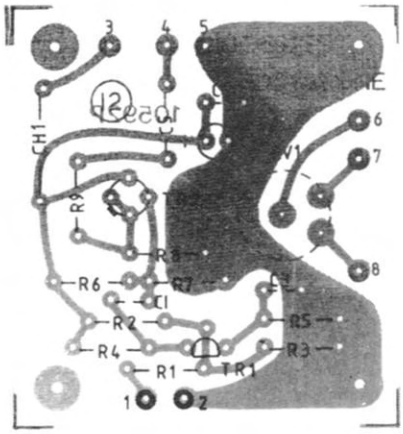
Capacitors

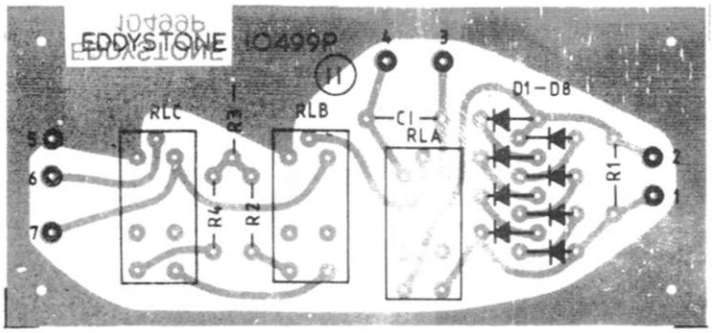
Ref	Value	Type	Tolerance	Wkg. Voltage
1C1	100µ	Electrolytic	+50% -20%	16V
2C1	10µ	Electrolytic	+50% - 20%	16V
2C2	100n	Polycarbonate	20%	100V
2C3	100n	Polycarbonate	20%	100V
2C4	10µ	Electrolytic	+50% -20%	16V
2C5	100µ	Electrolytic	+50% -20%	16V
2C6	100n	Polycarbonate	20%	100V
2C7	10n	Ceramic	+80% -20%	63V
2C8	100n	Polycarbonate	20%	100V
2C9	220µ	Electrolytic	+50% -20%	6V3
2C10	100µ	Electrolytic	+50% -20%	16V
2C11	10n	Ceramic	+80% -20%	63V
2C12	10n	Ceramic	+80% -20%	63V
2C13	1n8	Polystyrene	5%	63V
2C14	100µ	Electrolytic	+50% -20%	10V

Range Switch Board

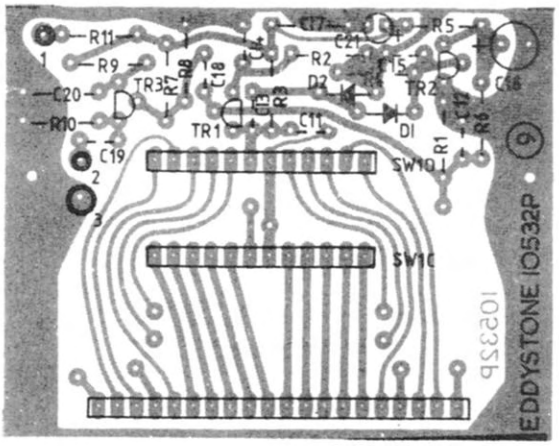


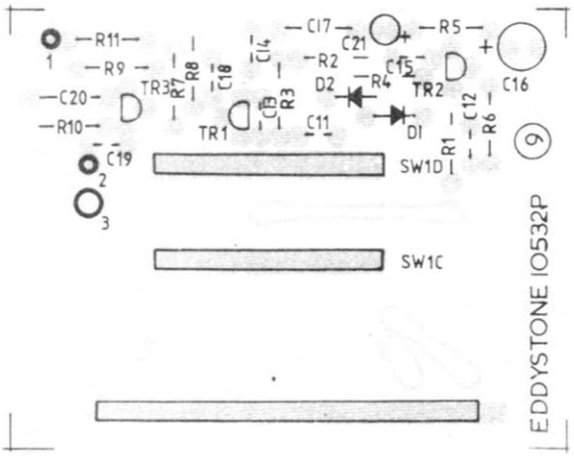
IF Output Board





Aerial Attenuator Board



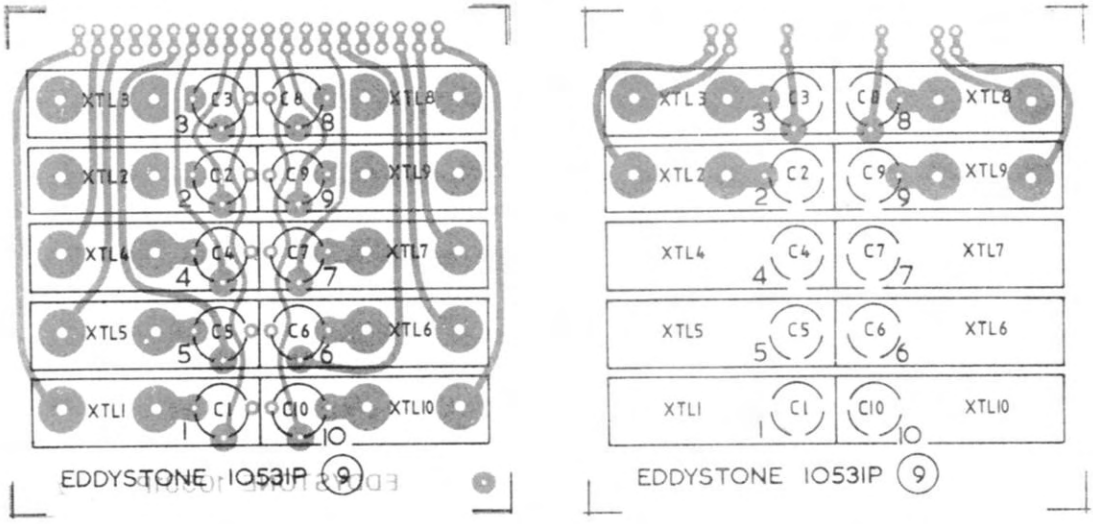


Crystal Board (1)

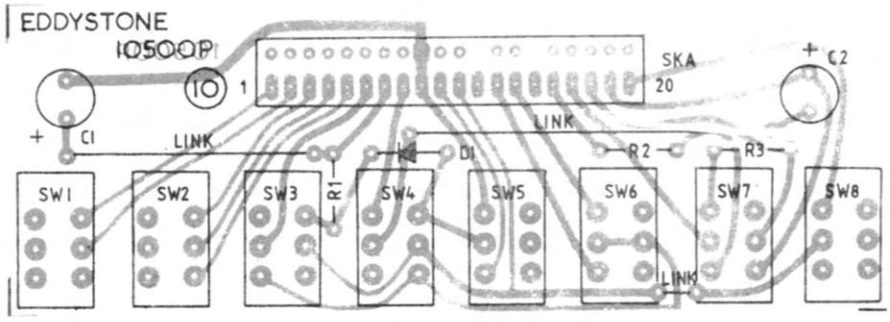
Module/Board Ref. No.	I.C.	Pin	Voltage	Remarks
		14	+8.1V	BFO selected
		15	+4.2V	BFO selected
		16	+3.6V	BFO selected

Table 5-7 INTEGRATED CIRCUIT VOLTAGES

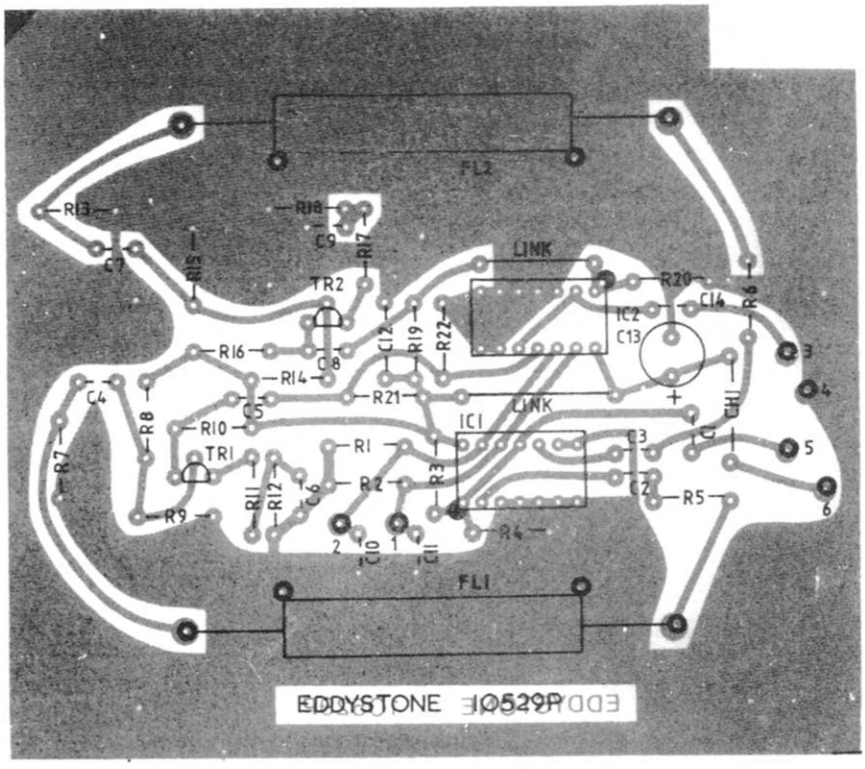
*2.5V Range



Crystal Board (2)

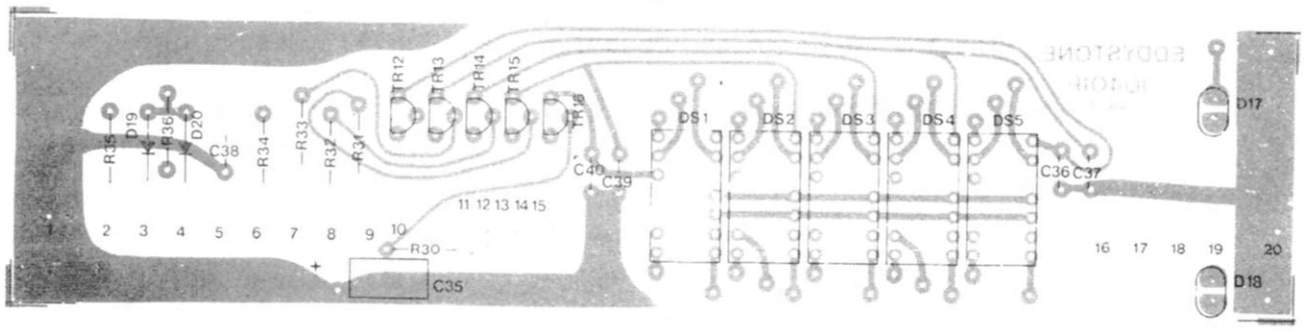


Switch Board

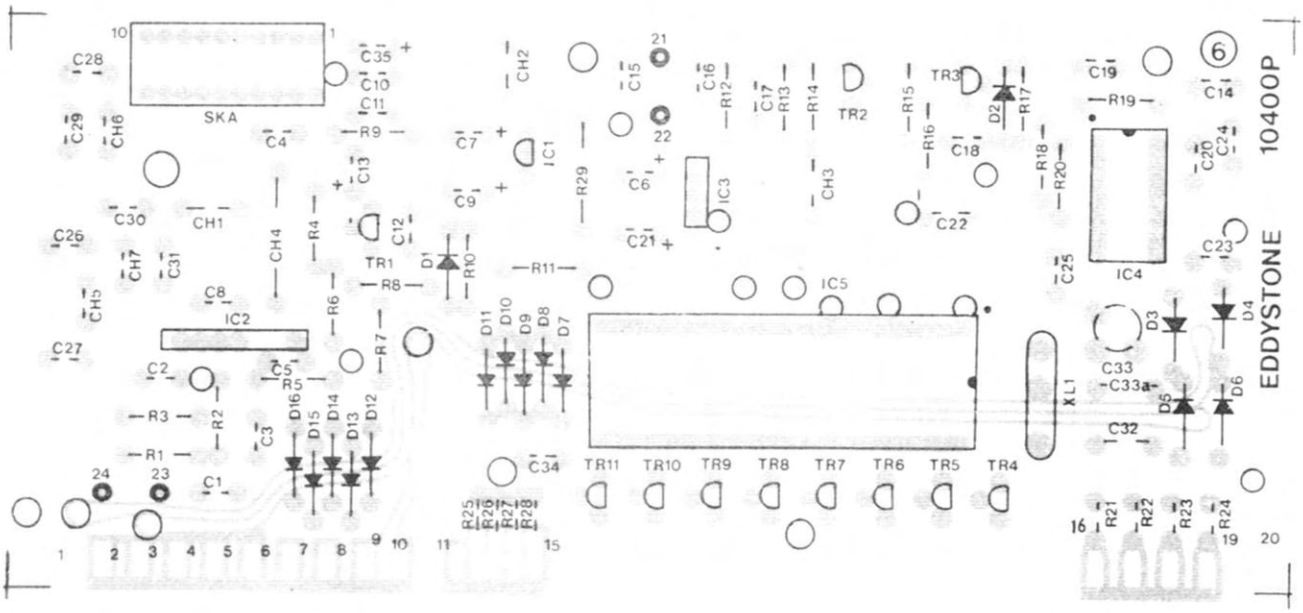


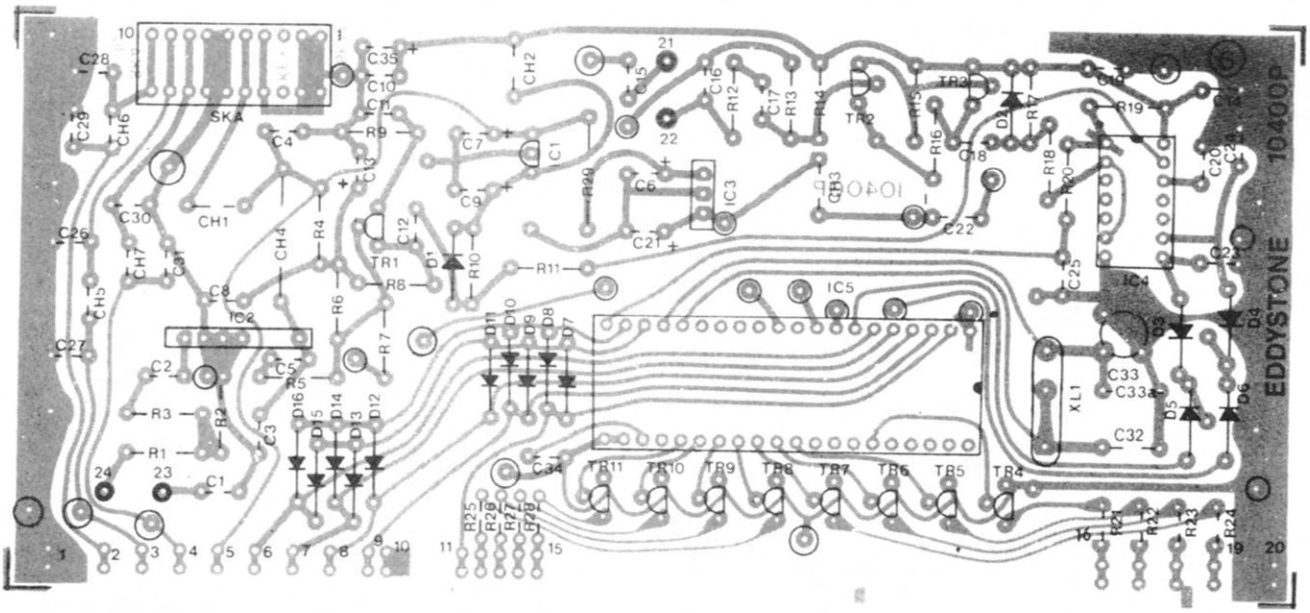
SSB Filter Board

Module/Board Ref. No.	I.C.	Pin	Voltage	Remarks
		2	+1.9V	
		3	+1.9V	
		4	+1.3V	
		5	+2.1V	
		6	0V	
		7	+1.5V	
		8	+3.7V	
		9	+3.7V	
		10	+ 5V	
		11	+4.5V	
		12	+3.7V	
		13	+1.3V	
		14	+0.7V	
		15	+4.5V	
		16	0V	
	3	1	0V	
		2	+1.9V	
		3	+1.9V	
		4	+1.5V	
		5	+2.2V	
		6	0V	
		7	+1.6V	
		8	+3.7V	
		9	+3.7V	
		10	+ 5V	
		11	+ 5V	
		12	+4.1V	
		13	+1.3V	
		14	+0.7V	
		15	+ 5V	
		16	0V	



Display Board



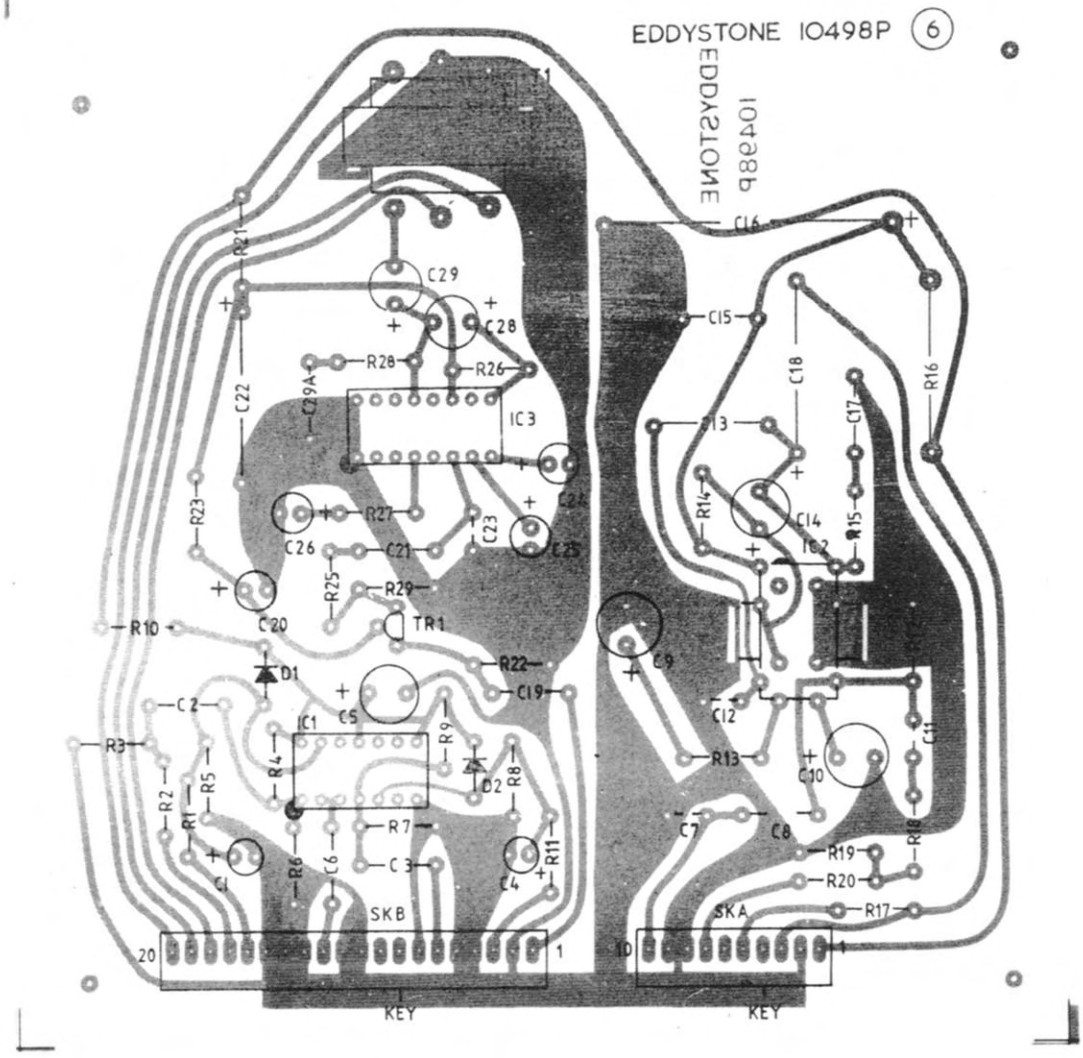


Counter Board

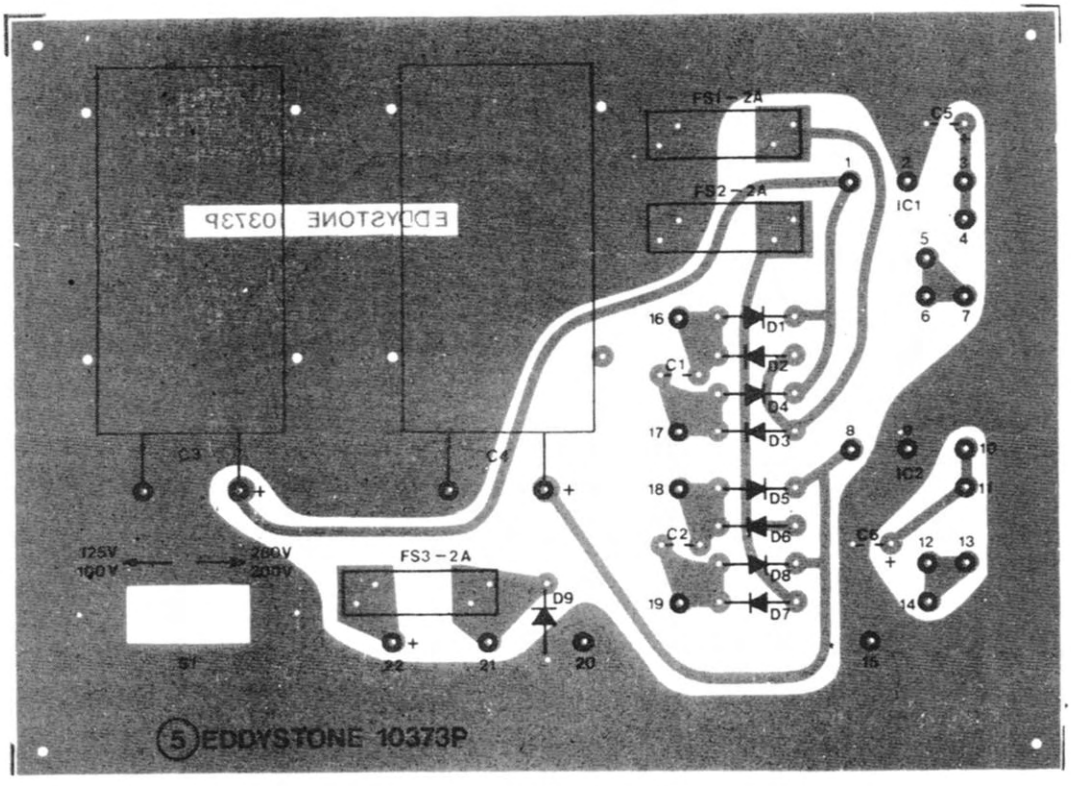
Board Ref. No.	Transistor	Emitter/ Source	Base/Gate/ Gate 1	Gate 2	Collector/ Drain	Remarks
A.M. 3	TR 1	+ 0.3V*	0V	+0.7V*	+10V	Range to 1-6
	TR 2	+ 0.4V*	0V	+0.5V*	+11.4V	Range to 1-6
	TR 3	+0.25V*	0V	-	+ 9.1V	Range to 1-6
	TR 4	+ 2.7V	+0.4V*	-	+ 10V	Range to 1-6
	TR 5	+ 5.7V	+6.4V	-	+ 10V	Range to 1-6
	TR 6	+ 2.4V*	+3.0V	-	+ 12V	Range to 1-6
	TR 7	+ 4.3V	+4.7V	-	+ 5V	Range to 1-6
	TR 8	+ 2.3V*	+2.9V	-	+ 5V	Range to 1-6
	TR 9	+ 1.2V*	+1.9V*	-	+ 5V	Range to 1-6
	TR10	+ 2.5V	+3.1V	-	+ 12V	Range to 1-6
	TR11	+ 1.6V*	0V	-	+ 12V	Range to 1-6
	TR12	+ 1.0V*	0V	-	+ 3.9V	Range to 1-6; BFO selected

* 2.5V range.

Table 5-6 TRANSISTOR VOLTAGES



Audio Board



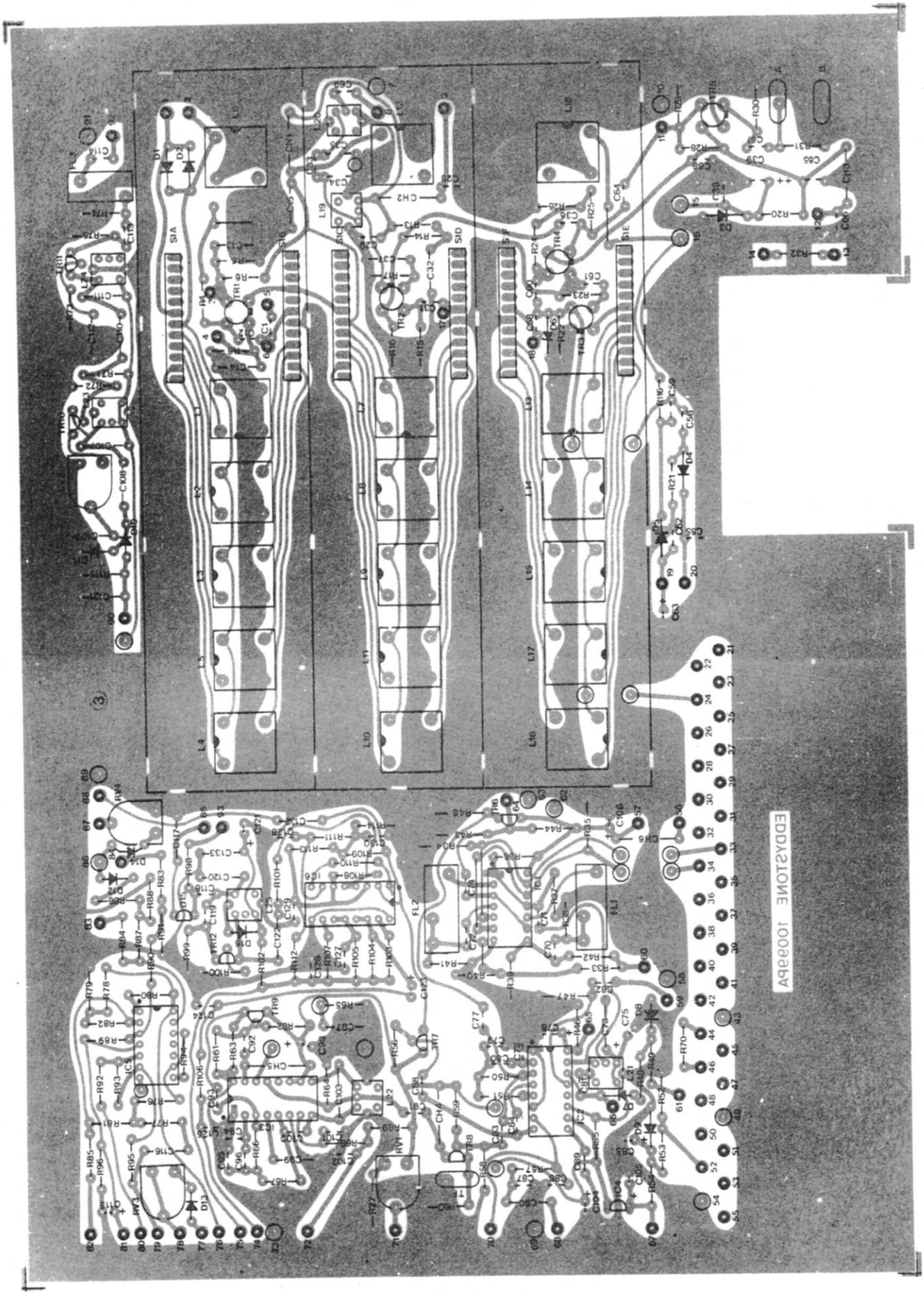
Power Unit Board

Module/Board	Ref. No.	Pin	Voltage	Remarks
AM continued..		9) 12) 56) 86)	+12V	
		33	+12V	
		34	+12V	
Frequency Display	6	5	+12V	

TABLE 5-5 Board Supplies

Notes on Table 5-5

1 Voltage present for all control and switch settings.



Main Board

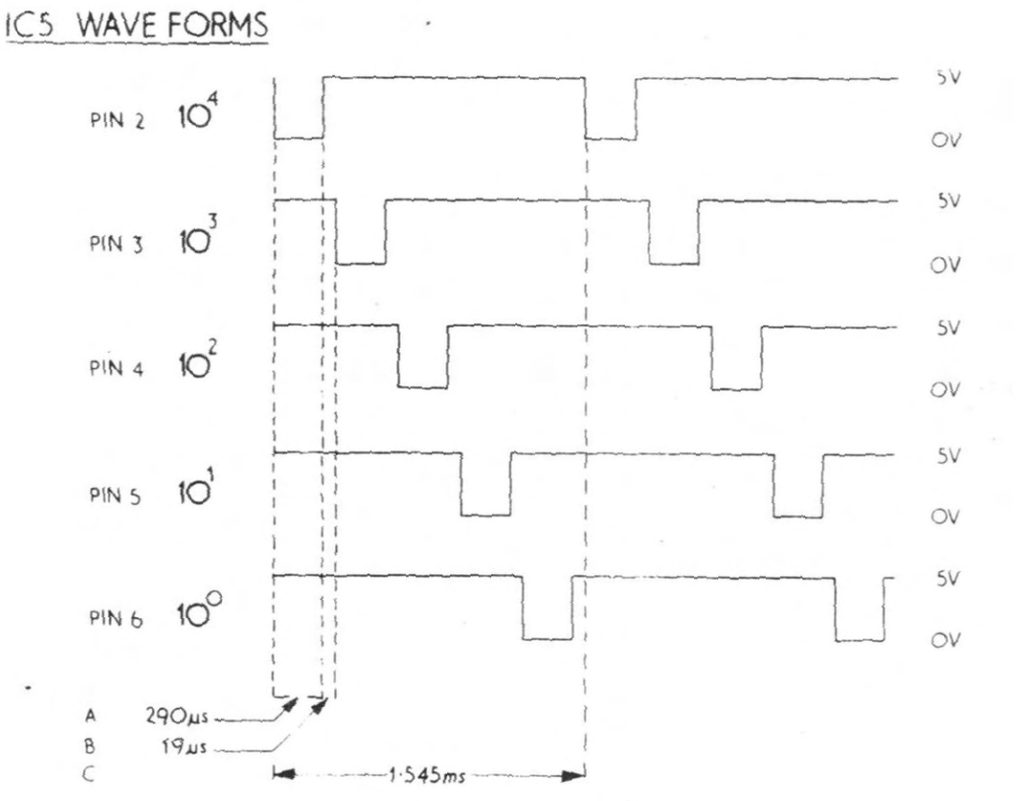


DIAGRAM ONE

Voltage Analysis

In the event of the receiver failing to operate normally first check all voltages at the board terminations listed in Table 5-5. If these voltages check out normally, refer to Tables 5-6 and 5-7 and carry out a detailed check of the individual semi-conductor voltages. The readings given in the Tables were taken with a standard 20,000Ω/V testmeter such as AVO Model 8. 10% variation should be allowed to cover the usual zener/semi-conductor spreads. All voltages are taken relative to earth.

Voltage readings should be taken with the SUPPLY switch set to ON and the essential receiver controls adjusted as shown in the relevant column in the Tables.

APPENDIX A

Component Handling

Lead bending. Component leads need in general, to be bent to enable the device to be fitted. The bend should be made so that the radius of the bend is not less than the diameter of the lead (or the thickness of the lead in the case of flat leads), and the lead should be supported between the body of the component and the bend. The bend should be at least 2mm (approx 1/16") from the component.

Soldering. A soldering iron having a bit temperature not exceeding 245°C may be used. The soldered joint should be completed within 5 seconds. Overheating may damage the component.

Heat Sinks. Certain devices which are required to dissipate power are fitted with heat sinks. When replacing these devices, the heat sinking arrangement should be carefully reproduced, eg thermal conducting compound may be used. If an insulating washer has been used, this should be replaced and thermal conducting compound applied to both sides.

MOS Devices. These have an exceptionally high input resistance and they are susceptible to damage when exposed to high static electrical charges. To avoid possible damage the following procedures should be followed:

1. Devices should be stored and transported in contact with a conductive material.
2. Soldering iron, bench surface, tools etc., should all be earthed. The operator should be earthed using a 1MΩ series resistor.
3. The equipment should be switched off when devices or boards are inserted or removed.
4. Nylon clothing should not be worn.

Anti-static precautions take on added importance in dry weather (relative humidity less than 30%).

Set RANGE switch to range 4 (1.5MHz to 3.5MHz) and set controls as follows:-

Gain	:	Switch to Manual
IF Gain	:	Control to Minimum
AF Gain	:	Control to Maximum
BFO	:	Control to Mid-Range

With the BFO switch set to OFF, connect audio generator set to 1kHz to Pins 3/68 and 3/69 (earth). Adjust generator level to give 0.5watt output at the power meter and check that the input level is of the order of 5mV.

With the BFO switch set to ON, connect audio generator set to 1kHz to Pins 3/74 and 3/73 (earth). Adjust generator level to give 0.5watt output at the power meter and check that the input level is of the order of 5mV.

AM IF Sensitivity Check

Overall Check

Connect the AM generator, set to 455kHz, modulated 30% at 1kHz to the mixer (middle) section of the main tuning gang. Stop the local oscillator by shorting to earth the oscillator (front) section of the main tuning gang.

RANGE switch to range 4 (1.5MHz to 3.5MHz) and set controls as follows:-

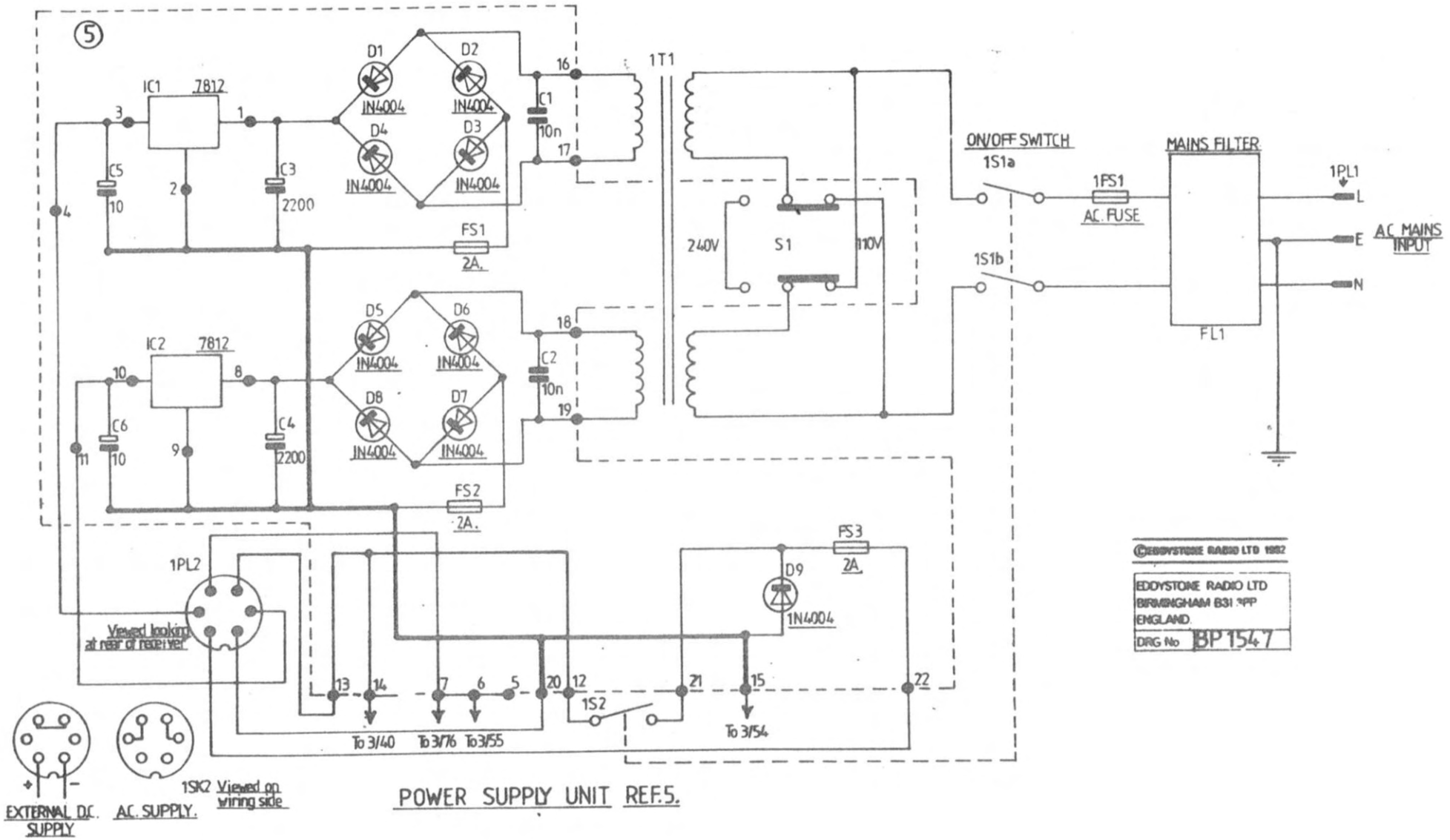
AM/CW - SSB	:	Switch to AM/CW
BFO	:	Switch to Off
Filter	:	Switch to Narrow
Gain	:	Switch to Manual
IF Gain	:	Control to Maximum
BFO	:	Control to Mid-Range
AF Gain	:	Control as required

Adjust generator level to give 15dB signal + noise/noise ratio at the AF output and check that the input level is of the order of 5µV.

Stage Checks

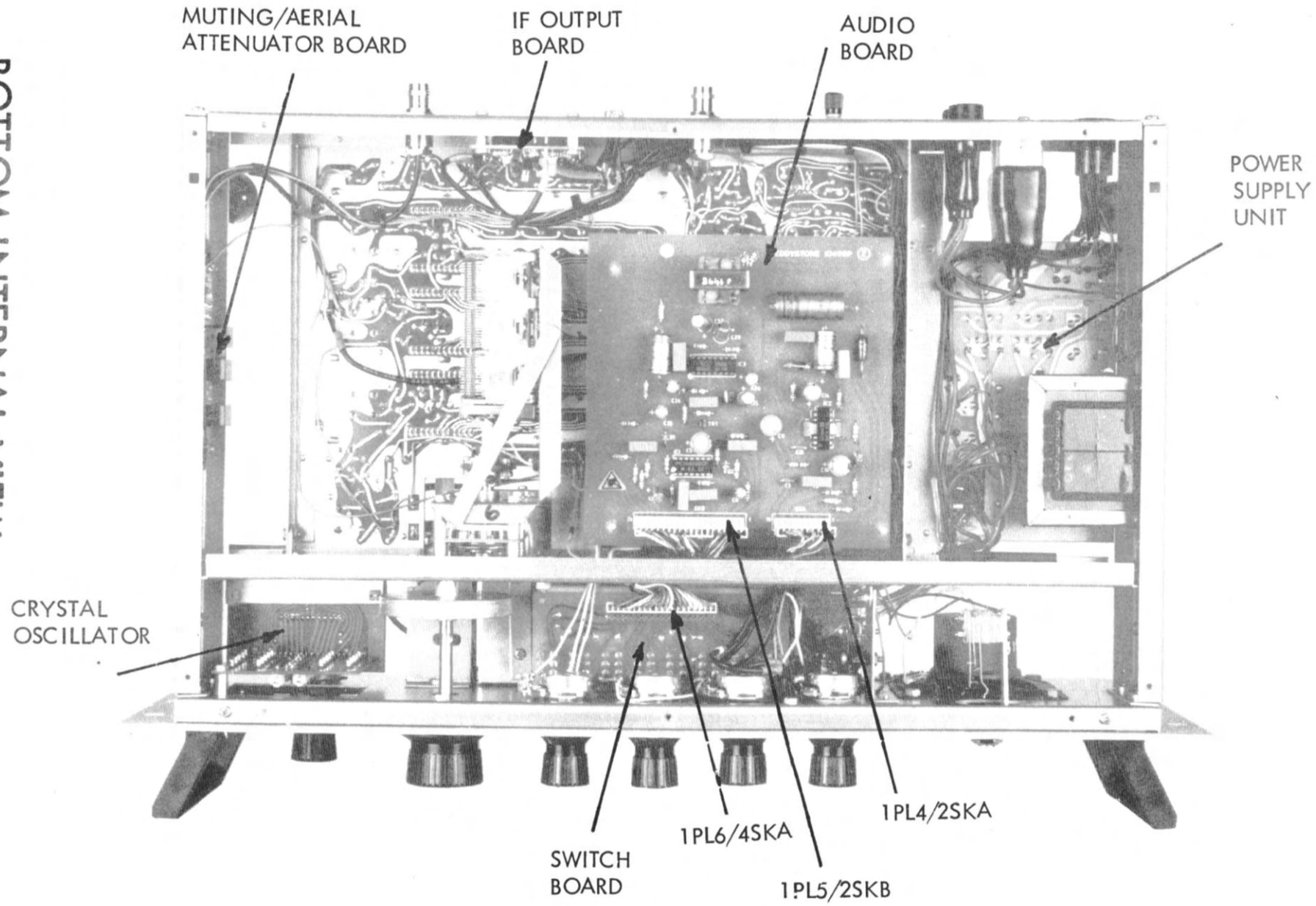
Connect the generator to Pins 3/59 and 3/58 (earth) and adjust the generator level to give 15dB signal + noise/noise ratio at the AF output. Check that the input level is of the order of 18µV.

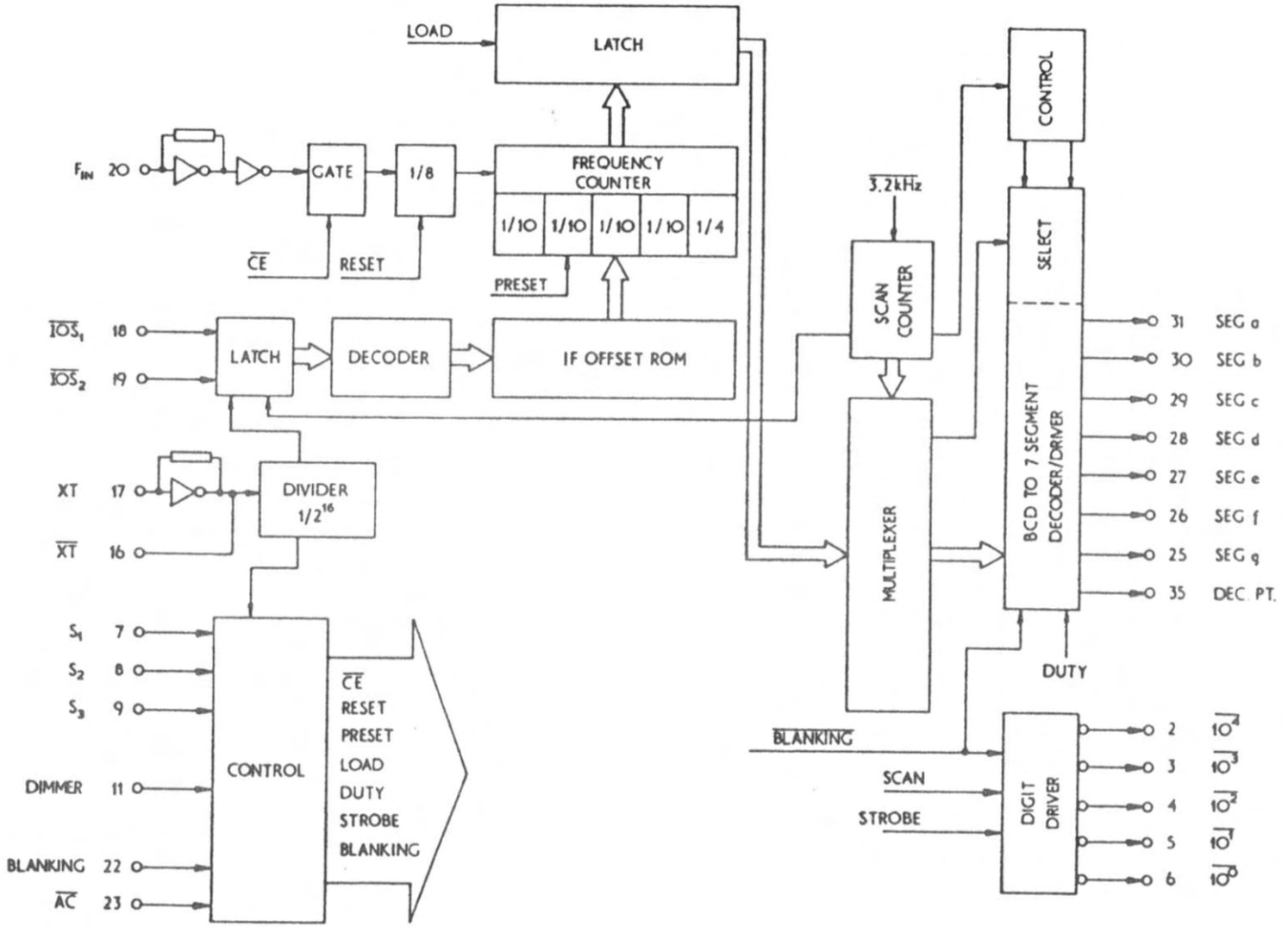
Repeat the test with the generator connected to Pin 3 on 3/IC2 (via a 100n blocking capacitor) and earth. Check that the input level required for 15dB signal + noise/noise ratio is of the order of 130µV.



POWER SUPPLY UNIT REF.5.

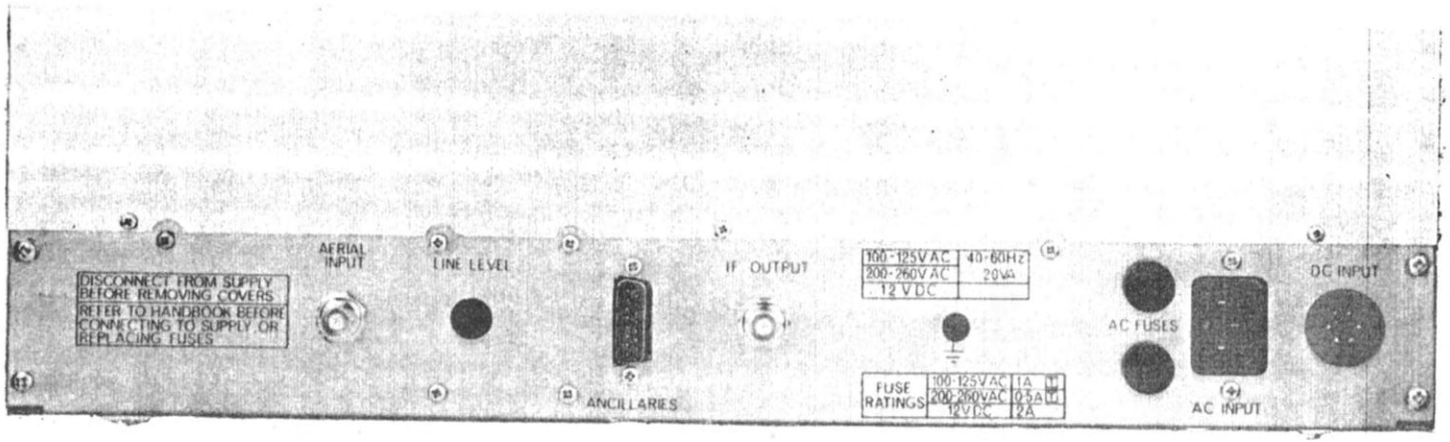
BOTTOM INTERNAL VIEW



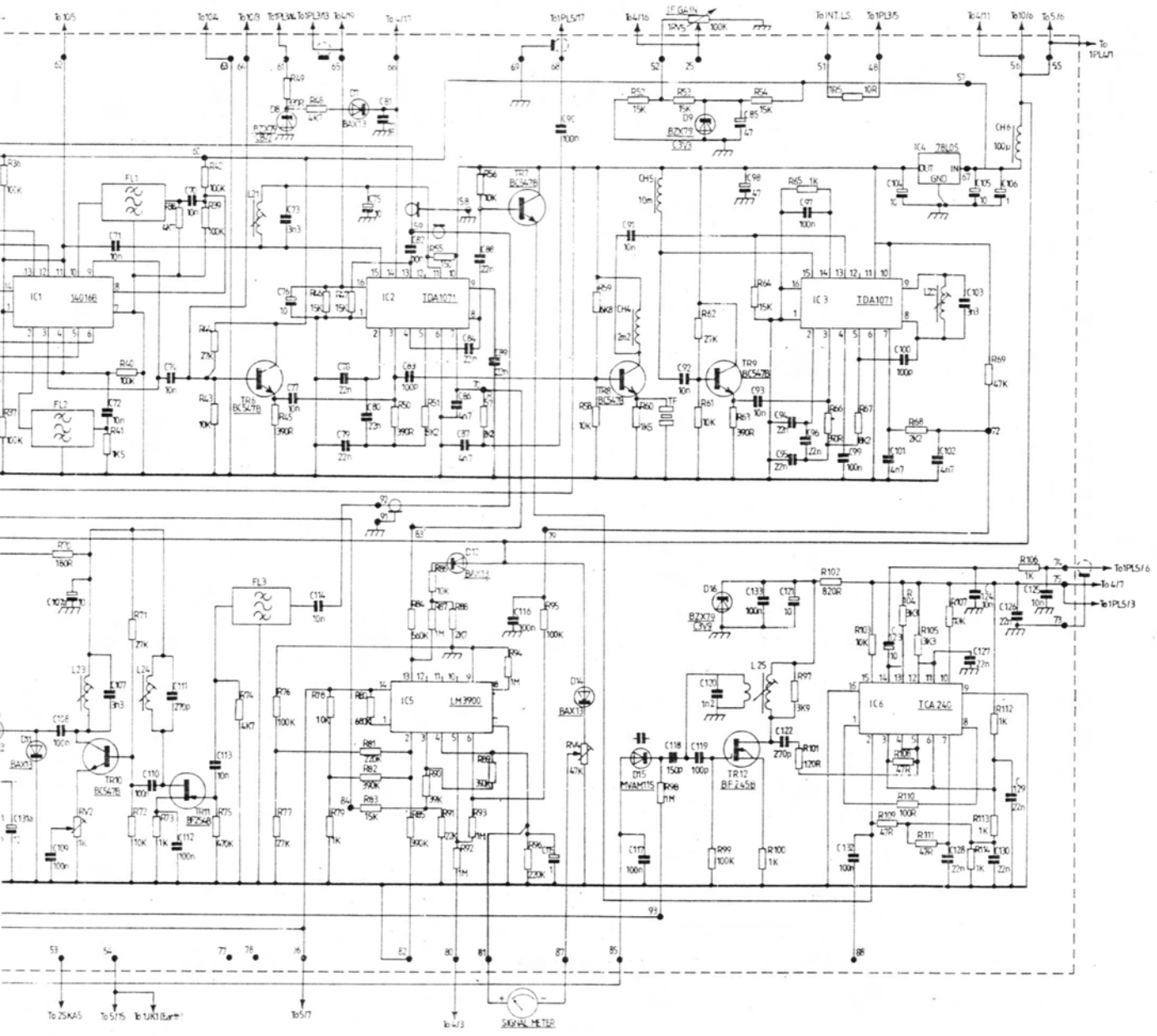


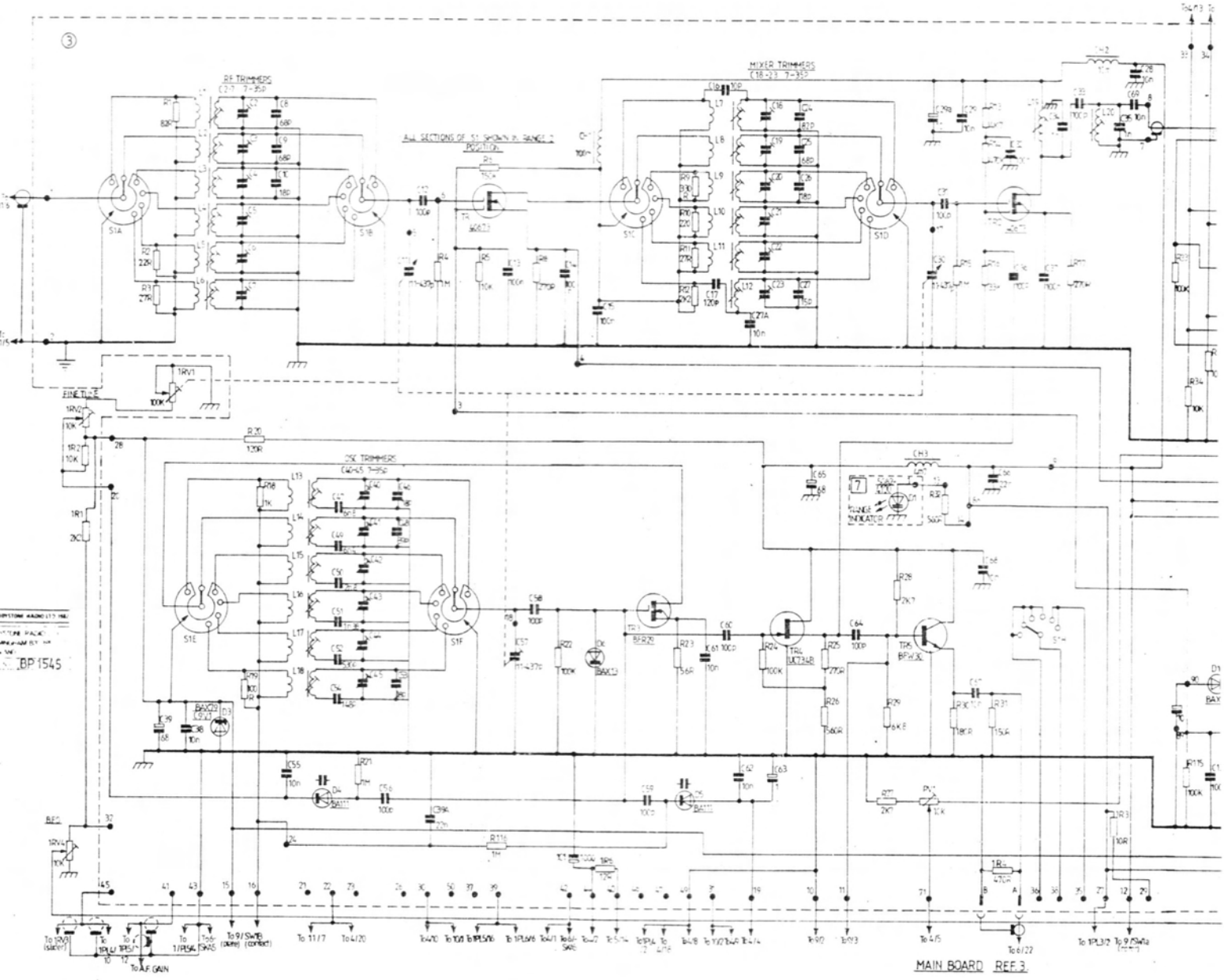
BLOCK SCHEMATIC - FREQUENCY DISPLAY CIRCUIT 6IC5

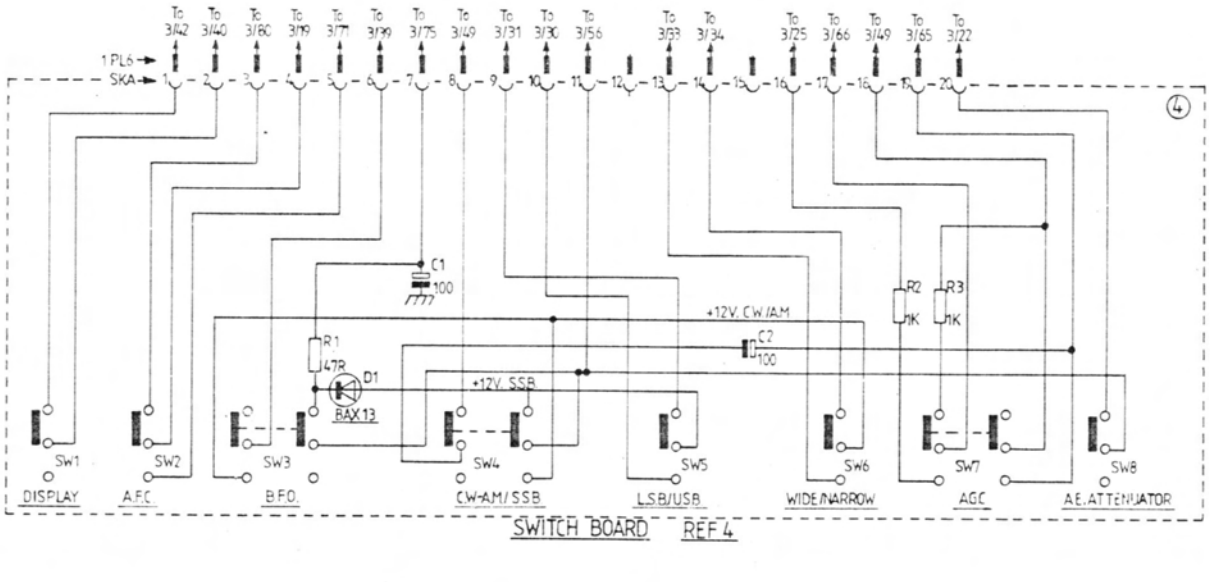
[USE IN CONJUNCTION WITH CIRCUIT DIAGRAM - FREQUENCY DISPLAY MODULE BP1464]



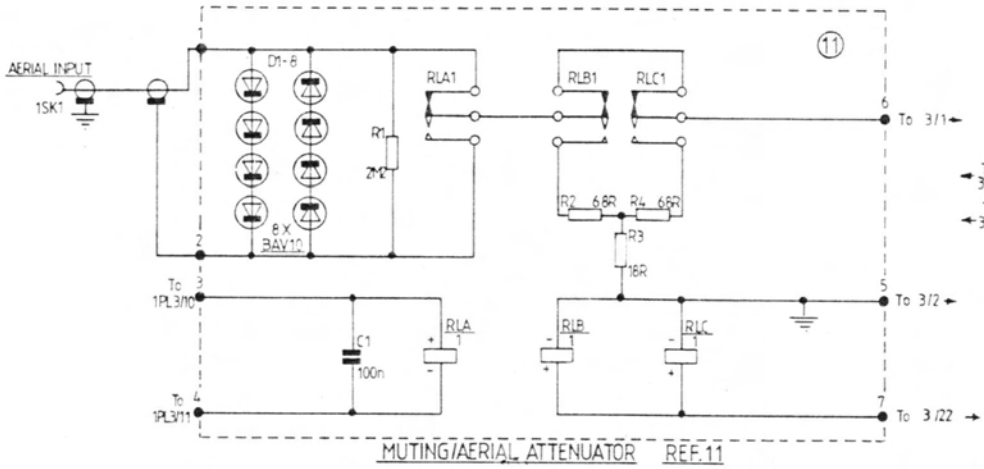
REAR PANEL VIEW


IC1 14016B
IC2 TDA1071
IC3 TDA1071
IC4 78L05
IC5 LM3900
IC6 TCA 240
TR6 BC547B
TR7 BC547B
TR8 BC547B
TR9 BC547B
TR10 BC547B
TR11 BF256
TR12 BF245B
D15 MVAM115
D16 BZX79 C5V6
SIGNAL METER
To 10/5
To 10/4
To 10/3
To PL3/6
To PL3/3
To 4/9
To 4/17
To PL5/17
To 4/16
IF GAIN
To INT. LS.
To PL3/5
To 4/11
To 10/6
To 5/16
To 1PL4/1
To PL5/16
To 4/7
To PL5/13
To 2SKA5
To 5/15
To UK1 (Earth)
To 5/7
To 4/3

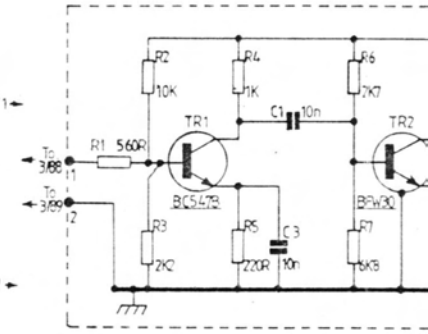

RF TRIMMERS
MIXER TRIMMERS
OSC TRIMMERS
FINE TUNE
RANGE INDICATOR
MAIN BOARD REF 3



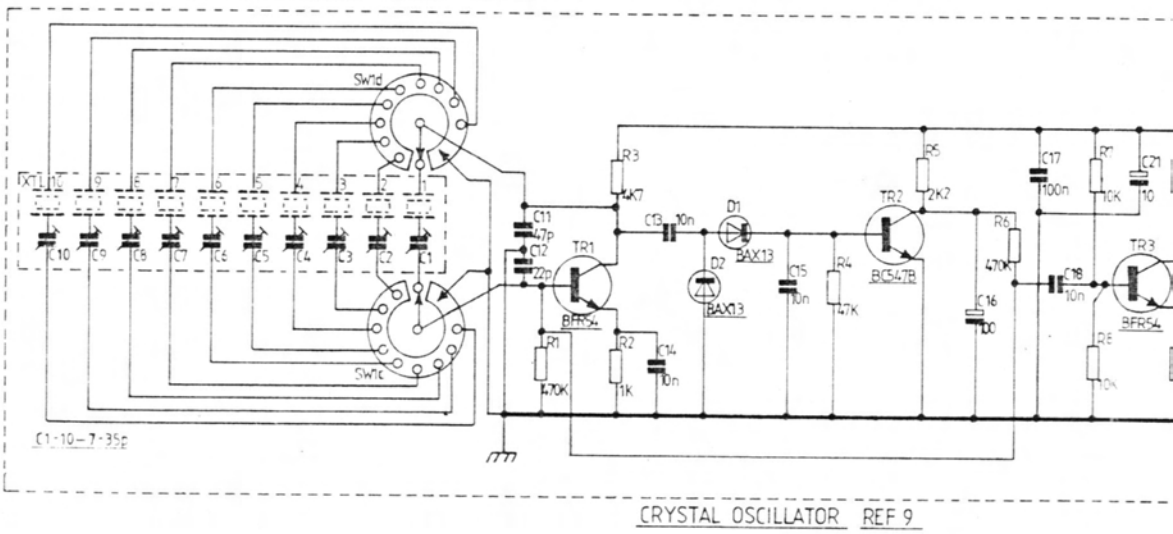
SWITCH BOARD REF 4



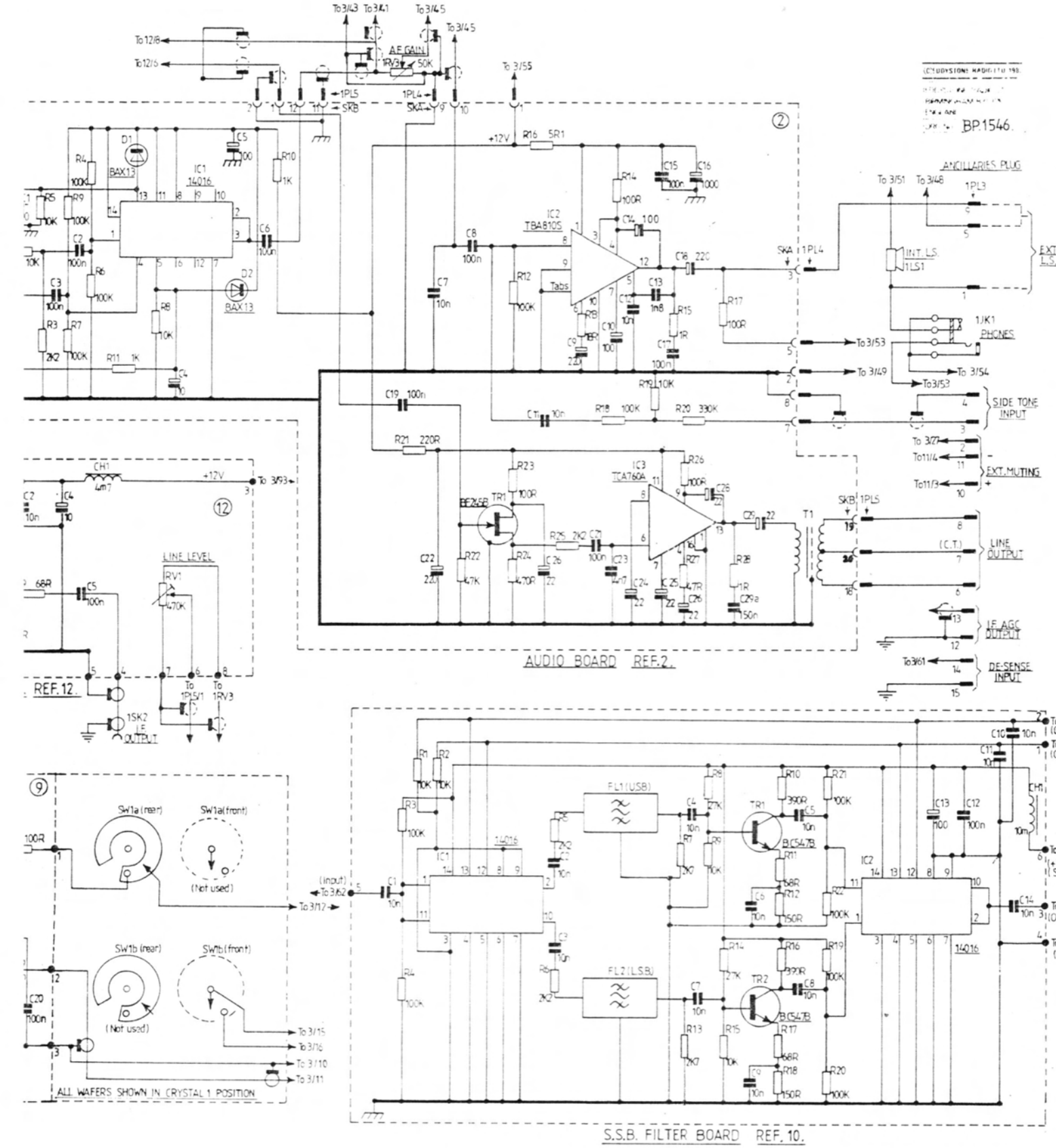
MUTING/AERIAL ATTENUATOR REF. 11

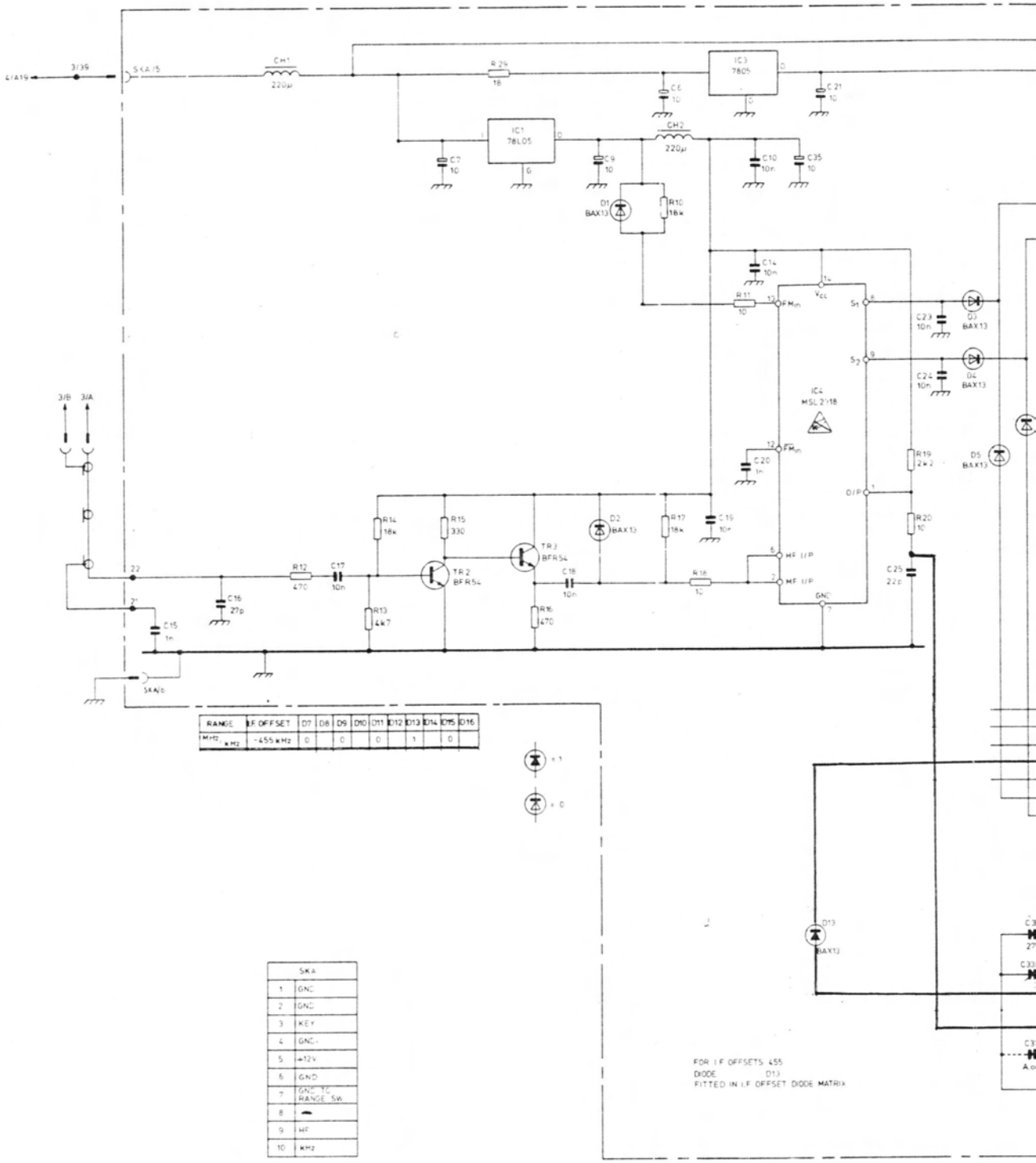


I.F. OUTPUT BO



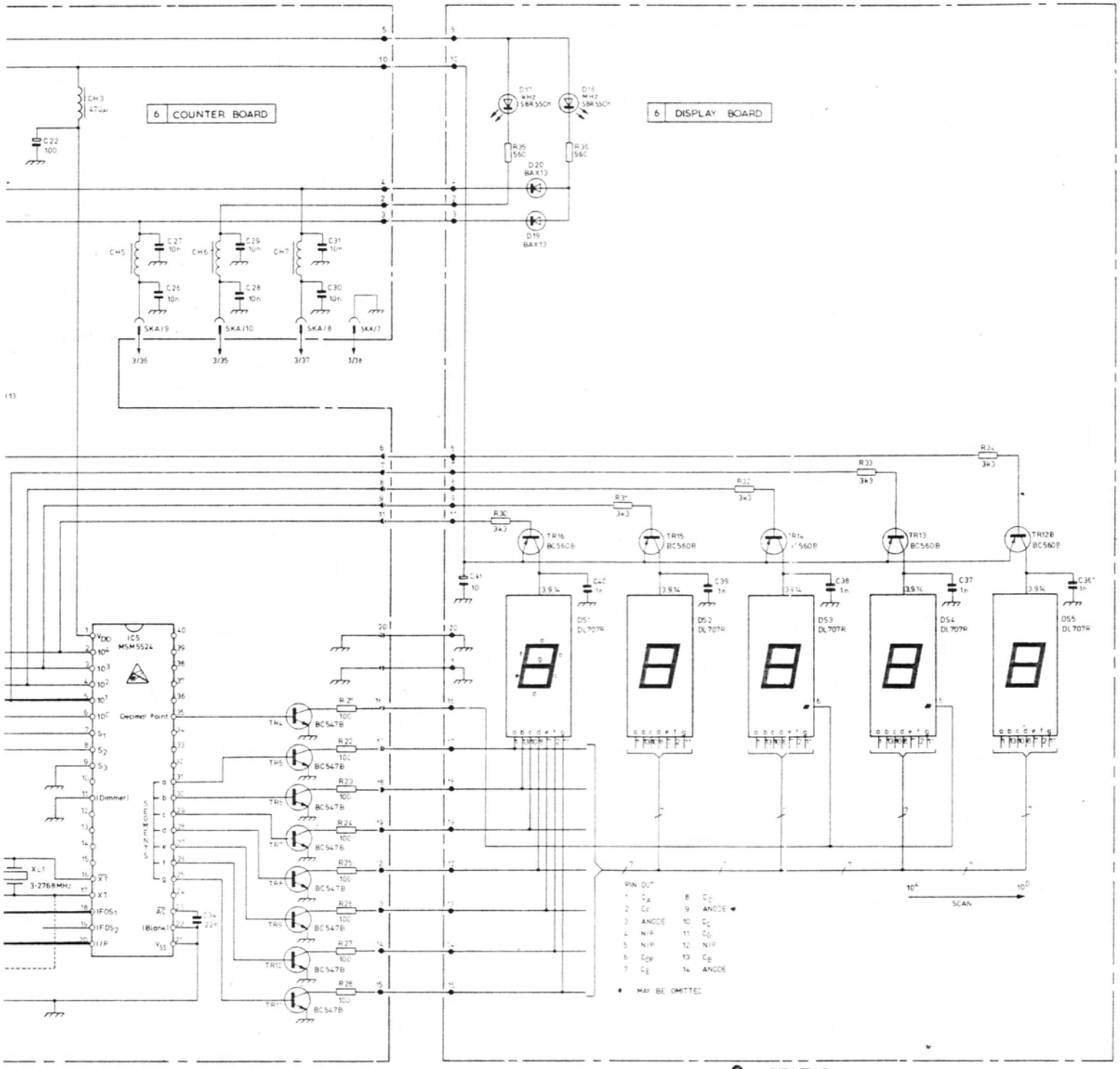
CRYSTAL OSCILLATOR REF 9


BP.1546.
AUDIO BOARD REF.2.
REF.12.
S.S.B. FILTER BOARD REF. 10.
ANCILLARIES PLUG
AF GAIN
50K
IC1 14016
IC2 TBA810S
IC3 TCA760A
TR1 BF256B
T1
INT. LS.
EXT. L.S.
PHONES
SIDE TONE INPUT
EXT. MUTING
LINE OUTPUT
IF AGC OUTPUT
DE-SENSE INPUT
LINE LEVEL
1SK2 I.F. OUTPUT
SW1a (rear)
SW1a (front)
SW1b (rear)
SW1b (front)
(Not used)
ALL WAFERS SHOWN IN CRYSTAL 1 POSITION
FL1 (USB)
FL2 (LSB)
TR1 BC547B
TR2 BC547B
14016
(Input)
(Output)



RANGE	I.F OFFSET	D7	D8	D9	D10	D11	D12	D13	D14	D15	D16
MHz / KHz	-455 KHz	0		0		0		1		0	

	SKA
1	GND
2	GND
3	KEY
4	GND
5	+12V
6	GND
7	GND TO RANGE SW.
8	—
9	MF
10	KHz



FREQUENCY DISPLAY MODULE

STATIC SENSITIVE DEVICE

BP1464 ISSUE 1