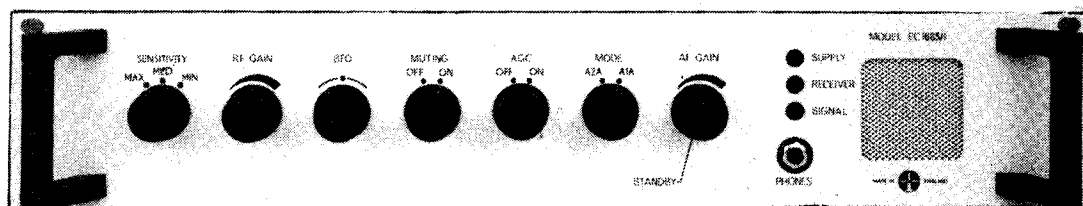


Eddystone

MODEL 1685 SERIES

For Remote Control of 1680 Receivers



Manufactured in England by Marconi Instruments Limited for —



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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.

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Supplement for 1685/3A and 1685/3B

The Eddystone 1685/3A and 1685/3B are variants of 1685 remote control units suitable for operating 1680/3A and 1680/3B receivers. These units differ from the 1685/1A in the following manner:-

Functions Controlled refer to Page 1 of Section 1.

RF Sensitivity 0dB, -20dB, -40dB	2 control lines
AGC on/off	1 control line
Muting (squench) on/off	1 control line
Mode AM, USB (1685/3A)	2 control lines
Mode AM, USB, CW (1685/3B)	3 control lines
RF Gain	1 analog line
Clarifier	1 analog line
Muting (squench) level	1 analog line
BFO (1685/3B)	1 analog line

Remote Connections refer to Figure 4.3 Page 5 of Section 4.

Pins 1 to 10 no connection	
Pin 11 Analog BFO (1685/3B only)	(3 to 8 volts)
Pin 12 CW Mode select (1685/3B only)	(Earth for CW)
Pin 13 AM Mode select	(Earth for AM)
Pin 14 RF Sensitivity (Min)	(Earth for max. sensitivity)
Pin 15 RF Sensitivity (Med)	(Earth for max. sensitivity)
Pin 16 Digital earth	
Pin 17 Analog earth	
Pin 18 Squelch on/off	(Earth for squelch off)
Pin 19 AGC on/off	(Earth for AGC on)
Pin 20 USB Mode select	(Earth for USB)
Pin 21 Analog squelch level	(3 to 8 volts)
Pin 22 Mute (squench) signal	
Pin 23 +15 volts from 1680	
Pin 24 Analog RF Gain	(3 to 8 volts)
Pin 25 Analog Clarifier	(3 to 8 volts)

Setting up Procedure refer to Page 5 of Section 4.

RV2 and RV5 adjust the limits of the squelch level.
 RV3 and RV6 adjust the limits of the RF Gain attenuation.
 RV4 and RV7 adjust the limits of the Clarifier.
 RV8 and RV9 adjust the limits of the BFO (1685/3B only).

Section 1

GENERAL DESCRIPTION AND SPECIFICATION

The Eddystone 1685/1 remote control unit provides remote control of an Eddystone 1680/1 receiver over multi-core cable. The functions controlled are:-

RF Sensitivity 0dB, - 20dB, -40dB
AGC on/off
Muting (Squelch) on/off
Mode A1A, A2A
RF Gain
BFO
Muting (Squelch) level on 1685/1A only

An audio amplifier is fitted to drive an internal monitor loudspeaker, external loudspeaker, or headphones.

Indicators on the remote control panel show whether power is applied to the 1680/1 receiver and whether a signal is present above the preset muting (squelch) threshold.

GENERAL SPECIFICATION

Switch functions provide a closed contact to ground (digital earth line), and analog controls provide a voltage switch of +3V to +8V referred to the analog earth.

RF Sensitivity MAX, MED, MIN	2 control lines
AGC on/off	1 control line
Muting (squelch) on/off	1 control line
Mode A1A, A2A	1 control line
RF Gain	1 analog line
BFO	1 analog line
Muting (squelch) level 1685/1A only	1 analog line
AF Gain -	changes audio output in 1685/1 only
Standby -	combined with AF Gain switches power on 1685/1 only

Additional lines are required for:-

- | | | |
|--------------------------|---|--|
| +15V from 1680/1 | - | indicates power on to 1680/1 and provides voltage for analog controls in 1685/1. |
| Muting (squellch) signal | | |
| Digital earth | | |
| Analog earth | | |

An additional twisted pair is required for the audio connection.

Power Supplies

AC 100V/130V and 200V/260V (40Hz-60Hz)
24V DC with negative earth
Consumption 10VA

Environmental

- | | | |
|-------------|---|---|
| Operational | - | -10°C to +55°C |
| Storage | - | -40°C to +70°C |
| Humidity | - | 95% at +40°C |
| Vibration | - | compatible with all marine specifications |

Dimensions

- | | | |
|---------------------|---|--|
| Panel | - | 483mm x 88mm (19 inches x 3.5 inches) |
| Intrusion into rack | - | 166mm (6.5") over cover plus 50mm (2") for cabling |
| Weight | - | 4.5Kg |

Audio Input

Preset control for levels between -10dBm and +10dBm.

Audio Output

- | | | |
|-------------|---|--|
| Loudspeaker | - | 2 watts into 8Ω at less than 5% distortion |
| Headphones | - | 10mW maximum Low/Medium impedance |

CIRCUIT DESCRIPTIONAudio Amplifier

Audio signals are fed via the ancillaries socket via transformer 2T1 to 2RV1 which is preset to cater for recommended input levels between -10dBm and +10dBm. Signals are then passed via the AF GAIN control 1RV1 to the audio amplifier 2IC1. Audio output is taken to Pin 1 on 1SK1 and also to the phone jack 1JK1. The internal loudspeaker is enabled by linking Pins 1 and 2 on 1SK1.

Power Supply

The power input requirements to the 1685/1 are either AC supplies 40Hz-60Hz at 100V/130V or 200V/260V or +24V DC with negative earth.

AC supplies are routed through a filtered mains socket to a transformer 1T1 and bridge rectifier 2D2 to 2D5. A fuse 1FS1 and on/off switch are incorporated in the 'LINE' side of the supply to the transformer. After rectification the voltage passes through a DC fuse to the reservoir capacitor 2C11 and to an 18V regulator 1IC1.

DC supplies are connected to the ancillaries socket 1SK1 Pin 24 (+) and Pin 25 (-). Negative supply Pin 25 is connected to Printed Circuit Board Pin 6.

The DC supply is fed to 1FS2 (DC fuse) via protection diode 2D1 which prevents damage due to accidental reversal of DC supply polarity. Front panel LED (1D3) 'SUPPLY' indicates presence of supply (AC or DC).

Controls and Control Lines

With the 1680/1 receiver set for remote operation +15V from the 1680/1 receiver is applied to Pin 23 of 1PL2, and when present turns on 2TR2 which lights 1D2 indicating that the 1680/1 receiver has power supplied. This voltage is also used to provide the control voltage for the BFO, RF Gain and Muting (squench) level. The actual voltage for these controls is preset by 2RV2 to 2RV7.

Mute (squench) signal is applied to Pin 22 of 1PL2 at either 0V (SIGNAL PRESENT) or +12V (NO SIGNAL). When 0V, 2TR1 is turned off and so 1D3 is illuminated provided that +15V is also present at Pin 12 of 1PL2.

The mode switch provides a connection to digital earth when mode A2A is selected.

The squelch switch provides a connection to digital earth when squelch is OFF.

The AGC switch provides a connection to digital earth when AGC is ON.

RF Sensitivity provides connections to digital earth for both lines when RF Sensitivity is Maximum.

MECHANICAL CONSTRUCTION

General

The 1685/1 Remote Control Unit is designed for direct mounting in 483mm (19 inches) rack-ing. Fixing slots conform to a standard centre-spacing of 76mm (3 inches) and the receiver should be secured to the rack by four M6 x 16mm chromium plated screws (Eddystone 11328P). The dimension of 50mm given in Section One for rear-mounted plugs etc., includes sufficient space to allow cables entering the unit in the same plane to be bent at right angles over a reasonable radius.

Internal Construction

All circuitry is contained on one printed circuit board which is secured to the chassis by four M3 x 6mm screws.

The power unit is contained in a screened box at the right hand side, with a removable cover allowing access for mains voltage adjustment. The bridge rectifier diodes and reservoir capacitors are mounted on the printed circuit board, and voltage regulator inside the power unit. AC and DC fuses are accessible from the rear panel.



Section 4

INSTALLATION AND OPERATION

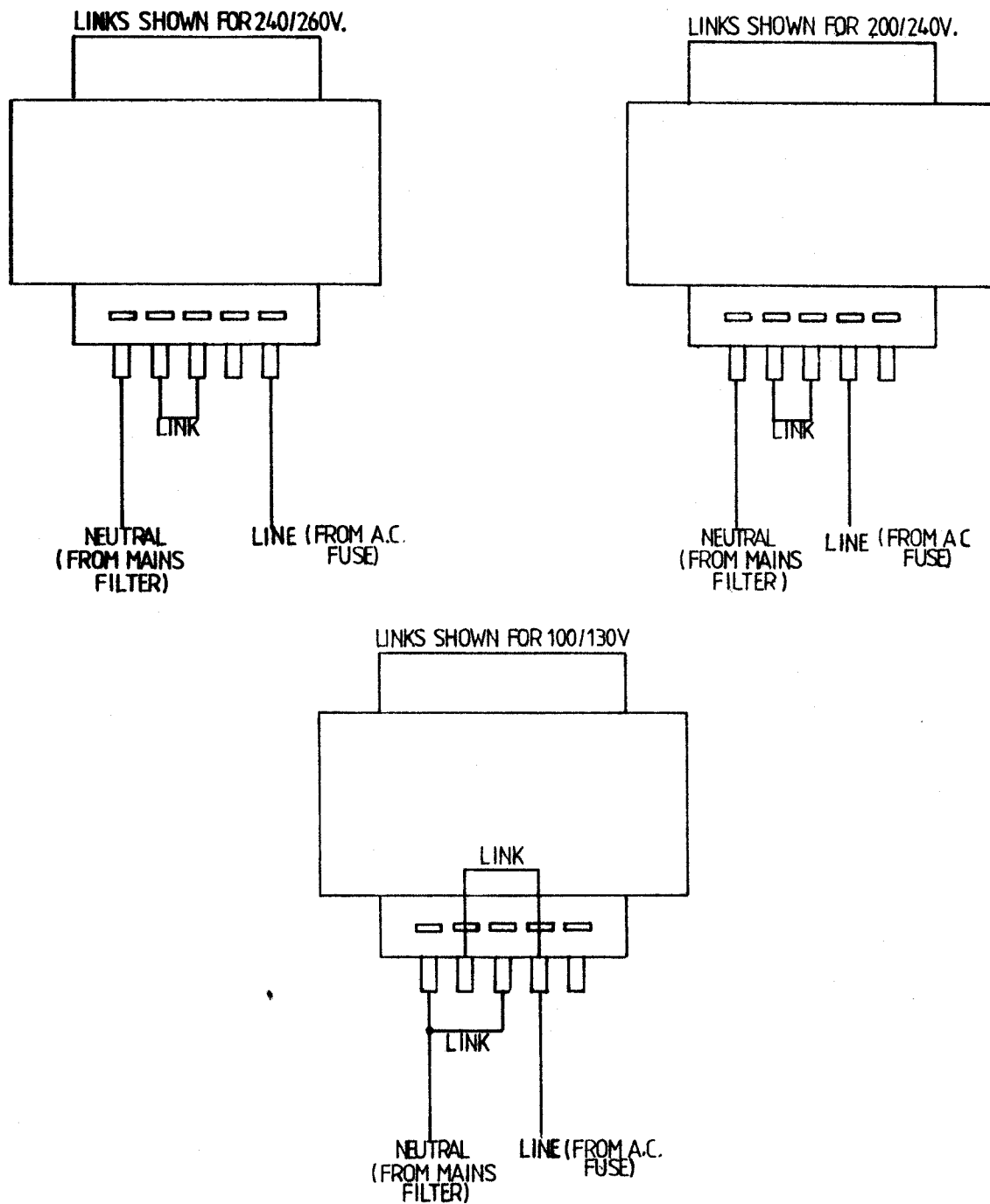
Accessories Kit (supplied with 1685/1)

Quantity	Description	Part Number
1	AC Supply Connector (complete with 2 metres of 3 core cable)	D4815
1	Ancillaries Connector (25 pin socket complete with cover)	D5677
1	Remote Connector (25 pin plug complete with cover)	D5676
1	Spare Fuse (1A for AC)	9816P
1	Spare Fuse (2A for DC)	10577P
1	Available to special order Box key for control knobs	9057P

Mains Transformer Voltage Adjustment (See Figure 4.1)

Unless otherwise specified at the time of ordering all 1680 receivers are supplied set for 240V/260V operation.

The power transformer is located in a screened compartment at the right hand rear of the receiver. It will be necessary to remove the receiver top cover (eight M3 screws) and the power unit screened compartment cover (four M3 screws, two are located on the receiver back plate) to gain access for mains voltage adjustment.



N.B. Disconnect from supply before adjusting taps or removing covers from receiver.

FIGURE 4.1

ANCILLARIES CONNECTOR (1PL1)
VIEWED ON WIRING SIDE.

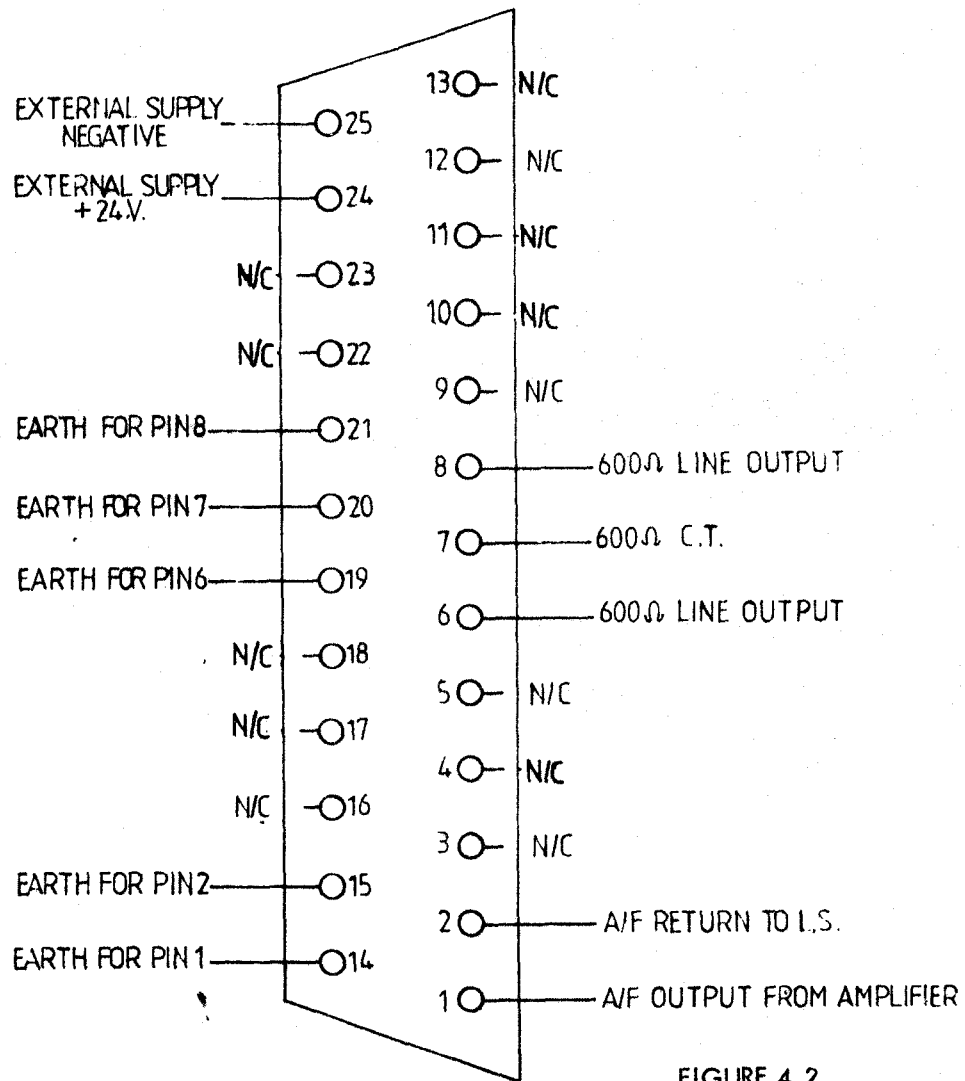


FIGURE 4.2.

Installation For AC Working

- 1) Check that power transformer is set to the correct mains voltage tapplings.
(Refer to paragraph headed : Mains Transformer Voltage Adjustment).
- 2) Connect Earth terminal on rear panel to rack frame.
- 3) Connect AC Supply Connector (1SK3) to AC Input socket (1PL3) on the rear panel and connect the mains lead to the local supply: BROWN = LINE; BLUE = NEUTRAL; GREEN/YELLOW = EARTH.

Installation For DC Working

- 1) Fit a red lead to Pin 24 of 25 way Ancillaries Connector (Plug 1PL1). Fit a black lead to Pin 25.
- 2) Connect red lead from Pin 24 to +24V. Connect black lead from Pin 25 to 0V (earth).

Audio Output

- 1) If the internal loudspeaker is required link Pins 1 and 2 on the ancillaries connector (1PL1). Insertion of the headset jack plug will mute the internal loudspeaker.
- 2) If external loudspeaker is required connect leads to Pins 1 and 15 on ancillaries connector (1PL1). External speaker will now be muted if the phone jack is inserted. For unmuted operation connect to Pins 1 and 14.
- 3) If headset reception is required insert jack plug in 'PHONES' socket on front panel. Insertion of jack plug disconnects internal loudspeaker and/or external loudspeaker. See (1) and (2).

Audio Input

Connect audio input to Pins 6 and 8 of Ancillaries Connector 1PL1. If balanced audio, connect Pin 7 of Ancillaries Connector to earth (Pin 20).

Remote Connections

Make the required connections as Figure 4.3.

Remote Connector (1SK2) viewed on wiring side.

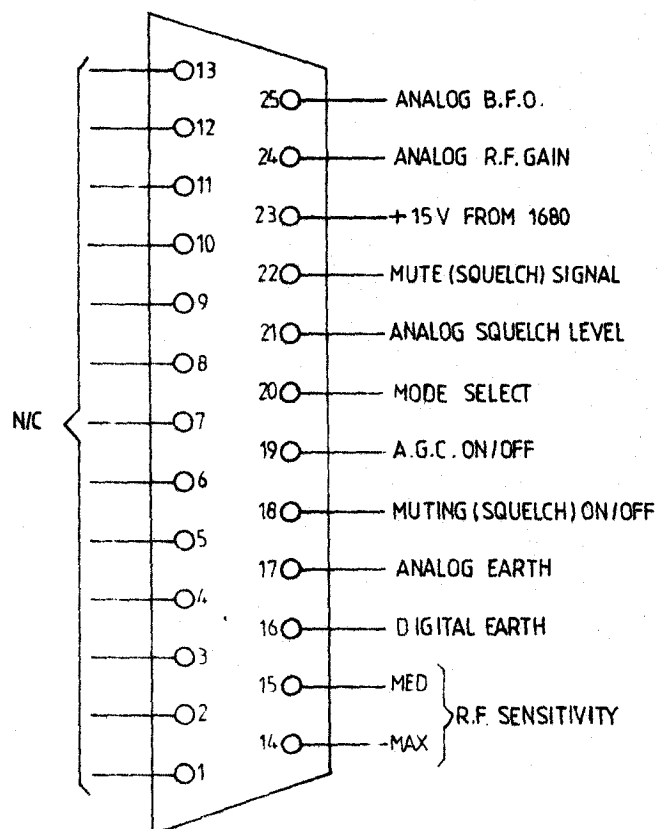


FIGURE 4.3.

Setting-Up Procedure

- 1) Ensure 1680/1 receiver has been set up according to the instruction manual and set Remote/Local switch to 'REMOTE'.
- 2) Ensure mains transformer has been adjusted to suit the intended input voltage and make necessary connections to 1PL3, 1SK1 and 1PL2.
- 3) Turn 1685/1 AF Gain in clockwise direction and ensure that 'SUPPLY' light is on.
- 4) Ensure 'RECEIVER' light is on (indicating +15V available from 1680/1 receiver) and that with squelch off, 'SIGNAL' light is on.

5) Preset potentiometers 2RV1 to 2RV7 are set at the factory before despatch, but may need some slight adjustment on installation:-

a) 2RV1 sets the audio drive and is best adjusted under traffic conditions with AF Gain turned to half travel to give a comfortable audio output level.

b) RV4 and RV7 adjust the limits of the BFO swing on A1A.

c) RV3 and RV6 adjust the limits of the RF Gain attenuation.

d) RV2 and RV5 adjust the limits of the squelch level (1685/1A only).

6) Check that all controls operate the 1680/1 receiver in the normal manner.

Section 5

MAINTENANCE

General

The basic design features of the 1685 series of receivers ensure that these are extremely reliable in service. Consequently, these receivers require very little in the way of maintenance, even when in continuous use under arduous operating conditions.

This section of the Handbook gives guidance for simple operations, such as changing fuses etc., and then progresses to more detailed instruction on performance testing and re-alignment.

At the end of this section there is a comprehensive analysis of all circuit voltages for reference when carrying out fault-finding, and should be used in conjunction with the circuit diagrams bound at the rear of this Handbook.

Fuse Replacement

Two screw-in type fuse holders are located on the rear panel of the receiver. The AC fuse is rated at 1A and the DC fuse at 2A. Spare fuses are included in the accessory kit supplied with each receiver and additional spares may be ordered by quoting Eddystone part number 9816P for 1A fuse and 10577P for the 2A fuse.

Circuitry Access

Removal of the top cover is achieved by removing eight 3mm screws which gives immediate access to all preset potentiometers.

In the extremely unlikely event of component failure, access can be gained to the underside of the printed circuit board by removing the four M3 fixing screws and hinging the board upwards.

Access to the power supply can be gained by removing four M3 screws (two inside the unit and two on the rear panel).

Performance Testing

Test Equipment

Audio oscillator - Marconi Instruments TF 2100 or similar
Multimeter or Digital Voltmeter - AV08 or Fluke 8050A or similar
AF Power Meter - Marconi Instruments TF893A or similar
Distortion Factor Meter - Marconi Instruments TF2331 or similar

If the unit is suspected of substandard performance, withdraw the unit from service and proceed as follows:-

- a) Connect power supply and ancillaries connector to unit.
- b) Test audio by applying a signal at 1kHz from the audio oscillator to Pins 6 and 8 of remote socket. With a power meter at 8 Ω impedance between Pins 1 and 14, an output of 2 watts at less than 5% distortion should be achieved for input of 10mV with AF Gain at half travel and 2RV1 fully clockwise.

- c) With Multimeter check following switch functions by measuring at remote socket:-

AGC on Pin 19 s/c to digital earth (Pin 16)
AGC off Pin 19 o/c
RF Sensitivity MAX , Pins 14, 15 of remote socket s/c to digital earth.
RF Sensitivity MED , Pin 14 s/c to digital earth, Pin 15 o/c.
RF Sensitivity MIN , Pin 14 o/c, Pin 15 s/c to digital earth.
MODE A2A, Pin 20 s/c to digital earth.
MODE A1A, Pin 20 o/c.
SQUELCH ON, Pin 18 o/c.
SQUELCH OFF, Pin 18 s/c to digital earth.

- d) Apply +15V to Pin 23 with negative to digital earth (Pin 16). Receiver light should be on when +15V applied. Signal light should also be on, and should go off when +15V is simultaneously applied to Pin 22.

- e) With +15V to Pin 23 and negative to analog earth, voltage on Pin 25 should vary between 3V and 8V (with respect to analog earth) over the BFO range. Pin 24 should vary between 3V and 8V over the RF Gain range. Pin 21 should vary between 3V and 8V over the squelch level range (1685/1A only).

BFO range is reset by 2RV4 and 2RV7.

RF Gain range is reset by 2RV3 and 2RV6.

Squelch level range is reset by 2RV2 and 2RV5.

VOLTAGE TABLES

Pin		1	2	3	4	5	6	7	8	9	10	11	12
IC1		18.0	0	0	17.6	0.7	1.5	8.9	0.2	0	0	0	9.4

	e	b	c
TR1	0	0	2.5
	0	0.7	0
TR2	0	0	18V
	0	0.7	0.2

Section 6

SPARES 1685/1 REMOTE CONTROL

Section 6

SPARES

1685/1 Main Printed Circuit Board

Capacitors

Circuit Ref.	Value	Tolerance	Voltage Wkg.	Type
2C1	100n	±20%	100V	Polyester
2C2	220μ	+50% - 20%	16V	Electrolytic
2C3	100μ	+50% -20%	25V	Electrolytic
2C4	1000μ	+50% -20%	25V	Electrolytic
2C5	100n	±20%	100V	Polyester
2C6	100μ	+50% -20%	25V	Electrolytic
2C7	4n7	±10%	100V	Ceramic Plate
2C8	820p	±10%	100V	Ceramic Plate
2C9	100n	±20%	100V	Polyester
2C10	220μ	+50% -20%	25V	Electrolytic
2C11	6800μ	+50% -20%	25V	Electrolytic
2C12	10μ	+50% -20%	50V	Electrolytic
2C13	10μ	+50% -20%	50V	Electrolytic

Resistors

Circuit Ref.	Value	Tolerance	Power Rating	Type
2R1	100k	±5%	0.5W	Carbon Film
2R2	18R			
2R3	100R			
2R4	1R			
2R5	100R			
2R6	100R			
2R7	2R7			
2R8	47k			
2R9	10k			
2R10	1k			
2R11	47k			
2R12	10k			
2R13	1k			

All resistors ±5% 0.33W Standard Film. Unless otherwise specified.

Variable Resistors

Circuit Ref.	Value	Tolerance	Power Rating	Type
2RV1	47k	±20%	0.5W	Cermet Preset
2RV2	100k	±20%	0.5W	Cermet Preset
2RV3	100k	±20%	0.5W	Cermet Preset
2RV4	100k	±20%	0.5W	Cermet Preset
2RV5	100k	±20%	0.5W	Cermet Preset
2RV6	100k	±20%	0.5W	Cermet Preset
2RV7	100k	±20%	0.5W	Cermet Preset

Diodes

Circuit Ref.	Type	Manufacturer	Description
2D1	1N4004	Mullard	Rectifier Diode
2D2	1N4004	Mullard	Rectifier Diode
2D3	1N4004	Mullard	Rectifier Diode
2D4	1N4004	Mullard	Rectifier Diode
2D5	1N4004	Mullard	Rectifier Diode
2D6	BAX13	Mullard	H/S Switching

Integrated Circuits

Circuit Ref.	Type	Manufacturer	Description
2IC1	TBA810S	S.G.S.	Audio Amp.

Transistors

Circuit Ref.	Type	Manufacturer	Description
2TR1	BC547B	Mullard	NPN G/P
2TR2	BC547B	Mullard	NPN G/P

1685/1 Main Printed Circuit Board Continued.....

Miscellaneous

T1 Audio Input Transformer 8641P
Printed Circuit Board 12118P

1685/1 Chassis Assembly Spares

Capacitors

Circuit Ref.	Value	Tolerance	Voltage Wkg.	Type
1C1	1 μ	+50% -20%	100V	Electrolytic

Resistors

Circuit Ref.	Value	Tolerance	Power Rating	Type
1R1	1k	\pm 5%	0.33W	Standard Film

Variable Resistors

Circuit Ref.	Value	Tolerance	Power Rating	Type
1RV1	*10k	\pm 20%	0.25W	Carbon Log
1RV2	100k	\pm 20%	0.5W	Carbon Lin
1RV3	10k	\pm 20%	0.5W	Carbon Lin
1RV4	47k	\pm 20%	0.5W	Carbon Lin

*Ganged with 1SW1a & b

1685/1 Chassis Assembly Continued.....

Integrated Circuits

Circuit Ref.	Type	Manufacturer	Description
1IC1	MC7818CT	Motorola	Voltage Regulator

Diodes

Circuit Ref.	Type	Manufacturer	Description
1D1	V168P	Telefunken	LED (Red)
1D2	V168P	Telefunken	LED (Red)
1D3	V168P	Telefunken	LED (Red)

Switches

Circuit Ref.	Description	Part Number
1SW1	2P/2W Ganged with 1RV1	11342P
1SW2	1P/2W Switch Spindle & Clicker	11266P
1SW3	1P/2W Switch Spindle & Clicker	11266P
1SW4	1P/2W Switch Spindle & Clicker	11266P
1SW5	2P/3W Switch Spindle & Clicker	11268P

Miscellaneous

1T1	Mains Transformer	11341P
1PL1	Mains connector/filter	9715P
1JK1	Phone Jack	6660P
1LS1	Loudspeaker	10558P
1PL2	25 way connector (Male)	11153P
1SK1	25 way socket (Female)	10976P
	Fuseholders	9458P
FS1	20mm 1A Glass Fuse	9816P
FS2	20mm 2A Glass Fuse	10577P

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 Number 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

APPENDIX A

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%).

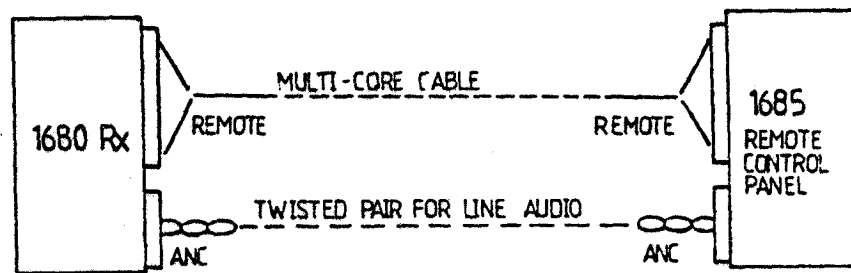
APPENDIX B

Remote Control of 1680 Receivers

Appendix B

The 1680 series of receivers can be used in a variety of remote controlled configurations, depending on the separation distance of the remote control panel from the receiver, and the number and quality of the interconnection lines.

Multi-Wire Parallel Data Systems



The number of ways on the multi-core cable depends on how many of the following functions are required.

AGC on/off	1 line
Muting on/off	1 line
Mode selection	1 line per mode
Channel selection	1 line (1680/4 only)
Input sensitivity	2 lines
Earth return	1 line
BFO	either 5 lines encoded or 1 analog line*
Clarifier	either 5 lines encoded or 1 analog line*
RF Gain	either 5 lines encoded or 1 analog line*
Mute Signal	1 line (indicates at remote panel when signal present in association with muting level).
Receiver on	1 line (indicating at remote panel that power is present at receiver.

*If analog BFO, clarifier and RF gain lines are used, a separate analog earth return is also needed as well as the 'receiver on' line which provides the voltage for these controls. Analog controls are satisfactory for most applications except when the lines are susceptible to a high level of noise pick-up.

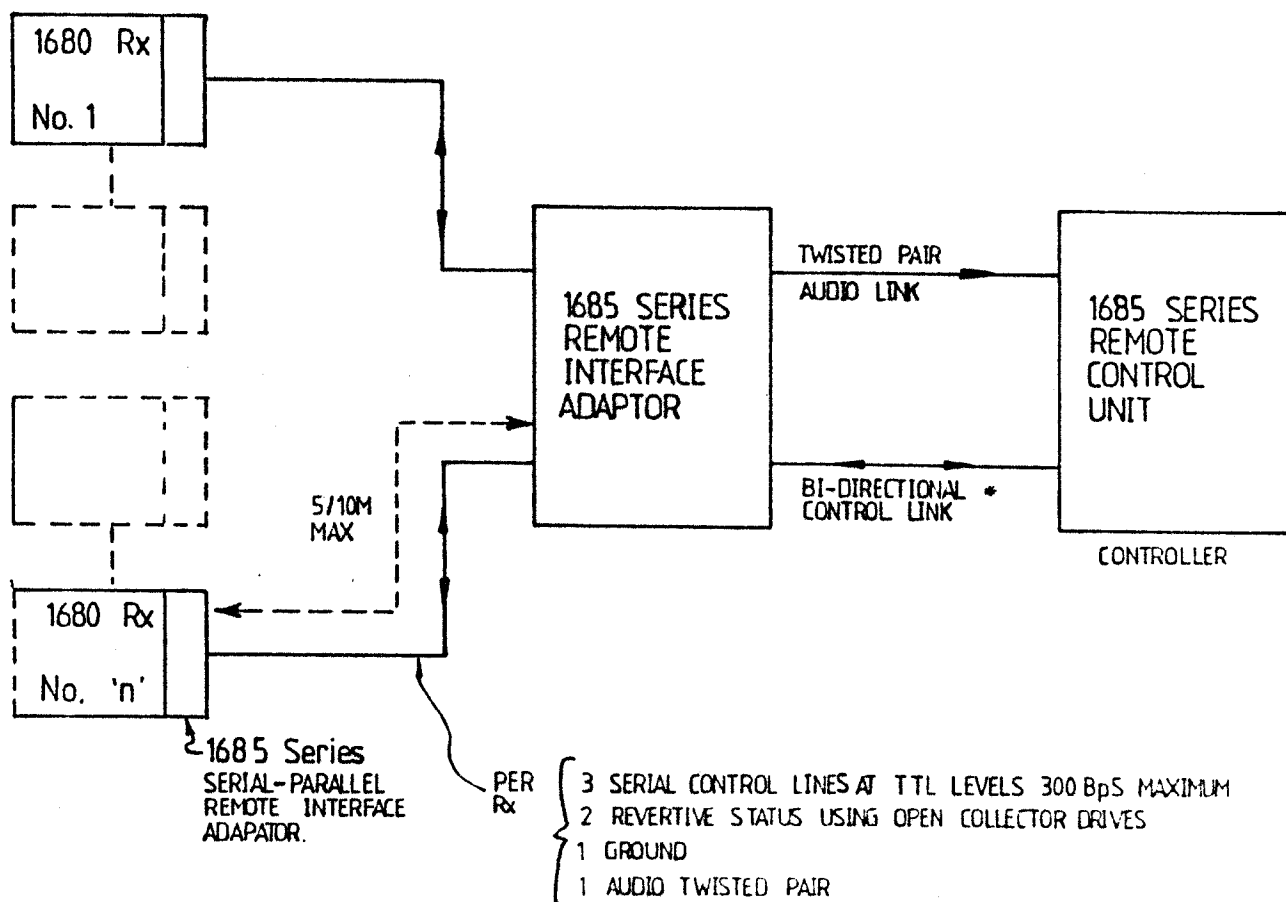
The standard 1680 receiver has connections for the encoded clarifier or BFO, and RF gain control, and can be used directly with a 1685 remote control panel if the line resistance is not greater than 30Ω . An additional interface printed circuit board fitted in the receiver is necessary if:-

- Analog controls of BFO, clarifier or RF gain required.
- Encoded control of BFO, clarifier and RF gain required (any two can be catered for without interface).
- Line resistance between 30Ω and 150Ω .

Note that with encoded clarifier/BFO/RF gain, a thirty-two position switch is provided in the 1685 for each control instead of an analog control. The amount of control for each step can be adjusted to suit a particular requirement. For serial data systems, 8 bit resolution is available for BFO and clarifier.

Serial Remote Control of 1680 Receivers

To reduce the number of remote control connections, especially in systems incorporating several receivers, a serial remote control link may be used as shown below using one controller to control up to 'n' receivers.



*The bi-directional control link recommended is as follows:

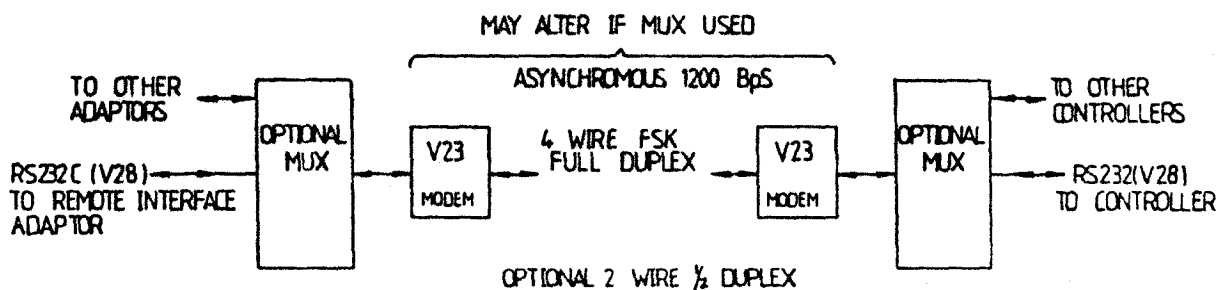
- a) Up to 20/50M - 3 way screened lead using RS232C (V28) level signals.
- b) Up to 1/1.5km - 5 way screened lead using RS423 (V10) level signals.

Asynchronous control data is used in case (a) and (b) with full duplex operation at 1200Bps. The appropriate interface hardware will be supplied inside the controller and interface adaptors as required.

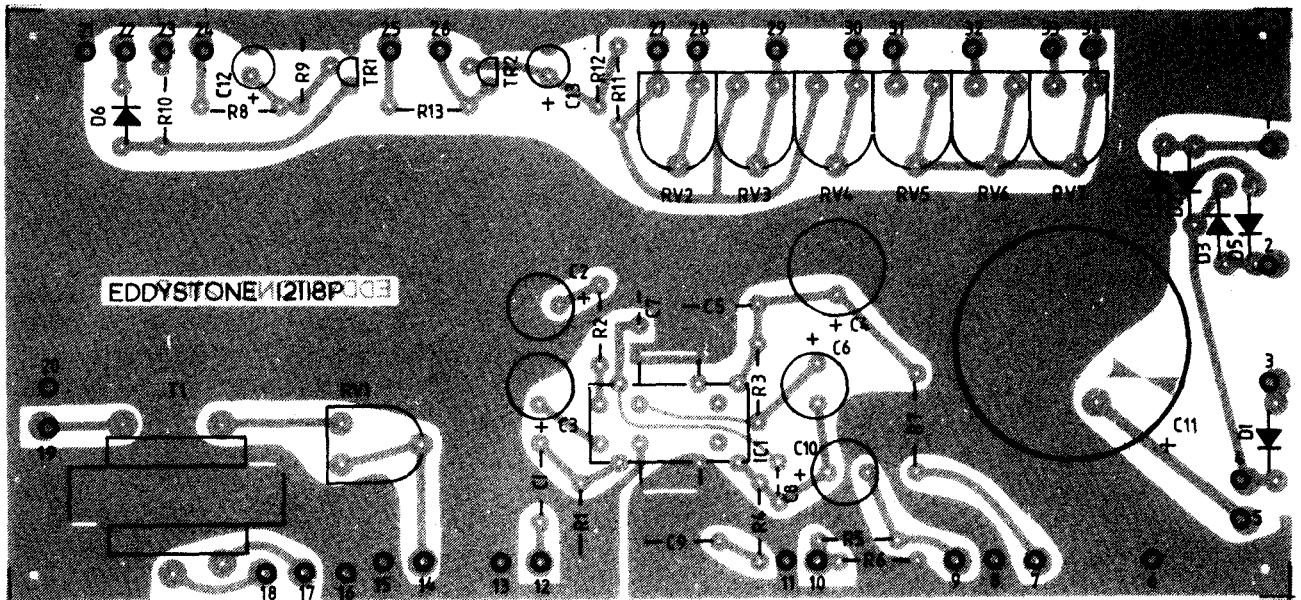
- c) For distances greater than 1/1.5km, the control link will need to be made via a pair of MODEMS or MODEM SIMULATORS (for up to fifteen miles only typically).

If a full duplex link which uses continuous non-switched carriers is used, the standard Eddystone 1685 series controller and remote interface adaptor can be used. For switched or half duplex systems a software option for the 1685 series is available which provides standard 'Request to Send' and responds to standard 'Data Carrier Detect' RS232C (V24) signals.

For systems which consist of several controllers and receiver groups but only one link, data multiplexers may be used as shown. These however will generally always require a 4 wire, full duplex link and the MODEM type, link data rate and 1685 data rate will have to be determined in consultation with Eddystone Radio Limited.



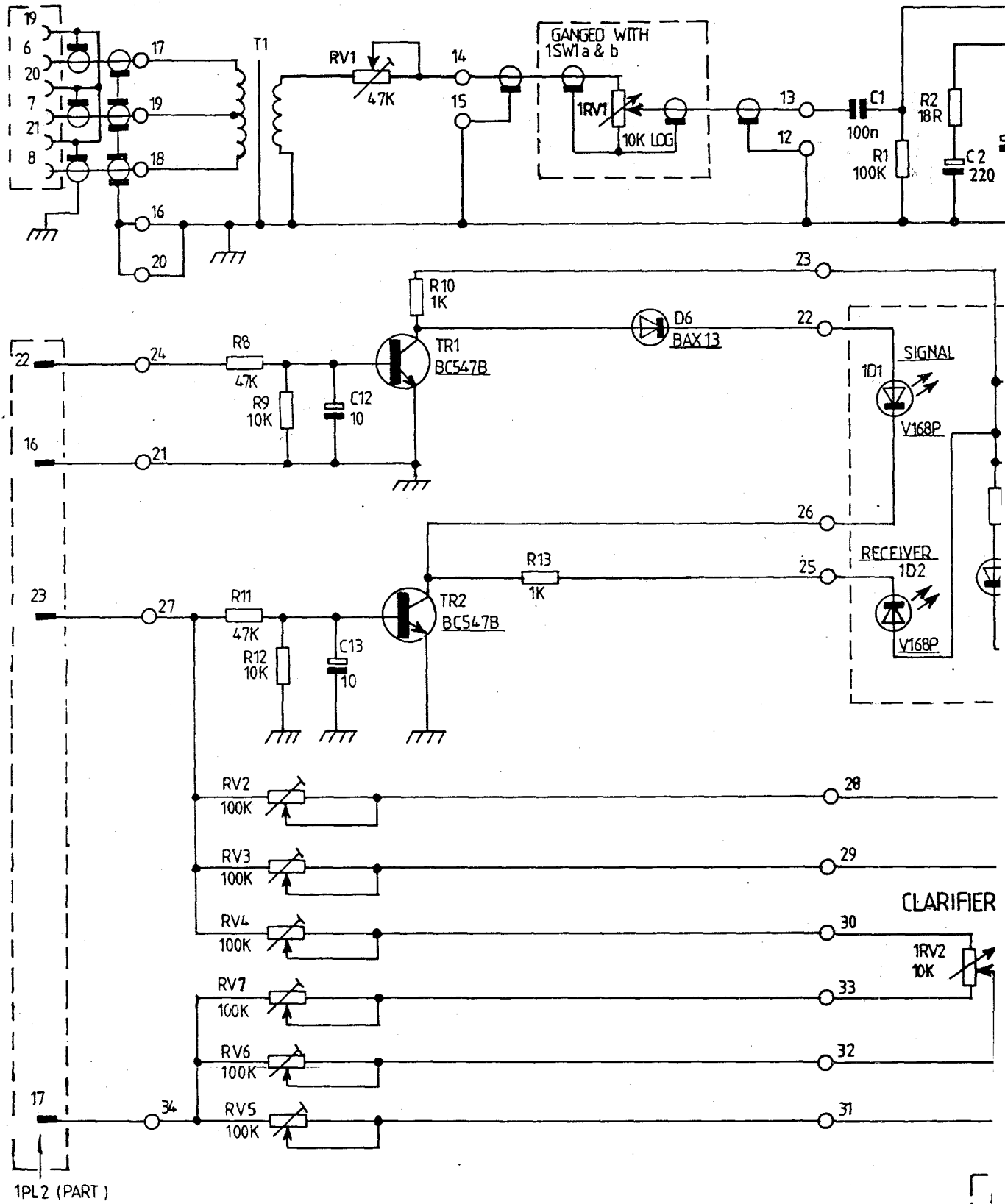
Note that the controller and interface adaptor will need to be supplied with RS232C (V28) interface hardware and that one audio line (for receiver audio outputs) will be required per controller. An optional line isolator model 1764 is available to provide extra protection of audio lines.

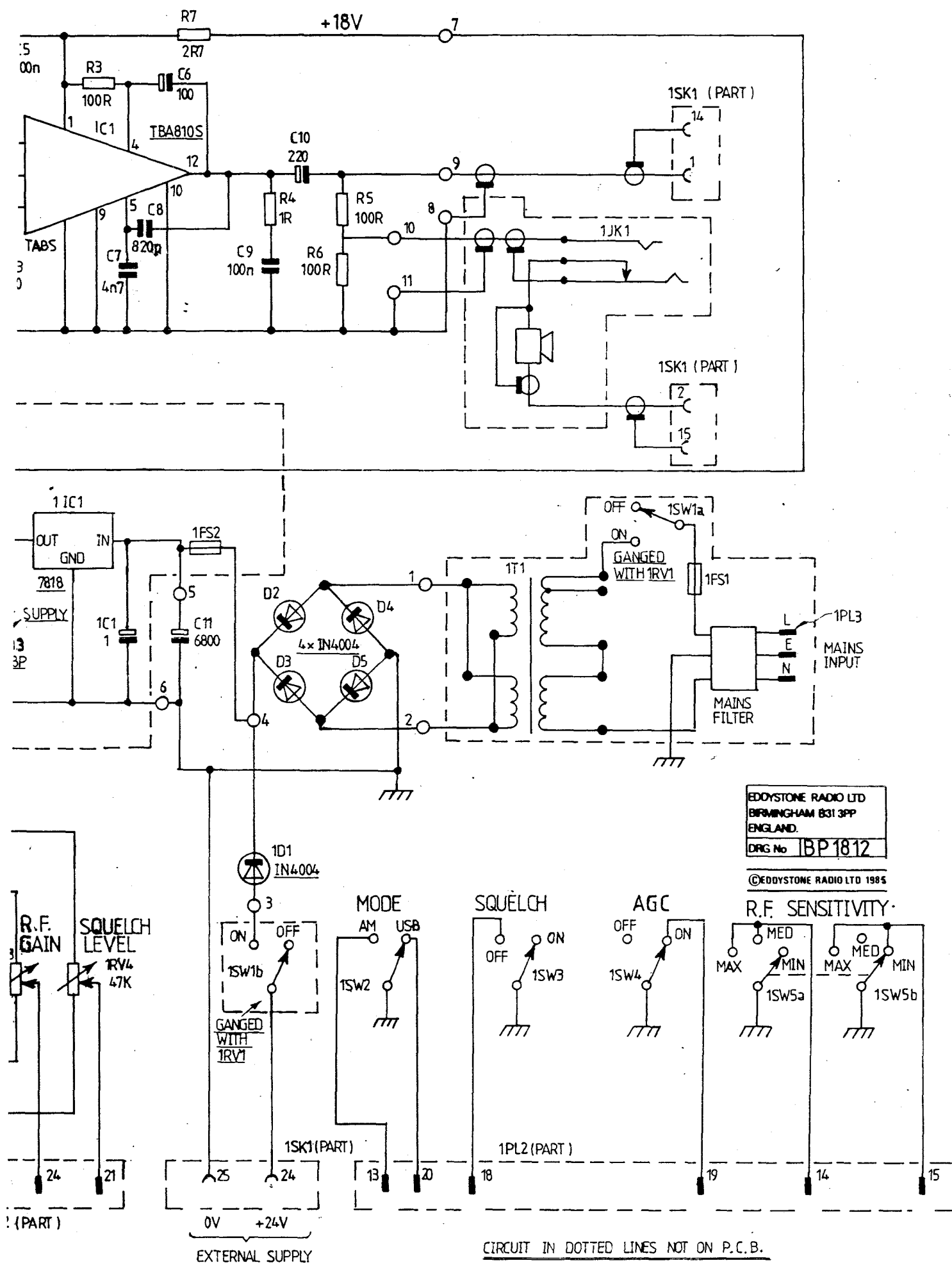


Printed Circuit Board
12118P

1SK1 — ANCILLARIES CONNECTOR

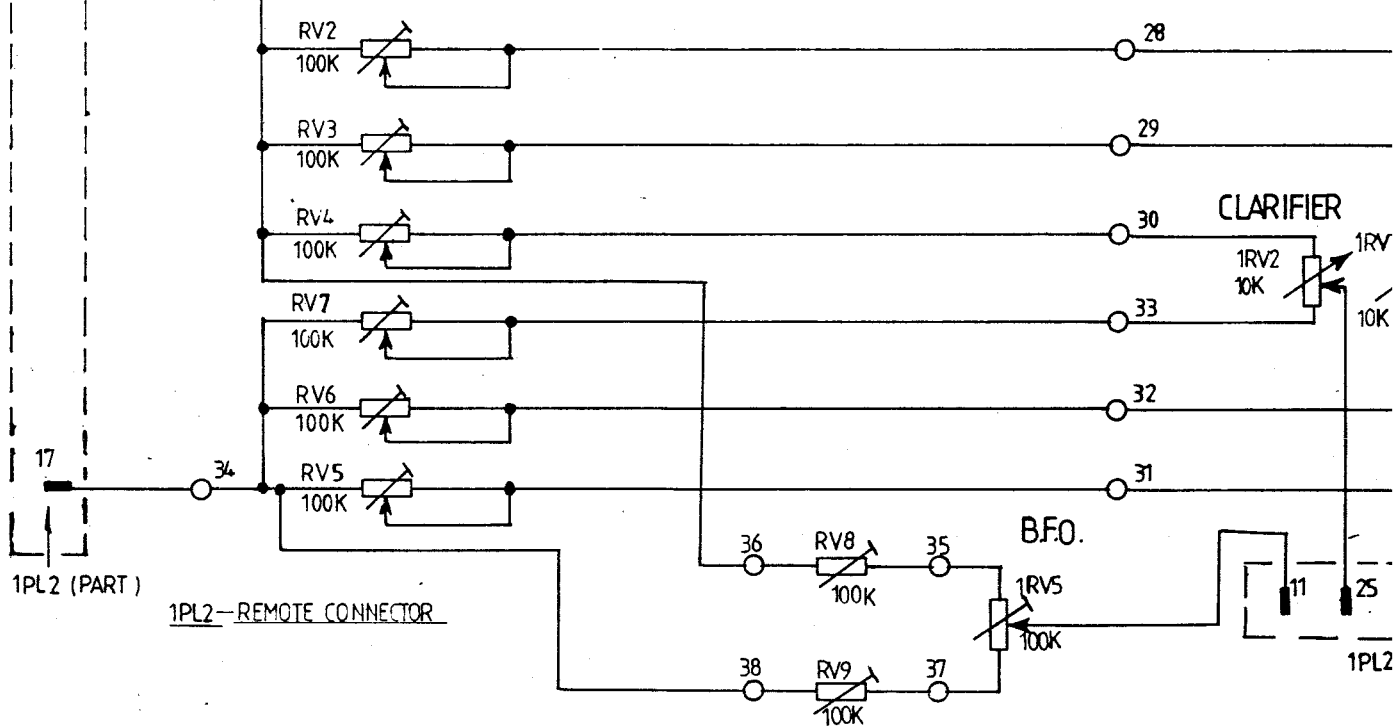
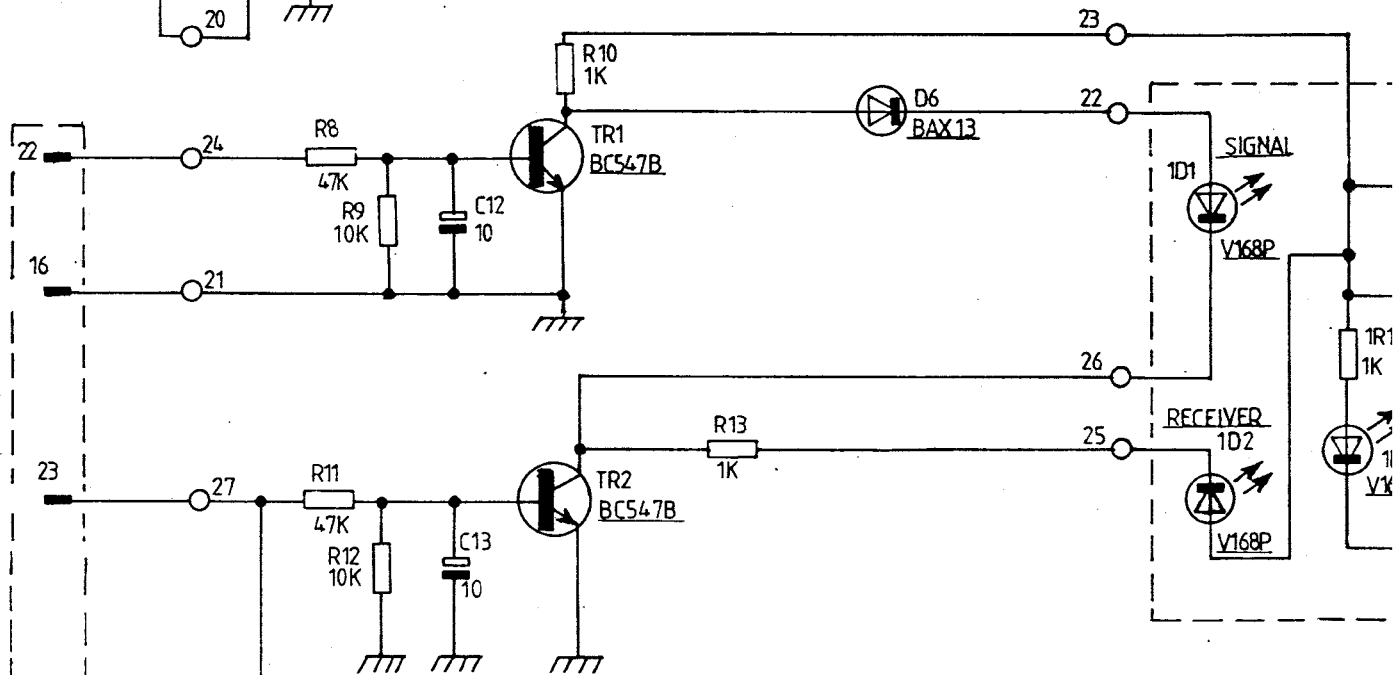
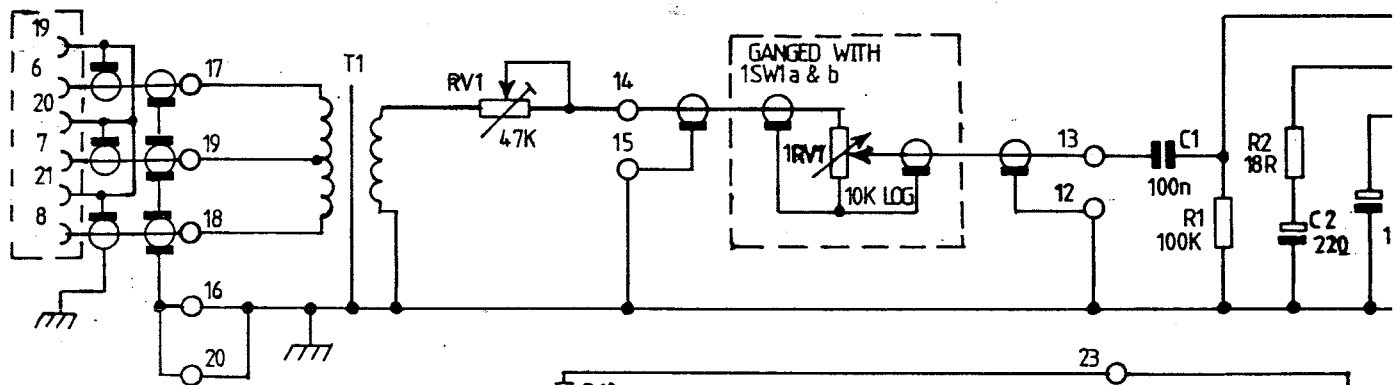
1SK1 (PART)





1SK1 — ANCILLARIES CONNECTOR

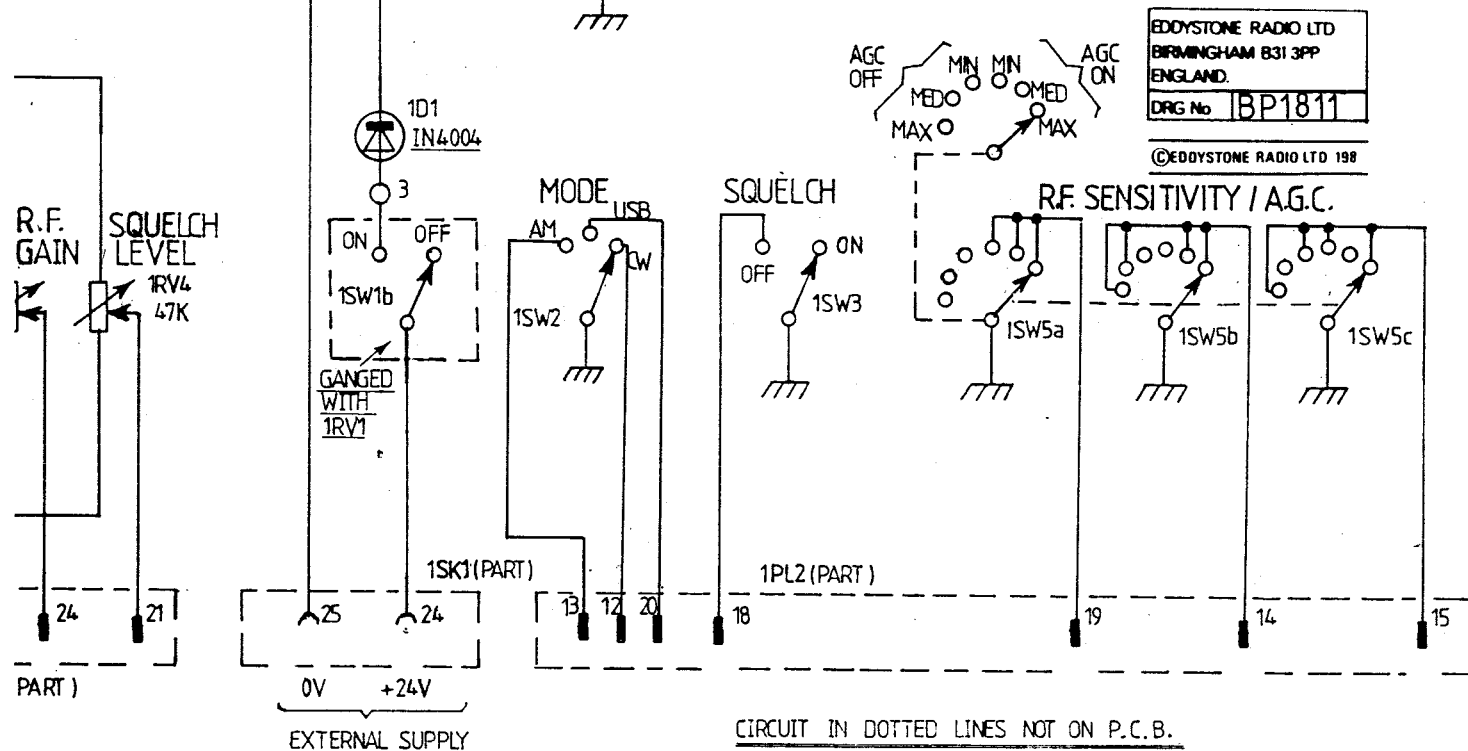
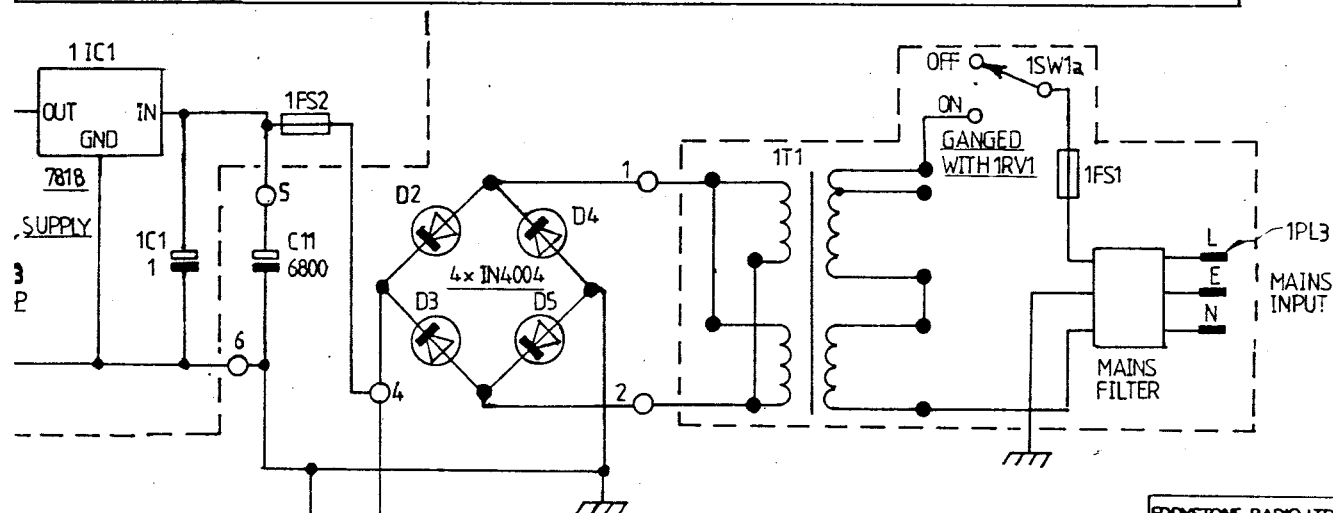
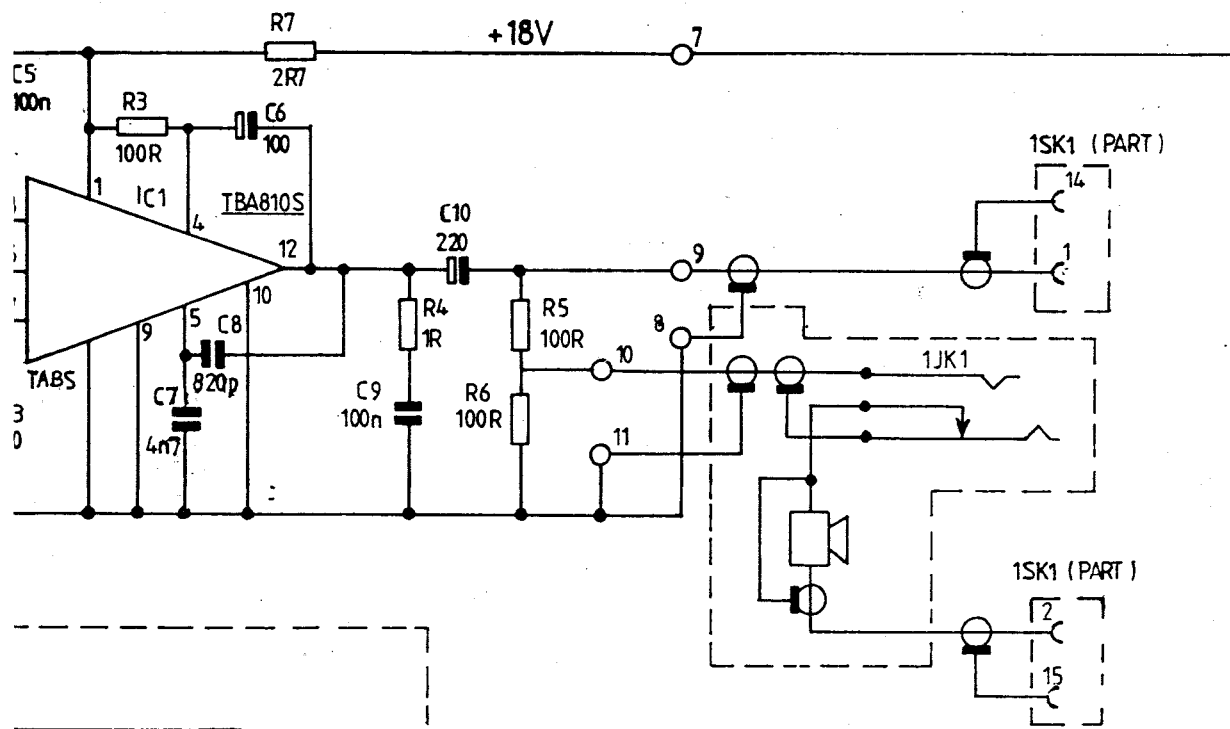
1SK1 (PART)



1PL2 (PART)

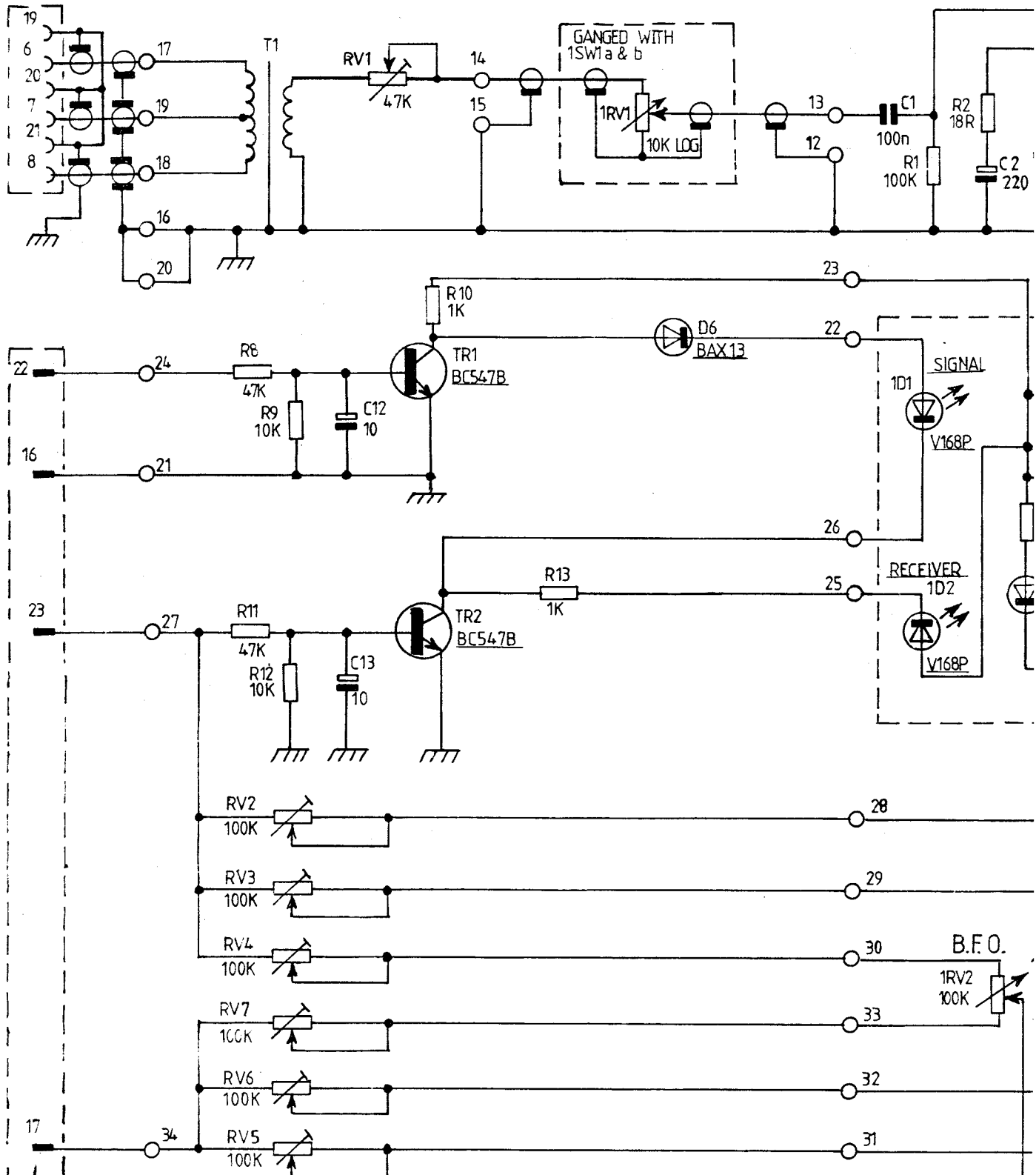
1PL2 — REMOTE CONNECTOR

1PL2



1SK1 — ANCILLARIES CONNECTOR

1SK1 (PART)



1PL2 (PART)

1PL2 — REMOTE CONNECTOR

