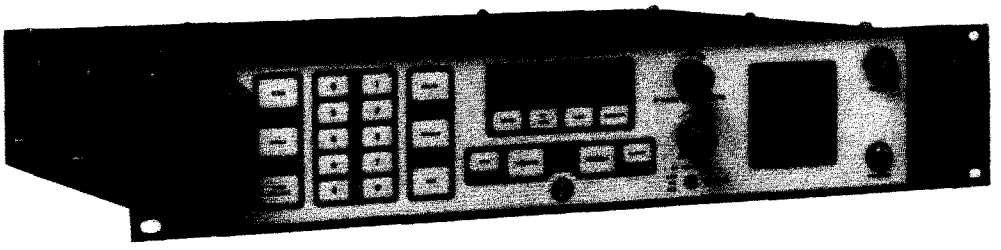
Eddystone

6100
RECEIVER
SERIES

INSTALLATION NOTES
OPERATING INSTRUCTIONS



Eddystone Radio

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6100 OPERATOR'S HANDBOOK INDEX

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BOUND AT REAR

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First Edition....6100 Operator's Handbook .....May 1992

6100 GENERAL AMENDMENT #1

The following amendments to the standard 6100 Receiver Operator's Handbook and Workshop Manual, only apply to 6100 receivers supplied after 01/01/95 or to those fitted with replacement Preselector/Wideband RF Input Boards (circuit ref.6) supplied after that date.

SECTION ONE : INTRODUCTION

Note that on these receivers, when the /B option is supplied, the internal current limiting resistors on the **CHANNEL NUMBER** rear panel output (see section 2.2.5 below) are reduced in value. This allows these control outputs to drive lower impedance loads.

SECTION TWO :INSTALLATION

2.2 EXTERNAL CONNECTIONS

2.2.5 **CHANNEL NUMBER** Connector (/B Option only)

All outputs are open collector transistors, 100mA maximum current, +50V maximum voltage with internal 10 Ohm (125mW) current limiting resistors fitted. Individual outputs will be on, pulling an output load to ground, when bit is set according to positive logic.

WARNING

⚠ Care must be taken that the maximum current rating of 100mA from any output is not exceeded. If it is, then damage to the internal current limiting resistors or the output transistors may occur. Each wanted output must therefore be connected to a positive supply not exceeding 50V dc via a resistive load which limits the current to less than 100mA. This would be 500 Ohms minimum at 50V to about 40 Ohms minimum at 5V.

SECTION SIX : SPARES

6.6 PRESELECTOR/WIDEBAND RF INPUT BOARD : CIRCUIT REF. 6

Ref.	Description	Manufacturer-Type	Part No.
R31	4X10R SIL (/B Option only)	Bourns 4608X-102-100	21-1544
R32	4X10R SIL (/B Option only)	Bourns 4608X-102-100	21-1544

BOUND AT REAR

CIRCUIT DIAGRAMS

PRESELECTOR BOARD BP2619 R31 and R32 to read '4x10R'

OR

WIDEBAND RF INPUT BOARD BP2810 R31 and R32 to read '4x10R'

--oOo--

File 6100amd1

Eddystone Radio Ltd January 1995

---- End of 6100 General Amendment #1 ----

6100/6800 Channel Programming Supplement

Both the 6100 Series of Channelised Receivers and associated 6800 Series of Remote Control Units can be programmed to receive up to 50 or 99 frequencies. If the appropriate hardware is fitted, they can also be programmed to enable ISB selection and/or selection of an additional IF filter.

This progaramming is generally performed by Eddystone Radio, to customer's requirements, before the equipment is supplied. If the user requires to change the programmed frequencies or add extra hardware (principally the additional filter) the programmed EPROM fitted will need to be reprogrammed.

A new EPROM can be supplied by Eddystone or the reprogramming can be performed by the user with the aid of a reprogramming kit LP5398. This kit, which is supplied by Eddystone, consists of a 3.5in floppy disk, an EPROM emulator/blower and a connecting cable. It will work with any IBM compatible XT or AT computer which has at least a single 3.5in floppy drive, 640k of RAM, an RS232 port and DOS 3.3 or later. It should be noted that the EPROM emulator/blower is the same type specified, in the Maintenance Section of the manuals, for circuit testing.

The frequencies are 'added,' using this kit, to a Master Eprom which is specfic to the equipment being reprogrammed and which is again supplied by Eddystone. The Master Eprom contains the rest of the equipment control program and, when the frequencies are added, replaces the Eprom on the Front Panel Board of the equipment. The fitted Eprom in an equipment can be read on BITE test 99. The current Master Eprom part numbers suitable for use with the utility program are as follows:-

6800 RCU (all)	14438P	(OS 1.0 onwards)
6100/1 and /4 Receivers	14742P	(OS 2.0 onwards)
6100/2 and /3 Receivers	14741P	(OS 2.0 onwards)

'Special' variants generally require different Masters as indicated in the appropriate handbook amendements. Note that the emulator/blower can duplicate Eproms amd thus strictly only one Master of a particular type is required.

Eddystone Radio.....August 1992

---- End of 6100/6800 Channel Supplement ----

SECTION ONE : INTRODUCTION

WARNING

⚠ Before connecting the unit to the power supply, SECTION TWO : INSTALLATION must be read especially with regard to the instructions concerning wiring of the mains connector. Information about first aid in the case of electric shock and about the 'Health and Safety at Work Act 1974 (United Kingdom)' is bound at the rear in Appendix A.

Two books are available for the 6100 receiver. The 'Operator's Handbook' covers the first three sections while all six, complete with circuit diagrams, are available in the 'Workshop Manual'. The sections are described as follows:

SECTION ONE : INTRODUCTION which includes safety warnings, a general description of the unit, it's options and ancillaries, a data summary and typical performance.

SECTION TWO : INSTALLATION which details physical dimensions and fittings and all external connections. Setting-up procedures, fuse details and remote control codes are also given.

SECTION THREE : OPERATION which describes all the unit's controls and their use (signal reception, BITE, channelised operation and scanning).

SECTION FOUR : CIRCUIT DESCRIPTION which explains operation with reference to the block and circuit diagrams.

SECTION FIVE : MAINTENANCE details alignment and setting up techniques as well as test procedures for the microcomputer related parts.

SECTION SIX : SPARES lists all printed circuit and related electronic components used in the receiver.

1.1 GENERAL DESCRIPTION

The Eddystone 6100 is a high performance, microprocessor controlled, fixed multi-channel receiver. Channels can be preset in the range 1600kHz to 29999.99kHz with 10Hz resolution. Operation down to 10kHz, with reduced performance, is provided as an option (see Table 1.2). Comprehensive facilities are provided for the reception of AM, CW, FSK, SSB and ISB signals.

The 6100/1 and /4 variants have simplified parallel

remote control allowing selection of up to seven channels, clarifier adjustment and IF gain adjustment. Other variants have comprehensive remote and automatic control facilities allowing control over RS232 compatible links using a computer or a dedicated remote control unit (Eddystone model 6800). The Eddystone 6860 RS232/RS422 Remote Interface Adaptor also enables control over RS422 links and the Eddystone 1778 (V21/V22) Modem enables long distance control over a single pair of wires. Complete multi-address remote control systems for up to sixteen receivers can be formed with the addition of the Eddystone 1771 Multi-address Decoder. A wide range of 300 or 1200 Baud asynchronous compatible 'off-the-shelf' Modems, line drivers and multiplexers etc. can also be used in the remote control system.

The 6100 has several variants, each of which can be supplied with various options. The variant is indicated by the number after '6100/' on the serial plate. The options fitted to a particular variant are indicated by the letters after '6100/'. A list of the variants is given in Table 1.1. and the options in Table 1.2.

Table 1.1
6100 Variants

Suffix	Variant
/1	Up to 99 fixed channels, parallel remote control only with BITE error output indication line (RS232 level).
/2	Up to 50 fixed channels with full serial remote control.
/3	ISB reception version with up to 50 fixed channels and full serial remote control.
/4	ISB reception version with up to 99 fixed channels, parallel remote control only with BITE error output indication line (RS232 level).

Table 1.2
6100 Options

Suffix	Option
/A	With internal sub-octave preselector giving operation down to 10kHz.
/B	With dual bcd data output indicating channel being received (enabling control of associated external preselector or transmitter).
/C	With additional customer specified filter ('n' position).
/F	With wideband preselector giving operation down to 10kHz.
/K	With internal FSK demodulator.
/S	With external standard input requiring 8720kHz at 0dBm (no internal master oscillator fitted).
/X	With higher stability internal oven controlled master oscillator.

All options are available for any 6100 except /S with /X, /A with /F or /A with /B.

A 6100/2AKX, for example, has the sub-octave preselector fitted, FSK demodulation facilities and a high stabilty internal frequency master.

As well as the 'read only' 50 or 99 channel memory for the required frequencies, a corresponding 50 or 99 channel non-volatile 'read-write' memory is provided for storage of all other major receiver settings. Each non-volatile channel memory can be loaded with a reception mode/bandwidth, RF sensitivity setting, AGC setting, BFO and clarifier setting for the associated fixed channel frequency memory. These additional settings can be loaded as required from the receiver front panel and are retained for at least 48 hours after power is removed from the receiver.

The memories can also be scanned as required with adjustable dwell and hang periods. The adjustable squelch/signal detector threshold level can be used in conjunction with the scanning facilities to control the operation of the receiver and any ancillary equipment, depending on the input signal level.

Built-In-Test-Equipment (BITE) is provided to monitor and test the signal path and synthesiser circuitry. The information provided assists fault finding to module level.

Rear panel connections are provided for a wide range of ancillary equipment. For example, the audio line output can be used to drive the Eddystone 1529/20 FSK demodulator. On /K receivers, an internal FSK demodulator provides a direct data output at RS232 level.

On /B receivers, a rear panel connector provides a dual binary coded decimal output which indicates the present received channel number. This can be used with ancillary equipment such as R.F. preselectors which need to know the received frequency. It can also be used to set the frequency of an associated transmitter.

1.2 DATA SUMMARY

Frequency Coverage	1600kHz to 29999.99kHz 10kHz to 29999.99kHz (/A). 10kHz to 29999.99kHz (/F).
Tuning Resolution	10Hz over ±100Hz clarifier range.
Reception Modes	AM mode for A2A, A3E. USB/LSB mode for H2A, H3E, R2A, R3E, J2A, J3E. ISB mode for B8A, B8E (ISB variants only). CW mode for A1A. FSK mode for F1B, F1D (suffix /K receivers or any receiver with an external 1529/20 FSK demodulator). The use of other external demodulators will enable most other signal modes to be received.
Bandwidths	0.3 to 2.7kHz on SSB/ISB. 2.4kHz all intermediate ('i') modes. 6kHz on all wide ('w') modes. A further filter can be provided on all narrow ('n') modes (suffix /C receivers).
Gain Control	Audio, slow or fast AGC or manual gain of between 90 and 100dB using front panel control. In all cases the RF sensitivity control provides up to at least 30-50dB extra manual gain control. A diversity AGC link is provided on the rear panel.
B.F.O.	±2.4kHz in 100Hz steps (CW and FSK modes).
Antenna Input	50 Ohm unbalanced, BNC connector. Overload protection is provided for continous application of 30V at input. Internal reed relay controlled (by contact to ground) from associated transmitter interrupts antenna feeder during transmission.

R.F. Selectivity	Wideband over specified range on all but /A option which has sub-octave filters above 1600kHz.
Squelch	Audio squelch and scan halt is derived from carrier level. The squelch level can be adjusted from the front panel and also controls the rear panel signal present output.
Audio Outputs	1W maximum into 4 to 8 Ohms external loudspeaker. 1W maximum into front panel monitor loudspeaker. 20mW maximum into 600 Ohm line. 10mW maximum into low/medium impedance headphones.
Intermediate Frequencies	45MHz first IF. 1.4MHz second IF.
Display	Sixteen character, two line liquid crystal display with led back lighting.
Controls	Twenty-four key sealed membrane keyboard with two control knobs. On ISB variants a two position toggle switch is provided to enable local monitoring of upper or lower sideband. On all variants a push button power supply switch is provided.
FSK Operation	On /K receivers, FSK signals with shifts of between 85 and 1100Hz and rates of up to 300 Baud can be demodulated. An RS232 data output is provided on the rear panel. Two front panel red leds are provided to assist tuning. These will be equally illuminated when an FSK signal is correctly tuned by the clarifier control.
BITE	BITE provides continuous fault monitoring and enables a wide range of individual tests to be made, thus assisting fault-finding to module level.

Stored Channels	A maximum of 50 (99 on /1 or /4 variants) channels can be stored with frequency (fixed at installation), mode/ bandwidth, AGC, RF sensitivity and BFO and clarifier settings. Channel contents can be interrogated and changed (except for centre frequency) without interruption of the signal being received. The channel centre frequencies are stored in permanent memory, capacitor back-up is provided to prevent loss of all other information in the event of a power failure of up to at least 48 hours. If non-frequency memories do become corrupted, an error message is given at switch on and they are set to a known condition (USB mode, maximum RF sensitivity, audio AGC, central BFO and clarifier).
Scanning	Any number of the 50 or 99 stored channels can be automatically or manually scanned with a dwell time on each channel of between 0.1 and 9.9 seconds. If squelch is selected, the scan will halt on channels with signals above the set threshold, and remain there for a hang period of between 0 and 9 seconds after the signal ceases. At all times the scan position can be altered using the increment and decrement keys.
Remote Control	Except on the /1 and /4 variants, all major functions can be controlled using 300 or 1200 Baud asynchronous data at RS232 level (or RS422 using adaptors). Simplified parallel remote control is provided on /1 or /4 variants which allows selection of up to seven channels and adjustment of the clarifier setting. Analogue control of the manual gain is also provided.

Power Supplies	100/150V and 200/260VAC (40-60Hz single phase). AC consumption approximately 20 to 30VA. Operation from 19-32V DC (negative ground) is automatically selected in the absence of an AC supply. DC current approximately 1.8A at 19V to 1A at 32V.
Environmental	Operational, -15 to +55 deg.C. Storage, -40 to +70 deg.C. Rel. humidity, 95% at 40 deg.C. Bump/vibration, meets MPT1204 and CEPT requirements.
Height	Rack mounting, 88mm (2U).
Width	Rack mounting, 483mm (19in).
Depth	Rack mounting, 440mm (intrusion into rack including allowance for cabling).
Weight	Rack mounting, approx. 12kg

1.3 TYPICAL PERFORMANCE

(above 400kHz)

Sensitivity for SINAD (S+N/N) ratios >10dB

Mode	I/P dBuVemf	B/W kHz
AM (1kHz, 60% mod.)	+5	6
AM (1kHz, 60% mod.)	+1	2.4
CW (1kHz tone)	-8	2.4
FSK (1.7kHz tone)	-5	2.4
SSB/ISB (1kHz tone)	-5	0.3 to 2.7

Filter Bandwidths

Bandwidth	-6dB (min.)	-60dB (max.)
Wide	6kHz	20kHz
SSB/ISB	0.3 to 2.7kHz	-0.4 to 3.4kHz
Intermediate	2.4kHz	3.8kHz
Narrow	To customer's requirements	

1st Image Rejection	>100dB.
2nd Image Rejection	>80dB.
IF Rejection	>100dB.
Frequency Stability	1ppm standard, 0.1ppm on /X receivers (over -10 to +50 deg. C).
AGC Characteristic	4dB change in output for a 100dB increase above AGC threshold (typically 0 to +3dBuV emf).
Intermodulation (in band)	The level of third order inter-modulation products produced by two in-band signals of +90dBuV emf will be at least 45dB below that of either signal (40dB on Fast AGC).
Intermodulation (out of band)	With a wanted signal of +30dBuV emf producing standard output, two unwanted signals adjusted to produce a third order intermodulation product at the wanted frequency, must be greater than +96dBuV emf to produce standard output when neither signal is closer than 30kHz to the wanted frequency.

Cross Modulation	With a wanted signal of +60dBuV emf producing standard output, an unwanted signal, of level +100dBuV emf at 20kHz off-tune, modulated 30% at 1kHz, will produce an output at least 30dB below standard output.
Blocking	With a wanted signal of +60dBuV emf, output will be effected by less than 3dB by an interfering signal 20kHz off-tune at level +110dBuV emf (AGC on or off).
Reciprocal Mixing	The level of a signal 20kHz removed from the tuned frequency will be at least 95dBuV emf to produce a noise signal equivalent to 0dBuV emf at the tuned frequency (USB/LSB/ISB modes).
Antenna Radiation	The level of radiated signals at the antenna socket will be less than 2uV pd (across 50 Ohms) in range 10kHz to 110MHz.

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SECTION TWO : INSTALLATION

WARNING

⚠ Before connecting to the power supply, the sub-sections 'EXTERNAL CONNECTIONS - 2.2.1 AC Supply Connector, 2.3.1 AC Supply and 2.3.2 Fuses' must be read.

2.1 PHYSICAL DIMENSIONS AND FITTING

2.1.1 Accessories Kit

A kit of accessories is supplied with the receiver. The contents of the kit should be checked against Table 2.1.

Table 2.1
Contents of Accessories Kit LP5231

Qty	Description	Part No.
1	Mains connector and lead	38-295
1	4 Way shell (DC supply)	33-721
2	Sockets (DC supply)	33-722
1	25 Way D Plug	33-428
1	15 Way D Plug	33-194
1(on /B)	9 Way D Plug	33-313
1	25 Way Cover	33-704
1	15 Way Cover	33-753
1(on /B)	9 Way Cover	33-752
1	BNC Plug	33-264
1(on /S)	BNC Plug	33-264
1	2A Fuse	8-18
1	3.15A Fuse	8-37
1	1A(T) HRC Fuse	8-74

Table 2.2
Accessories Available to Order

Description	Catalogue No.
Telescopic Slide Kit (rack mounting)	LP5332
Cabinet Kit	LP5333
Anti-Vibration Mounting Kit (use with LP5333)	LP5334
External Loudspeaker Unit	1615
Headphones	1588

2.1.2 Rack Mounting

The receiver can be installed directly in 483mm (19 in) racking using four suitable screws. Plain washers or plastic cup washers should be used beneath the screwheads to prevent damage to the paint finish. Fixing slots conform to the standard spacing of 57mm (2.25 in). Overall dimensions of the receiver are shown in Figure 2.1. Telescopic slides may be used with rack mounting receivers allowing convenient access to rear mounted connectors etc. The rack aperture dimensions to accomodate these are outlined in Figure 2.2. Telescopic slides (Figure 2.3) are supplied in pairs. Each slide has three sections. One is fixed to the receiver and another to the rack frame. The third moveable section (the beam) connects the two fixed sections together and allows the receiver to be withdrawn from the rack, holding the former at the fully extended position. Pressing the retaining clip on each beam will, when fully extended, allow the receiver to be withdrawn clear of the rack. Re-assembly is the reverse of the above. It is important that each slide is securely fixed by three M4X8 screws along each side of the receiver and that the rack slides are similarly supported throughout their length. Rack mounting receivers may easily be converted to cabinet mounting and vice-versa. The accessories required are listed in Table 2.2.

2.1.3 Cabinet/Anti-Vibration Mounting

Dimensions of the receiver are shown in Figure 2.1. Anti-Vibration Mountings are available for cabinet mounted receivers, see Table 2.2. The dimensions of the receiver and cabinet fitted with anti-vibration mountings are shown in Figure 2.1A and fitting is as follows:-

1) If access to the underside of the mounting surface (i.e. the desk or shelf) is available, drill four groups of four clearance holes on the centres shown in Figure 2.4, to enable the anti-vibration mountings to be bolted to the surface. If access to the underside is not available, these holes must be drilled and then tapped to take suitable screws.

2) Drill four 6.5mm diameter holes in the bottom side of the cabinet on the centres shown in Figure 2.4. It is important that these holes will lie exactly at the centre of each of the four groups of four clearance holes drilled in the mounting surface. Use of a common template is strongly recommended.

3) Secure the anti-vibration mountings to the mounting surface.

4) Fix the cabinet to the four anti-vibration mountings using M6 X 20 screws.

5) Fit the receiver into the cabinet, ensuring the earthing strap from receiver earth terminal to cabinet is correctly fitted.

Figure 2.1
Dimensions of Receiver in all Mounting Styles

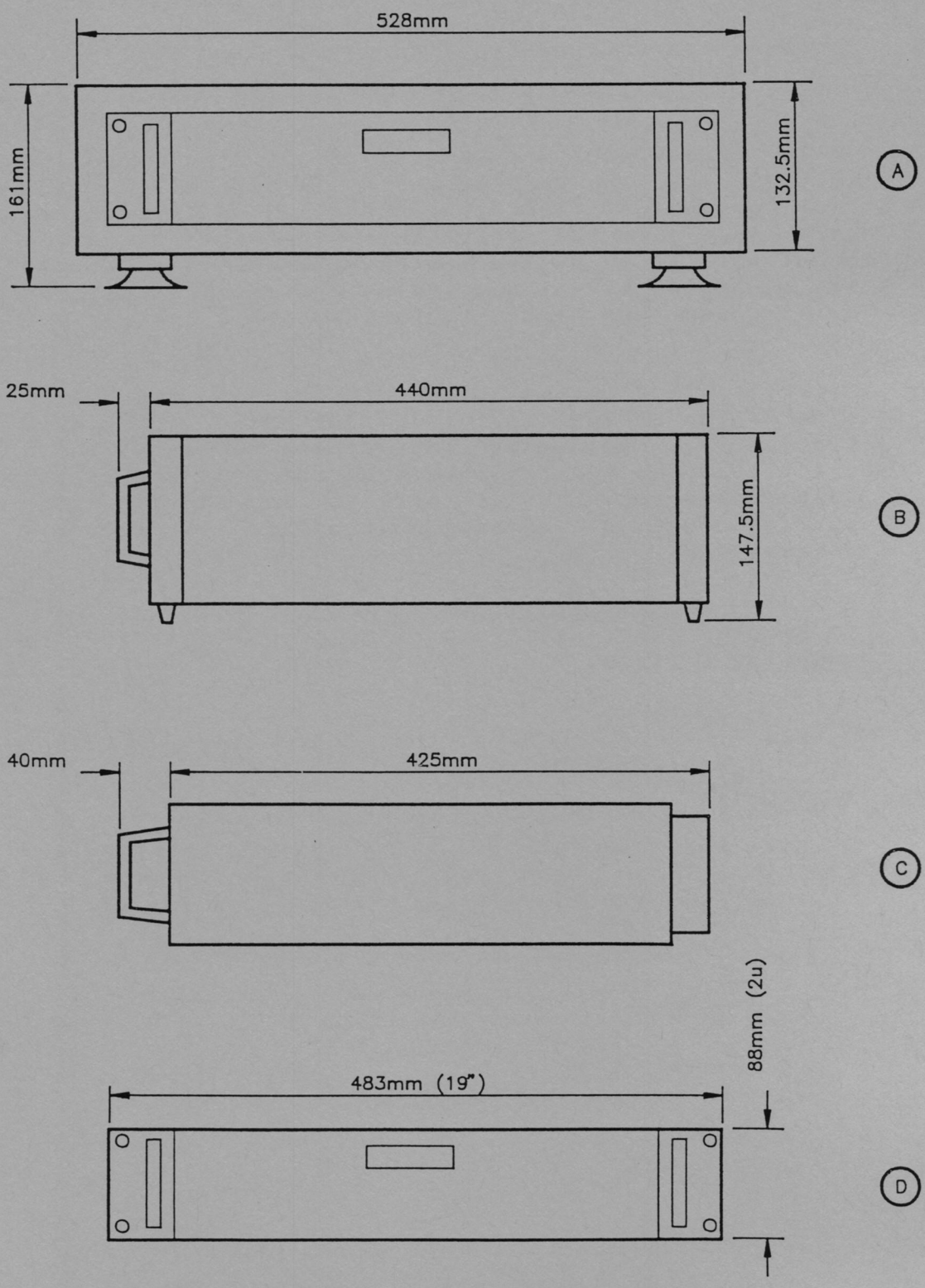


Figure 2.2
Rack Aperture Dimensions for Telescopic Slides

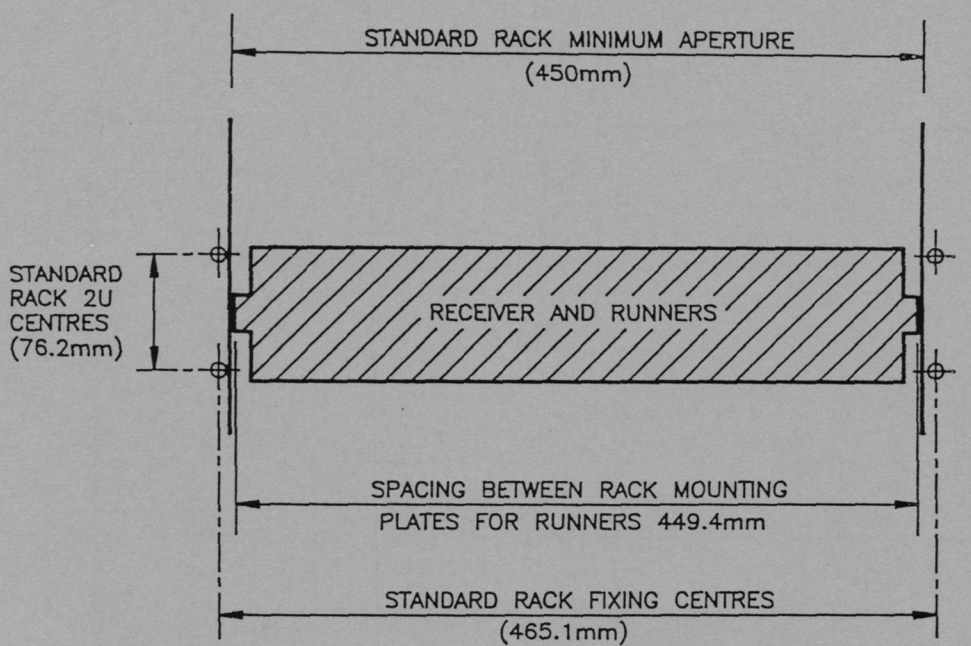


Figure 2.3
Telescopic Slide

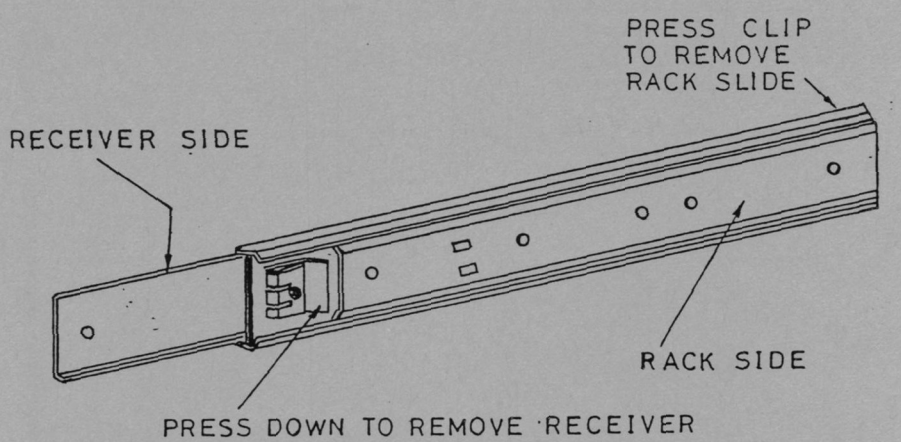
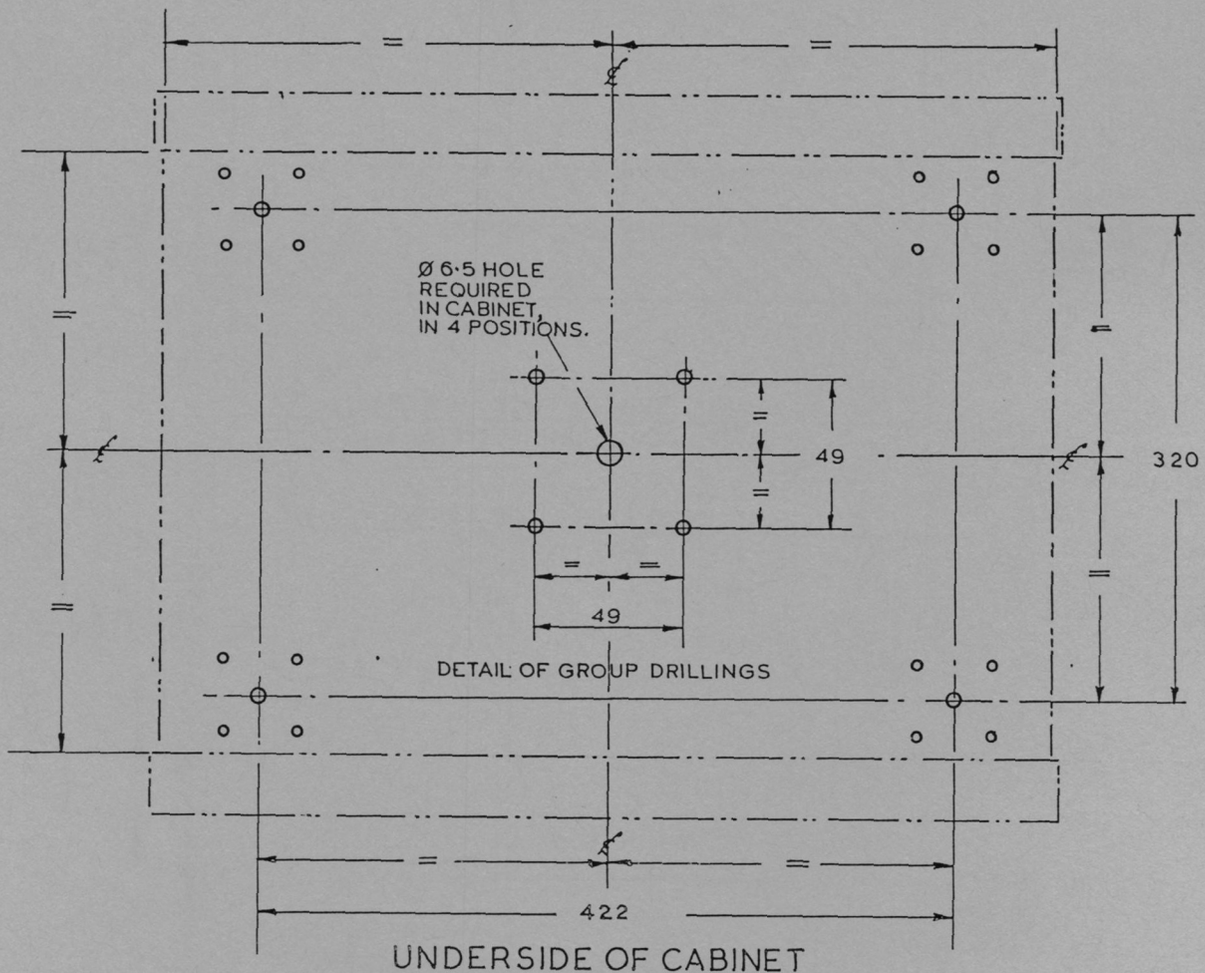


Figure 2.4
Drilling details for fixing Anti-Vibration Mountings



2.2 EXTERNAL CONNECTIONS

All external connections are made at the rear of the receiver with the exception of the headphone jack on the front panel (see layout BP2550 bound at rear).

2.2.1 AC Supply Connector

The AC SUPPLY socket accepts a 40-60Hz mains supply within the range specified using a standard I.E.C. connector.

WARNING

⚠ The AC mains supply MUST be completely disconnected from the receiver whilst the rear panel supply voltage selector is adjusted to suit the local supply conditions.

If a moulded plug and lead is used, a connector to suit the local supply arrangements can be fitted to the free end, observing the colour code which is as follows:-

LINE	-	BROWN
NEUTRAL	-	BLUE
EARTH	-	GREEN/YELLOW

The following additional information is issued in accordance with British Standard BS415 and concerns mains supply connections for the U.K.

'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 or 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.

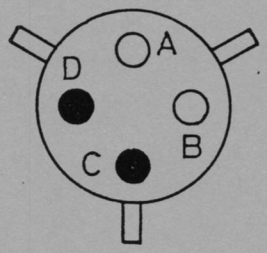
4. If a 13A (BS1363) Fused Plug is used for connection to the supply output, the plug MUST be protected by a 3A FUSE. If another type of plug is used, a fuse of the appropriate rating must be fitted either in the plug, or the adaptor, OR AT THE DISTRIBUTION BOARD.'

2.2.2 DC Input Connector

The receiver may be powered from an external DC supply of +19V to +32V dc (negative ground). Connections are shown in Figure 2.5

An Earth Terminal is provided to allow the chassis of the receiver to be bonded directly to adjacent metalwork.

Figure 2.5
DC INPUT Connector



view into 4 way
male connector (1)PL1

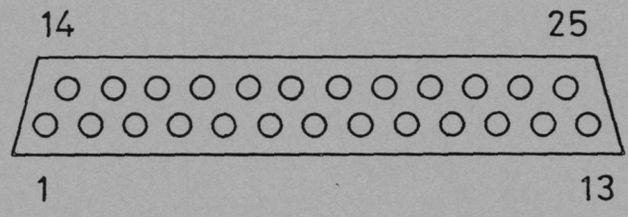
DC INPUT Connector

Pin	Description
A	Ground (OV).
B	+19V to +32V.
C	Not Used.
D	Not Used.

2.2.3 Ancillaries Connector

The pin connections and fundamental characteristics are given in Figure 2.6.

Figure 2.6
ANCILLARIES Connector



view into 25 way
female connector (1)SK2

ANCILLARIES Connector

Pin	Description
1	Audio output - 1W maximum into 4-8 ohms.
2	FSK Demodulator output - standard RS232c /V28 level (/K option only).
3	Signal indicator - open collector transistor output, 50mA maximum current, 30V maximum voltage, transistor 'on' when signal not present (an internal 220R, 0.5W current limiting resistor is fitted).
4	Diversity AGC (except LSB on ISB) - may be paralled with a number of receivers.
5	12V dc output at 50mA for external equipment.
6	600R line O/P)
7	600R line O/P CT) except LSB on ISB, preset by internal control (7)RV5.
8	600R line O/P)

Figure 2.6 (continued)

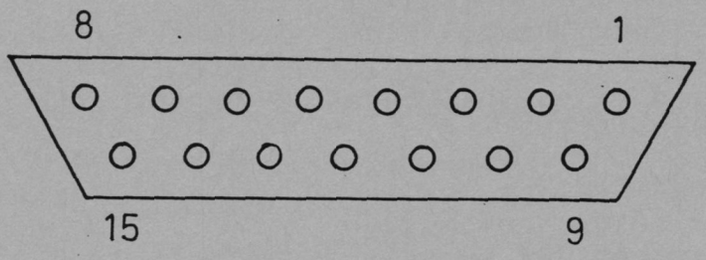
9	RF Mute (ground to mute) - pulled down 'R' to mute from +12V through 10k.	
10	Diversity AGC (LSB on ISB only) - may be paralled with a number fo receivers.	
11	600R line O/P	)
		) LSB on ISB only,
12	600R line O/P CT	) preset by internal
		) control (8)RV6.
13	600R line O/P	)
14	Earth for 1 (unmuted).	
15	Earth for 1 (muted via headphone jack on front panel).	
16	Earth for 4.	
17	Earth for 5.	
18	Earth for 6.	
19	Earth for 7.	
20	Earth for 8.	
21	Earth for 9.	
22	Earth for 10.	
23	Earth for 11.	
24	Earth for 12.	
25	Earth for 13.	

Note all external connections must be adequately screened.

2.2.4 Remote Control Connector

Connections to the REMOTE connector are detailed in Figure 2.7. The RS232c/V28 level serial data inputs and outputs (on /2 and /3 variants) can be converted to RS422A (V11) level using a 6860 Remote Interface Adaptor (R.I.A.). The interconnections required are shown in the 6860 manual.

Figure 2.7
REMOTE Connector



view into 15 way
female connector (1)SK3

REMOTE Connector

Pin	Description
1*	2.5V supply for extended control IF GAIN/ SQUELCH level 5kO linear potentiometer.
2*	IF GAIN/SQUELCH level control input at OV (max gain) to +2.5V (min gain) from extended control potentiometer.
3	Increment Down (/1 and /4 variants). Momentary pull to ground through less than 10k to decrement the BFO or CLARIFY setting. Internally pulled up to 5V via 10k. Do not exceed 5V on this input under any circumstances.
4	Increment Up (/1 and /4 variants). Momentary pull to ground through less than 10k to increment the BFO or CLARIFY setting. Internally pulled up to 5V via 10k. Do not exceed 5V on this input under any circumstances.

Figure 2.7 (continued)

5 Channel Select MSB (/1 and /4 variants).
Pull to ground through
less than 10k to select channels 1, 2, 3, 4.
Internally pulled up to 5V via 10k. Do not
exceed 5V on this input under any
circumstances.

6 Channel Select middle SB (/1 and /4 variants).
Pull to ground through
less than 10k to select channels 1, 2, 5, 6.
Internally pulled up to 5V via 10k. Do not
exceed 5V on this input under any
circumstances.

7 Channel Select LSB (/1 and /4 variants).
Pull to ground through
less than 10k to select channels 1, 3, 5, 7.
On serial remote control variants (/2 and /3),
pull to ground to select remote priority
(see 2.3.3).
Internally pulled up to 5V via 10k. Do not
exceed 5V on this input under any
circumstances.

8 12V dc output at 50mA for external equipment.

9 Ground

10 Ground

11 Ground (for 7 when required, see 2.3.3)

12 Remote control RS232c data input on
serial remote control variants (/2 and /3).

13 Ground for 12.

14 Ground for 15.

15 Remote control RS232c data ouput on
serial remote control variants (/2 and /3).
BITE error output (variants /1 and /4)
Approx. -10V when BITE error, +10V otherwise.

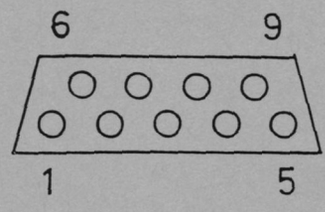
*For correct operation of the extended control IF GAIN/SQUELCH potentiometer, link (4)LK2, on the front panel printed circuit board, must be broken.

Note all external connections must be adequately screened.

2.2.5 Channel Number Connector (/B option only)

The number of the received channel is presented in dual bcd form on connector (1)SK6, see Figure 2.8. This allows control of ancillary equipment which needs to know the received frequency setting (eg RF preselectors, monitoring equipment or associated transmitters).

Figure 2.8
CHANNEL NUMBER Connector



view into 9 way
female connector (1)SK6

CHANNEL NUMBER Connector

Pin	Description	Example - set to channel 23
1	Ground.	
2	MS number, LS+1 bit.	Transistor ON
3	MS number, MS bit.	" OFF
4	LS number, LS+1 bit.	" ON
5	LS number, MS bit.	" OFF
6	MS number, LS bit.	" OFF
7	MS number, MS-1 bit.	" OFF
8	LS number, LS bit.	" ON
9	LS number, MS-1 bit.	" OFF

All outputs are open collector transistors, 10mA maximum current, 50V maximum voltage (internal 1kΩ, 125mW current limiting resistors are fitted). The transistor is 'on' when bit is set according to positive logic, this pulling an output load to ground (see Example above for channel 23).

2.2.6 Antenna Connector

Antenna input connection is by 50 ohm BNC socket (1)SK1.

2.2.7 External Standard Connector (/S option only)

External Standard input connection is by 50 ohm BNC connector (1)SK4. An input level of greater than OdBm at 8720kHz will lock the receiver to the external standard.

2.3 SETTING UP PROCEDURES

2.3.1 AC Supply

WARNING

⚠ The AC mains supply MUST be completely disconnected from the receiver whilst the mains voltage selector, located on the back panel, is adjusted for the local supply.

2.3.2 Fuses

AC FUSE (1)FS1 : 1A(T)HRC anti-surge 20mm cartridge fuse in series with the LINE input.

DC FUSE (1)FS2 : 2A 20mm cartridge fuse in series with the mains transformer secondary.

DC FUSE (1)FS3 : 3.15A 20mm cartridge fuse in series with the external +ve DC supply input.

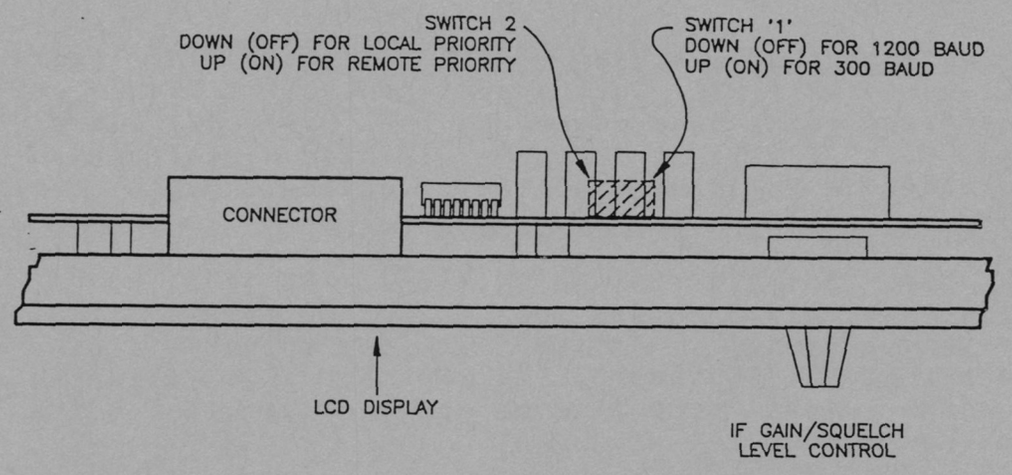
All fuses are accessible on the rear panel.

2.3.3 Preset Option Setting (/2 and /3 variants)

An internally fitted dual-in-line (DIL) switch selects certain remote control options on the serial remote control variants.

The switch is positioned behind the receiver front panel. To access, remove the receiver from it's cabinet or rack and remove the top dust cover. The two pole switch is positioned approximately in the middle of the front panel printed circuit board (see Figure 2.9)

Figure 2.9
PRESET OPTION SELECTOR SWITCH



view onto middle of front panel
(underneath top dust cover)

Switch	Function
1	OFF position for 1200 Baud remote control. ON position for 300 Baud remote control.
2	OFF position for LOCAL priority. ON position for REMOTE priority (note however that REMOTE priority also requires a link to ground on the rear panel REMOTE connector (link pins 7 and 11 on (1)SK3)

The selected Baud rate can be monitored using BITE test number 98.

2.3.4 Line Level Setting

The rear panel audio line output level is set internally.

Except for LSB reception on ISB mode, the line level is set by (7)RV5. This preset control is fitted at the front right hand corner of the Main IF board. The Main IF is the large printed circuit board situated in the centre of the receiver, below the top dust cover.

On ISB variants (/3 and /4), the line level of LSB signals received on ISB mode is set by (8)RV6. This preset control is fitted at the front left hand corner of the ISB board. The ISB board is situated on the right hand side of the receiver, below the top dust cover.

The top dust cover has to be removed to enable these control to be adjusted. The line level controls have a small integral 'knob' with a screwdriver slot to distinguish it from other preset potentiometers in the receiver. IT IS IMPORTANT that no other internal presets are adjusted unless as part of the maintenance procedure.

The line level output is generally set to give 0.5mW (-3dBm) into 600R loads for ssb signals above the agc threshold. This ensures that the line output will not normally exceed the 20mW available, when the receiver is being used on any mode, with agc selected.

2.3.5 FSK Idle Setting (/K option only)

The FSK detector board is fixed onto the Main IF board which, in turn, is located under the top dust cover.

The Idle Setting Switch 11SW1 permits either a 'High' or 'Low' output to be set when FSK mode is deselected and may be adjusted as follows:-

Switch away from PCB edge....output held at -10V.

Switch towards PCB edge....output held at +10V.

2.4 REMOTE CONTROL

Depending on the receiver variant, either parallel or serial remote control is provided. When parallel remote control is provided, the serial data output line is utilised as a BITE error indicator.

2.4.1 Parallel Remote Control (/1 and /4 variants)

Parallel ('extended') remote control of Channel Select, Clarifier (or BFO) and IF Gain/Squelch Level is provided. The Channel Select is, however, limited to the first seven channels (see Table 2.3). Note that if all Channel Select lines are disconnected from ground, channel selection and Clarifier/BFO control are performed from the receiver front panel.

Table 2.3
Channel Select Control Lines

REMOTE connector (1)SK3			Channel selected
Pin5	Pin6	Pin7	
o/c	o/c	o/c	Local control enabled (any channel can be selected using receiver's controls)
gnd	gnd	gnd	1
gnd	gnd	o/c	2
gnd	o/c	gnd	3
gnd	o/c	o/c	4
o/c	gnd	gnd	5
o/c	gnd	o/c	6
o/c	o/c	gnd	7

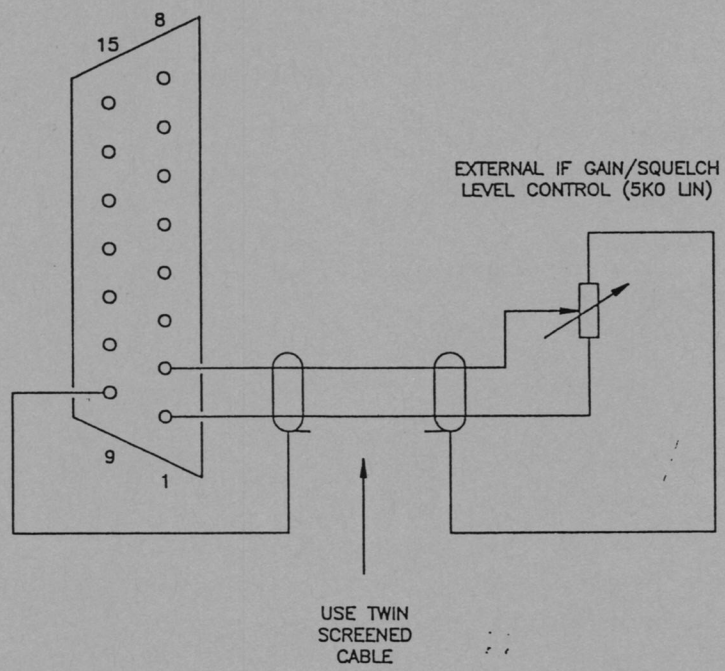
'gnd' - line connected to ground.

'o/c' - line disconnected from ground.

When one of channels 1-7 is selected using the extended control lines, the receiver is set to Receive mode and will always display and receive the selected channel. The Clarifier/BFO of the selected channel can then be incremented or decremented using the extended control lines (pins 4 and 3 of the REMOTE socket (1)SK3 respectively). These lines must normally be left open circuit, the appropriate one being grounded momentarily to alter the setting. This will adjust either the Clarifier or the BFO setting depending on the receiver display. The display can only be set at the receiver itself. Thus, for most systems, the setting which is to be remotely controlled must be pre-determined.

The IF Gain/Squelch Level can be remotely controlled using an external potentiometer (see Figure 2.10). For this to work correctly, the link (4)LK2 on the receiver display board must be broken. When this is done, the receiver's front panel IF Gain/Squelch Level control becomes non-operative. As when under local control, the operation of the extended control potentiometer depends on the agc setting of the received channel. This cannot be adjusted under extended control and thus must be preset at the receiver as required.

Figure 2.10
IF Gain/Squelch Level Control Connections



2.4.2 Serial Remote Control (/2 and /3 variants)

Full digital remote control and interrogation of these variants is possible via the serial data input and output lines (pins 12, 15) of the rear panel REMOTE connector (1)SK3. If control without revertive checks or status interrogation is required, just the serial data input is used. All functions can be controlled apart from loudspeaker monitoring, the display setting and the line output level. The control signals are at standard RS232c/V28 levels at the connector and can be internally preset to be 1200 or 300 Baud asynchronous with 1 start and two stop bits. The receiver is thus compatible with a wide range of standard asynchronous Modems (including the Eddystone 1778), Multiplexers and line drivers. It is also compatible with synchronous data communications equipment which can be fitted with asynchronous adaptors.

The principal Modem options are : -

a) V21 allowing control over a two wire link at 300 Baud (Eddystone 1778 option).

b) V22 (asynchronous) allowing control over a two wire link at 1200 Baud (Eddystone 1778 option).

c) V23 (1200 Baud, full duplex) allowing control over a four wire link at 1200 Baud.

Note that no control lines are provided for Modem/Multiplexers etc. These may require their RTS lines to be set true (i.e. at 0, a positive RS232c level). This is normally done by a link in the Modem connector to a convenient fixed output signal. Such equipment will also usually need internal switches set to match the Baud rate etc. set in the receiver. In all cases the equipment's operating manual should be consulted before attempting installation.

If an Eddystone 6860 RIA is used to convert the levels to RS422a (V11), control over two twisted pairs is possible, without additional line drivers, over distances up to 1/1.5km.

Remote control can be provided from an Eddystone 6800 Remote Control Unit (RCU) which operates in exactly the same manner as the receiver itself. Alternatively a mini/microcomputer can be programmed to provide exactly whatever control is required. In all cases the link between receiver and controller need not necessarily be maintained and no memory of the receiver's status kept at the controller end.

When the 6800 RCU or mini/microcomputer is used, error protection is normally provided in three ways to ensure correct remote operation. These are :-

a) By providing an exclusive OR (EOR) checksum with each data transfer.

b) By providing redundancy in the code words chosen so that not all are used.

c) By providing a revertive data 'echo' whereby the control data sent is reverted, after use, to the controller for checking by comparison.

In some cases the Preset Option switch mentioned previously will have to be set for the specific remote system used. The relevant settings are :-

a) Switch 1 to determine Baud rate. this can be set to 1200 Baud or 300 Baud. Where possible, 1200 Baud should be used as it gives a higher speed of control.

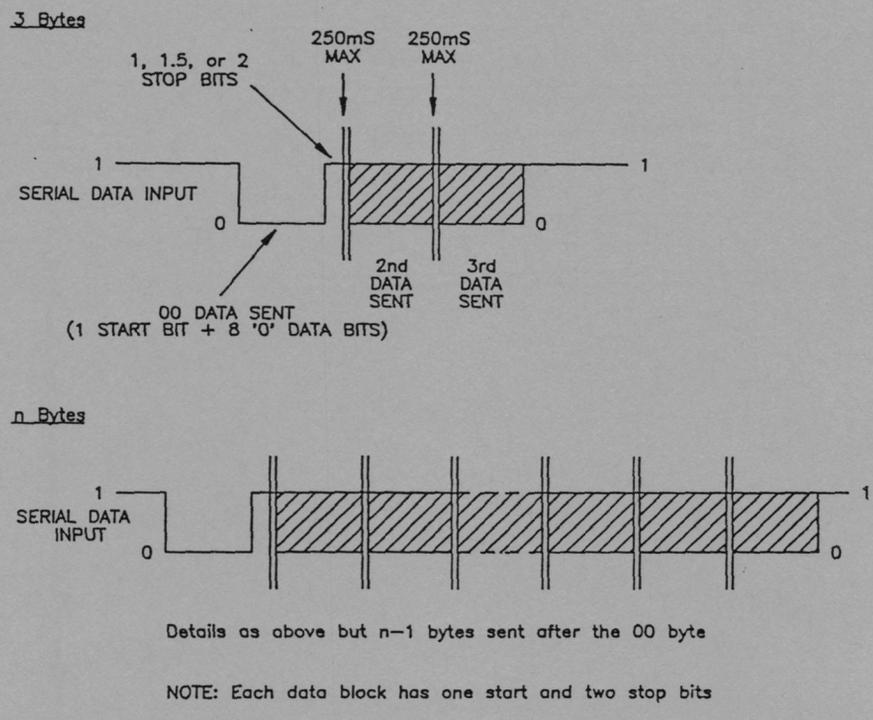
b) Switch 2 to determine local or remote priority of remote control. When set for local priority, mixed local and remote control of all functions (except IF Gain/Squelch Level) is provided. In this case, IF Gain/Squelch level can only be set locally at the receiver itself. When set for remote priority, as long as pin 7 on the REMOTE connector is grounded, all remoteable functions can <u>only</u> be controlled remotely. This includes the IF Gain/Squelch Level control. In most remote control systems, remote priority would normally be selected to prevent settings being inadvertently altered locally. If local operation is occasionally required for testing etc., the REMOTE connector can be temporarily disconnected, thus removing the ground link on pin 7 and establishing local control.

Details of the remote control settings (except local/remote priority) are given on BITE test 98. This also shows the programmed time-out (T/O) setting. This period (normally 250mS) is the maximum allowable gap between any two data bytes of a remote control command string. Gaps of greater than this, caused by any intervening data communications equipment, will cause the whole command to be rejected. No data 'echo' will be reverted by the receiver which will continue to operate normally. This time-out period is fixed but can be specified by the customer at time of ordering. The set value will always be shown on BITE test 98.

Control Inputs

These are shown in Figure 2.11. The first control byte has data 00. This is followed by two or more bytes. Details of the bytes are shown in Figures 2.12 and 2.13. Note that the input will respond to codes containing 1, 1.5 or 2 stop bits. One start bit is used throughout.

Figure 2.11
Control Inputs



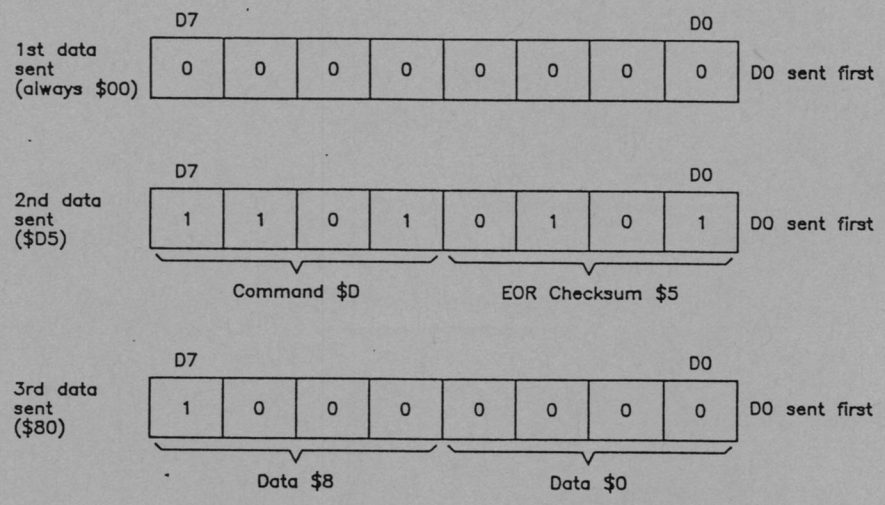
Details as above but n−1 bytes sent after the 00 byte

NOTE: Each data block has one start and two stop bits

The first byte sent has to contain 00 data to act as a synchronising byte. This is followed by two or more bytes depending on the action required (see Table 2.4) with a maximum gap of 250mS (0mS minimum) between bytes. A longer gap can be allowed if specified by the customer at time of ordering.

The form of three byte commands is shown in Figure 2.12 which gives a typical example.

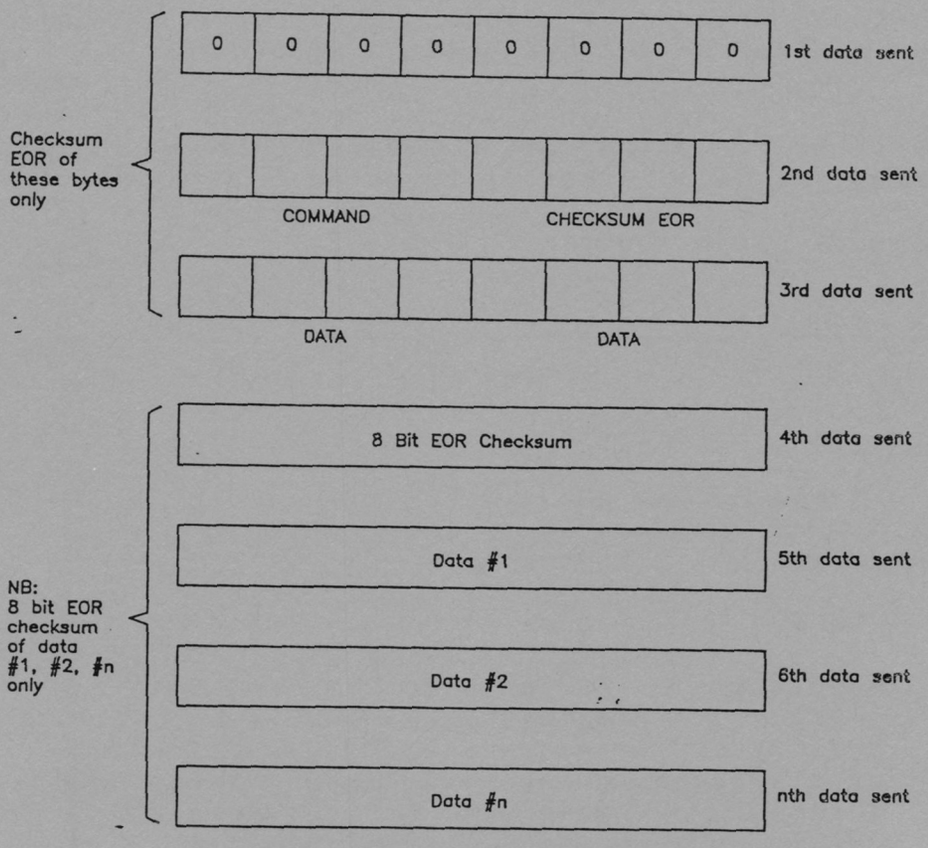
Figure 2.12
Contents of 3 Byte Commands
Typical Control Code (=$D580)



The two bytes sent after the initial 00 byte are described as the control code and consist of the parts shown in Figure 2.12 (start and stop bits not shown). The checksum is sent as the four bit EOR of the rest of the command and data nibbles (excluding all start and stop bits). The example control word in hexadecimal (HEX) form is $D580 ($ denotes HEX) and this will be the method used to define all of the control words. Where longer strings of data are defined, the same convention is also used with <u>each</u> data byte being represented by <u>two</u> symbols (e.g. XX or YY).

Multi-byte commands are detailed in Figure 2.13. These are used to load complete channel memories etc. with just one command sequence. Note the data is in binary coded decimal (BCD) for numerical settings (e.g. frequency offsets).

Figure 2.13
Contents of Multi-Byte Commands



In this case, the control word is followed by the 8 bit EOR of data bytes 1 to n following.

Control Ouputs

Reverted control outputs from the receiver are in the same form as the inputs except that the leading 00 byte is not reverted. Two stop bits are sent after each byte with 0 gap to the next byte. However, it should be noted that this will be compatible with 1, 1.5 or 2 stop bit systems since 'surplus' stop bits effectively become part of the 250mS maximum gap between bytes. The content of the reverted data is identical to that sent except in the case of interrogation or status checking commands where the data required is reverted in addition to the control code sent in the form shown in Figure 2.13. In situations where strings of commands are being sent and data reverted, the next command must not be sent until all the data from the previous command has been reverted or timed out.

Table 2.4
Complete List of Serial Control Codes

X = checksum nibble, Y = data nibble where a nibble is four bits or half a transmitted byte.

Note that if data errors are detected at the receiver, or if control of an 'Unused Channel' is attempted, no data 'echo' is reverted.

Examples of use are given in Table 2.7

Code in Hex	Action	Reverted Data	Notes
0XYY	None.	None.	
1XYY	None.	None.	
2XYY	None.	None.	
3XYY	Absolute setting of BFO offset of displayed channel.	As sent if data valid and Recall or Receive mode set.	YY is 0.0 to 2.4 kHz in bcd with msb = 0 for +BFO msb = 1 for -BFO see Table 2.5.
4XYY	Absolute setting of Clarifier offset of displayed channel.	As sent if data valid and Recall or Receive mode set.	YY is 00 to 10 in bcd with msb = 0 for +ve msb = 1 for -ve offset, see Table 2.5.
5XYY	None.	None.	
6XYY	Absolute setting of BITE test number and BITE mode.	As sent if data valid.	YY is 00 to 99 in bcd. BITE mode is set automatically. see Table 2.6.
7XYY	Absolute setting of IF Gain/ Squelch Level.	As sent.	YY is 00 to 3F in Hex. $00= max. gain $3F = min. gain, see Table 2.6.

Table 2.4 (continued)

Code in Hex	Action	Reverted Data	Notes
8XYY	Channel YY interrogate.	8XYYX_1X_2 Y_1Y_2----- ---$Y_{15}Y_{16}$	YY is 01 to 50 in bcd. X_1X_2 = 8 Bit EOR of eight following YY pairs Y_1--Y_{16}= contents of channel YY, see Table 2.5.
9XYY	Channel YY number load.	As sent if data valid and Recall or Receive mode set.	YY = 01 to 50 in bcd (channel to be displayed).
AA00	USB mode.	)	)
AE04	LSB mode.	)	)
A208	ISB mode.	) As sent	) Absolute
A70D	AM (w) mode.	) if in Recall or	) setting of displayed
A40E	AM (i) mode.	) Receive mode.	) channel contents.
A50F	AM (n) mode.	)	)
AA11	CW (w) mode.	)	)
A912	CW (i) mode.	)	)
A813	CW (n) mode.	)	)
AE15	FSK(w) mode.	)	)
AD16	FSK(i) mode.	)	)
AC17	FSK(n) mode.	)	)

Table 2.4 (continued)

Code in Hex	Action	Reverted Data	Notes
BXYY	Channel YY scan toggle.	As sent.	YY = 01 to 50 in bcd (channel toggled in or out of scan sequence).
CXYY	None.	None.	
D580	Initialise.	D580X_1X_2 Y_1Y_2----- ---Y_9Y_{10}	Sets Recall mode, X_1X_2 = 8 Bit EOR of five following YY pairs Y_1Y_2= received and displayed channel, Y_3--Y_{10} = received channel contents (inc. Squelch on/ off but excluding channel centre frequency), see Table 2.5.
D085	Status interrogate.	D085X_1X_2 Y_1Y_2----- --$Y_{11}Y_{12}$	Reverts status, X_1X_2 = 8 Bit EOR of six following YY pairs Y_1Y_2=oper. mode Y_3Y_4=rec'd channel Y_5Y_6=disp. channel Y_7Y_8=dwell period Y_9Y_{10}=hang period $Y_{11}Y_{12}$=BITE number see Table 2.6.
D386	Fast status interrogate.	D386$X_1X_2Y_1Y_2$	Reverts BITE error and signal present status, see Table 2.6.

Table 2.4 (continued)

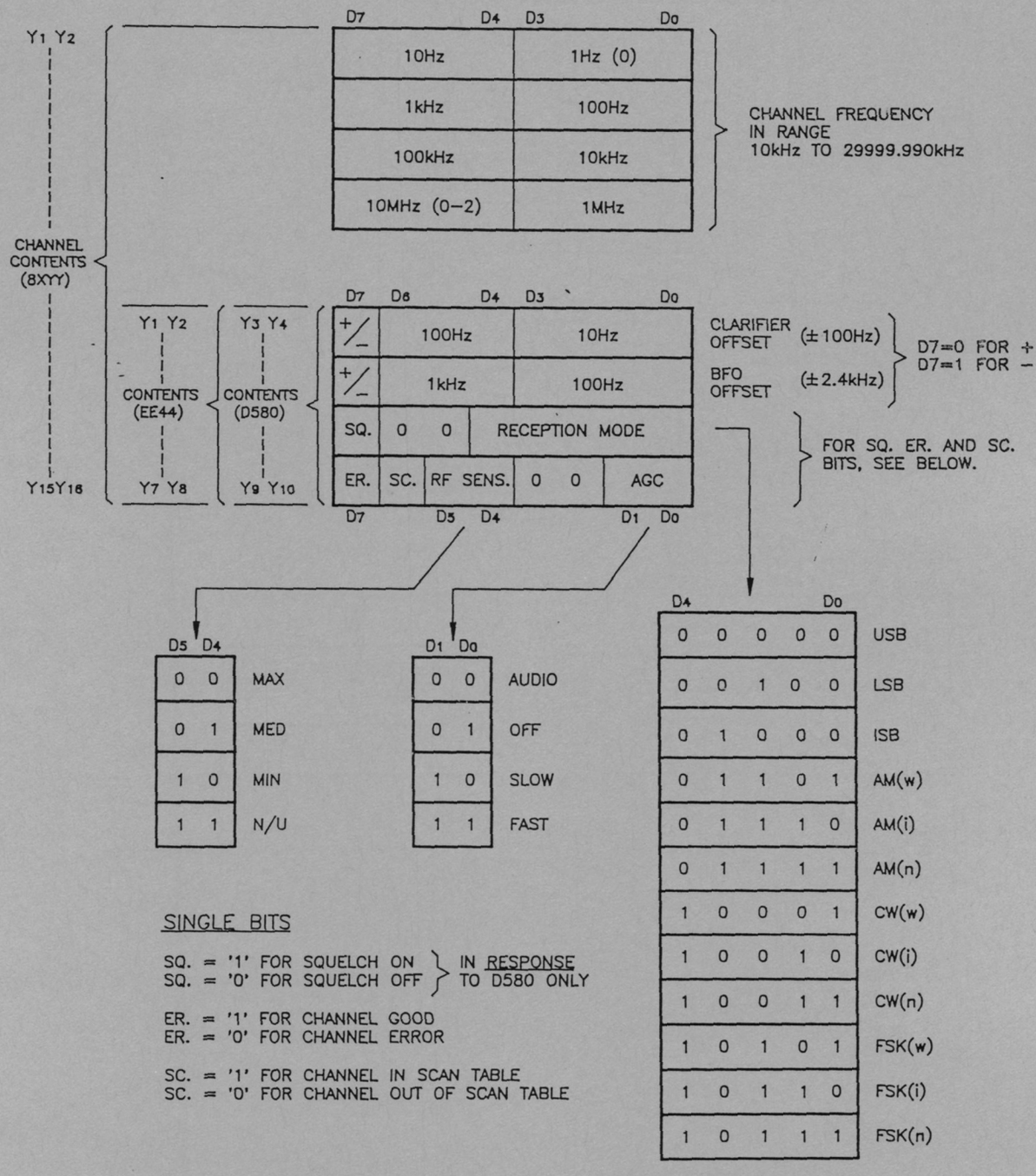
Code in Hex	Action	Reverted Data	Notes
DA07	Recall.	As sent.	Sets Recall mode.
DF8A	Receive.	As sent.	Sets Receive mode.
D60B	Scan.	As sent	Sets Scan mode.
D98C	Dwell	As sent.	Sets Dwell mode.
D397	Squelch on.	As sent.	Enables Squelch.
DC98	Squelch off.	As sent.	Disables Squelch.
DA25	Slow AGC.	) As sent if in Recall or Receive mode.	) Absolute setting of displayed channel contents.
DOA7	Fast AGC.		
DFA8	AGC off.		
DFB9	Audio AGC.		
D3B5	Max. RF sens.		
DOB6	Med. RF sens.		
D937	Min. RF sens.		
D6BO	Scan in.	) As sent if in Recall or Receive.	) Puts displayed channel in/out of scan sequence.
DF31	Scan out.		
E428 X_1X_2 Y_1Y_2 Y_3Y_4	Sets Dwell and Hang periods.	As sent if data valid.	X_1X_2 = 8 bit EOR of two following YY pairs. Y_1Y_2 = 0.0 to 9.9 secs dwell period Y_3Y_4 = 01 to 09 secs hang period. (Y_1 to Y_4 in bcd only).

Table 2.4 (continued)

Code in Hex	Action	Reverted Data	Notes
EE44 X_1X_2 YY Y_1Y_2 ---- Y_7Y_8	Sets channel YY contents. (except channel centre frequency) and sets Recall mode (receives channel YY).	As sent if data valid.	X_1X_2 = 8 bit EOR of five following YY pairs. YY = 01 to 50 in bcd (channel number) Y_1Y_2 = Clarifier offset. Y_3Y_4 = BFO offset. Y_5Y_6 = reception mode. Y_7Y_8 = AGC, RF sensitivity and scan bit settings. see Table 2.5
FXYY	None.	None.	Reserved for switching networks.

Table 2.5
Channel Setting and Status Contents

NOTE: ALL FREQUENCY INFORMATION IS IN BCD.



SINGLE BITS

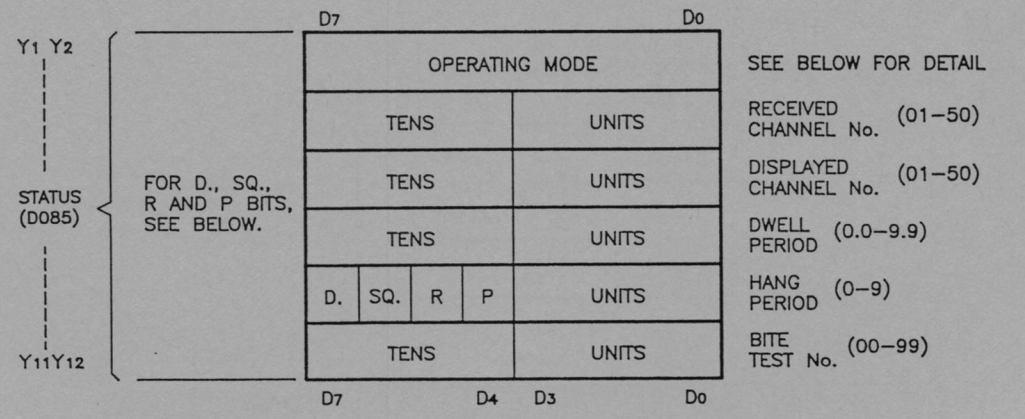
SQ. = '1' FOR SQUELCH ON
SQ. = '0' FOR SQUELCH OFF
} IN RESPONSE TO D580 ONLY

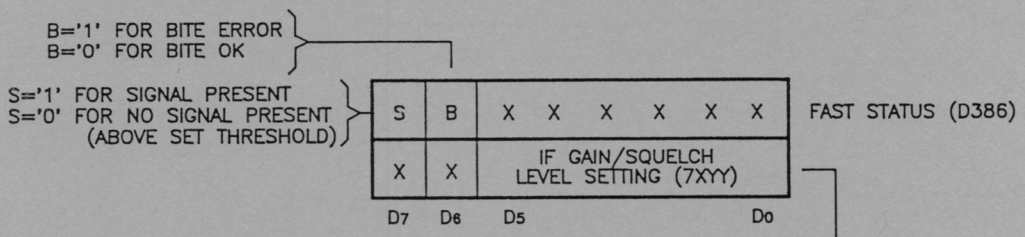
ER. = '1' FOR CHANNEL GOOD
ER. = '0' FOR CHANNEL ERROR

SC. = '1' FOR CHANNEL IN SCAN TABLE
SC. = '0' FOR CHANNEL OUT OF SCAN TABLE

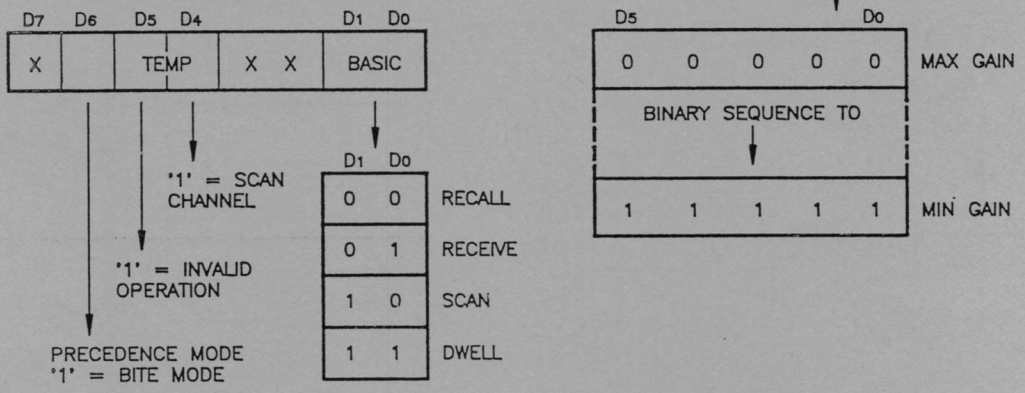
Table 2.6
General Setting and Status Contents

NOTE: 1) ALL NUMERICAL INFORMATION IS IN BCD
2) X = DON'T CARE (CAN BE 0 OR 1)





OPERATING MODE DETAIL



SINGLE BITS

SQ. = '1' FOR SQUELCH ON
SQ. = '0' FOR SQUELCH OFF
D. = '1' FOR BFO DISPLAY/KEY INPUT
D. = '0' FOR CLARIFIER DISPLAY/KEY INPUT

R = '1' FOR 1200 BAUD PRESET OPTION
R = '0' FOR 300 BAUD PRESET OPTION
P = '1' FOR LOCAL PRIORITY PRESET OPTION
P = '0' FOR REMOTE PRIORITY PRESET OPTION

Table 2.7
Simple Examples of Control Sequences

Code in Hex	Examples of use
3XYY and 4XYY	These codes are used to set the absolute BFO offset or the absolute clarifier offset (relative to the fixed channel centre frequency) of the channel being displayed. Note that both codes will operate irrespective of the setting of the display on the receiver itself.
6XYY	This code enables remote or automatic fault checking by sending 6XYY (where YY is the number of the test to be performed) then sending D386 (after a brief period of about 0.5 to 1 second) to interrogate the BITE error bit. Note that this leaves the receiver in BITE mode.
7XYY	This code is used to remotely set the IF Gain or Squelch Level of the channel being received. This input has priority over the front panel control when REMOTE priority is selected on the receiver. When LOCAL priority is selected, the receiver front panel control has priority.
8XYY	This code is used to interrogate a single channel memory (YY is the desired channel number). The fixed channel centre frequency is returned along with the present contents of the associated variable memory (mode, bandwidth etc.).
9XYY	This code can be used in conjunction with other codes to perform various operations on the stored channels. For example to set the receiver to receive on channel 23, send 9823 followed by (after about 50-100mS) the code DF8A (the code for Receive). When absolute settings of channel data are to be performed, 9XYY must be sent first to set the channel to be modified.

Table 2.7 (continued)

Code in Hex	Examples of use
AXYY	These codes are used to set the mode/bandwidth of the displayed channel. Note that if not already being displayed, the channel will need to be set using the 9XYY code. The same applies to DXYY codes used to control agc and RF sensitivity settings of the displayed channel.
BXYY D6B0 DF31	These codes determine if a particular channel is in or out of the scan sequence. BXYY can be used whilst scanning is taking place, to dynamically modify the scan sequence. D6B0 and DF31 only operate on the channel being displayed.
D580	This is a special code to intialise and interrogate a receiver, under remote control, using just one command.
D085	This code enables interrogation of all essential receiver status (except channel, BITE and signal status).
D386	When rapid remote indication of signal present and BITE warnings is required, this interrogation code can be sent at frequent intervals. A minimum gap of about 100mS should be left after receipt of the reverted data before the next interrogation command is sent (this gives a maximum update rate of three to four times a second). If the receivers internal scan mode is in use, too frequent use of D386 will effectively lengthen the dwell period.
D397 DC98	These codes are used to switch the audio squelch on or off. This function is not channel number dependent, operating on whatever channel is being received.

Table 2.7 (continued)

Code in Hex	Examples of use
E428 etc.	This code is used to set the dwell and hang periods of for the receiver's internal scanning facility. Note that both times have to be set simultaneously.
EE44 etc.	This code is used to set the entire (except centre frequency) channel contents of the specfied channel. It also automatically sets that channel as the received channel. This is used to provide channel reception and scanning operation using channel settings (again except the channel centre frequency) derived from the remote control unit itself.

--oOo--

SECTION THREE : OPERATION

This section starts with a description of each front panel control. A quick reference guide is given in Table 3.1. Signal Reception, BITE (Built- In- Test-Equipment), Channelised Reception and Scanning are then detailed separately. Each of these separate sections should be read and understood before proceeding to the next. Note however, that basic use of the receiver does not require all of them to be studied. A number of examples are given to show typical useage.

3.1 CONTROLS

A front view of the receiver, showing all the controls, is given on BP2549 bound at the rear of the manual. Certain controls have different uses depending on the current receiver operating mode. If a control has no function in the current mode, then the display indicates 'Invalid Key Operation' for approximately one second. Any attempts to use an unprogrammed channel ('Unused Channel') will also prompt the 'Invalid Key Operation' display.

3.1.1 Receiver Operating Mode Keys

These keys are grouped around the numerical entry keys on the left-hand side of the display. They control the mode of operation of the receiver control system (as opposed to the mode of signal reception and demodulation). The operating mode selected also affects the action of the other front panel controls.

RECALL

This mode initially displays the contents and number of the channel memory being received. The receiver is tuned to this channel and the channel data controls are enabled to allow the received clarifier setting, mode etc. to be adjusted. Selection of this mode immediately allows the 6100 to be used as a conventional receiver, starting from the actual frequency etc. being received (no matter what previous operating mode was in use). RECALL mode should therefore be selected if simple control without all the other operating facilities is required or if instant display and control of a received signal is required.

RECEIVE

Tunes the receiver to the channel selected by the numerical keys. The signal reception settings will remain as initially displayed but the channel data controls are enabled to allow the received clarifier setting, mode etc. to be adjusted.

DWELL

In this mode, the display indicates the scan dwell period (0.0 to 9.9 secs.) and the scan hang period (0 to 9 secs.) Dwell and hang times are entered together using the numerical keys. Pressing the <- or -> keys steps through the channel numbers of those channels set to be scanned. An 's' will appear in the display, adjacent to the channel number, if the channel is set to be scanned. In this mode, individual channels can be removed from the scan sequence by pressing SCAN CHANNEL whilst they are being displayed. The 's' in the display will go when the channel has been removed.

SCAN CHANNEL

Use of this key toggles the displayed channel in or out of the scan sequence. The 's' in the display, adjacent to the channel number, indicates that the displayed channel is in the scan sequence.

SCAN

In this mode the receiver continually scans the selected channel memories in order of channel number, staying on each channel for the selected dwell period (as long as at least two channels are set to be scanned). If SQUELCH is also selected, and a signal above the SQUELCH threshold is detected, the receiver will stay on that channel and remain there for the selected hang period after the signal ceases. Note that the receiver can be made to stay on a particular channel by selecting RECEIVE or RECALL mode. The scan sequence can be simultaneously controlled using the front panel <- and -> keys (channel data settings cannot be directly adjusted whilst scanning). If a dwell of 0.0 has been selected, the <- and -> keys have sole control of the scan sequence and thus provides 'tuning by channel'.

BITE

When in this mode, the full BITE facilities are available. The required BITE test number (00 to 99) can be entered using the numeric keys and can be incremented or decremented using the <- and -> keys. The display shows the selected BITE number (top line) and the result of the test (PASS or FAIL on the bottom line). Unused tests are shown as SPARE. Test 98 indicates the internal option settings (see section 2.3.3), test 99 displays the version of software used in the receiver (as OS X.X) and the EPROM part number (as XXXXXPX). Adequate time should be allowed for tests to settle. When the receiver is not in BITE mode, the LCD display will flash 'B', at the top left hand side, if the BITE circuitry detects a potential fault at the point at which the receiver is currently operating.

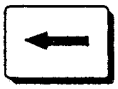
3.1.2 Numerical Keys

These keys are grouped with the receiver operating mode keys to the left of the display.

0 to 9

These are used to enter numerical data, the content of which depends on the receiver operating mode. The required displayed channel number is entered in RECALL or RECEIVE modes (note that if the displayed channel is not the received channel, the channel number will flash). The dwell and hang times are entered in DWELL mode and the BITE test number in BITE mode.

3.1.3 Decrement (<-) and Increment (->) Keys



These are used to alter data depending on the receiver operating mode and the state of the BFO and CLARIFY keys. In RECALL or RECEIVE modes the <- and -> keys control the clarifier or BFO settings. The display indicates which will be adjusted, this being set by pressing the BFO or CLARIFY key beforehand. In DWELL mode the keys show the numbers of channels which have been set to be scanned. In SCAN mode they alter the scan position and in BITE mode they step through the BITE tests.

3.1.4 Channel Data Keys

These are grouped just below the display. These keys, along with the increment and decrement keys are used to directly alter the contents of the channel memories in RECALL and RECEIVE modes only. Note that SQUELCH effectively operates on all channels simultaneously.

MODE

This key steps through the signal demodulation settings AM, CW, FSK or SSB. AM provides envelope detection, CW provides product demodulation with variable injection from the BFO and also switches in a audio low pass filter cutting off at about 1.3kHz. FSK also provides this last choice but without the filter (for FSK demodulation). SSB (USB, LSB or ISB when fitted) provides product demodulation with a fixed zero offset BFO frequency. On AM, CW and FSK modes, this switch also determines the selectivity. The displayed mode suffix 'w' indicates wide (6kHz), 'i' indicates intermediate (2.4kHz) and 'n' indicates narrow. The 'narrow' filter is only fitted on /C receivers, it's bandwidth being specified by the customer.

RF SENS

This key steps through the RF signal input attenuator settings of MAX (no attenuation), -10dB and MIN (an unspecified attenuation level of at least 30dB).

AGC

This key steps through the AGC choices of audio AGC, conventional AGC with slow or fast decay and AGC off (manual IF gain). In the last case, the IF GAIN/SQUELCH LEVEL control sets the receiver gain level. Otherwise, when AGC is on, this level control determines the signal threshold level used by the squelch, scan halt and signal/no signal detector functions.

SQUELCH

This key toggles on or off the audio squelch circuit and the scan halt threshold detector. Note that the signal/no signal detector operates independently of this key.

3.1.5 Miscellaneous Controls and Displays

The remaining controls and displays can generally be used in any receiver control mode although in some they may not provide a useful action.

BFO

This determines if the <- and -> keys are to be used to set the BFO offset (0.0 to ±2.4 kHz). This mode can be exited by pressing CLARIFY.

CLARIFY

This determines if the <- and -> keys are to be used to set the clarifier offset (0.0 to ±100Hz about the fixed channel centre frequency). This mode can be exited by pressing BFO.

SUPPLY

This push button is used to switch the mains or dc supply to the receiver on or off. A mechanical green indicator shows on the switch when it is in the on position.

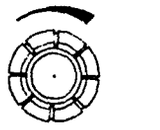
AF MONITOR

This toggle switch (fitted on ISB variants only) determines the source for the high level audio fed to the front and rear panel loudspeaker outputs and the PHONES output. For AM, CW, FSK, LSB, USB or for the USB side of an ISB signal, the switch should be set to NORMAL. For the LSB side of an ISB signal, LSB on ISB should be selected.

RED LEDs

These LEDs are used to assist tuning of fsk signals when the /K (internal fsk detector) option is fitted. In this circumstance, when an active fsk signal is correctly received, both LEDs will be equally illuminated. The arrows on the <- and -> keys indicate the required direction of clarifier tuning.

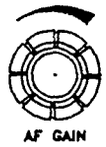
IF GAIN /SQUELCH LEVEL



IF GAIN/SQUELCH LEVEL

This knob controls the level of IF gain when AGC off is selected. When audio, slow or fast AGC is selected this knob sets the signal/no signal detector, audio squelch and scan halt threshold level.

AF GAIN



AF GAIN

This knob sets the output level of the front panel monitor loudspeaker. It also sets the output level from the front panel PHONES jack and from the rear panel high level audio output connector.

PHONES

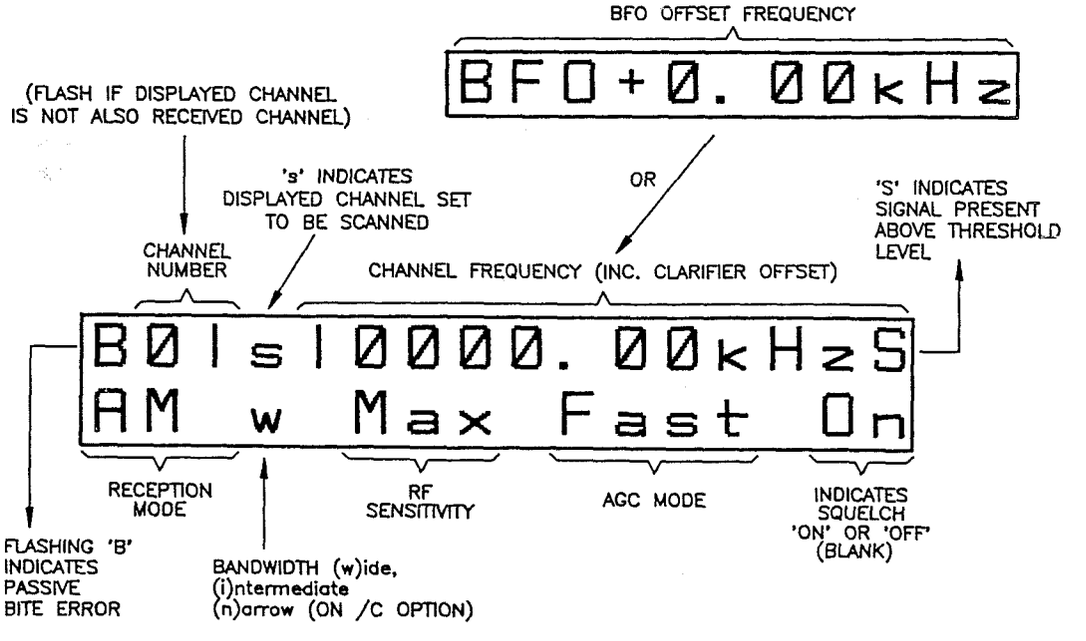
PHONES

This is a standard mono audio connector jack for headphones etc. Alternative rear panel high level audio output connections allow optional muting of that output when a jackplug is inserted into the PHONES connector. The front panel monitor loudspeaker is always muted in this situation.

Table 3.1
Receiver Operating Modes

CONTROL MODE	DISPLAY	⇄ KEYS	NUMERICAL KEYS	CHANNEL DATA KEYS	BASIC OPERATION
RECALL	* CONVENTIONAL RECEIVER DISPLAY	CHANGE CLARIFIER OR BFO OFFSET OF DISPLAYED CHANNEL	SELECT DISPLAY CHANNEL No.	MODIFY CONTENTS OF DISPLAYED CHANNEL	RECEIVER OPERATES CONVENTIONALY STARTING AT CHANNEL BEING RECEIVED
RECEIVE	* CONVENTIONAL RECEIVER DISPLAY	CHANGE CLARIFIER OR BFO OFFSET OF DISPLAYED CHANNEL	SELECT DISPLAY CHANNEL No.	MODIFY CONTENTS OF DISPLAYED CHANNEL	RECEIVER OPERATES CONVENTIONALY STARTING AT CHANNEL BEING DISPLAYED
BITE	BITE TEST No. AND REPORT	ALTER BITE TEST No.	SELECT BITE TEST No.	INVALID	BITE TESTS PERFORMED
SCAN	* CONVENTIONAL RECEIVER DISPLAY	ALTER SCAN POSITION	INVALID	INVALID	SCANS EACH CHANNEL IN SCAN SEQUENCE STAYING ON EACH FOR DWELL PERIOD
DWELL	DWELL, HANG AND SCAN CHANNEL	DISPLAY NEXT SCAN CHANNEL	ENTER DWELL AND HANG PERIOD	INVALID	DISPLAY/ENTRY OF SCAN PARAMETERS
SCAN CHANNEL	TEMPORARY MODE ONLY	INVALID	INVALID	INVALID	CHANNEL DISPLAYED TOGGLED IN OR OUT OF SCAN SEQUENCE

* CONVENTIONAL RECEIVER DISPLAY



3.2 SIGNAL RECEPTION

3.2.1 Switching On

⚠ Ensure that the rear panel voltage selector is set for the local mains power supply, apply mains power (or alternatively a suitable dc supply) and press the **SUPPLY** switch so that the green indicator shows on the switch.

All display pixels will briefly show as black and then **Power On Reset** will be displayed. The display will then show **Memory Pass** or **Memory Fail**. If Memory Fail is displayed it indicates that the mode, RF sensitivity, AGC, clarifier or BFO setting information stored in one or more channel memories has become corrupted. This will generally happen if no power has been supplied to the receiver for some time. In this situation, the affected channels are set to the default condition of USB mode, maximum RF sensitivity, audio AGC and central clarifier and BFO settings. The Memory Pass condition will only be restored when all the affected channels have had at least one of these settings altered. It should be noted that the channel centre frequencies are stored in permanent memory and are thus never lost during any interruption to the power supply. Finally the display will clear to one of the control mode formats with at least one of the red LEDs below the display illuminated.

The keyboard may now be used to control the receiver. If all the keyboard is not operating, the receiver may be internally set for remote control priority, see section 2.3.3.

If the **B** indicator at the top left hand side of the display flashes, it may indicate a potential fault at the current receiver settings. However at switch-on, at certain tuned frequencies when the /X option is fitted, this indicator may flash for a few minutes as the internal standard warms up to it's operating temerature. The **B** indicator will also flash, when the /S option is fitted, if the external frequency standard is not present at the correct level or frequency. In this case press **<BITE>**, **<0>**, **<8>** to determine if the 436MHz loop oscillator has locked to the external standard input (should display **PASS**). Other BITE warnings should be investigated using the BITE procedure, see section 3.3. In all cases, if the **B** BITE warning indicator flashes, the receiver will automatically go through the Power On Reset process every few seconds.

If the bottom right hand corner of the display above the SQUELCH switch shows On, press <SQUELCH> to prevent loss of audio whilst performing initial tuning.

If use of the equipment as a conventional receiver is required, operating on the channel already being received, press <RECALL>. Use involving the other stored channels is described in sections 3.4 and 3.5.

3.2.2 Fine Tuning of the Signal (Clarifier)

The clarifier setting of the displayed channel can be adjusted using the decrement (<-) and increment (->) keys. If the channel number is not flashing, it indicates that the displayed channel is also the received channel. Use of these keys in this circumstance will 'fine tune' the received signal. Otherwise, if the channel number is flashing, use of the keys will not cause any immediately audible effect. In both cases, the channel memory contents will be altered, the new setting being retained by the capacitor backed up memory.

To be able to adjust the clarifier, the display top line should show the channel frequency. If it shows BFO ±X.XXkHz then press <CLARIFY> to obtain the required display. Press < <- > to reduce the tuned frequency or < -> > to increase the tuned frequency. The range is limited to a maximum of ±100Hz around the fixed channel centre frequency.

3.2.3 Signal Mode/Selectivity Settings

The <MODE> key is used to step through the reception mode/selectivity options of AM, CW, FSK and USB/LSB/ISB. As for the clarifier setting, the displayed channel will always be the one which is altered. When CW is selected the BFO can be used to determine the detected audio output frequencies. On CW a low pass audio filter is also selected, cutting off at about 1.3kHz. On FSK the BFO is again used but without the audio filter. This allows a wider audio output frequency range for FSK etc.

On USB, LSB and ISB (when fitted) where the BFO is fixed at zero offset, 'zero beating' of the signal can be performed using the clarifier control.

Example 3.1
CW Reception

Press <MODE> repeatedly to select CW w, CW i, or, if fitted, CW n.

Press <BFO> and set the BFO in the range up to 1.3 kHz (+ or -) using the <- and -> keys. This setting equals the desired output tone in the range of the CW audio filter.

Press <CLARIFY> and fine-tune the desired signal, if required, as described in section 3.2.2.

Example 3.2
FSK Reception

Press <MODE> repeatedly to select FSK w, FSK i, or, if fitted, FSK n.

For external FSK demodulators driven from the receiver's audio output, press <BFO> and set the BFO (using the <- and -> keys) to the nominal centre input frequency of the external demodulator. Then press <CLARIFY> and fine tune the receiver to obtain centre zero deflection (or equivalent) on the demodulator's tuning indicator. Note that the sign of the BFO offset (+ or -) determines the effective 'polarity' of the FSK signal. The polarity may be reversed or made correct if necessary, by setting the same BFO offset but with the other sign.

On suffix /K options, which have an internal audio driven demodulator fitted, the BFO offset required is + or - 1.7kHz. In this case tune the receiver to obtain equal illumination intensity of the two red LEDs below the display.

Example 3.3
ISB Reception
(on ISB variants only)

Press <MODE> repeatedly to select ISB.

Press <CLARIFY> and fine-tune the desired signal, if required, as described in section 3.2.2.

Set the AF Monitor toggle switch to select NORMAL to monitor USB via the loudspeaker and phones or LSB on ISB to monitor LSB. Two rear panel line outputs provide independent USB and LSB outputs when ISB mode is selected. It should be noted that on all other modes including USB and LSB, the AF MONITOR switch must be set to NORMAL and only the main line output on the rear panel carries the signal.

3.2.4 Gain Control

Manual gain and three types of automatic gain control are available by pressing <AGC> repeatedly until the desired setting is obtained. As for the clarifier setting, the displayed channel will always be the one which is altered. When OFF is selected, gain is set by use of the <I.F. GAIN / SQUELCH LEVEL> control.

AGC type is normally selected to suit the signal being received. When AGC on is selected, the <I.F. GAIN /SQUELCH LEVEL> control is used to set the audio squelch, scan halt and signal/no signal detector thresholds. One of the three AGC on settings, AUD., SLOW or FAST, must be selected for these functions to operate correctly.

Note that the immediate operation of the <I.F. GAIN /SQUELCH LEVEL> control depends on the AGC setting of the channel actually being received

In all cases, the RF sensitivity of a channel can be reduced by pressing <RF SENS> repeatedly to select MED, which gives 10dB RF attenuation or MIN which gives at least 30dB RF attenuation. MAX gives zero RF attenuation.

3.2.5 Audio Squelch Operation

Signal level derived audio squelch is available on all reception modes.

Example 3.4
Selecting Audio Squelch

If the squelch On indicator is not present in the bottom right hand corner of the display above the SQUELCH switch, press <SQUELCH> to select audio squelch and press <AGC> repeatedly to obtain AUD., SLOW or FAST as required for the signal type or prevailing conditions.

Adjust the <I.F. GAIN / SQUELCH LEVEL> control to just remove the squelch and make the received signal fully audible. S will appear at the extreme top right hand side of the display when the audio squelch is removed.

When a signal above the reference signal level is present, full audio output will be available and the S indicator will be on, otherwise, the audio output will be muted by about 20dB and the S indicator will be absent. The S indication is available whether or not SQUELCH is on.

Note that the signal indicator has an open collector transistor output available on the rear panel so that external equipment can respond to signals above the audio squelch threshold. Again, this external indication is available whether or not SQUELCH is on.

The <I.F. GAIN / SQUELCH LEVEL> control corresponds to approximately 0dBuV (fully clockwise) to +100dBuv (fully anti-clockwise) emf signals.

3.3 BITE (Built-In-Test-Equipment)

3.3.1 Passive BITE

When the receiver is not in BITE mode, BITE continues to monitor certain receiver conditions and flashes the B indicator, at the top left hand side of the display, if a potential fault is found. This is described as 'passive BITE'. When convenient, the source of the fault can be found by pressing **<BITE>** and stepping through the BITE tests using the <- and -> keys. If the result of a particular test is required, its number can be directly entered using the numeric keys.

It should be noted, when the /X option is fitted, that the B indicator may flash for a few minutes when the receiver is first switched on as the internal frequency standard warms up to it's operating temperature.

The tests performed in passive BITE are those which do not interfere with the reception of signals (tests 00 to 09 inclusive - see Table 3.3). They mainly indicate whether power is supplied to modules and if the synthesiser is in lock at the frequency to which the receiver is tuned. All passive tests will indicate **PASS** or **FAIL** as appropriate. Test 03 will also indicate **SPARE** on non ISB variants. Table 3.3 gives a full description of all tests.

3.3.2 Active BITE

Comprehensive tests of the synthesiser and of signal paths through the receiver can also be performed. This involves switching the synthesiser over its whole range and injecting test signals from the inbuilt broadband noise generator and thus cannot be performed when the receiver is being used for signal reception. This is described as 'active BITE'. For this, BITE mode has to be selected (display indicates BITE number and test result **PASS** or **FAIL**) and the tests can then be stepped through using the <- and -> keys or directly entered using the numeric keys.

Tests 98 and 99 are special tests which are used to display certain receiver status conditions. Test 98 indicates the internal remote control option settings (see section 2.3.3). Test 99 indicates the receivers Operating System software issue number in the form OS X.X and the Eddystone part number of the EPROM fitted as XXXXXPX. The information given by both these tests should be quoted if questions about operation arise.

Table 3.3
BITE Tests

BITE No.	Test	Notes
Test 00-09 inc. are the passive BITE tests which are made at the current receiver settings. Test 00 will appear as FAIL if any of the tests 01-09 fail. Test 03 will appear as SPARE on non ISB variants.		
00	General alarm	as 01-09
01	Preselector power supply	
02	Main board power supply	
03	ISB board power supply	
04	Synthesiser main power supply	
05	Synthesiser varicap power supply	
06	Main synthesiser loop lock	
07	Reference synthesiser loop lock	
08	436MHz loop lock	
09	BFO loop lock	when in use
Tests 10 to 15 inc. are active BITE tests at the extreme ends of each synthesiser loop sub-range. The main loop is tested at the extreme ends of the two ranges (LF and HF). The reference loop is also tested at the extreme ends of it's range. Thus the tests will analyse if any loop has failed in total or just at one end. Note that due to the restricted range of the reference loop, the main loop will not necessarily fail when the reference loop fails.		
10	Main loop lock	LF bottom
11	Main loop lock	LF top
12	Main loop lock	HF bottom
13	Main loop lock	HF top
14	Reference loop lock	bottom
15	Reference loop lock	top
Tests 16 and 17 are active BITE tests at each end of the BFO synthesiser range.		
16	-2.4kHz BFO lock	
17	+2.4kHz BFO lock	

Table 3.3 (continued)

BITE No.	Test	Notes

Tests 18 to 51 inc. are overall signal path tests using the inbuilt noise generator to check the receiver gain level over the frequency range.

Tests 18 to 21 inc. are used to test particular IF paths separately. Tests 22 to 51 inc. are performed using two different IF paths at each RF setting. An RF fault would produce faults on each path, a single IF filter fault would produce a fault on only one path.

Faults only occuring at certain frequencies indicate faults prior to the first mixer 7IC1/2, or faults in the synthesiser at the corresponding points (note that a low synthesiser drive level will <u>not</u> necessarily indicate fail since it tends to increase the noise level generated). If all tests fail, a serious fault in the signal path or synthesiser is most likely. A fault producing approximately 15-30dB attenuation will produce a fail indication.

Note that tests 20 and 21 will indicate SPARE if the narrow filter is not fitted (test 20) or on non ISB variants (test 21).

18	Gain via 'i' IF filter 7FL2
19	Gain via IF pad 7R62-7R64 inc.
20	Gain via 'n' IF filter 7FL3
21	Gain via ISB filter 8FL1
22	2MHz gain via 'i' IF filter 7FL2
23	2MHz gain via IF pad 7R62-7R64 inc.
24	4MHz gain via 'i' IF filter 7FL2
25	4MHz gain via IF pad 7R62-7R64 inc.
26	6MHz gain via 'i' IF filter 7FL2
27	6MHz gain via IF pad 7R62-7R64 inc.
28	8MHz gain via 'i' IF filter 7FL2
29	8MHz gain via IF pad 7R62-7R64 inc.
30	10MHz gain via 'i' IF filter 7FL2
31	10MHz gain via IF pad 7R62-7R64 inc.

Table 3.3 (continued)

BITE No.	Test	Notes
32	12MHz gain via 'i' IF filter 7FL2	
33	12MHz gain via IF pad 7R62-7R64 inc.	
34	14MHz gain via 'i' IF filter 7FL2	
35	14MHz gain via IF pad 7R62-7R64 inc.	
36	16MHz gain via 'i' IF filter 7FL2	
37	16MHz gain via IF pad 7R62-7R64 inc.	
38	18MHz gain via 'i' IF filter 7FL2	
39	18MHz gain via IF pad 7R62-7R64 inc.	
40	20MHz gain via 'i' IF filter 7FL2	
41	20MHz gain via IF pad 7R62-7R64 inc.	
42	22MHz gain via 'i' IF filter 7FL2	
43	22MHz gain via IF pad 7R62-7R64 inc.	
44	24MHz gain via 'i' IF filter 7FL2	
45	24MHz gain via IF pad 7R62-7R64 inc.	
46	26MHz gain via 'i' IF filter 7FL2	
47	26MHz gain via IF pad 7R62-7R64 inc.	
48	28MHz gain via 'i' IF filter 7FL2	
49	28MHz gain via IF pad 7R62-7R64 inc.	
50	30MHz gain via 'i' IF filter 7FL2	
51	30MHz gain via IF pad 7R62-7R64 inc.	

Tests 52 to 97 inc. are spare.

Test 98 is used to display internal preset option remote control options.

Test 99 is used to display the issue number of the receivers operating system and the Eddystone part number of the EPROM fitted. Note that this number is specific for the variant, the options fitted and the channel frequencies programmed.

3.4 Channelised Operation

Up to 50 (or 99 on /1 and /4 variants) memories are provided for channel storage. In each memory, channel centre frequency, clarifier offset, BFO offset, reception mode/selectivity, RF sensitivity, and AGC setting are stored. Memories can be interrogated (viewed) and modified, except for channel centre frequency, without disturbing the signal being received. These operations often mean that the displayed channel is not that to which the receiver is tuned. This state is indicated by flashing the channel number on the top left hand side of the display. The displayed channel must not be the received channel if reception is to remain undisturbed by operation of the channel data keys (i.e. the channel number must be flashing).

Channel memories can be interrogated by entering the channel number using the numeric keys. RECALL or RECEIVE mode has to be selected before a channel number can be entered. The contents of the selected memory are thus displayed for checking before being altered. Channels which have no centre frequencies programmed display Unused Channel.

The channels stored can be received as required and can also be scanned (section 3.5). The following examples detail most of the commonly required channel operations concerning direct reception and contents alteration.

Example 3.5
Receiving on a Stored Channel
(tuning controls enabled)

To receive on channel 03's settings with the ability to adjust the settings if required (for example to tune the receiver to allow for small changes in the received signal's frequency).

Press <RECALL>, <0>, <3>, <RECEIVE>.

The initial RECALL ensures that the following numeric keys enter a channel number without mistuning the receiver. Generally however, this keypress is not required as long as the display shows a channel's contents and the receiver is not scanning. The final keypress tunes the receiver to the displayed channel settings.

Example 3.6
Modifying Channel Settings
(without disturbing the received signal)

Starting with channel 03 being received (as in example 3.5), to modify channel 12's settings for later use without breaking into the signal being received.

Press <1>, <2>.

Channel 12's present settings will be displayed. The 12 channel number will flash to indicate 12 is not the channel being received.

Modify the settings using the controls as described in sections 3.2.2, 3.2.3 and 3.2.4. Note that these modifications have no effect on the received signal (except for use of the IF GAIN/ SQUELCH LEVEL control which always operates on the received channel).

Press <RECALL> and the display goes back to channel 03, the channel to which the receiver is tuned.

Note that <RECALL> always displays the received channel, without altering the received signal settings. Compare this with <RECEIVE> which always sets the received signal settings to the displayed channel, without altering the display. Thus, during more complicated memory modifications, if the received signal requires the receiver to be retuned slightly or if the number of the received channel is forgotten, press <RECALL>.

3.5 Scanning Operation

Any number of the programmed, stored channels can be scanned, in channel number order, with adjustable dwell and hang times. The dwell time is the period for which the receiver stays on each channel. This period can be set in the range 0.0 to 9.9 seconds (0.1 second increments).

If SQUELCH on is selected and a signal above the audio squelch threshold is present on the channel being received, the receiver will halt on that channel and remain there for the hang period after the signal ceases or goes below the threshold level. This period can be set in the range 0 to 9 seconds (one second increments). However, for the scan halt to operate correctly, each scanned channel has to have one of the three AGC on modes set (AUD., SLOW or FAST) noting that the decay times of the AGC will add to the hang period. If zero or a short hang period (less than one or two seconds) is required, AGC FAST must be used which only adds a few hundred milliseconds to the displayed hang period. AGC SLOW adds about one or two seconds to the hang time. AUDIO AGC adds a similar amount of time but can produce erratic dwell times under certain circumstances. AUDIO AGC should thus be avoided, if possible, in channels set to be scanned.

The threshold level is set by the I.F. GAIN / SQUELCH LEVEL control. This corresponds to signal levels of approximately 0dBuV emf (fully clockwise) to +100dBuV emf (fully anti-clockwise).

The scan channel sequence can also be stepped on or back by the <- and -> keys. If a dwell of 0.0 seconds is set, these keys have sole control of the sequence and thus provide 'tuning by channel'.

The following examples show commonly used scanning operations. Scanning can be started when in any mode by pressing **<SCAN>**. Note however that at least two channels must be set to be scanned. Also note that if SQUELCH is on and a signal above the threshold is present before **<SCAN>** is pressed, scanning of the desired channels will not start until the signal ceases or the scan is forced to move on by pressing < <- > or < -> >.

Example 3.7
Displaying Scan Parameters / Channel Numbers

Press <DWELL>. The display will show the dwell and hang times. For example 1.2 - 8 Secs indicates a dwell of 1.2 seconds and a hang of 8 seconds.

Pressing < <- > or < -> > will step through the numbers of the channels set to be scanned (shown on the top left hand side of the display). The letter s will be displayed adjacent to the channel number if it is set to be scanned. If no channels with an s suffix appear, this indicates that no channels are set to be scanned.

Example 3.8
Removing Channels from the Scan Sequence

Proceed as in Example 3.7 using the < <- > and < -> > keys.

Press <SCAN CHANNEL> whilst displaying the number of the channel to be removed from the scan sequence. When it is removed, the s suffix will be removed.

This is the easiest way of removing channels from the scan sequence (it can also be done in RECALL or RECEIVE mode) since it only displays scanned channel numbers. If required, all channels can be rapidly removed until no s suffixed numbers appear.

If a channel is removed in error, it can be reset by pressing <SCAN CHANNEL> again before pressing < <- > or < -> > to select another number (as the removed channel number will not be displayed again in this mode).

Example 3.9
Setting Dwell and Hang Periods

To set, for example, a dwell period of 3.5 seconds and a hang period of one second.

Press <DWELL>, <3>, <5>, <1>. The numbers enter right to left. Note that dwell and hang cannot be entered separately.

Example 3.10
Setting Channels to be in the Scan Sequence

To enter channels into the scan sequence (23 and 45 for example) which are not already set to be scanned.

Press <RECALL>, <2>, <3>, <SCAN CHANNEL>.

Press <4>, <5>, <SCAN CHANNEL>.

In each case the s channel number suffix will appear when the channel is set to be scanned. Note that channels already in the sequence can be removed in the same way (see also Example 3.8).

Example 3.11
Typical Scanning Useage

A typical use would be to monitor a split frequency simplex transmission using frequencies stored in say, channels 23 and 45.

Proceed as in Examples 3.8 and 3.10 to ensure that channels 23 and 45 are the only channels in the scan sequence. Proceed as in Example 3.6 to ensure that FAST AGC has been set in channels 23 and 45.

Press <SQUELCH> if the squelch On indicator is absent.

Set the scan halt threshold level as required with the <I.F. GAIN / SQUELCH LEVEL> control. Signals higher than the set level will then cause the scan to halt.

Press <DWELL>, <0>, <5>, <0>, <SCAN>.

Example 3.11 sets the receiver scanning the channels which contain the frequencies used in the two way transmission. A short dwell time ensures that the start of the transmission is not missed no matter which frequency is used first. The short hang time ensures that the receiver tunes to the other signal when the first signal ceases.

In general the dwell period is kept as short as possible, just being long enough to allow reliable detection or recognition of desired signals by the chosen means (i.e. by the scan halt circuitry,by operator's 'ear' or by ancillary equipment).The hang period is selected to suit the type of communication being monitored and is usually kept very short for split frequency simplex. Several seconds are required for single frequency simplex to ensure the receiver stays on the same frequency to monitor both sides of the transmission. Certain signals may need AUD. or SLOW AGC to be selected (although AUDIO should be avoided, if possible, in scanned channels). Note that these AGC decay times add about one or two seconds to the hang period and this has to be taken into account when monitoring split frequency simplex transmissions. This lengthening of the hang period is desireable because some signals naturally fall below the threshold level during the normal one to two second pauses. A very short hang period in this circumstance would therefore cause erratic channel switching.

Example 3.12
Tuning by Channel

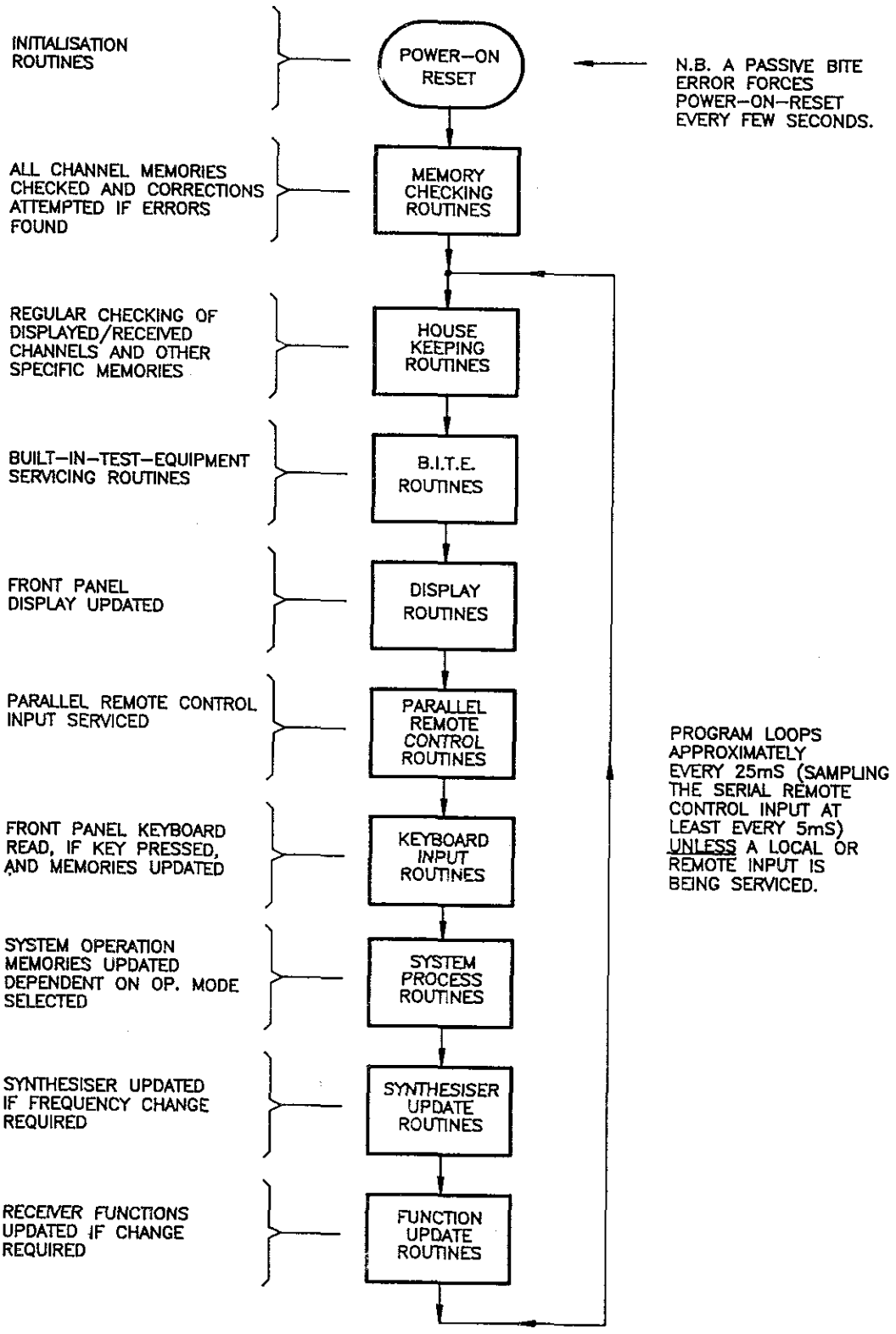
Proceed as in previous examples to set the channels which are to be scanned.

Press <DWELL>, <0>, <0>, <0> to enter a dwell period of 0.0 seconds (the hang period is not significant).

Press <SCAN>. Pressing the < <- > and < -> > keys now just tunes the receiver to the channels in the scan sequence.

Manual tuning by channel is useful in circumstances where rapid selection of of small number of channels is required.

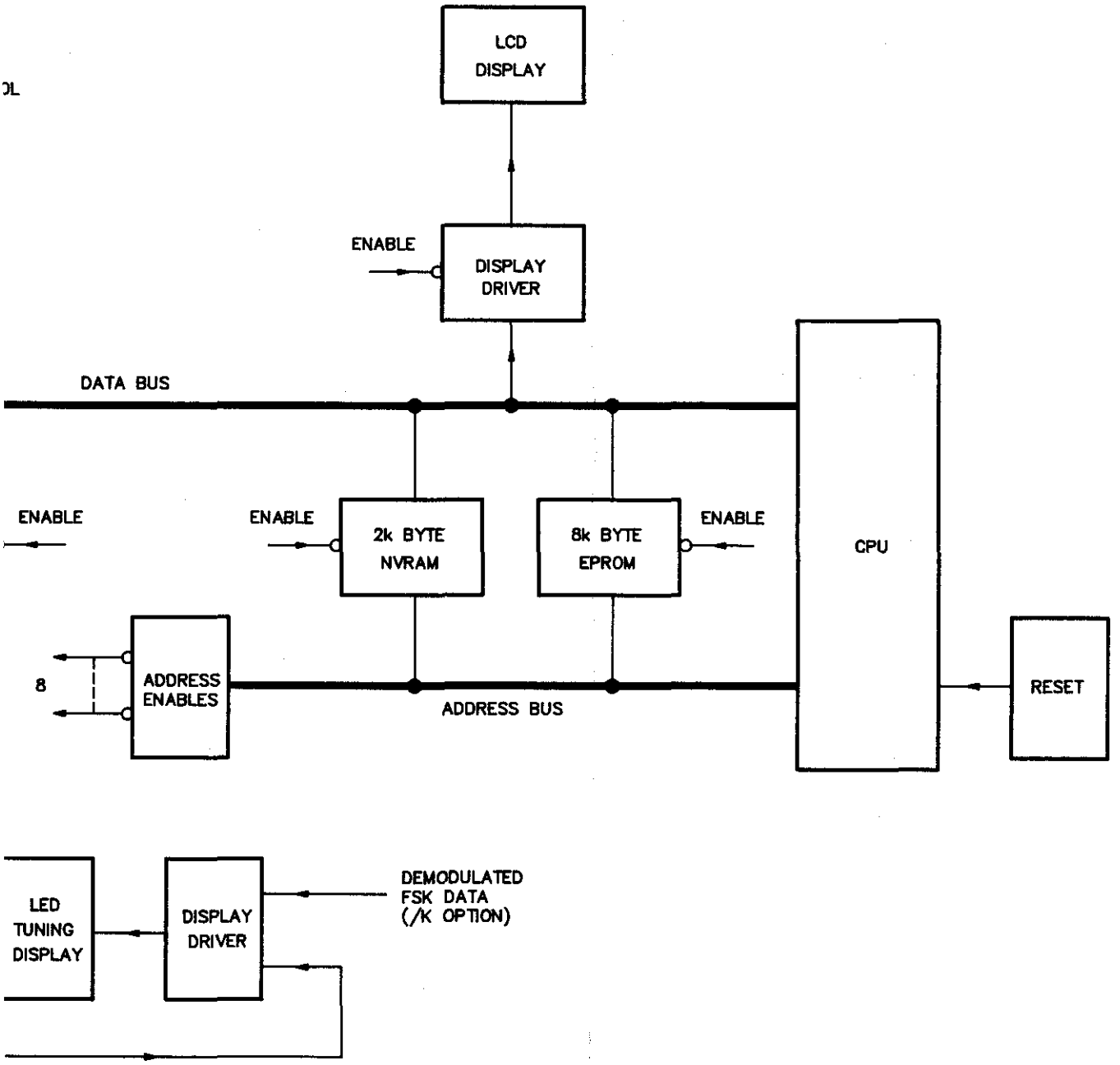
--oOo--



6100 RECEIVER SIMPLIFIED EXECUTIVE FLOWCHART

EDDYSTONE RADIO LTD
BIRMINGHAM B31 3PP
ENGLAND

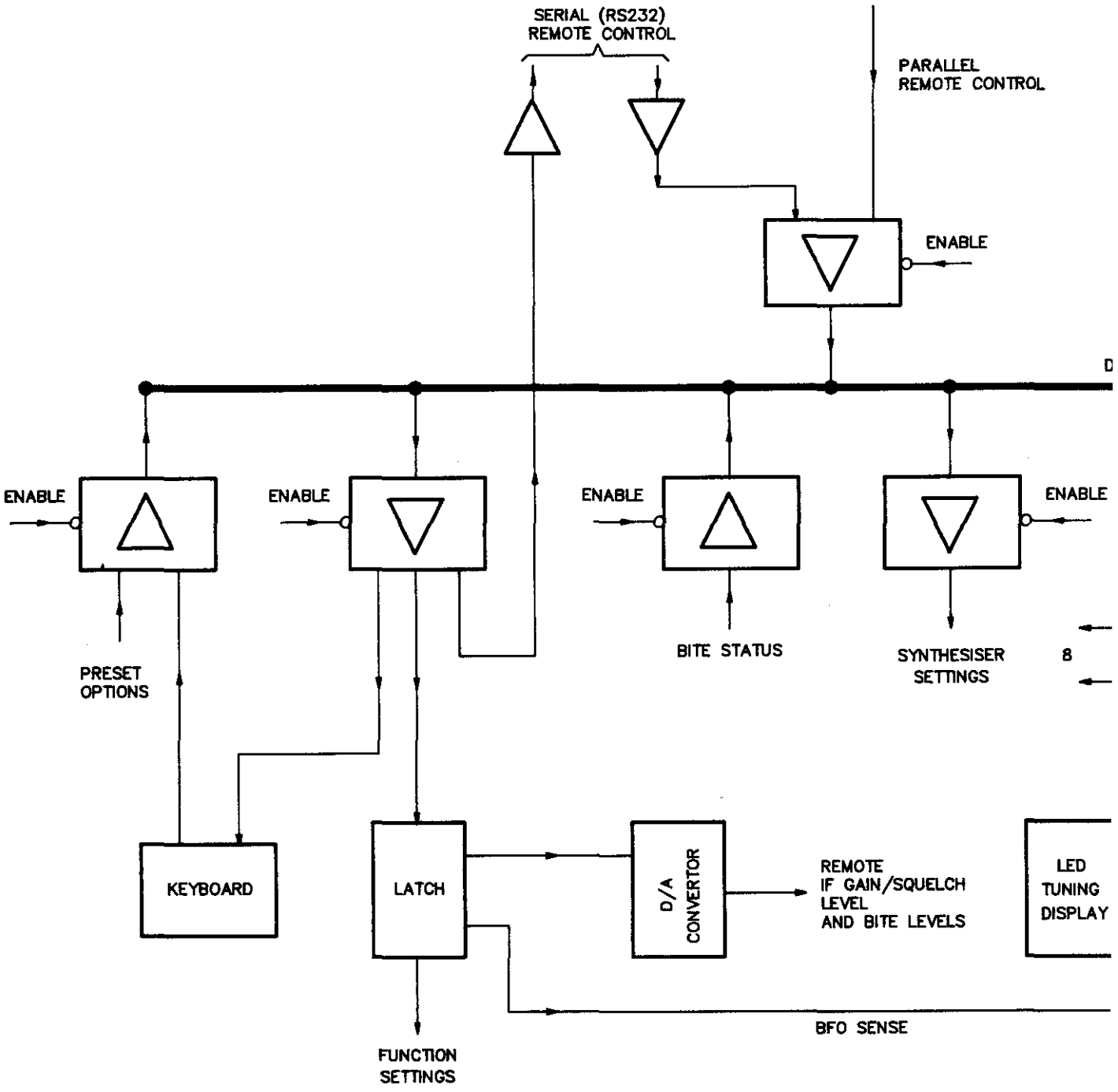
DRG No	BP2737
ISSUE 1	

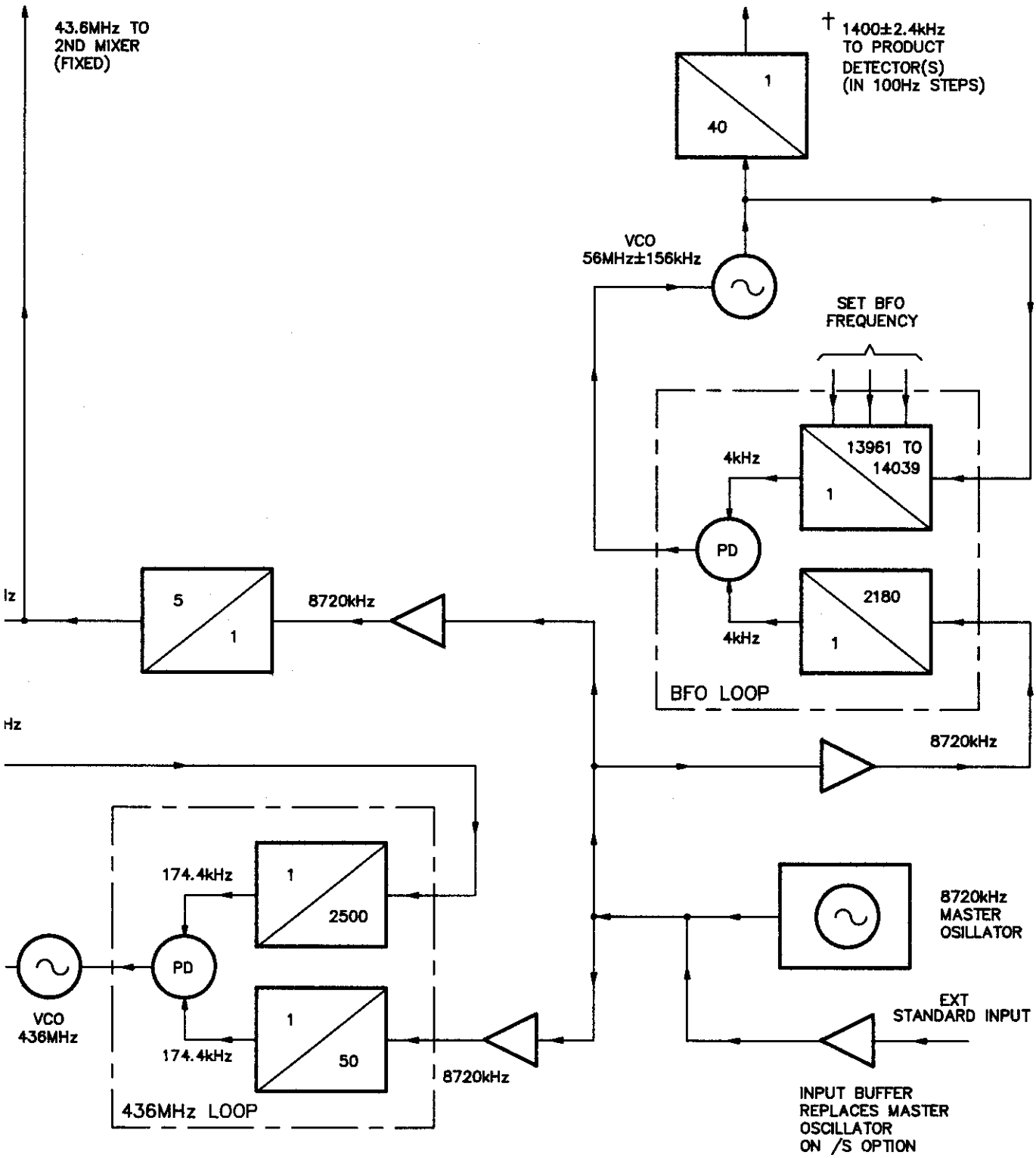


6100 RECEIVER CONTROL & MCU CIRCUITS BLOCK DIAGRAM

EDDYSTONE RADIO LTD
BIRMINGHAM B31 3PP
ENGLAND

DRG No	BP2736
ISSUE 1	

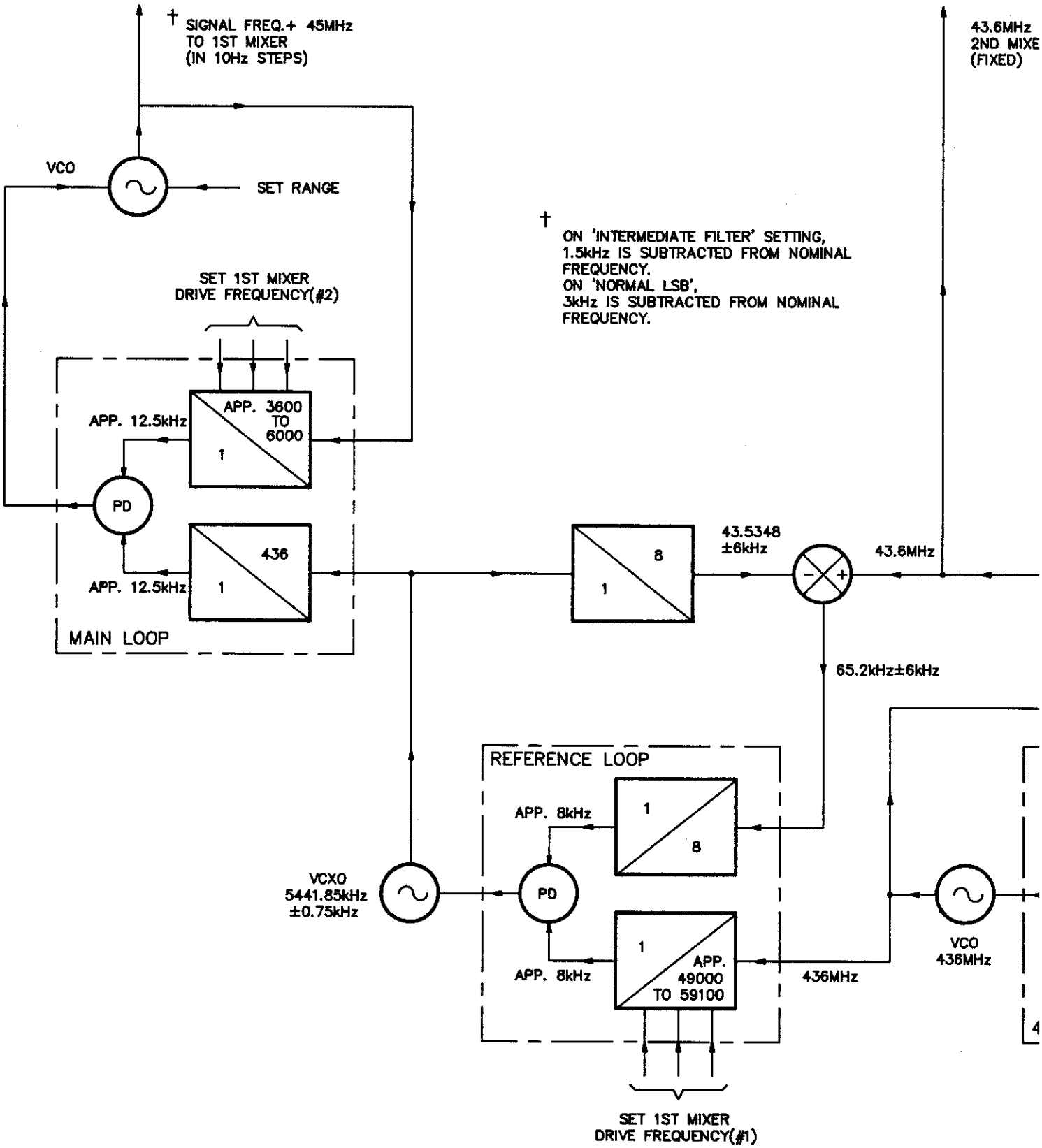

SERIAL (RS232)
REMOTE CONTROL
PARALLEL
REMOTE CONTROL
ENABLE
ENABLE
ENABLE
ENABLE
ENABLE
PRESET
OPTIONS
BITE STATUS
SYNTHESISER
SETTINGS
KEYBOARD
LATCH
D/A
CONVERTOR
REMOTE
IF GAIN/SQUELCH
LEVEL
AND BITE LEVELS
LED
TUNING
DISPLAY
BFO SENSE
FUNCTION
SETTINGS

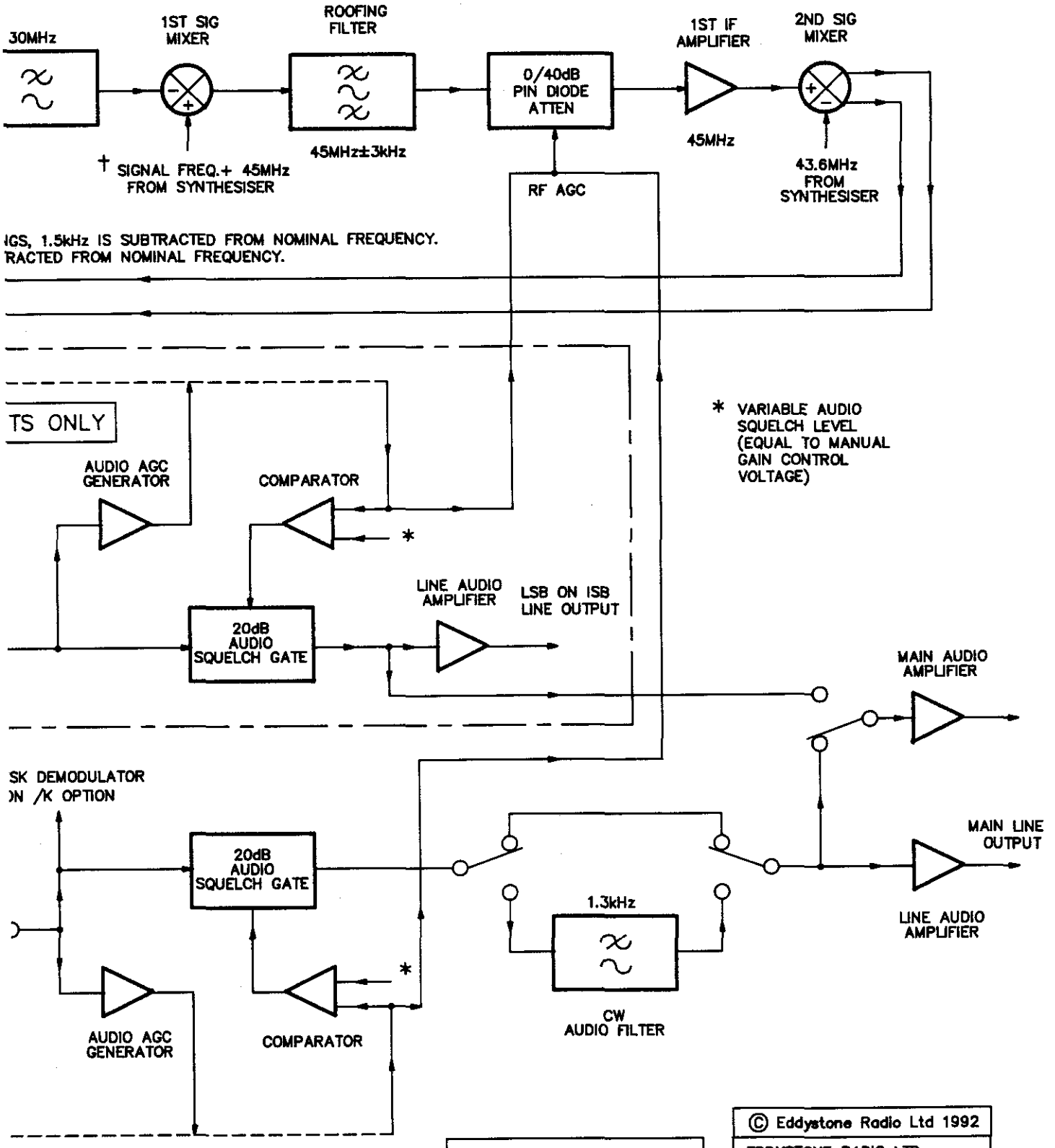


6100 RECEIVER SYNTHESISER CIRCUITS BLOCK DIAGRAM

EDDYSTONE RADIO LTD
BIRMINGHAM B31 3PP
ENGLAND

DRG No	BP2735
ISSUE 1	


† SIGNAL FREQ.+ 45MHz
TO 1ST MIXER
(IN 10Hz STEPS)
43.6MHz
2ND MIXE
(FIXED)
VCO
SET RANGE
† ON 'INTERMEDIATE FILTER' SETTING,
1.5kHz IS SUBTRACTED FROM NOMINAL
FREQUENCY.
ON 'NORMAL LSB',
3kHz IS SUBTRACTED FROM NOMINAL
FREQUENCY.
SET 1ST MIXER
DRIVE FREQUENCY(#2)
APP. 12.5kHz
APP. 3600
TO
6000
1
PD
436
1
APP. 12.5kHz
MAIN LOOP
8
1
43.5348
±6kHz
43.6MHz
65.2kHz±6kHz
REFERENCE LOOP
APP. 8kHz
1
8
VCXO
5441.85kHz
±0.75kHz
PD
1
APP.
49000
TO 59100
APP. 8kHz
436MHz
VCO
436MHz
SET 1ST MIXER
DRIVE FREQUENCY(#1)

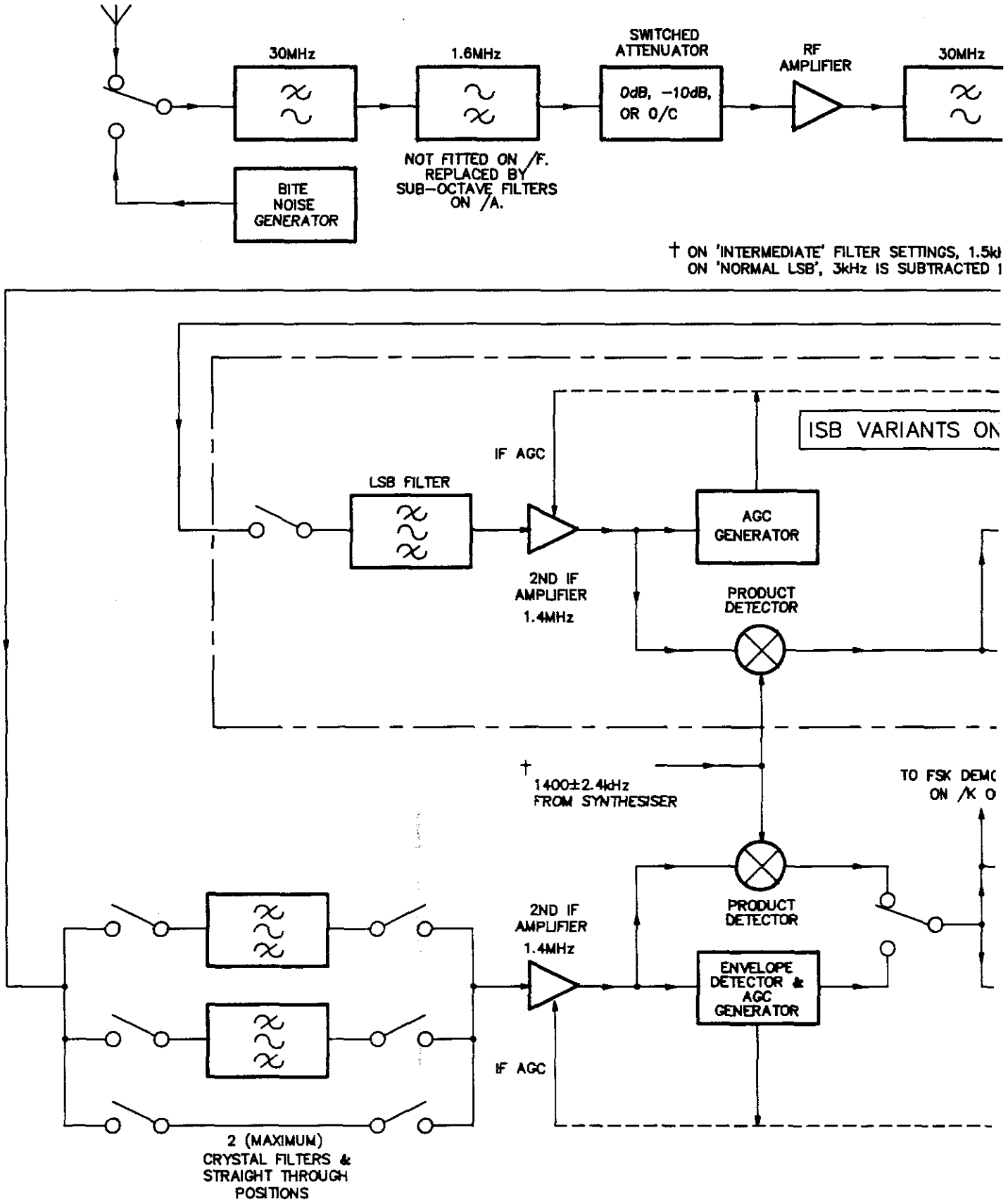


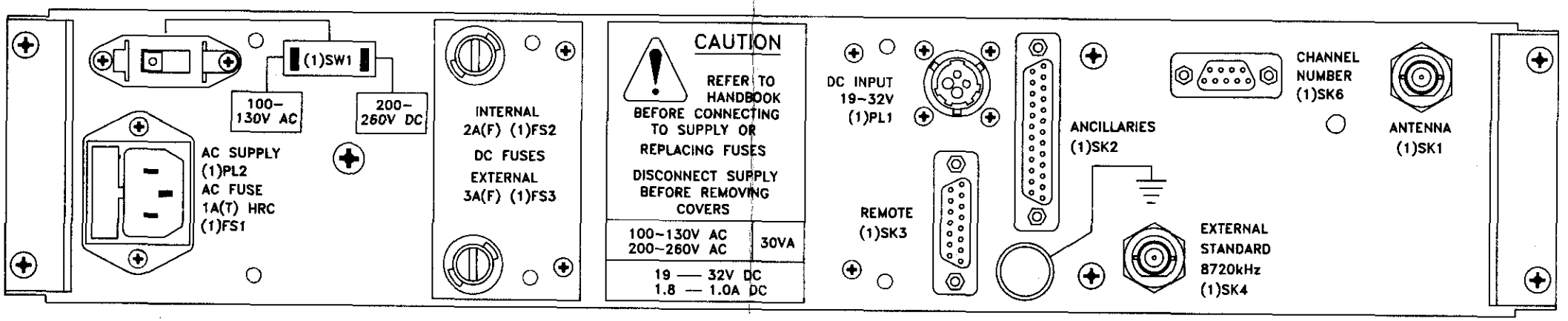
6100 RECEIVER SIGNAL CIRCUITS, BLOCK DIAGRAM

EDDYSTONE RADIO LTD
BIRMINGHAM B31 3PP
ENGLAND

DRG No BP2734

ISSUE 1


30MHz
1.6MHz
SWITCHED ATTENUATOR
0dB, −10dB, OR 0/C
RF AMPLIFIER
30MHz
BITE NOISE GENERATOR
NOT FITTED ON /F. REPLACED BY SUB-OCTAVE FILTERS ON /A.
† ON 'INTERMEDIATE' FILTER SETTINGS, 1.5k
ON 'NORMAL LSB', 3kHz IS SUBTRACTED
ISB VARIANTS ON
IF AGC
LSB FILTER
AGC GENERATOR
2ND IF AMPLIFIER 1.4MHz
PRODUCT DETECTOR
† 1400±2.4kHz FROM SYNTHESISER
TO FSK DEMO ON /K O
PRODUCT DETECTOR
2ND IF AMPLIFIER 1.4MHz
ENVELOPE DETECTOR & AGC GENERATOR
IF AGC
2 (MAXIMUM) CRYSTAL FILTERS & STRAIGHT THROUGH POSITIONS

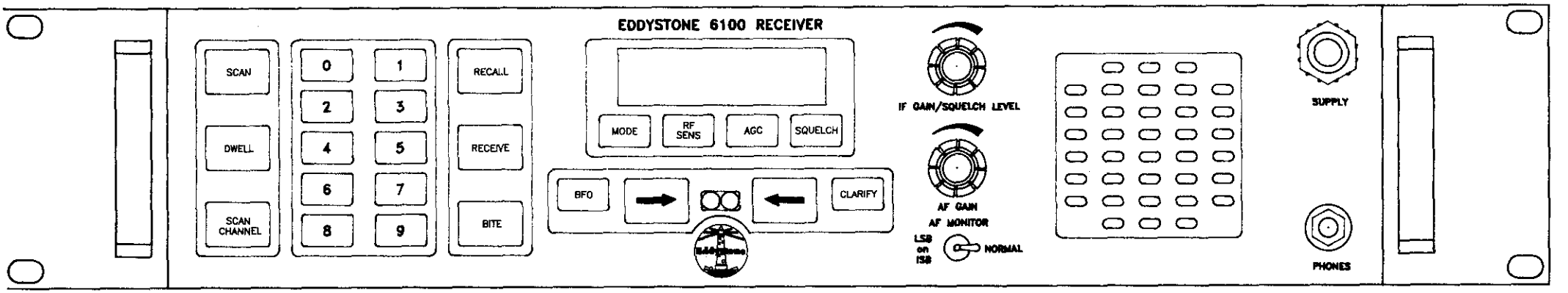


6100 RECEIVER REAR PANEL

N.B. (1)SK4 ONLY FITTED ON /S OPTION
(2)SK6 ONLY FITTED ON /B OPTION.

EDDYSTONE RADIO LTD
BIRMINGHAM B31 3PP
ENGLAND

DRG No	BP2550
ISSUE 2	



6100 RECEIVER FRONT PANEL LAYOUT

N.B. AF MONITOR SWITCH ONLY FITTED ON ISB VARIANTS.

EDDYSTONE RADIO LTD
BIRMINGHAM B31 3PP
ENGLAND

DRG No	BP2549
ISSUE	3