

Eddystone

5000
5500
5700
SERIES

INSTALLATION NOTES OPERATING INSTRUCTIONS

ORION TRANSCEIVER



Eddystone Radio

A MARCONI COMMUNICATION SYSTEMS COMPANY



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S1780 Broadband Dipole Antenna
S1781 Mobile Whip Antenna
S1782, S1783, S1784 Trap Dipole Antennas
S1785 Single Frequency Dipole Antenna
S1786, S1787, S1788 Aluminium Masts
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CONTROL AND CONNECTOR LAYOUTS

ORION 5000 FRONT PANEL LAYOUT BP2462
ORION 5500 FRONT PANEL LAYOUT BP2463
ORION 5700 FRONT PANEL LAYOUT BP2464
ORION REAR CONNECTOR LAYOUT BP2465

*Orion 5000 Series Operator's Handbook.
Second Edition.
October 1990.*

SECTION ONE : INTRODUCTION

WARNING

⚠ Before connecting any equipment to the supply, SECTION TWO : INSTALLATION must be read especially with regard to the instructions concerning wiring of the A.C. and D.C. connectors. 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.

There are two books available for the ORION 5000 Series Transceiver. These are the 'Operator's Handbook' and consists of sections 1 to 3 detailed below dealing with the installation and operation of the equipment. The other book is the 'Workshop Manual' consisting of sections 1 to 6 detailed below.

SECTION ONE : INTRODUCTION which includes safety warnings, a general description of the transceiver with its variants and ancillary units, and a data summary.

SECTION TWO : INSTALLATION which details physical dimensions and fittings of all the units and variants, and all external connections and equipment interconnection. Setting-up procedures and fuse details are also given.

SECTION THREE : OPERATION which describes the operation of the transceiver and associated equipments.

SECTION FOUR : CIRCUIT DESCRIPTION which gives details of the transceiver's circuitry with reference to the circuit diagrams bound at the rear of the book.

SECTION FIVE : MAINTENANCE which details test and fault finding procedures, again with reference to the circuit diagrams.

SECTION SIX : SPARES which gives a complete list of replaceable parts and diagrams of printed circuit board layouts.

1.1 GENERAL DESCRIPTION

The Eddystone ORION 5000 series of transceivers are variants based on a 150 watt P.E.P. transceiver operating on up to 6 crystal controlled channels in the range 2 to 16 MHz. An additional 2 channels with some limitation on frequency are available on some models.

In basic form the ORION 5000 operates in simplex mode on USB (J3E) from a 13.6V D.C. supply with negative ground. Optional features include LSB operation, AM (H3E) operation, semi-duplex operation on 2 channels, 24V D.C. supply, built-in A.C. supply, and rack mounting version.

The ORION 5700 series is intended for marine use and has a built-in 2 tone alarm generator in addition to the above variants.

The ORION 5600 series is intended for FSK operation and is covered in a separate manual.

The ORION 5500 series has additional ruggedisation and dust/moisture seals for operation in an extremely harsh environment.

A complete list of all options is given in Tables 1.1, 1.2, and 1.3.

Table 1.1
VARIATIONS OF 5000 SERIES

Model	12V DC only	AC/12V DC	24V DC only	AC/24V DC	USB only	USB/LSB	Table Vehicle	Rack Mount	Semi Duplex	Extra 2 Channels
5000/1	*				*		*			
5000/1A	*					*	*			
5000/2		*			*		*			
5000/2A		*				*	*			
5000/1R	*				*			*		
5000/1AR	*					*		*		
5000/2R		*			*			*		
5000/2AR		*				*		*		
5000/1B	*				*		*		*	
5000/1AB	*					*	*		*	
5000/2B		*			*		*		*	
5000/2AB		*				*	*		*	
5000/1BR	*				*			*	*	
5000/1ABR	*					*		*	*	
5000/2BR		*			*			*	*	
5000/2ABR		*				*		*	*	
5000/1C	*				*		*			*
5000/1AC	*					*	*			*
5000/2C		*			*		*			*
5000/2AC		*				*	*			*
5000/1CR	*				*			*		*
5000/1ACR	*					*		*		*
5000/2CR		*			*			*		*
5000/2ACR		*				*		*		*
5000/3			*		*		*			
5000/3A			*			*	*			

Table 1.1 (Continued)
 VARIATIONS OF 5000 SERIES

Model	12V DC only	AC/12V DC	24V DC only	AC/24V DC	USB only	USB/LSB	Table Vehicle	Rack Mount	Semi Duplex	Extra 2 Channels
5000/4				*	*		*			
5000/4A				*		*	*			
5000/3R			*		*			*		
5000/3AR			*			*		*		
5000/4R				*	*			*		
5000/4AR				*		*		*		
5000/3B			*		*		*		*	
5000/3AB			*			*	*		*	
5000/4B				*	*		*		*	
5000/4AB				*		*	*		*	
5000/3BR			*		*			*	*	
5000/3ABR			*			*		*	*	
5000/4BR				*	*			*	*	
5000/ABR				*		*		*	*	
5000/3C			*		*		*			*
5000/3AC			*			*	*			*
5000/4C				*	*		*			*
5000/4AC				*		*	*			*
5000/3CR			*		*			*		*
5000/3ACR			*			*		*		*
5000/4CR				*	*			*		*
5000/4ACR				*		*		*		*

AM (H3E) operation is available on any 1 pre-determined channel. A crystal oven can be supplied on all variants for high stability working.

5000/---I indicates that alternative switches and connectors are used (see Section 2).

Table 1.2
 VARIATIONS OF 5700 SERIES

Model	12V DC only	AC/12V DC	24V DC only	AC/24V DC	USB only	USB/LSB	Table Vehicle	Rack Mount	Semi Duplex	Extra 2 Channels
5700/1	*				*		*			
5700/1A	*					*	*			
5700/2		*			*		*			
5700/2A		*				*	*			
5700/1R	*				*			*		
5700/1AR	*					*		*		
5700/2R		*			*			*		
5700/2AR		*				*		*		
5700/1B	*				*		*		*	
5700/1AB	*					*	*		*	
5700/2B		*			*		*		*	
5700/2AB		*				*	*		*	
5700/1BR	*				*			*	*	
5700/1ABR	*					*		*	*	
5700/2BR		*			*			*	*	
5700/2ABR		*				*		*	*	
5700/1C	*				*		*			*
5700/1AC	*					*	*			*
5700/2C		*			*		*			*
5700/2AC		*				*	*			*
5700/1CR	*				*			*		*
5700/1ACR	*					*		*		*
5700/2CR		*			*			*		*
5700/2ACR		*				*		*		*
5700/3			*		*		*			
5700/3A			*			*	*			

Table 1.2 (Continued)
VARIATIONS OF 5700 SERIES

Model	12V DC only	AC/12V DC	24V DC only	AC/24V DC	USB only	USB/LSB	Table Vehicle	Rack Mount	Semi Duplex	Extra 2 Channels
5700/4				*	*		*			
5700/4A				*		*	*			
5700/3R			*		*			*		
5700/3AR			*			*		*		
5700/4R				*	*			*		
5700/4AR				*		*		*		
5700/3B			*		*		*		*	
5700/3AB			*			*	*		*	
5700/4B				*	*		*		*	
5700/4AB				*		*	*		*	
5700/3BR			*		*			*	*	
5700/3ABR			*			*		*	*	
5700/4BR				*	*			*	*	
5700/ABR				*		*		*	*	
5700/3C			*		*		*			*
5700/3AC			*			*	*			*
5700/4C				*	*		*			*
5700/4AC				*		*	*			*
5700/3CR			*		*			*		*
5700/3ACR			*			*		*		*
5700/4CR				*	*			*		*
5700/4ACR				*		*		*		*

The 5700 series are intended for marine use and have a Radio-Telephone Alarm generator fitted with all the above variants. AM (H3E) operation is fitted on channel frequency 2182kHz. A crystal oven can be supplied on all variants for high stability working.

5700/---I indicates that alternative switches and connectors are used (see Section 2).

Table 1.3
VARIATIONS OF 5500 SERIES

MODEL	12 VOLT DC	24 VOLT DC	SEMI DUPLEX	ADDITIONAL 2 CHANNELS
5500 - 12	*			
5500 - 24		*		
5500 - 12B	*		*	
5500 - 24B		*	*	
5500 - 12C	*			*
5500 - 24C		*		*

- NOTE :
- 1) All 5500 Series are fitted USB/LSB
 - 2) All models available in either Olive Drab finish as standard or in Black finish to special order designated suffix I.

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1.2 ANCILLARY EQUIPMENT

A comprehensive range of accessories is available for use with the ORION 5000 series of transceivers. These are listed in Table 1.4.

Table 1.4
Ancillary Equipment

<u>Model No.</u>	<u>Description.</u>
1780	Broadband Dipole 2-30MHz.
1781	Mobile Whip (centre loaded). Includes mounting spring.
1782	2 Frequency Trap Dipole.
1783	3 Frequency Trap Dipole.
1784	4 Frequency Trap Dipole.
1785	Single Frequency Dipole.
1786	30 foot Mast Assembly.
1787	42 foot Mast Assembly.
1788	60 foot Mast Assembly.
1789	Loading Coil and whip for 1781.
1790/1	Noise Cancelling Microphone. (All variants except 5500 and 5000/--I series).
1790/2	Noise Cancelling Microphone. (5500 and 5000/--I series).
1791/1	Base Station Microphone. (All variants except 5500 and 5000/--I series).
1791/2	Base Station Microphone. (5500 and 5000/--I series).
1792/1	Telephone Handset. (All variants except 5500 and 5000/--I series).
1792/2	Telephone Handset. (5500 and 5000/--I series).

Table 1.4(continued)
Ancillary Equipment

Model No.	Description.
1793/1	Mobile Mounting Kit. Includes anti-vibration mounts and mobile whip fixed mounting bracket. (5000 and 5700 series).
1793/2	Mobile Mounting Kit. Includes anti-vibration mounts and mobile whip fixed mounting bracket. (5500 series).
1794	Universal Mounting Bracket (45-90 degree mounting).
1795	Vehicle Suppression Kit.
1796	Not Allocated.
1797	Not allocated.
1798	6 Channel Antenna Tuning Unit.
1799	Mains Fail to Battery Unit.
1800	3 Metre Mobile Whip Antenna. Untuned for use with 1798 ATU.
1801	Not allocated.
1802	CW Modulator.
1803	Broadband Vertical Antenna.
1804	42 foot Heavy Duty Mast.
1805	Phone Patch Interface Unit.
1806	Headset, Boom Microphone and Transmit/Receive Switch Unit.
1807/1	A.C. PSU for 5000/5700 Series (13.6V).
1807/2	A.C. PSU for 5500 Series (13.6V).
1807/3	A.C. PSU for 5000/5700 Series (24V).
1807/4	A.C. PSU for 5500 Series (24V).
1814	Mast Erection Kit.

Table 1.4(continued)
Ancillary Equipment

Model No.	Description.
1815	2 Tone Audio Test Oscillator.
1816	Switched Line Interface Unit.
1817/1	Morse Key and lead. (All variants except 5500 and 5000/--I series).
1817/2	Morse Key and lead. (5500 and 5000/--I series).
5800	Phone Patch Unit.
5900	Selcall Unit.

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1.3 DATA SUMMARY

The following data is applicable to the 5000, 5500, and 5700 series except where stated.

1.3.1 General Data.

Frequency range	Continuous coverage 2MHz to 16MHz. Operation from 1.6MHz to 2MHz with slight reduction in performance.
Channels	Maximum 6 as standard. Further 2 channels available within 1% of other channels.
Mode of Operation	Simplex USB (J3E). USB and LSB optional. Standard on 5500 series. AM (H3E) on one channel optional, and standard on 5700 series. Semi-duplex operation on 2 channels optional. 2 tone radio-telephone alarm generator 5700 series only.
Front panel controls	Audio gain with supply switch. RF gain. Clarifier. Squelch on/off. Channel selector. USB/LSB if fitted. Simplex/semi-duplex if fitted. Meter intensity 5500 series only. Radio-telephone alarm generator test, send and cancel 5700 series only.
Front panel indicators.	Power on LED. Transmitter antenna current meter. Receiver signal strength meter. Radio-telephone alarm generator test and send LEDs 5700 series only.
Front panel connectors.	Microphone or handset.

Rear panel connectors.	Power connector. Antenna connector. Ancillary output for external loudspeaker and antenna tuner control.
Environmental	Operational temperature: -10 deg.C to +55 deg.C. Relative Humidity: 95% at 40 deg.C. Storage temperature: -40 deg.C to +70 deg.C.
Power Supply See Tables 1.1, 1.2 and 1.3 for variants.	13.6V D.C. negative ground. 24V D.C. negative ground. 100-130V or 200-260V A.C.at 40-60Hz.
Power consumption	D.C. receive 100-300mA. D.C. transmit 12A average voice operation.
Dimensions D.C. versions	300mm x 100mm x 250mm.
Dimensions A.C. versions	300mm x 100mm x 330mm.
Dimensions Rack versions	483mm x 133mm (3U) x 330mm.
Weight	4.5kg. (D.C. versions). 6kg. (A.C. versions).

1.3.2 Transmitter Data.

Output power	120W/150W PEP on SSB.
Antenna Output	50 ohms.
Intermodulation distortion	-25dB at 150W PEP. -30dB at 100W PEP.
Frequency stability	Standard .005% Better than 20Hz with proportional oven.
Audio bandwidth	350Hz to 2700Hz at -6dB.
Carrier suppression	-45dB.

Hum and noise	-45dB.
Harmonic suppression	-50dB typical. -40dB minimum. Other spuri better than -43dB.
ALC	10dB audio increase causes less than 0.5dB increase in power output with no change in intermodulation distortion.
Microphone	Gain adjustable for all medium or high output dynamic or ceramic microphones.
Antenna filter	5 pole Tchebycheff.
Radio-telephone alarm (5700)	Meets international specifications.
Duty Cycle (D.C. versions).	Continuous at 25 deg.C for SSB and CW.
Duty Cycle (A.C. versions).	50% transmit/receive at 25 deg.C for SSB and CW.
Output Protection	Transmitter protected against open or short circuit output, and high VSWR. Thermal switch reduces output by 10dB if PA overheats.


1.3.3 Receiver Data.

Sensitivity	0.5uV p.d. for 20dB sinad from 50 ohms.
Selectivity	-6dB at 350Hz and 2700Hz. -60dB at -400Hz and 3400Hz.
AGC	Less than 3dB change in audio output from threshold (less than 5uV) to 100mV signal input. 20mSec attack and 2 Sec decay, optimised for SSB operation with pedestal action.
Clarifier	Fine tune facility in receive mode only.
Image rejection	-55dB typical.

IF rejection	70dB to 90dB depending on signal frequency.
Audio output	3W at less than 5% distortion.
Cross modulation	With a wanted carrier 60dBuV adjusted to give standard output at an audio frequency of 1400Hz, an unwanted signal 10kHz off tune and modulated 30% at 1000Hz must be of a level exceeding 90dBuV to produce an audio output greater than 30dB below standard output.
Squelch	Operates from syllabic change, optimised for SSB operation.
Netting	Internal connection for netting transmitter while in the receive mode.
Intermediate frequency	1400kHz.

SECTION TWO : INSTALLATION

WARNING

 Before commencing installation of the ORION transceiver, it is recommended that this complete installation section is read as sub-standard performance may result from poor positioning and installation. Particular attention should be paid to the sub-section on EXTERNAL CONNECTIONS covering SUPPLY and ANTENNA connection details.

2.1 PHYSICAL DIMENSIONS AND ACCESSORIES

2.1.1 Accessories Kit

A kit of accessories is supplied with the ORION. The contents of the kit should be checked against the following tables depending on which version is supplied.

The contents may be modified when the equipments are supplied with other items as part of a system.

Table 2.1

Contents of Accessories Kit LP4061

All versions of 5000/1, 5000/3, 5700/1 and 5700/3.

Qty	Description	Part No.
1	D.C. connector and lead	28-387
1	9 Way Plug Housing	33-663
9	Crimp Male Connectors	33-664
1	20A Fuse	8-38
1	UHF83 Co-ax Plug	33-662
1	Adapter	33-671

Table 2.2

Contents of Accessories Kit LP5011

All versions of 5000/2, 5000/4, 5700/2 and 5700/4 except /I variants.

Qty	Description	Part No.
1	D.C. connector and lead	28-387
1	A.C. connector and lead	28-388
1	9 Way Plug Housing	33-663
9	Crimp Male Connectors	33-664
1	20A Fuse	8-38
1	3.15A(T) Fuse	8-40
1	3.15A Fuse	8-37
1	UHF83 Co-ax Plug	33-662
1	Adapter	33-671

Table 2.3

Contents of Accessories Kit LP5012

All /I versions of 5000/2, 5000/4, 5700/2 and 5700/4.

Qty	Description	Part No.
1	D.C. connector and lead	28-895
1	A.C. connector and lead	28-1063
1	9 Way Plug Housing	33-663
10	Crimp Male Connectors	33-664
1	20A Fuse	8-38
1	3.15A(T) Fuse	8-40
1	3.15A Fuse	8-37

Table 2.3 (continued)

Qty	Description	Part No.
1	UHF83 Co-ax Plug	33-662
1	Adapter	33-671

Table 2.4

Contents of Accessories Kit LP4390

All versions of 5500 (Olive Drab).

Qty	Description	Part No.
1*	D.C. connector and lead (4 way).	28-897
1	8 Way Plug Housing	33-720
10	Crimp Male Connectors	33-695
1	20A Fuse	8-38
1	UHF83 Co-ax Plug	33-662
1	Adapter	33-671
1	Allen Key	38-560

* This lead wired for D.C. only unless specific request for external loudspeaker facilities.

Table 2.5

Contents of Accessories Kit LP5013

All versions of 5500 (Black).

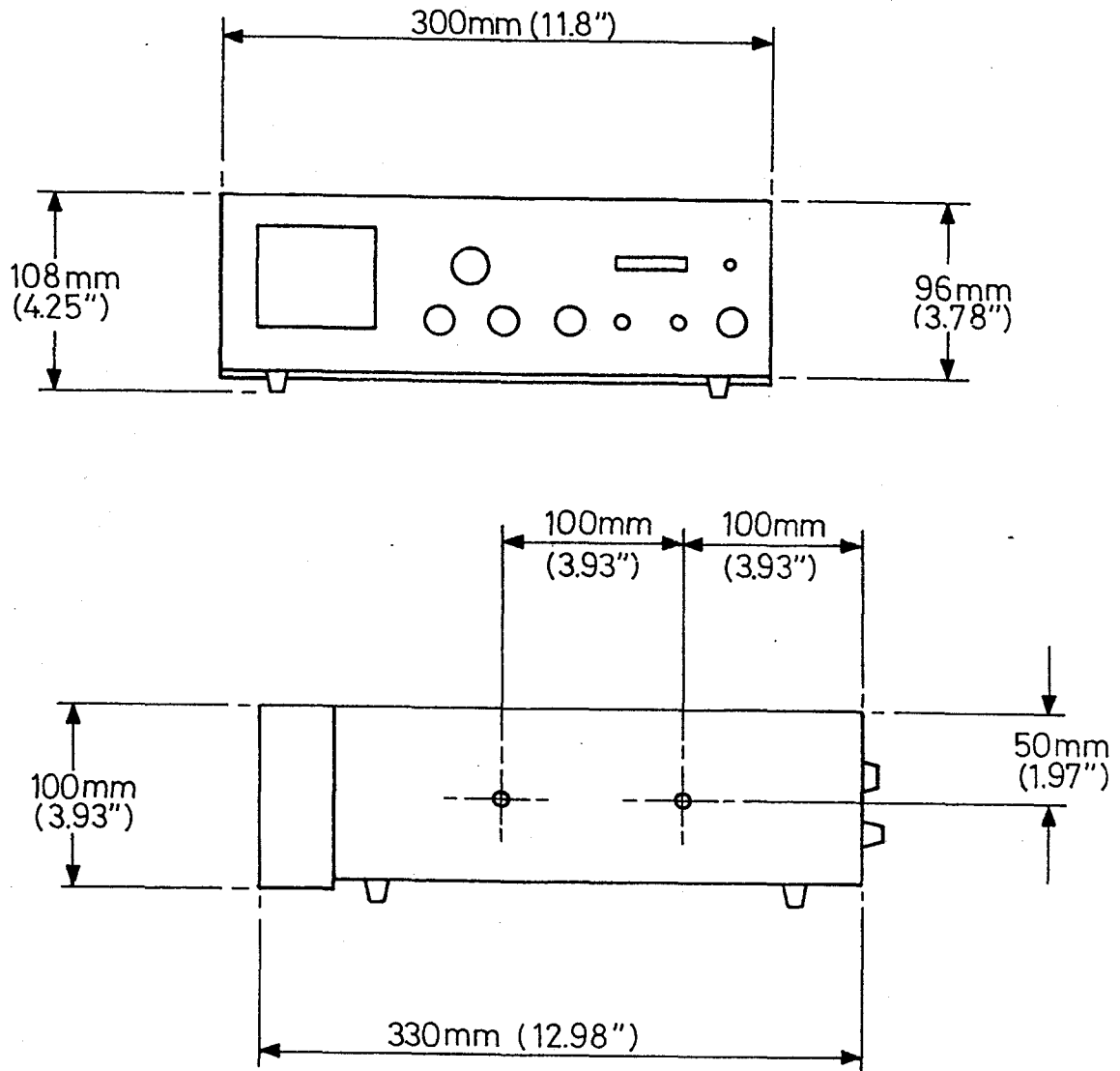
Qty	Description	Part No.
1*	D.C. connector and lead (8 way).	28-895
1	8 Way Plug Housing	33-720
10	Crimp Male Connectors	33-695
1	20A Fuse	8-38
1	UHF83 Co-ax Plug	33-662
1	Adapter	33-671
1	Allen Key	38-560

* This lead wired for D.C. only unless specific request for external loudspeaker facilities.

2.1.2 Physical Dimensions

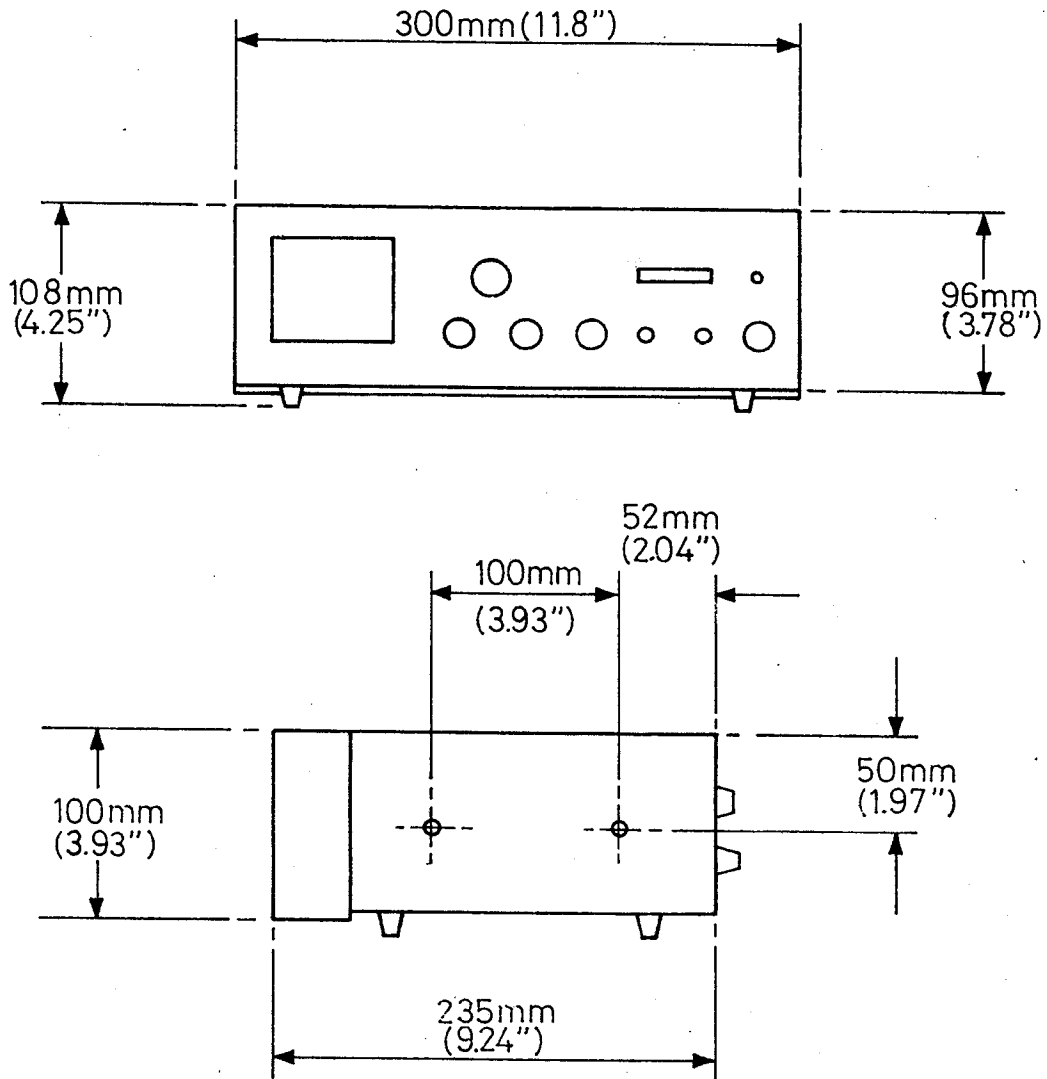
The dimensions of the different variants are shown in figures 2.1 to 2.4.

Figure 2.1
Dimensions of ORION D.C. versions.



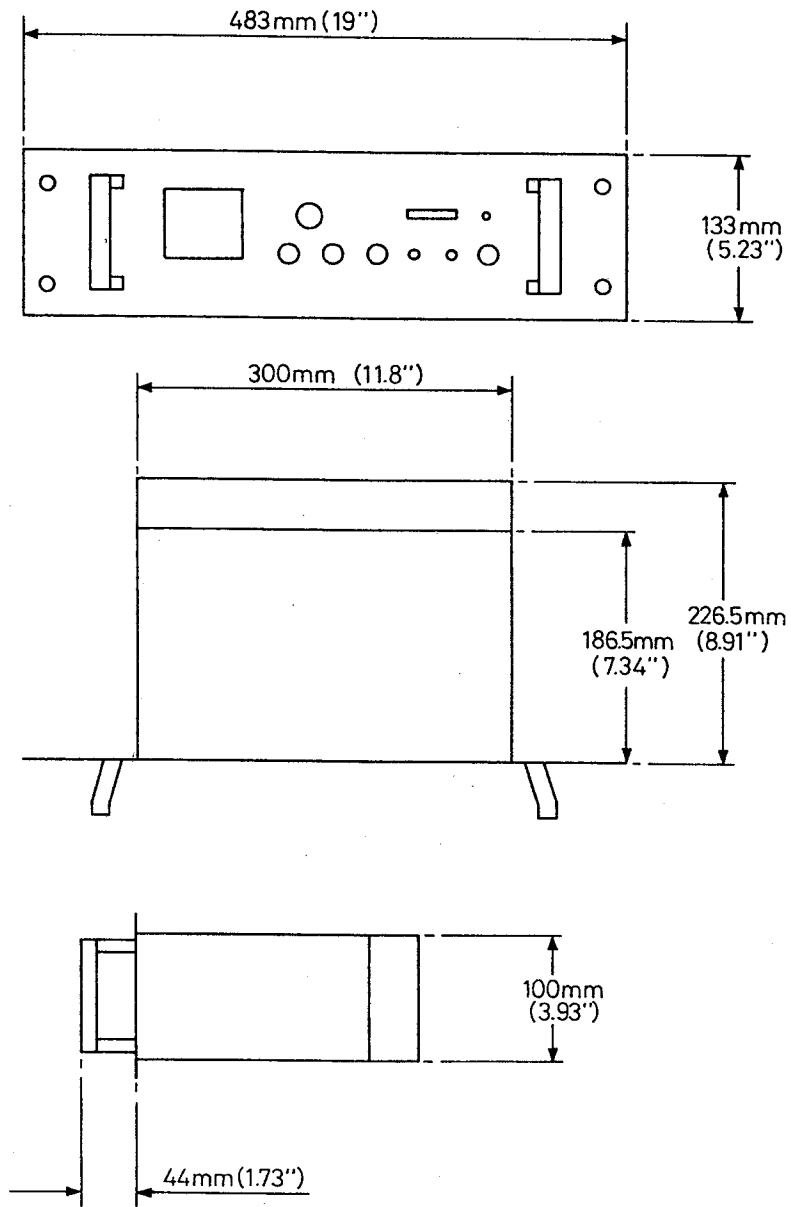
--oo0oo--

Figure 2.2
Dimensions of ORION A.C. versions.



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Figure 2.3
Dimensions of ORION Rack versions.



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2.2 MOUNTING

WARNING

- ⚠ Before commencing mounting the ORION, due consideration should be given to the supply, antenna and earth connection requirements.

2.2.1 Mobile Mounting

In order to decide the most suitable position for mounting the transceiver inside a vehicle, the mobile cradle/shock tray (part of S1793/1 for 5000 series or S1793/2 for 5500 series) should first be assembled and attached to the transceiver as shown in the assembly drawing figure 2.4 on page 9 of section 2.

The cradle/shock tray can be mounted in two ways:-

- 1) To allow the transceiver to be mounted under a dashboard.
- 2) To allow the transceiver to be mounted above a dashboard or on the centre tunnel.

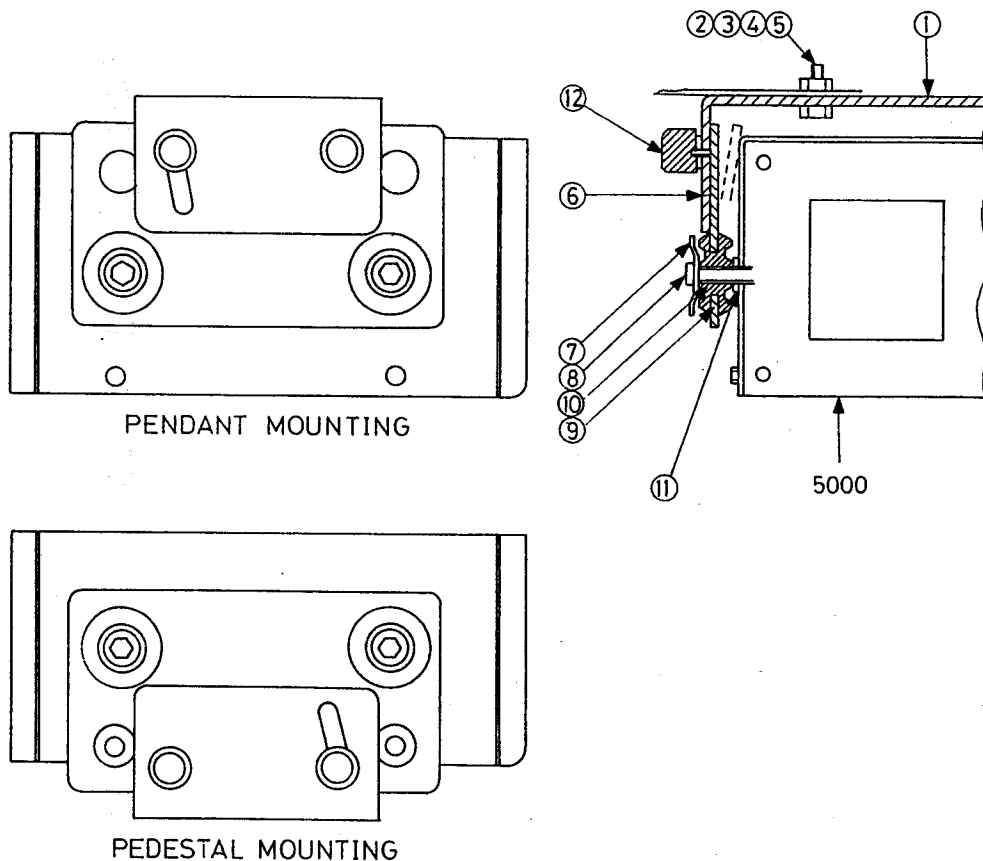
Angular adjustments are facilitated by radial slots in the rear of the cradle. Carefully position the transceiver and cradle to allow adequate ventilation to the rear heat sink, and to allow mounting on a sound surface.

Note the position for mounting and remove the transceiver from the cradle. Position the cradle and drill four 5.5 mm holes, taking care not to damage any wiring or instrumentation behind the panel being drilled.

Fit the cradle/shock mount to the vehicle with the four screws, nuts and washers provided and then reassemble the transceiver and shock mounting plates in the cradle as shown in figure 2.4.

If a microphone has been supplied with the transceiver, it will be provided with a mounting clip which should be fixed to a suitable surface close to the operating position with the screws supplied.

Figure 2.4
5000 Series Mobile Mounting Cradle



ASSEMBLY SEQUENCE

1. Secure mounting bracket (1) to vehicle using M5 x 16 hex head bolts, nuts and washers (2) (3) (4) & (5) supplied. The position of the radiussed slot is important; this should be to the rear for pendant mounting and to the front for pedestal mounting.
2. Fasten mounting plates (6) (2 off) complete with shock absorbers (10) and spacers (9) using the M5 hex head screws (8). The dished washer (7) is fitted under the head of the screw and the plain washer (11) between the shock absorber and top cover. The two studs in the mounting plate (6) should be facing outwards and must be positioned uppermost for pendant mounting and down for pedestal mounting.
3. Compress the mounting plates inwards against the top cover of the unit (see dotted line). It will then be found possible to engage studs in the holes and slots in the mounting bracket.
4. Release the compression on the mounting plates and fit knurled nuts (12) loosely on studs. Set unit to required angle and tightens knurled nut to retain.

2.2.2 Base Station Mounting

The ORION 5000 and 5700 series for base station use should be placed on a horizontal flat surface, allowing adequate space for ventilation all round the equipment.

Care should be taken not to place books or other materials on top of the transceiver as this may cause excessive overheating.

Rack mounting transceivers should be fixed with four 6mm screws through the front panel, ensuring that there is adequate ventilation within the rack round the equipment.

2.2.3 Antenna Mounting

The ORION series of transceivers require a 50 ohm antenna load presented to the antenna socket. Suitable antennas for base station use are shown in the Appendix allowing direct connection of the antenna to the ORION. Alternatively, an antenna tuning unit (ATU) type S1798 can be used with an untuned length of wire. Again, some suitable installations are shown in the Appendix, and covered in more detail in the S1798 handbook.

When siting base station antennas, the surrounding area should be as clear as possible of buildings or other obstructions, and generally the antenna should be as high as possible for best results. However, the radiation pattern of dipole antennas is dependent on the height of the antenna above ground with respect to the operating frequency. More details are given in the Appendix.

The siting of the antenna is extremely important, as it plays a big part in obtaining reliable and interference free long distance communication.

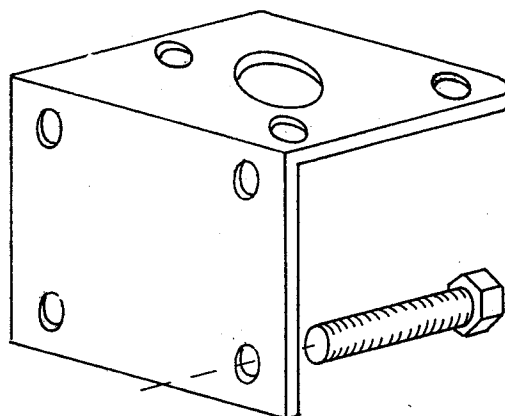
For mobile use where only single channel operation is required, the tuned whip antenna type S1781 is recommended.

This antenna is a rugged, heavy duty design, and therefore requires a solid mounting surface. It should be noted that a separate tuned whip is required for each channel, so where multi-channel operation is envisaged it may be more convenient to use an untuned whip antenna type S1800 with the Antenna Tuning Unit (ATU) type S1798. In general, however, the tuned whip antenna will out-perform the combination of untuned antenna with ATU.

If a flat bumper surface, such as that found on a Land Rover is not available, the angle bracket supplied as part of S1793/1 or S1793/2 can be used. Alternatively, the S1794 Universal Mounting Bracket may be more suitable in some installations.

The dimensions and position of the antenna base mounting holes can be determined by using the metal plate attached to the base, as a template. Adequate clearance must be allowed for the base centre connector bolt, as shown in figure 2.5.

Figure 2.5
Mobile Antenna Mounting Bracket



--oOo--

The bracket can then be bolted to a suitable surface.

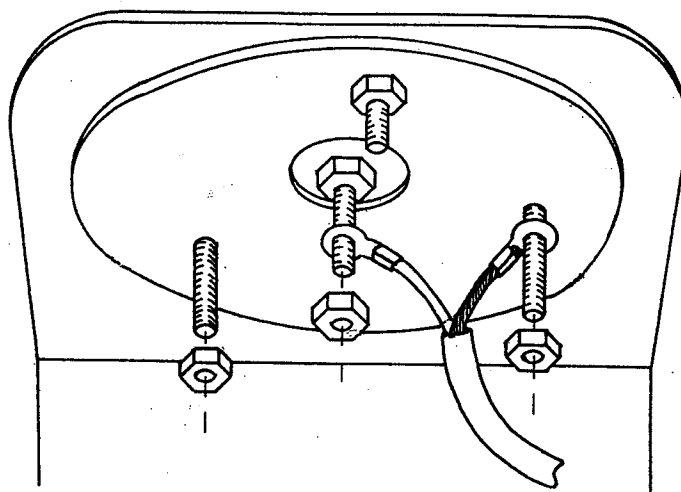
Mounting the antenna directly onto vehicle wings or roofs should be avoided as excessive movement in the antenna during motion will cause metal fatigue and eventual fracturing, resulting in the antenna breaking away.

Having mounted the antenna as described above, and securing the base with the three 6mm countersunk screws supplied, the co-axial cable should be routed through the vehicle body from the antenna base to the rear of the transceiver, with the attached PL259 connector at the transceiver end.

To ensure maximum efficiency the shortest route should be taken.

Excessive co-axial cable should be cut off, and the cable at the antenna base should be bared and the terminal connectors fitted as shown in figure 2.6.

Figure 2.6
Connections To Mobile Antenna



--oo0oo--

The outer braid connector is fitted under one of the antenna securing nuts and the inner conductor is connected to the centre connector.

Tuning and adjusting the antenna is covered in SETTING UP PROCEDURES in section 2.3.4

IMPORTANT

Ensure that the antenna connections at the 5000 and at the antenna are securely fixed.

2.3 EXTERNAL CONNECTIONS

2.3.1 D.C. Supply Connector

The D.C. SUPPLY socket is situated at the rear of the equipment. A ready wired D.C. lead is supplied with each equipment, consisting of 2 metres of heavy duty cable (51 strands of 0.25mm wire) connected to the appropriate plug.

The power cable should take the shortest route possible to the D.C. source to ensure minimum power loss, with connections either soldered or securely crimped to ensure a low resistance joint. Ring terminals are provided with S1793/1 and S1793/2 for connection to a vehicle battery. Connections should be made directly to the D.C. source and not by existing wiring which in most cases will not carry the large current. If longer than 2 metres of wiring is necessary, consideration should be given to using a heavier cable than supplied in the accessories kit.

No external fuse is necessary, as a supply fuse is fitted inside the transceiver.

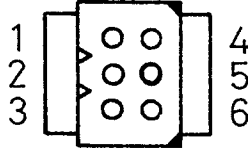
WARNING



It is mandatory that negative ground supplies only are used. The red wire is connected to the positive supply and the black wire to the negative.

D.C. connections for the different versions are shown in figures 2.7 to 2.11.

Figure 2.7
D.C. CONNECTOR
 All D.C. only versions of 5000 and 5700
 except /I variants.



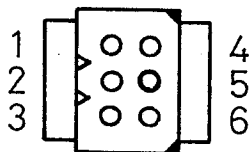
view into 6 way male connector
 D.C. Supply Connector

Pin	Description
1	Positive supply (red) 14A rating
2	No connection
3	No connection
4	Negative supply (black) 14A rating
5	No connection
6	No connection

Connector 6 way Plug ref. 1PL1

--oo0oo--

Figure 2.8
D.C. CONNECTOR
 All A.C./D.C. versions of 5000 and 5700
 except /I variants.



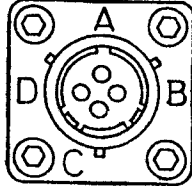
view into 6 way male connector
 D.C. Supply Connector

Pin	Description
1	Positive supply (red) 14A rating
2	Internal connection only
3	Internal connection only
4	Negative supply (black) 14A rating
5	Positive supply link to pin 1 3A rating link
6	Internal connection only

Connector 6 way Plug ref. 1PL1

--oo0oo--

Figure 2.9
D.C. CONNECTOR
5500 (Olive Drab).



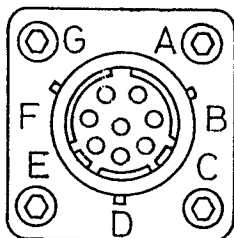
view into 4 way male connector
D.C. Supply Connector

Pin	Description
A	Negative supply (black) 14A rating
B	Positive supply (red) 14A rating
C	External Loudspeaker (if fitted)
D	Earth for external Loudspeaker

Connector 4 way Plug ref. 1PL1

--oo0oo--

Figure 2.10
D.C. CONNECTOR
 5500/I (Black).



CENTRE PIN H

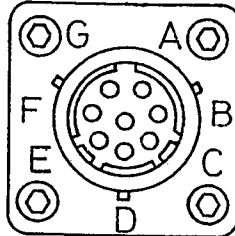
view into 8 way male connector
 D.C. Supply Connector

Pin	Description
A	Negative supply (black) 14A rating
B	Positive supply (red) 14A rating
C	External Loudspeaker (if fitted)
D	Earth for external Loudspeaker
E	No connection
F	No connection
G	No connection
H	No connection

Connector 8 way Plug ref. 1PL1

--oo0oo--

Figure 2.11
D.C. CONNECTOR
 A.C. versions of 5000 and 5700
 /I variants only.



CENTRE PIN H

view into 8 way male connector
 D.C. Supply Connector

Pin	Description
A	Negative supply (black) 14A rating
B	Positive supply (red) 14A rating
C	External Loudspeaker (if fitted)
D	Earth for external Loudspeaker
E	Internal connection only
F	Positive supply link to pin B 3A rating link
G	Internal connection only
H	Internal connection only


Connector 8 way Plug ref. 1PL1

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2.3.2 A.C. Supply Connector

On A.C. versions of the 5000 and 5700, the same connector at the rear is used for both D.C. operation and A.C. operation with the wiring to different pins. A ready wired A.C. supply lead is supplied with each equipment, consisting of 2 metres of mains cable with the necessary links made inside the connector.

WARNING

 Before connecting to the local mains supply ensure that the mains taps are set to the correct position (see SETTING-UP PROCEDURES section 2.3.1 A.C. supply).

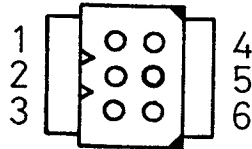
The A.C. Mains Input socket accepts a standard 40-60Hz mains supply within the range set. If the plug and lead supplied in the accessories kit is used, a connector to suit the local supply arrangements can be fitted to the free end, observing the colour code which is:-

LINE	-	BROWN
NEUTRAL	-	BLUE
EARTH	-	GREEN/YELLOW

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 adapter, or at the distribution board.

Details of the A.C. connector used on the A.C. versions of the 5000 and 5700 are shown in figure 2.12 and 2.13.

Figure 2.12
A.C. CONNECTOR
 A.C. versions of 5000 and 5700
 except /I variants.



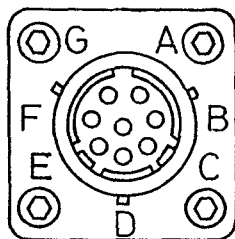
view into 6 way male connector
 A.C. Supply Connector

Pin	Description
1	Link to pin 2 (14A rating link)
2	Link to pin 1 (14A rating link)
3	A.C. supply NEUTRAL BLUE
4	Supply EARTH YELLOW/GREEN
5	Internal connection only
6	A.C. supply LINE BROWN

Connector 6 way Plug ref. 1PL1

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Figure 2.13
A.C. CONNECTOR
 A.C. versions of 5000 and 5700
 /I variants only.



CENTRE PIN H

view into 8 way male connector
 A.C. Supply Connector

Pin	Description
A	Supply EARTH YELLOW/GREEN
B	Link to pin E (14A rating link)
C	External Loudspeaker (if fitted)
D	Earth for external Loudspeaker
E	Link to pin B (14A rating link)
F	Internal connection only
G	A.C. supply NEUTRAL BLUE
H	A.C. supply LINE BROWN

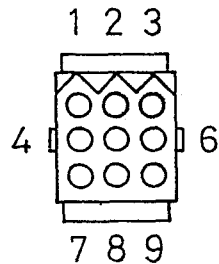
Connector 8 way Plug ref. 1PL1

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2.3.3 Ancillaries Connector

Details of the ancillaries connector for use with the ATU or an external loudspeaker are given in figures 2.14 and 2.15. Connections for the external loudspeaker are on the ancillaries connector for the 5000 and 5700, but on the D.C. connector for the 5500 (see figure 2.9 and 2.10).

Figure 2.14
ANCILLARIES CONNECTOR
All versions of 5000 and 5700
except /I variants.



CENTRE PIN 5

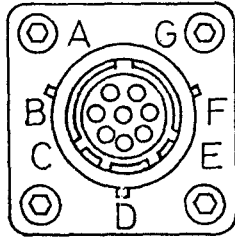
view into 9 way female connector
Ancillaries Connector

Pin	Description
1	ATU Earth Contact Channel 1.
2	ATU Earth Contact Channel 2.
3	ATU Earth Contact Channel 3.
4	ATU Earth Contact Channel 4.
5	ATU Earth Contact Channel 5.
6	ATU Earth Contact Channel 6.
7	Earth return for ATU or external LS.
8	External loudspeaker.
9	Positive supply for ATU.

Connector 9 way socket ref. 1SK4

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Figure 2.15
ANCILLARIES CONNECTOR
 All versions of 5500 and /I
 variants of 5000 and 5700.



CENTRE PIN H

view into 8 way female connector
 Ancillaries Connector

Pin	Description
A	ATU Earth Contact Channel 1.
B	ATU Earth Contact Channel 2.
C	ATU Earth Contact Channel 3.
D	ATU Earth Contact Channel 4.
E	ATU Earth Contact Channel 5.
F	ATU Earth Contact Channel 6.
G	Earth return for ATU.
H	Positive supply for ATU.

Connector 8 way socket ref. 1SK4

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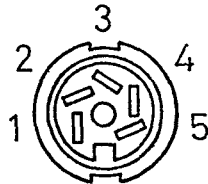
2.3.4 Antenna Connector

A UHF83 connector is supplied on the rear of the Orion series for connection to the antenna.

2.3.5 Microphone Input Connector

This connector is situated on the front panel of the equipment. Details of suitable microphones are included in the Appendix at the rear of this handbook.

Figure 2.16.
MICROPHONE SOCKET
All versions of 5000 and 5700
except /I variants.



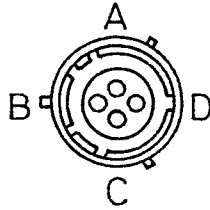
view into 5 way female connector
Microphone Socket

Pin	Description
1	Audio output from receiver.
2	Push-to-talk line (earth to transmit).
3	+12V supply output.
4	Microphone input.
5	Earth for pins 1 and 4.

Connector 5 way socket 1SK3

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Figure 2.17.
MICROPHONE SOCKET
All versions of 5500 and /I
variants of 5000 and 5700.



view into 4 way female connector
Microphone Socket

Pin	Description
A	Push-to-talk line (earth to transmit).
B	Microphone input.
C	Earth for pin B.
D	Earth for pin A.

Connector 4 way socket 1SK3

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2.4 SETTING-UP PROCEDURES

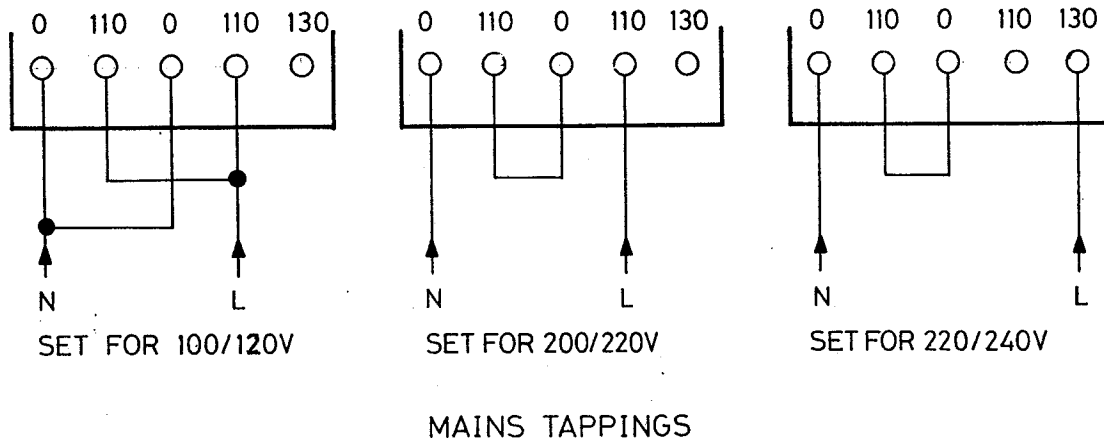
WARNING

⚠ Removal of the top cover allows access to the mains wiring, and even though fully insulated due care should be exercised if the A.C. mains supply is still connected. The A.C. mains supply **MUST** be completely disconnected from the unit before adjusting the transformer taps.

2.4.1 A.C. Supply (5000/2, 5000/4, 5700/2, 5700/4).

Remove the top cover of the transceiver and remove the cover plate over the mains transformer. Connect the taps as shown in figure 2.18 to suit the local mains supply.

Figure 2.18.
TRANSFORMER SETTINGS
(5000/2, 5000/4, 5700/2, 5700/4)



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2.4.2 Fuses

A.C. FUSE : 3.15A(T) anti-surge fuse in series with the LINE input.

D.C. INPUT FUSE : 20A fuse in series with the D.C. supply.

2.4.3 Antenna Adjustment

Details of suitable antennas are included in the Appendix at the rear of this handbook.

For base station use, the type of antenna would normally be the dipole type S1782, S1783, S1784 or S1785 depending on the number of channels. The broadband dipole S1780 can also be used but is not as efficient as the trap dipoles. These can be horizontally mounted between two supporting masts, or installed as an inverted-V from a single mast. It should be noted that the radiation pattern is determined by the height of the antenna above ground with respect to the operating frequency. Further details are given in the Appendix at the rear of this handbook. No antenna adjustments are necessary if 50 ohm antennas are used, but it is recommended that the VSWR is checked after installation.

If an untuned antenna is used with the S1798 ATU, refer to the S1798 handbook for installation instructions. It should be noted that the length of the antenna with this arrangement should not exceed a quarter wavelength at the highest operating frequency.

If a tuned mobile whip is used, the antenna will have been factory pre-tuned to the designated frequency, but will require a small amount of adjustment as follows to take into account individual vehicle proximity effects.

Connect a suitable VSWR meter between the antenna socket on the ORION and the antenna. Connect a 2-Tone Oscillator type S1815 to the MICROPHONE socket and turn on the ORION.

Place the VSWR meter in a position where the dial can be clearly seen, and set to transmit with the oscillator on. (With the S1815 this is accomplished by shorting the two croc leads together. It may be convenient to lengthen these wires to allow switching to transmit from outside the vehicle). It is recommended that initial tuning is done at reduced power to avoid overheating the ORION.

The use of a 2-tone oscillator source is also recommended to avoid the possibility of damage to the ORION.

Adjust the 'SET' control on the VSWR meter until the needle reaches the 'SET' mark on the dial. Switch the VSWR meter to read SWR, which will probably give a reading between 2 and 3. Turn the ORION from transmit to receive, and remove the top whip section from the antenna using the hexagonal key supplied.

A hacksaw should be used to remove 25mm from the thick end of the steel whip. When this is removed, replace the whip and re-tighten. Repeat the VSWR test and note the dial readings, which should be slightly reduced.

Repeat the whole antenna cutting and testing procedure until a reading of between 1 and 1.5 is observed on the SWR dial. Final small adjustment can be made by loosening the hexagonal screw holding the whip section of the antenna, and sliding the whip up and down to achieve minimum SWR reading.

When the lowest reading possible has been reached, the transceiver should be switched off, and the VSWR meter removed from the installation. Refit the antenna feeder cable connector to the transceiver antenna socket, and hand tighten securely. (Note that badly fitted RF connectors can cause loss of output and possible damage to the equipment).

WARNING

⚠ Ensure that the ORION is not set to transmit before carrying out any adjustments to the antenna. Ensure that all personnel are clear of the antenna before transmitting.

2.4.4 VSWR Adjustment

The ORION contains a VSWR protection circuit which reduces the RF output power under mis-match conditions. This protects the power amplifier transistors against open and short circuit load conditions.

If a good VSWR match is not possible due to antenna impedance or limitations in the ATU or installation, the forward power obtained from the transceiver may be limited by the VSWR protection circuit. Under these circumstances 10RV3 situated on the Output Filter PCB (see figure 2.20) can be turned in an anti-clockwise direction to increase the output power to the required level.

10RV3 should be set at the minimum level consistent with the required output power to maintain optimum protection against antenna open and short circuit conditions.

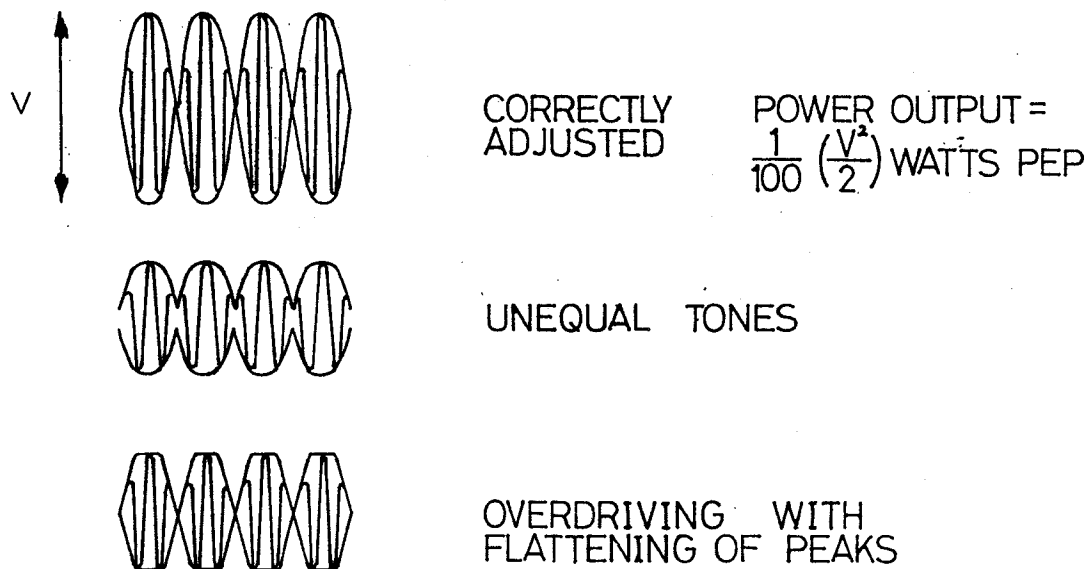
On most installations, no adjustment from the factory setting will be necessary. Every effort should be made to reduce the VSWR as much as possible for optimum communication.

2.4.5 Power Output Adjustment

As supplied the ORION is set for operation at 120/150 watts PEP on SSB. If desired, this output level can be reduced by adjusting 10RV1 on the Output Filter PCB (see figure 2.20). The power output should not be increased above the factory setting as intermodulation distortion will increase, and destruction of the power amplifier transistors may occur.

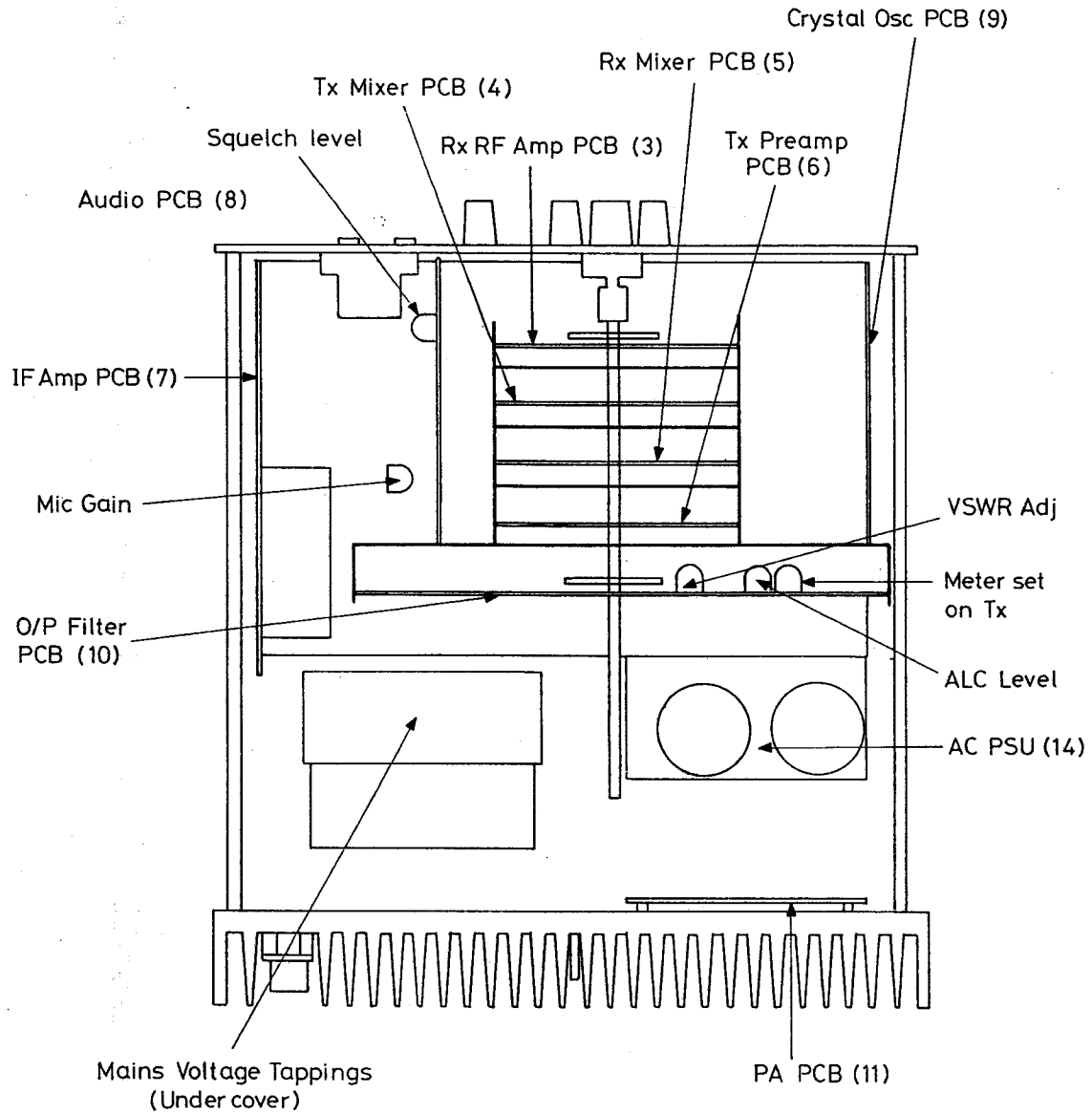
The power output level can be verified by measuring a 2-Tone output into a 50 ohm load with an accurate oscilloscope. The waveform shown in figure 2.19 should be observed from which the power output can be calculated.

Figure 2.19.
RF Power Output Waveforms



--oo0oo--

Figure 2.21
Internal View of A.C. Version.

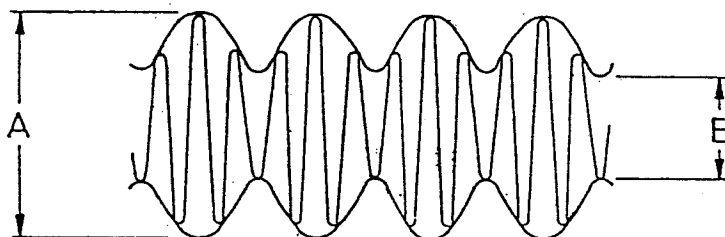


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2.4.6 AM Carrier Adjustment

If the ORION has the AM (H3E) transmit facility fitted, the output waveform for a single tone input should appear as figure 2.22, with the carrier level between 4.5dB and 6dB below the peak output. Adjustment of the carrier level is by 7RV2 on the IF PCB (see figure 2.20). This should not normally need adjustment from the factory setting.

Figure 2.22.
RF Power Output Waveform AM (H3E) Operation.



For normal operation with carrier between -4.5dB and -6dB, the ratio A/B is set between 3 and 4.

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2.4.7 Microphone Gain

The factory setting of the microphone gain is suitable for operation with the S1790, S1791 and S1792 series of microphones. If alternative microphones are used, the gain can be adjusted if required by 2RV1 on the interconnection PCB (see figure 2.20).

2.4.8 Squelch Level

In the unlikely event of the squelch setting needing adjustment from the factory setting, this should be made under normal working conditions such that the squelch lifts when receiving the required transmission. Adjustment is by 8RV1 on the AF PCB (see figure 2.20).

2.5 CHANNELLING

2.5.1 RF Stages

When setting up the ORION to operate on extra channels, it will be necessary to fit coils to the Receiver RF board Reference 3, the Receiver Mixer board Reference 5, the Transmitter Mixer board Reference 4 and the Transmitter Pre-amplifier board Reference 6 (See figure 2.20).

Table 2.6 below shows the coils to be fitted for the frequency range required.

The same type of coil is fitted to all four boards for a particular range.

Table 2.6
Range Coils

RANGE	FREQUENCY	PART NUMBER
1	2-3MHz	D5926
2	3-5MHz	D5927
3	5-8MHz	D5928
4	8-12MHz	D5929
5	12-16MHz	D5930
6	1.6-2MHz	D6256

Coils and capacitors will also have to be fitted to the PA output filter board Reference 10 for the appropriate range, but if frequencies for several channels fall within one coil range, links can be arranged on the switch wafers 10SW1 and 10SW2 to employ the one filter coil and capacitors for more than one channel.

Filter coils and capacitors for different ranges are shown in Table 2.7.

Capacitors are silver mica 350V working with $\pm 2\%$ tolerance.

Table 2.7
Output Filters

RANGE	FREQUENCY	C1	C2	C3	INDUCTOR PART NO.
1	2-3MHz	1000p	2000p	1000p	D5957
2	3-5MHz	470p	1200p	470p	D5958
3	5-8MHz	200p	750p	200p	D5959
4	8-12MHz	-	470p	-	D5960
5	12-16MHz	-	470p	-	D5961
6	1.6-2MHz	1000p	2000p	1000p	D5957

When removing any of the five plug in boards, it is first necessary to remove the switch shaft passing through the boards by loosening the grub screw on the shaft coupler and withdrawing the shaft to the rear through the hole provided in the heatsink.

Due to the tolerance in ferrite material in the PA output filter, it may be necessary, when operating at the extreme HF end of each filter coil, to remove turns to enable full power to be transmitted.

2.5.2 Oscillator

Crystals should be ordered against the following specification:-

Quartz Crystal type HC42/U Parallel Resonance
 ± 25 PPM Initial Tolerance at 25°C
 ± 5 PPM Frequency Variation over 0°C to 40°C.
 To tune with 30pF.

Crystal Frequency = Channel Frequency + 1400kHz

For all versions fitted with the high stability crystal oven, the initial tolerance of the crystal should be specified at 65°C, and the frequency variant specified at ± 0.5 ppm over 65°C ± 2 °C.

The oscillator circuits are optimised over the range 3.4MHz to 17.4MHz. If low activity crystals are fitted at the extreme ends of the range, oscillations may be unreliable and capacitors C6/7, C9/10, C12/13, C15/16, C18/19 or C21/22 (according to channel fitted) should be changed from 270pf to 150pf at high frequency end and 330pf at low frequency end.

2.5.3 Channel Alignment

After fitting coils and crystals for additional ranges, or when changing existing ranges, carry out the following test procedure. Coil core location and crystal trimmer locations will be found in figures 2.23 and 2.24.

Test Equipment Required

DC Power Supply 13.6V at 20 amp rating (or 24V depending on 5000 version).
Output Power Meter 8 ohm impedance (e.g. Marconi Instruments TF893A).
Signal Generator 2MHz to 16MHz (e.g. Marconi Instruments 2002 or similar).
50 ohm RF load resistor (100 watt rating).
Oscilloscope (50MHz bandwidth) with high impedance probe.
Distortion Factor Meter (e.g. Marconi Instruments TF2331 or similar).
Spectrum Analyser (if available) (e.g. Marconi Instruments TF2370).
Frequency Counter (to 16MHz).
AVO 8 Multi-meter or similar.

Connect DC Power Supply (set to 13.6V) to 5000 terminals (or use internal AC power supply if fitted).

Receiver Section Alignment

- Step 1 Connect output power meter to ancillary socket 8 ohm audio output, pin 8 and pin 7 (earth).
- Step 2 Set 5000 to channel required and connect Signal Generator to aerial socket. Set Signal Generator to channel frequency +1kHz and at a suitable output level below AGC threshold.
- Step 3 Tune 3L1-3L6 as appropriate on receiver RF amplifier and 5L1-5L6 as appropriate on receiver mixer printed circuit board for maximum output, taking care to keep the input level below the AGC threshold.
- Step 4 Set 7RV1 on lowest gain channel to give a 5uV (emf) AGC threshold.

Step 5 Remove Signal Generator and connect 50ohm load to antenna socket, and short pins 1 and 2 on 1SK3 (Microphone input) or change (s-u) link to (s-t) on Interconnection PCB.

Connect Frequency Counter to pin 52 on Interconnection PCB 2 and adjust 2C1 to 2C6 on channels 1 to 6 respectively (where fitted) to give correct frequency.

With the additional 2 channel versions, 12C11 and 12C12 are additionally adjusted to give correct frequency.

Replace (s-u) link and check clarifier range on each channel (approximately $\pm 100\text{Hz}$ at 3MHz to $\pm 1\text{kHz}$ at 16MHz).

With the Semi-Duplex version, netting of the additional crystals on the duplex PCB is achieved in the RECEIVE mode with (s-u) link and CLARIFIER central position. 12C11 and 12C12 should be adjusted for exact oscillator frequencies. Duplex button must be pressed.

Step 6 Reconnect Signal Generator to aerial socket. With Signal Generator set for 0.5uV p.d. output, check that the signal to noise ratio is better than 20dB on each channel fitted.

Step 7 Set squelch control 8RV1 to mid-position and with a steady state signal input of approximately 100uV check that receiver is muted.

Vary the input frequency with generator or clarifier and check that muting lifts.

A final setting of the squelch control 8RV1 should be made when receiving a speech signal in normal use.

Transmitter Section Alignment

Step 1 Set microphone gain control 2RV1 to mid-position and connect 50ohm 100 watt load resistor to aerial socket.

Connect oscilloscope across load.

Step 2 Select channel required. Apply audio input to pins 4 and 5 of 1SK3, then short pins 1 and 2 of 1SK3 together.

Tune 4L1-4L6 as appropriate for maximum output, reducing audio level to keep output level below 100V peak to peak on the oscilloscope. Always start with coils at maximum inductance (core inside former) and turn core anti-clockwise for first peak, otherwise it would be possible to tune to incorrect spurious frequencies.

Step 3 Turn ALC control 10RV1 fully anti-clockwise and apply 1kHz and 1.6kHz to audio input (pins 4 and 5 of 1SK3). Increase audio input level until output no longer increases, i.e. transmitter ALC is working. Turn ALC control in clockwise direction (increasing audio level if necessary) until 'unflattened' output level on oscilloscope is reached (see figure 2.19).

Output should be between 200V p-p and 250V p-p (150 watts PEP). If a Spectrum Analyser is available check that Intermodulation Distortion is better than -26dB.

Step 4 Check other channels for 'unflattened' output and adjust ALC control if necessary (and audio input level if necessary to ensure transmitter ALC is working).

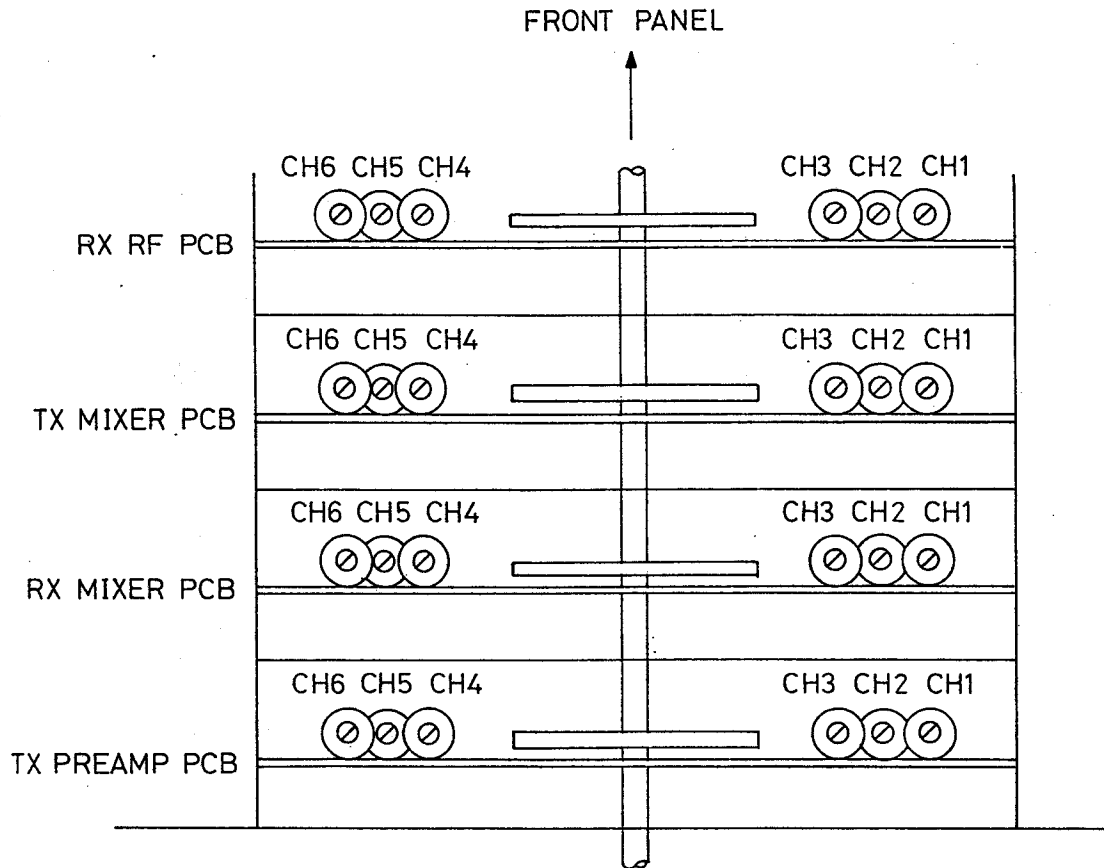
Step 5 Remove short circuits on 1SK3, connect microphone and adjust Microphone Gain 2RV1 so that talking normally into the microphone causes peaks to reach maximum output level without undue clipping.

WARNING

⚠ Continued operation on transmit at full power with a 2 tone test signal will cause the Power Amplifier heatsink to reach 70°C, when the safety thermostat will reduce the power output by 10dB. If the internal power supply is used on AC versions at full output power with a 2 tone test signal, **DAMAGE MAY OCCUR** to the mains transformer with prolonged running.

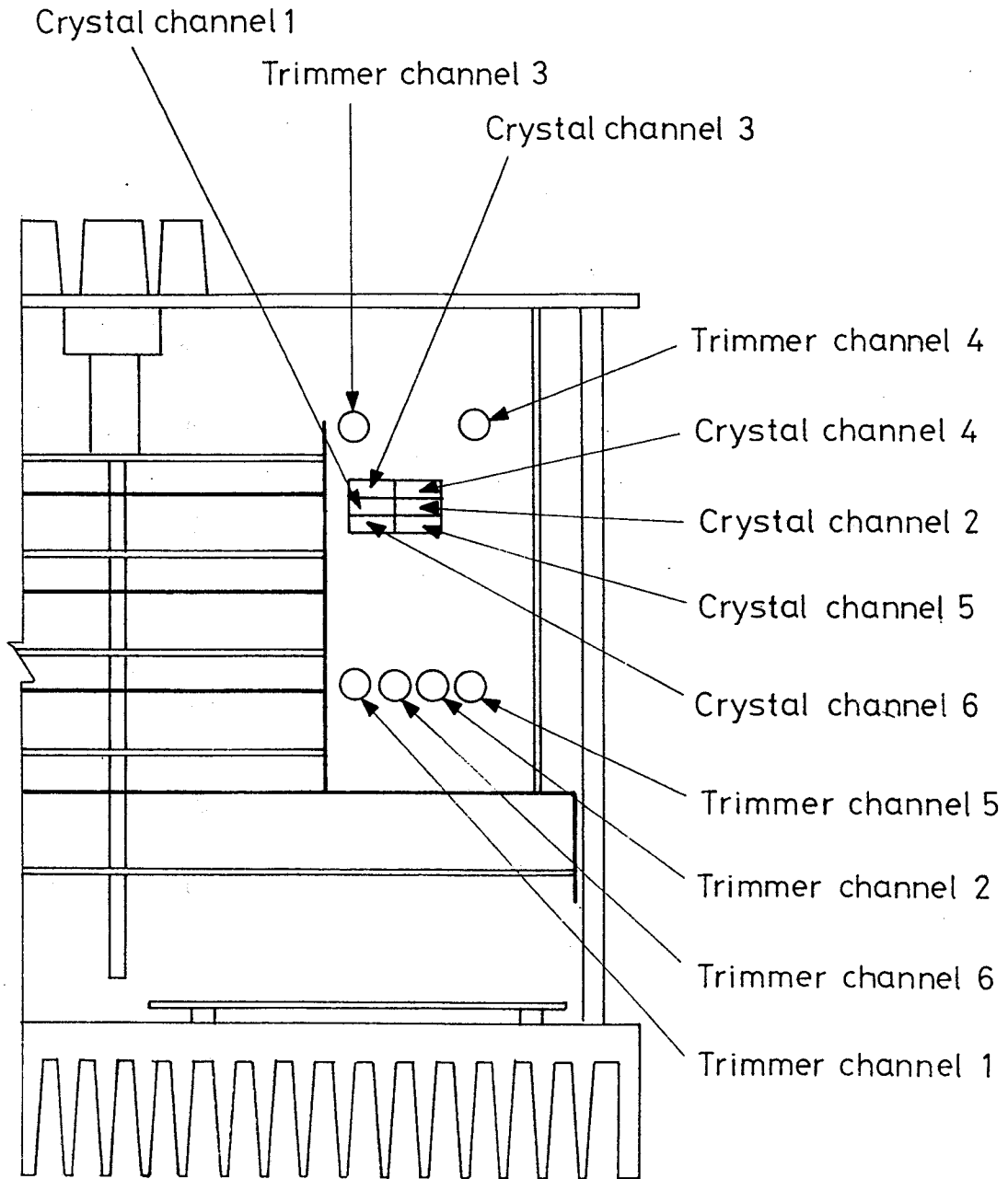
With normal speech operation, there is, of course, no problem with the internal PSU.

Figure 2.23
Core Tuning Locations.



--oOo--

Figure 2.24
Crystal Positions and Associated Trimmers.



--o0o--

SECTION THREE : OPERATION

This section starts with a description of each front panel control on the ORION 5000 series, and then continues with the operating procedure for this model. The main differences in controls and operating procedure for the other variants are then outlined. Reference should be made to the following front panel outline drawings bound at the rear of the manual.

BP2462 ORION 5000 Front Panel Controls.
BP2463 ORION 5500 Front Panel Controls.
BP2464 ORION 5700 Front Panel Controls.

3.1 ORION 5000

3.1.1 Controls and Indicators

AF GAIN Turning the control in a clockwise direction increases the output level to the loudspeaker when receiving a transmission. Turning the control fully anti-clockwise disconnects the supply to the transceiver.

CHANNEL If the transceiver is fitted with more than one channel, the appropriate channel can be selected by rotation of this control.

The frequency indicated will be applicable on both transmit and receive unless the transceiver is equipped for semi-duplex operation (see separate heading).

CLARIFIER The clarifier, which is operational in receive mode only, gives the operator a fine tune facility to adjust the received frequency for optimum clarity.

RF GAIN The RF GAIN control adjusts the sensitivity of the receiver section, and is used to prevent very strong signals from overloading the receiver. Maximum sensitivity is with the control fully clockwise.

SQUELCH In the ON position, the squelch is operational and no noise will be heard from the loudspeaker, regardless of the AF GAIN setting, unless speech is present on the selected channel.

USB/LSB If the transceiver has been supplied with USB and LSB filter option, (see variants list on pages 3 to 7 of section 1), the individual sidebands can be selected by the USB/LSB switch.

**SEMI
DUPLEX** If the transceiver has been supplied with semi-duplex option, (see variants list on pages 3 to 7 of section 1), semi-duplex operation should be selected on channels 1 and 6. This allows the operator to use the equipment on split frequencies, one for receive and another for transmit.

If the frequency spacing on transmit and receive is within 1%, simplex or semi-duplex operation on channels 1 and 6 is possible. Otherwise simplex **MUST** be selected on channels 2 to 5, and semi-duplex **MUST** be selected on channels 1 and 6.

**A/B
CHANNEL** If the transceiver has been supplied with A/B channel option, (see variants list on pages 3 to 7 of section 1), the number of channels on the equipment is increased to 8. This is achieved by selecting either A or B channel when on channel 1 or 6 of the main channel selector. On channels 2 to 5, the A channel should be selected. It should be noted that the frequency separation of the A and B channels should not exceed 1%.

METER The meter gives an indication of signal strength on receive. On transmit, the meter indicates the average antenna current supplied from the transceiver. Because of the waveform of speech, the average current is very low, and gives a reading in the region of 0.5 amp when using a microphone for normal 150W PEP operation. A current of 1.2 amp corresponds to 150W PEP from a steady two tone test signal.

SUPPLY This indicator is illuminated when power is applied to the transceiver, and the equipment is turned ON by the AF GAIN control.

3.1.2 Operation

Ensure that the ORION 5000 is wired to the correct supply voltage and polarity, and the antenna is securely connected. Connect microphone to front panel socket.

Turn the transceiver on using the AF GAIN control, and adjust this control for required audio output. Ensure SUPPLY light is illuminated.

RECEPTION

Turn SQUELCH off initially.

Select desired CHANNEL.

Select USB or LSB (if fitted) as desired.

Turn RF GAIN control fully clockwise initially. In the presence of strong signals shown by deflection of the meter to the right, clearer reception may be obtained by backing off this control.

When a signal is heard, adjust the CLARIFIER to produce the most realistic and acceptable voice.

SQUELCH can be turned ON to eliminate noise in the absence of a signal.

With very weak signals, the RF GAIN should be fully clockwise and the SQUELCH turned OFF.

TRANSMISSION

Depressing a button on the side of the microphone actuates the transmitter section of the equipment, (or a lever in the case of the base station microphone).

When ready to transmit, the microphone should be placed approximately 25mm to 50mm from the operator's mouth, and to one side, so that when speaking, the operator speaks across the face of the microphone. This prevents bursts of air blowing into the microphone and causing distorted speech peaks. Unless under very difficult communication conditions, the operator should always speak at a normal voice level.

When transmitting, observe that the meter indicates in the region of 0.5 amp. (See METER description on page 2 of section 3).

DUTY CYCLE

The ORION 5000 series allow a duty cycle of at least 50% transmit/receive when used at 25 deg.C with normal voice transmission. (On D.C. versions it is capable of continuous transmission at 25 deg.C with normal voice transmission). It should be noted that the heat sink and associated components may operate at up to 70 deg.C, and that this temperature is quite normal for this type of equipment. AT 70 deg.C, a thermal trip operates which reduces the power output by 10dB, resetting automatically when the temperature reduces.

3.2 ORION 5500

3.2.1 Controls and Indicators

All controls and indicators on the ORION 5500 series are the same as outlined for the ORION 5000 in the previous section, with the exception of the following:-

METER The analog meter on the ORION 5000 is replaced by an LED bargraph display which serves the same functions.

INTENSITY This is a three position switch controlling the intensity of the METER and SUPPLY indicators. Positions are HI (High), LO (Low), and OFF.

The push button switches of the ORION 5000 are replaced by toggle switches on the ORION 5500 series.

3.2.2 Operation

Operation of the ORION 5500 is identical to the ORION 5000.

3.3 ORION 5700

3.3.1 Controls and Indicators

All controls and indicators on the ORION 5700 series are the same as outlined for the ORION 5000 in section 3.1.1, but with the following additional controls and indicators for the RADIO-TELEPHONE ALARM:-

- TEST This button tests the Radio-Telephone Alarm circuit and illuminates the green TEST LED. The test lasts for 32 seconds unless manually stopped during this period.
- STOP This button is used to cancel the Radio-Telephone Alarm in either TEST or SEND mode.
- SEND This button transmits the Radio-Telephone Alarm and illuminates the red SEND LED. The transmission lasts for 32 seconds unless manually stopped during this period.

3.3.2 Operation

Operation of the ORION 5700 is identical to the ORION 5000, but with the additional facility of the Radio-Telephone Alarm.

3.3.3 Radio-Telephone Alarm Operation

Select 2182kHz (Channel 4).

Simultaneously press TEST and SEND buttons on the front panel. This will cause the alarm to be transmitted, and will be indicated by the red SEND LED, and the Tx antenna current on the meter. The audio tones also provide an output from the loudspeaker as an additional monitor facility.

After 32 seconds, the alarm will automatically stop, and the transceiver reverts to normal usage. The alarm can be stopped manually within this 32 second period if required by pressing the STOP button on the front panel. The alarm will also be stopped if the microphone switch is pressed to transmit.

CAUTION

DO NOT TEST THE ALARM ON 2182KHz BY TRANSMITTING INTO ANTENNA. This could cause monitoring receivers to automatically respond, with the consequent alerting of the rescue services.

The alarm can be tested (without transmission) by pressing the TEST button on the front panel. The green TEST LED will be illuminated and the distinctive tone sequence heard from the loudspeaker. After 32 seconds, the alarm will automatically stop, and the transceiver reverts to normal usage. The alarm can be stopped manually within this 32 second period if required by pressing the STOP button on the front panel. The alarm will also be stopped if the microphone switch is pressed to transmit.

APPENDIX A

A.1 COMPONENT HANDLING

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

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

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

MOS Devices. These have an exceptionally high input resistance, and are susceptible to damage when exposed to high electric charges. To avoid possible damage the following procedures should be adopted:

1. Devices should be stored and transported in contact with a conductive material.
2. Soldering iron, bench surface, tools etc., should be earthed. The operator should be earthed using a 1M ohm series resistor.
3. The equipment should be switched off when devices or boards are inserted or removed.

Nylon clothing should not be worn.

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

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A.2 FIRST AID IN CASE OF ELECTRIC SHOCK

The Royal Life Saving Society recommends the Expired Air method of artificial respiration for use in any case of electric shock. It is comparatively simple and produces the best and quickest results when correctly applied. It also has an important advantage over the accepted manual methods in that it can be carried out in awkward situations in confined spaces, such as might well be encountered at sea.

However, where there is a facial injury, or if the patient is trapped in a face downwards position, it might be necessary to use a manual method of artificial respiration: of this type the Holger Nielson method is considered the most satisfactory

Directions for applying both methods are therefore given.

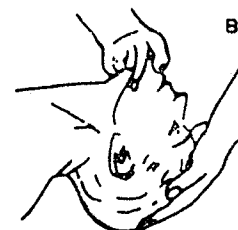
EXPIRED AIR METHOD OF ARTIFICIAL RESPIRATION

It is essential to commence artificial respiration without delay.

DO NOT TOUCH THE VICTIM WITH YOUR BARE HANDS until the circuit is broken.

SWITCH OFF. If this is not possible, **PROTECT YOURSELF** with dry insulating material and pull the victim clear of the conductor.

1. Lay the patient on his back and, if on a slope, have the stomach slightly lower than the chest.
2. Make a brief inspection of the mouth and throat to ensure that they are clear of obvious obstruction.
3. Give the patient's head the maximum backwards tilt so that the chin is prominent, the mouth closed and the neck stretched to give a clear airway—Fig. A.
4. Open your mouth wide, make an airtight seal over the nose of the patient and blow. The operator's cheek or the hand supporting the chin can be used to seal the patient's lips—Fig. B, or if the nose is blocked, open the patient's mouth using the hand supporting the chin; open your mouth wide and make an airtight seal over his mouth and blow—Fig. C. This may also be used as an alternative to the mouth-to-nose technique.
5. After exhaling, turn your head to watch for chest movement whilst inhaling deeply in readiness for blowing again—Fig. D.
6. If the chest does not rise, check that the patient's mouth and throat are free of obstruction and the head is tilted backwards as far as possible. Blow again.



Send for medical assistance if possible.

HOLGER NIELSON METHOD OF ARTIFICIAL RESPIRATION

It is essential to commence artificial respiration without delay.

DO NOT TOUCH THE VICTIM WITH YOUR BARE HANDS until the circuit is broken.

SWITCH OFF. If this is not possible, **PROTECT YOURSELF** with dry insulating material and pull the victim clear of the conductor.

1. Lay patient face downwards with the forehead resting on the hands, placed one above the other

2. Remove false teeth, tobacco or gum from patient's mouth; make sure the tongue is free by firm blows between the shoulders with the flat of the hand.

3. Kneel on one knee at patient's head, one foot by the patient's elbow.

4. Place palms of your hands on patient's shoulder blades—Fig. A.

5. Rock forward until arms are vertical, the pressure should be light and without force (22–30 lb. is sufficient); this should take $2\frac{1}{2}$ seconds— Fig. B.

6. Release the pressure by allowing the hands to slide down the arms to the patient's elbow (approximately 1 second) then raise the patient's arms and shoulders slightly pulling at the same time by swinging backwards (approximately $2\frac{1}{2}$ seconds)—Fig. C, lower the patient's arms—Fig.D. and return your hands to the patient's shoulder blades.

7. Repeat the movements taking 7 seconds for each complete respiration.

8. While artificial respiration is continued, have someone else—

(a) Loosen patient's clothing.

(b) Keep patient warm.

9. If patient stops breathing, continue artificial respiration. Four hours or more may be required

10. Do not give liquids until patient is conscious.

Send for medical assistance if possible.



A.3 HEALTH AND SAFETY AT WORK ACT 1974 (UK)

The objective of this Act is to maintain or improve standards of health, safety and welfare of persons at work, and to protect persons at work and others, against risks to health, safety and welfare.

To the best of current knowledge, there is no risk to health or safety when Eddystone equipment is installed and operated properly, provided it has been properly maintained.

Precautions have been taken during the design and manufacture of this equipment to reduce the risks involved when repairing or maintaining the equipment, but a certain degree of risk must always be present, particularly under fault conditions. The list below has been prepared to draw attention to the general risks envisaged; further information is available from Eddystone Radio Limited, at any time.

1. Electric Shock

Beware mains voltage and induced aerial voltages, ensure metal chassis is properly bonded to earth. Some units generate a high voltage even when the equipment is operated from a battery supply. Circuitry operating at low voltage is not necessarily at or near earth potential.

2. Physical Strain

Obtain assistance if a heavy unit is to be lifted or removed from an equipment rack.

3. Explosion and Implosion

Cathode ray tubes may implode if carelessly handled or dropped.
Use protective masks and gloves.
Electrolytic capacitors may explode if subjected to excessive voltage or voltage of incorrect polarity, and toxic materials may be released.

4. Burns

Resistors and power transistors (for example) may attain high temperatures. Physical contact with these is to be avoided.

5. X Rays

Cathode ray tubes operated at excessive voltage may generate harmful X Rays.

6. Soldering

Beware of flying droplets of molten solder and careless use of soldering irons (place in a proper stand when not in use). Avoid fumes. Do not handle food or drink, cigarettes etc., without washing hands (risk from lead poisoning).

7. Cleaning Solutions

Certain solutions give off flammable or toxic fumes, eg. trichloroethylene and its derivatives. Do not smoke in proximity, and avoid inhalation of vapours.

8. Disposal of Faulty Components

Certain components contain toxic materials which may be released if the component is broken or disposed of carelessly, eg. semiconductor devices containing poisonous metallic compounds; electrolytic capacitors containing poisonous organic compounds.

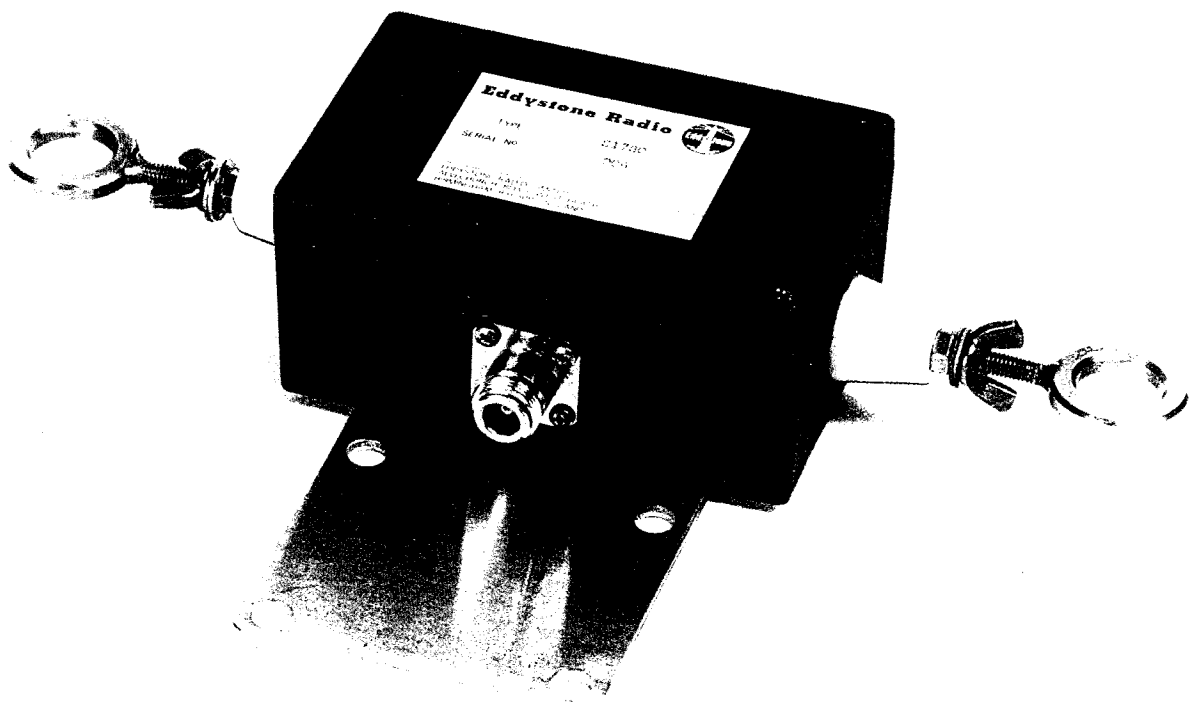
TREATMENT FOR BURNS

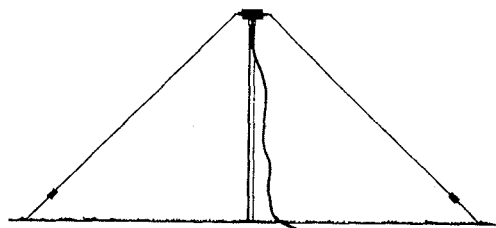
1. No attempt should be made to remove clothing adhering to the burn.
2. If other help is available, or as soon as artificial respiration is no longer required, cover the burn with a dry dressing.
3. Oil or grease in any form should not be applied.
4. Warm, weak, sweet tea may be given when the patient is able to swallow.

These instructions are approved by the Royal Life Saving Society. A handbook and charts dealing with Artificial Respiration can be obtained from the Society at:
14, Devonshire Street,
London, W.1.

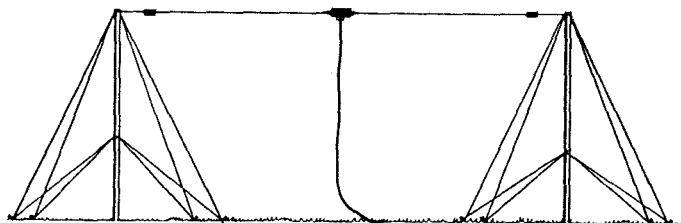
S1780 BROAD BAND DIPOLE

- Ideal for all HF communications
- Matches any wire over 7 metres long in end fed or dipole configurations
- Eliminates needs for ATU
- Easily deployed for tactical applications or for permanent installation
- Supplied with two radiators and ceramic insulators as standard
- Ideal for use with frequency agile equipment
- Fitted with 'N' Type socket as standard

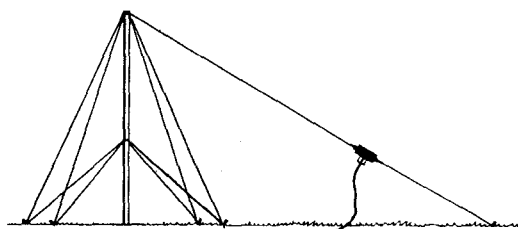




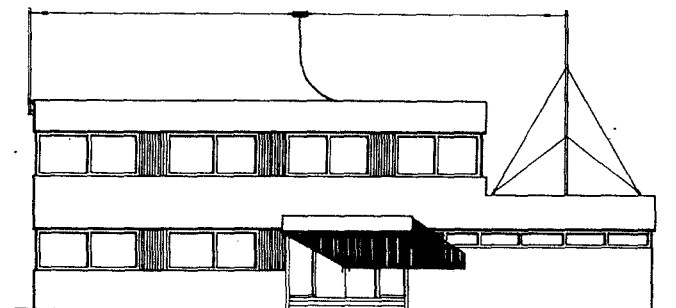
Pole mounted



Mast to mast

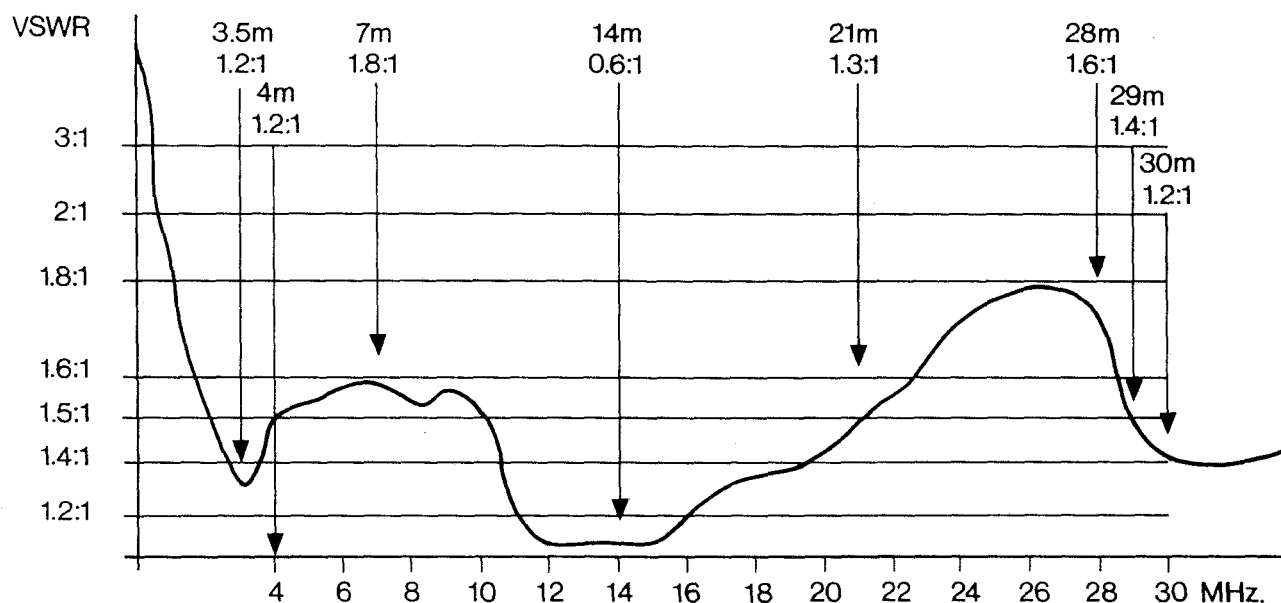


Mast to ground



Typical building installation

The figures above the arrows are the reflectometer reading at frequency stated.



Matches any wire dipole or wire over 7 metres long over frequency range 1.5-30 MHz. The S17 80 centre fed wire dipoles or end fed wires to be fed without the conventional ATU. Fully wideband over stated frequency range and available in 150, 400, or 2000W p.e.p. rating. This device will find wide acceptance with frequency agility equipment ideal for field use and licensing to original equipment manufacturer's for inclusion in their radio's.

Freq. Range: 1.5 to 30.0 MHz

VSWR: Better than 2.1 across band

Impedance: 50 ohms nominal

Power Rating: 150 W p.e.p.

Mass (inc wires): 2kg approx.

This document gives only a general description of the products or services offered, and shall not form part of any contract. From time to time changes may be made in the products or the conditions of supply.

Eddystone Radio



A MARCONI COMMUNICATION SYSTEMS COMPANY.

Eddystone Radio Limited,
Eddystone Works,
Alvechurch Road, Birmingham B31 3PP, England.
Telephone: 021-475 2231
Telex: 337081. Cables: Eddystone Birmingham

S1781 SERIES MOBILE WHIP

- Robust
- Efficient
- No A.T.U. required
- Parts available separately

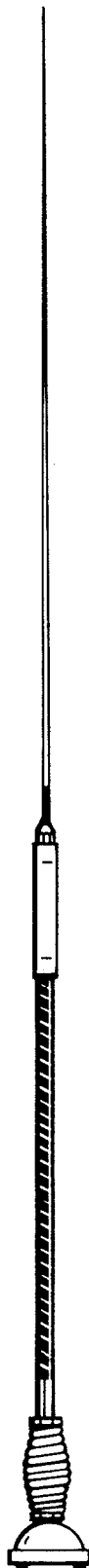
The S1781 antenna has been designed as an efficient HF centre loaded spot frequency mobile antenna, capable of being used without an antenna tuning unit. Where a second or third frequency is to be used, it is only necessary to unscrew the loading coil/whip combination and replace with a pre-tuned assembly.

Medium power capability permits an unobtrusive slimline format for either wing, bumper or rear vertical panel mounting, to provide reliable HF communications under the most arduous conditions.

These antennas have proved themselves over many years in the role of vital communication links to authorities worldwide.

The resonator and whip sections are individually made and calibrated to your specified frequency; additional frequency allocations need only another resonator and whip section.

Although resonators are supplied to a specific frequency, adjacent frequency working may be used within the bandwidth specifications as shown overleaf.



Technical Specification

MAXIMUM POWER:

100 watts 1.5 MHz to 3.0 MHz.

CAPABILITY:

150 watts 3.0 MHz to 30.0 MHz rated SSB duty cycle.

VSWR:

Typical less than 1.5 : 1 at resonance.

IMPEDANCE:

Nominal 50 ohm. Impedance matching networks *not* normally needed for valve or solid state amplifiers.

BANDWIDTH:

For 2.1 VSWR

Better than:

20 KHz at 1.5 MHz
40 KHz at 3.0 MHz
80 KHz at 7.0 MHz
150 KHz at 10 MHz
300 KHz at 22 MHz
500 KHz at 30 MHz

Mechanical Specification

MAST SECTION:

Fibreglass with non ferrous fittings $\frac{3}{8}$ UNF stainless steel screw fittings for basemount. Partial inductive loading on mast, enclosed in tough black PVC heat shrunk sleeve.

RESONATOR/WHIP SECTION:

Non ferrous metal fittings on high impact resist formers. Former lengths vary from 13" at 1.5 MHz to 6" at 30 MHz.

Individually wound and calibrated, coated 100% polyurethane, finished with tough black PVC sleeve.

Resonator supplied with 40" stainless steel semi-flexible tapered whip section.



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S1782/3/4 TRAP DIPOLE ANTENNAS

- Up to 4 spot frequencies.
- Transportable or fixed station use.
- Power up to 1 kW.
- High quality materials used.
- Strong and durable.

The Trap Dipole Antenna is a compact and simply operated multi frequency antenna. Options provide up to 4 spot frequencies, (dependent upon channel spacing) with bi-or omni-directional coverage in the HF band. The antenna may be used as shown, with two support units, or more economically using a single support structure.

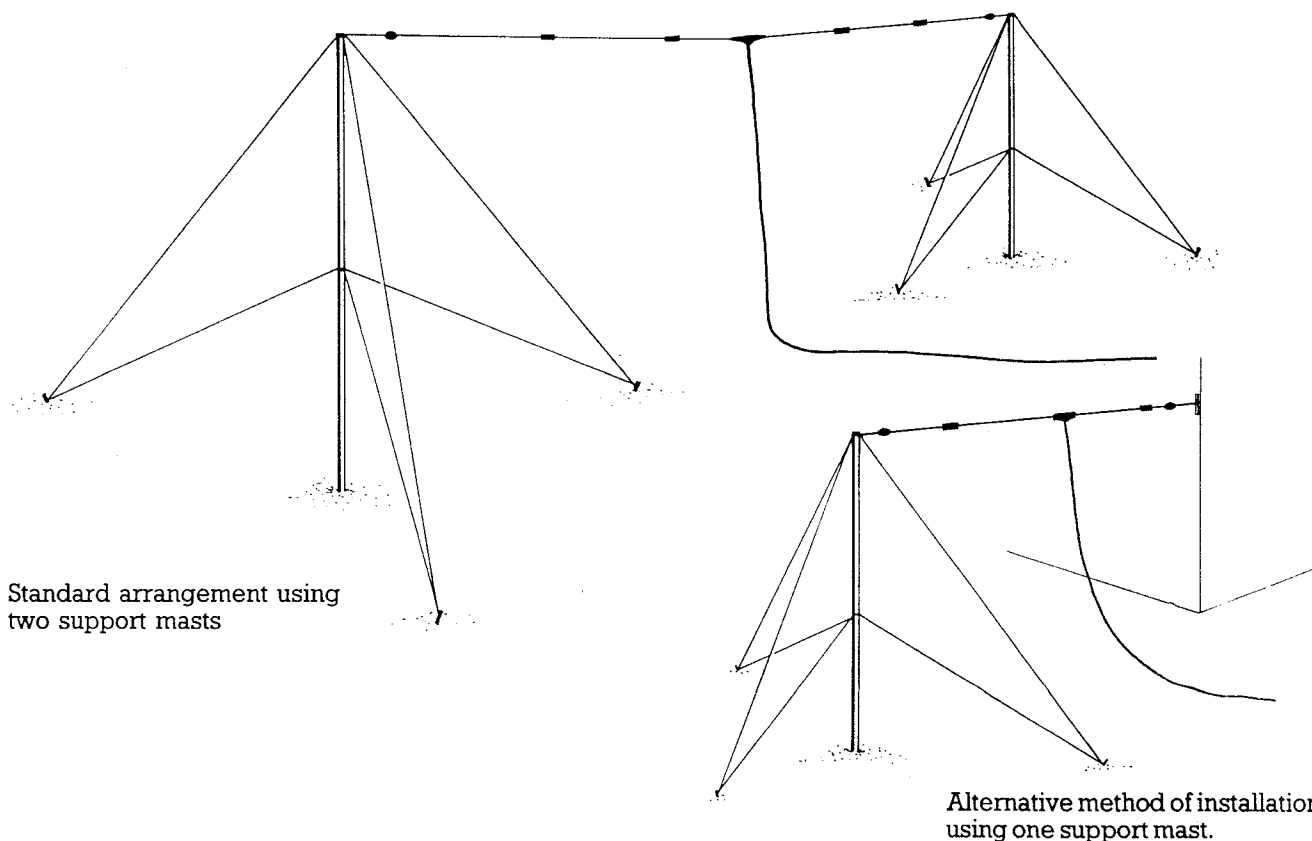
The construction reflects a policy of ensuring long trouble-free use, utilising only

best quality components. Each antenna is supplied complete with 30 metres of low loss coaxial feeder incorporating a strain relief arrangement, and fitted with one PL259 connector. The Dipole Centre Junction is formed by a balun unit to ensure optimum matching.

The elements are constructed of hard drawn cadmium copper multi-strand wire for durability and high resistance to corrosion.

The most important components of this antenna are the Traps. These are installed in the antenna elements, and provide the means by which multi frequency operation is achieved. The Trap components are fully encapsulated in epoxy resin, providing a non Hygrascopic and very strong unit, with proven durability.

We generally recommend the use of our 51786/7/8 series lightweight mast to support the Trapped Dipole antennas, providing a compact support structure, of lightweight.



Technical Specification

FREQUENCY RANGE:

2 - 30 MHz up to 4 spot frequencies (depends on frequency spacing).

POWER:

Up to 1 kW.

POLARISATION:

Horizontal.

AZIMUTH RADIATION:

Depends on frequency and height of antenna. Typically as polar diagrams.

INPUT IMPEDANCE:

50 - 70 ohms depending on design height.

VSWR:

Normally better than 1.5 : 1.

Mechanical Specification

ANTENNA ELEMENTS:

7/0.914mm (7/036") or 7/1.18mm (7/044") hard drawn copper strand.

INSULATORS:

Carbon loaded ultra violet resistant polypropelene or Frequelex porcelain.

JUNCTION:

Encapsulated in high grade epoxy resin.

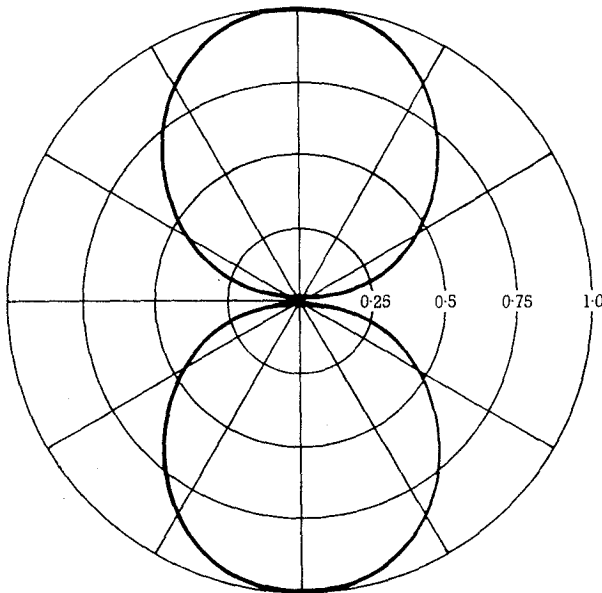
METALWORK:

Stainless steel or plated brass.

COAXIAL CABLE:

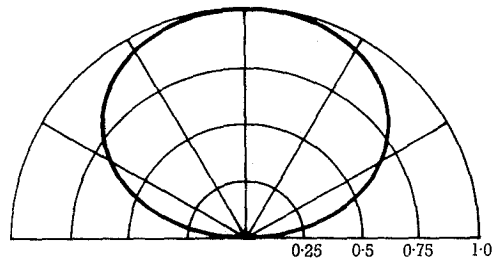
Normally 30 metres UR67 low loss.

POLAR DIAGRAMS



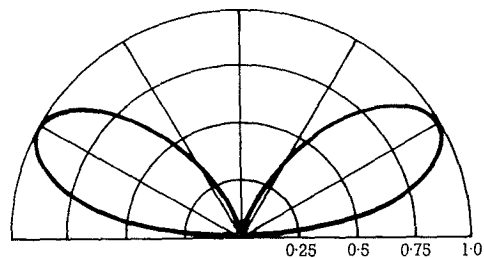
$$l = 0.5 \lambda$$

TYPICAL AZIMUTH
GROUND WAVE PATTERN



$$h = 0.25 \lambda$$

TYPICAL ELEVATION



$$h = 0.50 \lambda$$

RADIATION PATTERNS

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Eddystone Radio



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S1785 HF DIPOLE ANTENNA

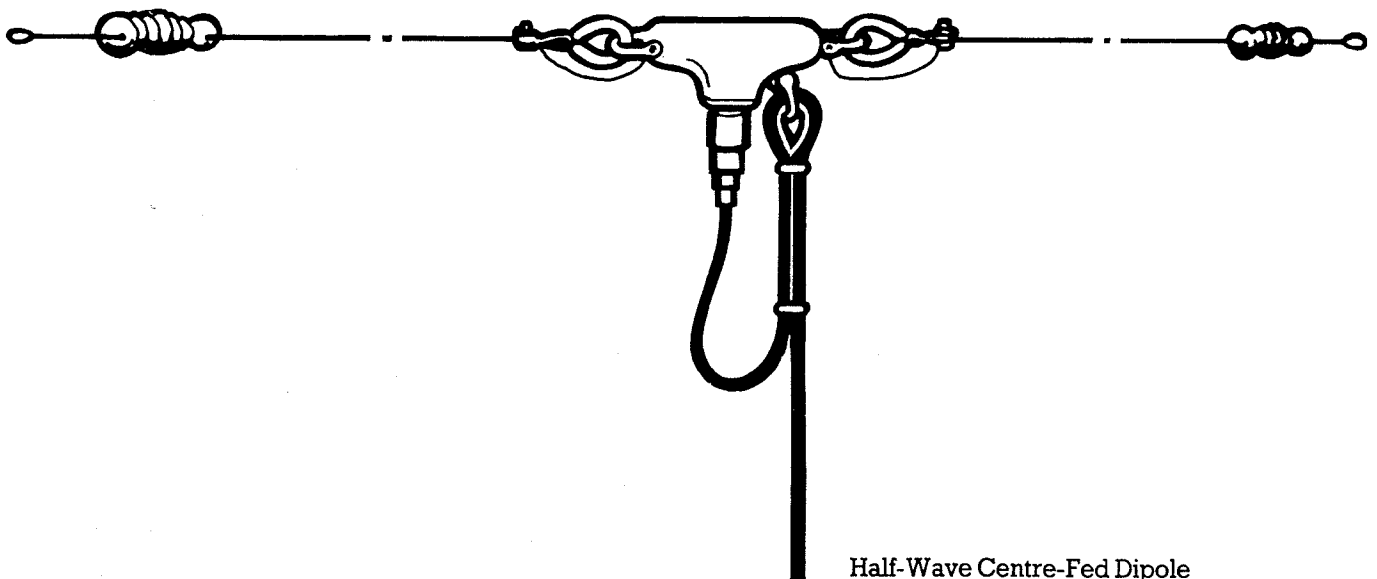
Half-Wave Centre-Fed Dipoles

These antennas are most suited for medium range working. When suspended a quarter wave above ground level, radiation is predominantly upwards, giving omnidirectional coverage using skywaves. As the height above ground level is increased to a half wave, the radiation pattern evolves to a figure of eight.

The S1785 half dipole is probably the most popular single frequency antenna world wide. The design is inherently robust using a moulded coaxial cable junction unit, which assures safe feeder cable suspension. Antennas are supplied ready assembled for customers specific frequencies.

General Specification

Frequency range:	2-30 MHz.
Bandwidth:	+2% of centre frequency
VSWR:	Better than 1.5:1
Power:	Up to 2kW
Impedance:	50-75 ohms
Polarisation:	Horizontal



Half-Wave Centre-Fed Dipole

Mechanical Specification

ANTENNA ELEMENTS:

7/0.44" (7/1.118mm) or 7/0.36" (7/0.914mm) hard drawn cadmium copper strand.

INSULATORS:

Frequelex, porcelain, or carbon loaded polypropelene.

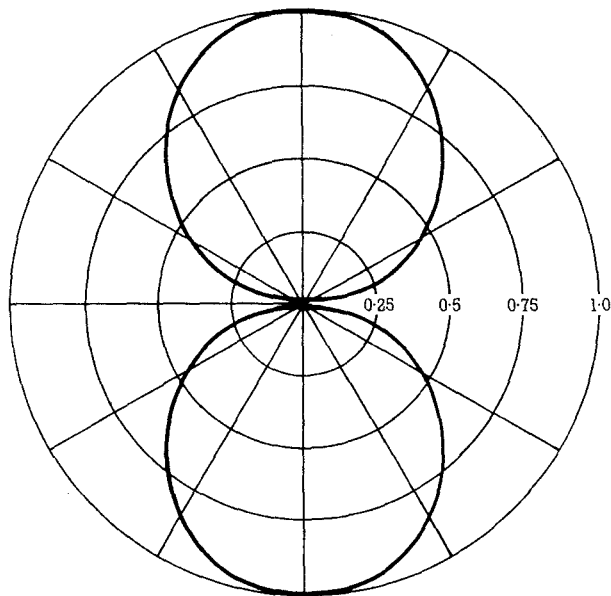
COAXIAL CABLE:

Length 30m. type UR67.

NOTE:

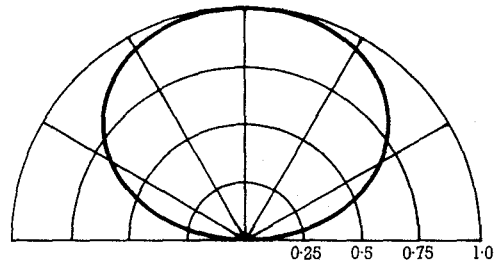
All antennas are supplied with 1 metre galvanised wire strops with eyes for halyard attachment.

POLAR DIAGRAMS



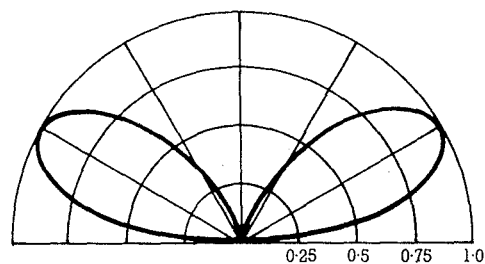
$$l = 0.5 \lambda$$

TYPICAL AZIMUTH
GROUND WAVE PATTERN



$$h = 0.25 \lambda$$

TYPICAL ELEVATION



$$h = 0.50 \lambda$$

RADIATION PATTERNS

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Eddystone Radio

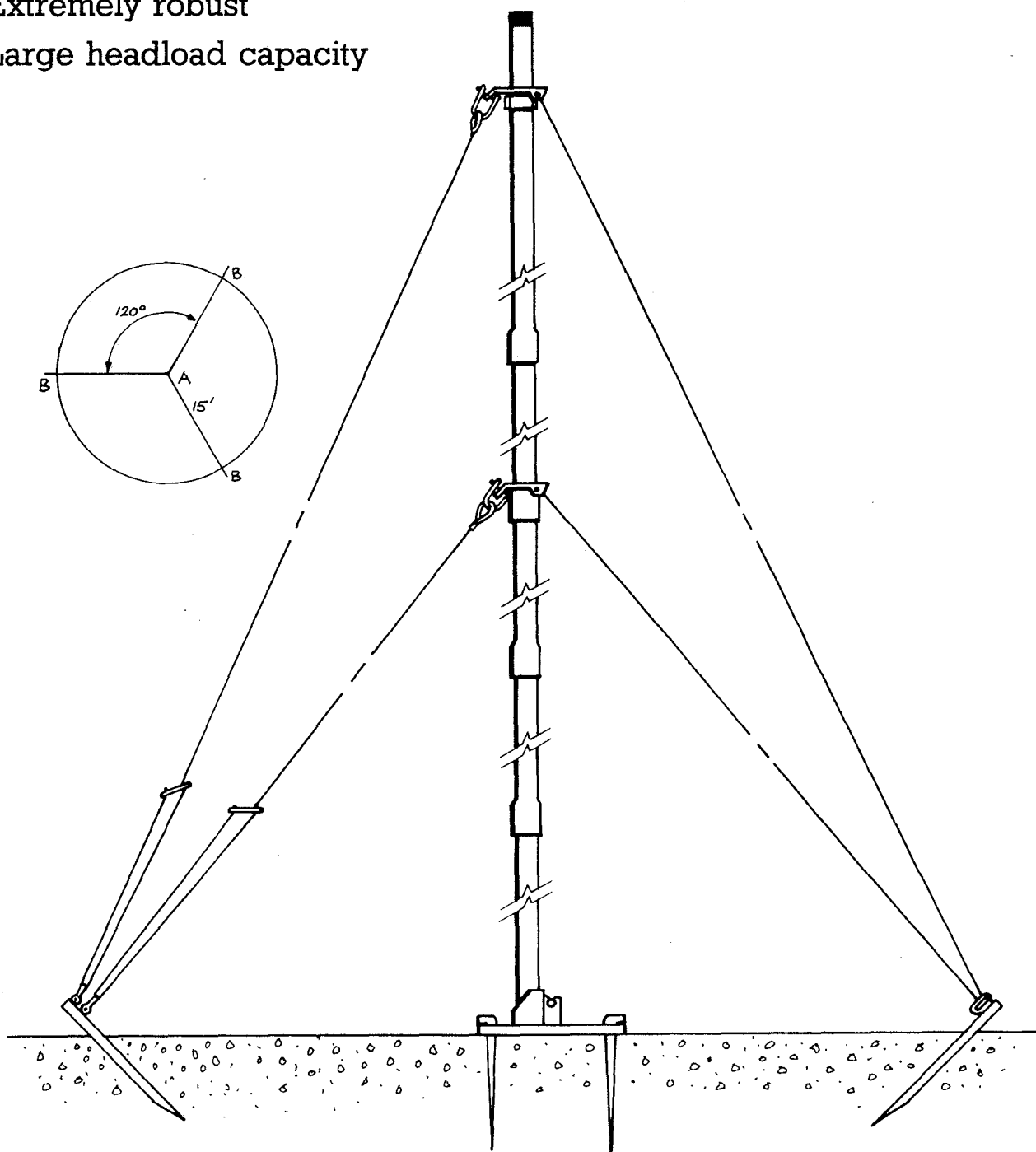


A MARCONI COMMUNICATION SYSTEMS COMPANY.

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Telephone: 021-475 2231
Telex: 337081. Cables: Eddystone Birmingham

S1786/7/8 ALUMINIUM MASTS

- Lightweight
- Easy installation
- Portable or permanent
- Extremely robust
- Large headload capacity



Each mast section has a belled end, ensuring easy assembly and quick erection by unskilled staff. For example, a 3 man team can erect the 42 ft. or 60 ft. mast in less than half an hour, following our practical installation instructions. Each section is 48.4mm O.D. and can be supplied in 6, 10 or 12 ft. (1.8, 3.04 and 3.65m) lengths for mast heights from 30 to 60 ft. (6.1 and 30.5m). Stays can be either 3 or 4 point fixing at each level, depending upon customers' requirements.

From a wide selection of stock components, masts can be supplied to suit customers' requirements, from a transportable mast complete with canvas carrying bags and all necessary hardware for erection, to installations for mounting permanently, complete with masthead and intermediate halyards, masthead lighting to ICAO standards, erection kit and all ground anchors.

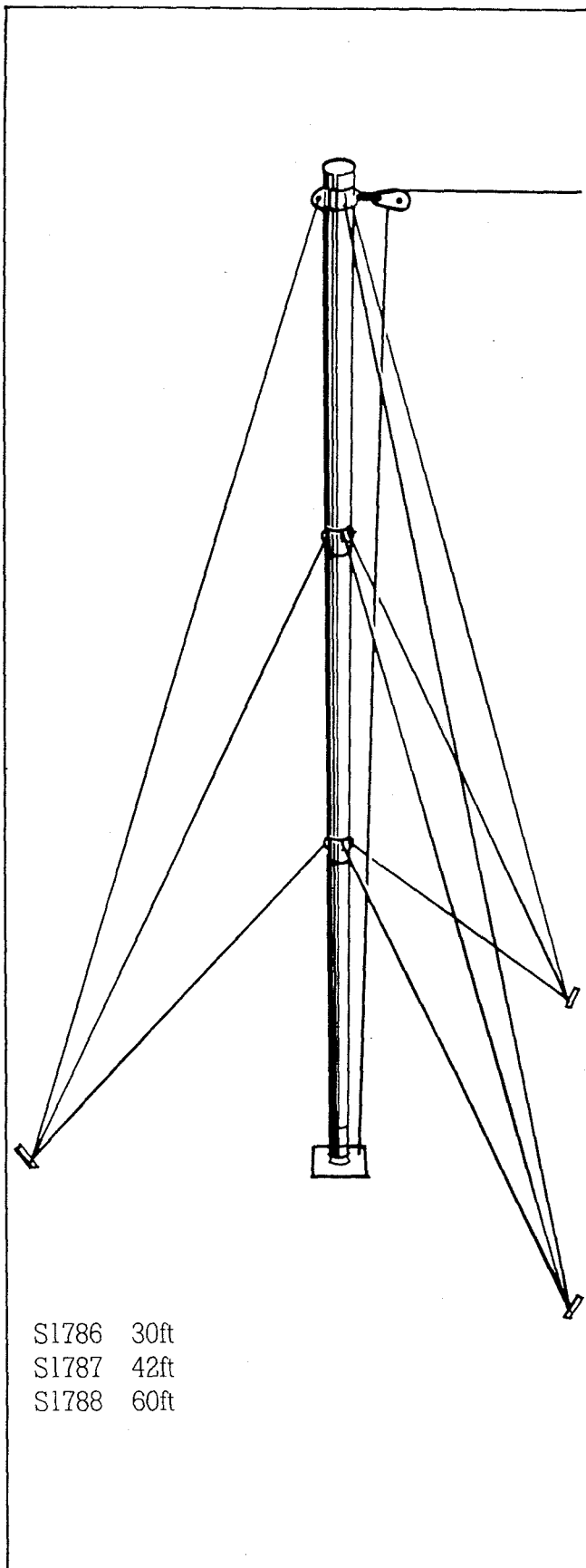
OPTIONAL.

Canvas holdalls for mast sections.

Mast head lighting available to I.C.A.O. recommendations.

Full erection kits available for 30 ft. - 60 ft. masts.

Thinner gauge sections, different lengths, special designs or variations to customers' requirements undertaken, and quick deliveries provided.



S1786	30ft
S1787	42ft
S1788	60ft

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Eddystone Radio



A MARCONI COMMUNICATION SYSTEMS COMPANY.

Eddystone Radio Limited,
Eddystone Works,
Alvechurch Road, Birmingham B31 3PP, England.
Telephone: 021-475 2231
Telex: 337081. Cables: Eddystone Birmingham

S1790 and S1791 MICROPHONES

S1790 HANDHELD MICROPHONE

The Eddystone S1790 noise cancelling microphone is supplied with a flexible coiled cord, and a connector to suit the ORION microphone input socket.

1790/1 for all ORION variants except 5500 and 5000/--I series.

1790/2 for all 5500 variants and 5000/--I series.

SPECIFICATIONS

Frequency Response	200Hz to 4000Hz (direct) 300Hz to 7000Hz (noise cancelling mode)
Impedance	600 ohms
Output Level	-75dB (direct) -80dB (noise cancelling mode) (0dB=1V/ubar at 1000Hz from 2cm)
Weight	180g.

INSTALLATION

The microphone is supplied with:-

- Microphone Hanger (1)
- Screws (2)
- Tapping Screws (2)
- Washers (2)

The microphone hanger may be installed wherever convenient for easy access to the microphone. Use the screws and washers enclosed.

OPERATION

For normal operation, close the PTT switch and speak into the microphone in a normal voice. The microphone should be approximately 25mm to 50mm from the operators mouth, and to one side, so that the operator speaks across the face of the microphone. This prevents bursts of air blowing into the microphone and causing distorted speech peaks. For high noise suppression, place the switch on the rear of the cartridge in the NOISE CANCEL ON position, and speak from a distance of 20mm or less from the microphone as above.

S1791 BASE STATION MICROPHONE

The Eddystone S1791 base station dynamic microphone is supplied with a lead and connector to suit the ORION microphone input socket. It features a rugged die-cast body, easily adjustable goose-neck, and locking push-to-talk switch.

1791/1 for all ORION variants except 5500 and 5000/--I series.

1791/2 for all 5500 variants and 5000/--I series.

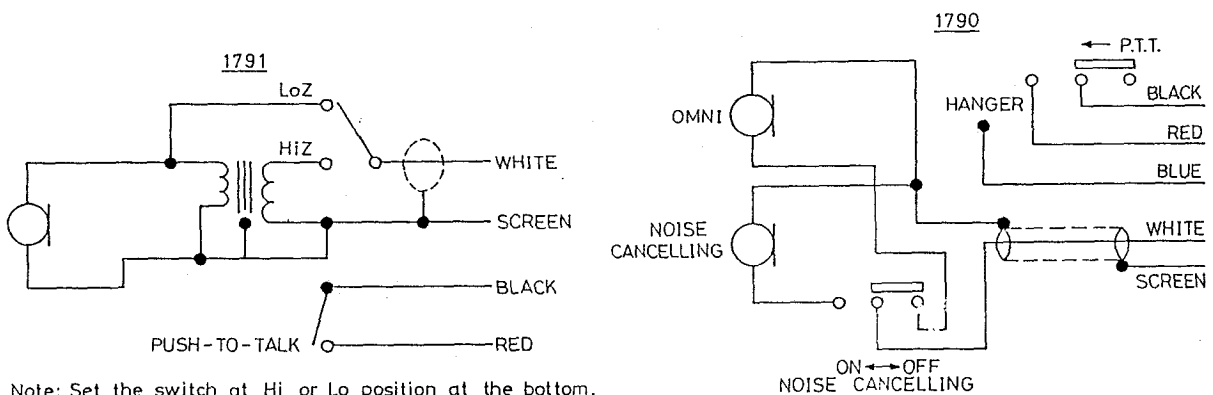
SPECIFICATIONS

Frequency Response 200Hz to 10kHz

Dual Impedance 500ohms/50kohms

Output Level -78dB (500ohms)/-58dB (50kohms)

MICROPHONE INTERNAL CONNECTIONS



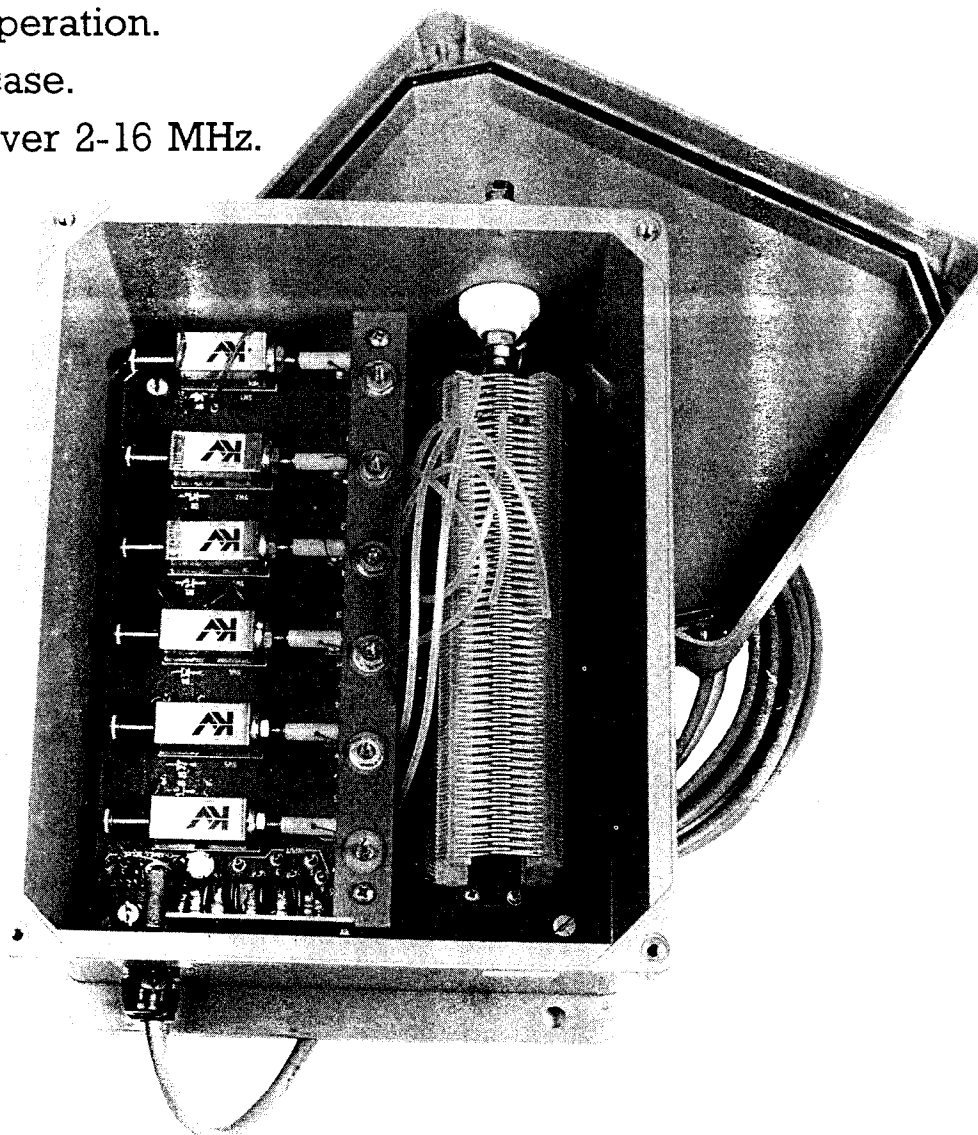
S1795 VEHICLE SUPPRESSION KIT

A kit for suppressing vehicle electrical interference is available type S1795 consisting of the following items:-

Qty	Description	Part No.
1	LT Coil Capacitor	ASB100/LS627
5	Distributor Suppressors	ASB636/LS636
1	Alternator Suppressor	ASB102/LS720
2	Instrument Regulator Choke	ASB301/LS639
2	Bonnet/Engine Bonding Strap	ASB500/LS642
1	Instruction Manual on Radio Interference Suppression	

S1798 HF ANTENNA TUNER.

- Mobile or marine applications.
- 6 channel capacity.
- Automatic operation.
- Watertight case.
- 150W PEP over 2-16 MHz.



This Antenna Tuner is designed to operate on 6 channels in the frequency range 2-16 MHz. Remote switching is provided over a 8-wire control cable at distances up to 50 metres. When used with most modern SSB transceivers the tuner switches automatically when the channel switch is turned.

The tuner is constructed in a rugged fibreglass case, designed for outdoor mounting in most

environments. The case cover is sealed by a heavy neoprene gasket and the cable entries are through waterproof glands. The tuner is completely waterproof and is particularly suitable for marine installations. The antenna connecton is made through a high voltage insulator on the top of the case. In mobile installations the tuner may be installed inside the automobile, or mounted on the exterior of large commercial vehicles.

ATW

The S1798 Antenna Tuner is designed for operation with short vertical antennas such as mobile and marine whips, which do not exceed $\frac{1}{4}$ wavelength at the highest channel frequency. The minimum antenna length is 3 metres (10 feet) at 2MHz making the tuner ideal for mobile or marine operation over the HF range. Because the voltages at the base of short whip antennas, operating on the lower channel frequencies, is extremely high, the S1798 has a special relay design with a contact gap of 1 cm to ensure reliable switching at these high voltages. The tuner uses a large high Q airwound inductor to resonate the antenna, with small slug tuned inductors to provide vernier tuning to each channel frequency. A broadband ferrite transformer provides matching to the 50 ohm co-axial line. When used with an effective ground the tuner is simple to adjust and can provide a VSWR of less than 2:1 on all channel frequencies.

SPECIFICATIONS

Power:

150W PEP

Switching:

12V 200mA

Control:

8 wire cable (active channel connection grounded)

Input impedance:

50 ohms

Antennas:

Suggested antennas -

Antenna Length	Frequency Range
2.7 metres (9 feet)	2-18 MHz
4 metres (13 feet)	2-14 MHz
5.5 metres (19 feet)	2-11 MHz
7 metres (23 feet)	2.8 MHz
11 metres (35 feet)	2.6 MHz
14 metres (45 feet)	2-4.5 MHz

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S1799 MAINS FAIL TO BATTERY UNIT

The S1799 Mains Fail to Battery Unit is used with the A.C. variants of the ORION 5000 and 5700 series to provide automatic switching to a battery supply in the event of failure of the mains A.C. supply. If the unit is to be used with /--I variants, this must be specified at time of order. The standard unit works with A.C. supplies in the range 200-250V A.C. If operation required with supplies in the range 100-130V A.C., this must be specified at time of order.

WARNING

⚠ The A.C. Mains Input socket accepts a standard 40-60Hz mains supply within the range required by the ORION. If the plug and lead supplied in the accessories kit is used, a connector to suit the local supply arrangements can be fitted to the free end, observing the colour code which is:-

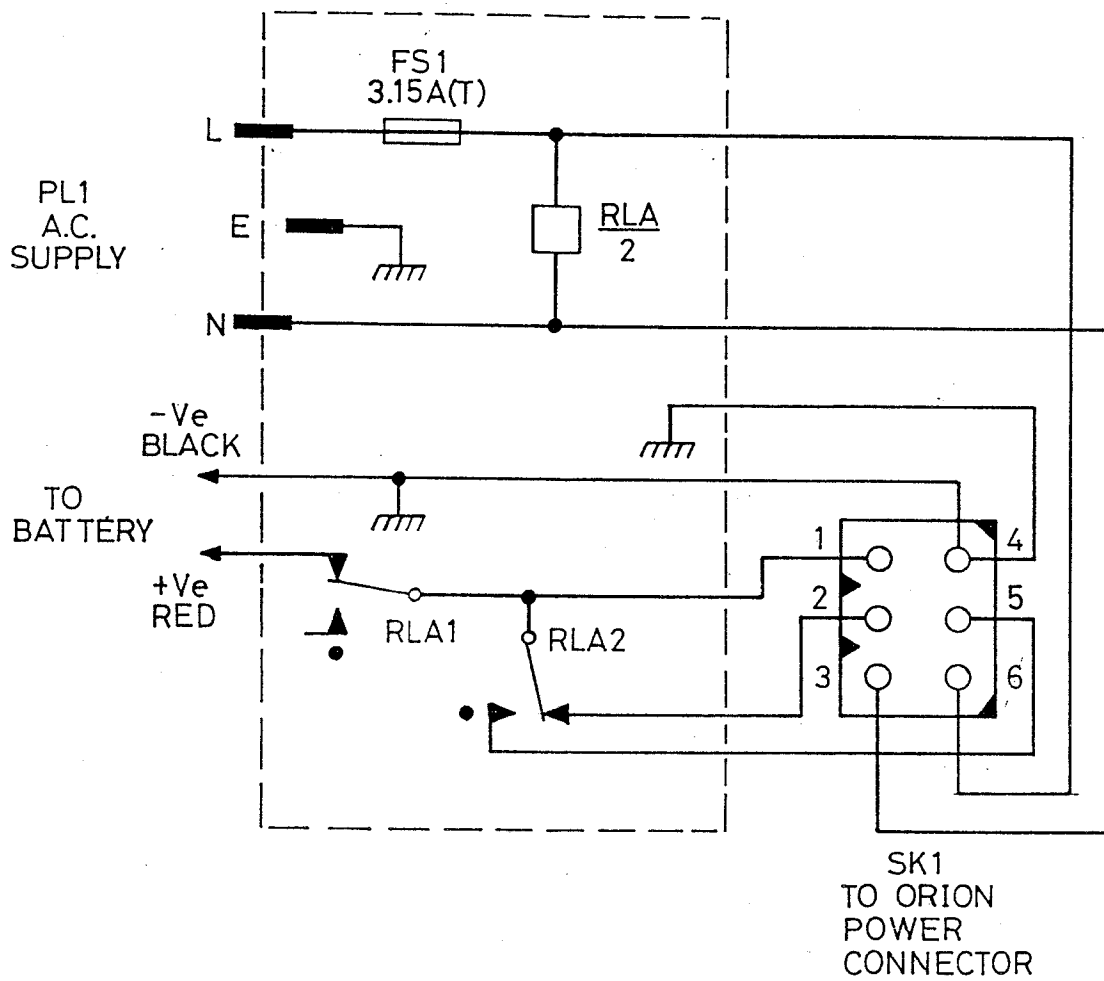
LINE	-	BROWN
NEUTRAL	-	BLUE
EARTH	-	GREEN/YELLOW

If a 13A (BS1363) Fused Plug is used for connection to the supply output, the plug must be protected by a 5A FUSE. If another type of plug is used, a fuse of the appropriate rating must be fitted either in the plug, or the adapter, or at the distribution board.

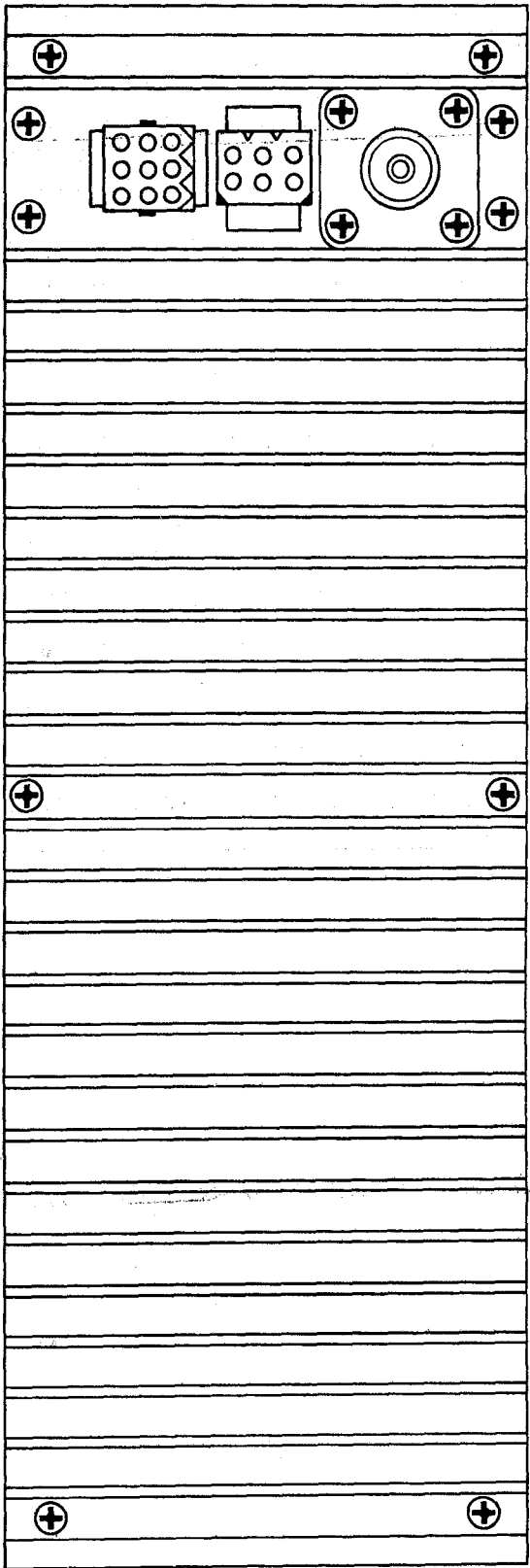
The A.C. connector on the S1799 is a standard I.E.C. connector. A captive lead is supplied for connection to the ORION.

Connection to the battery is by the red and black leads from the S1799 unit. CORRECT POLARITY MUST BE OBSERVED.

RED	-	POSITIVE
BLACK	-	NEGATIVE

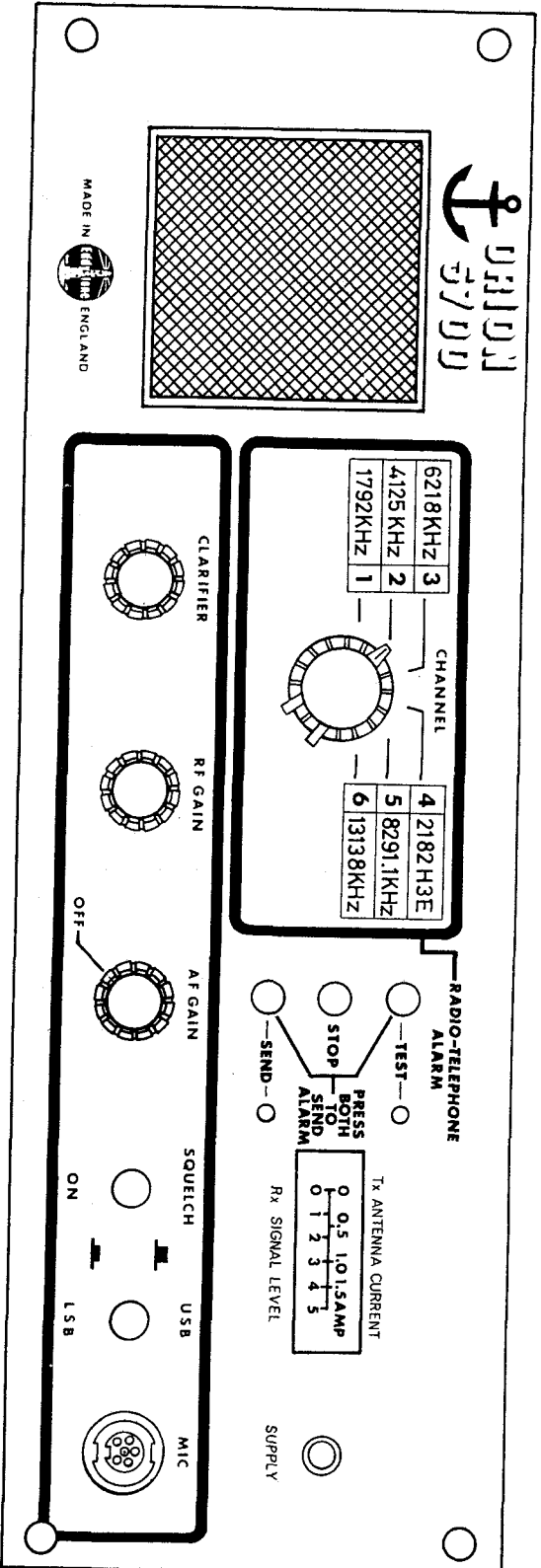


S1799 Circuit Diagram



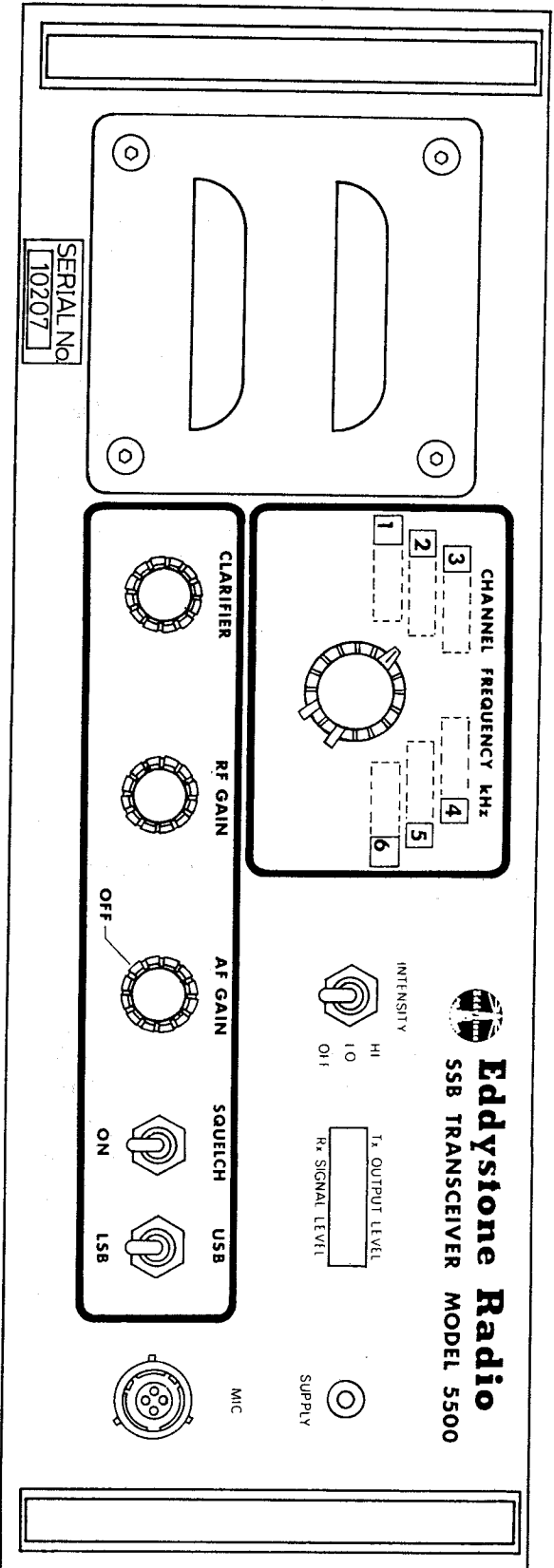
ORION 5000 REAR PANEL LAYOUT

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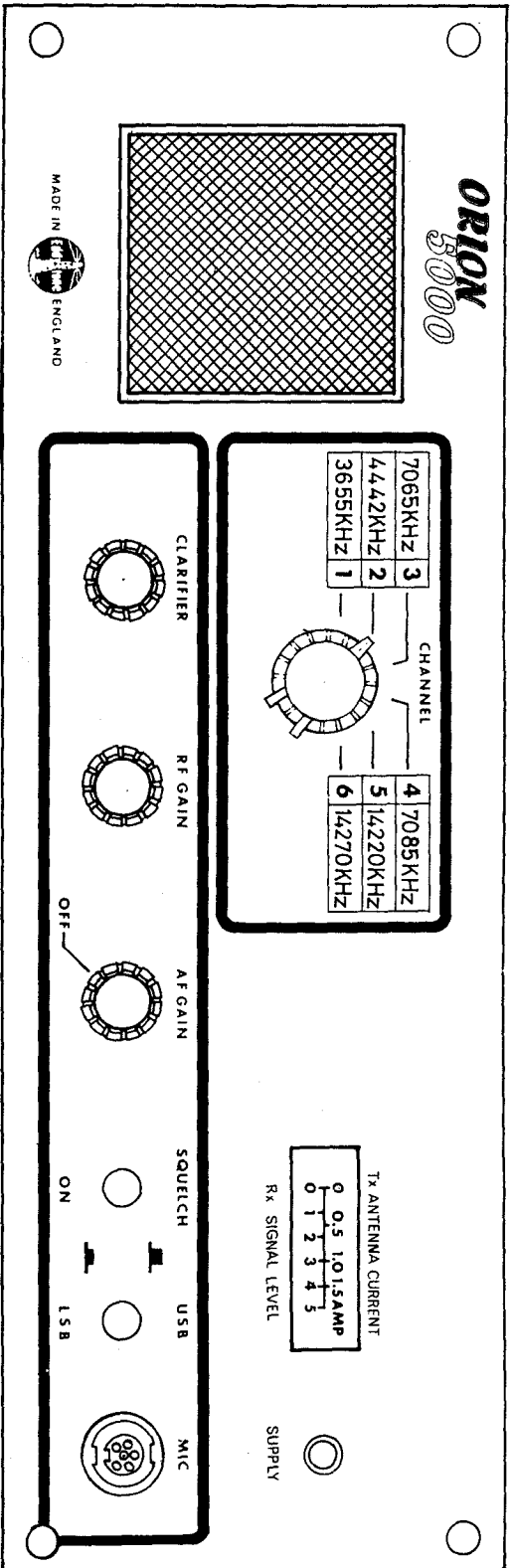
ORION 5700 FRONT PANEL LAYOUT

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5500 FRONT PANEL LAYOUT

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ORION 5000 FRONT PANEL LAYOUT

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