PARK AIR ELECTRONICS

OPERATOR'S HANDBOOK

3000 SERIES

TRANSMITTERS/RECEIVERS

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PAE Part Number: 31-33030000

AMENDMENT RECORD

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CONTENTS

RELATED/ASSOCIATED PUBLICATIONS

Reference should be made to the Related/Associated Publications family tree in AP 215H–3700–13A

WARNINGS

HAZARDOUS SUBSTANCES

1 Before using any hazardous substance or material, the user must be conversant with the safety precautions and first aid instructions:

1.1 On the label of the container it was supplied in.

1.2 On the material Safety Data Sheet.

1.3 In local Safety Orders and Regulations.

WARNINGS AND PRECAUTIONS

2 Observe all warnings and precautions displayed within the equipment units, and highlighted within the various categories of the equipment handbook.

WARNINGS

1 BERYLLIUM OXIDE. BERYLLIUM OXIDE IS TOXIC. REFER TO JSP(F)395, CATALOGUE OF HAZARDOUS STORES.

2 CERTAIN ELECTRONIC COMPONENTS MAY USE BERYLLIUM AS AN INSULATOR OR THERMAL CONDUCTOR. IN NORMAL USE OR HANDLING, NO HAZARD EXISTS AND NO SPECIAL PRECAUTIONS ARE NECESSARY, BUT AS A PRECAUTIONARY MEASURE COMPONENTS SHOULD NOT BE BROKEN UP AND, IN PARTICULAR, THE OUTER ENVELOPES OF SEMICONDUCTOR DEVICES SHOULD NOT BE OPENED. BERYLLIUM OXIDE IS HAZARDOUS IF:

2.1 BERYLLIUM MATERIALS ARE ABSORBED INTO THE BODY TISSUES THROUGH THE SKIN, MOUTH OR WOUND.

2.2 THE DUST CREATED BY THE BREAKAGE OF A BERYLLIUM COMPONENT IS INHALED.

3 FLUORELASTOMERS. COMPONENTS MADE FROM FLUORELASTOMERS (EG VITON, FLUOREL, TECMOFLON) ARE USED IN THIS EQUIPMENT AND CABLING EG FOR HEATSHRINK AND FLEXIBLE CONDUITS.

3.1 THESE MATERIALS ARE SAFE UNDER NORMAL TEMPERATURES AND CONDITIONS.

3.2 WHEN HEATED EXCESSIVELY (GREATER THAN 200 °C) HYDROFLUORIC ACID FUMES ARE RELEASED, THESE FUMES ARE HIGHLY CORROSIVE AND DANGEROUS TO PERSONNEL. REFER TO AP 100B–10 LEAFLET S.2602.

3.3 PERSONNEL MAY BE AFFECTED BY HYDROFLUORIC ACID WITHOUT BEING AWARE OF CONTAMINATION. ANYONE INVOLVED IN AN INCIDENT MUST BE TREATED IN ACCORDANCE WITH LOCAL INSTRUCTIONS.

3.4 IN THE EVENT OF EQUIPMENT CONTAMINATION, LOCAL PROCEDURES FOR DECONTAMINATION MUST BE FOLLOWED.

3.5 GREAT CARE MUST BE TAKEN WHEN USING SOLDERING IRONS, HOT AIR BLOWERS OR ANY OTHER SOURCE OF HEAT NEAR FLUORELASTOMERS.

3.6 DO NOT SMOKE WHEN WORKING WITH OR NEAR FLUORELASTOMERS.

4 FIRE. IN THE EVENT OF AN ANTENNA AND PALLET ASSEMBLY FIRE, OPERATE THE EMERGENCY OFF BUTTON ON THE TOP OF THE LOCAL CONTROL UNIT (AT THE END OF THE PALLET ASSEMBLY) TO SWITCH OFF. IF IT IS NOT POSSIBLE TO APPROACH THE ANTENNA, THE EMERGENCY OFF BUTTON ON THE END–FRAME OF THE RMC CABIN CAN BE USED TO SWITCH OFF. FOR ISOLATION PURPOSES SWITCH OFF CIRCUIT BREAKER CB13 IN THE RMC AC DISTRIBUTION UNIT.

5 IN THE RMC, OPERATE THE EMERGENCY OFF BUTTON ON THE FRONT OF THE CABIN AC DISTRIBUTION UNIT TO SWITCH OFF THE RADAR SYSTEM. FOR ISOLATION PURPOSES SWITCH OFF MAIN CIRCUIT BREAKER CB1 AND UPS OUTPUT CIRCUIT BREAKER CB18.

6 TO ISOLATE THE TRANSMITTER COMPLETELY IT IS NECESSARY TO SWITCH OFF THE FOLLOWING CIRCUIT BREAKERS AT THE AC DISTRIBUTION RACK:

CB29	TRANSMITTER 440 V
CB24	TRANSMITTER CONTROL
CB34, 35 AND 36	TRANSMITTER FANS

CIRCUIT BREAKERS CB34, 35 AND 36 ARE PUSH BUTTON DEVICES MOUNTED ON THE ANCILLARIES PANEL ON THE BACK WALL OF THE AC DISTRIBUTION RACK. EXTREME CAUTION MUST BE TAKEN WHEN OPENING THE AC DISTRIBUTION RACK TO ACCESS THESE DEVICES. REFER TO DEF. STAN. 61–15, PRECAUTIONS AGAINST ELECTRIC SHOCK IN MAINTENANCE AREAS. ALTERNATELY, CB9 CAN BE SWITCHED OFF AT THE AC DISTRIBUTION RACK, BUT IT SHOULD BE NOTED THAT THIS REMOVES THE FAN SUPPLIES FROM ALL OTHER RACKS.

7 NOTE THAT THIS DOES NOT ISOLATE THE UPS BATTERY, UPS INVERTER OR UPS OUTPUT SUPPLY CABLES. TO ISOLATE THE UPS INVERTER AND UPS OUTPUT SUPPLY CABLES, THE UPS BATTERY ISOLATOR MUST ALSO BE SWITCHED OFF.

8 HIGH CURRENT. THE DC POWER SUPPLIES WITHIN THE EQUIPMENT UNITS ARE OF A HIGH CURRENT CAPACITY. CARE MUST BE TAKEN NOT TO SHORT CIRCUIT ANY POWER SUPPLY AS THE ASSEMBLY WIRING COULD BE DAMAGED, AND A FIRE MAY RESULT.

9 X–RAY HAZARD. THIS EQUIPMENT CAN EMIT X–RAY RADIATION. CHECK FOR X–RAY RADIATION LEAKS MUST BE MADE AT REGULAR INTERVALS. REFER TO JSP392.

10 RADIO FREQUENCY HAZARD. RF RADIATION IS A HEALTH HAZARD. WHILE THE LEVEL OF POWER BEYOND 4 METRES FROM THE ANTENNA IS WITHIN NATIONALLY ACCEPTED SAFETY LEVELS (REFER TO THE SYSTEM HANDBOOK FOR DETAILS), PERSONNEL SHOULD NOT STAND OR LINGER IN THE VICINITY OF THE ROTATING ANTENNA. (NOTE THAT AN INTERLOCK PREVENTS TRANSMISSION IN THE MAIN EQUIPMENT WHEN THE ANTENNA IS STATIONARY, BUT NOT THE IFF EQUIPMENT). DO NOT CLIMB ONTO CABIN ROOFS WHILE THE TRANSMITTER IS OPERATING.

11 ACCESS TO THE DWC CABIN ROOF SHOULD BE DENIED WHILE THE RADIO EQUIPMENT IS OPERATING.

12 RADIATION HAZARD. PRE–TR CELLS IN THE WAVEGUIDE ASSEMBLIES CONTAIN RADIO–ACTIVE TRITIUM. THE UNITS ARE SAFE UNLESS AN INTERNAL GLASS CONTAINER IS DAMAGED OR BROKEN. DAMAGED ITEMS MUST BE HANDLED AND DISPOSED OF USING LOCAL INSTRUCTIONS FOR RADIO ACTIVE MATERIAL.

13 INFRA–RED RADIATION. INFRA–RED RADIATION IS EMITTED WHEN THE FIBRE OPTIC CABLE BETWEEN THE DISPLAY INTERFACE AND THE SIGNAL PROCESSOR IS DISCONNECTED WITH POWER APPLIED TO THE DATA LINK.

14 LETHAL VOLTAGES. EQUIPMENTS IN OPERATIONAL USE CARRY LETHAL VOLTAGES. OPERATIONS INVOLVING THE REMOVAL OF COVERS/PANELS SHOULD ONLY BE UNDERTAKEN BY PERSONNEL AWARE OF THE HAZARDS INVOLVED. REFER TO DEF. STAN. 61–15, PRECAUTIONS AGAINST ELECTRIC SHOCK IN MAINTENANCE AREAS.

14.1 THE ANTENNA AND PALLET ASSEMBLY IS SUPPLIED WITH 440 V 3–PHASE SUPPLIES FROM THE RADAR MANAGEMENT CABIN. WHENEVER POSSIBLE, SWITCH OFF THE MAINS SUPPLIES TO ALL ANTENNA AND PALLET ASSEMBLY EQUIPMENTS AT THE RMC AC DISTRIBUTION CUBICLE BEFORE OPENING OR REMOVING ANY PANELS ON THE ASSEMBLY.

14.2 DANGEROUS VOLTAGES (UP TO 50 KV) EXIST WITHIN THE TRANSMITTER EQUIPMENT IN THE RMC.

15 CIRCUIT BREAKER LOCKS. WHENEVER POSSIBLE, WHILE WORKING ON EQUIPMENT REMOTE FROM THE CIRCUIT BREAKER(S) CONTROLLING IT, LOCK THE CIRCUIT BREAKERS IN THE OFF POSITION USING THE PADLOCKS PROVIDED.

16 FLUID SPILLAGE. ANY HYDRAULIC OIL, LUBRICATING OIL OR COOLANT SPILLAGE MUST BE WIPED UP IMMEDIATELY.

17 HIGH TEMPERATURE. THE TOP OF THE TRAVELLING WAVE TUBE REACHES TEMPERATURES OF UP TO 200°C. REFER TO THE WARNING LABEL ATTACHED LOCALLY.

18 CASTELLATED LOCKING KEY. WHENEVER SERVICING IS CARRIED OUT ON THE ANTENNA, ENSURE THAT THE TURNING LOCK CASTEL SAFETY KEY IS REMOVED FROM THE AC DISTRIBUTION UNIT IN THE RADAR MANAGEMENT CABIN (RMC), AND IS IN THE POSSESSION OF THE PERSONNEL OPERATING THE ANTENNA.

19 STAINLESS STEEL CABLE MARKERS. SOME CABLES USED ON THIS SYSTEM HAVE STAINLESS STEEL MARKERS. THESE MAY HAVE SHARP EDGES WHICH COULD CAUSE CUTS. IT IS THEREFORE ADVISABLE TO WEAR PROTECTIVE GLOVES WHEN HANDLING SUCH CABLES.

20 NOISE. NOISE LEVELS ARE HIGH WITHIN THE GENERATOR CABINS WHEN THE GENERATORS ARE IN USE. PERSONNEL WORKING WITHIN AN IN–USE CABIN MUST WEAR EAR DEFENDERS.

21 LITHIUM BATTERIES. THE UHF/VHF EQUIPMENTS CONTAIN LITHIUM BATTERIES. THESE ARE SAFE DURING NORMAL USE, BUT PRESENT A DANGER OF EXPLOSION IF INCORRECTLY CONNECTED OR CHARGED. THE BATTERIES MUST NOT BE PUNCTURED, PIERCED OR INCINERATED.

22 ANTENNA STABILITY. PARTICULAR NOTE SHOULD BE TAKEN OF ANY PRECAUTION NECESSARY TO ENSURE ANTENNA STABILITY DURING DEPLOYMENT AND OPERATION.

23 ELECTRICAL STORMS. WORK ON THE ANTENNA DURING ELECTRICAL STORMS OR POTENTIAL LIGHTNING STRIKE SITUATIONS SHOULD BE AVOIDED, AS IT PRESENTS A PERSONNEL SAFETY HAZARD. THE CONVOY COMMANDER MUST MAKE THE FINAL DECISION ON ANY SUCH OPERATION.

CAUTIONS

STATIC SENSITIVE DEVICES (SSD)

Some semiconductor devices are susceptible to damage if subjected to static electrical charges.

The assemblies and pec incorporating semiconductor devices that are susceptible to damage if subjected to static electrical charges are fitted with a yellow warning label. To avoid possible damage to these devices observe the following precautions:

(1) Store SSD or any pec incorporating them in conductive wrappers.

(2) Except when fitted in the equipment keep SSD leads or pins shorted together or in contact with conductive material.

(3) Keep the pec edge connector covered by a shorting strip until immediately before use. Replace the shorting strip immediately after removing the pec from the equipment. Do not handle the edge connector contacts.

(4) Switch off power supplies before inserting or removing SSD or pec. Do not apply input signals to the SSD with the power off.

(5) Take care that test voltages applied to the pec are of the correct polarity and do not exceed the recommended SSD supply voltage.

(6) Connect soldering iron tips, tools and handling devices to ground. Use only low voltage soldering irons.

(7) It is recommended that work bench tops, stools etc. should be covered with grounded conducting material and that operatives should wear skin contact wrist straps with a ground leakage resistance between 100 k and 1 M ohms.

MODIFICATION RECORD

The following record confirms that this publication incorporates all technical changes necessitated by the modifications listed below. Information on modification titles, classification categories and Mark applicabilities is given Category 8.

Mod. No.

ISSUE 4/DEC. 94
To Amendment 1

OPERATOR'S HANDBOOK

3000 SERIES

TRANSMITTERS/RECEIVERS

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DECEMBER 1994

PART NO: 31-33030000

WARNINGS

LETHAL VOLTAGES

Equipments in operational use contain lethal voltages and operations involving the removal of covers or panels should only be undertaken by skilled personnel who are aware of the hazards involved. This equipment must be earthed.

BERYLLIUM/BERYLLIA

The equipment covered by this Handbook contains components incorporating the highly toxic material Beryllium and/or its oxide Beryllia. These materials are especially hazardous if:

1 Beryllium materials are absorbed into the body tissues through the skin, mouth or wound.

2 The dust created by breakage of Beryllia is inhaled.

3 Toxic fumes are inhaled from Beryllia/Beryllium involved in a fire.

LITHIUM BATTERIES

This equipment contains lithium batteries. These batteries present a danger of explosion if incorrectly connected or charged. Batteries must be disposed of in accordance with current regulations. Lithium batteries must not be punctured, pierced or incinerated.

RADIATION

The antenna used with this equipment must be installed such that the resultant radiated field strength is below 10 W/m^2 in areas normally accessible to personnel.

CAUTION

ESDs

The equipment covered by this Handbook contains electrostatic sensitive devices (ESDs). Observe handling precautions to avoid static charges which may damage these devices.

AMENDMENT RECORD

Amdt.	Incorporated By	Date	Brief Details	ECN
1	PAE	Dec. 95	Preface pages reformatted	-

CONTENTS

Preliminary Pages

MODIFICATION RECORD

Refer to the modification plate attached to the equipment to identify the appropriate modifications.

MOD No.	Details	Date

GLOSSARY OF TERMS

The words used in this manual have the first spelling and meaning given in the Concise Oxford Dictionary except for the following:

WARNING	A warning is used to denote a danger to personnel of injury or death.
CAUTION	A caution is used to denote a possibility of damage to equipment or material.
Note	A note is advice and is used to convey, or draw attention to, information that is extraneous to the immediate subject of the text.
Lethal voltages	A voltage exceeding 30 V (rms) or 50 V (peak) ac; or 50 V dc
Inspect	Measure, examine, test, gauge or otherwise compare the item with the applicable requirements.
Check	Make a comparison against a specified standard.
Ensure	Make certain that the specified conditions are correct, and if necessary take action to achieve the specified conditions.
Test	Ascertain, by using the appropriate test equipment, that a component or system functions correctly.
Examine	Undertake a comprehensive scrutiny, supplemented by measurement and physical testing, to determine the condition of the item. For example the condition of an item can be impaired by one or more of the following: (1) Insecurity of attachment. (2) Corrosion, contamination or deterioration. (3) Loose or missing rivets, bolts, screws, nuts, etc. (4) Faulty or broken locking devices. (5) External damage. (6) Faulty or broken audio/visual indicating devices.
Fit	Correctly attach one item to another.
Refit	Fit an item which has been previously removed.
Disconnect	Uncouple or detach cables, plugs or connections.
Reconnect	Recouple or reattach cables, plugs or connections previously disconnected.
Remove	Correctly disconnect and detach the item from its mounting or position.
Replace	Remove an item and fit a new or serviceable item.
Function	Check, as far as can be determined without the use of test equipment or reference to measurements, that the item or system is serviceable and operates correctly.

Paragraph

INTRODUCTION

1 This handbook describes the installation and operation of the Park Air Electronics (PAE) series 3000 transceivers, transmitters and receivers. The series comprises the following models:

- 3010 VHF transmitter/receiver (T/R)
- 3030 UHF transmitter/receiver (T/R)
- 3050 VHF/UHF transmitter/receiver (T/R)
- 3130 UHF transmitter
- 3150 VHF/UHF transmitter
- 3230 UHF receiver
- 3250 VHF/UHF receiver

2 The purpose of this handbook is to provide sufficient information to successfully install and operate the equipment. No topics covered in this book involve power being applied with any equipment covers removed. A full technical description, to component level, of each equipment is provided in an associated technical handbook. Details of how to order copies of the technical handbooks are given in section 5.

3 This handbook is divided into six sections. The sections cover the following topics:

- **Section 1.** Provides an overview of the equipments, and details the various installation options.
- **Section 2.** Brief technical specification of the equipment.

- **Section 3**. Provides installation and commissioning instructions for the equipments. It must be noted that the installation involves the connection of lethal voltages to the equipment. Installation must therefore be carried out only by suitably qualified personnel.
- **Section 4**. Describes the purpose of each equipment's controls, connectors and indicators. Also provided is an example setting-up procedure, operating instructions, and user maintenance procedures.
- **Section 5**. Lists the spare parts applicable to the topics covered in this handbook (each equipment's full parts-listing is contained in the associated technical handbook).
- **Section 6**. PAE drawings applicable to this handbook. The drawings are referenced in the text as Fig. 1, Fig. 2 etc. It should be noted that in-text illustrations are referenced by the section and figure numbers; for example, Fig. 3-1, Fig. 3-2 etc.

EQUIPMENT OVERVIEW

4 The series 3000 equipments operate in the VHF 108 to 156 MHz and UHF 225 to 400 MHz frequency band(s), with 25 kHz channel spacing. Standard operating modes are amplitude modulation (AM) or frequency modulation (FM) with both speech (narrow-band) and data (16 kBit cypher wide-band) bandwidths selectable. The equipment is suitable for use in voice encryption systems, and (3030 and 3050 TRs only) Link 11 applications.

5 The equipment's operating frequency is selected using the front panel's numeric data keys. Up to 99 preset channels can be stored in the equipment's memory. Each stored channel contains frequency and operating mode information. Preset channels can be recalled for operational use, or recalled for display without altering the operational frequency.

6 The transceiver and transmitter equipments produce a maximum output of 40 watts in AM mode and 60 watts in FM mode. The output power can be reduced by using a front panel control.

Built-in Test Equipment

7 A built-in test equipment (BITE) facility monitors essential parameters within the equipment, and displays an error message if a fault is found. The BITE functions in three different ways:

- It allows certain equipment parameters to be displayed only when selected by the user.
- It continuously performs certain test routines while the equipment is operating.
- It provides a complete check of the equipment when selected to do so by the user. During this operation, normal operation of the equipment is suspended.

8 Full details of BITE operation are provided in section 4.

TYPES OF INSTALLATION

9 The series 3000 equipments can be installed in one of four ways:

- Mounted on fixed runners within a standard 483 mm (19 inch) equipment rack.

- Fitted on telescopic slides within a standard 483 mm (19 inch) equipment rack.
- As a free-standing desk-top equipment using the PAE free-standing accessory kit.
- In mobile applications using the PAE free-standing accessory kit plus an anti-vibration mount kit.

Power Supplies

10 The equipments can be operated from standard ac input supplies, or from a low voltage dc supply (refer to section 2, specification). Both ac and dc input supplies can be simultaneously connected to the equipment. When ac and dc is connected, operation from the ac supply takes priority; automatic change-over to the dc supply will occur if the ac supply fails. On restoration of the ac supply, the equipment reverts to ac operation.

Control of Equipment

11 The equipment can be controlled in local, or remote modes. In local mode, control of the equipment is through the front panel controls and indicators as detailed in section 4. In addition to the front panel controls, a number of inputs, outputs and control facilities can be configured through the rear panel facilities socket. A full list of the facilities can be found in section 3.

12 As an alternative to local control a PAE series 3000EB Remote Control Unit (RCU) can be used; the 3000EB RCU replicates many of the equipment's front panel controls and indicators. The equipment's remote control decoder can be configured for operation through dc or ac (tone) circuits. When configured for dc operation, the RCU can be located (using suitable land lines) up to 1 km (1092 yards) from the equipment. When configured for ac operation, no dc path is required between the equipment and the RCU; this enables the control circuits to be routed, for example, through a microwave link.

13 For remote management of the T/R, when part of a communications system, the PAE Multi Access Remote Control (MARC) system can be used.

OPTIONS

14 The following options are available:

- **Option 1** - Guard receiver option (not 3130 and 3150 transmitters).
- **Option 2** - Single antenna port (3050 TR and 3150 transmitter only).
- **Option 3** - Link 11 antenna port configuration (3030 and 3050 T/Rs only).
- **Option 4** - External filter drive (parallel frequency data)
- **Option 5** - 100 to 163 MHz VHF frequency extension (3150 transmitter and 3010 and 3050 TRs only)
- **Option 6** - 2.5 kHz synthesiser

VHF/UHF Guard Receiver Option

15 The guard receiver continuously monitors the international VHF (121.5 MHz) or UHF (243 MHz) distress frequencies, depending on the transceiver or receiver operational frequency band during normal operation. When a distress signal is detected, the guard receiver's audio is automatically routed to the equipment's loudspeaker or headset.

Single Antenna Port

16 Provides a single combined VHF and UHF antenna port for use with a wideband antenna (3050 TR and 3150 transmitter only).

Note ...

This option is not suitable for Link 11 applications.

Link 11 Antenna Port Configuration

17 Provides independent UHF Tx and UHF Rx antenna ports which are necessary to accommodate the fast Tx/Rx switching required for Link 11 operation in the UHF band. In the 3050 TR a single combined VHF Tx/Rx antenna port is provided for general purpose VHF communications.

External Filter Drive (Parallel Frequency Data)

18 Provides BCD outputs representing the radio tune frequency for interfacing with auto-tune antenna filters etc. Connections via a 37 way D type rear panel connector.

100 to 163 MHz VHF Frequency Extension

19 Provides extension of the VHF operation frequency band to 100-163 MHz.

2.5 kHz Synthesiser

20 Provides 2.5 kHz frequency increment for offset carrier operation (3130 and 3150 transmitters only)

USER MAINTENANCE

21 User maintenance is limited to cleaning the rear panel air filter and checking the frequency accuracy of the equipment. The procedures for user maintenance are provided in section 4.

Paragraph

GENERAL

1 This section provides a brief specification for the Series 3060 equipments. The specification covers all models, therefore, users should only read those parts of the specification applicable to their equipment.

Frequency range	UHF - 225 to 399.975 MHz VHF - 108 to 155.975 MHz
Channel spacing	25 kHz
Preset channels	Up to 99
Classes of emission:	(a) Amplitude modulated speech (A3E) (b) Amplitude modulated data (AXX) (c) Frequency modulated speech (F3E) (d) Frequency modulated data (FXX)
Compatibility	Link 11 compatible (3030 and 3050 transceivers only)
Transceiver carrier output	AM: 40 W maximum FM: 60 W maximum
Transceiver sensitivity (for S+N:N of 10 dB)	A3E: ≤2μV (-101 dBm). M=0.3 with 1 kHz modulation F3E:≤1μV (-107 dBm). Deviation of 3.5 kHz with 1 kHz modulation AXX: ≤4μV (-95 dBm). M=0.6 measured in a 23 kHz bandwidth FXX: ≤4μV (-95 dBm). Deviation of 5.5 kHz measured in a 23 kHz bandwidth Note ... Sensitivity is reduced by 3 dB when the optional guard receiver is fitted.

INPUT SUPPLIES

2 The equipments will operate with the following input supplies:

ac supply	Between 198 and 264 V ac at 45 to 65 Hz or, Between 99 and 132 V ac at 45 to 65 Hz Note ... The correct transformer tap must be selected to suit the incoming ac supply (refer to section 3).

Typical ac power consumption:

3010, 3030 and 3050 T/Rs	Receive, 175 VA Transmit, 700 VA
3130 transmitter	700 VA
3150 transmitter	700 VA
3250 receiver	175 VA
3250 receiver	175 VA

Typical dc supply current:

3010, 3030 and 3050 T/Rs	Receive, 3 A Transmit, 18 A
3130 transmitter	18 A
3150 transmitter	18 A
3230 receiver	3 A
3250 receiver	3 A

DIMENSIONS AND WEIGHT

3 The dimensions, and weight of the equipments are:

Maximum width	430 mm (16.93 inches)
Maximum height	178 mm (7 inches)
Maximum depth	543 mm (21.38 inches)
Maximum weight	32 kg (70.6 lb)

ENVIRONMENTAL

4 The temperature range of the equipments are:

Operating ambient temperature range	-20°C to +55°C (-4 to +131°F)
Storage temperature range	-40°C to +70°C (-40 to +158°F)

REMOTE CONTROL DECODER

5 The equipment is fitted with an internal remote control module which may be configured for operation over dc or ac circuits. The specification of the decoder is:

dc connected circuits	Audio circuits: 4-wire (two-wire for transmitter audio, two-wire for receiver audio, connected when applicable) 600 ohms nominal balanced transformer. Level adjustable -20 dBm to +10 dBm. Operable up to a distance of 2 km PTT: via separate contact closure or phantom audio circuit link (transceiver and transmitter equipments only) Data circuits: 4-wire serial control interface, RS422 compatible
ac connected circuits	Audio circuits: 4-wire (two-wire for transmitter audio, two-wire for receiver audio, connected when applicable) 600 ohms nominal balanced transformer. Level fixed at -13 dBm, automatic gain adjustment for line losses up to 17 dB PTT: via 2930 Hz tone on audio circuit Data circuits: 4-wire 600 ohms nominal serial control interface, CCITT V23 compatible (internal modem)
Link 11 output	Wideband receiver audio is filtered in a 5th order Bessel low pass filter with a 5 kHz cut off frequency. An amplifier stage provides a nominal 600 ohm output, with the output level adjustable from -30 dBm to +10 dBm for 20 kHz deviation at 1 kHz

GUARD RECEIVER OPTION

6 The transceiver and receiver equipment's optional guard receiver operates as follows:

Mode	AM speech (A3E) only
Frequency	121.5 MHz only (VHF equipments only) 243 MHz only (UHF equipments only) 121.5 MHz and 243 MHz (VHF/UHF equipments only) Note ... In the VHF/UHF T/Rs and receivers the guard receiver frequency depends on selected frequency band of main receiver.

Paragraph

Table Page

Figure Page

INTRODUCTION

WARNING ...

INSTALLATION AND COMMISSIONING INVOLVES THE CONNECTION OF LETHAL VOLTAGES. THE INSTRUCTIONS DETAILED IN THIS SECTION MUST BE CARRIED OUT ONLY BY SUITABLY QUALIFIED PERSONNEL.

1 This section details the installation and commissioning instructions for the series 3000 transmitters and receivers. It is recommended that on receipt of the equipment from PAE, all instructions in this section be carried out in the order presented.

INSTALLATION

PRELIMINARY CHECKS

2 Carefully remove the transit packaging and carry out a visual inspection of the equipment. If any transit damage has occurred, contact PAE for advice. If a claim for damage is to be made, the transit packaging and/or containers should be retained.

MECHANICAL INSTALLATION

3 The equipments can be installed in one of the following ways:

- On fixed runners within a standard 483 mm (19 inch) equipment rack.
- On telescopic slides within a standard 483 mm (19 inch) equipment rack.
- As a desk-top equipment by using the PAE free-standing accessory kit.
- In mobile applications by using the PAE free-standing accessory kit plus an anti-vibration mount accessory kit.

CAUTION ...

It is essential that the chosen mechanical installation provides adequate support along the depth (front to rear) of the unit. The unit is not designed to be supported by the front panel; doing so can cause irreparable damage.

Rack Mounted Installation

4 The equipment can be fitted in a standard 483 mm (19 inch) equipment rack, either on fixed runners, or on telescopic slides. Installation must be in accordance with instructions relating to the rack or cabinet in use.

Fixed Runner

5 If using fixed runners, they must provide adequate support along the depth (front to rear), at both sides of the unit. The unit is secured to the rack through the four front panel fixing holes using suitable hardware. The front panel fixing holes must not be used at any time to support the equipment.

Telescopic Slides

6 If using telescopic slides, reference should be made to Fig. 5. Four M4 tapped holes, each 10 mm deep, are provided each side of the equipment for the fitting of the runners. Dependent on the rack/slide combination used, it may be necessary to fit a spacer bar between the runner and the equipment. The width of the spacer must be such that the runners locate correctly within the slide assemblies.

Note ...

Details of suitable telescopic slides are available from PAE.

Desk-top Installation

7 The following instructions configure the equipment for desk-top operation using a free-standing accessory kit (PAE part number 70-3000TR1). Referring to Fig. 6, identify the free-standing kit's components, then complete the following steps:

(a) At the front of the equipment locate and remove the 4 securing screws from the left and right rack mounting brackets. Separate the handles from the brackets by removing the two securing screws. Retain the handles.

(b) Attach the handles, removed in step (a), to the left handle plate (item 3) and the right hand plate (item 2) using the 4 (two per handle) M5 x 16 mm caphead screws (item 10). Secure the handle plates to the unit using the 8 (4 per plate) M4 x 16 mm panhead screws (item 9) and M4 crinkle washers (item 14).

(c) At the rear of the equipment locate and remove the 11 rear panel assembly retaining screws (item A) and carefully lower the rear panel assembly.

(d) On the left and right hand sides of the psu compartment, locate the 4 symmetrically placed holes (note that the two rearmost holes are countersunk). Fit the 8 hexagonal M3 x 12 mm spacers (item 4) to the sides using the 4 M3 x 6 mm panhead screws (item 11), 4 M3 x 6 mm countersunk screws (item 8) and 8 M4 crinkle washers (item 14).

(e) Raise and secure the rear panel assembly with the 11 retaining screws (item A) removed in step (c).

(f) Fit the 2 side covers (item 7) to the hexagonal spacers using the M3 x 6 mm countersunk screws (item 8).

(g) Fit the top cover support bracket (item 5) to the rear panel above the filter using the 2 M4 x 6 mm panhead screws (item 12) and crinkle washers (item 14).

(h) Fit the top cover (item 6) using the M3 x 6 mm countersunk screws (item 8).

(i) On the underside of the equipment locate the 4 front and rear M4 countersunk crosshead screws that secure the base plate. Remove the two outer screws from both the front and rear locations and fit the feet (item 15).

Mobile Installation

8 The following instructions configure the equipment for mobile operation using a free-standing accessory kit (PAE part number 70-3000TR1) and an anti-vibration mount accessory kit (PAE part number 70-3000TR2). Before the anti-vibration mounts can be fitted, the equipment must have the free-standing accessory kit fitted (refer to previous paragraphs detailing desk-top installation).

9 Referring to Fig. 7, identify the anti-vibration mount accessory kit components, then complete the following steps:

(a) Ensure that the free-standing accessory kit is fitted as detailed in the desk-top installation procedures.

(b) Fit the front location plate (item 2) to the bottom of the handle blocks of the equipment using four M4 x 8 mm csk screws (item 11). The return should be at the front of the equipment and projecting downwards.

(c) Before fitting the rear location plate (item 5) it is necessary to remove two screws from the equipment's bottom cover as detailed in Fig. 7 (note 3). Fit the rear location plate (item 5) to the bottom of the equipment using six M4 x 8 mm csk screws (item 11), ensure that the return projects upwards.

(d) Fit the four shock mounts (item 9) to the bottom rails (item 10) using 16 M5 x 10 mm csk screws, nuts and washers (item 4).

(e) Fit the shock mount tray (item 7) to the shock mounts using the four M6 x 20 mm hexagonal headed screws (item 8).

(f) Using the dimensions detailed on Fig. 7, select a suitable position on the vehicle and mark out the centres for the fixing holes. Prior to drilling the fixing holes, position the assembled shock mount tray and ensure that there is sufficient clearance for the equipment when fitted (allowing for rear panel connectors).

Note ...

The mounting holes can be drilled and tapped M6 and the tray fitted with 16 M6 x 20 mm hexagonal headed screws (item 12), or drilled out to 6.5 mm and the tray fitted using the hexagonal headed screws (item 12), nuts and washers (item 13).

(g) Fit the anti-vibration mount assembly into the vehicle and secure.

(h) Attach the two guide pin bushes (item 6) to the equipment mounted rear location plate (item 5).

(i) Attach the two locating guide pins (item 6), facing forward, to the shock mount tray rear rail (item 7).

(j) Carefully position the equipment onto the shock mount tray. Slide the unit rearward and ensure that the guide pins and guide pin bushes are securely located. Secure the equipment to the tray using the three knurled screws (item 3) located on the front location plate (item 2).

EXTERNAL CONNECTIONS

10 The following external connections must be made to the equipment (dependent on how the equipment is to be operated):

(a) ac and/or dc input supplies.

(b) Facilities connections (as required).

(c) Remote control (if the remote control facility is to be used).

(d) Antenna.

Note ...

The equipment operates from either an ac or dc supply. When both ac and dc are connected, operation from the ac supply takes priority; automatic change-over to the dc supply will occur if the ac supply fails. On restoration of the ac supply, the equipment reverts to ac operation.

AC Voltage Selection

11 The equipment can operate with an ac input supply of 110/120 V, or 220/240 V (refer to section 2 - specification). The mains voltage selector fitted to the equipment's rear panel (refer to Fig. 1, 2, or 3) must be set to correspond to the local ac voltage. If the selector's current setting is incorrect, refer to Fig. 3-1 and complete the following steps:

(a) Remove the mains selector cover plate.

(b) Set the two switches as detailed in Fig. 3-1.

(c) Refit the cover plate ensuring the voltage displayed in the plate's cut-out agrees with the required switch setting.

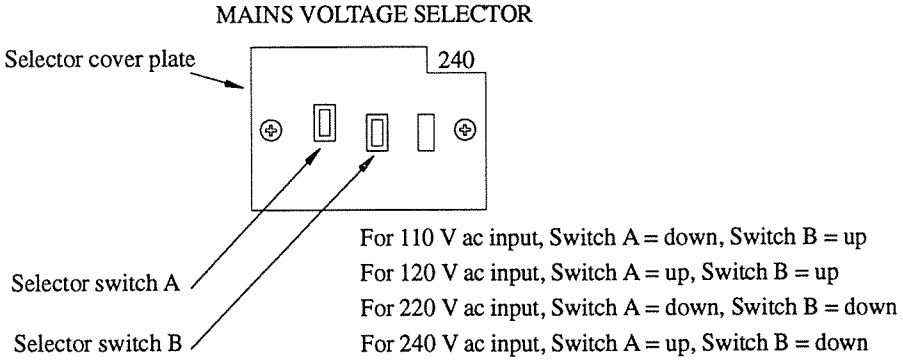


Fig. 3-1 Mains voltage selector cover plate

Supply Fuses

12 Three fuses are fitted to the equipment's rear panel:

- The ac input supply fuse (fitted in the ac input connector).
- The dc input supply fuse.
- The dc equipment fuse.

13 Noting that different value ac input supply fuses are fitted dependent on the local ac supply, ensure that the fuses conform to the values detailed in TABLE 3-1.

TABLE 3-1 REAR PANEL FUSE RATINGS

Fuse (1)	Rating (2)	Size (3)	PAE stock number (4)
Fuse 1 (110/120 V ac)	7 A - T8A 250 V IEC	20 mm	29-01210102
Fuse 1 (220/240 V ac)	3.5 A - T4A 250 V IEC	20 mm	29-01120102
Fuse 2	20 A - F20A 32 V BS	Size 0 (1¼ in.)	29-01450201
Fuse 3	4 A - F4A 250 V IEC	20 mm	29-01120101

AC Supply Connection

WARNING ...

THIS EQUIPMENT MUST BE EARTHED.

14 The AC SUPPLY connector (with integral fuse) is fitted to the equipment's rear panel as shown in Fig. 1. The minimum rating of the ac supply cable is: 3-core (to IEC 227) rated 250 V ac at 8 amps, and having a minimum cross sectional area of 1.0 mm^2 per core. PAE recommends the use of polyvinyl chloride (PVC) cable. The cable must be fitted with an IEC approved equipment connector (PAE part number 20-02030102), and conform to the following specification:

(a) If PVC insulated, be not lighter than ordinary polyvinyl chloride sheathed flexible cord according to IEC publication 227 (designation H05 VV-F, or H05 VVH2-F).

(b) If rubber insulated, be of synthetic rubber and not lighter than ordinary tough rubber-sheathed flexible cord according to IEC Publication 245: Rubber Insulated Cables of Rated Voltages up to and including 450/750 V, (designation H05 RR-F).

15 The series 3000 transmitters/receivers are Class 1 equipments. The ac supply cable must have a green-and-yellow protective earthing conductor electrically connected to the protective earthing terminal of the equipment connector, and the mains plug. PAE recommends the ac supply cable is colour coded in accordance with the electrical appliance (colour code) regulations for the UK. That is:

Live: Brown
Neutral: Blue
Earth: Green-and-yellow

16 The cores of the power supply cable should be connected to the equipment connector provided, and your plug as follows:

(a) The core which is coloured green-and-yellow must be connected to the terminal in the plug which is marked with the letter E or by the earth symbol ⏚ or coloured green-and-yellow.

(b) The core which is coloured blue must be connected to the terminal which is marked with the letter N or coloured black.

(c) The core which is coloured brown must be connected to the terminal which is marked with the letter L or coloured red.

DC Supply Connection

17 The DC SUPPLY connector is fitted to the equipment's rear panel as shown in Fig. 1. The recommended minimum rating of the dc supply cable is: 2-core, having a cross sectional area of 1.5 mm^2 per core. The supply cable must be fitted with an XLR3 connector (PAE part number 20-01030106).

Facilities Connections

18 The facilities connector, fitted to the equipment's rear panel (refer to Fig. 1), provides a number of control and monitoring signals that can be configured by the user as required. The connector's pin-outs are detailed in TABLES 3-2 the signals are described in the following paragraphs.

TABLE 3-2 FACILITIES 2 CONNECTOR PIN-OUT FOR 3010, 3030 AND 3050 T/Rs

Pin (1)	Function (2)	Description (3)
1	Wideband output	600 ohm balanced output (-8 dBm adjustable)
2	Wideband output	600 ohm balanced output (-8 dBm adjustable)
3	Wideband input	600 ohm balanced input (-8 dBm adjustable)
4	Wideband input	600 ohm balanced input (-8 dBm adjustable)
5	Tape output	600 ohm single ended output combined Tx and Rx audio (-8 dBm nominal)
6	Guard mute relay contacts	Guard receiver mute relay } If guard receiver option is fitted
7	Guard mute relay contacts	Guard receiver mute relay
8	Guard line output	Guard receiver line output
9	Guard line output	Guard receiver line output
10	Rx encryption audio input	For decrypted audio processing
11	Rx encryption audio input	For decrypted audio processing
12	Mute state output	Active low TTL output
13	Antenna change-over	Control signal for external relay
14	Antenna change-over +20 V	Regulated dc output 100 mA maximum
15	Hardwire PTT	0 V Tx, Rx open-circuit
16	Tx encryption audio input	Audio input to transmitter } Not used on standard equipment
17	Tx encryption audio input	Audio input to transmitter
18	Encryption audio output	Balanced audio output 4 V p-p
19	Encryption audio output	Balanced audio output 4 V p-p
20	Unprocessed audio output	Receiver's unprocessed audio output
21	Unprocessed audio output	Receiver's unprocessed audio output
22	Link 11 output	Filtered wideband audio
23	Link 11 output	Filtered wideband audio
24	Bite output	Memory (fault) output. Active low TTL
25	0 V	Ground

TABLE 3-3 FACILITIES 2 CONNECTOR PIN-OUT FOR 3130 AND 3150 TRANSMITTERS

Pin (1)	Function (2)	Description (3)
3	Wideband input	600 ohm balanced output (-8 dBm adjustable)
4	Wideband input	600 ohm balanced output (-8 dBm adjustable)
5	Tape output	600 ohm single ended output (-8 dBm nominal)
14	Regulated +20 V	Regulated dc output 100 mA maximum
15	Hardwire PTT	0 V Tx, Rx open circuit
16	Tx encryption audio input	Audio input to transmitter } Not used on standard equipment
17	Tx encryption audio input	Audio input to transmitter
18	Tx encryption audio output	Audio output from transmitter
19	Tx encryption audio output	Audio output from transmitter
24	Bite output	Memory (fault) output. Active low TTL
25	0 V	Ground

TABLE 3-4 FACILITIES 2 CONNECTOR PIN-OUT FOR 3230 AND 3250 RECEIVERS

Pin (1)	Function (2)	Description (3)
1	Wideband output	600 ohm balanced output (-8 dBm adjustable)
2	Wideband output	600 ohm balanced output (-8 dBm adjustable)
5	Tape output	600 ohm single ended output (-8 dBm nominal)
6	Guard mute relay contacts	Guard receiver mute relay } If guard receiver option is fitted
7	Guard mute relay contacts	Guard receiver mute relay
8	Guard line output	Guard receiver line output
9	Guard line output	Guard receiver line output
10	Rx encryption audio input	For decrypted audio processing } Not used on standard equipment
11	Rx encryption audio input	For decrypted audio processing
12	Mute state output	Active low TTL output
20	Unprocessed audio output	Receiver's unprocessed audio output
21	Unprocessed audio output	Receiver's unprocessed audio output
22	Link 11 output	Filtered wideband audio
23	Link 11 output	Filtered wideband audio
24	Bite output	Memory (fault) output. Active low TTL
25	0 V	Ground

Wideband Output

19 Pins 1 and 2 of the transceivers and receivers provide a 600 ohm balanced wideband data output. The output is factory set at -8 dBm, but can be adjusted in the range -20 to +3 dBm.

Wideband Input

20 Pins 3 and 4 of the transceivers and transmitters provide a 600 ohm balanced wideband data input. The input is factory set at -8 dBm, but can be adjusted in the range -20 to +3 dBm.

Tape Output

21 Pin 5 of all models provides a 600 ohm single-ended audio output for use with suitable tape recording equipment. The output contains both transmit and receive audio, and is factory set at the level of -8 dBm (nominal).

Guard Mute Relay Contacts

22 These relay contacts are available only on the transceivers and receivers when the guard receiver option is fitted. The normal condition between pins 6 and 7 is an open-circuit. When the guard receiver's mute threshold is exceeded, the relay contacts close to provide a short-circuit. The relay contacts are rated 125 V at 2 A.

Guard Line Output

23 The guard line output is available only on the transceivers and receivers when the guard receiver option is fitted to the equipment. The guard line output, available between pins 8 and 9, provides a 600 ohm balanced audio output from the guard receiver.

Rx Encryption Audio Input

24 Pins 10 and 11 of the transceivers and receivers provide an input to the receiver's audio filter circuits. These inputs are normally used to route the plain-language output from an external encryption unit, to the receiver's audio frequency stages. This facility is not available on standard equipments; advice should be sought from PAE if the facility is required.

Mute State Output

25 Pin 12 provides an active low TTL output when the receiver's mute threshold is exceeded. This output can be used to indicate when a signal is being received.

Antenna Change-over

26 Pins 13 and 14 of the transceivers provide the energizing signal and potential required to operate an external antenna change-over relay. Pin 13 is normally open circuit, but will be at ground potential when the transmitter is keyed. Pin 14 provides a +20 V dc at 100 mA (maximum) supply for the change-over relay.

Regulated +20 V

27 Pin 14 provides a regulated +20 V dc at 100 mA (maximum) supply.

Hardwire PTT

28 Pin 15 of the transceivers and transmitters provide a connection for keying the transmitter from an external source (for example, a Link 11 modem). A ground potential on this connection will key the transmitter.

Tx Encryption Audio Input

29 Pins 16 and 17 of the transceivers and transmitters provide an audio input which can be used to route encrypted audio, from an external encryption unit, to the transmitter. This facility is not available on standard equipments; advice should be sought from PAE if the facility is required.

Tx Encryption Audio Output

30 Pins 18 and 19 of the transceivers provide an audio output (at a maximum level of 4 V peak-to-peak) from the transmitter's audio circuits, for routing to external decryption equipment. This facility is not available on standard equipments; advice should be sought from PAE if the facility is required.

Unprocessed Audio Output

31 Pins 20 and 21 of the transceivers and receivers provide an audio output from the receiver. The output is taken before the receiver's audio filters, and is intended to be used as the input for external encryption equipment.

Link 11 Output

32 Pins 22 and 23 of the transceivers and receivers provide a wideband receiver audio signal after being filtered by a 5th order low-pass filter with a 5 kHz cut off frequency. This output can be used for Link 11 processing.

BITE Output

33 Pin 24 is a memory fault output. The output provides a TTL low potential when the BITE detects a transmitter or receiver fault. This output can be configured as an equipment fault indicator.

Remote Control Connections

34 As an alternative to local operation, the equipment can be operated from a remote position by using a PAE 3000 Remote Control Unit (RCU). Connections to the RCU are made from the equipment's rear panel 9-way D-type Remote 1 connector. The pin-out of the connector is detailed in TABLE 3-5. When connecting to the Remote 1 connector, reference should also be made to the technical handbook supplied with the 3000 RCU.

TABLE 3-5 REMOTE 1 CONNECTOR PIN-OUT

Pin (1)	Function (2)
1	Transmit serial data (all models)
2	Transmit serial data (all models)
3	Receive serial data (all models)
4	Receive serial data (all models)
5	Receiver audio (transceiver and receiver models)
6	Receiver audio (transceiver and receiver models)
7	Transmitter audio and tone PTT (transceiver and receiver models)
8	Transmitter audio and tone PTT (transceiver and receiver models)
9	0 V connection (all models)

Microphone/Headset Connection

35 To operate the equipment in local mode (that is, from the front panel), a suitable microphone/headset, or headset is connected to the front panel's connector. The connector's location is shown in Figs. 1, 2 and 3; the pin-outs are detailed in TABLES 3-6, 3-7 and 3-8.

TABLE 3-6 TRANSCEIVER MIC/HEADSET CONNECTOR PIN-OUT

Pin (1)	Description (2)
1	Mic ground
2	Not used
3	PTT
4	Not used
5	Sidetone/Rx audio
6	Mic live
7	0 V

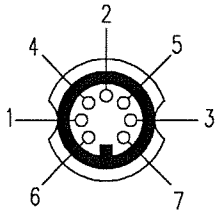


TABLE 3-7 TRANSMITTER MIC CONNECTOR PIN-OUT

Pin (1)	Description (2)
1	Mic ground
2	Not used
3	PTT
4	Not used
5	Sidetone
6	Mic live
7	0 V

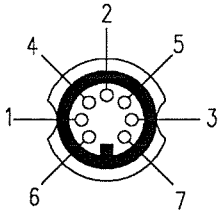
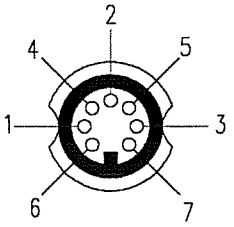


TABLE 3-8 RECEIVER HEADSET CONNECTOR PIN-OUT

Pin (1)	Description (2)
1	Not used
2	Not used
3	Not used
4	Not used
5	Rx audio
6	Not used
7	0 V



PRELIMINARY CHECKS

36 Prior to the application of ac and/or dc supplies, ensure that the front panel AC and DC SUPPLY switches are in their OFF positions (down). Carry out a physical check of the equipment verifying the following:

(a) All connections and connectors are secure.

(b) All cable assemblies are properly supported.

(c) No cable is trapped or kinked.

(d) The equipment is secured in its operational position.

(e) Tools used during installation have been removed.

(f) The impedance of the antenna feed cable is correct.

(g) The supply voltage selection and fuse ratings are correct.

37 At the equipment's front panel, press and hold the CE key, and set the AC SUPPLY switch to the on position (up). Confirm that the AC SUPPLY indicator above the switch is lit. This switching on procedure clears the equipment memory of any previously programmed or corrupted data.

38 The frequency display on the synthesiser front panel will read 305.000 and the band edges will be set to 108-155.975 and/or 225-399.975 MHz depending on model.

39 If applicable set the DC SUPPLY switch, located on the mainframe front panel, to the on position (up), and confirm that the DC SUPPLY indicator above the switch is lit. If the equipment is to be operated only from a dc supply, the equipment's memory will be cleared if the CE key is pressed when the DC SUPPLY switch is set to the on position.

AC AND DC CHANGE-OVER CHECK

40 If both ac and dc supplies are connected to the equipment, carry out the following change-over check:

(a) Confirm that both AC and DC supply indicators, located on the front panel, are lit.

(b) Isolate the equipment from the ac supply and confirm that the following conditions exist:

AC SUPPLY indicator is unlit.

DC SUPPLY indicator is lit.

Frequency display reads 305.000.

(c) Restore the ac supply, and confirm that both SUPPLY indicators are lit.

41 It should be noted that when both ac and dc supplies are present, the equipment operates from the ac supply.

BITE TEST

42 Perform an interruptive self-test routine. This test is initiated by pressing the TEST key. During the self-test routine, normal operation of the equipment is suspended, and the TEST indicator flashes.

43 At the start of the test, the fault memory is cleared and the MEM indicator is turned off. If a fault is found, the module and test point number is stored in the fault memory, and the MEM indicator turned on. The test routine then proceeds to the next module.

44 On completion of the test routine, one of the following status messages is shown on the MONITOR display:

(a) PASS - indicating system is fully operational.

(b) bitE - indicating one or more out of limit conditions exist.

(c) ANT - indicating high VSWR present at the transmitter's antenna connection (transceiver and transmitter only).

45 The BITE test routine can be terminated at any time by pressing the RSET or PTT key. Pressing either of these keys will immediately terminate the test and restore the equipment to normal operation. If the equipment displays PASS at the end of the test, proceed to the following paragraphs.

SETTING-UP AND FUNCTIONAL CHECKS

46 Set up the equipment for operational use following the setting-up procedures detailed in section 4 of this handbook.

47 Perform a functional check of the equipment by transmitting to, and monitoring the reception from, a known source. During test transmissions, the FWD key should be selected in order to monitor the equipment's output power. The maximum output power should be 40 watt for AM operation and 60 watt for FM.

INTRODUCTION

1 This section details the equipments' controls and indicators, and explains how to operate the equipment using the front panel controls.

2 As an alternative to operating the equipment using the front panel controls, a suitable Remote Control Unit (RCU) can be employed. Although the RCU replicates many of the equipment's front panel controls and indicators, reference should always be made to the operating instructions supplied with the RCU.

FRONT PANEL CONTROLS AND INDICATORS

FRONT PANEL LAYOUT

3 For the purposes of describing the controls and indicators, the front panels (see Figs. 1, 2, and 3) can be divided into four areas:

- Transmitter (Tx) controls and indicators (not fitted on receiver equipments).
- Receiver (Rx) controls and indicators (not fitted on transmitter equipments).
- Synthesiser controls and indicators.
- Mainframe controls and indicators.

Transmitter (Tx) Controls and Indicators

4 The transceiver and transmitter equipment's controls and indicators (see Fig. 4-1) comprise a SET PWR control, PTT switch and the four monitor switches LINE, FWD, RFL and MOD. It should be noted that only one monitor function can be selected at any one time; selecting a monitor function automatically cancels any previously selected monitor function. Selecting the same monitor function again cancels the selection.

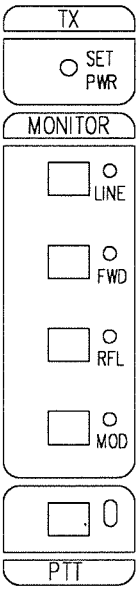


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Fig. 4-1 Transmitter Controls and Indicators

SET PWR

5 The maximum output power from the transmitter is 40 W (AM) or 60 W (FM). The set power control allows a reduction of output power between 0 and 10 dB.

PTT

6 A momentary action press-to-operate switch: When the switch is pressed, the transmitter becomes keyed, and the adjacent indicator lights.

LINE

7 Two-position push-to-select (push again to de-select) line monitor switch. When selected, the adjacent indicator is lit. When selected, and the transmitter is keyed, the front panel monitor display shows the transmitter's line input level (in dBm).

FWD

8 Two-position push-to-select (push again to de-select) forward power monitor switch. When selected, the adjacent indicator is lit. When selected, and the transmitter is keyed, the front panel monitor display shows the transmitter's forward output power (in watts).

RFL

9 Two-position push-to-select (push again to de-select) reflected power monitor switch. When selected, the adjacent indicator is lit. When selected, and the transmitter is keyed, the front panel monitor display shows the transmitter's reflected output power (in watts).

MOD

10 Two-position push-to-select (push again to de-select) modulation depth monitor switch. When selected, the adjacent indicator is lit. When selected, and the transmitter is keyed, the front panel monitor display shows the transmitter's modulation depth (as a % when AM is selected, or in kHz when FM is selected).

Receiver (Rx) Controls and Indicators

11 The transceiver and receiver equipment's controls and indicators (see Fig. 4-2) comprise a SET MUTE control, MUTE OPEN control, and the two monitor switches LINE and AGC. It should be noted that only one of the two monitor functions can be selected at any one time; the selected function must be switched off before the other function can be selected.

SET MUTE

12 The set mute control allows the receiver's mute threshold to be adjusted between a 6 dB and 16 dB signal-to-noise (S+N:N) ratio.

MUTE OPEN

13 Two-position push-to-select (push again to de-select) mute on/off switch. When in the off position, the adjacent OPEN indicator is lit, and the receiver's mute circuit is disabled. When the switch is in the on position, the OPEN indicator is unlit, and the mute circuit operates at the threshold determined by the SET MUTE control.

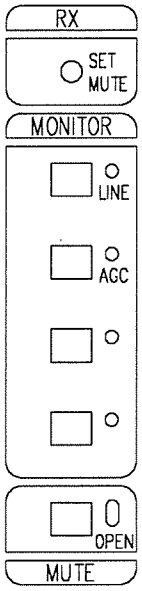

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Fig. 4-2 Receiver Controls and Indicators

LINE

14 Two-position push-to-select (push again to de-select) line monitor switch. When selected, the adjacent indicator is lit, and the front panel monitor display shows the receiver's line output level (in dBm).

AGC

15 Two-position push-to-select (push again to de-select) AGC monitor switch. When selected, the adjacent indicator is lit, and the front panel monitor display shows the receiver's automatic gain control (AGC) level (in volts).

Synthesiser Controls and Indicators

16 The synthesiser controls and indicators (see Fig. 4-3) comprise:

- A frequency and a channel display.
- A dual function keypad providing primary and secondary key functions. The keys allow frequencies and channels to be entered and stored in the equipment's memory, and provide for the selection of different display functions. Those keys that have both a primary and secondary function have the primary function engraved on the key, and the secondary function engraved above the key. It should be noted that the Guard and Link 11 keys have unmarked secondary functions.
- Four mode selection keys: AM/FM, Narrow-band/Wideband, Guard, and Link 11.

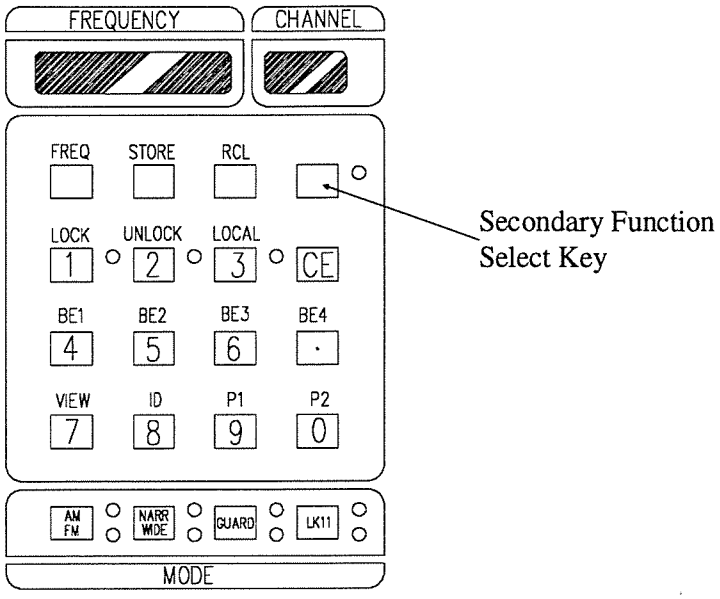

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Fig. 4-3 Synthesiser Controls and Indicators

FREQUENCY and CHANNEL Displays

17 The synthesiser provides a six-digit frequency display and a two-digit channel display. The displays have four functions:

- **Monitor Function.** The displays show the current operational frequency and channel number.
- **Edit Function.** The edit function is indicated by a flashing decimal point at the bottom right-hand side of the frequency display. When edit function is selected, the displays indicate information being entered from the numeric data keys, not the equipment's current settings.
- **View Function.** When this function is selected, channel information is displayed without changing the current operational parameters of the equipment. The view function is active for approximately five seconds after which the display returns to the monitor function.
- **Error Message Function.** Error messages (as detailed in TABLE 4-1) are automatically generated when a non-valid keypad entry is made. Pressing the CE key cancels the error message and restores the edit function so that the keypad entry can be corrected.

Secondary Function Select Key

18 The secondary function select key (the unmarked blue key) is a push-to-select, push again to de-select key, that selects either the primary or secondary function of the keypad. When secondary function is selected, the adjacent indicator is lit. When primary function is selected, the adjacent indicator is unlit.

Numerical Data Keys 0 through 9

19 Primary function data keys 0 through 9 enter the appropriate number into the display. The position of the digit entered depends on the key sequence prior to pressing the data key.

(a) If the previous key entry was also a numerical data key, or the decimal point, the new digit is entered in the next blank right-hand position.

(b) If the previous entry was a secondary function key, the display will blank and the new digit entered in the first position.

Decimal Point Key

20 The primary function decimal point key, adds a point to the right of the last number entered. If the previous entry was a secondary function, the display will blank and a 0 (zero) followed by a decimal point will be entered in the first position.

Cancel Entry (CE) Key

21 The primary function CE key cancels previous selections as follows:

(a) If the previous selection was a numeric data key, the last digit entered will be replaced by a blank. Further use of the CE key progressively removes remaining digits from the display; pressing the CE key when only one digit is shown causes the display to go to the monitor mode.

(b) If the previous key entry resulted in an error code (refer to TABLE 4-1), pressing the CE key restores the settings shown before the previous key entry.

Frequency (FREQ) Key

22 Pressing this key causes the equipment's operating frequency to change to that shown on the frequency display, if the displayed frequency is valid. Pressing this key does not alter any stored channels. Entering a valid frequency results in the frequency being shown in the frequency display, and the channel display being blanked.

23 If the entered frequency falls outside the band-edge frequencies an error message (refer to TABLE 4-1) is displayed and the synthesiser is not changed. The error message is cancelled by pressing the CE key.

TABLE 4-1 ERROR MESSAGE CODES

Code (1)	Meaning (2)	Action (3)
02	Inappropriate number (freq)	Press the CE key and enter the correct frequency.
03	Not 25 kHz channel	Press the CE key and enter the correct frequency related to 25 kHz channel spacing.
04	Function locked	Indicates that the LOCK function is selected. Press the CE key to re-gain Edit Mode. Select the UNLOCK function to allow the locked out function to be set - if permitted.
05	Attempted change while PTT in progress (not receiver equipment)	Release PTT (if applicable) press the CE key to carry out change.
06	Frequency below band-edge 1	Press the CE and enter a frequency above band-edge 1 or reset band-edge 1 to accommodate the required frequency.
07	Frequency above band-edge 4	Press the CE key and enter a frequency below band-edge 4 or reset band-edge 4 to accommodate the required frequency.
08	Inappropriate number (chan)	Press the CE key and enter a valid channel number.
09	Inappropriate channel	Channel empty, no frequency stored. Press the CE key and select another channel.
10-13	Internal error	
14	Frequency between band-edge 2 and band-edge 3	Press the CE key and enter the correct frequency or reset the band-edges 2 and 3 to accommodate the required frequency.
15	Reserved code	
16	Reserved code	
17	Frequency outside valid band-edge range	Press the CE key and enter correct frequency.
18-23	Internal error	
24	Reserved code	

Channel Store (STORE) Key

24 When a valid number is displayed in the channel display and the store key (secondary function) is pressed, the following settings will be stored with the channel number:

- Frequency
- AM or FM selection
- Narrow-band or wideband selection
- Link 11 selection

Channel Recall (RCL) Key

25 The channel recall key is used to recall preset frequencies and associated settings. Entering a valid channel number, and pressing the recall key, resets the equipment's frequency, AM/FM selection, narrow/wideband selection and Link 11 selection. If the recalled channel number contains no previously stored data, the key entry will be ignored.

LOCK Key

26 The lock key (secondary function) disables all keypad functions which can alter the stored frequency and channel settings. When lock is selected, the adjacent indicator is lit.

UNLOCK Key

27 The unlock key (secondary function) returns the keypad from the locked condition and enables normal operation. When the unlock condition is selected, the adjacent indicator is lit.

LOCAL Key

28 The local key (secondary function) is used to select the equipment to operate in local or remote mode. When local is selected (shown by the adjacent indicator being lit) the equipment can be operated by using the front panel controls. When remote is selected (shown by the adjacent indicator being unlit), operation is transferred to a remote control unit.

BE1 and BE2 Keys (VHF and VHF/UHF sets only)

29 The BE3 and BE4 keys (secondary function) are used to set the lower and upper band-edge limits of the frequency range 108 to 155.975 MHz. The BE3 and BE4 keys are used to limit the frequency range. For example, if the equipment is to be operated only on frequencies between 120 and 150 MHz, these two keys can be used to set this new frequency range. Frequencies selected outside the band-edge limits will be rejected as invalid frequencies.

BE3 and BE4 Keys (UHF and VHF/UHF sets only)

30 The BE3 and BE4 keys (secondary function) are used to set the lower and upper band-edge limits of the frequency range 225 to 399.975 MHz. The BE3 and BE4 keys are used to limit the frequency range. For example, if the equipment is to be operated only on frequencies between 240 and 300 MHz, these two keys can be used to set this new frequency range. Frequencies selected outside the band-edge limits will be rejected as invalid frequencies.

VIEW Key

31 Used to verify channel information. When a channel has been selected and the view key (secondary function) is pressed, all stored information appropriate to the selected channel is displayed without changing the operational parameters of the equipment.

ID Key

32 The identification (ID) key (secondary function) is used when the equipment is operated from a remote control unit (RCU). An RCU can only operate an equipment if both the RCU and the equipment have the same identification codes (thumbprint). Valid ID codes must be in the range 0 to 15.

33 When a valid identification number is entered through the data keys and the ID key is pressed, the ID is stored in the equipment and the display will then return to the monitor mode.

P1 and P2 Keys

34 The P1 and P2 functions are not used.

AM/FM Mode Key

35 This primary function key is used to select either AM or FM operating mode. Two indicators are fitted to the right of the key. When AM is selected, the upper indicator will be lit; when FM is selected, the lower indicator will be lit.

36 Pressing this key when the Link 11 mode is selected causes Link 11 to be cancelled and the AGC long/short status to be forced to long.

NARR/Wide Mode Key

37 The narrow/wide (primary function) key is used to select either narrow or wideband mode of operation. Two indicators are fitted to the right of the key. When narrow-band is selected, the upper indicator will be lit; when wideband is selected, the lower indicator will be lit.

38 Pressing this key when the Link 11 mode is selected causes Link 11 to be cancelled and the AGC long/short status to be forced to long.

GUARD Key

39 The primary function guard key is effective only when the guard receiver option is fitted to the transceiver. The key is used to enable, or disable, operation of the guard receiver. Two indicators are fitted to the right of the key. When the guard receiver is enabled, the upper indicator will be lit. When the guard receiver is disabled, the upper indicator will be unlit.

Guard Receiver Mute Defeat Key

40 The guard receiver mute defeat is an unmarked secondary function of the GUARD key; the function is effective only when the guard receiver option is fitted to the transceivers or the receivers. The key is used to switch on and off the guard receiver's mute circuit. When the mute is switched off, the key's lower indicator will be lit. When the mute is enabled, the key's lower indicator will be unlit.

LK11 Key

41 The Link 11 key (primary function) is used to switch the equipment between normal and Link 11 modes of operation. When Link 11 mode is selected, the upper indicator, to the right of the key, will be lit. When normal mode is selected, the upper indicator will be unlit.

42 When Link 11 is selected, FM, wideband, and short AGC modes of operation are automatically selected.

Power Reduction Key

43 Power reduction is an unmarked secondary function of the LK11 key. The low power facility is provided for testing purposes. At reduced power the modulation characteristics may not meet the full stated specifications. Successive presses of this key produce the following results:

(a) Initial state. No power reduction. The lower indicator to the right of the key will be unlit.

(b) First level of power reduction. The lower indicator to the right of the key will be lit.

(c) Second level of power reduction. The lower indicator to the right of the key will continually flash.

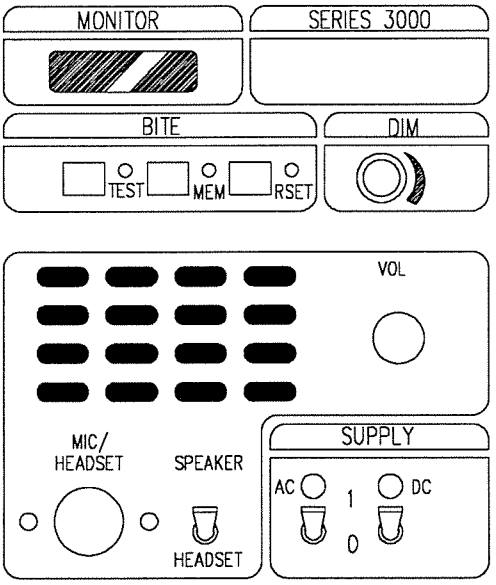
(d) A further press returns to the initial state of no power reduction.

Mainframe Controls and Indicators

44 The mainframe controls and indicators (see Fig. 4-4) comprise a monitor display, BITE controls, audio controls, and supply on/off switches.

Note ...

Volume control, speaker/ headset switch, and loudspeaker not fitted to the transmitter equipments.



(GA8403)

Fig. 4-4 Mainframe Controls and Indicators

BITE TEST Key

45 The test key is used to start an interruptive self-test routine. During this routine, normal operation of the equipment is suspended and the test indicator flashes. Details of this test routine can be found in this section under the heading: Built-in test equipment (BITE) operation.

BITE MEM Key

46 The memory (mem) key is used to indicate the contents of the equipment's fault memory store. Successive presses of the memory key displays (in the monitor display) fault conditions found during BITE routines. Details of the fault memory can be found in this section under the heading: built-in test equipment (BITE) operation.

BITE RSET Key

47 The reset (RSET) key is used to terminate the following functions:

(a) Pressing the reset key terminates an interruptive self-test routine.

(b) Pressing the reset key will terminate monitoring of any user selected monitor functions.

DIM Control

48 A rotary control that adjusts the brilliance of the front panel indicators. This control should be adjusted for optimum brilliance according to ambient lighting conditions.

VOL Control

49 Fitted only to the transceiver and receiver equipment. Turning the volume control clockwise increases the volume of the received audio at the speaker or headset dependent upon the setting of the speaker/headset switch.

MIC/HEADSET Connector

50 Fitted only to the transceivers, a seven pin connector that allows a microphone/headset to be connected. Details of the pin-outs can be found in section 3 of this handbook.

MIC

51 Fitted only to the transmitters. A seven pin connector that allows a microphone to be connected. Details of the pin-outs can be found in section 3 of this handbook.

HEADSET

52 Fitted only to the receivers. A seven pin connector that allows a headset to be connected. Details of the pin-outs can be found in section 3 of this handbook.

SPEAKER/HEADSET

53 Fitted only to the transceiver and receiver equipment. A switch which selects whether reception is heard through the internal loudspeaker, or a headset connected to the microphone/headset connector.

SUPPLY ON/OFF Switches

54 Two-position switches and associated indicators for the ac and the dc input supplies. When switching on the equipment, any previously programmed information, stored in the equipment's memory can be cleared by operating the on/off switch and the CE key together. Details of the switching on procedures can be found in this section under the heading: Setting-up.

REAR PANEL CONNECTIONS

REAR PANEL LAYOUT

55 The equipments' rear panel layouts are shown in Figs. 1, 2 and 3. The connectors are described in the following paragraphs.

AC Supply

56 3-pin connector (with integral fuse) for the ac mains supply. The fuse rating must be selected according to the local ac supply; details of fuse ratings are given in section 3 of this handbook.

DC Supply

57 3-pin connector (only 2 pins are used) for the connection of the incoming dc supply.

Remote 1 Connector

58 Remote 1 is a 9-way D-type connector used to connect a PAE type 3000 remote control unit (RCU). When an RCU is connected, and remote operation is required, users must ensure that the identification codes (thumbprint settings) are set up, and that remote operation is selected at the equipment. Details of the connector's pin-out is given in section 3 of this handbook.

FACILITIES 2 Connector

59 Facilities 2 is a 25-way D-type connector used to connect the external control and monitoring signals. The pin-out of this connector and a description of the external signals can be found in section 3 of this handbook.

BUILT IN TEST EQUIPMENT (BITE) OPERATION

60 The equipment's BITE monitors key parameters and provides an indication if an equipment malfunction occurs. The BITE functions in three different ways:

- User selected monitor functions.
- Continuously monitored functions.
- Interruptive self-test routines.

USER SELECTED MONITOR FUNCTIONS

61 The user selected functions allows certain equipment functions to be monitored. A function is monitored when the appropriate front panel control is selected to ON. The measurement is shown on the monitor display, and is updated at least once per second. When either the BITE RSET (reset) key is pressed, or the function key is de-selected, monitoring will

cease and the display will blank. A monitor function can also be de-selected by selecting a different monitor function. It should be noted that the monitor facilities only give an approximate indication of the levels. For accurate results, external instruments should be used. The monitor functions available are described in the following paragraphs.

Transceivers and transmitters:

- Transmitter line input level. Measured in dBm, and selected by pressing the transmitter LINE control.
- Transmitter output power. Measured in watts, and selected by pressing the FWD control.
- Transmitter reflected power. Measured in watts, and selected by pressing the RFL control.
- Transmitter modulation depth. Measured in % if AM mode or kHz if in FM mode, and selected by pressing the MOD control.

Transceivers and receivers:

- Receiver line output. Measured in dBm, and selected by pressing the receiver LINE control.
- Receiver AGC level. Measured in volts, and selected by pressing the AGC control.

CONTINUOUSLY MONITORED FUNCTIONS

62 The BITE automatically performs test routines that monitor the equipment's test points at least once every two seconds. If a test point is found to be outside the preset limit, the module and test point numbers are stored in the fault memory. The error message 'bitE' will be shown on the monitor display.

63 If the fault is only temporary, the bitE error message will disappear, but the fault memory entry remains stored. If a high temperature within the equipment is sensed, the error message °C will be shown on the monitor display.

64 If the fault is caused by a high VSWR at the transmitter's antenna, ANT will be shown on the monitor display (transceiver and transmitter equipment).

INTERRUPTIVE SELF-TEST ROUTINE

65 This test is initiated by pressing the TEST key. During the self-test routine, normal operation of the equipment is suspended, and the TEST indicator flashes.

66 At the start of the test, the fault memory is cleared and the MEM indicator is turned off. If a fault is found, the module and test point number is stored in the fault memory, and the MEM indicator turned on. The test routine then proceeds to the next module.

67 On completion of the test routine, one of the following status messages is shown on the MONITOR display:

- PASS-indicating system is fully operational.
- bitE-indicating one or more out of limit conditions exist.
- ANT-indicating high VSWR present at the transmitter's antenna connection (transceiver and transmitter equipment).

68 The BITE test routine can be terminated at any time by pressing the RSET or PTT key. Pressing either of these keys will immediately terminate the test and restore the equipment to normal operation.

FAULT MEMORY

69 The fault memory contains one location for each module position; the contents of the memory can be viewed by pressing the memory (MEM) key. Successive MEM key presses display the other stored faults in rotation.

70 Internal faults are displayed on the monitor display as module number and test point number. External fault shall be displayed as ANT, transmitter VSWR (transceiver and transmitter equipment).

71 The fault memory is cleared by pressing the RSET and MEM keys together.

SETTING-UP AND OPERATING PROCEDURES

SETTING-UP

72 Setting-up the equipment, in order to make it ready for operational use, requires the following procedures to be carried out:

- Switching on the ac and dc supplies as applicable to the installation. The switching on procedure can be used to completely erase any previously programmed frequency and channel information.
- Setting the band-edge frequency limits. This procedure restricts the equipment's frequency range (if required).
- Programming channel and frequency information into the equipment's memory.
- Setting the identification code (thumbprint). This procedure must be completed when a remote control unit (RCU) is used with the equipment.
- Frequency selection. This procedure is used to select an operating frequency without programming the frequency and an appropriate channel number into the equipment's memory.
- Channel recall. This procedure recalls a previously stored channel, setting the equipment to operate on the frequency appropriate to that channel number.
- Channel verification. This procedure allows an operator to check the frequency allocated to any stored channel number.
- Guard receiver operation. This procedure is appropriate only to equipment which have the guard receiver option fitted. The guard receiver provides constant monitoring of the international distress frequency.

73 Before any setting-up procedures are carried out, users must ensure that the installation instructions, as detailed in section 3 of the handbook, have been successfully completed.

SWITCHING ON

74 The equipment can be operated from an ac or a dc supply. If both ac and dc supplies are connected, the equipment will normally operate from the ac supply; if the ac supply fails, operation will automatically transfer (without interruption) to the dc supply. When the ac supply is restored, the equipment reverts to ac operation. Switching on is carried out as follows:

(1) At the equipment's front panel, ensure the AC and DC SUPPLY switches are in the off position (down).

(2) Apply ac, and/or, dc supplies to the equipment.

(3) If an ac supply is connected to the equipment, set the AC SUPPLY to the on position (up). Check that the AC indicator is lit.

(4) If a dc supply is connected to the equipment, set the DC SUPPLY switch to the on position (up). Check that the DC indicator is lit.

75 If it is required to clear the equipment's memory of all previously programmed information:

(a) At the equipment's front panel, ensure the AC and DC SUPPLY switches are in the off position (down). If an ac supply is connected to the equipment, complete step (b). If the equipment operates only from a dc supply, complete step (c).

(b) If an ac supply is connected to the equipment, press the CE key (hold it in the pressed state) and set the AC SUPPLY switch to the on position (up); release the CE key. If a dc supply is connected to the equipment, set the DC SUPPLY switch to the on position.

(c) If the equipment operates only from a dc supply, press the CE key (hold it in the pressed state) and set the DC SUPPLY switch to the on position (up); release the CE key.

Note ...

In the following explanations the UHF settings are described, equivalent VHF settings are shown in parenthesis and equivalent VHF displays are shown under the UHF displays.

BAND-EDGE FREQUENCY LIMIT SETTINGS

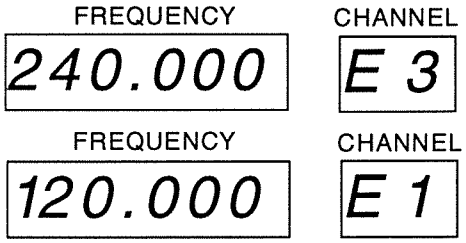
76 The normal operating range of the equipment for UHF is 225 to 399.975 MHz and for VHF is 108 to 155.975 MHz. If the equipment is to be operated on a limited range of frequencies, for example, frequencies between 240 MHz and 300 MHz (UHF) or 110 MHz and 150 MHz (VHF), the upper and lower band-edge frequencies can be set to reflect this range. The equipment will then inhibit frequency selections that fall outside the set limits.

77 The following examples demonstrate the setting of the band-edge limits for the UHF frequency range and VHF frequency range. Keys B3 (lower band edge) and B4 (upper band edge) are used to set the UHF range. It is the same procedure for setting the band-edges in the VHF frequency range except that the B1 (lower edge limit) and B2 (upper edge limit) keys are used.

(1) Select the second function key to the on position.

(2) Press the B3 (B1), lower edge limit key. Check that the frequency display is in the edit mode (indicated by a flashing decimal point at the lower right-hand side of the display).

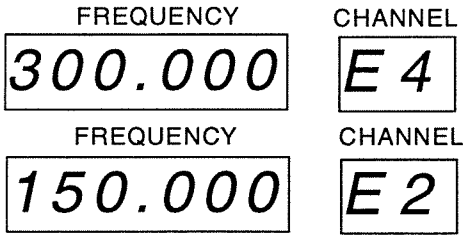
(3) Using the numeric data keys, enter the lower edge limit, for example, 240.000 (120.000). The displays will show:



(4) Press the FREQ key.

(5) Select the second function key to the on position.

(6) Press the B4 (B2) upper edge limit key. Using the numeric data keys, enter the upper edge limit, for example, 300.000 (150.000). The displays will show:



(7) Press the FREQ key. The band-edge limits are now set up.

78 To confirm the band-edge settings, proceed as follows:

(1) Select the second function key to the on position and press the B3 (B1) key. The lower edge limit will be displayed.

(2) Select the second function key to the on position and press the B4 (B2) key. The upper edge limit will be displayed.

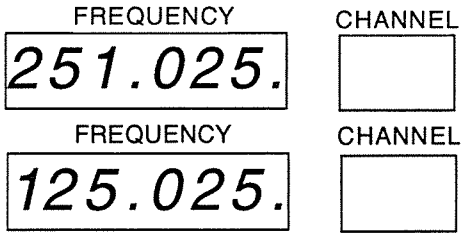
(3) Press the CE key to revert to normal operation.

CHANNEL FREQUENCY SETTING

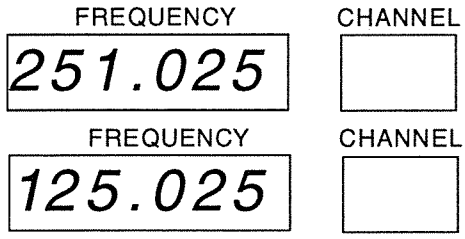
79 Up to 99 channels can be stored in the equipment's memory. Each stored channel comprises an associated frequency, and operational mode information.

80 The following example details how to preset channel 16 (08) with a frequency of 251.025 MHz (125.025 MHz):

(1) At the synthesiser front panel using the numerical data keys enter the required frequency eg. 251.025 MHz (125.025 MHz). Displays (in edit mode) show:

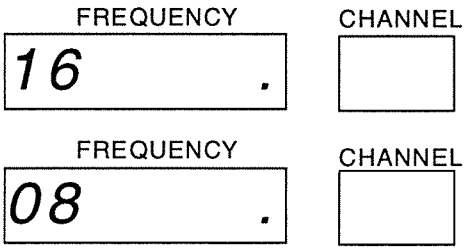


(2) Press the FREQ key. Displays (in monitor mode) show:

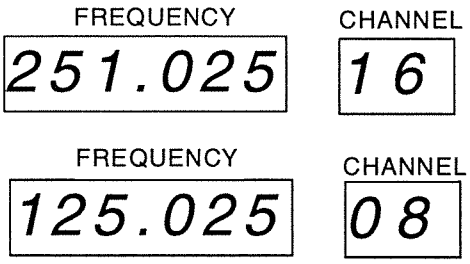


(3) Set the AM/FM and narrow-band/wideband (NARR/WIDE) select switches as required for the frequency channel (for example, AM, NARR).

(4) Using the numerical data keys, enter the channel number required, for example, 16 (08). Displays (in edit mode) show:



(5) Press the STORE key. Displays (in monitor mode) show:



81 Channel 16 (08) is now set to a frequency of 251.025 MHz (125.025 MHz) operating in AM narrow-band mode. Other channels up to a maximum of 99 can be set up as detailed in paragraph 80, steps 1 to 5.

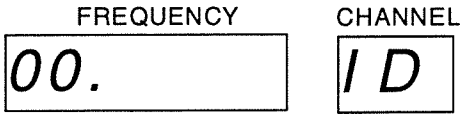
IDENTIFICATION CODE (THUMBPRINT) SETTING

82 An identification code (thumbprint) is required when a remote control unit (RCU) is used to control the equipment. The code is used to ensure that each RCU will only

communicate with an equipment which is identified by an identical code. The code, which must be a number between 0 and 15 is set as follows:

(1) Set the second function key to the on position.

(2) Press the ID key. The displays will show:



Note ...

The FREQUENCY display may show a previously recorded code.

(3) Using the numeric data keys, enter the required code within the limits 00-15, then press the STORE key.

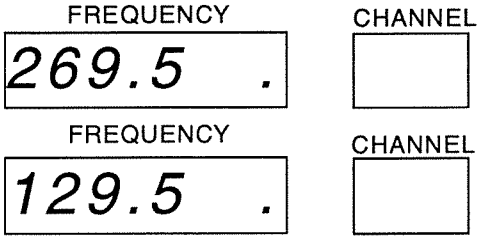
83 The unit is now set with a thumbprint code and will only communicate with a remote controller having the same code. Reference should also be made to the handbook supplied with the RCU.

FREQUENCY SELECTION

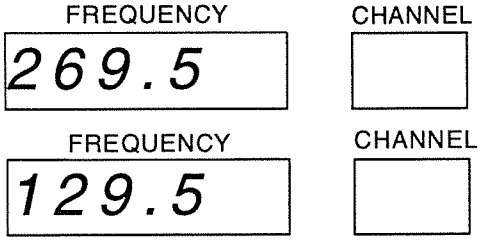
84 The equipment can be set to any operational frequency without allocating the frequency to a channel. To set the frequency, proceed as follows:

(1) Using the numerical data keys, enter the required frequency, then press the FREQ key. The equipment is now set to operate on the selected frequency. For example, to set 269.5 MHz (129.5 MHz):

(2) Using the numerical data keys, enter the frequency 269.5 MHz (129.5 MHz). The displays (in edit mode) show:



(3) Press the FREQ key. The displays (in monitor mode) show:

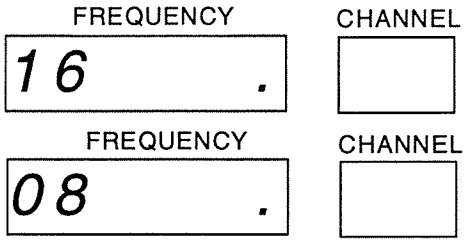


(4) Select the required operational mode, for example, AM, narrow-band (NARR). The equipment is now set to operate on 269.5 MHz (129.5 MHz), AM, narrow-band mode.

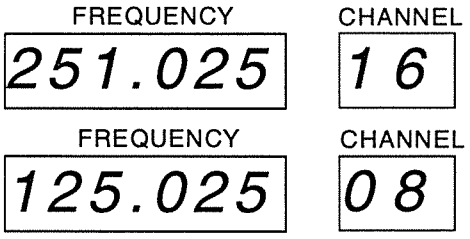
CHANNEL RECALL

85 Channels may be recalled by using the numerical data keys to select the required channel number, then pressing the RCL key. For example to recall channel 16, the sequence would be as follows:

(1) Using the numerical data keys enter the channel number required, eg. 16 (08). The displays (in edit mode) show:



(2) Press the RCL key. The displays (in monitor mode) show:

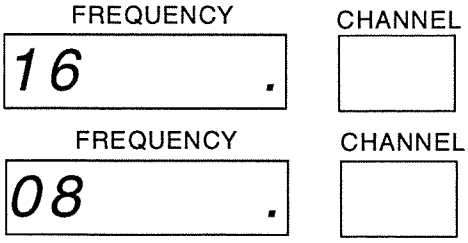


(3) The equipment is now set to operate on the frequency displayed. The AM or FM/narrow-band or wideband mode, selected when the channel was stored, will also be set accordingly on a channel recall instruction.

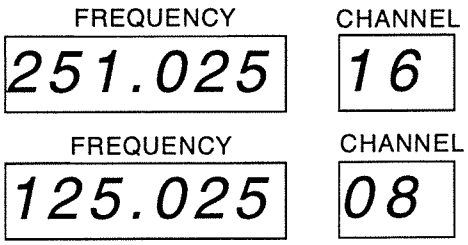
CHANNEL VERIFICATION

86 Any channel may be viewed for 5 seconds without changing the frequency, or affecting the operation of the equipment. For example, to verify which frequency channel 16 (08) is set to:

(1) Use the numerical data key to enter the channel number 16 (08). The displays will show:



(2) Set the second function key to the on position and press the VIEW key. The displays will show the frequency and channel number as follows:



(3) After five seconds, the displays will revert to the monitor mode and show the previously selected channel frequency.

GUARD RECEIVER OPERATION

87 The GUARD mode function is only available on the transceiver and receiver equipment when the guard receiver option is fitted. Selection of the guard receiver is achieved by selecting the GUARD key to the on position.

88 Depending on the frequency band that the main receiver is selected to, the guard receiver will continuously monitor the international distress frequency for that band, 243 MHz (UHF) or 121.5 MHz (VHF). When a distress signal is detected, the lower of the two indicators (to the right of the GUARD key) will light and the audio heard in the loudspeaker, headset, or through the guard receiver's audio output which is available on the facilities connector.

89 When a distress broadcast is received through the guard receiver, the operator can select the appropriate distress frequency as the equipment's operating frequency by using the channel recall procedure, or the frequency selection procedure.

OPERATING PROCEDURES

LOCAL OPERATION

90 To set the equipment for local operation, select the second function key to the on position, then press the LOCAL key. Operation is now from the equipment's front panel.

91 Connect a microphone/headset, microphone, or headset (as applicable to the equipment) to the MIC/HEADSET, MIC, or HEADSET connector.

Transmit Operation

92 On the transceiver synthesiser front panel, select the required operational frequency either by recalling a preset channel, or by using the numeric keypad (as detailed in previous paragraphs).

93 Transmission can now take place by operating the PTT switch and speaking into the microphone.

94 A sidetone of the transmitted audio is available from the MIC/HEADSET or MIC socket.

95 A data (wideband) input is also available at the rear panel FACILITIES connector. If using this function ensure that the narrow-band/wideband (NARR/WIDE) mode has been set for wideband.

Receive Operation

96 At the transceiver synthesiser front panel, select the required operational frequency either by recalling a preset channel or using the numeric keypad (as detailed in the previous paragraphs).

97 Verify that the displayed frequency is correct. Reception will now take place with the audio being available at the MIC/HEADSET or HEADSET socket, and the internal loudspeaker (when set to the on position). All audio outputs can be controlled using the VOL control.

98 A data (wideband) output is also available at the rear panel FACILITIES connector. The level of this output is preset.

USER MAINTENANCE

FILTER CLEANING

99 The air filter, fitted to the equipment's rear panel, should be cleaned every six months. The filter is cleaned as follows:

(a) Ensure that the equipment has been isolated from the input ac and dc supplies.

(b) At the rear of the unit, locate and remove the four screws that secure the fan filter housing to the rear panel (see Fig. 8).

(c) Remove the filter housing and filter. Clean the filter either by using a low pressure air supply, or washing in warm water and leaving to dry. If necessary replace with a new filter.

(d) Refit filter and filter housing.

FREQUENCY ACCURACY CHECK

100 The accuracy of the transceiver's, and transmitter's frequency can be checked if a suitable frequency counter and 30 dB attenuator are available. It is recommended the frequency check be completed every six months as follows:

(a) Connect a digital frequency counter, through a 30 dB attenuator, to the TX ANT connector (transceiver) or ANT connector (transmitter).

(b) At the front panel, select a frequency of 399 MHz (155 MHz), and key the transmitter. Check that the frequency indicated on the frequency counter is between 398.999 and 399.001 MHz (154.999 and 155.001).

(c) If the specification in step (b) is not met, reference should be made to the appropriate technical handbook, or to PAE.

Paragraph

INTRODUCTION

1 This section details the PAE part numbers for items referred to in this handbook. The equipment's full parts listing is contained in the associated technical handbook.

2 When ordering parts from PAE, the item, full description, and PAE part number should be quoted.

PARTS LIST

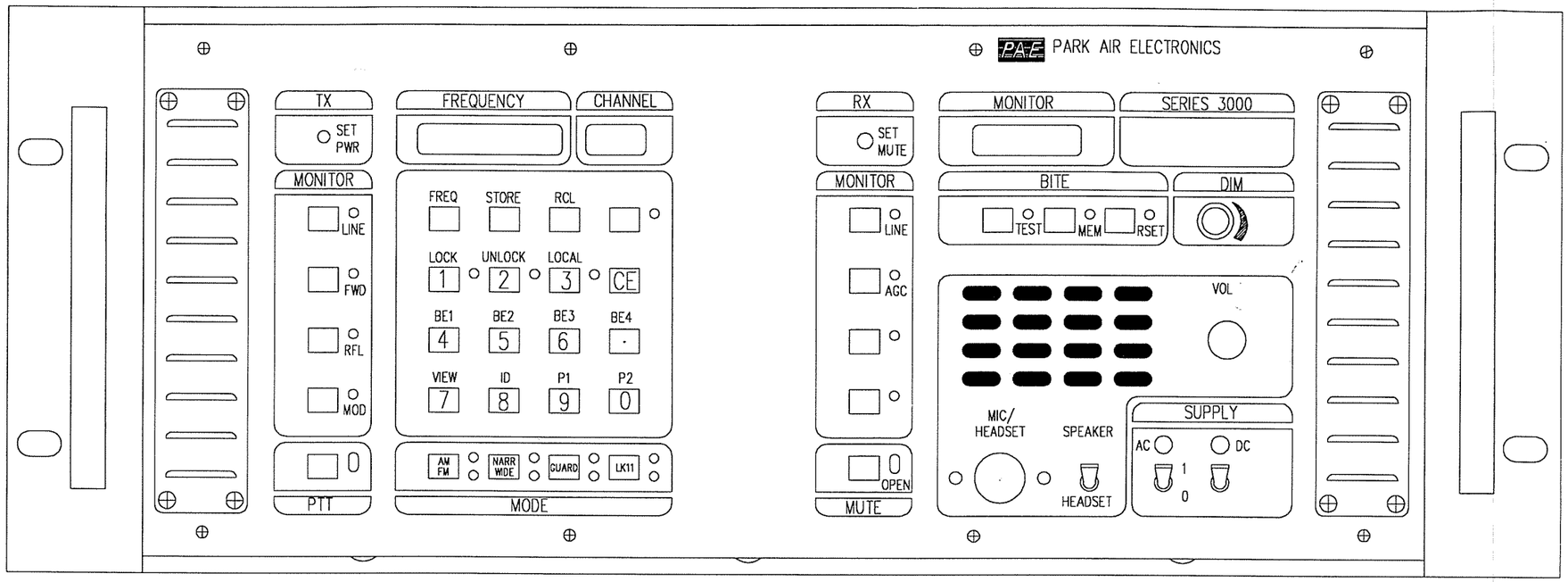
3

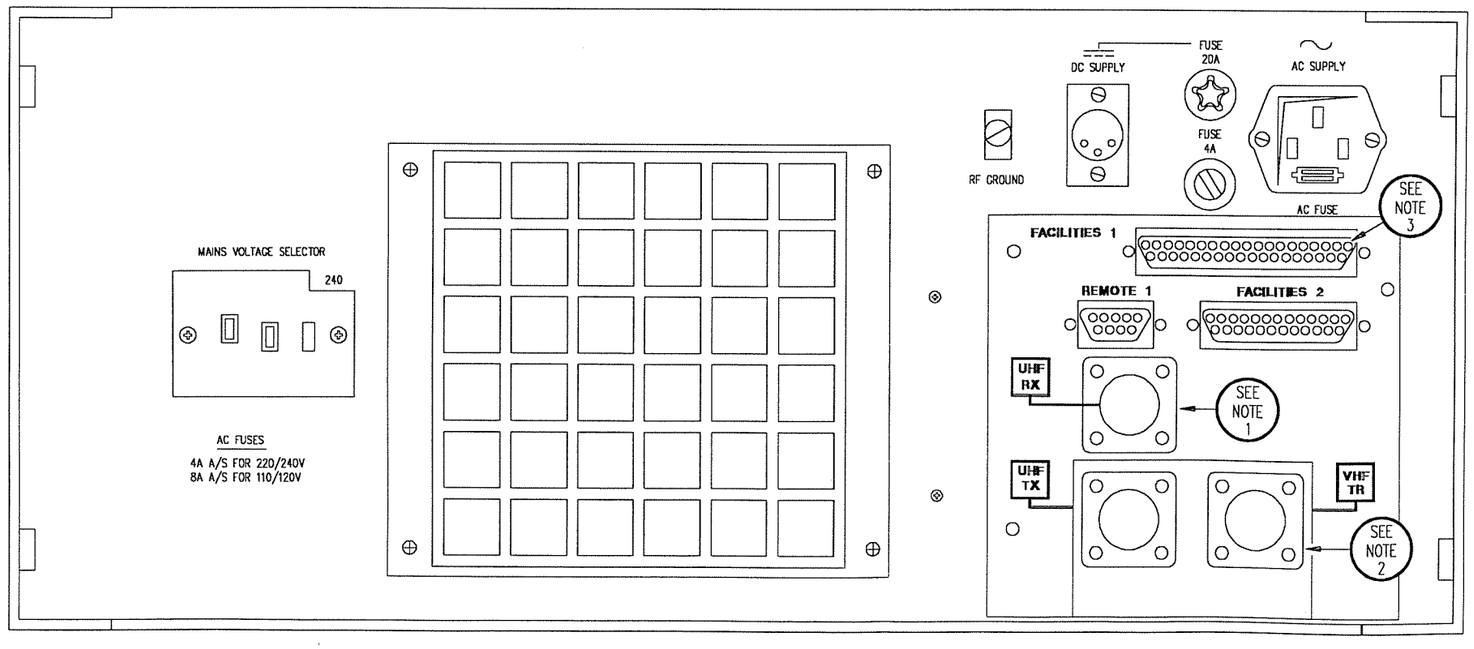
Item	Description	Part number
-	3010 VHF transceiver	B3010
-	3030 UHF transceiver	B3030
-	3050 VHF/UHF transceiver	B3050
-	3130 UHF transmitter	B3130
-	3150 VHF/UHF transmitter	B3150
-	3230 UHF receiver	B3230
-	3250 VHF/UHF receiver	B3250
-	Series 3000 operator's handbook	31-33030000
-	Series 3000 transceiver technical handbook	31-13050000
-	3130 UHF transmitter technical handbook	31-13130000
-	3230 UHF receiver technical handbook	31-13230000
-	3150 UHF VHF/UHF transmitter technical handbook	31-13150000
-	3250 VHF/UHF receiver technical handbook	31-13250000
FS1	Fuse (20 mm) 7 A - T8A 250 V IEC for 110/120 V ac input supply	29-01210102
FS1	Fuse (20 mm) 3.5 A - T4A 250 V IEC for 220/240 V ac input supply	29-01120102
FS2	Fuse (size 0, 1 1/4 in.) 20 amp - F20A 32 V BS	29-01450201
FS3	Fuse (20 mm) 4 amp - F4A 250 V IEC	29-01120101
ac connector	Free-connector for mating with the equipment's AC connector	20-02030102
dc connector	Free-connector for mating with the equipment's DC connector	20-01030106
antenna connector	N-type plug (for RG213 cable) that mates with the equipment's ANT connectors	19-01030301
antenna cable	Coaxial cable type RG213 (see note)	10-05120600
antenna connector	N-type plug (for RG174 cable) that mates with the equipment's ANT connectors	19-01030306
antenna cable	Coaxial cable type RG174 (see note)	10-05120200
air filter	Rear panel replacement air filter	51-00507867

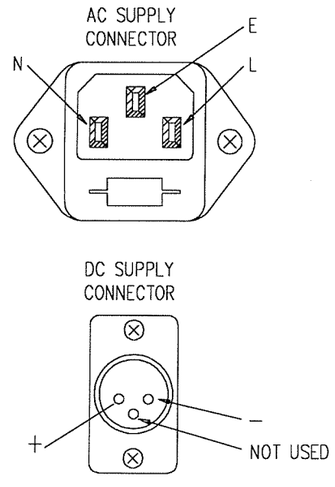
Note ...

Two types of antenna cable (and appropriate N-type connectors) are detailed. RG213 is the normally recommended cable. However, RG174, which has better loss and power handling characteristics can be used.

Figure







Notes...

1) Only fitted on 3050 TRs with OPTION 3 incorporated

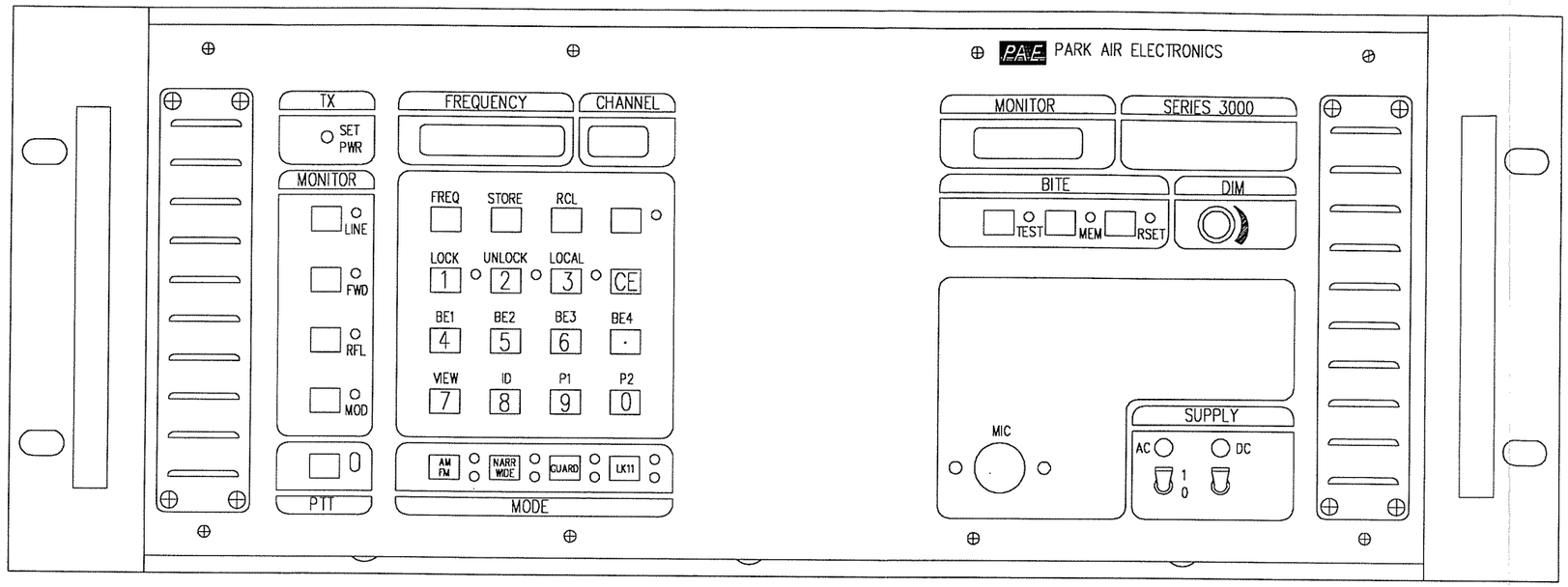
2) Fitted as standard on 3050TR, and on 3030TRs with OPTION 3 incorporated (3030 label will show 'UHF RX'). Not fitted on 3010.

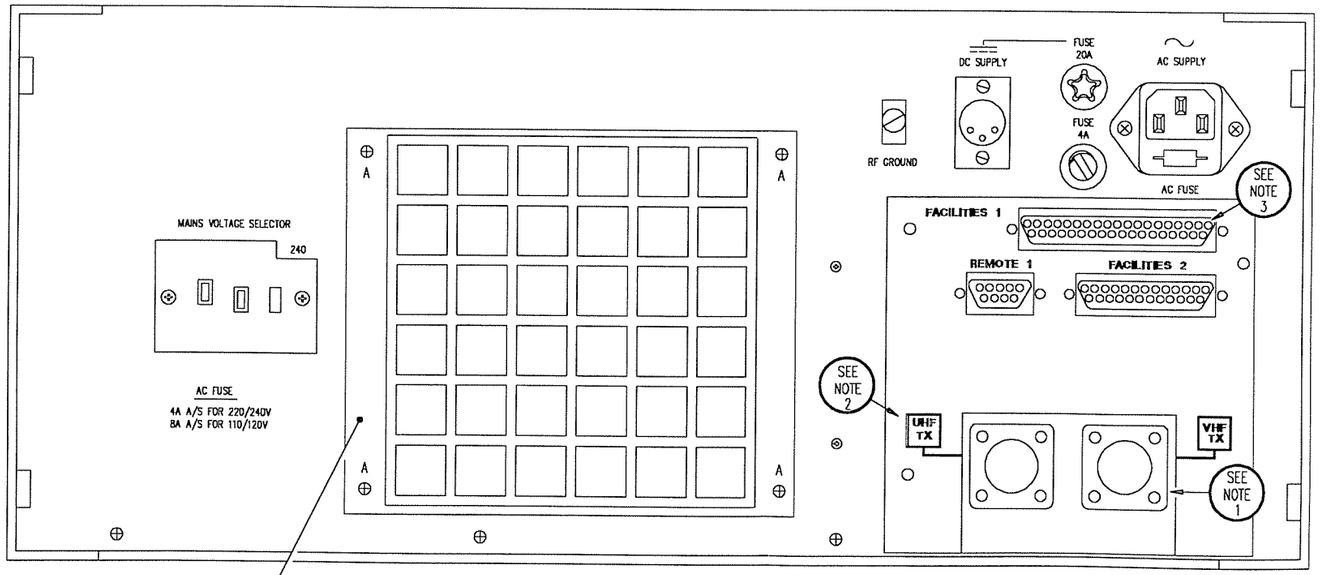
3) Only fitted on TRs with OPTION 4 incorporated.

(ILS 5366 Iss. 1)

Standard Transceiver Layout Diagram

Fig. 1





Air Filter housing

A – Denotes fan filter housing securing screws

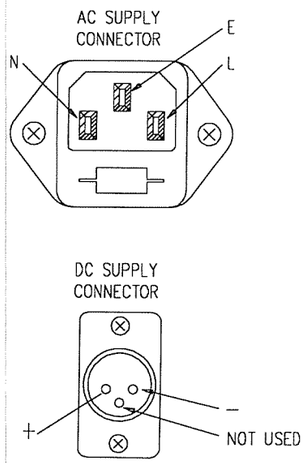
B – Denotes hinged rear panel securing screws

Notes...

1) Not fitted on 3130 transmitter or on 3150 transmitter with OPTION 2 incorporated.

2) With OPTION 2 incorporated on 3150 transmitter, label shows ANT.

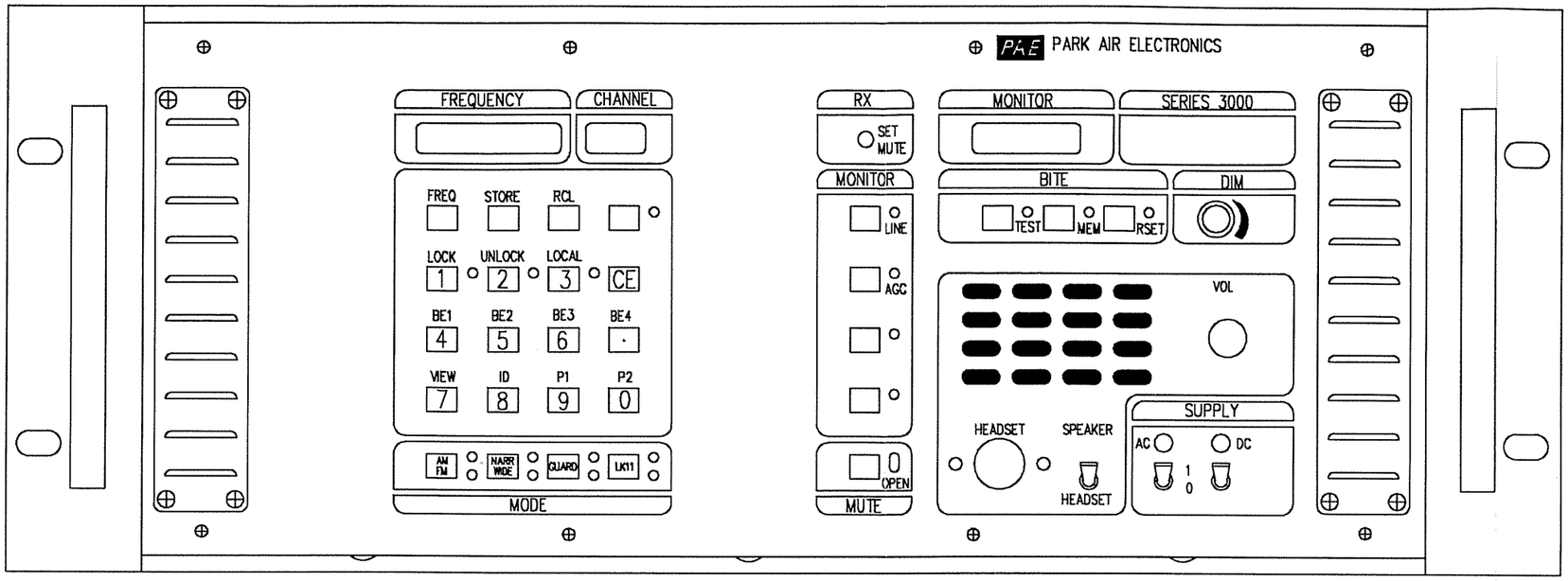
3) Only fitted on transmitters with OPTION 4 incorporated.

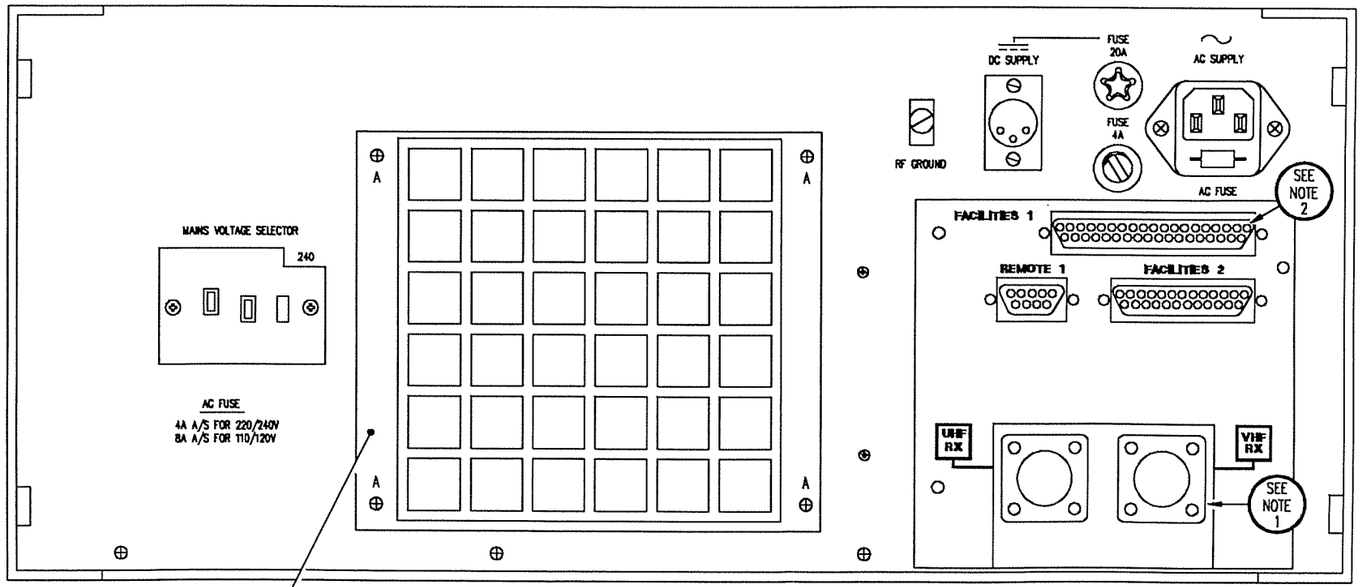


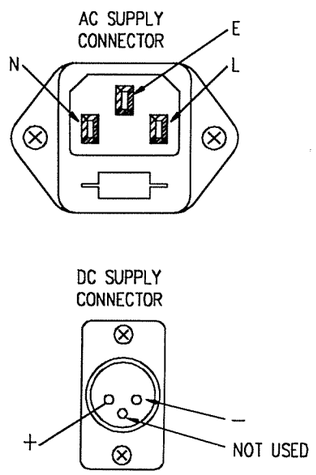
(GA8400 Iss. 1)

Standard Transmitter Layout Diagram

Fig. 2







Air Filter housing

A – Denotes fan filter housing securing screws

B – Denotes hinged rear panel securing screws

Notes...

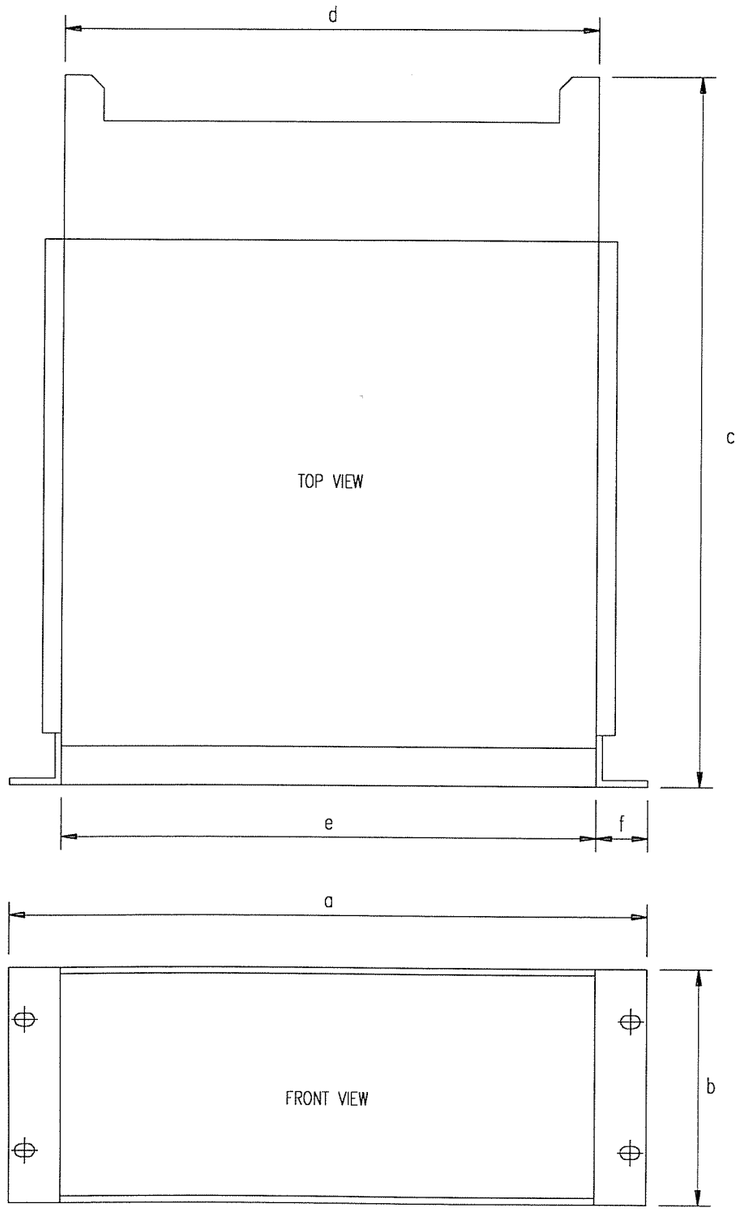
1) Not fitted on 3230 receiver.

2) Only fitted on TRs with OPTION 4 incorporated.

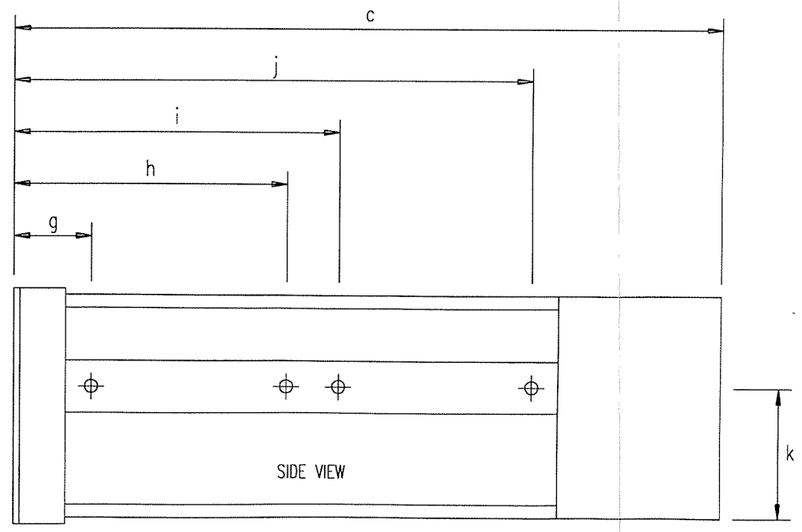
(GA 8401 Iss. 1)

Standard Receiver Layout Diagram

Fig. 3



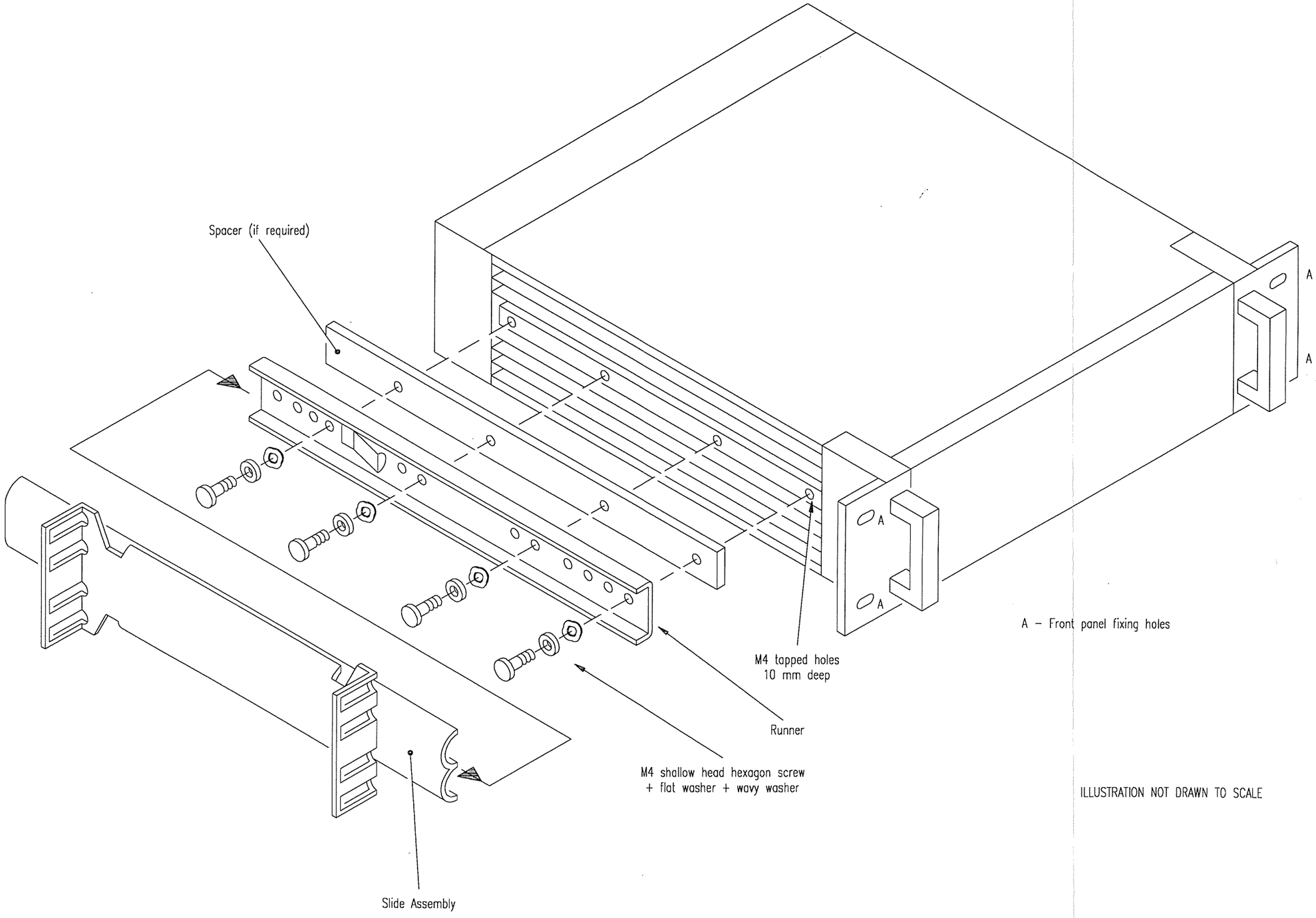
DIMENSION	mm	inches
a	483.0	19.00
b	177.0	6.97
c	545.0	21.46
d	429.0	16.89
e	442.5	17.42
f	40.5	1.60
g	61.5	2.42
h	214.0	8.43
i	252.0	9.92
j	404.5	15.93
k	111.0	4.37



(GA5769 Iss. 1)

Overall Dimensions

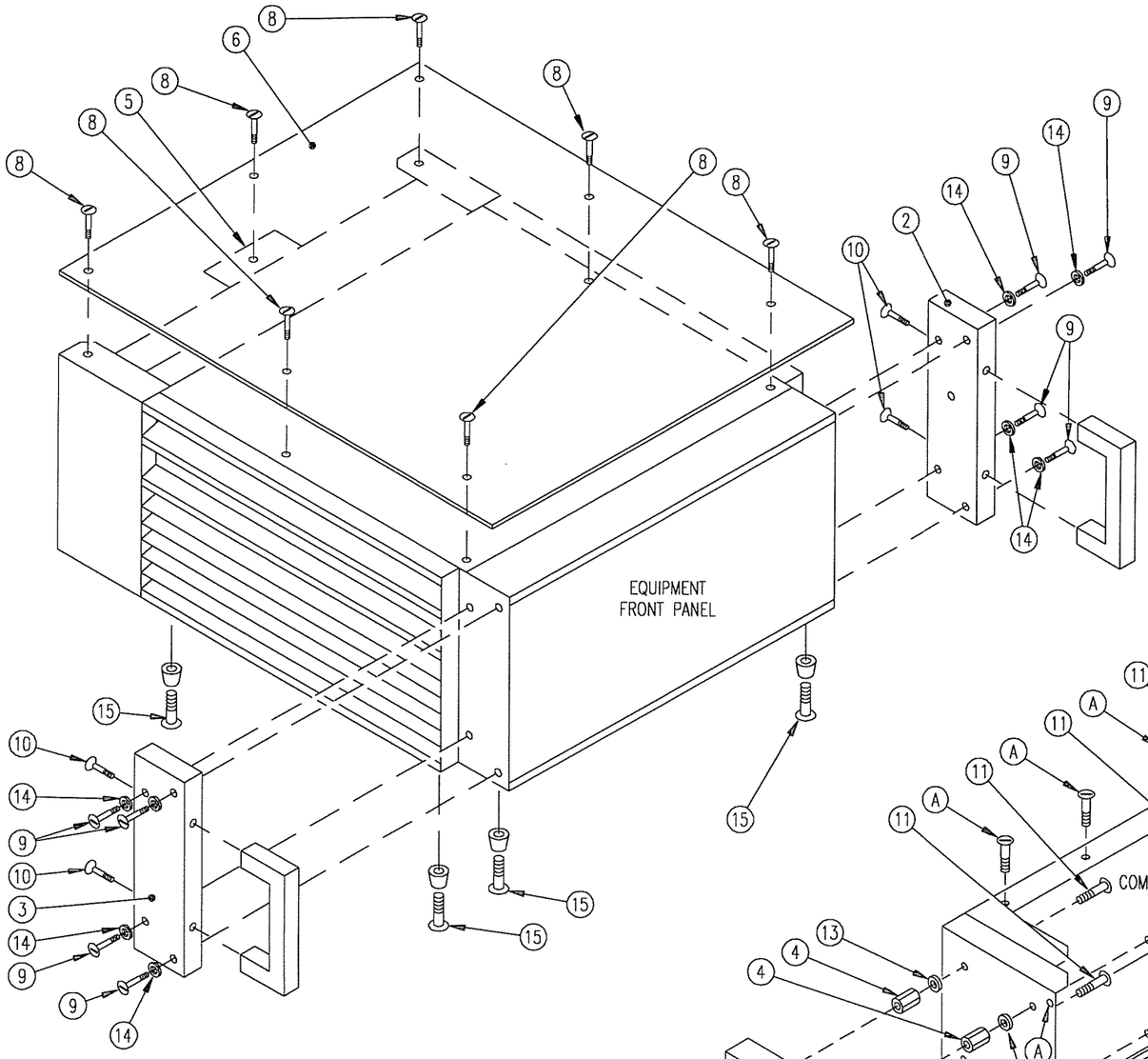
Fig. 4



(GA5788 Iss. 1)

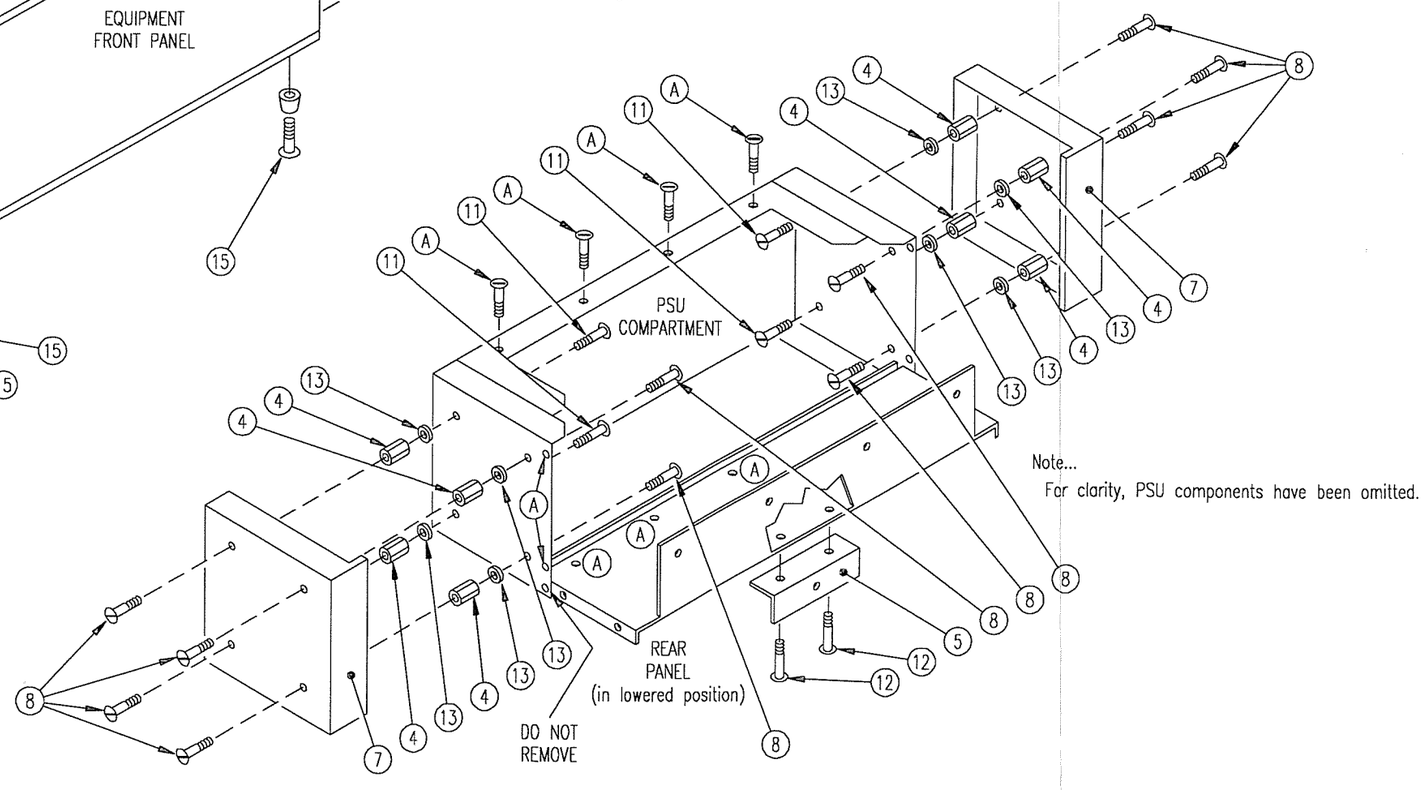
Telescopic Slides

Fig. 5



COMPONENT IDENTIFICATION

REF	ITEM	QTY	PAE PART No
1	Free-standing kit (comprising items 2 to 15)	–	70-3000TR1
2	Handle plate (right-hand)	1	45-00002652
3	Handle plate (left-hand)	1	45-00002912
4	Hexagonal M3 x 12 mm spacer	8	35-30071617
5	Top cover support bracket	1	45-00002972
6	Top cover	1	45-00002777
7	Side cover	2	45-00002955
8	Screw M3 x 6 mm c/s	21	35-10070614
9	Screw M4 x 16 mm Pan	8	35-11080415
10	Screw M5 x 16 mm Caphead	4	35-13093018
11	Screw M3 x 6 mm Panhead	4	35-10070414
12	Screw M4 x 6 mm Panhead	2	35-11080414
13	Crinkle washer M3	8	35-21071200
14	Crinkle washer M4	10	35-28081200
15	Feet 16W/SS (Including fixing screws)	4	02-22000002
A	Refer to text	11	---------



Note...
For clarity, PSU components have been omitted.

ILLUSTRATIONS NOT DRAWN TO SCALE

(GA5773 Iss. 1)

Desk-Top Installation

Fig. 6

COMPONENT IDENTIFICATION

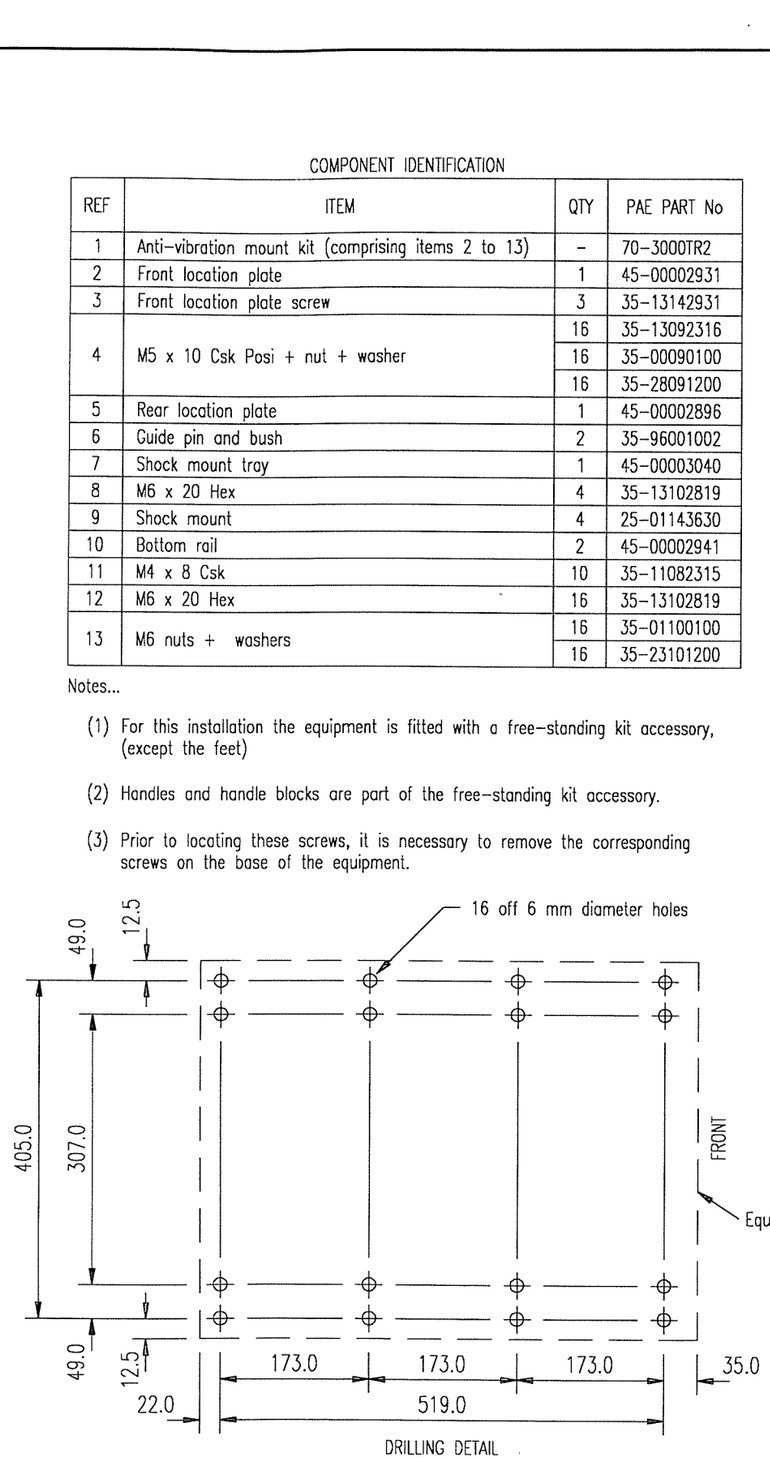
REF	ITEM	QTY	PAE PART No
1	Anti-vibration mount kit (comprising items 2 to 13)	–	70-3000TR2
2	Front location plate	1	45-00002931
3	Front location plate screw	3	35-13142931
4	M5 x 10 Csk Posi + nut + washer	16	35-13092316
		16	35-00090100
		16	35-28091200
5	Rear location plate	1	45-00002896
6	Guide pin and bush	2	35-96001002
7	Shock mount tray	1	45-00003040
8	M6 x 20 Hex	4	35-13102819
9	Shock mount	4	25-01143630
10	Bottom rail	2	45-00002941
11	M4 x 8 Csk	10	35-11082315
12	M6 x 20 Hex	16	35-13102819
13	M6 nuts + washers	16	35-01100100
		16	35-23101200

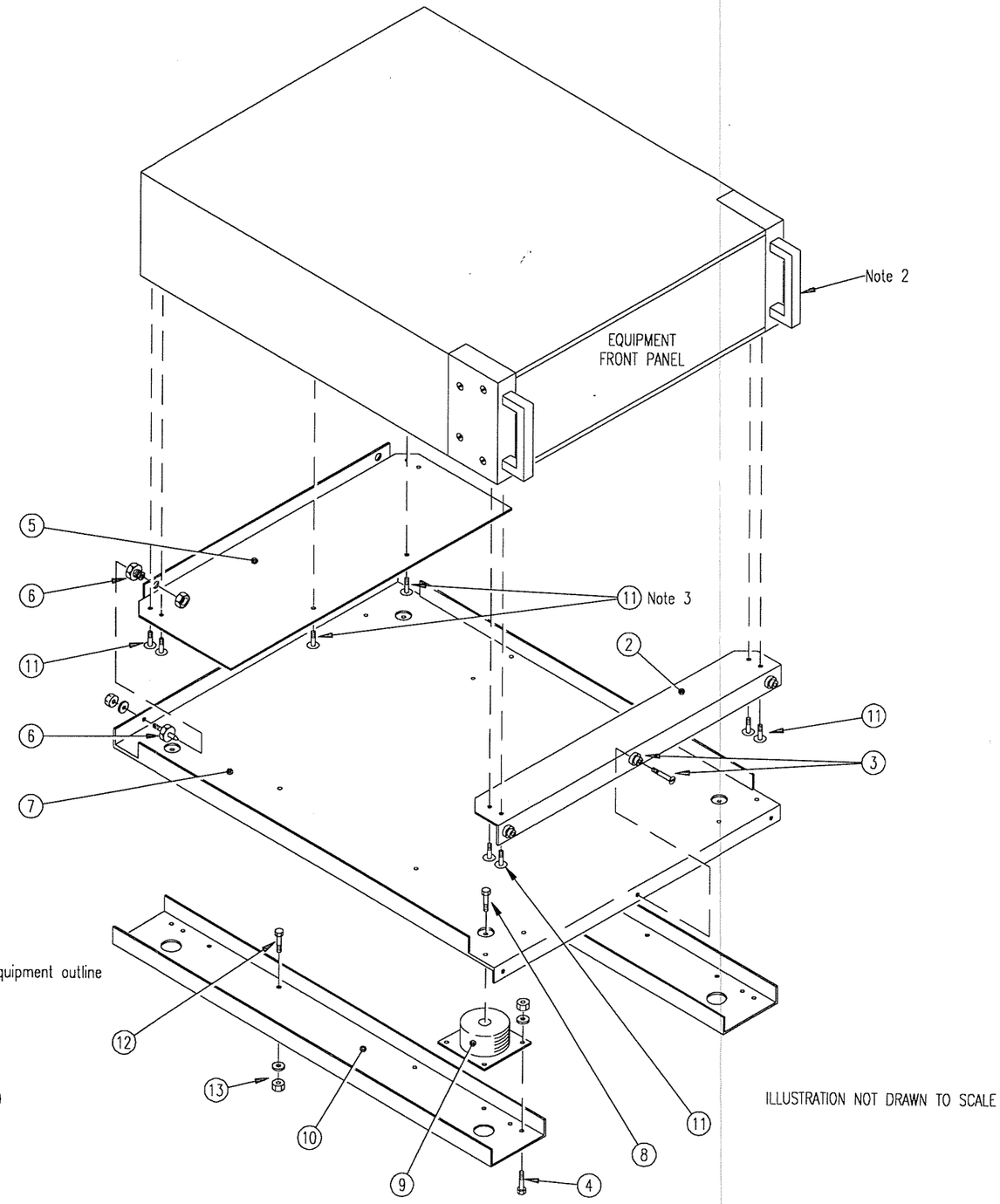
Notes...

(1) For this installation the equipment is fitted with a free-standing kit accessory, (except the feet)

(2) Handles and handle blocks are part of the free-standing kit accessory.

(3) Prior to locating these screws, it is necessary to remove the corresponding screws on the base of the equipment.

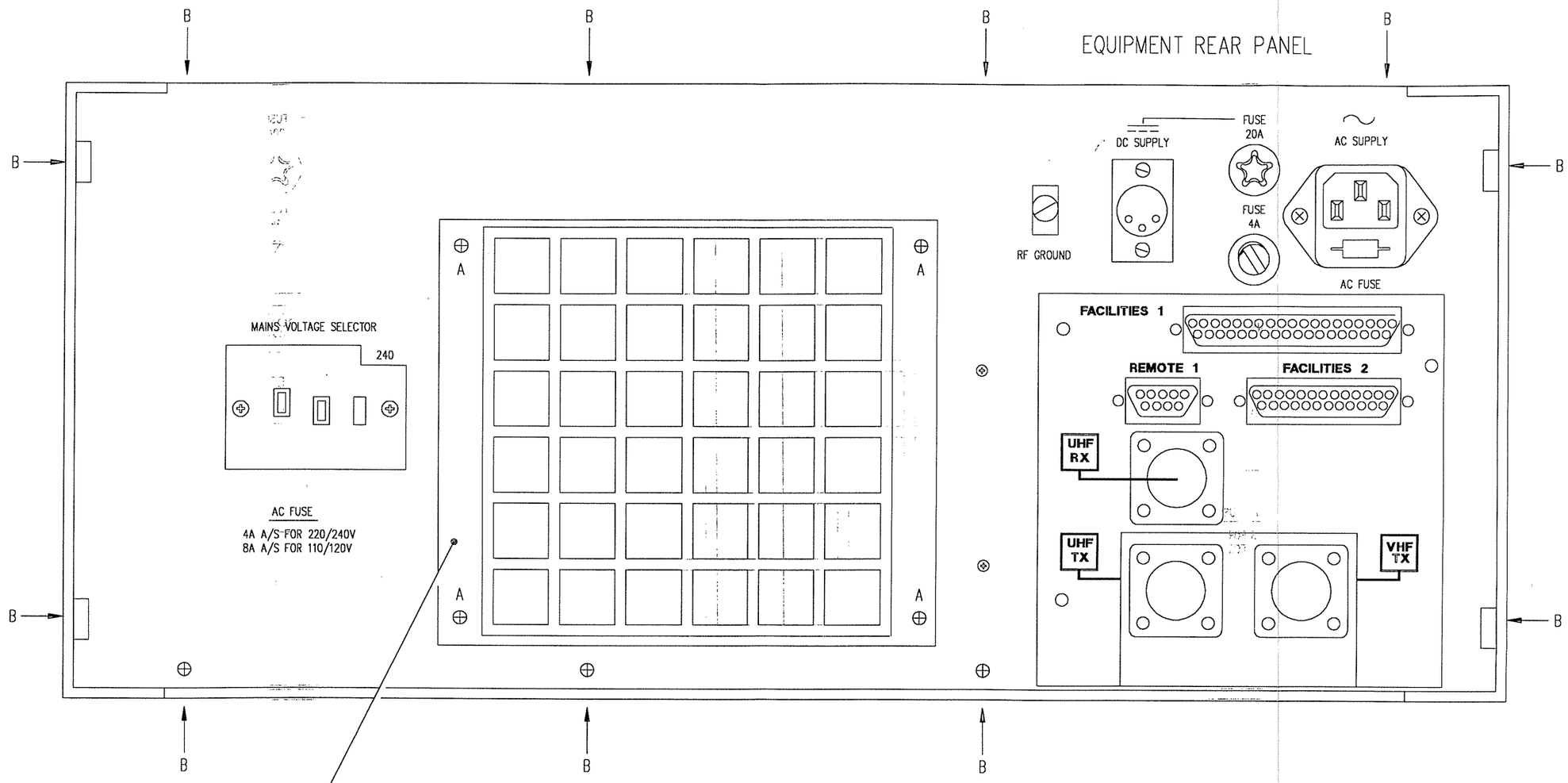




(GA5783 Iss. 1)

Anti-Vibration Mount Installation

Fig. 7



Air Filter housing

A – Denotes fan filter housing securing screws

B – Denotes hinged rear panel securing screws

Note:

Example is 3050 TR with OPTION 3 incorporated.

(GA8404 Iss. 1)

Air Filter Housing Securing Screws

Fig. 8