

Series 3000DV2 Radios
User Guide

Handbook Title: Series 3000DV2 Radios User Guide
Handbook Part Number: 31-33000DTR
Issue Number: 2
Date of Issue: July 2000

Handbook Amendment Record

Amendments to this handbook, originated by Park Air Electronics, are listed in the following table.

Amendment Number	Date	Brief Details	PAE Change Note Number

Equipment Modification Record

Modifications to the 3000DV2 radios are detailed in the following table.

Modification Number	Date	Brief Details	PAE Change Note Number
1	March '99	RF PA capacitors C17, C26, C39, C40 changed.	3590

Warnings

Warning. Lethal Voltages!

Installation involves the connection of lethal voltages. The instructions detailed in this handbook must be carried out only by suitably qualified personnel.

Warning. Heavy Item!

The 3000DV2 series radios weigh in excess of 25 kg; care must be taken when lifting and handling these units. At least two people must be used to lift the equipment.

Warning. Antenna Radiation!

Antennas used with 3000DV2 transmitters and transceivers must be installed such that the resultant radiated field strength is below 10 watt per square metre in areas normally accessible to personnel.

Warning. Beryllium/Beryllia!

The equipment covered by this handbook contains components incorporating the highly toxic material Beryllium and/or its oxide Beryllia. No instructions within this user guide require the removal of the radio's top or bottom covers so users are not exposed to a potential beryllium hazard. If the radio is to be disposed of, users must be aware of current disposal regulations regarding equipment containing Beryllium/Beryllia.

Caution

Caution. Electrostatic Sensitive Devices!

The equipment covered by this handbook contains electrostatic sensitive devices some of which are exposed when the rear panel is hinged down to obtain access to the mains voltage selector (see section 3 page 8). Observe handling precautions to avoid static charges which may damage these devices.

FEDERAL COMMUNICATIONS COMMISSION (FCC) REGULATIONS

- ❑ This device complies with Part 15 of the FCC Rules. Operation is subject to the condition that this device does not cause harmful interference.
- ❑ You are required to obtain a station licence before transmitting from your base station.
- ❑ This equipment is only licenced for operation on 25 kHz channel spacing in the VHF aeronautical band of 118 MHz to 136.975MHz employing amplitude modulation.
- ❑ The base station power output must not exceed the output necessary for satisfactory technical operation taking account of local conditions and the area to be covered.
- ❑ The base station's frequency and parameters should be checked by authorized service personnel before use, and at least yearly thereafter.

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INTRODUCTION

1 This handbook describes the installation and operation of the Park Air Electronics (PAE) series 3000DV2 radios. The series comprises the following models:

- 3040V2 UHF transmitter/receiver
- 3070V2 VHF transmitter/receiver
- 3060V2 VHF/UHF transmitter/receiver
- 3140V2 UHF transmitter
- 3170V2 VHF transmitter
- 3160V2 VHF/UHF transmitter
- 3240V2 UHF receiver
- 3270V2 VHF receiver
- 3260V2 VHF/UHF receiver

2 The purpose of this handbook is to provide sufficient information to successfully install and operate the radios. No topics covered in this book involve power being applied with any equipment covers removed. A full technical description, to component level, of each radio 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 equipment, and details the various installation options.
- ❑ **Section 2.** Provides the technical specification of the equipment.
- ❑ **Section 3.** Provides installation and commissioning instructions for the equipment. 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 the 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 number; for example, Fig. 3-1.

EQUIPMENT OVERVIEW

4 Series 3000DV2 radios can operate in the VHF 100 to 163 MHz and/or UHF 225 to 339.975 MHz frequency bands, with 25 kHz channel spacing. 8.33 kHz channel spacing is also available in the VHF band between 118.000 MHz and 136.975 MHz. Standard operating modes are amplitude modulation (AM) or frequency modulation (FM) with both clear voice and data (16 kBit cypher) modes selectable. When 8.33 kHz channel spacing is used, the radio automatically defaults to AM, clear voice mode.

5 The radios are suitable for use in voice encryption systems and Link 11 applications. All UHF sets can be equipped with an internal ECCM module to provide Have Quick II frequency hopping operation (for Have Quick operating instructions refer to document PAE 31B33060SUP).

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

7 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. If a PAE 3640 power amplifier is used in conjunction with a 3000DV2 transmitter or transceiver, the radio's FM output is automatically reduced to 40 watts to produce a 100 watt output from the power amplifier.

Power Supplies

8 The radios 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.

9 When both ac and dc supplies 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.

Built-in Test Facility

10 A built-in test (BIT) facility monitors essential parameters within the equipment, and displays an error message if a fault is found. The BIT 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.

11 Full details of BIT operation and the resultant error messages are given in section 4.

TYPES OF INSTALLATION

12 The series 3000DV2 radios 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 desktop equipment using the PAE free-standing accessory kit.
- In mobile applications using the PAE free-standing accessory kit plus an anti-vibration mount kit.

Control of Equipment

13 The radios can be controlled in local, or remote modes. In local mode, control of the equipment is by using 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.

14 As an alternative to local control, a PAE series 3000V2 Remote Control Unit (RCU) can be used; the RCU replicates many of the radio's front panel controls and indicators. The radio's remote control module 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 (1043 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.

15 For remote management of the equipment, and when part of a communication system, the PAE Multi-Access Remote Control (MARC) system can be used.

OPTIONS

16 In addition to the standard operational functions the following options are available (see Table 1-1 for applicability to your model). Some of the options require additional hardware; others are built-in the radio and are available when the option is selected from the front panel. Table 1-1 details which options can be fitted to which radio.

VHF/UHF Guard Receiver (Option 01)

17 Guard receiver module operating on 121.5 or 243.00 MHz AM. Can be configured for independent or combined (with main receiver) antenna operation. This option requires an additional module to be fitted in the radio.

Configurable Antenna Port (Option 04)

18 Configurable antenna switching. This includes single and multi-antenna options configured to a customer's requirements.

Fill Gun Port (Option 05)

19 Provides a front panel fill gun port (for use with Have Quick radios).

External Power Amplifier/Filter Drive (Option 06)

20 A multi-purpose interface for use with an external power amplifier, or an auto-tune filter. This option is built-in and becomes operational when selected from the radio's front panel.

Internal Have Quick (Option 07)

21 Option 07 provides a Have Quick II ECCM capability. This option requires an additional module to be fitted in the radio.

VHF Frequency Extension (Option 08)

22 Provides for extension of the VHF frequency range to cover 100 to 163 MHz. This option is built-in and becomes operational when selected from the radio's front panel.

Maritime Band (Option 10)

23 Provides pre-programmed international maritime channels within the frequency range of 156 MHz to 163 MHz. Information regarding maritime frequency channels is given in section 4 of this handbook. This option is built-in and becomes operational when selected from the radio's front panel.

Internal Quick Fox Module (Option 12)

24 Option 12 provides a Quick Fox ECCM capability. This option requires minor modification to the standard radio and an additional module to be fitted.

Table 1-1 Options - Model Applicability

Model	Options							
	01	04	05	06	07	08	10	12
Transceivers:								
3070V2 VHF	✓	✓	X	✓	X	✓	✓	X
3040V2 UHF	✓	✓	✓	✓	✓	X	X	✓
3060V2 V/UHF	✓	✓	✓	✓	✓	✓	✓	✓
Transmitters:								
3170V2 VHF	X	✓	X	✓	X	✓	✓	X
3140V2 UHF	X	✓	✓	✓	✓	X	X	✓
3160V2 V/UHF	X	✓	✓	✓	✓	✓	✓	✓
Receivers:								
3270V2 VHF	✓	✓	X	✓	X	✓	✓	X
3240V2 UHF	✓	✓	✓	✓	✓	X	X	✓
3260V2 V/UHF	✓	✓	✓	✓	✓	✓	✓	✓

✓ = available X = not available

Options shown shaded are built-in to all applicable radios and can be made operational from the front panel (see section 4)

USER MAINTENANCE

25 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.

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GENERAL

1 This section provides the specification for the series 3000DV2 radios. The specification covers all models, therefore, users should only read those parts of the specification applicable to their equipment.

Frequency range:

VHF	100 to 155.975 MHz
	100 to 163 MHz when Option 08 is selected

UHF	225 to 399.975 MHz
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Frequency error ≤1.5 ppm (-20°C to +0°C)

≤ 1 ppm (0°C to +55°C)

Ageing ≤ 1 ppm/year

Channel spacing 25 kHz
8.33 kHz (only available between 118 and 136.975 MHz, AM voice band. See FCC Warning)

pre-set channels 99

Time for frequency change ≤8 ms

Classes of emission	A3E, AXX, F3E, FXX Link 11 to STANAG 5511 Have Quick to STANAG 4246 (Option 07)
Antenna configuration	Independent VHF and UHF antenna ports are provided as standard, other configurations are optional (Option 04)

INPUT SUPPLIES

2 The equipment operates from an ac or dc input supply. The voltage ranges and system readiness data are:

Power supply	110/120 V or 220/240 V, 45 to 65 Hz \pm 10% from selected tap Consumption: 700 VA (Tx/TR models) 175 VA (Rx models)
DC	22 to 32 V. Negative earth Consumption: 18 A (Tx/TR models) 3 A (Rx models)
System readiness	<10 seconds

DIMENSIONS AND WEIGHT

3 The dimensions and weight of the equipment are:

Width (W)	430 mm (width to the extremities of side heatsink fins)
Height (H)	178 mm
Depth (D)	597 mm (depth from rear mounting face). Front panel projections 41 mm (from mounting face)
Weight	32 kg

ENVIRONMENTAL

4 The temperature and relative humidity ranges, and other environmental data are:

Temperature range:

Operating	-20°C to +55°C
Storage	-40°C to +70°C

Duty cycle	Continuous operation up to +55°C
Relative humidity:	
Operating	95% at 55°C MIL STD 810C
Storage	85% at 40°C MIL STD 810C
Salt fog	Complies with MIL STD 810C
Vibration and shock:	
Shock	40 g, 6 ms
Vibration	10 to 500 Hz MIL STD 810C
EMC	To MIL STD 461/462D part 4

TRANSMITTER

RF Characteristics

5 The characteristics of the transmitter's RF output are:

Carrier power output	40 W AM; 60 W FM. FM power is automatically reduced to 40 watts when a serviceable PAE 3640 power amplifier is connected to a UHF transmitter or transceiver.
	±0.5 dB over operating band
	±1 dB over temperature range
	0 to 10 dB front panel adjustment
Power reduction	Output power is automatically reduced under the following conditions:
	<input type="checkbox"/> when VSWR exceeds 2.5:1 (gradual reduction to -10 dB at infinite VSWR)
	<input type="checkbox"/> when dc supply falls below 26 V (1 dB nominal reduction)
	<input type="checkbox"/> when the temperature exceeds 80°C (6 dB reduction)
	<input type="checkbox"/> when the temperature exceeds 90°C (9 dB reduction)
Permissible mismatch	Infinite VSWR
Harmonic outputs	Better than -70 dBc (-60 dBc between 225 and 230 MHz)

Spurious outputs	Better than -80 dBc >500 kHz from carrier
Broadband noise	Better than -155 dBc/Hz, 3 MHz from carrier

Modulation Characteristics (Speech A3E, F3E)

6 The characteristics of the transmitter's speech modulation are:

Frequency response:

25 kHz channel spacing	300 Hz to 3.4 kHz, +1.5, -3 dB (ref. 1 kHz) 75 Hz, -20 dB; 6.8 kHz, -30 dB
------------------------	---

8.33 kHz channel spacing	300 Hz -2.5 kHz, +2, -4 dB (ref. 1 kHz) 75 Hz, -20 dB; 3.2 kHz, -25 dB
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Modulation index	M = 0.9 AM, ± 5 kHz FM
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Distortion	$\leq 5\%$ THD at M = 0.9
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Line input	See - Remote Control Decoder
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Microphone input	600 ohms adjustable 0.5 mV to 30 mV
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Speech processing:

VOGAD (switchable)	Dynamic range 30 dB for $\pm 2\%$ change in modulation depth Attack time <10 ms Decay time >1 second for 10 dB step input
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RF clipper	Clipping depth 6 dB ± 2 dB. Provides increase in average modulation depth
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Mute	Adjustable to open from 3 mV mic input. Response time 5 ms for 20 dB step input from 10 dB below VOGAD threshold. Hang time 1.5 sec nominal
-------------	---

Modulation Characteristics (Data AXX, FXX)

7 The characteristics of the transmitter's data modulation are:

Modulation index	M = 0.9 AM, 20 kHz FM
-------------------------	-----------------------

Frequency response	25 Hz to 20 kHz ± 3 dB (ref. 5.5 kHz) 20 Hz to 24 kHz ± 5 dB (ref. 5.5 kHz)
---------------------------	--

Differential group delay	<100 μ s, 600 Hz to 20 kHz <100 μ s, 300 Hz to 600 Hz
---------------------------------	--

Line input	600 ohms nominal balanced Level adjustable -20 dBm +10 dBm
Link 11 input (UHF models only)	600 ohms nominal balanced input level adjustable between -20 dBm and +10 dBm for ± 20 kHz deviation

RECEIVER

RF Characteristics

8 The characteristics of the receiver's RF circuitry are:

Sensitivity (for S+N:N of 10 dB)	A3E: $\leq 2 \mu\text{V}$ (-101 dBm); M= 0.3 at 1 kHz modulation F3E: $\leq 1.5 \mu\text{V}$ (-104 dBm): deviation 3.5 kHz with 1 kHz modulation AXX: $\leq 4.0 \mu\text{V}$ (-95 dBm); M=0.6 FXX: $\leq 4.0 \mu\text{V}$ (-95 dBm); 5.5 kHz deviation Note: depending on antenna configuration, sensitivity may be reduced by 3 dB when optional guard receiver is fitted.
Spurious suppression	≥ 80 dB (two exceptions 70 dB)
Desensitisation (for S+N:N ≥ 6 dB)	Wanted signal: $2 \mu\text{V}$ M=0.3 Interfering signal: 0 dBm at 5 MHz
Cross modulation (for 20 dB ratio)	≥ 100 dB at ± 5 MHz (ref $1 \mu\text{V}$ emf)
Intermodulation (ref $1 \mu\text{V}$ emf)	≥ 80 dB for equal amplitude signals, ± 100 kHz or greater from fc
Antenna radiation	$\leq 20 \mu\text{V}$ at antenna connector
Maximum RF input	20 V without damage (<30 seconds)
IF Bandwidth:	
A3E, F3E with 25 kHz channel spacing	≥ 24 kHz for 3 dB ≤ 50 kHz for 70 dB
A3E with 8.33 kHz channel spacing	≥ 7 kHz for 6 dB ≤ 16.66 kHz for 50 dB
AXX, FXX	≥ 75 kHz for 6 dB ≤ 150 kHz for 60 dB

AGC:

RF	≤3 dB change in audio output for input signals in the range 2 μV to 700 mV. Time constant 10 to 30 ms attack, 75 to 150 ms release
AF	≤1 dB change in audio output for M=0.3 to M=0.9

AF Characteristics (Speech A3E, F3E)

9 Speech characteristics of the receiver's audio are:

Line output	600 ohms balanced transformer. Level adjustable -20 dBm to +6 dBm. Frequency response 300 Hz to 3.4 kHz ±3 dB (ref 1 kHz); -20 dB at 75 Hz; -30 dB at 6.8 kHz
Loudspeaker output	8 ohms, 1.5 W into internal loudspeaker
Distortion:	
AM	M=0.3 ≤5% THD, M=0.9 ≤10% THD
FM	F=3.5 kHz ≤5% THD
Linearity (FM)	With 935 Hz and 1045 Hz tones of 10 kHz deviation the level of the third order products is less than -30 dB relative to the other tone
Noise blanking	Impulse noise removed by audio blanker that operates for M=0.9 or greater
Mute	S/N operated with carrier override adjustment. Range 6 to 16 dB S+N:N Response time: ≤50 ms with step input 10 dB above the threshold Hang time: ≤50 ms Hysteresis: ≤3 dB Quieting: >40 dB 8.33 kHz channel spacing uses carrier operated mute.

AF Characteristics (Data AXX, FXX)

10 Data characteristics of the receiver's audio are:

Wideband output	600 ohm nominal balanced. Adjustable -20 dBm to 0 dBm
Frequency response	25 Hz to 20 kHz ±3 dB ref. 5.5 kHz; 20 Hz to 24 kHz ±5 dB (ref. 5.5 kHz)
Differential group delay	≤20 μs 600 Hz to 20 kHz

Link 11 output
(UHF models only)

600 ohm balanced. Adjustable from -20 dBm to 0 dBm for ± 20 kHz deviation at 1 kHz

REMOTE CONTROL DECODER

11 Remote control can be configured for operation over ac or dc data circuits as follows:

DC control:

Data circuits	4-wire serial control interface, RS422 compatible. Operable up to a distance of 2 km
Audio circuits	4-wire 600 ohms nominal balanced transformer. Level adjustable -20 dBm to +10 dBm
PTT	Via separate contact closure or phantom audio link

AC control:

Data circuits	4-wire 600 ohms nominal serial control interface, CCITT V23 compatible (internal modem). Level fixed at -13 dBm, automatic gain adjustment for line losses up to 17 dB
Audio circuits	4-wire 600 ohms nominal balanced transformer.
PTT	Via 2930 Hz tone on audio circuit

GUARD RECEIVER SPECIFICATION

12 The specification of the optional guard receiver is:

Mode	AM speech only
Frequencies	121.5 MHz and 243 MHz
Frequency error	≤ 10 ppm
Sensitivity (for S+N:N of 10 dB) May be degraded by 3 or 6 dB depending on the antenna configuration	≤ 1.0 μ V (weighted to CCITT) ≤ 1.5 μ V (non-weighted) M=0.9 at 1 kHz
IF bandwidth	≥ 22 kHz for 6 dB
IF selectivity	≤ 50 Hz for 60 dB
Mute	Mute adjustable for S+N:N, 6 dB to 16 dB
Mute indication	Separate front panel indicator and rear panel signal output

Audio output	Mixable with normal receiver audio with separate line output
Line output (narrow-band)	600 ohm balanced transformer. Adjustable -20 dBm to +6 dBm (for M =0.3)
Frequency response	300 Hz to 3.4 kHz \pm 3 dB (ref. 1 kHz); -20 dB at 75 Hz; -30 dB at 6.8 kHz.

Installation and Setting-Up Instructions

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INTRODUCTION

Warning!

Installation involves the connection of lethal voltages. The instructions detailed in this section must be carried out only by suitably qualified personnel.

Warning!

The series 3000DV2 radios weigh in excess of 25 kg; care must be taken when lifting and handling these units. At least two people must be used to lift the equipment.

1 This section details the installation and setting-up instructions for the equipment. It is recommended that the instructions given in this section are carried out in the order presented.

INSTALLATION

PRELIMINARY CHECKS

2 Carefully remove the transit packaging from the equipment and carry out a visual inspection of the unit for signs of damage that may have occurred during shipment.

Note ...

It is recommended that if a claim for damage in transit is to be made the packaging and/or containers should be retained to substantiate the claim.

3 Table 3-1 details the internal user adjustments for series 3000DV2 radios with column (3) showing the manufacturers standard settings. Check that settings applicable to your equipment meet the required operational conditions.

Note that the radio(s) are normally configured to a user's requirements during manufacture at Park Air Electronics. Table 3-1 is therefore given for informational purposes only. If there is a need to alter any settings reference to the appropriate technical handbook(s) may be required.

4 If adjustments are required to be made to the internal standard settings remove the top cover and locate the appropriate module as indicated in Table 3-1. If the equipment is configured as a desktop or module installation, the olive green top cover will have to be removed prior to the removal of the equipment top cover. To access the components locate and loosen the two securing slotted head screws and withdraw the module. Refitting is the reverse of removal.

Table 3-1 3000DV2 Radio Standard Settings

Module/Component (1)	Function (2)	Standard Setting (3)
Tx Control (Module 2) RV3 RV8 RV6 RV2 RV4 RV1 Link J1 Link J5 Link J2 Link J6	Set tape output Modulation depth for wideband AM Modulation depth for wideband FM Modulation depth for narrow-band Set mute Microphone gain VOGAD Factory set Mute RF drive level detect override	-8 dBm AM = 80% FM = 20 kHz AM = 80% FM = 5 kHz 1 mV 5 mV On Off Off Off
Rx IF and Audio (Module 8) RV1 RV9 RV7 Link Lk3 Link Lk2	Wideband output level Mute carrier override VOGAD threshold level VOGAD Noise blanker	-8 dBm for 30% AM 30 μ V pd 30% AM Off Off
Guard Receiver (Module 4) (if fitted) RV9 RV8 Link J1 Link J2	Mute level Audio line output level Noise blanker VOGAD	1 μ V pd -8 dBm for 30% AM Off Off
Remote Control (Module 5) (if fitted) - - Links J1 to J11	Line input level Line output level Mode configuration	-13 dBm -13 dBm Set for required mode of operation. Refer to the Remote Control section of the 3000DV2 Technical Handbook.

MECHANICAL INSTALLATION

- 5 The equipment 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 desktop 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 radio. Under no circumstances must the radio be supported by the front panel; doing so can cause irreparable damage.

Fixed Runner

6 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

7 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 fitting 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.

Desktop Installation

8 The following installation instructions configure the equipment for desktop operation using a free-standing accessory kit (PAE part no. 70-3060TR1). With reference to Fig. 6 locate and identify the components of the free-standing kit.

- (a) At the front of the equipment locate and remove the four 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 (a), to the left handle plate (item 3) and the right handle plate (item 2) using the four (two per handle) M5 x 16 mm cap head screws (item 10). Secure the handle plates to the unit using the eight (four per plate) M4 x 16 mm pan head screws (item 9) and M4 crinkle washers (item 14).
- (c) At the rear of the equipment locate and remove the ten rear panel assembly retaining screws (item A) and carefully lower the rear panel assembly.
- (d) On the left and right-hand side of the PSU compartment locate the four symmetrically placed holes, note that the two rearmost holes are countersunk. Fit the eight hexagonal M3 x 12 mm spacers (item 4) to the sides using the four M3 x 6 mm pan head screws (item 11), four M3 x 6 mm countersunk screws (item 8) and eight M4 crinkle washers (item 14).
- (e) Raise and secure the rear panel with the ten retaining screws (item A) removed in (c).
- (f) Fit the two 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 two M4 x 6 mm pan head 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 four 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

9 The following instructions configure the equipment for mobile operation using a free-standing accessory kit (PAE part number 70-3060TR1) and anti-vibration mount accessory kit (PAE part number 70-3060TR2). Before the anti-vibration mounts can be fitted, the equipment must have the free-standing accessory kit fitted (refer to previous paragraphs detailing desktop installation).

10 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 desktop installation procedures. 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.
- (b) Before fitting the rear location plate (item 5) it is necessary to remove two screws from the 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.
- (c) 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).
- (d) Fit the shock mount tray (item 7) to the shock mounts using the four M6 x 20 mm hexagonal headed screws (item 8).
- (e) 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).

- (f) Fit the anti-vibration mount assembly into the vehicle and secure firmly.
- (g) Attach the two guide pin bushes (item 6) to the equipment mounted rear location plate (item 5).
- (h) Attach the two locating guide pins (item 6), facing forward, to the shock mount tray rear rail (item 7).
- (i) 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 SELECTIONS AND CONNECTIONS

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

- ac and/or dc supplies.
- Facilities connections (as required).
- Remote control (if remote control facility is to be used).
- Power amplifier or auto-tune filter connection (if required)
- Antenna.

Note ...

The radio 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

12 The equipment can operate with an ac input of 110/120 V or 220/240 V (refer to section 2 specification). The mains voltage selector, fitted under the rear panel top plate must correspond to the local ac voltage. If the selector's current setting is incorrect, complete the following steps:

- (a) Remove four screws securing the top of the rear panel to the main chassis.
- (b) Remove the two securing screws on both the left and right-hand sides of the rear panel and remove the two screws securing the rear panel to the antenna assembly.
- (c) Hinge the rear panel down to expose the mains voltage selector.
- (d) Remove the mains selector cover plate.
- (e) Set the two switches as required.
- (f) Refit the cover plate ensuring that the voltage displayed in the plate's cut-out agrees with the required switch setting.
- (g) Replace the rear cover using the reverse of the procedure detailed in (a), (b), and (c).

Supply Fuses

13 Three fuses are fitted to the equipments rear panel (see Fig. 4):

- The ac input supply fuse F3 (fitted in the ac input connector).
- The dc input fuse F1.
- The dc equipment fuse F2.

14 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 3-2.


Table 3-2 Rear Panel Fuse Ratings

Fuse	Rating	Size	PAE Part Number
Fuse 1	20 amp. F20A 32 V BS	Size 0 (1¼ inch)	29-01450201
Fuse 2	4 amp. F4A 250 V IEC	20 mm	29-01120101
Fuse 3 (110/120 V)	8 amp. T8A 250 V IEC	20 mm	29-01210102
Fuse 3 (220/240 V)	4 amp. T4A 250 V IEC	20 mm	29-01120102

ac Supply Connection

Warnings!

This equipment must be earthed. The earth terminal of the ac connector should be used as the safety earth.

A chassis stud, marked  is fitted to the equipment's rear panel. This stud is for connecting the equipment to the equipment rack or user's system earth point. The stud is not intended to be used as the safety earth.

15 The ac supply connector is fitted to the radio's rear panel (see Fig. 4). The minimum rating of the ac supply cable is: 3-core (to IEC227) rated 250 V ac at 13 amps, and having a minimum cross-sectional area of 1.25 mm² per core. PAE recommends the use of polyvinyl chloride (PVC) cable. The cable must be fitted with an IEC approved equipment connector (for example, PAE part number 20-02030102) and conform to the following specification.

- 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).
- 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).

16 The series 3000DV2 transmitters, receivers and transceivers 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.

17 PAE recommends the ac supply cable is colour coded in accordance with the electrical appliance (colour code) regulations for the UK. That is:

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

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


- The core that 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.
- The core that is coloured blue must be connected to the terminal that is marked with the letter N or coloured black.
- The core that is coloured brown must be connected to the terminal that is marked with the letter L or coloured red.

dc Supply Connection

19 The dc supply connector is fitted to the equipment's rear panel as shown in Fig. 4. The recommended minimum rating of the dc supply cable is: 2-core, each having a cross-sectional area of not less than 6.0 mm² per core and fitted with an AMP 3 series connector. The dc supply is connected to the rear panel DC SUPPLY AXR-PDN style connector, with its associated fuse, as detailed in Table 3-2 and colour coded as follows:

Pin 1 +28 V	Red
Pin 2 0 V (ground)	Black

Chassis Stud Connection

20 In order not to compromise the equipment's Electromagnetic Capability (EMC) the chassis stud marked  fitted to the rear panel must be connected to the equipment rack (if a rack is being used) or to the user's system earth point. The connection must be made using a single tri-rated, green-and-yellow cable having a cross-sectional area of 2.5 mm². The cable should have CSA and UL1015 approval, and be connected to the chassis stud through an M6 eyelet (for example, PAE part number 20-08010103).

Failure to comply with this instruction could result in non-compliance with the European Commission EMC Directive 89/336/EEC.

Facilities 2 Connections

21 The facilities 2 connector CN2, fitted to the equipment's rear panel (refer to Fig. 4), provides a number of control and monitoring signals that can be configured by the user as required. The connector pin-outs are detailed in Tables 3-3 to 3-5 and described in the following paragraphs.

22 When making connections to rear panel D-type connector CN2, and in order not to compromise the equipment's Electromagnetic Compatibility (EMC), users must:

- ❑ use a D-type connector that has a screened cover.
- ❑ use screened multi-way cable, with the cable's screen connected to the connector's shell or body.

Rx Audio 1 and 2, Wideband Output

23 Pins 1 and 2 provide a 600 ohm balanced wideband data output. The output can be adjusted between -20 and +10 dBm.

Tx Audio 1 and 2, Wideband Input

24 Pins 3 and 4 provide a 600 ohm balanced wideband data input. The input can be adjusted between -20 to +10 dBm.

Tape Output

25 Pin 5 provides a 600 ohm single-ended audio output for use with suitable tape recording equipment. The output contains both the transmit and receive audio.

Guard Mute State

26 Pin 6 provides an active low TTL compatible output when the guard receiver's (if fitted) mute threshold is exceeded. This output can be used to indicate when a signal is being received.

PTT State

27 Pin 7 provides an active low TTL compatible output on PTT (pin not used if option 06 fitted).

Guard Rx, Audio 1 and 2 Output

28 The guard Rx audio output, available between pins 8 and 9, provides a 600 ohm balanced audio output from the guard receiver (if fitted).

Input to Receiver Audio Filter

29 Pins 10 and 11 provide an input to the receiver's audio filter circuits. These inputs are usually 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

30 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.

DPTT

31 Pin 13 provides a delayed PTT that may be required in Have Quick and/or encryption system applications.

Hardwire PTT

32 Pin 15 provides 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 Audio 1 and 2 Narrow-band Input

33 Pins 16 and 17 provide a 600 ohm balanced narrow-band audio input. The input can be adjusted in the range -20 dBm to +10 dBm.

Rx Audio 1 and 2 Narrow-band Output

34 Pins 18 and 19 provide a 600 ohm balanced narrow-band audio output. The output can be adjusted in the range -20 dBm to +10 dBm.

Link 11 Tx Audio 1 and 2 Input

35 Pins 20 and 21 provide a 600 ohm balanced input. The input can be adjusted in the range -20 dBm to +10 dBm.

Link 11 Rx Audio 1 and 2 Output

36 Pins 22 and 23 provide a 600 ohm balanced output. The output can be adjusted in the range -20 dBm to +10 dBm.

BIT Output

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

Table 3-3 Facilities 2 Connector (CN2) Pin-Out for Transceivers

Pin	Function	Description
1 2	Rx wideband audio line L1 Rx wideband audio line L2	600 ohm balanced output (adjustable -20 dBm to +10 dBm for m = 0.9)
3 4	Tx wideband audio line L1 Tx wideband audio line L2	600 ohm balanced input (adjustable -20 dBm to +10 dBm for m = 0.9)
5	Tape output	600 ohm single-ended output. Combined Tx and Rx audio at -8 dBm (nominal)
6	Guard mute state	Open collector with 10k pull-up resistor to 5 V
7	PTT state (pin 7 not used if option 06 is selected)	Open collector with 10k pull-up resistor to 5 V
8 9	Guard receiver audio line L1 Guard receiver audio line L2	600 ohm balanced audio output from guard receiver (if fitted) at -8 dBm (adjustable)
10 11	Rx encryption audio input line L1 Rx encryption audio input line L2	For decrypted audio processing
12	Mute state output	Active low TTL output
13	DPTT	Delayed PTT input
14	Not used	-
15	Hardwire PTT	0 volt input keys transmitter
16 17	Tx narrow-band audio line L1 Tx narrow-band audio line L2	600 ohm balanced input (adjustable -20 dBm to +10 dBm for m = 0.9)
18 19	Rx narrow-band audio line L1 Rx narrow-band audio line L2	600 ohm balanced output (adjustable -20 dBm to +10 dBm for m = 0.9)
20 21	Link 11 Tx audio line L1 (UHF only) Link 11 Tx audio line L2 (UHF only)	600 ohm balanced Link 11 audio input (adjustable -20 dBm to +10 dBm for F = 20 kHz)
22 23	Link 11 Rx audio line L1 (UHF only) Link 11 Rx audio line L2 (UHF only)	600 ohm balanced Link 11 audio output (adjustable -20 dBm to +10 dBm for F = 20 kHz)
24	BIT output	Memory fault output. Active low TTL
25	0 volt	Ground

Table 3-4 Facilities 2 Connector (CN2) Pin-Out for Receivers

Pin	Function	Description
1 2	Rx wideband audio line L1 Rx wideband audio line L2	600 ohm balanced output (adjustable -20 dBm to +10 dBm for m = 0.9)
5	Tape output	600 ohm single-ended output. Rx audio at -8 dBm (nominal)
6	Guard mute state	Open collector with 10k pull-up resistor to 5 V
8 9	Guard receiver audio line L1 Guard receiver audio line L2	600 ohm balanced audio output from guard receiver (if fitted) at -8 dBm (adjustable)
10 11	Rx encryption audio input line L1 Rx encryption audio input line L2	For decrypted audio processing
12	Mute state output	Active low TTL output
18 19	Rx narrow-band audio line L1 Rx narrow-band audio line L2	600 ohm balanced output (adjustable -20 dBm to +10 dBm for m = 0.9)
22 23	Link 11 Rx audio line L1 (UHF only) Link 11 Rx audio line L2 (UHF only)	600 ohm balanced Link 11 audio output (adjustable -20 dBm to +10 dBm for F = 20 kHz)
24	BIT output	Memory fault output. Active low TTL
25	0 volt	Ground

Table 3-5 Facilities 2 Connector (CN2) Pin-Out for Transmitters

Pin	Function	Description
3 4	Tx wideband audio line L1 Tx wideband audio line L2	600 ohm balanced input (adjustable -20 dBm to +10 dBm for m = 0.9)
5	Tape output	600 ohm single-ended output. Tx audio at -8 dBm (nominal)
7	PTT state (pin 7 not used if option 6 is selected)	Open collector with 10k pull-up resistor to 5 V
13	DPTT	Delayed PTT input
15	Hardwire PTT	0 volt input keys transmitter
16 17	Tx narrow-band audio line L1 Tx narrow-band audio line L2	600 ohm balanced input (adjustable -20 dBm to +10 dBm for m = 0.9)
20 21	Link 11 Tx audio line L1 (UHF only) Link 11 Tx audio line L2 (UHF only)	600 ohm balanced Link 11 audio input (adjustable -20 dBm to +10 dBm for F = 20 kHz)
24	BIT output	Memory fault output. Active low TTL
25	0 volt	Ground

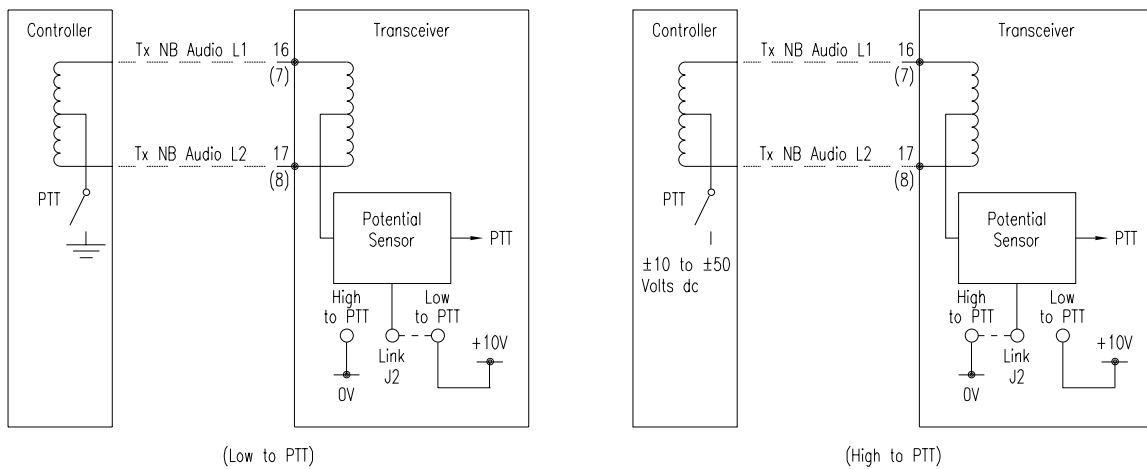
Remote PTT Configurations

38 Remote PTT configurations (reference transceivers and transmitters) are shown in Fig. 3-1 and are as follows:

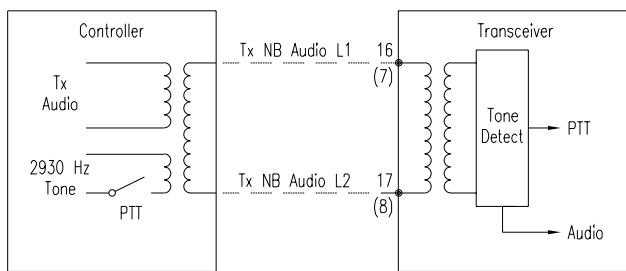
- dc Phantom keying (Low to PTT)
- dc Phantom keying (High to PTT)
- ac Tone keying
- Direct keying (Low to PTT)
- Direct keying (High to PTT)

39 Connections shown in Fig. 3-1 are to the transceivers facilities 2 connector CN2. Additionally, phantom keying and ac tone keying can be configured through the remote connector CN5. If using this method, use those connections shown in Fig. 3-1 that are in brackets. All links and circuitry shown are on the remote control module.

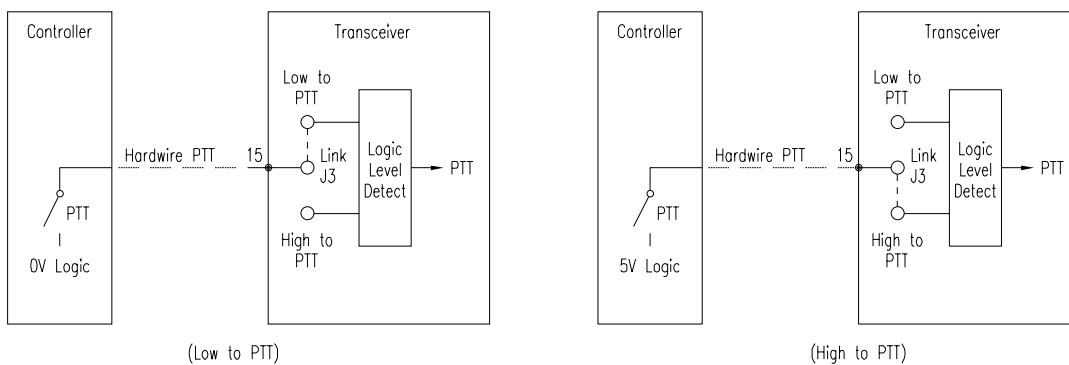
Note that the radio(s) are normally configured to a user's requirements during manufacture at Park Air Electronics. PTT configurations are therefore given for informational purposes only. If there is a need to alter any settings reference to the appropriate technical handbook(s) may be



dc Phantom Keying



ac (Tone) Keying



Direct Keying

Note...

dc phantom and ac tone keying connections can be made at the transceiver facilities connector CN2 or remote control connector CN5. Pin connections in brackets are in respect to CN5.

Fig. 3-1 Remote Interface PTT Configurations

Remote Control Connections

40 As an alternative to local operation, the equipment can be operated from a remote position using a PAE 3000V2 Series Remote Control Unit (RCU). Connections to the RCU are made from the radio's rear panel 9-way D-type remote connector CN5 (see Fig. 4).

41 The pin-out of the remote connector is detailed in Table 3-6. Pins 1 to 4 and 9 are used by all models; pins 5 and 6 by transceivers and receivers only, and pins 7 and 8 by transceivers and transmitters only.

42 When making connections to rear panel D-type connectors, and in order not to compromise the equipment's Electromagnetic Compatibility (EMC), users must:

- ❑ use a D-type connector that has a screened cover.
- ❑ use screened multi-way cable, with the cable's screen connected to the connector's shell or body.

Table 3-6 Remote Connector (CN5) Pin-Out

Pin	Function	Description	
		AC Control	DC Control
1 2 3 4	Transmit data Transmit data Receive data Receive data	CCITT V23 serial interface over ac lines with maximum line loss of 17 dB	Serial RS422 interface for operation up to 2 km when used with PAE 3000V2 Series Remote Control Unit (RCU)
5 6	Receive audio line L1 Receive audio line L1	4-wire operation. 600 ohm nominal. Operating line level with Automatic Level Control (ALC) is -13 dBm.	Line output adjustable between -20 dBm and +10 dBm
7 8	Transmitter audio line L1 Transmitter audio line L2	PTT signal is a 2930 Hz tone superimposed on the audio circuit.	Line input adjustable between -20 dBm and +10 dBm
9	0 volt connection	Ground	Ground

Microphone/Headset Connection

43 To operate the equipment in local mode using the front panel, a suitable microphone/headset, or headset is connected to the front panel's MIC/HEADSET connector. The connectors location is shown in Figs. 7 to 9 and the connector's pin-outs are detailed in Table 3-7 to 3-9. Fig. 3-2 shows the connector's pin-out.

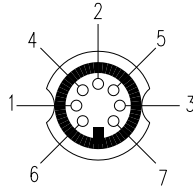


Fig. 3-2 Mic/Headset Connector Pin-Out

Table 3-7 Transceiver Mic/Headset Connector Pin-Out

Pin	Function	Description
1	Microphone ground	Microphone return
2	Not used	-
3	PTT	Local PTT line (0 volt keys transmitter)
4	Not used	-
5	Sidetone	Receive + Transmit audio to headset. 100 mW into 100 ohm.
6	Microphone live	600 ohm. 3 mV to 30 mV
7	0 volt	PTT grounding signal

Table 3-8 Receiver Mic/Headset Connector Pin-Out

Pin	Function	Description
1 to 4	Not used	-
5	Receiver audio	Receiver audio to headset. 100 mW into 100 ohm.
6	Not used	-
7	0 volt	Ground

Table 3-9 Transmitter Mic/Headset Connector Pin-Out

Pin	Function	Description
1	Microphone ground	Microphone return
2	Not used	-
3	PTT	Local PTT line (0 volt keys transmitter)
4	Not used	-
5	Sidetone	Transmit audio to headset. 100 mW into 100 ohm.
6	Microphone live	600 ohm. 3 mV to 30 mV
7	0 volt	PTT grounding signal

PA/Filter Drive Connection (Option 06)

44 With this option, the 37-way D-type connector CN3 on the rear panel (refer to Fig. 4) is used to interface the radio to an external auto-tune filter or power amplifier (such as a PAE 3640). The pin-out of the connector is detailed in Table 3-10.

45 When making connections to the rear panel D-type connector CN3, and in order not to compromise the equipment's Electromagnetic Compatibility (EMC), users must:

- use a D-type connector that has a screened cover.
- use screened multi-way cable, with the cable's screen connected to the connector's shell or body.

Note ...

When the optional Have Quick module is fitted in the radio, the function of connector CN3 pins 24 and 25 changes. These changes are detailed in Table 3-10. Note also the radio's front panel PCB DIP switch SW1-5 must be correctly set: On when a Have Quick module is fitted; Off when a Have Quick module is not fitted.

Table 3-10 Power Amplifier/Auto-Tune Filter Connections at CN3

Pin	Condition	Function
1	TTL	25 kHz
2	TTL	50 kHz
3	TTL	100 kHz
4	TTL	200 kHz
5	TTL	400 kHz
6	TTL	800 kHz
7	TTL	1 MHz
8	TTL	2 MHz
9	TTL	4 MHz
10	TTL	8 MHz
11	TTL	Amplifier present
12	Not used	-
13	Not used	-
14	Not used	-
15	0 volt	0 volt
16	0 volt	0 volt
17	0 volt	0 volt
18	0 volt	-
19	TTL	Filter detect
20	TTL	10 MHz
21	TTL	20 MHz
22	TTL	40 MHz
23	TTL	80 MHz
24	TTL	100 MHz (HQ module fitted: 200/300 MHz. High = 300 MHz selected)
25	TTL	200 MHz (HQ module fitted: No connection)
26	TTL	Filter tune
27	TTL	VHF/UHF state
28	TTL	AM/FM state
29	TTL	EBIT
30	TTL	Reset bypass/HQ AJ state
31	TTL	Inhibit
32	TTL	Fast PTT
33	Not used	-
34	Not used	-
35	28 V dc	28 V dc
36	28 V dc	28 V dc
37	28 V dc	28 V dc

Note ...

The frequency output pins (pins 1-10 and 20-25) are positive logic and represent the current frequency of the radio. For example if the radio was operating on 225.000 MHz, CN3 pins 7, 9, 21 and 25 would be logic high.

External Clock

46 The rear panel connector CN4 (see Fig. 4) is for use with transceivers with the Have Quick option that require an external clock. The connector allows an external timing source to be connected (see Table 3-11).

47 When making connections to the rear panel D-type connector CN4, and in order not to compromise the equipment's Electromagnetic Compatibility (EMC), users must:

- ❑ use a D-type connector that has a screened cover.
- ❑ use screened multi-way cable, with the cable's screen connected to the connector's shell or body.

Table 3-11 External Clock Interface Connector (CN4) Pin-Out

Pin Number	Signal	Function
1	Ext +5V In	+5 volt external oscillator supply
2	Ext TOD Out	External TOD output
3	Ext CLK In	External clock input
4	Ext CLK Shield	External clock 0 volt/screen
5	Ext TOD In	External time-of-day input
6	Gnd	0 volt signal return
7	Ext CLK En	External clock enable input
8 to 15	Not used	-

Unused Connection CN6

48 Connector CN6 is fitted on the rear panel, but is reserved for future development.

Antenna Connection

Warning!

Antennas used with 3000DV2 transmitters and transceivers must be installed such that the resultant radiated field strength is below 10 watt per square metre in areas normally accessible to personnel.

49 The antenna is connected through the appropriate rear panel VHF and/or UHF ANTENNA N-type coaxial connectors, (see Fig. 4). Connection to the antenna sockets should be made using coaxial cable type RG213 (PAE accessory part no. 10-05120600) fitted with the appropriate N-type plug (PAE part no. 19-01030301), see Fig. 8 for assembly details.

50 An alternative coaxial cable (PAE accessory part no. 10-05120200) with equivalent or better loss and power handling characteristics, fitted with an appropriate N-type plug (PAE part no. 19-01030306), can be used. Ensure that any coaxial cable connected to the equipment has a characteristic impedance of 50 ohms.

SETTING-UP

51 If available the following test equipment is recommended for carrying out the setting-up instructions:

RF Power Meter

or

Dummy Load

Note ...

When making key entries during the following procedures, do not pause more than 5 seconds between key strokes or new data will be lost and the system will revert to default settings.

PRELIMINARY CHECKS

52 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 transmitter verifying the following:

- All connections and connectors are secure.
- All cable assemblies are properly supported.
- No cable is trapped or kinked.
- The transmitter/receiver is secured in its operational position.
- Tools used during installation have been removed.
- The impedance of the antenna feed cable is correct.
- The supply voltages and ratings are correct.

53 If available connect a suitable RF power meter or dummy load to the appropriate rear panel N-type ANTENNA connector.

Warning ...

On application of ac and/or dc supplies lethal voltages are present within the equipment. Care must be taken by personnel to avoid contact with exposed circuitry during any setting-up or maintenance procedures.

SWITCHING ON, AND AC AND DC CHANGE-OVER CHECKS

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

- (a) At the front panel, set both AC and DC SUPPLY switches to on. Confirm that both AC and DC SUPPLY indicators, located on the front panel, are lit.
- (b) Isolate the radio from the ac supply and confirm that the following conditions exist:
 - AC SUPPLY indicator is unlit.
 - DC SUPPLY indicator is lit.
 - Frequency display shows a frequency.
- (c) Restore the ac supply to the equipment and confirm that both SUPPLY indicators are lit. When both ac and dc supplies are present the equipment will automatically select the ac supply.

55 If only one supply is used, set the appropriate front panel SUPPLY switch to its on position and confirm that the SUPPLY indicator above the switch is lit. Check also that the frequency display shows a frequency.

SELECTING OPTIONS

56 Options available on a radio are described in section 1 of this handbook. Before becoming operational, the options must be selected at the radio's front panel. How to do this is fully described in section 4 on page 21. **No options become operational until this procedure has been completed.**

SET RADIO ID

57 If the radio is to be used as part of a system, controlled remotely by an RCU, it must be identified by its own unique ID that is a number in the range 0 and 254.

Key sequence: ID number, SHIFT ▲, 8

Example. Setting the Radio's ID

58 To set the ID to 2, enter the following key sequence:

2, SHIFT ▲, 8

59 Error 38 is displayed if an invalid ID is entered.

VIEW RADIO ID

60 The previous sequence can be used to both set, and view, the current ID of a radio. If a number does not prefix the key sequence then the ID is displayed for 5 seconds, but can be cancelled before the 5 seconds have elapsed by pressing the CE key.

Example. Viewing the Radio's ID

61 To view the current ID, enter the following key sequence:

SHIFT ▲, 8

62 The radio's front panel displays show the ID as shown below.

FREQUENCY	CHANNEL	MONITOR
002	Id	

SET EQUIPMENT BAUD RATE

63 If the radio is to be remotely controlled at a baud rate other than the default 1200 rate, a key sequence can be entered to select the required baud rate. Valid baud rates are: 1200, 2400, 4800 and 9600.

Key sequence: baud rate, SHIFT ▲, 9

64 Error 38 (Err 38) is displayed if an invalid baud rate is selected.

Example. Setting the Baud Rate

65 To set the baud rate to 9600, enter the following key sequence:

9600, SHIFT ▲, 9

VIEW EQUIPMENT BAUD RATE

66 The previous sequence is used to set, and view, the baud rate of the radio being remotely controlled. If a number does not prefix the key sequence, the current baud rate setting is displayed for 5 seconds, but can be cancelled before the 5 seconds have elapsed by pressing the CE key.

Example. Viewing the Current Baud Rate

67 To view the current ID, enter the following key sequence:

SHIFT ▲, 9

The radio's front panel displays show the baud rate as illustrated below.

FREQUENCY	CHANNEL	MONITOR
9600	--	bAUd

VIEW BAND EDGES

68 The highest and lowest frequencies that a radio can operate on are called the band edges. These can be viewed using the following key sequences:

- SHIFT ▲, 4 View band edge 1 (lowest VHF frequency)
- SHIFT ▲, 5 View band edge 2 (highest VHF frequency)
- SHIFT ▲, 6 View band edge 3 (lowest UHF frequency)
- SHIFT ▲, 7 View band edge 4 (highest UHF frequency)

69 Viewing band edges 1 and 2 is only available on VHF equipments and viewing band edges 3 and 4 is only available on UHF equipments. VHF/UHF radios, for example the 3060V2 transceiver, can display all band edges.

70 Band edges cannot be programmed, only viewed. Following each valid key sequence the display shows the band edge for five seconds. The display can be returned to normal before 5 seconds have elapsed by pressing the CE key.

Example. Viewing a Band Edge

71 To view band edge 1 (lowest VHF frequency that in this example is 100 MHz) enter key sequence SHIFT ▲, 4. The radio's displays are shown below.

Before key sequence, displays show operating frequency and channel	FREQUENCY 325.000	CHANNEL 21	MONITOR
Enter key sequence, SHIFT ▲, 4	FREQUENCY 100	CHANNEL E1	MONITOR
After five seconds, or if the CE key is pressed, displays show original values	FREQUENCY 325.000	CHANNEL 21	MONITOR

FUNCTIONAL CHECKS

72 The following checks are for transceivers and transmitters only. At the front panel TX control pad set the FWD button to its on position, indicated by the associated indicator being lit (refer to Figs. 1 and 2). Operate the PTT button (red) and confirm that a reading of approximately 40 W (AM) or 60 W (FM) is indicated on the front panel MONITOR display, unless connected to a serviceable 3640 power amplifier in which case a reading of approximately 40 W AM and FM is indicated.

73 Connect a microphone (with integral PTT switch) to the front panel MIC/HEADSET socket, set the MOD button to its on position, operate the PTT and speak into the microphone (maintaining a constant tone). Confirm that a reading of greater than 30(%) is indicated in the MONITOR display, release the PTT switch.

74 Remove the dummy load and reconnect the antenna. Carry out an interruptive BIT test as detailed in section 4, operating instructions.

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INTRODUCTION

1 This section details the radio's controls and indicators, and explains how to operate the equipment using the front panel controls. All of this section is applicable to 3000DV2 transceivers. Series 3000DV2 transmitter and receiver users should only read those parts of this section applicable to their type of equipment.

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 panel can be divided into the following five sections (see Figs. 1, 2, and 3). Each section is described in the following paragraphs.

- Transmitter (Tx) controls and indicators.
- Receiver (Rx) controls and indicators.
- Synthesiser controls and indicators.
- Mainframe controls and indicators.
- Auxiliary controls and indicators.

Transmitter (Tx) Controls and Indicators

4 The transmitter'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; to deselect a selected function, press the selected function switch or select the other function or press the RESET switch.

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. Note that when the radio is connected to a PAE 3640 power amplifier, the FM output is reduced to 40 W.

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 deselect) line monitor switch. When selected, the adjacent indicator is lit and the front panel monitor display shows the transmitter's line input level (in dBm).

FWD

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

RFL

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

MOD

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

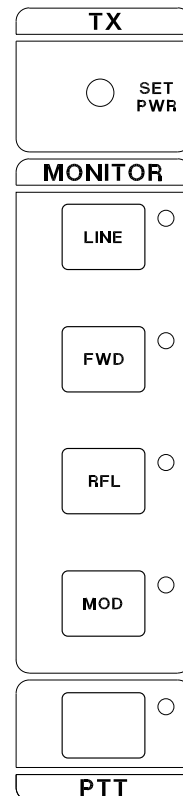


Fig. 4-1
Transmitter Controls

Receiver (Rx) Controls and Indicators

11 The receiver's controls and indicators (see Fig. 4-2) comprise a SET MUTE (narrow-band) and SET MUTE (wideband) controls, MUTE control, two monitor switches LINE and AGC, and guard receiver controls ON and MUTE. It should be noted that only one of the two monitor functions can be selected at any one time; to deselect a selected function, press the selected function switch or select the other function or press the RESET switch.

SET MUTE (Narrow-band)

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

SET MUTE (Wideband)

13 The set mute (wideband) control allows the receiver's mute threshold to be adjusted over the RF input range 1.5 mV to 50 mV emf.

MUTE

14 Two-position push-to-select (push again to deselect) mute defeat switch. When in the defeat position, the adjacent indicator is lit, and the receiver's mute circuit is disabled. When the switch is in the other position, the indicator lights when audio is present, and the mute circuit operates at the threshold determined by the SET MUTE control operative at the time.

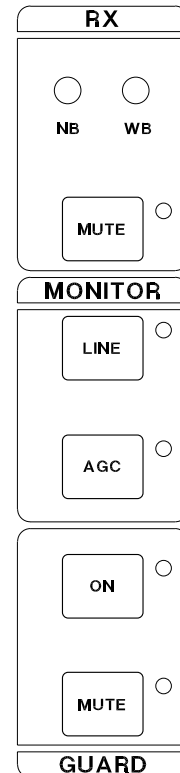


Fig. 4-2
Receiver Controls

LINE

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

AGC

16 Two-position push-to-select (push again to deselect) 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).

GUARD ON

17 Two-position push-to-select (push again to deselect) switch. This switch is only operational when the guard option is fitted. When selected, the adjacent indicator is lit and the guard receiver audio can be monitored on the loudspeaker or headphones (if connected). The presence of audio is dependent on the guard receiver's mute status.

GUARD MUTE

18 Two-position push-to-select (push again to de-select) guard mute defeat switch. When in the defeat position, the adjacent indicator is always lit, and the guard receiver's mute circuit is disabled. When the switch is in the other position, the indicator lights when audio is present and the mute circuit is operational.

Synthesiser Controls and Indicators

19 The synthesiser controls and indicators panel (see Fig. 4-3) comprises:

- ❑ A frequency and a channel display.
- ❑ A triple function keypad providing primary, secondary and tertiary key functions. The primary function of the keypad is engraved on the key(s) (0-9). 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. Keys with lettering above them provide a second function and provide the means by which a number of operational functions are carried out. Keys with lettering below them have a third function that is used in sets when option 07 (Have Quick) or option 12 (Quick Fox) is fitted.
- ❑ Three mode selection keys: AM/FM, Narrow-band/Wideband (NB/WB) and Link 11.

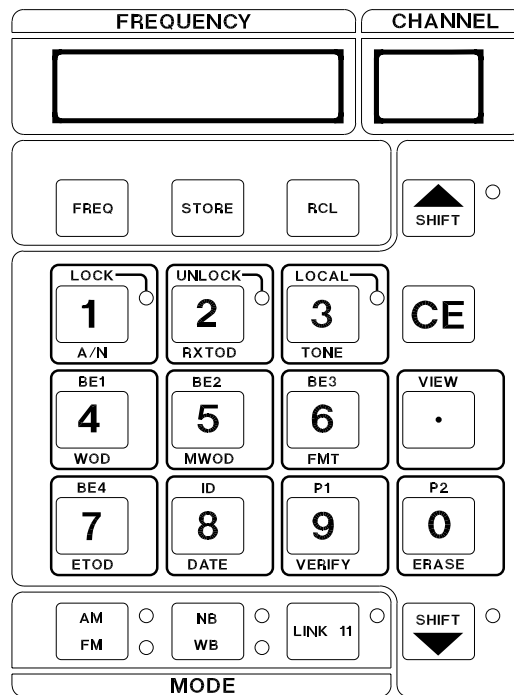


Fig. 4-3 Synthesiser Controls

FREQUENCY and CHANNEL Displays

20 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 operating frequency and channel number.
- ❑ **Edit Function.** The edit function is indicated by a flashing decimal point at the bottom right-hand end of the frequency display. Edit function shows information being entered from the keypad, not the radio's current operating parameters.
- ❑ **View Function.** View facilities allow channel information to be displayed without affecting the operation of the radio. This can be used, for example, to check the frequencies stored in each of the 99 pre-set channels; during such checks, the radio's operating frequency does not change.
- ❑ **Error Message Function.** Error messages are automatically displayed if invalid keypad entries are made, or when certain fault conditions are detected. Error messages are detailed in Table 4-5 on page 34.

Second Function Select Key

21 The second function select key (SHIFT ▲) is a push-to-select, push again to de-select key, that selects either the primary or second function of the keypad. When second function is selected, the adjacent indicator is lit. When primary function is selected, the adjacent indicator is unlit.

Third Function Select Key

22 The third function select key (SHIFT ▼) is a push-to-select, push again to de-select key, that selects either the primary or third function of the keypad. When third function is selected, the adjacent indicator is lit. When primary function is selected, the adjacent indicator is unlit.

Numerical Data Keys 0 through 9

23 Primary function data keys 0 through 9 are used to enter numeric data.

Decimal Point Key

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

Cancel Entry (CE) Key

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

- ❑ 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.
- ❑ If the previous key entry resulted in an error code (refer to Table 4-5), pressing the CE key restores the settings shown before the previous key entry.
- ❑ If the previous entry was as a function key, then the key entry is ignored.

Frequency (FREQ) Key

26 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.

27 If the entered frequency falls outside the band edge frequencies an error message (refer to Table 4-5) is displayed and the operational frequency is not changed. The error message is cancelled by pressing the CE key.

Channel Store (STORE) Key

28 In edit mode, when a valid channel number is displayed in the frequency display and the store key 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.

29 Entering an invalid channel number will result in an error message. Pressing the CE key will remove the error message.

Channel Recall (RCL) Key

30 The channel recall key is used to recall pre-set 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

31 The LOCK key (second function) disables all functions except the Unlock Key, PTT and monitor functions. When lock is selected, the adjacent indicator is lit.

UNLOCK Key

32 The unlock key (second 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

33 The local key (second function) is not used.

VIEW Key

34 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. The display will show the viewed channel for 5 seconds before returning to the monitor mode.

P1 Key

35 The P1 key (second function) is used to set or view the remote operation baud rate during initial installation (see section 3) or following replacement of the radio.

P2 Key (Lamp Test)

36 The P2 key (second function) enables a lamp test to be performed on all LEDs and lamps on the front panel allowing the operator to test for unserviceable LEDs/lamps. The test lasts for 5 seconds, or less if the CE key is pressed. Note that the AC and DC supply lamps are not tested as part of this test.

AM/FM Mode Key

37 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. Note that FM cannot be selected if an 8.33 kHz channel is being used. If it is selected, an error message is displayed (see Table 4-5 on page 34).

NB/WB Mode Key

38 The NB/WB (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. Note that WB cannot be selected if an 8.33 kHz channel is being used. If it is selected, an error message is displayed (see Table 4-5 on page 34).

LK11 Key

39 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.

40 When Link 11 is selected, FM, wideband, and short AGC modes of operation are automatically selected. The mode is disabled when the AM/FM or NB/WB key is pressed. Note that Link 11 cannot be selected if an 8.33 kHz channel is being used. If it is selected, an error message is displayed (see Table 4-5 on page 34).

Mainframe Controls and Indicators

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

BIT TEST Key

42 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 (BIT) operation.

BIT MEM Key

43 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 BIT routines. Details of the fault memory can be found in this section under the heading: Built-in Test (BIT) operation.

BIT RESET Key

44 The reset (RESET) key is used to clear the monitor display. The second function (▲), RESET key sequence clears the BIT memory. The second function (▲), RESET key sequence also resets the bypass of a 3640 power amplifier if in fault and Ebit displayed, this will put the 3640 back into normal mode once the fault on the 3640 is cleared.

DIM Control

45 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

46 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

47 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.

Speaker/Off switch

48 When in the SPEAKER position selects the loudspeaker to receive the audio output of the receiver. In this position Tx sidetone is not available on the mic/headset socket. In the OFF position the mic/headset socket headphone output receives the audio output of the receiver and Tx sidetone.

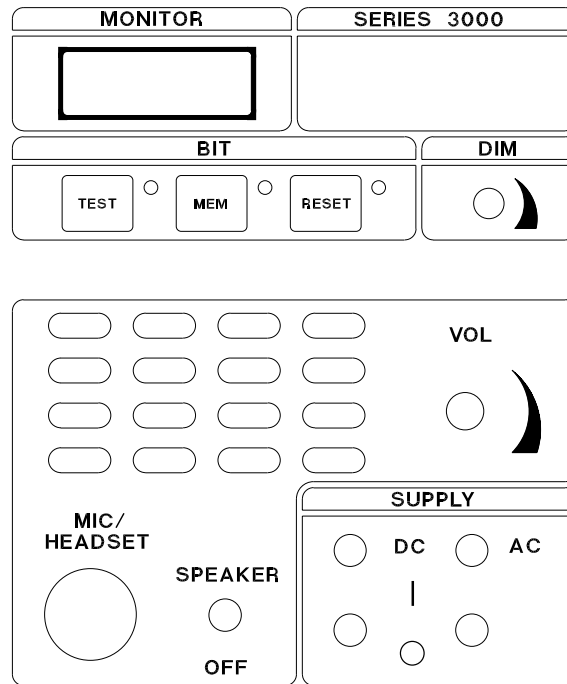


Fig. 4-4 Mainframe Controls and Indicators

SUPPLY ON/OFF Switches

49 Two-position switches and associated indicators for the ac and the dc input supplies.

Auxiliary Controls

50 The auxiliary control pad (see Fig. 4-5) comprises four switches designated A, B, C, and LO PWR (transmitters and transceivers) or D (receivers). On equipments with Option 05, a six-pin connector is fitted. This is used to connect a fill gun or tape reader; these items are used to electronically read in the Word-of-Day (WOD). The procedure for electronically reading in the WOD is given in the Have Quick Supplement PAE Part No. 31B33060SUP and Quick Fox Supplement PAE Part No. 31-330600QF.

51 Switch A is used to enable or disable Crypto mode. Crypto mode can only be selected from Normal mode. Crypto mode cannot be selected if an 8.33 kHz channel is being used. If it is selected, an error message is displayed (see Table 4-5 on page 34). Selecting the AUX A key will enable the function and cause the associated LED to illuminate. Pressing the following keys will de-select Crypto mode when the radio is in Normal mode (non Anti-Jam mode):

LINK 11 AM/FM NB/WB AUX A

52 Crypto is available in Anti-Jam mode by selecting AUX A prior to entering Anti-Jam. To deselect Crypto; exit the Anti-Jam mode, then de-select by pressing one of the above keys.

53 Switch B is used when electronically loading the WOD in Have Quick or Quick Fox applications. Switch B, along with switches A and C, is also used as part of the key sequences required to view options menus (see paragraph 81).

54 Switch LO PWR, when pressed and the indicator lit, sets the transmitter/transceiver into the low power mode. If external power reduction is in operation the indicator flashes. For details of internal/external power attenuator selection (see options on page 21). Switch D on a receiver is reserved for future use.

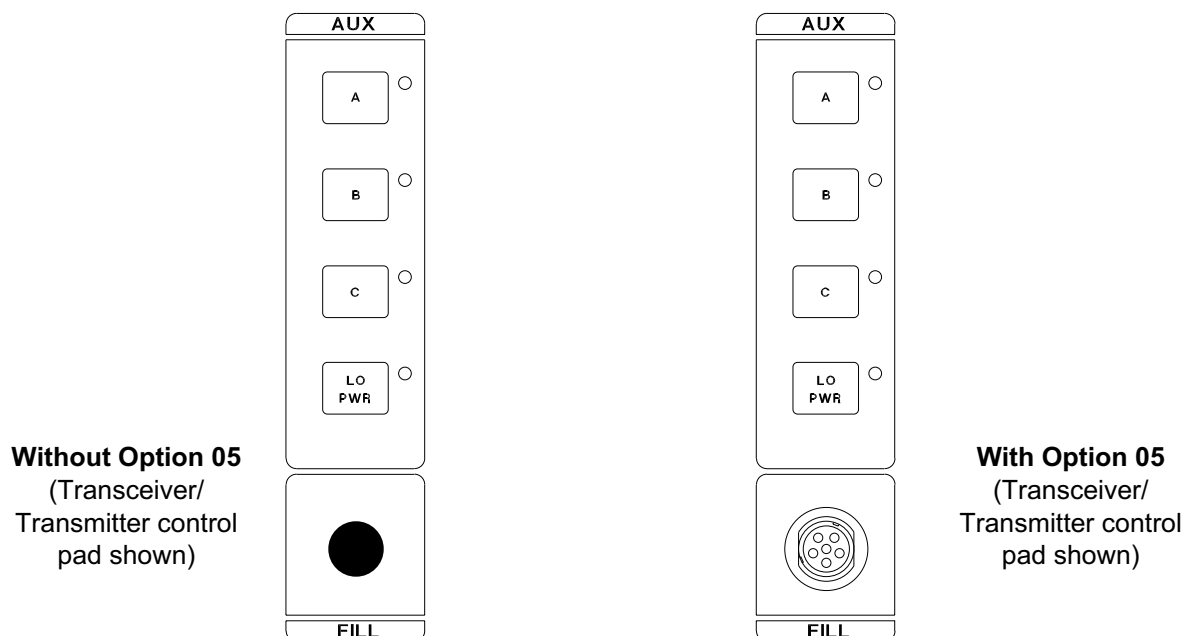


Fig. 4-5 Auxiliary Controls

REAR PANEL CONNECTIONS

55 The equipments' rear panel layout is shown in Fig. 4. Connector CN6 is reserved for future development. The other 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 Control Connector CN5

58 The remote control 9-way D-type connector is used to connect a PAE type 3000V2 remote control unit (RCU). When an RCU is connected users must ensure that the identification code is correctly set (see section 3). details of the connector's pin-out is also given in section 3 of this handbook.

Facilities 2 Connector CN2

59 Facilities 2 is a 25-way D-type connector used to connect 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.

MPA/Filter Interface Connector CN3

60 The MPA/filter interface connector is a 37 way D type used to interface the equipment to external filter/amplifiers (option 06).

Ext Clock CN4

61 The Ext Clock (external clock) connector is a 15-way D-type used to connect an external timing source.

SETTING-UP AND OPERATING PROCEDURES

Note ...

When making key entries, do not pause more than 5 seconds between key strokes or new data will be lost and the system will revert to default settings.

62 Before any setting-up procedures are carried out, users must ensure that the installation instructions, as detailed in Section 3 of this handbook, have been successfully completed. Setting-up the equipment requires the following procedures to be carried out:

- Switching on the ac and dc supplies as applicable to the installation.
- Frequency selection. This procedure is used to select an operating frequency without programming the frequency and an appropriate channel number into the radio's memory.
- Programming channel and frequency information into the radio'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.
- Screen blanking (if this facility is required).
- System reset and auto-calibrate (if necessary).
- 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.

Users should note that there are different procedures for selecting frequencies and channel information when using 25 kHz channel spacing, and 8.33 kHz channel spacing.

SWITCHING ON

63 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:

- (a) At the equipment's front panel, ensure the AC and DC SUPPLY switches are in the off position (down).
- (b) Apply ac, and/or, dc supplies to the equipment.
- (c) 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.
- (d) 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.
- (e) Once power is established the radio then carries out a power-on self-test (see paragraph 111 on page 30).

FREQUENCY SELECTION

This procedure should be used when 25 kHz channel spacing is required. If 8.33 kHz channel spacing is being used, refer to paragraph 71 on page 17.

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

- (a) 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:

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

	FREQUENCY	CHANNEL	MONITOR
	269.500.		

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

	FREQUENCY	CHANNEL	MONITOR
	269.500		

- (d) Select the required operational mode, for example, AM, NB. The radio is now set to operate on 269.5 MHz, AM, narrow-band mode.

CHANNEL FREQUENCY SETTING

This procedure should be used when 25 kHz channel spacing is required. If 8.33 kHz channel spacing is being used, refer to paragraph 71 on page 17.

65 Up to 99 channels can be stored in the equipment's memory. Each stored channel comprises an associated frequency, and operational mode information. The following example details how to pre-set channel 16 with a frequency of 251.025 MHz:

- (a) At the radio's front panel use the numeric keys to enter the required frequency: 251.025 MHz. The displays show:

FREQUENCY	CHANNEL	MONITOR
251.025.		

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

FREQUENCY	CHANNEL	MONITOR
251.025		

- (c) Set the AM/FM, narrow-band/wideband (NB/WB) and Link 11 mode select switches as required for the frequency channel (for example, AM, NB, LINK 11 off).

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

FREQUENCY	CHANNEL	MONITOR
16 .		

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

FREQUENCY	CHANNEL	MONITOR
251.025	16	

66 Channel 16 is now set to a frequency of 251.025 MHz operating in AM narrow-band mode. Other channels up to a maximum of 99 can be set up as detailed in steps (a) to (e).

CHANNEL RECALL

67 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:

- (a) Using the numerical data keys enter the channel number required, e.g. 16. The displays (in edit mode) show:
- | FREQUENCY | CHANNEL | MONITOR |
|-----------|---------|---------|
| 16 . | | |
- (b) Press the RCL key. The displays (in monitor mode) show:
- | FREQUENCY | CHANNEL | MONITOR |
|-----------|---------|---------|
| 251.025 | 16 | |
- (c) The radio now operates on the displayed frequency. The AM or FM selection, and narrow-band or wideband mode that was stored with the channel remains operational.

CHANNEL VERIFICATION

68 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 37 is set to:

- (a) Use the numerical data keys to enter the channel number 37. The displays will show:
- | FREQUENCY | CHANNEL | MONITOR |
|-----------|---------|---------|
| 37 . | | |
- (b) Press the second function key (SHIFT ▲) and then press the VIEW key. The displays will show the frequency allocated to that channel (see example) and the channel number as follows:
- | FREQUENCY | CHANNEL | MONITOR |
|-----------|---------|---------|
| 260.100 | 37 | |
- (c) After five seconds, the displays will revert to the monitor mode and show the radio's operational frequency, which in this example is 251.025 MHz.

8.33 kHz CHANNEL OPERATION

69 The 3000DV2 VHF, or V/UHF, radios can operate between 118.000 MHz and 136.975 MHz using 8.33 kHz channel spacing. When setting a radio's operating frequency to operate with 8.33 kHz channel spacing, a special frequency designation should be entered from the front panel, **not** the actual frequency.

70 Table 4-1 shows the special frequency pattern over the frequency range 118.0000 MHz to 118.1916 MHz. These channel designations have been defined by ICAO and are detailed in ICAO Annex 10, Volume v, Chapter 4. The frequency designation pattern is repeated over the available 8.33 kHz frequency range (that is, up to 136.975 MHz). Examples for entering frequencies are given on the next pages.

71 When 8.33 kHz channel spacing is used, the radio automatically selects AM and narrow-band working. Other modes are not available with this channel spacing.

Table 4-1 8.33 kHz Channel Spacing - Special Frequency Designations

Actual Frequency (MHz)	Frequency Designation at 3000DV2 Radio (MHz)
118.0000	118.005
118.0083	118.010
118.0166	118.015
118.0250	118.030
118.0333	118.035
118.0416	118.040
118.0500	118.055
118.0583	118.060
118.0666	118.065
118.0750	118.080
118.0833	118.085
118.0916	118.090
118.1000	118.105
118.1083	118.110
118.1166	118.115
118.1250	118.130
118.1333	118.135
118.1416	118.140
118.1500	118.155
118.1583	118.160
118.1666	118.165
118.1750	118.180
118.1833	118.185
118.1916	118.190

Frequency Selection for 8.33 KHz Channel Spacing

72 The radio can be set to any operational frequency using 8.33 kHz channel spacing without allocating the frequency to a channel. For example, to set 118.0083 MHz:

- (a) Refer to Table 4- to determine the frequency designation for the actual frequency of 118.0083 MHz. Using the numerical data keys, enter the frequency designation 118.010 MHz. The displays (in edit mode) show:

FREQUENCY	CHANNEL	MONITOR
118.010.		

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

FREQUENCY	CHANNEL	MONITOR
118.010		

- (c) The radio is now set to operate on 118.0083 MHz, AM, narrow-band mode.

Channel Frequency Setting for 8.33 KHz Channel Spacing

73 Up to 99 channels can be stored in the equipment's memory. Each stored channel comprises an associated frequency, and operational mode information. The frequencies can operate with 25 kHz channel spacing, 8.33 kHz channel spacing, or a mixture of both. The following example details how to pre-set channel 37 with a frequency of 126.4583 MHz:

- (a) Refer to Table 4-1 to determine the frequency designation for the actual frequency of 126.4583 MHz. Using the numerical data keys, enter the frequency designation 126.4600 MHz. The displays (in edit mode) show:

FREQUENCY	CHANNEL	MONITOR
126.460.		

- (b) Press the **FREQ** key. The displays (in monitor mode) show:

FREQUENCY	CHANNEL	MONITOR
126.460		

- (c) Using the numerical data keys, enter the channel number required, for example, 37. Displays (in edit mode) show:

FREQUENCY	CHANNEL	MONITOR
37.		

- (d) Press the **STORE** key. Displays (in monitor mode) show:

FREQUENCY	CHANNEL	MONITOR
126.460	37	

74 Channel 37 is now set to a frequency of 126.4583 MHz operating in AM narrow-band mode (AM and narrow-band working are automatically selected when an 8.33 kHz channel spaced frequency is chosen). Other channels up to a maximum of 99 can be set up as detailed in steps (a) to (d) above, or if 25 kHz channels are required see paragraph 65.

SYSTEM RESET

75 The system reset command resets the radio resulting in all options, channel and synthesiser calibration information being lost. Before further use, and following this command, an auto-calibrate procedure must be carried out (see paragraph 77).

76 The system reset key sequence 91, (SHIFT ▲), RESET resets the radio and returns it to a known state. After a system reset (plus auto-calibrate) frequency and channel settings must be re-entered.

AUTO-CALIBRATE

77 The auto-calibrate routine recalibrates the synthesiser lock times, and needs to be initiated after a system reset. (A system reset clears the equipment of all stored data). To initiate the auto-calibrate routine, use the following procedure:

- (a) Ensure the step auto-calibrate size is 25 kHz (0.025 MHz). The key sequence is 0.0 2 5, (SHIFT ▲), FREQ
- (b) Initiate auto-calibrate. The key sequence for this is: 91, AUX C
- (c) Set the radio to the lowest available frequency, 100 MHz (VHF or VHF/UHF radio) or 225 MHz (UHF only radio).
- (d) The equipment will then go through the calibration routine which takes approximately 10 minutes. During this time, the frequency display shows *Calib*, the channel display shows *ON* and the monitor display increments from 1 to 100 to give a progress indication.
- (e) When the equipment has stepped through all UHF and VHF channel frequencies (all channels have been calibrated when the frequency display returns to the original frequency display), stop the routine by switching off the radio. Auto-calibration can be stopped by entering 91, AUX C.
- (f) Re-enter any required channel frequencies. The radio is now ready for operational use.

GUARD RECEIVER OPERATION

78 The GUARD mode function is only available when the guard receiver option is fitted. Selection of the guard receiver is achieved by selecting the guard ON key to the on position (shown by the adjacent indicator being lit).

79 The guard receiver will continuously monitor the international VHF distress frequency of 121.5 MHz when the main receiver is set to a VHF frequency or the UHF distress frequency of 243 MHz when the main receiver is set to a UHF frequency. When a signal is detected on the guard frequency the indicator adjacent to the guard MUTE key will light and the audio will be heard in the loudspeaker, headset, or through the guard receiver's audio output that is available on the facilities 2 connector.

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

OPTIONS, SOFTWARE VERSIONS, AND RADIO TYPE MENUS

81 There are three menus (options, software versions and radio type) available via the front panel. Options (in the options menu) can be viewed and changed, the other two menus are read only. The key sequences needed to view each particular type are shown in Table 4-2.

Table 4-2 Options, Software Versions, and Radio Type Menus

Key Sequence	Monitor Display	Selected Menu
91, Shift ▲, Aux B 91, Shift ▲, Aux C 91, Shift ▲, Aux A	oPt SoFt tyPE	Options menu Software Versions menu Radio Type menu

82 Each menu is described in the following paragraphs.

Options

83 To activate the options menu, enter the key sequence shown in Table 4-2.

84 When in view mode, as indicated by the BIT display changing to the appropriate display stream, the user can scroll up (Shift ▲) and down (Shift ▼) through the available options and their current state. If the option is selectable then the numeral 1 key can be used to enable the option and the numeral 0 key can be used to disable the option. Selected options are activated by pressing the STORE key, and then switching the set off and back on.

85 The options that can be activated from the menu are:

- Option 01**, Guard Receiver (can be activated only when a guard receiver module is fitted in the radio).
- Option 04**, Fill Gun Port (can be activated only when a fill gun connector is fitted to the radio's front panel).
- Option 06**, Interface for an external power amplifier or external auto-tune filter.
- Option 07**, Have Quick operation (can be activated only when a Have Quick module is fitted in the radio).
- Option 08**, VHF frequency extension that increases the VHF band from 100 to 163 MHz.
- Option 10**, Maritime band working. When Option 10 is selected the VHF frequency band is extended to 163 MHz only for designated marine channels. ***If the radio is required to operate on maritime channels, and non-maritime channels above 155.975 MHz, both Option 08 and Option 10 must be selected.***
- Option 12**, Quick Fox working. This should only be selected on radios modified for, and fitted with a Quick Fox module. Note that the radio's front panel has modified key names.
- AttEnU**. Must be activated if an external attenuator is being used with the radio.

Note ...

If option 05 is selected without either option 07 or 12 selected, the following error message will be displayed during a POST check:

FREQUENCY	CHANNEL	MONITOR
noFLgn	--	POST

86 The following sequence shows how to activate marine mode. In the example shown the key sequence is continued after enabling option 10, to show all available selections, but can be terminated at any time by pressing the STORE key, and then switching the set off and back on.

87 Pressing the STORE key stores all selections and terminates the function. Pressing the CE key terminates the function without saving the selections. **After selecting which options are to be activated, power should be removed from the radio, and then reapplied.**

	FREQUENCY	CHANNEL	MONITOR
Before key sequence	3 2 5 . 0 0 0 .	2 1	
91, (SHIFT ▲), Aux B	o P t 0 1	0 0	o P t
(SHIFT ▼)	o P t 0 5	0 0	o P t
(SHIFT ▼)	o P t 0 6	0 0	o P t
(SHIFT ▼)	o P t 0 7	0 0	o P t
(SHIFT ▼)	o P t 0 8	0 0	o P t
(SHIFT ▼)	o P t 1 0	0 0	o P t
1	o P t 1 0	0 1	o P t
(SHIFT ▼)	o P t 1 2	0 0	o P t
(SHIFT ▼)	A t t E n U	0 0	o P t
Press STORE	3 2 5 . 0 0 0 .	2 1	

Viewing Software Versions

88 Three items of software are installed in the radio: Synthesiser (*sy*), Front Panel (*FP*), and Remote Control (*rC*). The software numbers and versions can be viewed using the following key sequences.

	FREQUENCY	CHANNEL	MONITOR
Before key sequence (example)	3 2 5 . 0 0 0 .	2 1	
Press 91 (SHIFT ▲), Aux C	2 6 3 - 0 0	sy	Soft
Press (SHIFT ▼)	2 6 4 - 0 0	FP	Soft
Press (SHIFT ▼)	2 6 5 - 0 0	rC	Soft
Press CE key to end viewing	3 2 5 . 0 0 0 .	2 1	

Radio Type Menu

89 The following key sequences show how to interrogate the radio to display the radio type. This procedure is an engineering facility and is unlikely to be of value to an operator. If an unknown display is shown, this indicates that the switches fitted to the BITE module are incorrectly set. Refer to the Technical Handbook.

	FREQUENCY	CHANNEL	MONITOR
Before key sequence (example)	3 2 5 . 0 0 0 .	2 1	
Press 91 (SHIFT ▲), Aux A	3 1 4 0	t	tyPE
if the radio type is unknown	- - - -	- -	tyPE
Press CE key to end viewing	3 2 5 . 0 0 0 .	2 1	

SCREEN BLANKING

90 The operator may 'blank' the frequency and channel screen display by selecting the key sequence 91, (SHIFT ▲), 5.

91 The following functions will be available when the screen is blanked:

- PTT
- Monitor functions.

92 To restore the frequency and channel displays, select the key sequence 91, (SHIFT ▲), 5.

TRANSMIT OPERATION (FOR TRANSMITTERS AND TRANSCEIVERS ONLY)

93 On the synthesiser front panel (see Fig. 4-3), select the required operational frequency either by recalling a pre-set channel, or by using the numeric keypad (as detailed in previous paragraphs).

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

95 A sidetone of the transmitted audio is available from the MIC/HEADSET or MIC socket if the speaker is switched off.

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

RECEIVE OPERATION (FOR RECEIVERS AND TRANSCEIVERS ONLY)

97 On the synthesiser front panel (see Fig. 4-3), select the required operational frequency either by recalling a pre-set channel or by using the numeric keypad (as detailed in previous paragraphs).

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

99 A data (wideband) output is also available at the rear panel FACILITIES 2 connector. The level of this output is pre-set.

MARITIME BAND - ADDITIONAL OPERATING INFORMATION

GENERAL

100 Radios incorporating the maritime band option (Option 10) are user selectable between the following operational modes:

- Normal (non-maritime band operation)
- Ship (maritime band operation)
- Shore (maritime band operation).

NORMAL MODE

101 The normal (or non-maritime mode) will perform identically to a radio without maritime capability. The only exception is an additional key sequence that is required to switch into one or other of the maritime modes (see paragraph 109).

SHIP/SHORE MODES

102 In maritime mode, the channels 1 to 28, 60 to 74 and 77 to 88 (see Table 4-4) are overlaid with international maritime VHF frequencies. These particular channels cannot be altered by the operator although the remaining channels still have this capability.

103 As the actual frequency of transmission and reception are pre-set for maritime channels, the 6-digit display will either indicate 'SH IP.' or ShorE.'. The display will also include one of the following suffix characters:

'I' - denotes International selection (i.e. SH IP.I or ShorE.I)

'A' - denotes American selection (i.e. SH IP.A or ShorE. A)

104 The format in use may be toggled by a key sequence (see paragraph 109).

Ship/Shore View Modes

105 In the ship/shore view modes the current operating frequency is displayed at all times. During reception, the receive frequency is displayed. the display will then indicate the transmit frequency during subsequent transmissions (this allows test engineers to check that the radios are transmitting and receiving on the correct frequency).

Channel Change

106 Changing maritime channels follows the same format as with normal channel changes. As digits are entered, they are displayed on the frequency display. Once a valid selection has been made, the new channel is selected. If this is within the maritime range, the display will return to maritime mode, i.e. displaying 'SH IP.A' (SH IP.I) or 'ShorE.A' (ShorE.I) unless in view mode.

Frequency Change

107 Maritime frequencies cannot be changed as they are internationally set. If a frequency is entered, the frequency display will show 'Error' and the channel display will show the error number 10.

Note ...

The channels not covered by the maritime standards may be re-programmed as normal. These channels are duplicates of those in non-maritime mode and as such, any changes made will remain when maritime mode is de-selected.

External RF Filter

108 The external RF filters normally used with 3000DV2 series equipment require a few seconds to retune to a new frequency and cannot be used for filtering both transmission and reception signals on a Two Frequency Simplex channel. If a filter is fitted when one of these channels is recalled, an error message will be displayed (see Table 4-5).

KEY SEQUENCES

109 The following describes the additional key sequences required to access the maritime functions:

Table 4-3 Maritime Function Key Sequences

Required Function	Key Sequence	Display
Change from any operating mode to Normal mode	0, SHIFT▼, FREQ	Transceiver frequency (for example, 156.125)
Change from any operating mode to Ship mode	1, SHIFT▼, FREQ	SH IP.A or SH IP.I
Change from any operating mode to Shore mode	2, SHIFT▼, FREQ	ShorE.A or ShorE.I
Change from Ship mode to Ship View mode	SHIFT▲, VIEW	Transmitter, or Receiver frequency (for example 156.125)
Change from Ship View mode to Ship mode	SHIFT▲, VIEW	SH IP.A or SH IP.I
Change from Shore mode to Shore View mode	SHIFT▲, VIEW	Transmitter, or Receiver frequency (for example 156.125)
Change from Shore View mode to Shore mode	SHIFT▲, VIEW	ShorE.A or ShorE.I
Change from International format to American format	SHIFT▼, FMT	SH IP.A or ShorE.A
Change from American format to International format	SHIFT▼, FMT	SH IP.I or ShorE.I

Table 4-4 Maritime Frequencies

Channel Number	Ship to Tx Frequency	Shore Tx Frequency	Channel Number	Ship to Tx Frequency	Shore Tx Frequency
			60	156.025	160.625
01*	156.050	160.650	61	156.075	160.675
02	156.100	160.700	62	156.125	160.725
03	156.150	160.750	63*	156.175	160.775
04	156.200	160.800	64	156.225	160.825
05*	156.250	160.850	65*	156.275	160.875
06	156.300	156.300	66*	156.325	160.925
07*	156.350	160.950	67	156.375	156.375
08	156.400	156.400	68	156.425	156.425
09	156.450	156.450	69	156.475	156.475
10	156.500	156.500	70	156.525	156.525
11	156.550	156.550	71	156.575	156.575
12	156.600	156.600	72	156.625	156.625
13	156.650	156.650	73	156.675	156.675
14	156.700	156.700	74	156.725	156.725
15	156.750	156.750	75	see comment 1	see comment 1
16	156.800	156.800	76	see comment 2	see comment 2
17	156.850	156.850	77	156.875	156.875
18*	156.900	161.500	78*	156.925	161.525
19*	156.950	161.550	79*	156.975	161.575
20	157.000	161.600	80*	157.025	161.625
21*	157.050	161.650	81*	157.075	161.675
22*	157.100	161.700	82*	157.125	161.725
23	157.150	161.750	83*	157.175	161.775
24	157.200	161.800	84	157.225	161.825
25	157.250	161.850	85	157.275	161.875
26	157.300	161.900	86	157.325	161.925
27	157.350	161.950	87	157.375	161.975
28	157.400	162.000	88*	157.425	162.025

* Denotes that for American format, use Ship Tx Frequency for both ship and shore, i.e. Simplex.

Comment 1: Guard-band 156.7625 to 156.7825 MHz; Marine channel not used.

Comment 2: Guard-band 156.8125 to 156.8375 MHz; Marine channel not used.

BUILT-IN TEST (BIT) OPERATION

110 The BIT functions monitor key radio parameters and provides an indication if an equipment malfunction occurs. The BIT functions in three different ways:

- ❑ Power-On Self-Test (POST)
- ❑ Continuously monitored functions
- ❑ Interruptive self-test routines.

POWER-ON SELF-TEST

111 A power-on self-test (POST) is performed to check the basic functionality of the radio.

112 If no problems are revealed *PASS* is shown in the monitor display; see following example:

FREQUENCY	CHANNEL	MONITOR
225.000	01	PASS

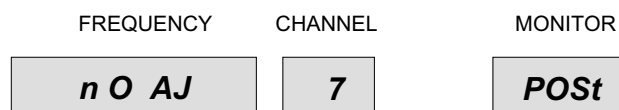
113 If a problem exists with the synthesiser, the frequency window shows the following message (this message indicates the set is inoperative and cannot be used):

FREQUENCY	CHANNEL	MONITOR
n O Syn	3	POSt

114 Any other post-initialisation problems are indicated by having the BIT display window show 'POST' as shown in the following example:

FREQUENCY	CHANNEL	MONITOR
305.000	01	POSt

115 On error the MEM key can be used to view each problem in turn, so that each POST problem can be noted. For example, if the internal Have Quick module (anti-jam) option is enabled and the Have Quick module has failed, the MEM key should be pressed a number of times and the following display will be shown:



116 Pressing the MEM key a number of times will cause each POST problem in turn to be shown, returning to the original display when all POST codes have been shown. The post-initialisation test can only be cleared by switching the set off, fixing the problem concerned and switching the set back on again. Analysing faults is outside the scope of this handbook. Reference should be made to the appropriate technical handbook for further information.

CONTINUOUSLY MONITORED FUNCTIONS

117 The BIT automatically performs test routines that monitor the equipment's test point voltages at least once every two seconds. If a test point voltage is found to be outside the pre-set limit, the module and test point numbers are stored in the fault memory. The error message 'bit' will be shown on the monitor display. If the fault is only temporary, the bit error message will disappear.

118 If the fault is caused by an external influence and the set is still operating correctly at reduced power, one of the following messages will be displayed:

- If a high temperature within the equipment is sensed, the error message °C will be shown on the monitor display.
- If the fault is caused by a high VSWR at the VHF antenna connection, ANT 1 will be shown on the monitor display.
- If the fault is caused by a high VSWR at the UHF antenna connection, ANT 2 will be shown on the monitor display.
- If the fault is caused by a low supply voltage AC or DC (as selected), PS will be shown in the monitor display.
- If the fault is with an external power amplifier, 3640, Ebit will be shown in the monitor display. Under this condition the set will be operating correctly at full power, however the 3640 will be in bypass condition (non-amplifying). When the 3640 fault is cleared, the following key sequence must be entered at the radio to clear the bypass condition and restore normal working:

SHIFT▲, RESET

INTERRUPTIVE SELF-TEST ROUTINE

119 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 is on.

120 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.

121 On completion, one of the following status messages is shown on the MONITOR display:

- PASS - indicating system is fully operational.
- bit - indicating one or more out of limit conditions exist.
- tCAr - indicating the interruptive test has been aborted. The transmitter's carrier output power is below specification, i.e. less than 4 watts (not applicable to receivers).
- tAUd - indicating the interruptive test has been aborted. The transmitter's depth of modulation is below specification, i.e., less than 50% (not applicable to receivers).
- rSEn - indicating the interruptive test has been aborted. The receiver's sensitivity is below specification (not applicable to transmitters).
- rAUd - indicating the interruptive test has been aborted. The receiver's audio is below specification (not applicable to transmitters).
- ANT 1 - indicating high VSWR present at the VHF antenna connection.
- ANT 2 - indicating high VSWR present at the UHF antenna connection.
- °C - indicating equipment above normal operating temperature.
- PS - indicating low supply voltage AC or DC as selected.
- EbIt - indicating an external error has occurred. When an external power amplifier type 3640 is connected to the radio and this message is received, the 3640 is switched to the bypass condition (non-amplifying). When the fault is cleared in the 3640, the following key sequence must be entered at the radio to clear the 3640 bypass condition and restore normal working of the 3640:

SHIFT ▲, RESET

Note ...

During antenna testing it is not possible for the equipment to indicate a fault on both VHF and UHF antenna systems simultaneously. Should this situation occur, the first detected fault will be displayed on the monitor. It is therefore advisable to check both antenna systems independently in the event of a failure indication.

FAULT MEMORY

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

123 Internal faults are displayed on the monitor display as module number and test point number. External faults are displayed as ANT 1, ANT 2, °C, PS, and Eblt indicating VHF transmitter VSWR, UHF transmitter VSWR, temperature, supply voltage, and an external equipment fault respectively.

124 The fault memory is cleared by pressing SHIFT ▲, RESET.

Table 4-5 Error Message Codes

Code	Meaning	Action
01	* Check sum error	Indicates marginal line conditions. Clears on next correct polling sequence or pressing CE key.
02	Not used	
03	Not 25 or 8.33 kHz channel	Press the CE key and enter the correct frequency related to relevant kHz channel spacing.
04	* Attempted to change frequency at RCU with LOCK selected	Indicates that the LOCK function is selected. Press the CE key to regain Edit Mode. Select the UNLOCK function at the RCU unit to allow the locked out function to be set - if permitted.
05-09	Not used	
10-14	Not used	
15	FM mode not available at this frequency	Press CE key, select another frequency if FM required.
16	* Serial Data Failure	This error code is displayed only at the 3000V2 Remote Control Unit (RCU). This code indicates a communication link failure between the transmitter or receiver and the 3000V2 RCU. The fault can be in the transmitter or receiver, data link, or the 3300 Data Unit. The error code clears when the CE key is pressed, but is displayed again after approximately ten seconds if the fault has not been cleared.
17-24	Not used	
25	Attempt to change frequency of maritime channel	Exit maritime mode if change required
26-36	Not used	
37	RF filter incompatible with transmission mode	Remove RF filter or select single frequency transmission
38	Out of range	Press CE key and re-enter data
39	* Same IDs	One or more radios in the system have the same IDs. Reconfigure radio IDs and restart. Applicable to split and non-split sites.

Table 4-5 Error Message Codes (continued)

Code	Meaning	Action
40	* Too many radios in system	Split-site operation - two radios only. Non split-site operation - 15 radios.
41	* Transceiver split. One or more radios in split-site configuration is a transceiver	Reconfigure radios and restart.
42	* Two transmitter split. Both radios in split-site are transmitters	Reconfigure radios and restart system.
43	* Two receiver split. Both radios in split-site are receivers	Reconfigure radios and restart system.
44	* VHF/UHF split. Radios in split-site have different frequency bands	Reconfigure radios and restart system.
45	* In split-site operation a radio has not responded to the 3000V2 RCU	Reconfigure radio and restart system.
46	* Radio Busy	Radio is unable to perform required function. For example radio commanded to exit Anti-Jam when not in Anti-Jam mode. Press CE key to acknowledge fault and continue operation.
47	* Havequick function not available	Havequick function not available at this radio. Press CE key and select another operation.
48	WB mode not available at this frequency	Press CE key, select another frequency if WB required.
49	Link 11 mode not available at this frequency	Press CE key, select another frequency if Link 11 required.
50	Crypto mode not available at this frequency	Press CE key, select another frequency if crypto mode required.

Note...

* means error message code only displayed at an associated remote control/monitoring equipment (such as a PAE 3000V2 remote control unit).

USER MAINTENANCE

FILTER CLEANING

125 The air filters, fitted to the equipment's rear panel, should be cleaned every six months (or more regularly in high dust conditions). 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 two screws that secure the fan filter housing to the rear panel (see Fig. 4).
- (c) Remove the filter housing, fan EMC screen and filters. Clean the filters either by using a low pressure air supply or washing in warm water and leaving to dry. If necessary replace with a new filter (PAE Part No. 51-00507867).
- (d) Refit the filters, fan EMC screen and filter housing.

LAMP TEST

126 The lamp test allows all the front panel LEDs and lamps to be illuminated simultaneously allowing the operator to check for unserviceable lamps/LEDs. To carry out the test, press the SHIFT(▲) followed by the 0 (zero) key. The test is cancelled by pressing the CE key. Note that this test does not check the AC and DC supply lamps.

FREQUENCY ACCURACY CHECK

127 The ac accuracy of the transceiver's and transmitters'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 VHF (or UHF) antenna connector.
- (b) At the front panel, select a frequency of 155 MHz (VHF transmitter) or 399 MHz (UHF transmitter and VHF/UHF transceiver) and key the transmitter. Check that the frequency indicated on the frequency counter is between 154.999 and 155.001 MHz (VHF) or 398.999 and 399.001 MHz (UHF).
- (c) If the specification in step (b) is not met, reference should be made to PAE.

Contents

Paragraph

- 1 Introduction
- 3 Parts list

INTRODUCTION

- 1 This section details the PAE part numbers for items referred to in this handbook. The radio'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 PAE part numbers for items referred to in this handbook.

Item	Description	Part number
-	3040V2, UHF transceiver	B3040V2
-	3070V2, VHF transceiver	B3070V2
-	3060V2, VHF/UHF transceiver	B3060V2
-	3140V2, UHF transmitter	B3140V2
-	3170V2 VHF transmitter	B3170V2
-	3160V2, VHF/UHF transmitter	B3160V2
-	3240V2, UHF receiver	B3240V2
-	3270V2, VHF receiver	B3270V2
-	3260V2, VHF/UHF receiver	B3260V2
-	Series 3000DV2 Radios User Guide	31-33000DTR
-	Series 3000DV2 Transceiver Technical Handbook	31-13000DTR
-	Series 3000DV2 Transmitter Technical Handbook	31-13000DTX
-	Series 3000DV2 Receiver Technical Handbook	31-13000DRX
FS1	Fuse (size 0, 1.25 inch) 20 A - F20A 32 V BS	29-01450201
FS2	Fuse (20 mm) 4 A - F4A 250 V IEC	29-01120101
FS3	Fuse (20 mm) 8 A - T8A 250 V IEC (when used with 110/120 V ac input supply)	29-01210102
FS3	Fuse (20 mm) 4 A - T4A 250 V IEC for 220/240 V ac input supply	29-01120102
Air filter	Rear panel replacement air filter	51-00507867
	Free-standing accessory kit	70-3060TR1
	Anti-vibration mount accessory kit	70-3060TR2
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
Ant connector	N-type plug (for RG213 cable) that mates with radio's ANT connector	19-01030301
Antenna cable	Coaxial cable type RG213 (see note)	10-05120600
Ant connector	N-type plug (for RG174 cable) that mates with radio's ANT connector	19-01030306
Antenna cable	Coaxial cable type RG174 (see note)	10-05120200
	Free-standing accessory kit	70-3060

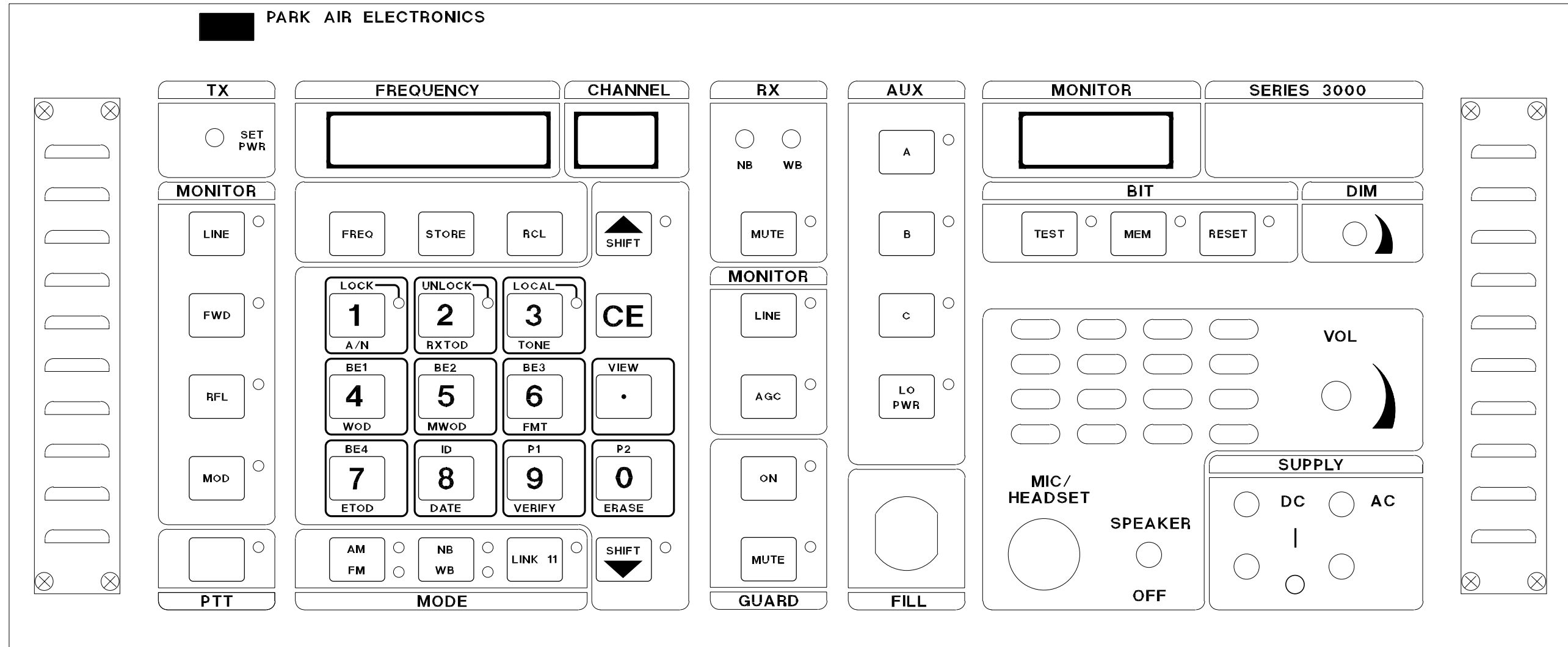
Note ...

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.

The following A3 size figures are bound in this section

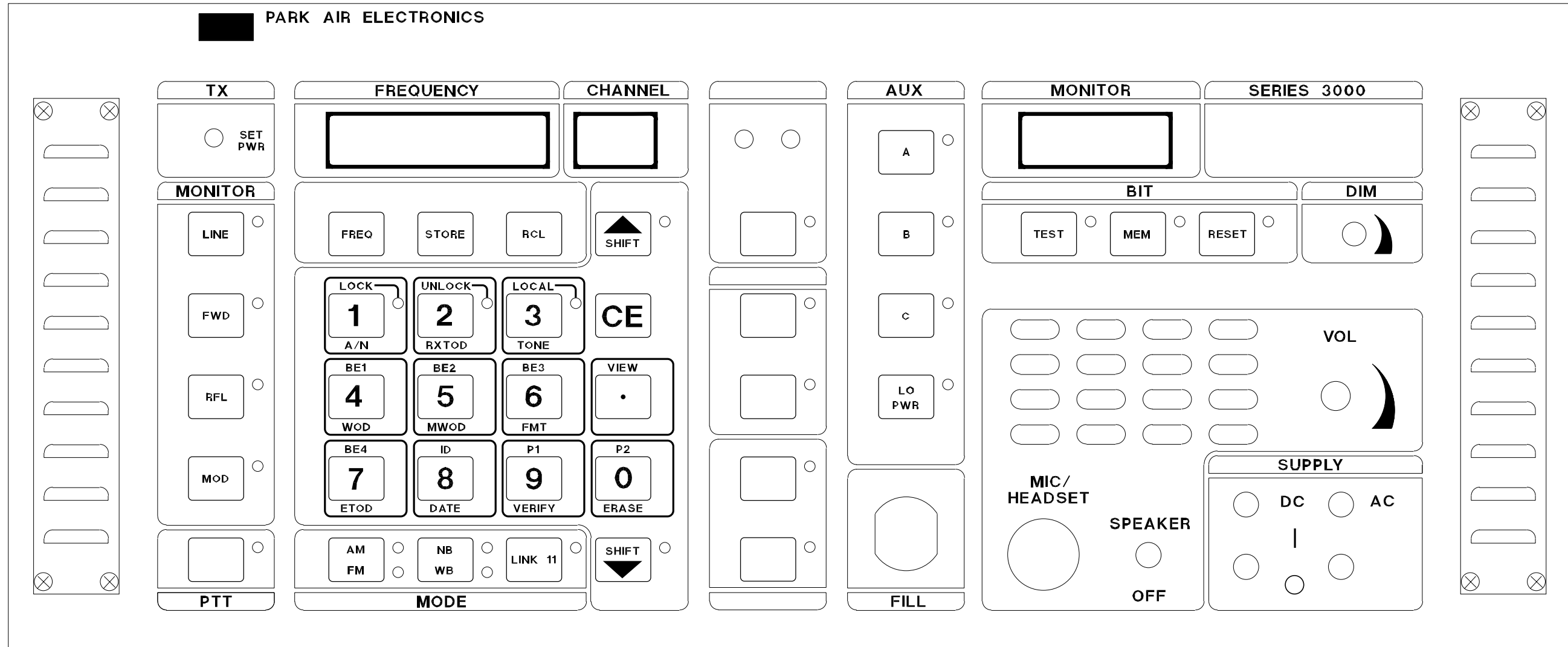
Figure

1	3000DV2 transceiver front panel · · · · ·	GA9553
2	3000DV2 transmitter front panel · · · · ·	GA8635
3	3000DV2 receiver front panel · · · · ·	GA8636
4	3000DV2 radio panel view · · · · ·	GA8535
5	Fitting telescopic slides · · · · ·	GA2983
6	Free standing kit assembly · · · · ·	GA7869
7	Anti-vibration mount assembly · · · · ·	GA8528
8	Assembly of N-type plugs · · · · ·	GA7883/4
9	3000DV2 overall dimensions · · · · ·	GA7868



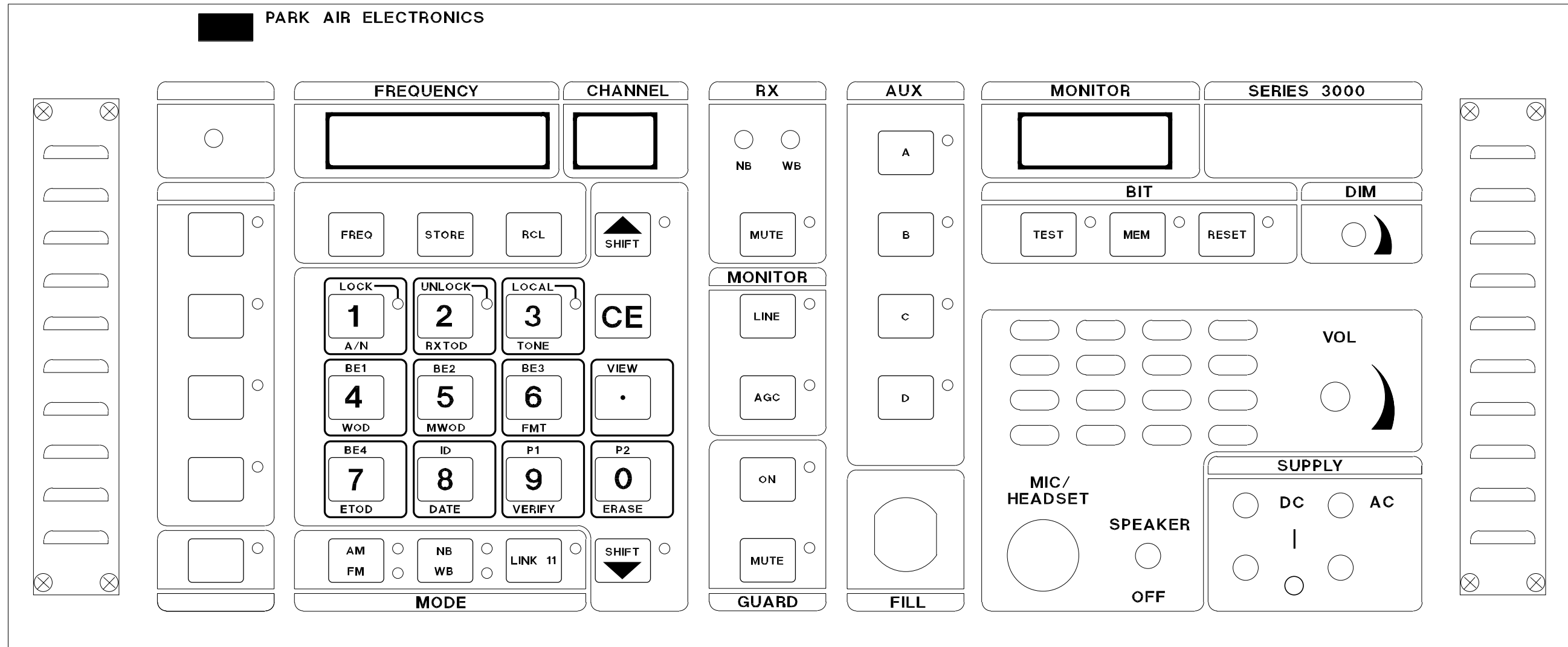
3000DV2 Transceiver Front Panel

Fig. 1



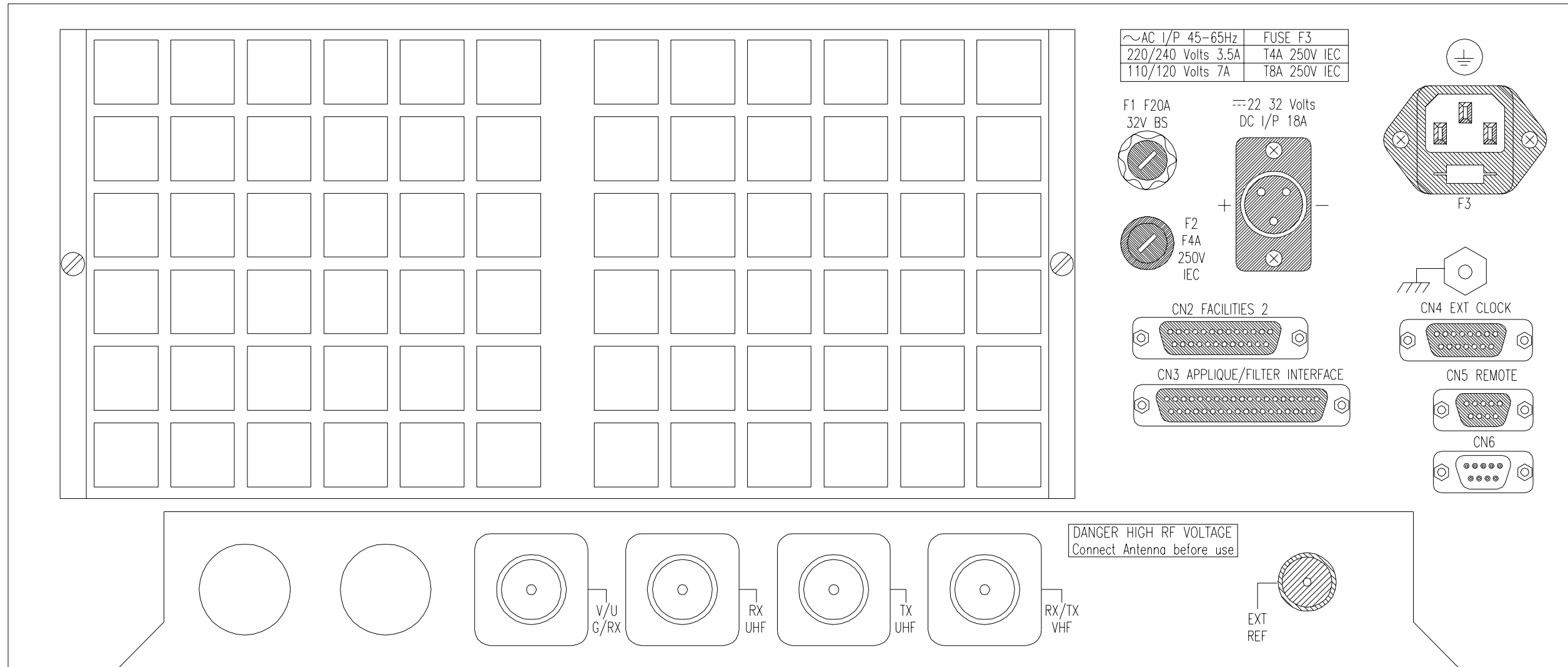
3000DV2 Transmitter Front Panel

Fig. 2



3000DV2 Receiver Front Panel

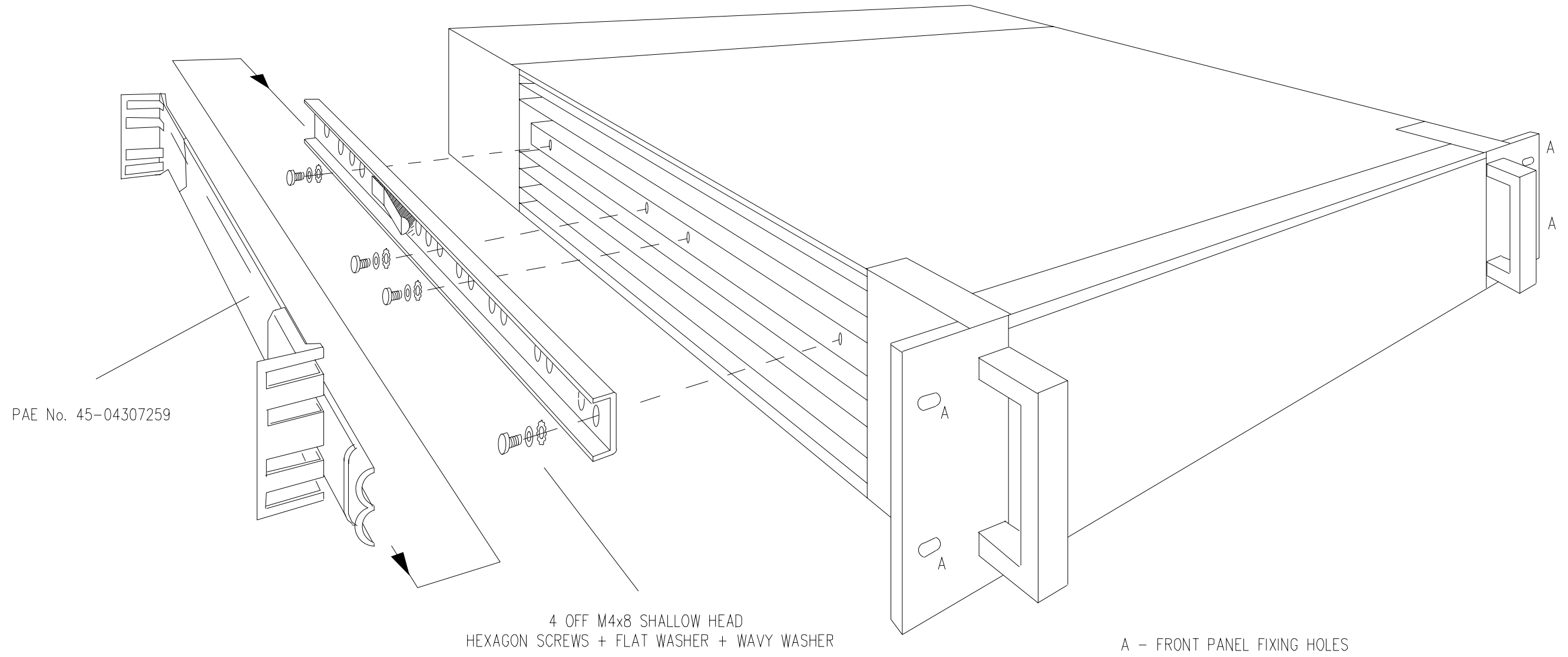
Fig. 3



Note: The Antenna Assembly configuration is dependent on model type. The example shown is for a VHF/UHF Transceiver

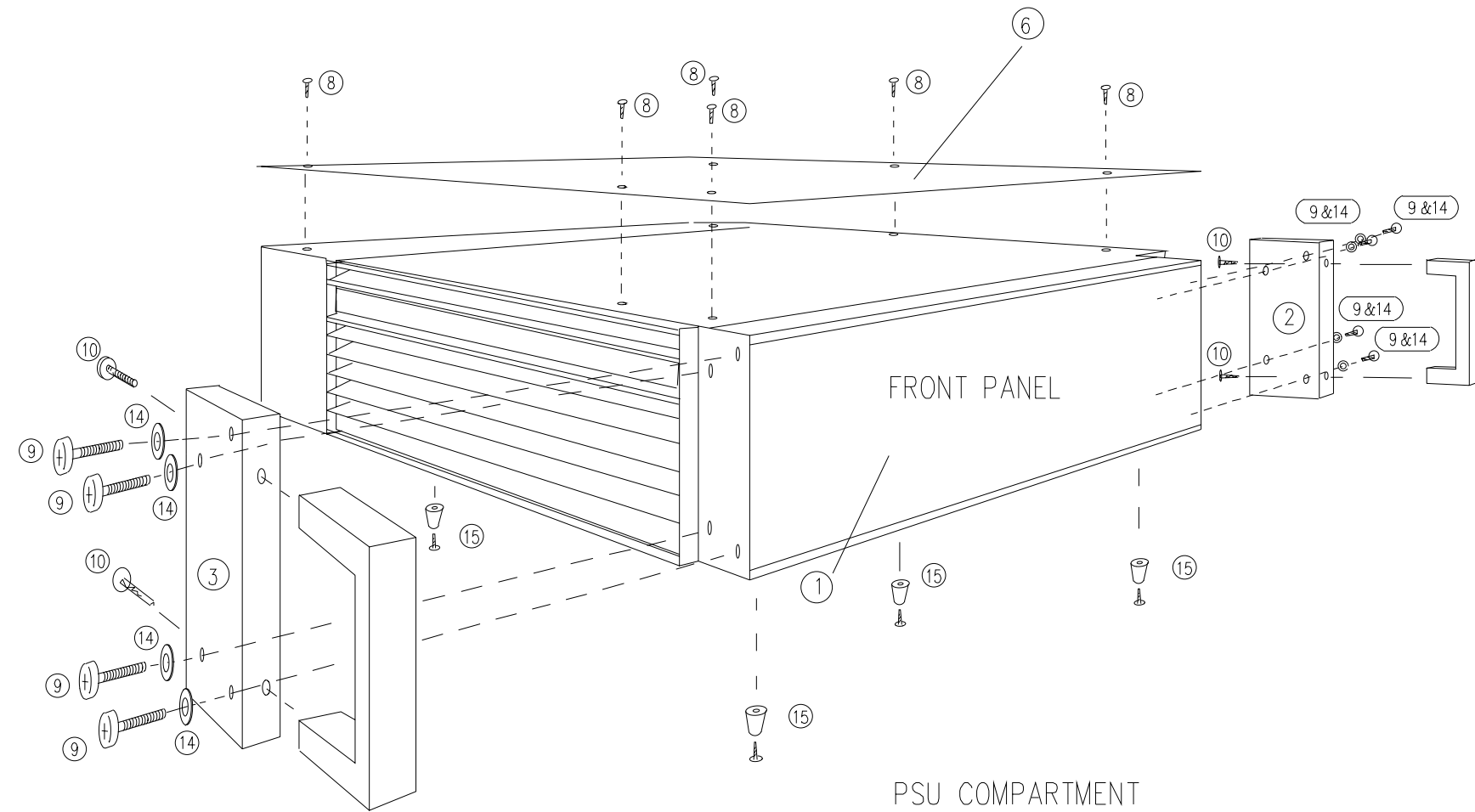
3000DV2 Rear Panel View

Fig. 4



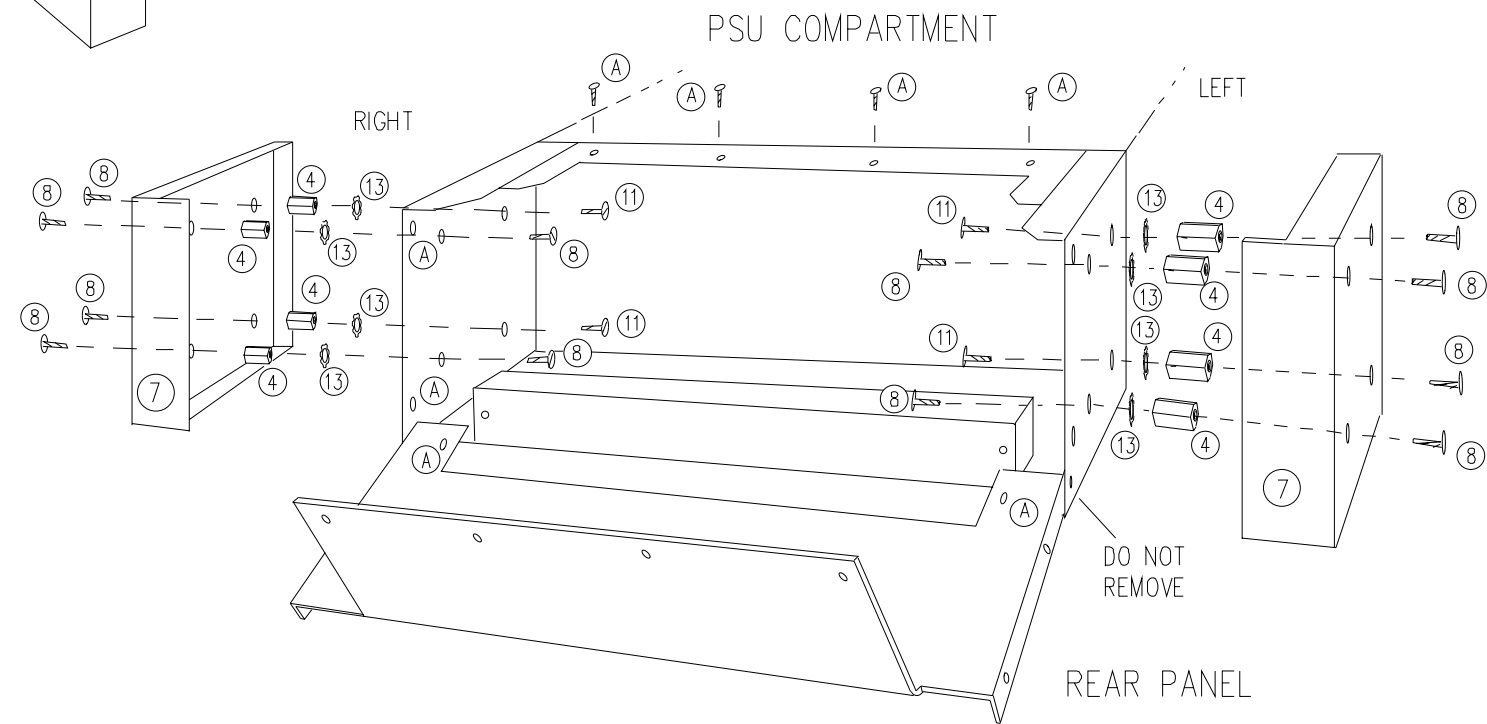
Fitting Telescopic Slides

Fig. 5



COMPONENT IDENTIFICATION

REF	ITEM	QTY	PAE PART No.
1	T/R 3060	1	24-05306000
2	HANDLE PLATE (R/H)	1	45-00002652
3	HANDLE PLATE (L/H)	1	45-00002912
4	HEXAGONAL M3x12mm SPACER	8	36-06030120
5		—	—
6	TOP COVER (OLIVE GREEN)	1	45-0000907
7	SIDE COVER (OLIVE GREEN)	2	45-0000908
8	SCREW M3x6mm C/S	20	36-41330060
9	SCREW M4x16mm PAN	8	36-45340160
10	SCREW M5x16mm CAPHEAD	4	36-50350160
11	SCREW M3x6mm PANHEAD	4	36-45330060
12		—	—
13	CRINKLE WASHER M3	8	36-12130000
14	CRINKLE WASHER M4	10	36-12140000
15	FEET 16W/SS (INCLUDING FIXING SCREWS)	4	02-22000002
A	REFER TO TEXT	11	—



NOTE :
FOR CLARITY, THE FRONT, REAR AND
PSU COMPONENTS HAVE BEEN OMITTED.

Free-Standing Kit Assembly

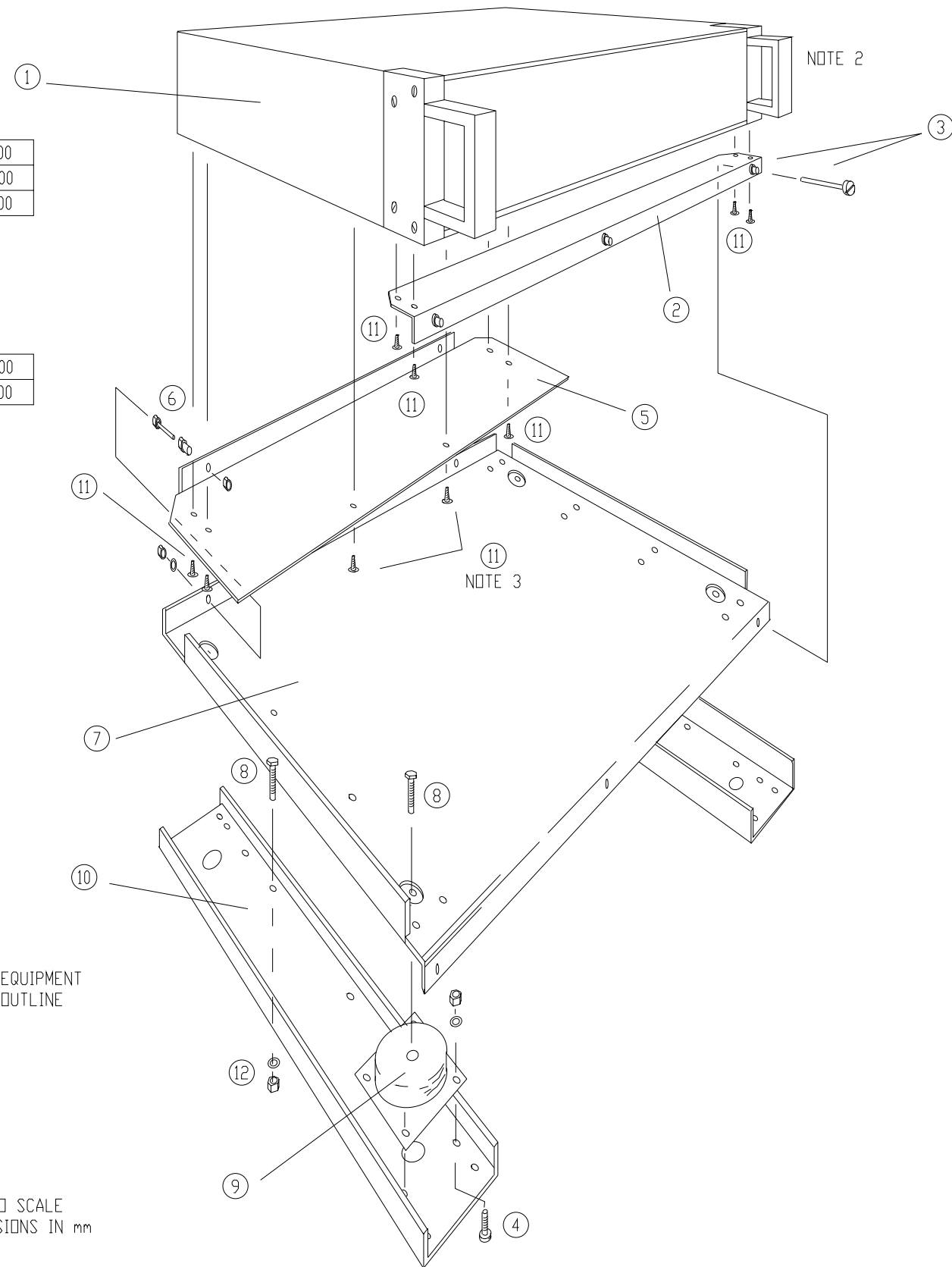
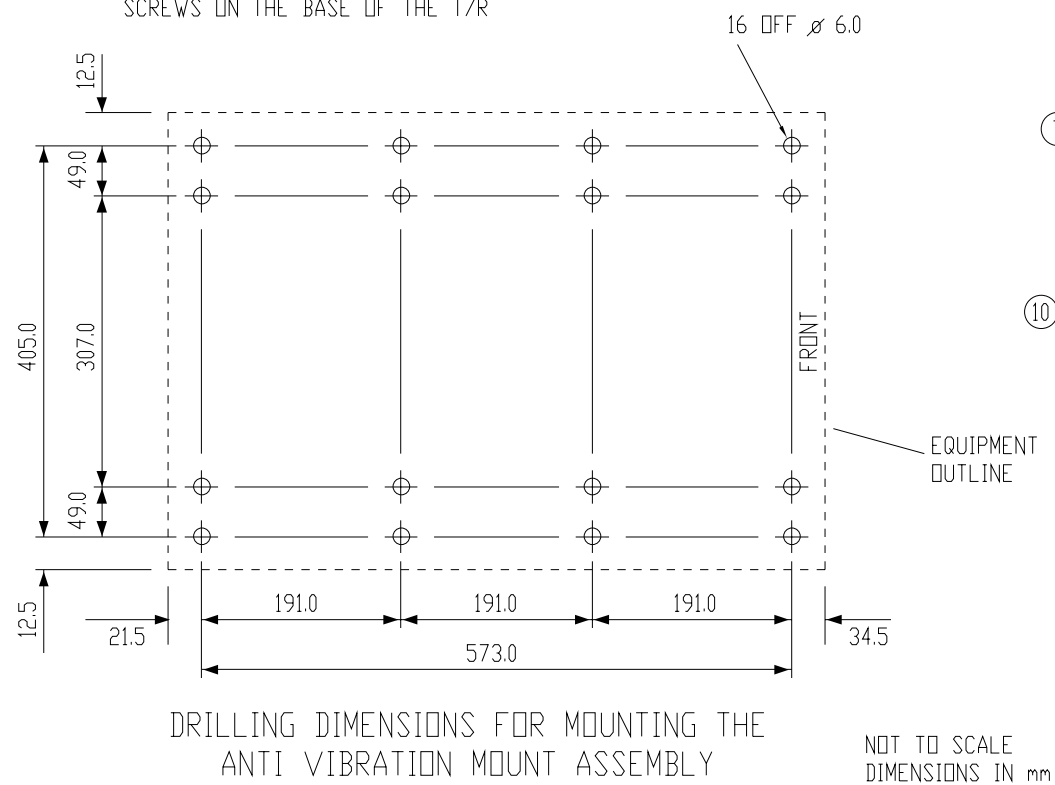
REF	ITEM		PAE PART No.
1	T/R (SEE NOTE 1)	1	24-xxxxxxx
2	FRONT LOCATION PLATE	1	45-00002931
3	FRONT LOCATION PLATE SCREW	3	36-92350240
4	M5 x 10 CSK POSI + NUT + WASHER		
5	REAR LOCATION PLATE	1	45-00007802
6	GUIDE PIN AND BUSH	2	36-99399000
7	SHOCK MOUNT TRAY	1	45-00007899
8	M6 x 20 HEX	20	36-20360200
9	SHOCK MOUNT	4	25-01143630
10	BOTTOM RAIL	2	45-00007903
11	M4 x 8 CSK	10	36-41340080
12	M6 NUTS + WASHERS		

16	36-41150100
16	36-01350000
16	36-12150000

20	36-01360000
20	36-12160000

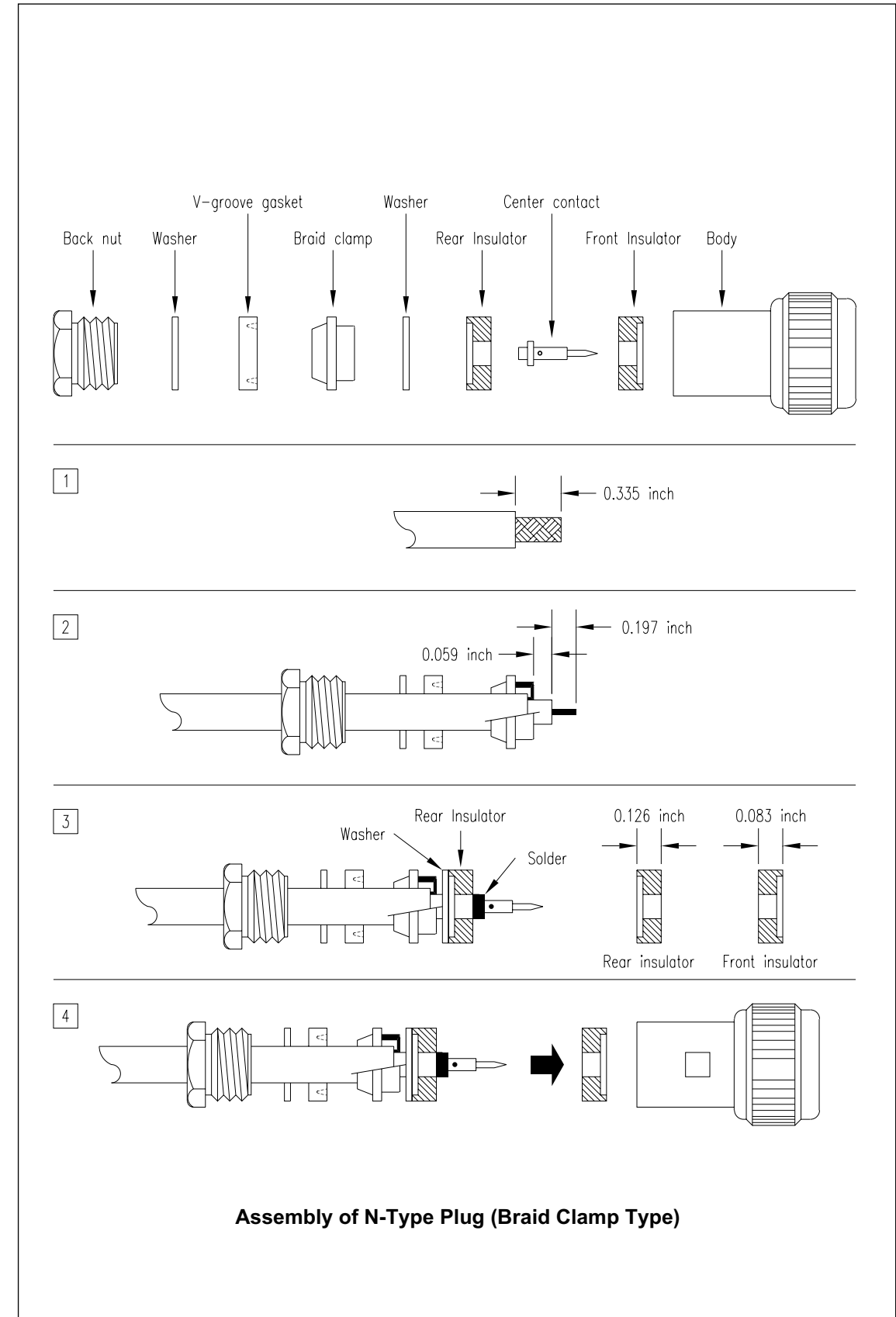
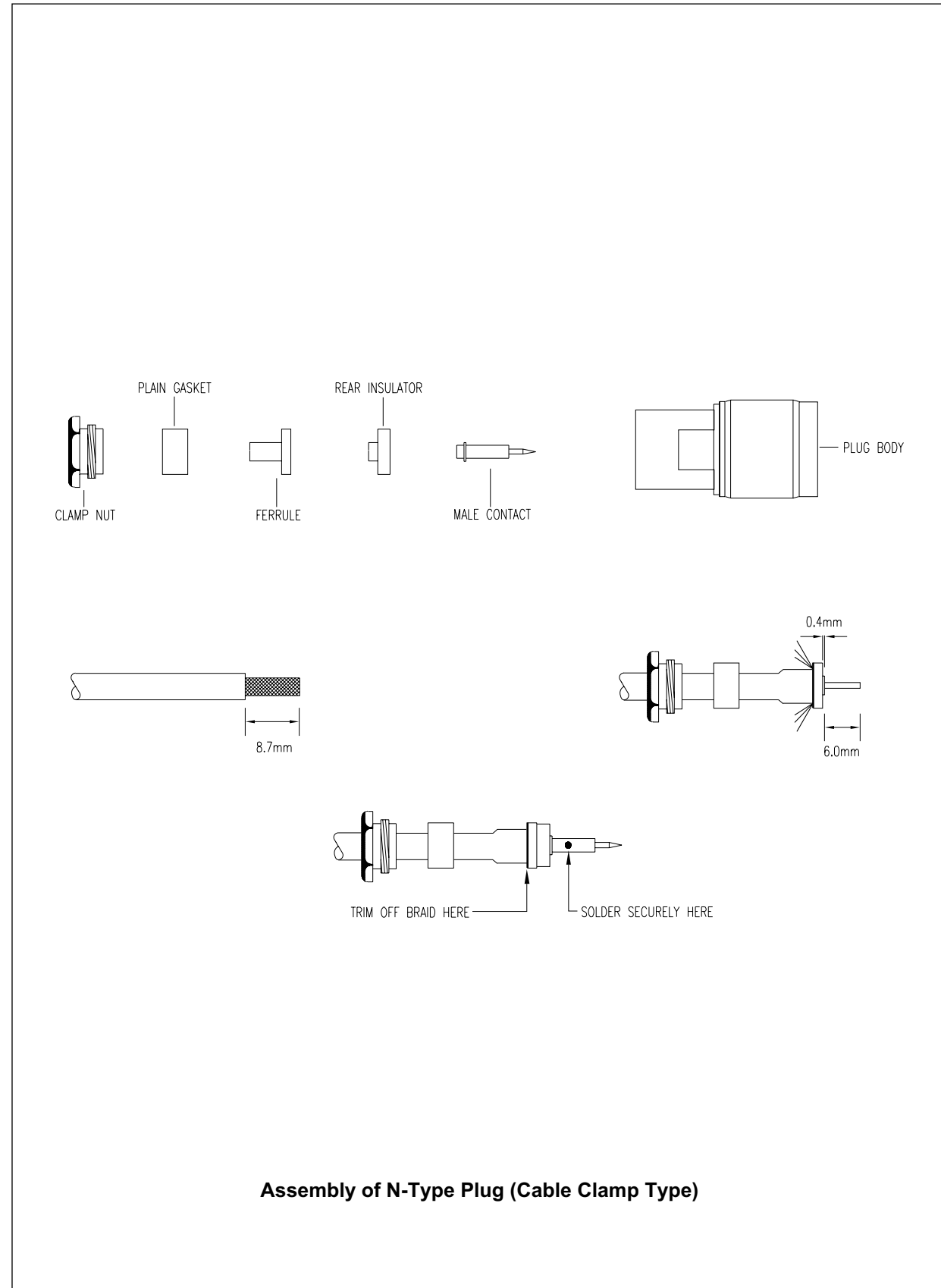
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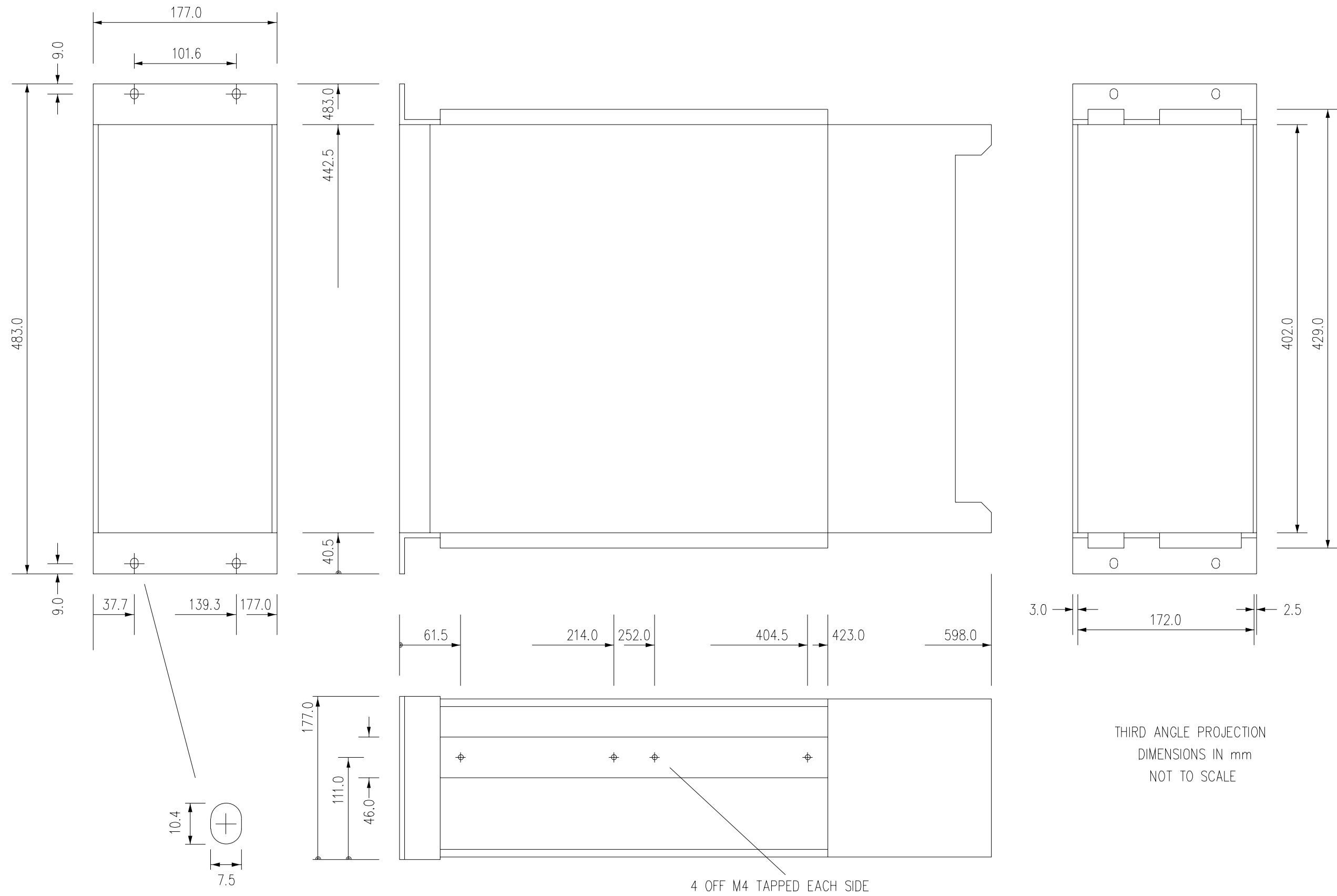
- 1) FOR THIS INSTALLATION THE T/R IS FITTED WITH A FREE STANDING KIT ACCESSORY.(EXCEPT THE FEET)
- 2) HANDLES AND HANDLE BLOCKS ARE PART OF THE FREE STANDING KIT ACCESSORY.
- 3) PRIOR TO LOCATING THESE SCREWS IT IS NECESSARY TO REMOVE THE CORRESPONDING SCREWS ON THE BASE OF THE T/R



Anti-Vibration Mount Assembly

Fig. 7





3000DV2 Overall Dimensions

Fig. 9