VHF TRANSCEIVER TYPE 5525-D8

USER GUIDE

Issue 3

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Amendment Record

Amendments to this handbook, initiated by PAE, are recorded in the following table.

Amendment Number	Incorporated by:	Date	Brief Details
1	PAE	March 1999	To correct typographical error Page 5 Paragraph 1.

List of Abbreviations

AM	Amplitude Modulation
BIT	Built-In Test
dB	decibel
EMC	Electromagnetic Compatibility
kHz	kilohertz
MHz	Megahertz
PAE	Park Air Electronics
PC	Personal Computer
ppm	parts per million
Rx	Receiver
Tx	Transmitter
VHF	Very High Frequency
VSWR	Voltage Standing Wave Ratio

1. INTRODUCTION

The Park Air Electronics (PAE) 5525-D8 Transceiver provides Mode 1 and Mode 2 (D8PSK) transmissions and reception within the VHF aeronautical frequency band between 118 and 136.975 MHz. Channel spacing is 25 kHz, and the maximum transmit power is 25 watt.
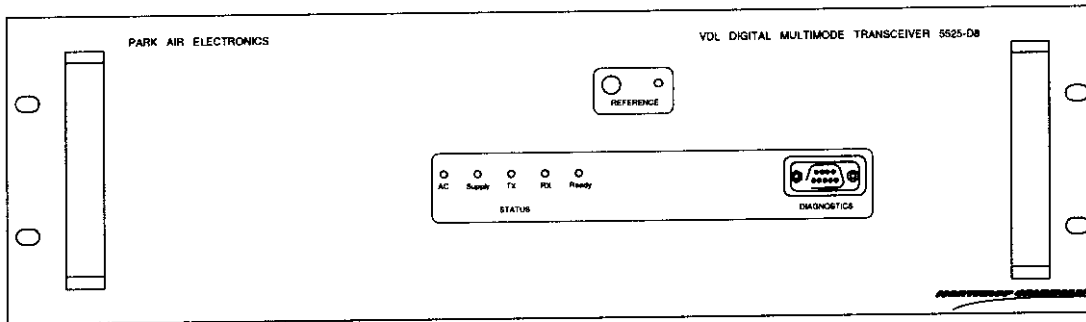
Fig 1 5525-D8 Transceiver Front Panel

During normal operation, key parameters are monitored by the Built-In Test (BIT) circuits and the front panel Ready indicator remains lit to show that no faults have been detected. If the radio develops a fault, one of the built-in tests will fail causing the Ready indicator to become unlit. The front panel Ready indicator flashes when the radio is not connected to an active HDLC link. All front panel indicators are described on page 15.

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

The radio is configured by connecting a PC, loaded with PAE Virtual Front Panel software, to the front panel Diagnostics connector in order to display a Virtual Front Panel. Configuration, which is fully detailed on page 21, comprises setting parameters relevant to the mode selected.

Note ...

This User Guide provides information on Virtual Front Panel Software Part Number 65-00000286. Refer to Section 5 for further details.

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2. SPECIFICATION

TRANSCEIVER OPERATING CHARACTERISTICS

Frequency range	Between 118 and 136.975 MHz
Number of channels	1
Channel spacing	25 kHz
Modulation modes	13KOA2D 6KOOA3E Mode 2 D8PSK
Frequency stability	Better than 2 ppm within permissible environmental conditions

DIMENSIONS AND WEIGHT

The dimensions and weight of the transceiver are:

Width	483 mm (19 inches).
Depth	419 mm (16.5 inches).
Height	133 mm (5.25 inches).
Weight	15 kg (33 pounds).

INPUT SUPPLY REQUIREMENT

The transceiver operates from a standard mains supply, or from a low voltage dc supply as follows. When both ac and dc input supplies are connected, automatic change-over to dc supply occurs if the ac supply fails.

ac input supply	110, 120 V, 220 or 240 V, ±10%, 45 to 65 Hz.
ac power consumption	Tx - less than 500 VA. Rx - less than 50 VA
dc input supply	22 to 32 V
dc current consumption	Tx - 4 amp Rx - 1 amp

ENVIRONMENTAL

Temperature Range

-20 to +55°C operating
-30 to +70°C non-operating

Ventilation

Natural convection

Warm-up time

Less than 10 seconds

3. INSTALLATION AND COMMISSIONING

INSTALLATION

WARNINGS!

LETHAL VOLTAGES. INSTALLATION INVOLVES CONNECTING LETHAL VOLTAGES TO THE EQUIPMENT. THE INSTRUCTIONS DETAILED IN THIS SECTION MUST BE CARRIED OUT ONLY BY SUITABLY QUALIFIED PERSONNEL.

LETHAL VOLTAGES. THE EQUIPMENT IS PERMANENTLY CONNECTED TO THE MAINS SUPPLY WHILST THE MAINS CONNECTOR IS ATTACHED. SWITCHING THE REAR PANEL ON/OFF SWITCH TO THE OFF POSITION DOES NOT ISOLATE THE INTERNAL CIRCUITRY FROM THE MAINS SUPPLY. FOR THIS REASON, A MAINS ISOLATING SWITCH SHOULD BE AVAILABLE CLOSE TO, AND EASILY ACCESSIBLE FROM, THE EQUIPMENT POSITION.

ANTENNA RADIATION. THE ANTENNA USED WITH THIS RADIO EQUIPMENT MUST BE INSTALLED SUCH THAT THE RESULTANT RADIATED FIELD STRENGTH IS BELOW 10W/m² IN AREAS NORMALLY ACCESSIBLE TO PERSONNEL.

UNAUTHORIZED MODIFICATIONS. CHANGES OR MODIFICATIONS MADE TO THIS EQUIPMENT THAT ARE NOT EXPRESSLY APPROVED BY PARK AIR ELECTRONICS, OR PARTIES AUTHORIZED BY PARK AIR ELECTRONICS, COULD VOID THE USER'S AUTHORITY TO OPERATE THE EQUIPMENT.

HIGH RF VOLTAGES. AN ANTENNA, OR SUITABLE DUMMY LOAD, MUST BE CONNECTED TO THE RADIO BEFORE USE. FAILURE TO COMPLY WITH THIS INSTRUCTION CAN EXPOSE PERSONNEL TO HIGH RF VOLTAGES.

Note ...

The equipment incorporates a supply filter which contains capacitors. These components may remain charged after the equipment is disconnected from the supply. Although the stored energy is within the approved safety requirements, a small shock may be experienced if the plug pins are touched immediately after removal of the supply lead.

Installing the 5525-D8 transceiver involves the following tasks which should be carried out in the order presented.

☐ Ensuring the radio's ac supply taps are set to suit the local mains supply (see page 10)

☐ Fitting the correct input fuse (see page 11)

☐ Fitting the radios, if required, into an equipment rack (see page 12)

☐ Connecting an ac input supply (see page 13)

☐ Connecting a dc input supply (see page 14)

☐ Connecting an antenna (see page 14)

☐ Making the chassis stud connection to the equipment rack or system earth (see page 14)

☐ Making facilities connections (see page 14).

PRELIMINARY CHECKS

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

AC INPUT SUPPLY VOLTAGE TAPS

Before initial use, the transceiver's ac input supply taps should be checked to ensure the setting corresponds to the local ac supply voltage. The taps can be linked to one of four voltage settings:

110 V, 120 V, 220 V, or 240 V

To set the taps, use the following procedure:

❑ Ensure that ac and dc input supplies to the transceiver are disconnected.

❑ Access the underside of the transceiver. Release the 13 screws that secure the transceiver's bottom cover; then remove the cover.

❑ Refer to Fig 2 and identify the AC Terminal Block.

❑ Release the screw that secures the terminal block's cover; then remove the cover.

❑ Establish the local ac mains voltage; then set the wires and links appropriate to that voltage (see Fig 3)

❑ Refit the terminal block's cover and securing screw.

❑ Refit the transceiver's bottom cover and 13 securing screws.
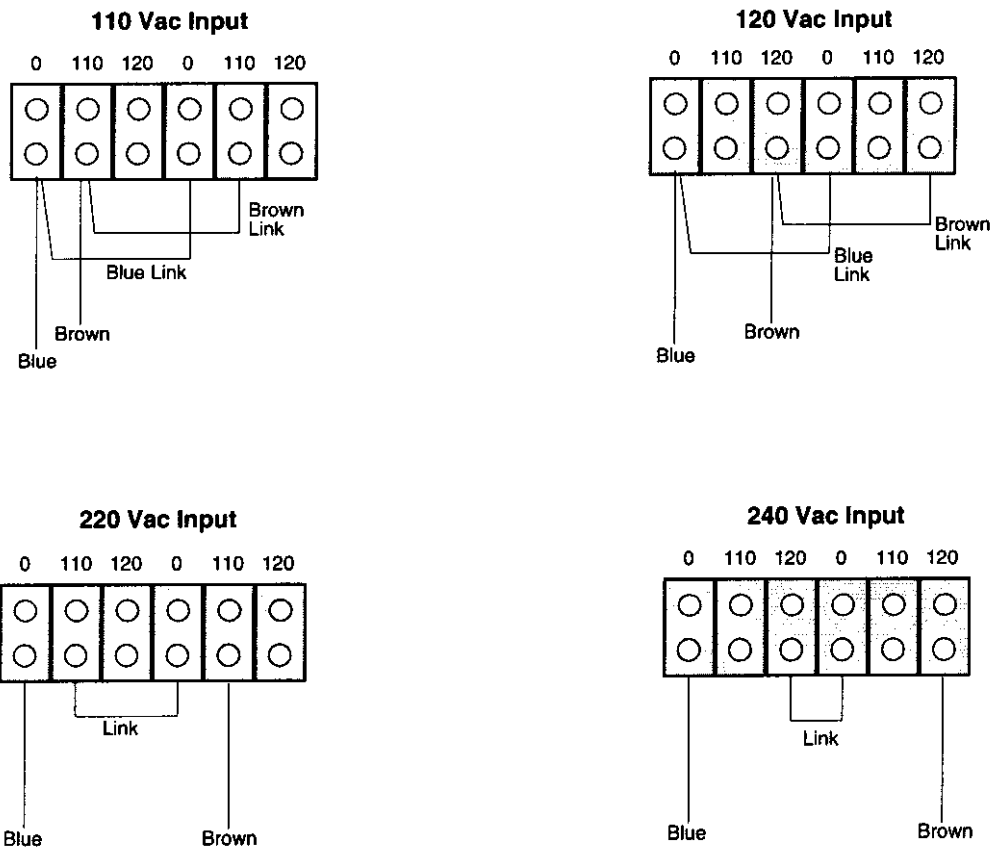

Fig 2 AC Tap Location

110 Vac Input

0 110 120 0 110 120

Brown Link

Blue Link

Brown

Blue

120 Vac Input

0 110 120 0 110 120

Brown Link

Blue Link

Brown

Blue

220 Vac Input

0 110 120 0 110 120

Link

Blue   Brown

240 Vac Input

0 110 120 0 110 120

Link
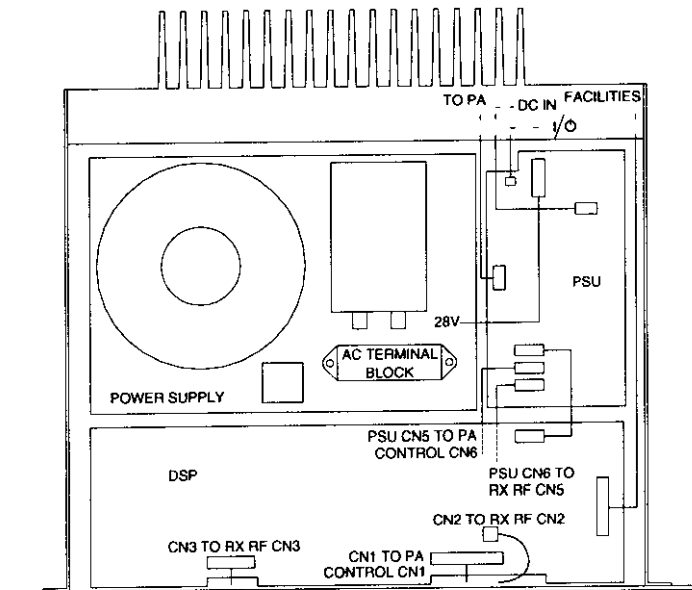
Blue   Brown

Fig 3 AC Tap Configuration

FITTING THE CORRECT AC INPUT FUSE

An ac input fuse is fitted to the radio's rear panel (see page 19). During installation, ensure that the correctly rated fuse, appropriate to the local mains supply, is fitted. This should be:

For 110 or 120 Vac input   a 4 amp time-delay fuse (PAE Part Number 29C11120102S)

For 220 or 240 Vac input   a 3.15 amp High Breaking Capacity (HBC) time-delay fuse
(PAE Part Number 29C01100102S)

FITTING A RADIO INTO AN EQUIPMENT RACK

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

The transceiver can be installed on telescopic slides, or on fixed runners, within a standard 483 mm (19 inch) equipment rack. Four M4 tapped holes, each 10 mm deep (see Fig 4) are provided on each side of the equipment for fitting slides or runners. Details of suitable telescopic slides and fixed runners are available from PAE.
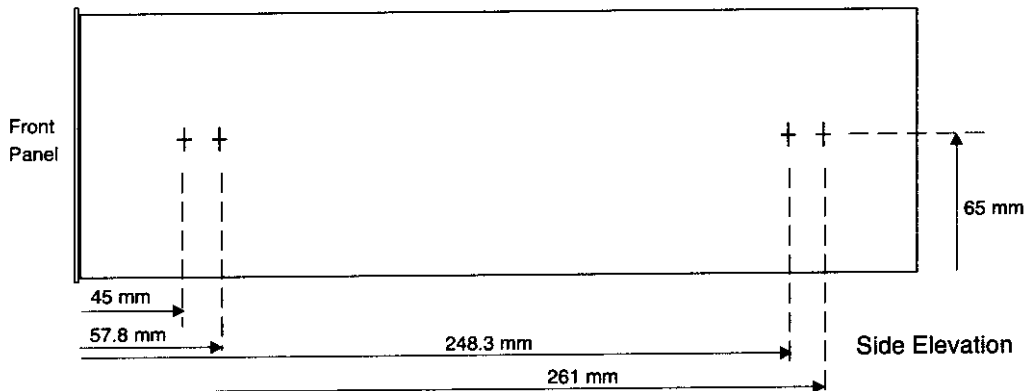
Fig 4 Slide fixing holes

Telescopic Slides

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. Installation must be in accordance with instructions relating to the slides, and the rack or cabinet being used. The transceiver is secured to the rack through the front panel fixing holes using suitable hardware.

Fixed Runner

The runners 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.**

AC SUPPLY CONNECTION

WARNINGS

LETHAL VOLTAGES! THE EQUIPMENT IS PERMANENTLY CONNECTED TO THE MAINS SUPPLY WHILST THE MAINS CONNECTOR IS ATTACHED. SWITCHING THE REAR PANEL ON/OFF SWITCH TO THE OFF POSITION DOES NOT ISOLATE THE INTERNAL CIRCUITRY FROM THE MAINS SUPPLY. FOR THIS REASON, A MAINS ISOLATING SWITCH SHOULD BE AVAILABLE CLOSE TO, AND EASILY ACCESSIBLE FROM, THE EQUIPMENT POSITION.

EARTH CONNECTION! THIS EQUIPMENT MUST BE EARTHED. THE EARTH TERMINAL OF THE AC CONNECTOR SHOULD BE USED AS THE SAFETY EARTH.

CHASSIS EARTH! A CHASSIS STUD, MARKED ⏚ IS FITTED TO THE EQUIPMENT'S REAR PANEL. THIS STUD IS USED TO CONNECT THE RADIO TO THE EQUIPMENT RACK, OR TO THE USER'S SYSTEM EARTH POINT. THE STUD IS NOT INTENDED TO BE USED AS THE SAFETY EARTH.

An ac input connector (see page 19) is fitted to the equipment's rear panel. The cable used to connect between the equipment and the user's ac power source should be 3-core (to IEC 227) rated 250 V ac at 8 amps, and have a minimum cross sectional area of 1.0 mm² per core. PAE recommends the use of polyvinyl chloride (PVC) cable. The cable must be fitted with an IEC approved equipment connector (PAE part number 20-02030102), and conform to the following specification:

❑ 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 titled 'Rubber Insulated Cables of Rated Voltages up to and Including 450/750 V (designation H05 RR-F)'.

The 5525-D8 transceiver is a Class 1 equipment. The ac supply cable should have a green-and-yellow protective earthing conductor electrically connected to the protective earthing terminal of the equipment connector and the mains plug. PAE recommends the ac supply cable is colour coded in accordance with the electrical appliance (colour code) regulations for the UK. That is:

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

The cores of the mains lead should be connected to the equipment connector provided, and your plug as follows:

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

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

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

DC SUPPLY CONNECTION

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

A dc input supply connector (see page 18) is fitted to the equipment's rear panel. The recommended minimum rating of the dc supply cable is: 2-core having a cross sectional area of 1.5 mm^2 per core. The supply cable must be fitted with an XLR3 connector (PAE part number 20-01030106).

CONNECTING AN ANTENNA

The antenna feeder cable connects to the transceiver's rear panel N-type Antenna connector (see page 17). The VSWR of the antenna and feeder cable should be as low as possible. The radio reduces power by 10 dB if the VSWR exceeds 2.5:1. The antenna system should ideally have a VSWR considerably less than this figure.

CHASSIS STUD CONNECTION

In order not to compromise the transceiver's Electromagnetic Compatibility (EMC) the Chassis Stud, marked $\eta\eta$ and 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 should be made using a single tri-rated, green-and-yellow cable having a cross sectional area of 2.5 mm^2. 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.**

MAKING FACILITIES CONNECTIONS

A 25-way D-type rear panel Facilities socket allows the required audio, control, and monitoring signals to be connected. The connector is shown on page 18 and the pin-out detailed in Table 2 on page 20. When making connections to the Facilities Connector, and in order not to compromise the transceiver'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 Facilities Connector's shell or body.

4. FRONT AND REAR PANEL LAYOUT

FRONT PANEL

The radio's front panel is fitted with five Status indicators, a Diagnostics connector, and a Reference Frequency output and adjustment control.

STATUS INDICATORS

The five amber light emitting diode (LED) indicators display the radio's status. They are shown in the following illustration and detailed below.
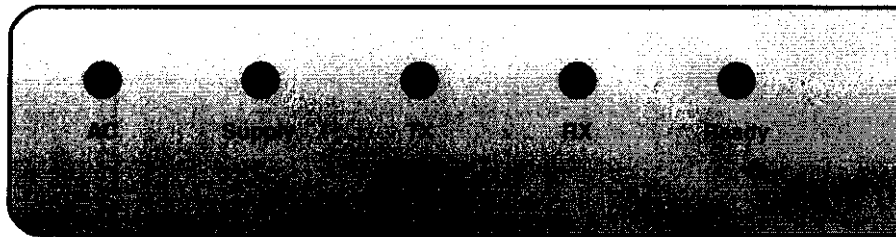
AC Indicator
Lights when an ac supply is connected to the radio.

TX Indicator
Lights when the transmitter is keyed and is producing power.

Ready Indicator
Lights when the radio is ready for service and no faults have been detected by the built-in tests.
Flashes when radio is not connected to an active HDLC link

Supply Indicator
Lights when an ac or dc supply is connected, and switched on at the radio's rear panel On/Off switch.

RX Indicator
Lights when a valid signal is sensed by the receiver. Also lights when receiving the radio's own transmission.

DIAGNOSTICS CONNECTOR

This 9-way D-Type socket is used to connect a PC to the radio so that the Virtual Front Panel can be displayed (see page 22). The connector's pin designation is shown in Fig 5 and the pin-out is detailed in Table 1. The interconnections between the Diagnostics connector, and the PC's COM port are pin-to-pin.
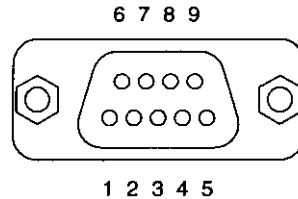
Fig 5 Front Panel Diagnostic Connector (looking at front panel)

Table 1 Diagnostics Connector Pin-Out

Diagnostics Connector Pin Number	Signal Name	Signal Type
1	Carrier detect (DCD)	RS232
2	Receive data (RD)	RS232
3	Transmit data (TD)	RS232
4	Data terminal ready (DTR)	RS232
5	Signal ground (SG)	0 volt
6	Data set ready (DSR)	RS232
7	Request to send (RTS)	RS232
8	Clear to send (CTS)	RS232
9	Ring indicator (RI)	RS232

Note ... Only pins 2 (RD), 3 (TD), and 5 (SG) need to be connected

REFERENCE SOCKET AND CONTROL

An SMB plug that provides the connection for a high impedance frequency counter. This facility is required to check the radio's reference frequency. The adjacent multi-turn control allows the reference frequency to be trimmed. The correct frequency is 20.950000 MHz.

REAR PANEL

The radio's rear panel is fitted with a Supply on/off switch, ac and dc input supply connectors, ac and dc supply fuses, a chassis earth connector, a 25-way facilities connector, and an antenna connector.
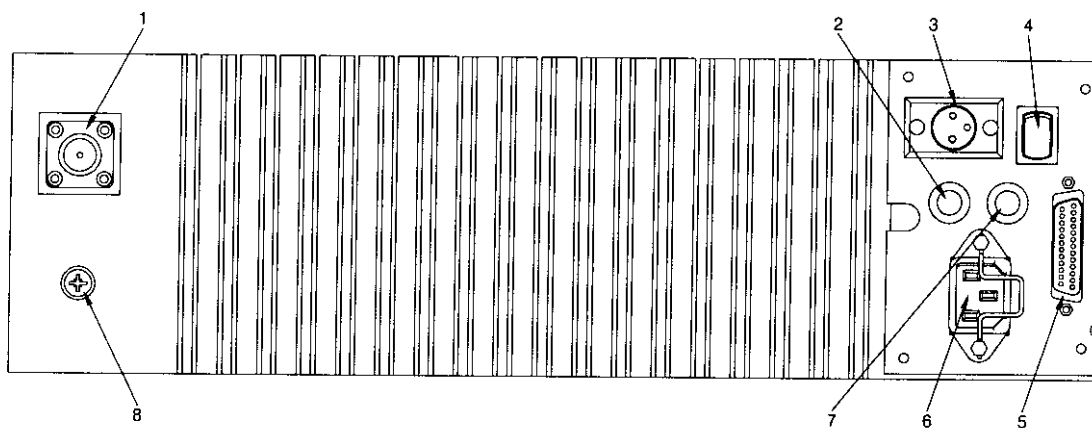
Fig 6 Rear Panel Layout

ANTENNA CONNECTOR (FIG 8 ITEM 1)

An N-type socket that is used to connect the antenna feeder cable to the transceiver. Connection should be made using a free N-type plug (PAE part number 19-0103030) which is suitable for RG213 coaxial cable.

DC INPUT SUPPLY FUSE (FIG 8 ITEM 2)

A 1¼ inch, 15 amp, time-delay fuse protecting the dc input supply. The PAE part number for the fuse is 29-01350201.

DC INPUT CONNECTOR (FIG 8 ITEM 3)

A 3-pin plug for the radio's optional 28 V
(nominal) dc input supply. Note that only
two of the three pins are used. Fig 7,
which is shown looking at the rear of the
radio, details the pins.

Negative (-)

Positive (+)

Not used
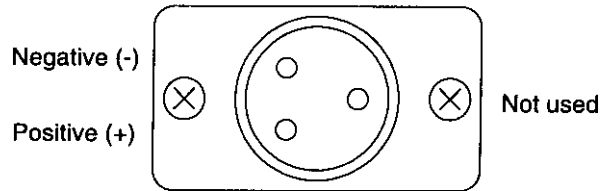
Fig 7 dc Input Connector

SUPPLY ON/OFF SWITCH (FIG 8 ITEM 4)

SUPPLY

A two-way switch that connects power to the radio's circuits when
an ac and/or dc input supply is connected to the transceiver.

Up, marked   I   = ON

Down, marked ⏻   = OFF
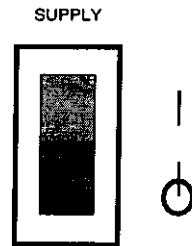
Warning!
When an ac mains supply is connected to the radio, lethal voltages are present within the
radio regardless of the Supply switch setting.

FACILITIES CONNECTOR (FIG 8 ITEM 5)

A 25-way D-type socket that connects audio, control, and monitoring signals to the radio. The connector
is shown in Fig 8 and detailed in Table 2 (see page 20).

25   13

14   1
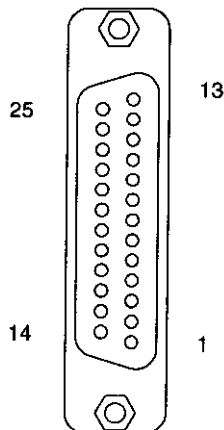
Fig 8 Rear Panel Facilities Connector Pin-Out

AC INPUT CONNECTOR (FIG 8 ITEM 6)

A 3-pin chassis plug used to connect the input ac supply. The pins (as seen when looking at the rear of the radio) are detailed in Fig 9.
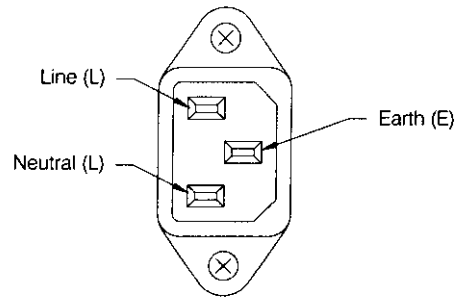
Fig 9 ac Input Connector

AC INPUT SUPPLY FUSE (FIG 8 ITEM 7)

A 20 mm, semi-delay fuse protecting the ac input supply. The fuse value depends on the input ac supply being used and is either: Fig   ac Input Connector

For 110/120 Vac input, 4 amp, time-delay, PAE Part Number 29C11120102S

For 220/240 Vac input, 3.15 amp, HBC, time-delay, PAE Part Number 29C01100102S.

CHASSIS STUD (FIG 8 ITEM 8)

A chassis stud. Must be connected to the equipment rack (if a rack is being used) or to the user's system earth point (see page 14 for further details)

Table 2   Facilities Connector Pin-Out

Pin Number	Signal Name	Signal Level	Input or Output
	Audio In/Out		
14	Transmitter audio (+)	-10 to +10 dBm 600 ohms	Input
2	Transmitter audio (-)	-10 to +10 dBm 600 ohms	Input
4	Receiver audio (+)	-10 to +10 dBm 600 ohms	Output
17	Receiver audio (-)	-10 to +10 dBm 600 ohms	Output
	Control/Indication		
25	PTT	Open circuit or 0 volt. 0 volt keys the transmitter	Input
12	Mute	Open circuit or 0 volt. 0 volt inhibits Rx audio output	Input
3	Signal strength	dc level between 0 and 5 volt	Output
	Serial Interface 0		
18	Serial 0 Out (A)	RS422	Output
6	Serial 0 Out (B)	RS422	Output
19	Serial 0 In (A)	RS422	Input
7	Serial 0 In (B)	RS422	Input
20	Serial 0 CLK (A)	RS422	Output
8	Serial 0 CLK (B)	RS422	Output
	Serial Interface 1		
21	Serial 1 Out (A)	RS422	Output
9	Serial 1 Out (B)	RS422	Output
22	Serial 1 In (A)	RS422	Input
10	Serial 1 In (B)	RS422	Input
23	Serial 1 CLK (A)	RS422	Output
11	Serial 1 CLK (B)	RS422	Output
	Reference		
24	Time	5 volt CMOS	Input
	0 volt		
1	0 volt	0 volt	-
5	0 volt	0 volt	-
13	0 volt	0 volt	-
15	0 volt	0 volt	-
16	0 volt	0 volt	-

Note...   Serial Interface 0 is the HDLC control and data connection for Mode 2 operation. Serial Interface 1 is for future use.

5. CONFIGURING THE RADIO

GENERAL INFORMATION

User configuration of the radio is carried out using a PC connected to the radio's front panel Diagnostic connector and running an application provided by PAE called Virtual Front Panel.

There are two versions of the Virtual Front Panel software:

❏ **Version 65-00000215** can be used to configure ACARS only radios, not multi-mode radios.

❏ **Version 65-00000286** is used to configure multi-mode radios. How to use this software for ACARS and Mode 2 operation is described in this handbook.

Note ...

Multi-mode radios are identified by a label bearing the letter 'M'. The label is attached to one of the radio's side panels. All radios supplied from October 1998 are Multi-mode.

INSTALLING THE VIRTUAL FRONT PANEL (VFP) SOFTWARE

The VFP software is supplied by PAE on floppy disk. To install the software onto a PC:

❏ Ensure that your PC is running Windows 95™ and that no applications are running in the background.

❏ Insert the floppy disk containing the PAE software into the PC's floppy disk drive.

❏ From the Start menu select *RUN*.

❏ In the *RUN* dialog box, key in, 'A:\SETUP.EXE' and click on 'OK' (where A is the drive letter of the floppy drive).

❏ The Set-up procedure then begins. Follow the on-screen instructions.

❏ When completed, the set-up programme returns the PC to the Desktop. The VFP is now installed.

CONFIGURING THE VIRTUAL FRONT PANEL

To configure the virtual front panel:

❑ Ensure that input power is isolated from the radio and PC

❑ Using a suitable lead (see page 16) connect between the radio's front panel Diagnostic connector and the PC's COM Port 1 connector.

❑ Switch on power to the radio and the PC.

❑ At the radio, check that the appropriate Status indicators are lit (see page 15).

❑ At the PC, start the PAE software by clicking on the location specified during installation. By default, the installation procedure locates the shortcut to VFP Loader at 'Start Menu\Programs\Virtual Front Panel'.

❑ Using the mouse, click on the PAE icon. Check that the following screen is displayed.
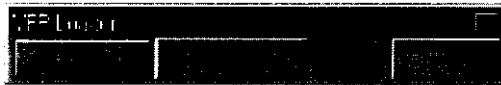
❑ If the radio is configured for multi-mode operation (identified by a label bearing the letter 'M' fitted to the side panel) click on Multi-mode. The procedures starting on page 31 detail Multi-mode operation.

❑ If the radio is configured for ACARS only operation, click on ACARS only. The procedures starting on page 24 detail ACARS operation.

CONFIGURING THE RADIO

The procedures referred to above (which are, configuring Multi-mode, or ACARS operation) describe setting the parameters applicable to the radio's mode of operation.

When configuration has been completed, the VFP Loader screen is displayed with the selection icons 'greyed-out'. The VFP Loader can then be closed as detailed under the following heading 'Exiting the VFP'

EXITING THE VFP

When configuration of the radio is complete, the user exits the VFP. This action returns the user to the following screen. Select Yes.
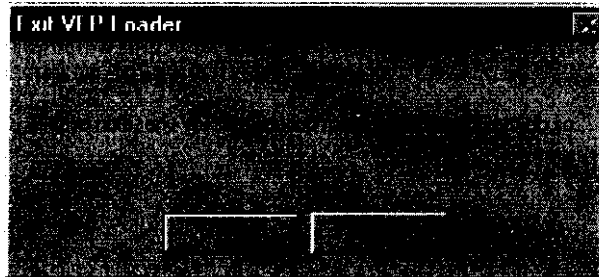
Then:

☐ Power down the PC and remove input power from the radio.

☐ Disconnect the lead between the radio and the PC.

☐ Restore the radio for operational use.

ACARS ONLY VIRTUAL FRONT PANEL (VFP)

Configuration involves setting the following parameters:

1.   The operating frequency. This can be any frequency between 118 and 136.975 MHz with 25 kHz channel spacing.

2.   The transmitter output power. This can be any value between 3 and 25 watts in increments of 1 watt.

3.   The transmitter time-out period. This is the maximum time that the transmitter can remain keyed and is set to any value between 0 and 510 seconds (in two second steps). 0 is a special value that disables this feature.

4.   The Rx line level. This can be any value between -10 and +10 dBm in increments of 0.1 dB.

5.   The Tx line level. This can be any value between -10 and +10 dBm in increments of 0.1 dB.

6.   The mute level. This function is not currently implemented.

CONNECTING THE VFP

❑ Check that the VDL Virtual Front Panel is displayed (see Fig 10).

❑ Using the mouse, click on the ▉▉▉▉▉▉ icon.

❑ Select COM Port 1 to be active (see note).

❑ Using the mouse, click on the ▉▉▉▉▉▉ icon.

    Note...

    Note that COM Port 2 can be used if connection is made between the radio's front panel Diagnostic connector and the PC's COM Port 2. Setting the required COM Port active needs to be done only when first using the PC, or if the setting has been changed.

DISCONNECTING THE VIRTUAL FRONT PANEL

When the radio has been configured, the virtual front panel must be disconnected using the following procedure.

❑ Using the mouse, click on the ▉▉▉▉▉▉ icon.

❑ Using the mouse, click on the ▉▉▉▉▉ icon.

❑ The PC returns to the Exit VFP Loader as shown on page 23.
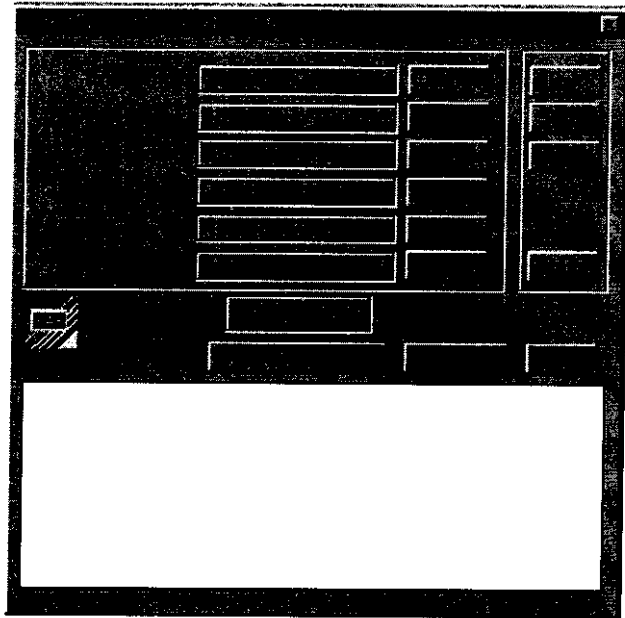
Fig 10 ACARS Only Virtual Front Panel

SETTING THE RADIO'S OPERATING FREQUENCY
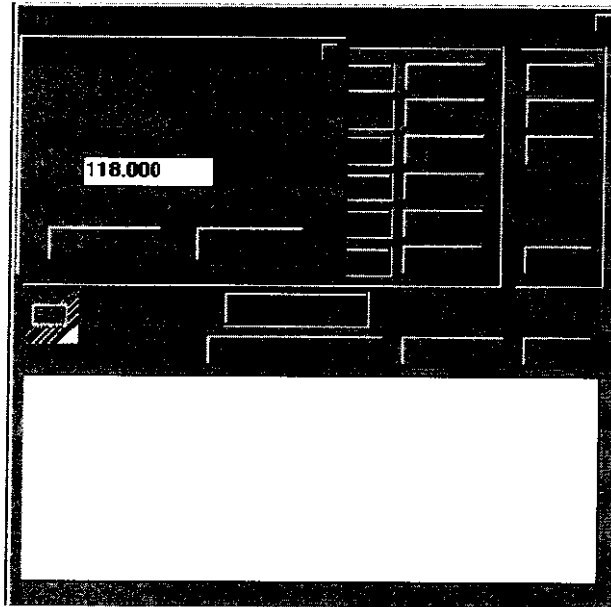
Fig 11 Setting Radio's Operating Frequency

The radio's operating frequency can be set to any 25 kHz spaced channel between 118 and 136.975 MHz. To set the frequency:

❑ Display the radio's Virtual Front Panel (see page 25).

❑ Using the mouse, click on the Frequency ▇▇▇▇▇ icon.

❑ Check that the Change Frequency screen is superimposed (see Fig 11).

❑ Using the mouse, click in the box showing the current frequency (Fig 11 shows 118.000 MHz). Delete the current numbers and enter the required frequency from the PC's keyboard.

❑ Check that the frequency is between 117.975 and 136.975; then click on the ▇▇▇▇▇ icon.

This operation can be aborted at any time by clicking on the ▇▇▇▇▇ icon

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SETTING THE TRANSMITTER OUTPUT POWER
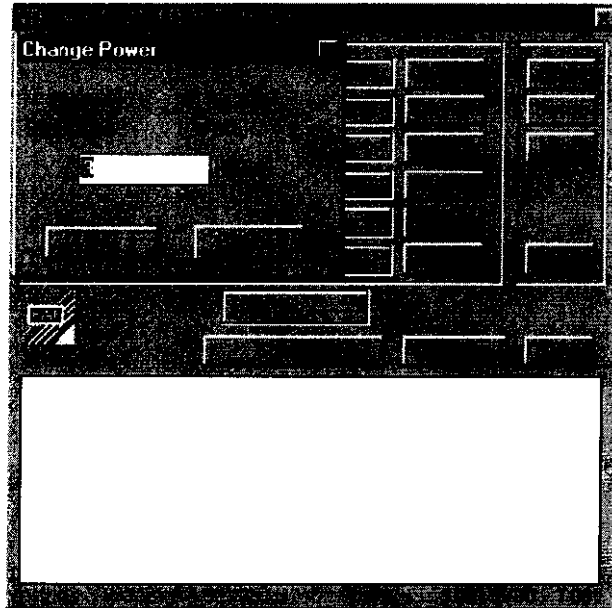
Fig 12 Setting the Transmitter Output Power

The transmitter output power can be set to any level between 3 and 25 watts (in increments of 1 watt). To set the output power:

❑ Display the radio's Virtual Front Panel (see page 25).

❑ Using the mouse, click on the Power ▨▨▨▨ icon.

❑ Check that the Change Power screen is superimposed (see Fig 12).

❑ Using the mouse, click in the box showing the current number of Watts (Fig 12 shows 3 watts). Delete the current value and enter the required value from the PC's keyboard.

❑ Check that the value is between 3 and 25; then click on the ▨OK▨ icon.

This operation can be aborted at any time by clicking on the ▨▨▨▨ icon


SETTING THE TRANSMITTER TIME OUT
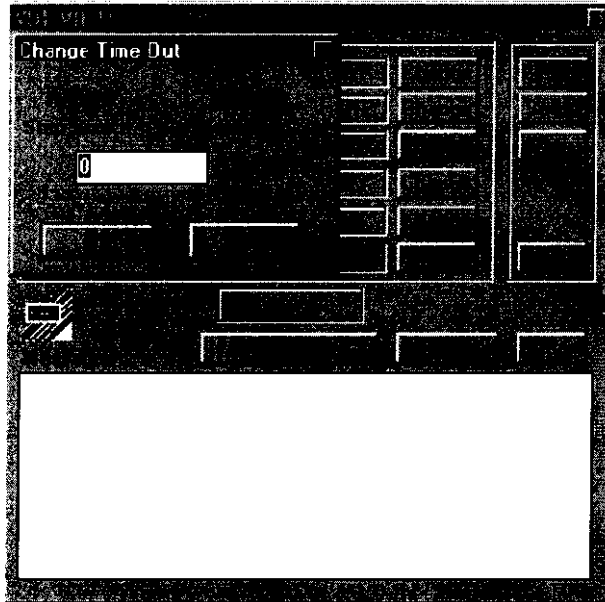
Fig 13 Setting the Transmitter's Time Out

The transmitter's time out can be set to any period between 0 and 510 seconds (in increments of 2 seconds). 0 is a special value that disables this feature. To set the time out:

❑ Display the radio's Virtual Front Panel (see page 25).

❑ Using the mouse, click on the Time Out Period ▨▨▨ icon.

❑ Check that the Time Out screen is superimposed (see Fig 13).

❑ Using the mouse, click in the box showing the current number of seconds (Fig 13 shows 0 seconds). Delete the current value and enter the required value from the PC's keyboard.

❑ Check that the value is between 0 and 510; then click on the ▨▨▨ icon.

This operation can be aborted at any time by clicking on the ▨▨▨ icon
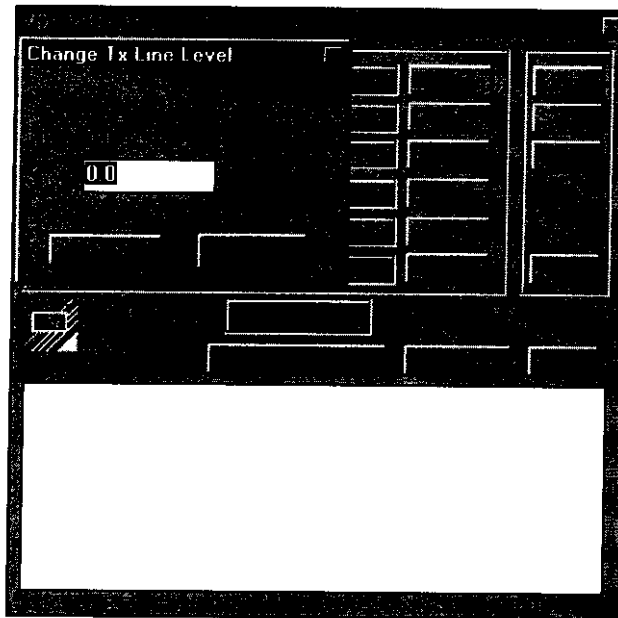

SETTING THE RX LINE LEVEL
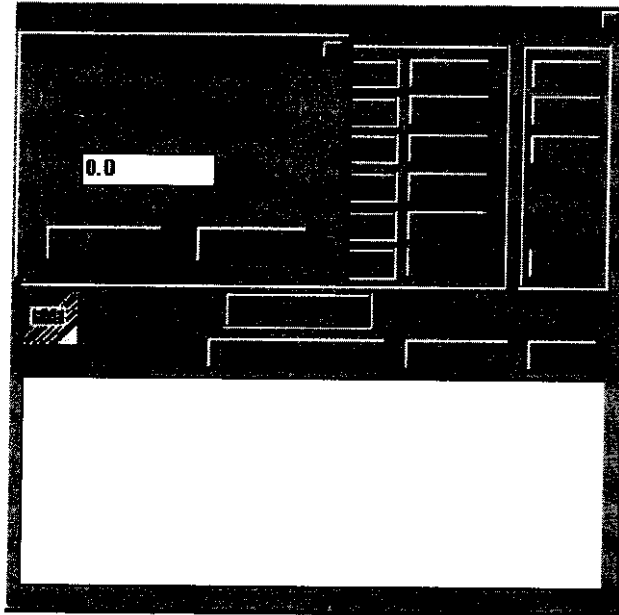
Fig 14 Setting the Rx Line Gain

The Rx line level can be set to any value from -10 to +10 dBm (in increments of 0.1 dB). This can be used with an appropriate signal generator and line level meter to set the receiver line output to the required level. To set the line level:

❑ Display the radio's Virtual Front Panel (see page 25).

❑ Using the mouse, click on the Rx Line Level ⬛⬛⬛⬛⬛ icon.

❑ Check that the Rx Line Level screen is superimposed (see Fig 14).

❑ Using the mouse, click in the box showing the current line gain (Fig 14 shows 0.0 dBm). Delete the current value and enter the required value from the PC's keyboard.

❑ Check that the value is between -10 and +10 dBm; then click on the ⬛⬛⬛⬛⬛ icon.

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This operation can be aborted at any time by clicking on the ⬛⬛⬛⬛ icon

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SETTING THE TX LINE LEVEL

Fig 15 Setting the Tx Line Gain

The Tx line level can be set to any value from -10 to +10 dBm (in increments of 0.1 dB). This can be used with an appropriate signal generator and modulation meter to set the transmitter modulation depth to the required level. To set the line gain:

☐ Display the radio's Virtual Front Panel (see page 25).

☐ Using the mouse, click on the Tx Line Level ▮▮▮▮▮ icon.

☐ Check that the Tx Line Level screen is superimposed (see Fig 15).

☐ Using the mouse, click in the box showing the current line gain setting (Fig 15 shows 0.0 dBm). Delete the current value and enter the required value from the PC's keyboard.

☐ Check that the value is between -10 and +10 dBm; then click on the ▮▮▮▮▮ icon.

This operation can be aborted at any time by clicking on the ▮▮▮▮▮ icon

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SETTING THE MUTE LEVEL

(This function is not currently implemented).

MULTI-MODE VIRTUAL FRONT PANEL (VFP)

The Multi-mode Virtual Front Panel (VFP) allows the radio to be configured for either ACARS, or Mode 2 operation.

ACARS Only

If ACARS mode is selected, the following parameters can be configured:

❑ Frequency

❑ Power

❑ Transmitter's (Tx) time out

❑ Transmitter's (Tx) line gain

❑ Receiver's (Rx) line gain.

Mode 2

If Mode 2 is selected, the following parameters can be configured:

❑ Frequency

❑ Power

❑ Scramble vector

❑ Transmitter (Tx) enable

❑ Loopback

❑ Raw

❑ Addressing

❑ MAC parameters.

Note ...

Those parameters not applicable to the selected mode are 'greyed-out' on the VFP (see Figs 16 and 17).

During normal Mode 2 operation, the radio is configured through the control computer via the HDLC link. For engineering purposes, configuration is also available using the VFP. The procedures for configuring each parameter are given on the following pages.
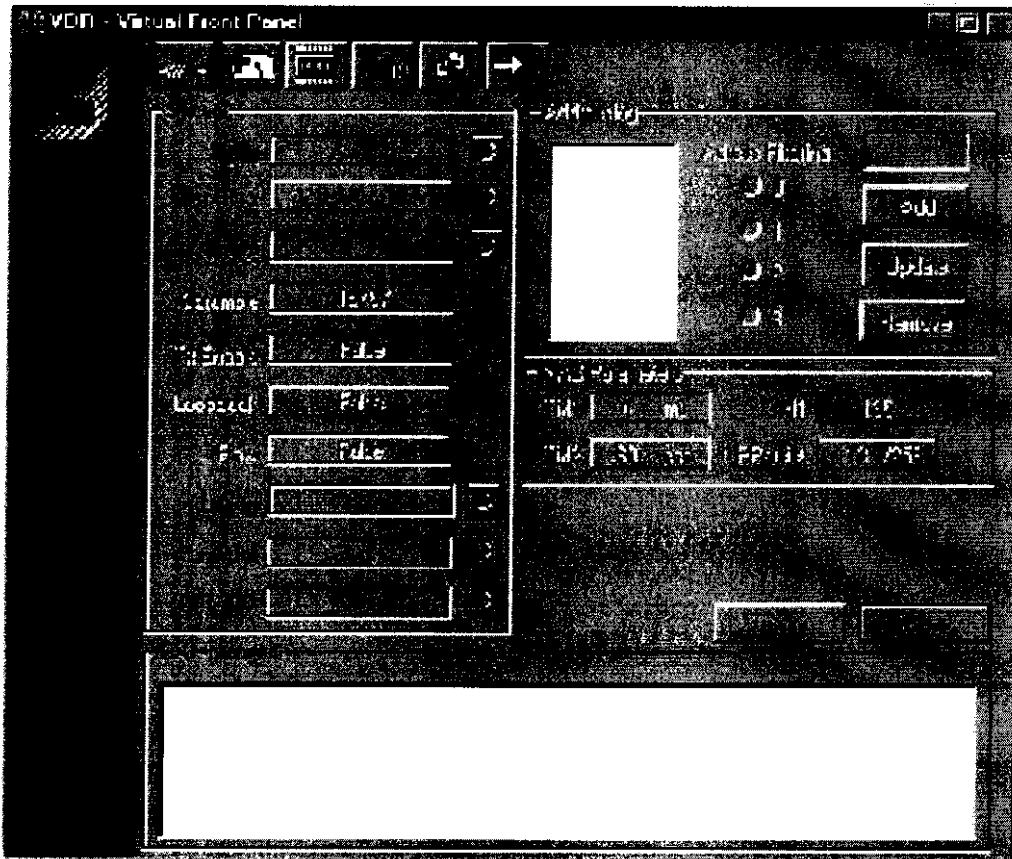
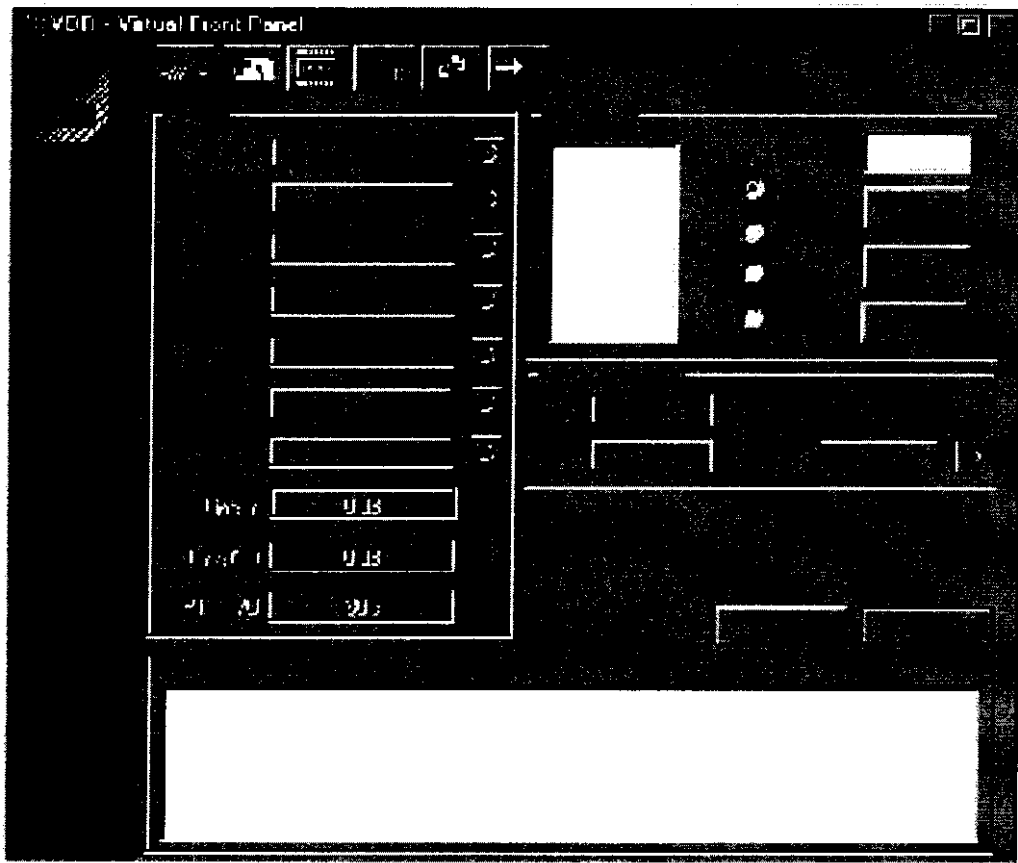**Fig 16 Multi-Mode Virtual Front Panel Showing ACARS Selected**

Fig 17 Multi-Mode Virtual Front Panel Showing Mode 2 Selected

VFP BUTTONS

Six buttons at the top of the VFP (see illustration below) have the uses described in the following paragraphs. Other icons and buttons are described in the configuration procedures.
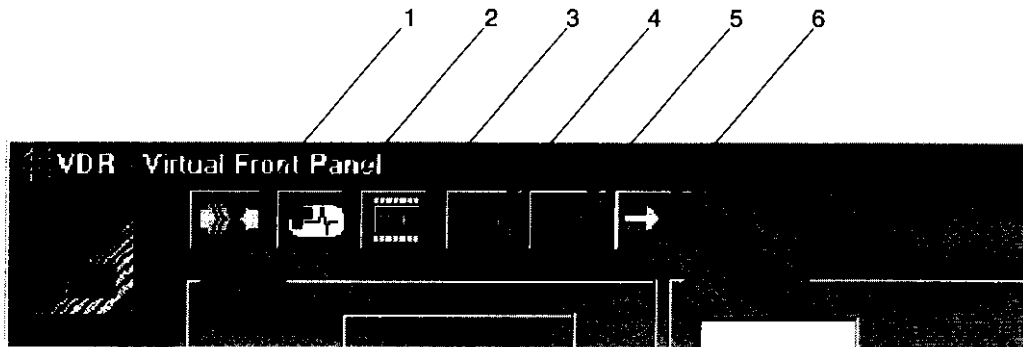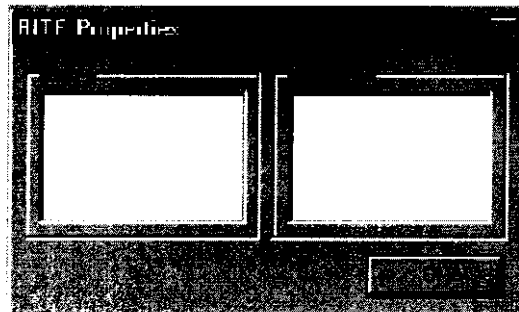

Fig 18 Mode 2 Virtual Front Panel - Top Icons

1. **Connect Button.** Used to connect the VFP to the Radio if polling is switched off (connection must be made before the VFP can be used). If polling is switched on, connection is automatic.

2. **BITE Button.** Used to list the BITE status of the 5525-D8 radio.

3. **Download Button**. Used to download new flash/XDSP files. If new software is issued by PAE, full loading instructions will also be provided.

   Flash code files with a .BIN extension must be downloaded into area F.

    DSP code files with an .XDF extension must be loaded into areas 0 to 3. The actual area used is not critical but it is recommended that the version button (see next page) is used to confirm the current software fill and version number. The new software should be loaded in the same area as the old version.
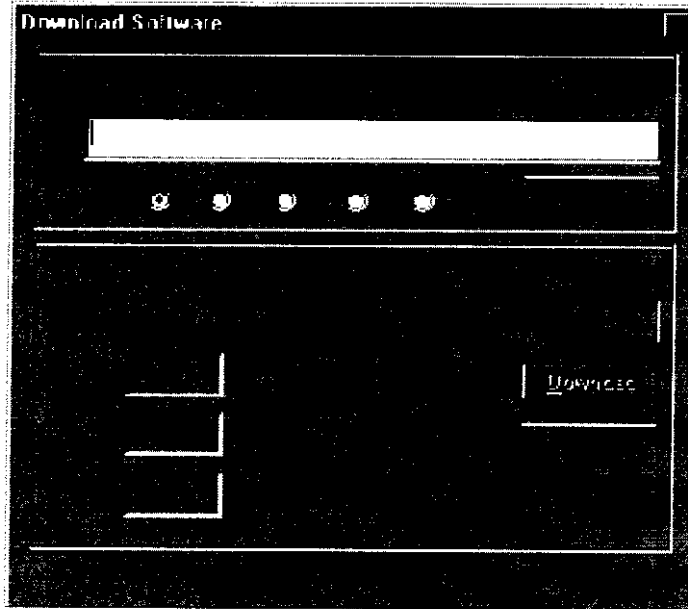

The VFP will not allow files with inappropriate extensions to be loaded into any area. If attempted, the following Fill Error screen is displayed.

4. **Setup Button**. Allows System properties to be set using the following screen. COM Port 1 must be selected as active unless the radio is connected to the PC's COM Port 2. Polling should be selected as Active as shown below.
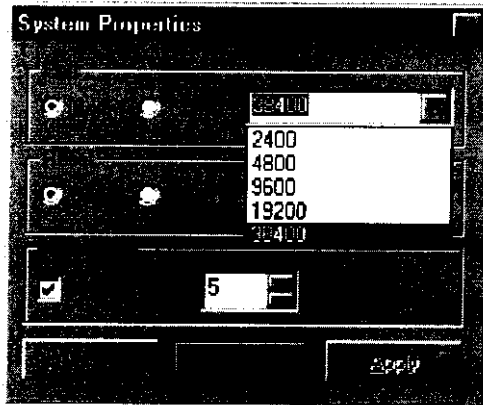
5. **Versions Button**. Details the version of all software installed in the radio.
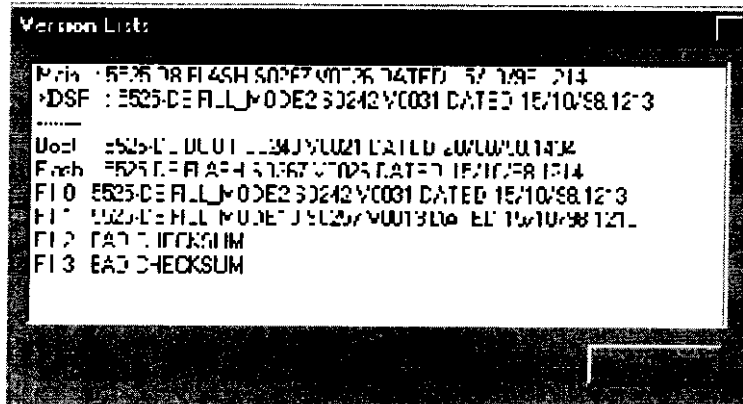
6. **Exit Button**. Exits the VFP and returns to the VFP Loader as shown on page 23.

SELECTING THE RADIO'S MODE OF OPERATION

The radio's mode of operation can be set to ACARS, or Mode 2. To select the required mode, display the VFP (see Figs. 16 and 17). Check which Mode is displayed. If the displayed mode is incorrect, proceed as follows.

❑   Use the mouse and click on the mode button. Check that the Change Mode screen is displayed.
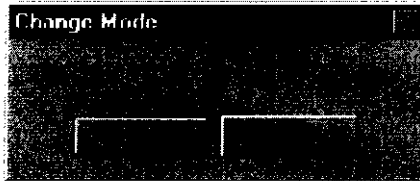

To confirm that change of mode is required, click on *OK* otherwise, click on *Cancel* to return to the currently selected mode.

SETTING THE RADIO'S OPERATING FREQUENCY (ACARS AND MODE 2)

The radio's operating frequency can be set to any 25 kHz spaced channel in the range 118 to 136.975 MHz. To set the frequency:

- ❏ Display the radio's Virtual Front Panel (see Fig. 16 or 17).

- ❏ Using the mouse, click on the Frequency icon.

- ❏ Check that the Change Frequency screen is superimposed (see below).
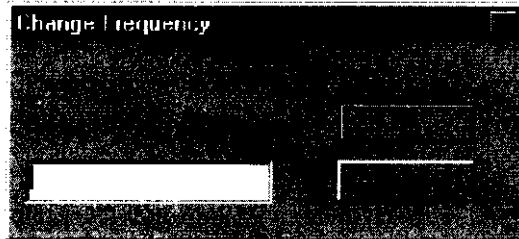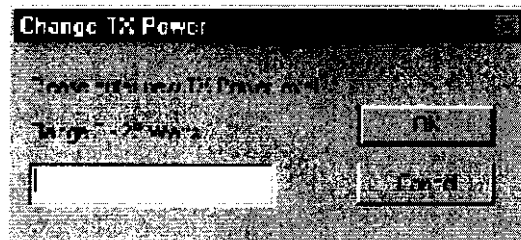

- ❏ Using the mouse, click in the box and enter the required frequency from the PC's keyboard.

- ❏ Check that the frequency is between 118 and 136.975; then click on the [icon] icon.

SETTING THE TRANSMITTER OUTPUT POWER (ACARS AND MODE 2)

The transmitter output power can be set to any level between 3 and 25 watts (in increments of 1 watt). To set the output power:

- ❏ Display the radio's Virtual Front Panel (see Fig. 16 or 17).

- ❏ Using the mouse, click on the Power icon.

- ❏ Check that the Change Power screen is superimposed (see below).

- ❏ Using the mouse, click in the box and enter the required value from the PC's keyboard.

- ❏ Check that the value is between 3 and 25; then click on the [OK] icon.

SCRAMBLE (MODE 2 ONLY)

Scramble is the scrambling vector that has a value between 0 and 32767. **For ICAO Mode 2 operation, the scramble value must be set to 19787.**
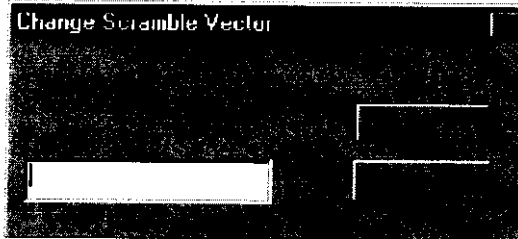
TX ENABLE (MODE 2 ONLY)

Tx Enable can be set as True or False. Clicking the appropriate button toggles between the two settings. The radio will transmit data only when True is selected. The default setting for this parameter is therefore True.

LOOPBACK (MODE 2 ONLY)

Loopback can be set as True or False. Clicking the appropriate button toggles between the two settings. When set to True, the radio demodulates its own transmit signals. The demodulated signal can be used for engineering purposes. The default setting for this parameter is False.

RAW (MODE 2 ONLY)

The Raw parameter can be set to True or False. Clicking the appropriate button toggles between the two settings. This feature is used for engineering purposes to measure the raw BER performance of the receiver with an appropriate BER test fixture. When set to true, all error correction is switched off. The default setting is False.

ADDRESSING (MODE 2 ONLY)

A received data frame contains source and destination address fields. The 5525-D8 is capable of receiving both downlinks and uplinks. When required, the control computer can program the address of stations the network has assigned the ground station to deal with into the 5525-D8 radio. All messages are then screened and only certain messages are passed by the 5525-D8 radio to the control computer contingent on the addressing mode set at the radio. For engineering purposes, these modes are selected using the VFP and are described below.

One of four selections can be made at the VFP:

0   All messages received by the radio are passed to the ground station regardless of type field, or source/destination address.

1   All messages received by the radio are passed to the ground station if the type field of the destination station address field indicates the frame is destined for a ground station as either a discreet message, or a broadcast message.

2   All messages received at the radio are passed to the ground station if:

the station address field of the destination station address matches one of the addresses in the station address set (SAS)

and

the type field of the destination address field indicates that the frame is destined for a ground station as either a discreet message, or a broadcast message.

3   All messages received at the radio are passed to the ground station if:

the station address field of the destination station address matches one of the addresses in the station address set (SAS). And, the type field of the destination address field indicates that the frame is destined for a ground station as either a discreet message, or a broadcast message.

or

the station address field of the source station address matches one of the addresses in the station address set (SAS) regardless of type field in the source destination station address.

Addresses are entered, updated, and removed using the three icons below the Address Filtering Edit box.

❏ To add an address, enter an address in the Address Filtering Edit box, and then click on *Add*. The address appears in the Addressing list box.

❏ To update (change) and address, highlight the old address in the list box; enter the new address in the Address Filtering Edit box; then click on *Update*.

❏ To remove an address, highlight the address in the list box, then click on *Remove*.

SETTING THE MEDIA ACCESS CONTROL (MAC) PARAMETERS (MODE 2 ONLY)

The MAC parameters are detailed in the following table.

Symbol	Parameter Name	Minimum Value	Maximum Value	Default Setting	Increment
TM1	Inter-Access Delay	0.5 ms	125 ms	4.5 ms	0.5 ms
TM2	Channel busy	6 s	120 s	60 s	1 s
P	Probability that the radio will transmit on any access attempt	1/256	1	13/256	1/256
M1	Maximum number of access attempts	1	65535	135	1

To set the MAC parameters:

❑ Display the radio's Virtual Front Panel (see Fig).

❑ Using the mouse, click on the MAC Parameters button.

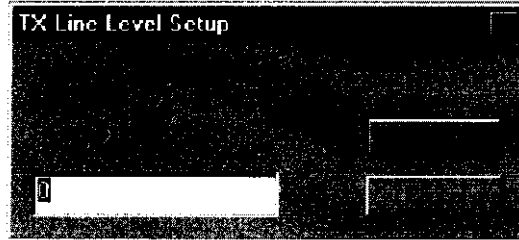❑ Check that the MAC screen is superimposed (see below).
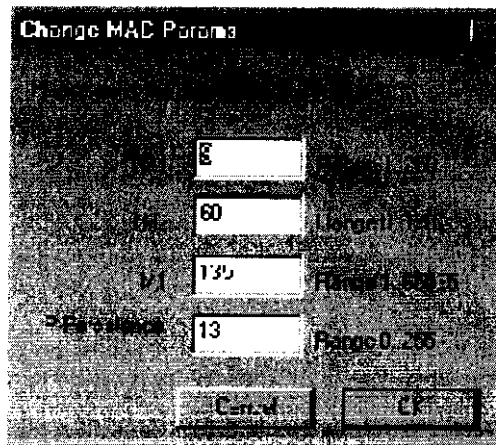
❑ Using the mouse, click in the appropriate boxes and enter the required values from the PC's keyboard.

❑ Check that the value is as required; then click on the ▨ icon.

SETTING THE TX LINE GAIN (ACARS ONLY)

The Tx line gain can be set to any value from -10 to +10 dBm (in increments of 0.1 dB). This can be used with an appropriate signal generator and modulation meter to set the transmitter modulation depth to the required level. To set the line gain:

❑ Display the radio's Virtual Front Panel (see Fig 16).

❑ Using the mouse, click on the Line Out button.

❑ Check that the Tx Line Level Setup screen is superimposed (see below).

❑ Using the mouse, click in the box showing the current line gain setting. Delete the current value and enter the required value from the PC's keyboard.

❑ Check that the value is between -10 and +10 dBm; then click on the [■■■■] icon.

SETTING THE RX LINE GAIN (ACARS ONLY)

The Rx line gain can be set to any value from -10 to +10 dBm (in increments of 0.1 dB). This can be used with an appropriate signal generator and line level meter to set the receiver line output to the required level. To set the line level:

❏ Display the radio's Virtual Front Panel (see Fig 16).

❏ Using the mouse, click on the Line In button.

❏ Check that the Rx Line Level Setup screen is superimposed (see below).

Intentionally Blank

6. SCHEDULED MAINTENANCE

Scheduled maintenance to the 5525-D8 transceiver is limited to checking, and adjusting if necessary, the radio's reference frequency. This check should be carried out annually using the following tools and test equipment:

1. A high impedance frequency counter capable of measuring 20.95 MHz with a resolution of 1 Hz.

2. A cable to connect the frequency counter to the radio. One end of the cable must be terminated with an plug to allow connection to the radio's Reference connector.

3. Trimming tool (PAE part number 75C18000001).

To Check and Adjust the Reference Frequency:

❑ Using the cable (item 2) connect the frequency counter to the radio's front panel Reference connector.

❑ If the radio is switched off, switch on and allow 10 minutes to reach its normal operating temperature.

❑ Using the trimming tool (item 3), adjust the multi-turn reference control until the frequency counter reads 20.95 MHz ±3 Hz.

❑ Disconnect the frequency counter.