



Orator

INTERCOM

Installation Guide

Issue 6

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Comments or correspondence concerning this manual should be addressed to The Design Manager at the address given at the front of this User Guide.

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ISSUE 6

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1. INTRODUCTION

1.1 This Manual

This manual provides installation information for the Orator Digital Intercom system. Cabling and pin-out information is included for all of the Trilogy manufactured items plus some commonly used third party equipment. Other information relating to the hardware configuration will be useful if the system is upgraded or expanded in the future.

- Section 2 covers the matrix assembly and installation, to the point where the matrix may be powered
- Section 3 covers all of the cabling necessary to complete the installation.
- Section 4 gives details for the current range of Trilogy control panels.
- Section 5 provides Information on installing other equipment (e.g. telephones, radio talkback).
- Section 6 includes information on legacy control panels which are no longer supplied with new Orator units.

For further assistance please contact Trilogy Communications Support Department at the address given at the front of this document. You may also contact us by e-mail at:

support@trilogycomms.com

1.2 Options Available and Module Type Numbers

Contact Sales Department for a listing of the current module types.

Due to the nature of talkback systems, any given installation may have some custom parts. Trilogy Communications Ltd. prides itself on its ability to tailor standard parts to meet specific requirements and is willing to discuss any other customisation as required.

2. INSTALLATION

2.1 Introduction

Follow the sequence below, step by step, to install the Orator matrix.

- Unpack the matrix.
- Locate the documentation and accessory box, which is packed on top of the matrix.
- Follow the instructions on the Quick Start Guide poster to prove the basic operation of the system.
 - Connect two panels.
 - Load a test configuration.
 - Apply power and check communication between the two panels.
- Install the matrix in the equipment bay and control panels throughout the studio.
- Set up the configuration PC.

2.2 Unpacking

Carefully unpack the equipment from its transit material and check each item for any signs of damage.

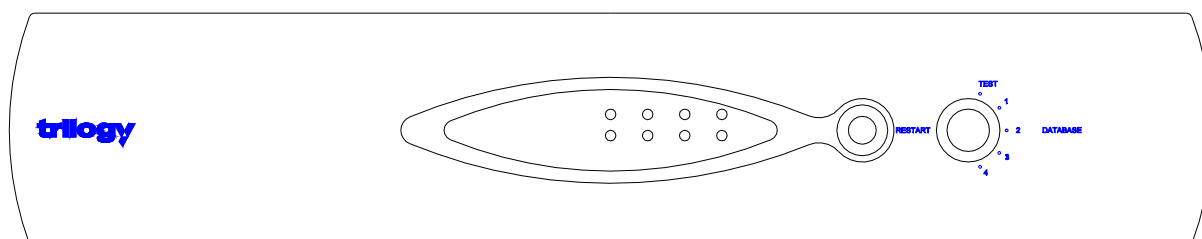
Check the contents of the boxes against our despatch note and your original order to ensure that you have received the correct parts.

In the event that the unit has been damaged or does not match your order, immediately contact Trilogy Communications Ltd. at the address given at the front of this guide.

2.3 Rack Mounting

The Orator Matrix occupies 2U of rack space. The depth (excluding mating connectors) is 370mm (15"). Control Panels are standard 425mm (19") rack-mounting units; most panels are 2U although a series of 1U panel are available and custom panels may be 3U, 4U or larger.

It is most likely that a system contractor or Trilogy personnel will install the central matrix. Suitable care should be taken with cooling and ventilation within the equipment bay.

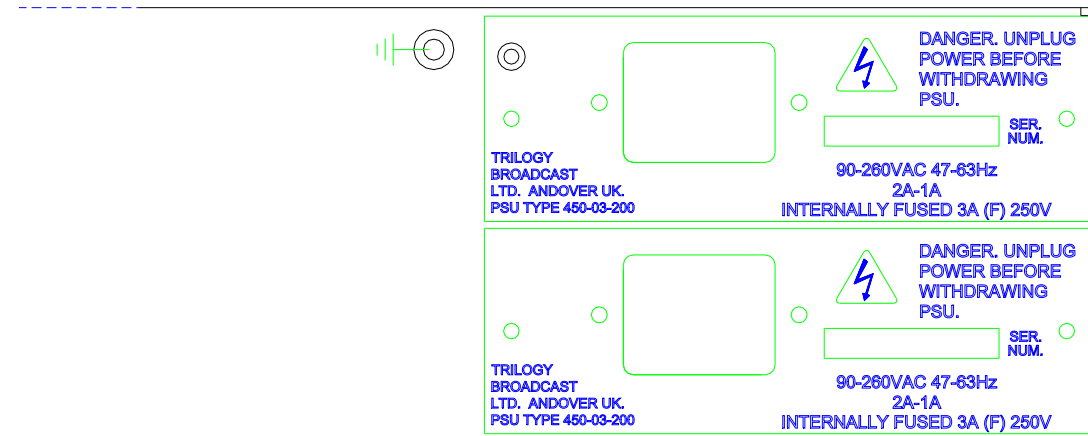


2.4 Mains Connection and Fusing

The Orator matrix operates from a single power supply, although an optional second power supply may be fitted to provide full redundancy. This may be purchased and fitted later if required.

The power supplies are fitted from the rear of the matrix and fixed with retaining screws.

If the second power supply is not fitted, a blanking plate covers the space at the back of the matrix.



2.5 Earthing Requirements

A 4mm stud is provided on the rear panel of the matrix for connection to a local technical earth. For safety reasons, the unit should be earthed at all times

2.6 Starting the system

The system may now be powered and will load a configuration from the Flash RAM. The rotary switch selects the boot configuration bank. It is not necessary to have the computer operating at this stage.

Tip: When the switch is set to position **TEST**, a default simple configuration is loaded. See below for more information.

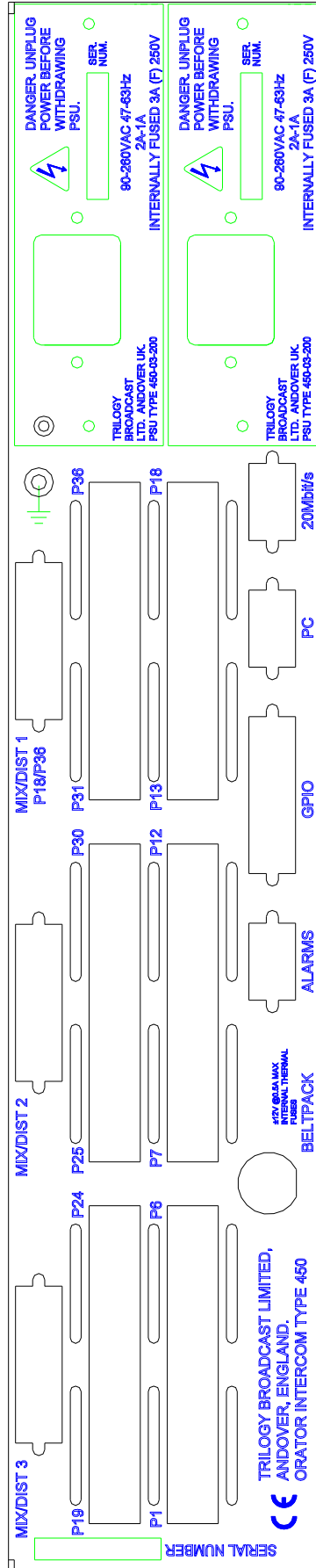
2.7 Test Configuration

A simple test configuration is “hard-coded” into the system software and cannot be erased. Connect control panels to Ports 1 and 2 using the supplied leads, as described in the Quick Start Guide included with the system.

This configuration can be used to prove the basic system functionality.

As the system is powered, all front panel LEDs are lit briefly. Under normal operating conditions, the LEDs are lit as detailed in the following table.

Phase	LED	Colour	Status	
POWER UP	COMMS	YELLOW	ON	
	POWER A	BLUE	ON	If present
	POWER B	BLUE	ON	If present
	AUDIO 1 OK	GREEN	OFF	If present
	AUDIO 2 OK	GREEN	OFF	If present
	FAULT	RED	ON	briefly
NORMAL	COMMS	YELLOW	FLASHING	
	POWER A	BLUE	ON	If present
	POWER B	BLUE	ON	If present
	AUDIO 1 OK	GREEN		If present
	AUDIO 2 OK	GREEN		If present
	FAULT	RED	ON	briefly
PROBLEM				
(System Failure)	FAULT	RED	ON	other LED states indeterminate
PROBLEM	FAULT	RED	OFF	
(Audio Failure)	AUDIO 1 OK	GREEN	FLASHING	Alarm will trigger
	AUDIO 1 OK	GREEN	FLASHING	Alarm will trigger
PROBLEM	FAULT	RED	OFF	Alarm will trigger
(Power Failure)	POWER A	BLUE	OFF	Alarm will trigger
	POWER B	BLUE	OFF	Alarm will trigger



3. CONNECTING TO THE MATRIX

3.1 Connecting the Ports

The drawing on page 10 shows the rear view of the Orator central matrix. Connectors are provided for:

- 18 or 36 matrix ports, either 4-wire or panel
- The configuration PC (See section 3.2.)
- Logic connections (GPI and GPO) input and output (See section 3.3.5.)
- A 20MB/S data link, primarily for use by Trilogy staff for system testing. (See section 3.3.7.)
- Optional multi way camera connections. (See section 3.3.2.)
- Pre-configured backpack connector. (See section 3.3.6.)

These are covered in more detail in the following sections. Where appropriate, the connector type, denoted by male or female, refers to the **fixed** connector on the rear of the equipment.

The diagram opposite shows the location of all connectors on the rear panel.

3.2 Connecting the PC to the Orator System

Communication between Orator matrix and PC uses an RS232 serial link, direct from a standard PC COM port. Configuration files are relatively compact, compared to the much larger Trilogy Commander systems. Download speed is not an issue, so the expensive and difficult to configure link adaptor card is not required.

3.2.1 Connection via a PC COM port using RS232 protocol

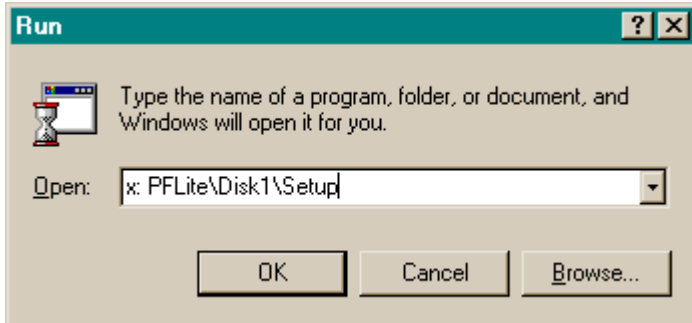
Connect the Orator matrix to the PC COM port with a D9-type cable. A red 2-metre cable is supplied with the unit. If the PC has a 25 way D-type COM port, fit the adaptor supplied. The pin-out of the supplied cable is given below. Screened cable is advisable. Due to differences in PC earth wiring, it may prove necessary to remove the connection from Pin 5 at the PC to avoid earth loops.

D9 Free Plug (PC) Pin	D9 Free Socket (Orator) Pin	Notes
1	1	Pair 1
6	6	
2	2	Pair 2
7	7	
3	3	Pair 3
8	8	
4	4	Pair 4
9	9	
5	5	Screen

To use the RS232 download facility, start PathFinder Lite and use the **Options: Settings** menu form to select the serial download option. Select the relevant PC COM port: all other settings are automatically adjusted.

3.2.2 Installing PathFinder Lite

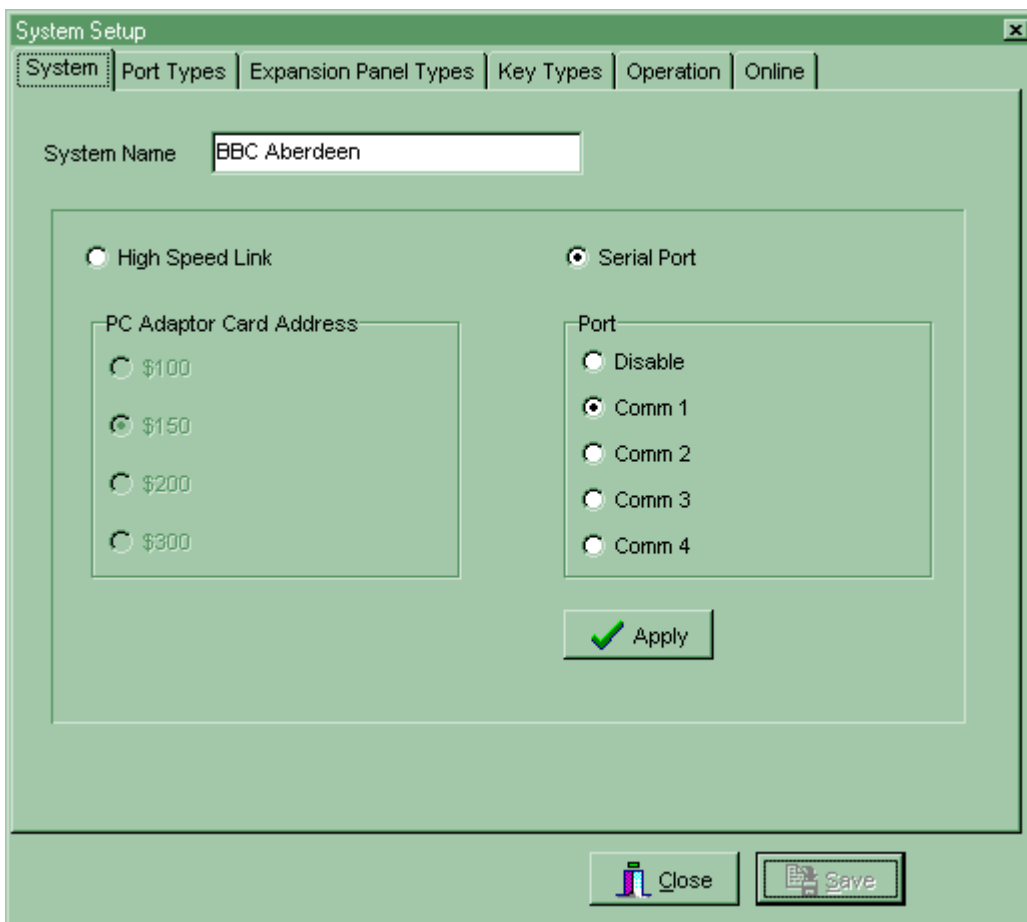
Software is supplied on CD-ROM but is also available on 3.5" floppy or by download from the Trilogy web-site by prior arrangement. To install from CD-ROM, follow the instructions below.



Click Ok then follow the on-screen prompts. When the software installation is complete, the PathFinder Lite icons will be visible in a folder on the desktop.

Start PathFinder Lite, following the options to create a New Database. From the Options pull down menu, select Settings and the dialogue box shown below will be displayed.

Any changes made to the settings only take effect when PathFinder Lite is re-started. A warning dialogue box is displayed when the settings dialogue box is closed.



This allows system name and PC Adapter Address to be changed. Changes to the PC card adapter address will only be required if there is a hardware clash with other PC devices such as a sound card or CD-ROM. Any changes within PathFinder Lite must be matched by changes to the adapter card itself.

Make the necessary changes to the System settings, to match hardware and software parameters. Save the Settings, then close and re-start PathFinder Lite.

3.3 Other Connections

A number of other connections are provided on the rear of the matrix.

3.3.1 Matrix Ports

The same connector pin-out applies to ports used for panels or externals. External (4-wire) connections will not use the data pairs. Cable is quad twisted 100Ω pair, with overall screen. Only STP or FTP cables are suitable. See Specification for maximum cable length. We suggest a shielded CAT 5 type cable, from a recognised supplier such as **Beldon**.

Connector type: RJ45 chassis socket

Pin	Function		Notes
1	Matrix Data in +	Pair 1	Only applies to ports used for panels
2	Matrix Data in -		Only applies to ports used for panels
3	Matrix Data out +	Pair 2	Only applies to ports used for panels
6	Matrix Data out-		Only applies to ports used for panels
5	Matrix Audio in +	Pair 3	
4	Matrix Audio in -		
7	Matrix Audio out +	Pair 4	
8	Matrix Audio out -		

3.3.2 Camera Connector

This option provides a mixing pad for up to 6 camera inputs, and a single feed for audio connection to cameras.

Connector type: 25 way D type fixed socket.

Pin	Function	Pin	Function
1	SCREEN/CHASSIS		
2	FROM CAM 1+	14	FROM CAM 1-
3	FROM CAM 2+	15	FROM CAM 2-
4	FROM CAM 3+	16	FROM CAM 3-
5	FROM CAM 4+	17	FROM CAM 4-
6	FROM CAM 5+	18	FROM CAM 5-
7	FROM CAM 6+	19	FROM CAM 6-
8	TO CAM 1+	20	TO CAM 1-
9	TO CAM 2+	21	TO CAM 2-
10	TO CAM 3+	22	TO CAM 3-
11	TO CAM 4+	23	TO CAM 4-
12	TO CAM 5+	24	TO CAM 5-
13	TO CAM 6+	25	TO CAM 6-

On most systems, as supplied, only a single Camera Connector is fitted. The default position is Port 18 (for 18 port systems) or Port 36 (for 36 port systems). Extra sub-assemblies may easily be retrofitted.

3.3.3 Alarms

The output is a normally made solid state relay contact. Maximum current rating is 120mA.

Connector type: D9 type fixed socket.

Pin	Function
1	Ground
6	PSU Fail -
2	PSU Fail +
7	Fan Fail -
3	Fan Fail +
8	Internal Alarm -
4	Internal Alarm +
9	N/c
5	N/c

3.3.4 Serial Link

The serial port may be configured internally as RS232 or RS422. As supplied, the system is configured for RS232 operation. The tables below show the alternative pin-out. Details of the supplied RS232 cable are in section 3.2.1.

Connector type: D9 type fixed socket

RS232 configuration

Commander D9 Fixed Socket - Pin	Function	PC COM Port	
		D9 Fixed Socket	D25 Fixed Socket
1	DCD	1	8
2	TX	2	3
3	RX	3	2
4	DTR	4	20
5	0V or GND	5	8
6	DSR	6	6
7	CTS	7	4
8	RTS	8	5
9	RI	9	DTR+DSD+DCD
Case			1

Connection to external equipment will depend on the manufacturer and model of RS422 card fitted. The table below only relates to the matrix.

RS422 configuration

Commander D9 Fixed Socket Pin	Function	Notes
4,8	422 in, +,-	Pair 1 (RX)
6,1	422 out, +,-	Pair 2 (TX)
7,2	422 RTS +,-	Pair 3
5,9	422 CTS +,-	Pair 4
3		Chassis

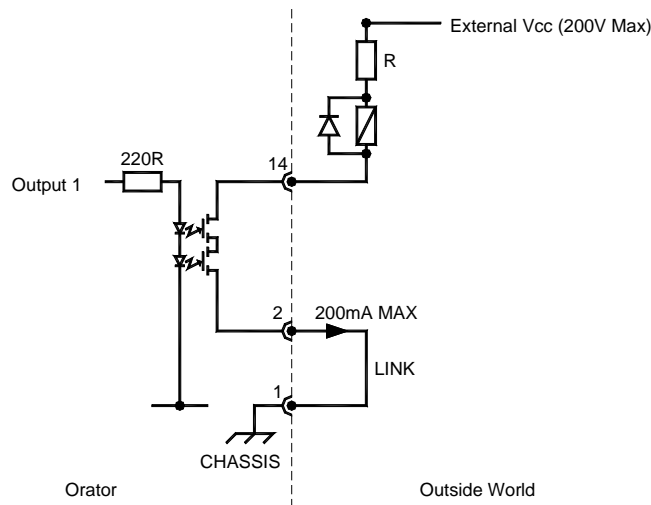
3.3.5 GPI O Connector

Connector: 25 way D type fixed socket.

Pin	Function
1	GROUND
14	Output 1+
2	Output 1-
15	Output 2+
3	Output 2-
16	Output 3+
4	Output 3-
17	Output 4+
5	Output 4-
18	Output 5+
6	Output 5-
19	Output 6+
7	Output 6-
20	Output 7+
8	Output 7-
21	Output 8+
9	Output 8-
22	Input 1
10	Input 2
23	Input 3
11	Input 4
24	Input 5
12	Input 6
25	Input 7
13	Input 8

The circuit below shows suggested wiring for Output 1 of the Orator Logic facilities. Maximum current through the output stage must be limited to 200mA and the maximum permitted external voltage is +200V. **If these limits are exceeded, the card may be damaged.**

To activate a logic input, connect the relevant logic input pin to ground. A typical example of the external circuitry for the logic outputs is shown below.



3.3.6 Belpack

Connector type: 12 way Hirose fixed socket

Pin	Orator Port	Function
1		Chassis (cable screen)
2	Matrix Port 18 Out	Main audio + (PTB) to belpack
3		Main audio - (PTB) to belpack
4	Matrix Port 17 Out	Audio 2+ (Prog Snd) to belpack
5		Audio 2- (Prog Snd) to belpack
6	Matrix Port 18 In	Audio + from belpack
7		Audio - from belpack
8		+12V to belpack
9		-12V to belpack
10		0V to belpack (not cable screen!)
11	Matrix Port 16 Out	Audio 3+ to belpack
12		Audio 3- to belpack

The Belpack connector is connected internally to the ports shown in the above table, so the configuration generated in PathFinder Lite must match this to ensure correct operation.

Further information on the Trilogy belpacks is provided in Section 5.1.

3.3.7 20M bit/S Link

Connector type: D9 type fixed plug

Pin	Function
1	Error Out
6	CPU Analyse
2	N Test
7	N Reset
3	Ground
8	From PC-
4	From PC+
9	To PC-
5	To PC+

This connection will normally be used exclusively by Trilogy during the initial factory test phase of the matrix. However, in a networked environment, the serial link port (see 3.3.4) will carry network data in place of download data. To facilitate download, a 500-16-03 Download Converter must be connected between the PC COM port and the Orator 20Mbit/s link port.

4. CONTROL PANELS

4.1 Introduction

There are now a number of different generations of Trilogy control panels in service. Those which are part of the current range are listed in the following section. Panels which are no longer supplied (legacy range) are covered in section 6.1.

The following general points should be noted:

- All control panels connect to the matrix in point to point topology. Each panel utilises a single matrix port, although on some models, expansion panels may be connected to a single “master” panel using the **expansion in** and **expansion out** connectors fitted on the rear of the panel. Two standard 24 key panels may be linked together, for example to provide 48 keys for an operator, but only utilising a single matrix port.
- Panel firmware may be re-programmed locally using the appropriate software utility and connection cable. Contact Trilogy Communications for more information.

4.2 Current Range

- 500-41-xx series desktop panels. See section 4.4.
- 500-3x-5x series panels. They cannot be connected to panels from another series (e.g. in expansion mode) but they may be used simultaneously on a system. See section 4.5. The associated expansion panels are from the 500-43-5x series. See section 4.6.
- 500-42-50 1U, 10-lever key panel fitted with 5 character LED displays. See section 4.7.
- The 500-31-60 16 lever key control panel. See section 4.9.
- The following control panels introduced in 2006. See section 4.10.
 - 500-33-00 32 key, 2U panel
 - 500-45-00 8 button, 1U panel
 - 500-46-00 10 button, LC key, 1U panel.

4.3 Control Panel Facility Comparison Table

A series of additional connectors provide the following facilities, on the panel types indicated in the table.

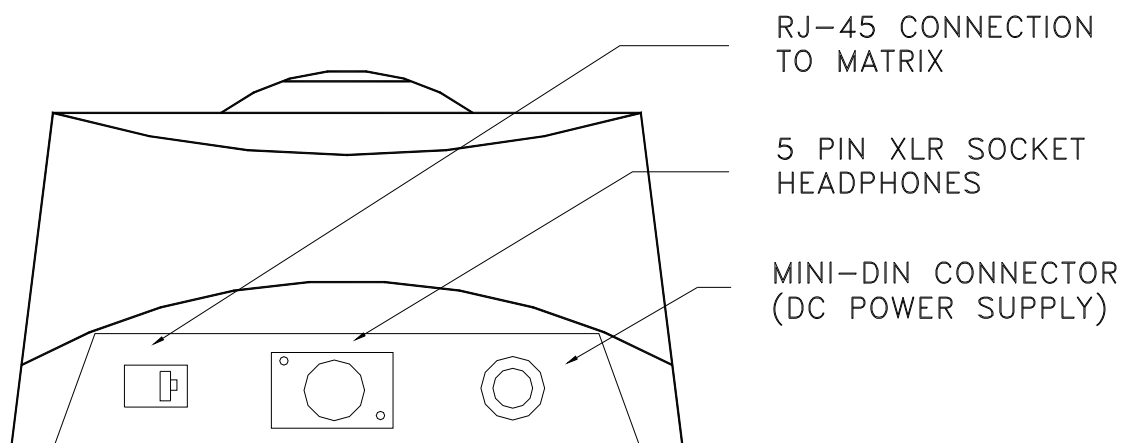
	500-3x-5x Control Panels	500-31-60 16 lever key panel.	500-41-xx Desktop	500-42-50 1U, 10 key with displays	500-43-5x Expansion Panel	500-33-00 / 500-45-00 / 500-46-00
Comprehensive audio inputs and outputs	√	√				√
Expansion ports	1			2	2	†
Local logic inputs and outputs	√	√				√
Remote control footswitch	√	√				√
Software re-programmable	√			√	√	√
External dialpad connector	√			√		
5 character alphanumeric displays	√	√	√	√		†
Fitted front panel microphone	√	√	√	√		√
Built in loudspeaker	√	√	√	√		√
Headset connector	√	√	√	√		√

† Display type varies. Please contact Trilogy for current availability of expansion facility on these panels.

4.4 500-41-xx Series Desktop Panels

Early desktop panel were DC powered from a mains power supply unit connected via a mini DIN connector on the rear. From 2003 onwards, panels have an internal mains power supply. The only remaining user connection is to the Headset connector on the rear of the desktop.

The following wiring applies to panels marked "Mod State 2" and later. Earlier panels had pins 4 and 6 transposed internally, with corresponding changes to the interconnecting cable. The later wiring allows operation over longer cable runs.



RJ-45 connection to Matrix

RJ-45 Pin	Function	
1	Panel Data out +	Pair 1
2	Panel Data out -	
3	Panel Data In +	Pair 2
6	Panel Data In -	
5	Panel Audio out +	Pair 3
4	Panel Audio out -	
7	Panel Audio in +	Pair 4
8	Panel Audio in -	
n/c	Cable Screen	

Headset - 5 Pin XLR Fixed Socket (Rear panel)

Pin	Function
1	Mic IN (Screen)
2	Mic IN
3	Headset Gnd
4	Headset Out
5	Headset Out

Note: As delivered, 500-41 Series Desktop Panels will not operate with T-Edit (early DOS configuration editor) based systems. An internal link must be changed and full details are given in Section 8.

4.5 500-31-51 16 key plus dial pad control panel

Information about the following legacy panel types is also included here.

- 500-30-50 24 key panel (with internal loudspeaker)
- 500-31-50 16 key panel
- 500-32-50 8 key panel
- 500-32-51 8 key panel with dial pad

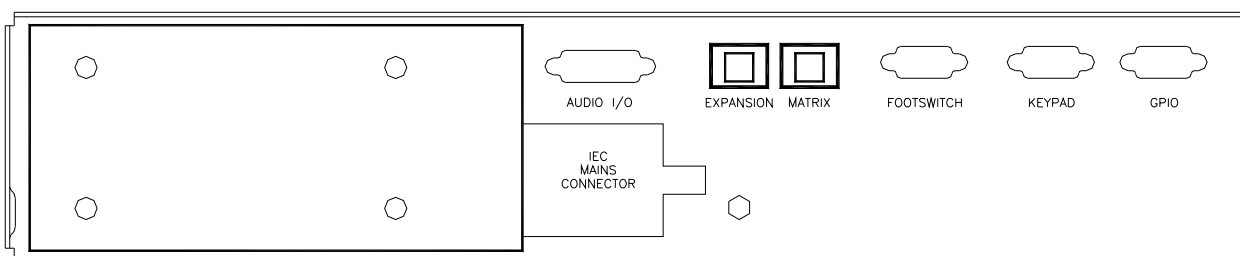
4.5.1 Specification

Dimensions	485mm wide x 88.9mm high x 80mm deep (max, excluding connectors). Approx. 110mm deep (max including mating connectors) 19" x 2RU rack mounting
Mains Input	90 – 250 V ac, 50-60Hz
Current Consumption	150mA @ 90V, 50 mA @ 250V

Detail of panel connections is provided in the following tables. Other features may be enabled or disabled by the DIP switches accessible at the top of the panel. These are detailed in section 4.5.4.

One of the key differences between the 500-3x-5x series and earlier versions is the use of the RJ45 connector for matrix and expansion ports. It is also now possible to connect together multiple standard panels in a chain, using the "Matrix" and "Expansion" connectors.

4.5.2 500-3x-5x Series Standard Control Panel Rear View



4.5.3 500-3x-5x Series Control Panel Connections

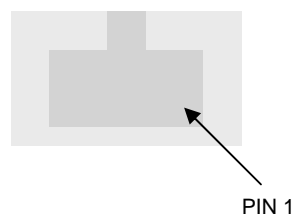
Matrix – RJ-45 fixed socket on panel

RJ-45 Pin	Function	
1	Panel Data out +	Pair 1
2	Panel Data out -	
3	Panel Data In +	Pair 2
6	Panel Data In -	
5	Panel Audio out +	Pair 3
4	Panel Audio out -	
7	Panel Audio in +	Pair 4
8	Panel Audio in -	
	Cable Screen	

Expansion Port – RJ45 socket

RJ-45 Pin	Function
1	Panel Data in +
2	Panel Data in -
3	Panel Data out +
6	Panel Data out -
5	Panel Audio out +
4	Panel Audio out -
7	Panel Audio in +
8	Panel Audio in -
	Cable Screen

Matrix and Expansion RJ45 socket (view from rear of panel)



Headset - 5 Pin XLR Fixed Socket (front panel)

Pin	Function
1	Mic IN (Screen)
2	Mic IN
3	Headset Gnd
4	Headset Out
5	Headset Out

Foot Switch - D9 Fixed Socket

Pin	Function
1	Foot Switch Input
2	No Connection
3	Chassis Ground
4	No Connection
5	No Connection
6	Ground
7	No Connection
8	No Connection
9	No Connection

GPIO (Local logic in and out) - D9 Fixed Socket

Pin	Function	Notes
1	Ground	
2	Logic Input 1	
3	Logic Input 2	
4	Logic 2 Out Common	
5	Internal +5V (Out)	Protected with series 44R & 1N4002 diode.
6	Logic Output 1	
7	Logic 1 Out Common	
8	Logic Output 2	
9	Logic Input +VCC	NB Pin 9 may be driven by external voltage (With dropper resistor if greater than 5V), or by internal +5V via pin 5.

Audio I/O – D15 Fixed Socket

Pin	Function	Notes
1	Slave Mic Input	Line level, un-balanced
2	+15V Out (for slave mic panel)	NOT protected!
3	Clean Mic Out +	Line level, balanced, pair with 11
4	Ext CUT Input (for slave mic panel)	Parallel function to front panel Cut Switch. Ground to activate
5	Chassis Ground	
6	No connection	
7	External Input to LS Amp -	Line level, balanced, pair with 14
8	Matrix Audio Input to Panel / parallel output -	Line level, balanced, pair with 15
9	Ext Mic Cut output (to slave panel)	Normally grounded. O/P is open circuit when front panel cut selected.
10	-15V Out (for Slave mic panel)	NOT protected
11	Clean Mic Out -	Line level, balanced, pair with 3
12	Mic Ground	
13	Loudspeaker Output	8 ohm loudspeaker
14	External Input to LS Amp +	Line level, balanced, pair with 7
15	Matrix Audio Input to Panel / parallel output +	Line level, balanced, pair with 8

NB 15V supplies are also used to derive 12V for panel. (Thermally Fused @ 0.7A)

Keypad D9 Fixed Socket (-51 variant only)

Pin	Function	Notes
1	Column 1	Switch 1,4,7, *
2	Column 3	Switch 3,6,9,#
3	Row 2	Switch 4,5,6
4	Row 4	Switch *,0,#
5	GND	For switch LEDs
6	Column 2	Switch 2,5,8,0
7	Row 1	Switch 1,2,3
8	Row 3	Switch 7,8,9
9	+12V out	Switch

View of Keypad (front panel)

1	2	3
4	5	6
7	8	9
*	0	#

4.5.4 500-3x-5x Series DIP Switch Settings

Within the panel a series of DIP switches determine the correct panel type. These are factory set and are included for reference in Appendix 1.

A further set of DIP switches are user accessible at the rear of the panel and control the action of the front panel CUT switch. The factory default is shown in the table below. Switch position 4 is not used.

Cut Switch Action	DIP 1	DIP 2	DIP 3
No action	OFF	OFF	OFF
Changeover to HSet MIC (default)	ON	OFF	OFF
LS cut	OFF	ON	OFF
Changeover to HSet MIC and LS cut	ON	ON	OFF
MIC cut	OFF	OFF	ON
Changeover to HSet MIC and MIC cut	ON	OFF	ON
LS cut and MIC cut	OFF	ON	ON
Everything	ON	ON	ON

4.6 500-43-50 12 way Rotary Encoder Expansion Panel

These may only be connected to panels from the 500-xx--5x range.

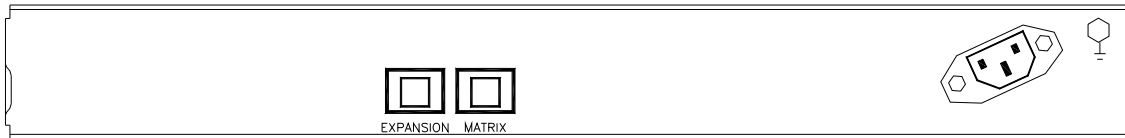
Information about the following legacy panel types is also provided here:

- 500-43-51 1U, 8 REN level control panel

4.6.1 Specification

Dimensions	485mm wide x 44.5mm high x 150mm deep (excluding connectors) 200mm approx. (including mating connectors) 19" x 1RU rack mounting
Mains Input	90 – 260 V ac, 50-60Hz
Current Consumption	150mA @ 90V ac, 50mA @ 250V ac.

4.6.2 Rear Connector Layout



The “expansion in” and “expansion out” connections are provided on RJ45 sockets. The pin-out format of these connectors is given below.

Expansion in (Matrix) – RJ-45 fixed socket on panel

RJ-45 Pin	Function	
1	Panel Data out +	Pair 1
2	Panel Data out -	
3	Panel Data In +	Pair 2
6	Panel Data In -	
5	Panel Audio out +	Pair 3
4	Panel Audio out -	
7	Panel Audio in +	Pair 4
8	Panel Audio in -	
	Cable Screen	

Expansion out (Expansion) – RJ-45 fixed socket on panel

RJ-45 Pin	Function	
1	Panel Data in +	Pair 1
2	Panel Data in -	
3	Panel Data out +	Pair 2
6	Panel Data out -	
5	Panel Audio out +	Pair 3
4	Panel Audio out -	
7	Panel Audio in +	Pair 4
8	Panel Audio in -	
	Cable Screen	

4.7 500-42-50 1U, 10 lever key panel with LED displays.

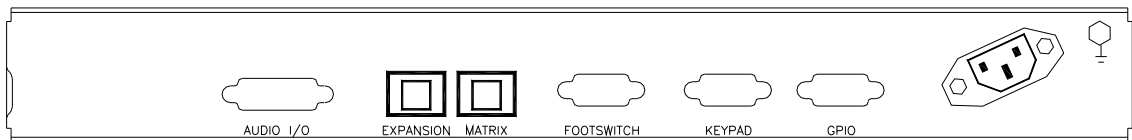
Information about the following legacy panel types is also provided here:

- 500-44-50 1U, 10 lever key reduced facility control panel without displays.
- 500-44-51

4.7.1 Specification

Dimensions	485mm wide x 44.5mm high x 150mm deep (excluding connectors) 200mm approx. (including mating connectors) 19" x 1RU rack mounting
Mains Input	90 – 260 V ac, 50-60Hz
Current Consumption	150mA @ 90V ac, 50mA @ 250V ac.

4.7.2 Rear Connector Layout



4.7.3 Connections

Expansion out – RJ-45 fixed socket on panel

RJ-45 Pin	Function	
1	Panel Data in +	Pair 1
2	Panel Data in -	
3	Panel Data out +	Pair 2
6	Panel Data out -	
5	Panel Audio out +	Pair 3
4	Panel Audio out -	
7	Panel Audio in +	Pair 4
8	Panel Audio in -	
	Cable Screen	

Matrix – RJ-45 fixed socket on panel

RJ-45 Pin	Function	
1	Panel Data out +	Pair 1
2	Panel Data out -	
3	Panel Data In +	Pair 2
6	Panel Data In -	
5	Panel Audio out +	Pair 3
4	Panel Audio out -	
7	Panel Audio in +	Pair 4
8	Panel Audio in -	
	Cable Screen	

Headset - 5 Pin XLR Fixed Socket (front panel)

Pin	Function
1	Mic IN (Screen)
2	Mic IN
3	Headset Gnd
4	Headset Out
5	Headset Out

Foot Switch - D9 Fixed Socket

Pin	Function
1	Foot Switch Input
2	No Connection
3	Chassis Ground
4	No Connection
5	No Connection
6	Ground
7	No Connection
8	No Connection
9	No Connection

GPIO (Local logic in and out) - D9 Fixed Socket

Pin	Function	Notes
1	Ground	Protected with series 44R & 1N4002 diode.
2	Logic Input 1	
3	Logic Input 2	
4	Logic 2 Out Common	
5	Internal +5V (Out)	
6	Logic Output 1	
7	Logic 1 Out Common	
8	Logic Output 2	
9	Logic Input +VCC	

Audio I/O – D15 Fixed Socket

Pin	Function	Notes
1	Slave Mic Input	Line level, un-balanced
2	+15V Out (for slave mic panel)	NOT protected!
3	Clean Mic Out +	Line level, balanced, pair with 11
4	Ext CUT Input (for slave mic panel)	Parallel function to front panel Cut Switch. Ground to activate
5	Chassis Ground	
6	No connection	
7	External Input to LS Amp -	Line level, balanced, pair with 14
8	Matrix Audio Input to Panel / parallel output -	Line level, balanced, pair with 15
9	Ext Mic Cut output (to slave panel)	Normally grounded. O/P is open circuit when front panel cut selected.
10	-15V Out (for Slave mic panel)	NOT protected
11	Clean Mic Out -	Line level, balanced, pair with 3
12	Mic Ground	
13	Loudspeaker Output	8 ohm loudspeaker
14	External Input to LS Amp +	Line level, balanced, pair with 7
15	Matrix Audio Input to Panel / parallel output +	Line level, balanced, pair with 8

NB 15V supplies are also used to derive 12V for panel. (Thermally Fused @ 0.7A)

Keypad D9 Fixed Socket

View of Keypad (as seen on front panel)

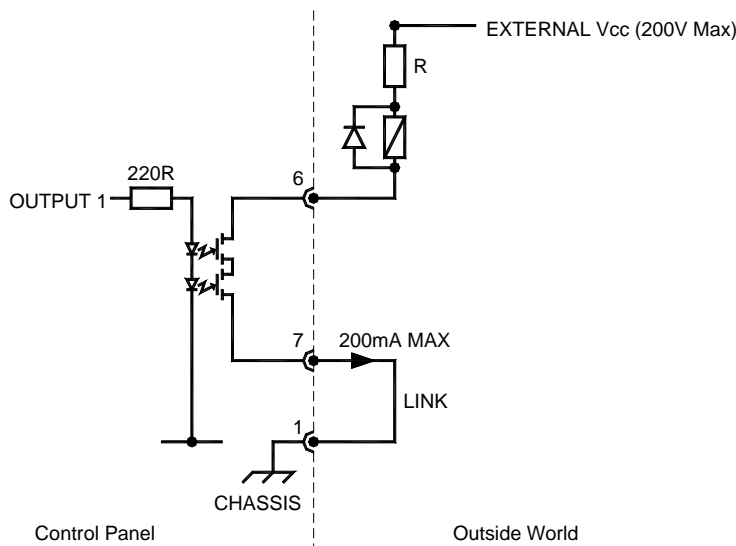
Pin	Function	Notes
1	Column 1	Switch 1,4,7, *
2	Column 3	Switch 3,6,9,#
3	Row 2	Switch 4,5,6
4	Row 4	Switch *,0,#
5	GND	For switch LEDs
6	Column 2	Switch 2,5,8,0
7	Row 1	Switch 1,2,3
8	Row 3	Switch 7,8,9
9	+12V out	Switch

1	2	3
4	5	6
7	8	9
*	0	#

4.8 Control Panel GPIO External Circuitry

Control panels from the 500-3x-30 and 500-3x-50 range provide 2 local GP inputs and 2 local GP outputs on a D9 fixed socket. The tables in section 6.1.2.2 and 4.5.3 provide pin-out details. The circuit below gives suggested wiring details for Logic Output 1. Like the matrix GPI card (see 0) the maximum current must be limited to 200mA and the maximum external voltage to 200V. Exceeding these limits will damage the panel circuitry.

The circuit below shows suggested wiring for Logic Input 1. If the input circuitry needs to be isolated from the panel voltage, the link between pins 5 and 9 should be removed. An external voltage can now be connected to pin 9 but an additional dropper resistor should be added if this voltage is >5V.



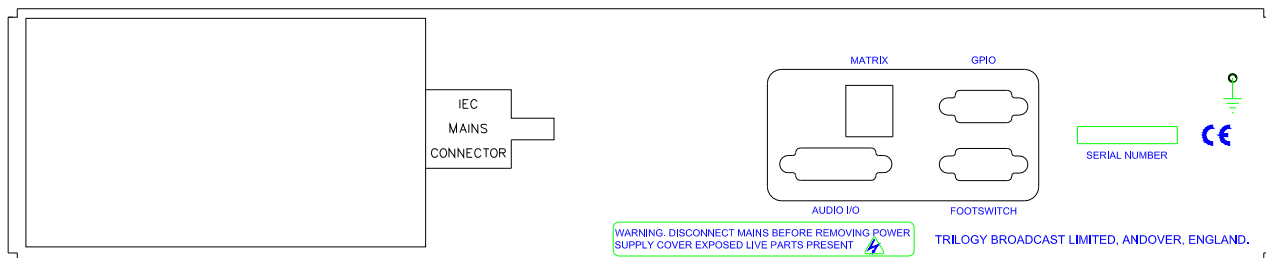
4.9 500-31-60 Standard facility 16 key control panel

The 500-31-60 panel provides 16 programmable lever keys in a 2U rack mount chassis. For information on programming the software driven “cut switch” operation, see section **Error! Reference source not found..**

4.9.1 Specification

Dimensions	485mm wide x 88.9mm high x 80mm deep (approx. including PSU and mating connectors). 19" x 2RU rack mounting
Mains Input	90 – 250 V ac, 50-60Hz
Current Consumption	150mA @ 90V, 50mA @ 250V

4.9.2 Rear Panel Layout



Connector types:

Matrix	RJ 45 socket
GPIO	D9 Fixed Socket
Audio I/O	D15 Fixed Socket
Footswitch	D9 Fixed Socket

Headset - 5 Pin XLR Fixed Socket (front panel)

Pin	Function
1	Mic IN (Screen)
2	Mic IN
3	Headset Gnd
4	Headset Out
5	Headset Out

Matrix – RJ-45 fixed socket on panel

RJ-45 Pin	Function	
1	Panel Data out +	Pair 1
2	Panel Data out -	
3	Panel Data In +	Pair 2
6	Panel Data In -	
5	Panel Audio out +	Pair 3
4	Panel Audio out -	
7	Panel Audio in +	Pair 4
8	Panel Audio in -	
	Cable Screen	

Foot Switch - D9 Fixed Socket

Pin	Function
1	Foot Switch Input
2	No Connection
3	Chassis Ground
4	Reserved
5	Reserved
6	Ground
7	Reserved
8	Reserved
9	Reserved

GPIO (Local logic in and out) - D9 Fixed Socket

Pin	Function	Notes
1	Ground	
2	Logic Input 1	
3	Logic Input 2	
4	Logic 2 Out Common	
5	Internal +5V (Out)	Protected with 0.5A thermal fuse & 1N4002 diode.
6	Logic Output 1	
7	Logic 1 Out Common	
8	Logic Output 2	
9	Logic Input +VCC	NB Pin 9 may be driven by external voltage (With dropper resistor if greater than 5V), or by internal +5V via pin 5.

Audio I/O – D15 Fixed Socket

Pin	Function	Notes
1	No connection	
2	+12V Out	Fused internally 0.5A
3	Clean Mic Out +	Line level, balanced, pair with 11 – o/p is affected by CUT switch
4	Ext CUT Input	Parallel function to front panel Cut Switch. Ground to activate
5	Chassis Ground	
6	No connection	
7	External Input to LS Amp -	Line level, balanced, pair with 14
8	Matrix Audio Input to Panel / parallel output -	Line level, balanced, pair with 15
9	No connection	
10	No connection	
11	Clean Mic Out -	Line level, balanced, pair with 3
12	Internal Ground	
13	No connection	
14	External Input to LS Amp +	Line level, balanced, pair with 7
15	Matrix Audio Input to Panel / parallel output +	Line level, balanced, pair with 8

4.10 500-33-00 / 500-45-00 / 500-46-00 Range

Although offering differing types and numbers of switches and displays, these panels share the same electronics and connectivity.

- 500-33-00 32 way lever key
- 500-45-00 8 way push button
- 500-46-00 10 button, LC key.

4.10.1 Specification

Dimensions	<ul style="list-style-type: none"> ○ 500-33-00 485mm wide x 88.9mm high x 80mm deep (approx. including PSU and mating connectors). 19" x 2RU rack mounting ○ 500-45-00 / 500-46-00 485mm wide x 44.5mm high x 80mm deep (approx. including PSU and mating connectors). 19" x 1RU rack mounting
Mains Input	90 – 250 V ac, 50-60Hz
Current Consumption	150mA @ 90V, 50mA @ 250V

4.10.2 Connections

Matrix – RJ-45 fixed socket on panel

RJ-45 Pin	Function	
1	Panel Data out +	Pair 1
2	Panel Data out -	
3	Panel Data In +	Pair 2
6	Panel Data In -	
5	Panel Audio out +	Pair 3
4	Panel Audio out -	
7	Panel Audio in +	Pair 4
8	Panel Audio in -	
	Cable Screen	

Foot Switch - D9 Fixed Socket

Pin	Function
1	Foot Switch Input
2	No Connection
3	Chassis Ground
4	Reserved
5	Reserved
6	Ground
7	Reserved
8	Reserved
9	Reserved

Headset - 5 Pin XLR Fixed Socket (front panel)

Pin	Function
1	Mic IN (Screen)
2	Mic IN
3	Headset Gnd
4	Headset Out
5	Headset Out

GPIO (Local logic in and out) - D9 Fixed Socket

Pin	Function	Notes
1	Ground	
2	Logic Input 1	
3	Logic Input 2	
4	Logic 2 Out Common	
5	Internal +5V (Out)	Protected with 0.5A thermal fuse & 1N4002 diode.
6	Logic Output 1	
7	Logic 1 Out Common	
8	Logic Output 2	
9	Logic Input +VCC	NB Pin 9 may be driven by external voltage (With dropper resistor if greater than 5V), or by internal +5V via pin 5.

Audio I/O – D15 Fixed Socket

Pin	Function	Notes
1	No connection	
2	+12V Out	Fused internally 0.5A
3	Clean Mic Out +	Line level, balanced, pair with 11 – o/p is affected by CUT switch
4	Ext CUT Input	Parallel function to front panel Cut Switch. Ground to activate
5	Chassis Ground	
6	No connection	
7	External Input to LS Amp -	Line level, balanced, pair with 14
8	Matrix Audio Input to Panel / parallel output -	Line level, balanced, pair with 15
9	No connection	
10	No connection	
11	Clean Mic Out -	Line level, balanced, pair with 3
12	Internal Ground	
13	No connection	
14	External Input to LS Amp +	Line level, balanced, pair with 7
15	Matrix Audio Input to Panel / parallel output +	Line level, balanced, pair with 8

5. OTHER EQUIPMENT

5.1 Beltpacks

Beltpacks may be connected to the Orator matrix, on ports configured as 4 wire. They require an external voltage supply, either +15V or $\pm 15V$ depending on the type number. A dedicated connector is provided on the rear of the Orator matrix, pre-configured as shown in Section 3.3.6. This includes the required DC voltage and is wired to match any of the beltpacks below.

Type	No. of input channels (from matrix)	Fixed Connector type	Mating Connector type required	Supply voltage required	Headset connector (socket)
410-50-02	1	XLR6 Male	XLR6 Female	+15V	B-gauge 1/4" jack
410-50-03	2	Hirose 12 Way Plug RM15TRD-12P	Hirose 12 Way Socket RM15TPD-12S	$\pm 15V$	B-gauge 1/4" jack
410-50-12	1	XLR6 Male	XLR6 Female	+15V	XLR5 Female
410-50-13	2	Hirose 12 Way Plug RM15TRD-12P	Hirose 12 Way Socket RM15TPD-12S	$\pm 15V$	XLR5 Female

Notes:

1. All Beltpacks have one output channel (i.e. return to the matrix).
2. The Beltpack PTT (talk) switch is normally momentary action. The -12 and -13 types may be ordered with a latching talk switch, using part codes -12-L and -13-L.
3. The -02 and -03 variants are discontinued with effect December 2008.

The following tables give individual connector pin-outs for each type.

410-50-02 / 410-50-12 Single Channel Beltpack – Matrix Connection

Pin	Function
1,2 (+,-)	Audio from box
3,4 (+,-)	Audio to box
5	0V
6	+15V

410-50-03 / 410-50-13 Two Channel Beltpack– Matrix Connection

Pin	Function
1	Chassis
2,3 (+,-)	Audio 1 to box (PTB)
4,5 (+,-)	Audio 2 to box (Prog Snd)
6,7 (+,-)	Audio from box
8	+15V
9	-15V
10	0V to box
11,12 (+,-)	N/c

410-50-12 & 410-50-13 Headset Connector (XLR5 Socket on Beltpack)

Pin	Function
1	Mic IN (Screen)
2	Mic IN
3	Headset Gnd
4	Headset Out
5	Headset Out

5.2 Telephone Interfaces

The Trilogy 500-19 range of equipment provides full DTMF telephone facilities when used in conjunction with the Telos ONE “smart” telephone hybrid. To obtain the full facilities available with the Orator system, the Telos ONE should be fitted with the Telos Super Auto Answer (SAA) option. During the installation it is important to remember that the Telephone Interface must be connected to the matrix via a panel port wired with 4 pair cable. The connection is not just audio / 4-wire, there is a data exchange between the matrix and telephone interface. Each 500-19-10 Rack Mounting Frame can contain a maximum of three 500-19-00 Telephone Interface Cards. An installation specification for the frame is given below.

Trilogy 500-19-10 Telephone Interface Frame

Dimensions	485mm wide x 44.5mm high x 440mm deep (excluding connectors) 19" x 1RU rack mounting
Mains Input	90 – 250 V ac, 50-60Hz
Power Consumption	45VA

Connector Detail (per channel)

Active link to matrix	D9 Fixed Plug
Audio to Telos Hybrid	3 pin XLR Fixed Plug
Audio from Telos Hybrid	3 pin XLR Fixed Socket
Control link to Telos Hybrid	D15 Fixed Plug

Each connection to a telephone line requires a separate Telos ONE hybrid. An installation specification is given below.

Telos ONE Telephone Hybrid

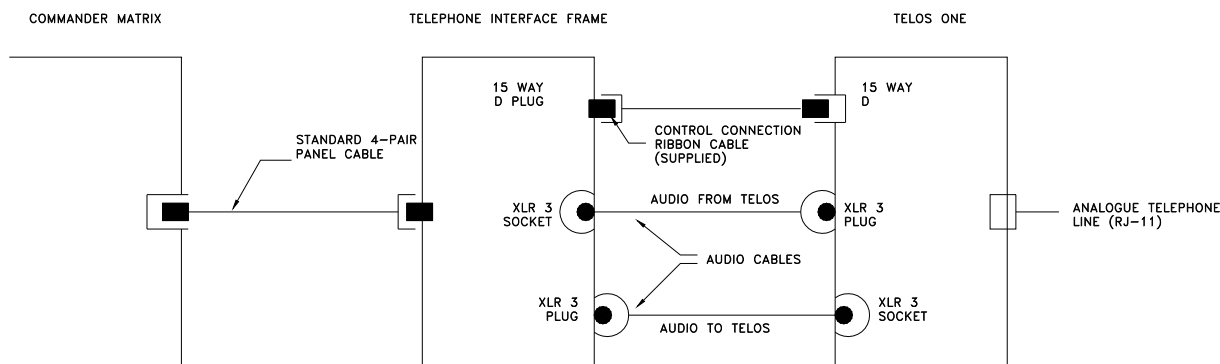
Dimensions	485mm wide x 44.5mm high x 240mm deep (excluding connectors) 19" x 1RU rack mounting
Mains Input	100 – 240 V ac, 50-60Hz
Power Consumption	90mA – 50mA

Connector Detail

Audio to Trilogy Telephone Interface	3 pin XLR Fixed Plug
Audio from Trilogy Telephone Interface	3 pin XLR Fixed Socket
Control link to Trilogy Telephone Interface	D15 Fixed Socket
Telephone Line	RJ-11

If the Telos equipment is purchased separately (i.e. not via Trilogy) it is important to specify to your supplier that the equipment is for connection to a Trilogy intercom system. This allows the correct software versions and hardware modifications to be fitted.

A typical system interconnection diagram is given below.



5.2.1 Telos ONE alignment

The level adjustment of the Telos ONE hybrid unit is fairly critical. Slight variations can cause the unit to fail to initiate outgoing calls. The usual symptom will be failure to break the dial tone when pressing keys on the dial-pad of a Trilogy panel. All units supplied via Trilogy are factory tested but this cannot take account of variations in local telephone lines and switchboards. To quickly re-align the levels, use the LED array on the front of the Telos unit.

To adjust the outgoing level:

- Initiate an outgoing call from a control panel equipped with a dial-pad, such that dialling tone can be heard on the panel loudspeaker.
- Press and hold a key on the dial pad, so that the DTMF tone is heard.
- Select the in/out monitor switch on the Telos to “in”.
- Adjust the multi-turn control labelled “Gain In” so that the 0 level LED is just illuminated. This is the last green LED: the red LED should not be lit.

To adjust the incoming level:

- Call the Telos hybrid from another telephone line (e.g. a mobile phone) and pick up the call.
- Select the in/out monitor switch on the Telos to “out”.
- While the line is active, press a key on the other telephone so that the DTMF tone is heard.
- Adjust the multi-turn control labelled “Gain Out” so that the 0 level LED is just illuminated. This is the last green LED: the red LED should not be lit.

Trilogy recommends that these levels be checked from time to time, to ensure that the Telos hybrids remain correctly aligned.

NOTE: The Telos hybrid has an intelligent dimming circuit built into the unit, therefore we recommend that the port assigned to the telephone hybrid from the PathFinder GUI is set to 0dB dimming. Please refer to the PathFinder User Guide for more information.

5.3 RT Equipment

Radio Talkback equipment may be supplied by Trilogy as part of a complete system. It is not manufactured by Trilogy and will be supplied with the original equipment manuals.

The usual configuration consists of one or more Base Stations and a number of portable transceivers. The Base Stations are connected to the matrix using normal 4 wire audio ports according to the pin-out information in Section 0.

5.4 500-22-00 ICIS-1 ISDN Interface

The 500-22 ICIS-1 ISDN interface is connected in the same manner as the Telos Hybrid (see Section 5.2). The 1U package contains two 64k-bandwidth channels, which may be used independently or as a single ISDN2 (128k) bandwidth channel.

To make correct use of the available bandwidth, two separate telephone interface cards (500-19-10) should be allocated, along with two matrix ports. It is possible to request two independent incoming telephone numbers, either via your in-house switchboard or (if appropriate) from your telco. In this way, incoming calls can be directed to either Bearer 1 or 2 and outgoing calls will be connected to the first available Bearer. Careful programming within the telephone groups area of PathFinder is required to obtain the best results.

5.4.1 500-22-00 ICIS-1 ISDN Interface Connector Pin-Outs

5.4.1.1 Bearer 1 & Bearer 2

Audio Input – XLR3 fixed socket	Pin 1	Ground
	Pin 2	Balanced input 1
	Pin 3	Balanced input 2
Audio output – XLR3 fixed plug	Pin 1	Ground
	Pin 2	Balanced output 1
	Pin 3	Balanced output 2
D15 fixed socket	Pin 1	AUTO control input
	Pin 2	DROP control input
	Pin 3	+5VDC
	Pin 4	D8 DTMF output
	Pin 5	D4 DTMF output
	Pin 6	D2 DTMF output
	Pin 7	D1 DTMF output
	Pin 8	Not connected
	Pin 9	SIEZE control input
	Pin 10	Ground
	Pin 11	Line Mode output
	Pin 12	Automode output
	Pin 13	DTMF data valid
	Pin 14	Not connected
	Pin 15	Not connected

5.4.1.2 ISDN Interface RJ45 Connector

RJ45 Fixed Socket	Pin 1	Not connected
	Pin 2	Not connected
	Pin 3	Tx to network A/Rx from terminal A
	Pin 4	Rx from network A/Tx to terminal A
	Pin 5	Rx from network B/Tx terminal B
	Pin 6	Tx to network B/Rx from terminal B
	Pin 7	Not connected
	Pin 8	Not connected

5.4.1.3 Com Port

D9, not yet supported, for future development.

5.4.1.4 Remote Ports

Each input is the cathode of the LED on an opto-isolator. The anode is connected through a 470R resistor to +5VDC. Therefore to activate a control input, short the pin to ground, i.e. pin 10. Each output is the open collector of a ULN2003 driver chip. Therefore connect the pin through load to +5VDC.

5.4.1.5 RJ45

This is the ISDN 2 connector. This must only be connected to an approved ISDN 2 connection or serious damage may occur.

5.5 500-23-00 ICIS-2 ISDN Interface

The ICIS-2 ISDN interface provides complete remote panel functionality over an ISDN2 link. It is connected directly to the matrix at the studio end, then to the control panel at the remote end. No additional interfaces are required. Using both bearers of the ISDN2 circuit, two control panels or a single panel plus an additional 4 –wire circuit may be installed.

D15 Fixed Plug on ICIS-2 (DTE)

Pin	Function
1	Shield
2	TX data (a)
3	Control (a)
4	RX data (a)
5	Indication (a)
6	Clock (a)
7	Not used
8	Signal Ground
9	TX data (b)
10	Control (b)
11	RX data (b)
12	Indication (b)
13	Clock (b)
14	Not used
15	Not used

6. LEGACY HARDWARE

6.1 Legacy Control Panels

- 500-3x-10 series formed the original series. The electronics is modular based. These panels fall outside the scope of this manual but any technical queries may be addressed to Trilogy Communications.
- 500-3x-3x series were supplied from 1996 until late 2000. See section 6.1.2. The associated expansion panels are from the 500-40-0x series. See section 6.1.4.
- The simple 1U, 12 key panel, type 500-39-30 which has no alphanumeric displays. See section 6.1.6 for details.
- Many variants from the 500-3x-50 series have now been discontinued. However, some models are still current so information is provided in section 4.5
- A simplified version of the 500-42-50 which has no active displays and other reduced facilities. The part number is 500-44-50: See section 4.7.

6.1.1 Legacy Control Panel Facility Comparison Table

A series of additional connectors provide the following facilities, on the panel types indicated in the table.

	500-3x-3x Control Panels	500-3x-5x Control Panels	500-39-30 1RU 12 key	500-39-31 1RU 12 key + expansion	500-43-5x Expansion Panel	500-44-50 1U, 10 key simple panel	500-40-0x Expansion Panel
Comprehensive audio inputs and outputs	√	√	√	√			
Expansion ports	1	1		1	2		2
Local logic inputs and outputs	√	√		√			
Remote control footswitch	√	√					
External connector for re-programming	√	√	√	√	√	√	√
External dialpad connector		√		√			
5 character alphanumeric displays	√	√					
Fitted front panel microphone	√	√	√	√			
Built in loudspeaker	√	√	√	√		√	
Headset connector	√	√	√	√		√	

6.1.2 500-3x-3x Series Control Panels

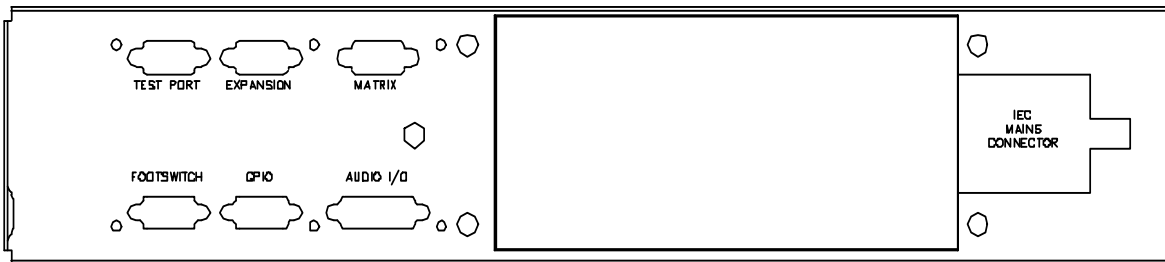
The following detail refers to these panel types:

- 500-30-30 24 key panel
- 500-31-30 16 key panel
- 500-31-31 16 key panel with dial pad
- 500-32-30 8 key panel
- 500-32-31 8 key panel with dial pad

Dimensions	485mm wide x 88.9mm high x 80mm deep (max, excluding connectors). Approx. 110mm deep (max including mating connectors) 19" x 2RU rack mounting
Mains Input	90 – 250 V ac, 50-60Hz
Current Consumption	150mA @ 90V ac, 50mA @ 250V ac.

Details of panel connections are provided in the following tables. Other features may be enabled or disabled by the DIP switches accessible at the top of the panel. These are detailed in section 6.1.3.

6.1.2.1 500-3x-3x Series Standard Control Panel Rear View



6.1.2.2 500-3x-3x Series Control Panel Connections

Matrix – D9 Fixed Plug

Pin	Function
1	NC (Screen)
2	Data Out-
3	Data In-
4	Audio Out-
5	Audio In-
6	Data Out +
7	Data In +
8	Audio Out
9	Audio In +

Expansion Port– D9 Fixed Socket

Pin	Function
1	Analyse Input
2	Enable Remote Boot
3	Ground
4	Transputer Link Out +
5	Transputer Link In +
6	Error signal in
7	Reset Out
8	Transputer Link Out-
9	Transputer Link In-

Test Port– D9 Fixed Socket

Pin	Function
1	Analyse Input
2	Enable Remote Boot
3	Ground
4	Transputer Link Out +
5	Transputer Link In +
6	Error signal Out
7	Reset In
8	Transputer Link Out-
9	Transputer Link In-

Foot Switch - D9 Fixed Socket

Pin	Function
1	Foot Switch Input
2	No Connection
3	Chassis Ground
4	No Connection
5	No Connection
6	Ground
7	No Connection
8	No Connection
9	No Connection

Headset - 5 Pin XLR Fixed Socket

(Front panel)

Pin	Function
1	Mic IN (Screen)
2	Mic IN
3	Headset Gnd
4	Headset Out
5	Headset Out

GPIO (Local logic in and out) - D9 Fixed Socket

Pin	Function	Notes
1	Ground	
2	Logic Input 1	
3	Logic Input 2	
4	Logic 2 Out Common	
5	Internal +5V (Out)	Protected with series 44R & 1N4002 diode.
6	Logic Output 1	
7	Logic 1 Out Common	
8	Logic Output 2	
9	Logic Input +VCC	NB Pin 9 may be driven by external voltage (With dropper resistor if greater than 5V), or by internal +5V via pin 5.

Audio I/O – D15 Fixed Socket

Pin	Function	Notes
1	Slave Mic Input	Line level, un-balanced
2	+15V Out (for slave mic panel)	NOT protected!
3	Clean Mic Out +	Line level, balanced, pair with 11
4	Ext CUT Input (for slave mic panel)	Parallel function to front panel Cut Switch. Ground to activate
5	Chassis Ground	
6	No connection	
7	External Input to LS Amp -	Line level, balanced, pair with 14
8	Matrix Audio Input to Panel / parallel output -	Line level, balanced, pair with 15
9	Ext Mic Cut output (to slave panel)	Normally grounded. O/P is open circuit when front panel cut selected.
10	-15V Out (for Slave mic panel)	NOT protected
11	Clean Mic Out -	Line level, balanced, pair with 3
12	Mic Ground	
13	Loudspeaker Output	8 ohm loudspeaker
14	External Input to LS Amp +	Line level, balanced, pair with 7
15	Matrix Audio Input to Panel / parallel output +	Line level, balanced, pair with 8

NB 15V supplies are also used to derive 12V for panel. (Thermally Fused @ 0.7A)

6.1.3 500-30 Series DIP Switch Settings

Within the panel a series of DIP switches determine the correct panel type. These are factory set and are included for reference in section 8

A further set of DIP switches is user accessible at the top side of the panel and control the action of the front panel CUT switch. The factory default is shown in the table below.

Cut Switch Action	DIP 1	DIP 2	DIP 3
No action	OFF	OFF	OFF
Changeover to HSet MIC (default)	ON	OFF	OFF
LS cut	OFF	ON	OFF
Changeover to HSet MIC and LS cut	ON	ON	OFF
MIC cut	OFF	OFF	ON
Changeover to HSet MIC and MIC cut	ON	OFF	ON
LS cut and MIC cut	OFF	ON	ON
Everything	ON	ON	ON

6.1.4 500-40-0x Series Expansion Panels

Control Panels may be linked together to provide additional facilities at one operating position. Additional level controls (RENs) or switches may be added. Alternatively, two standard panels from the 500-30 series may be linked together and will only utilise a single matrix port.

The following detail refers to expansion panel types:

- 500-40-00 8 way encoder panel
- 500-40-01 12 way encoder panel
- 500-40-02 15 key switch panel
- 500-40-04 32 way encoder panel

An installation specification is given below.

Dimensions	485mm wide x 44.5mm high x 100mm deep (excluding connectors) 150mm deep (maximum including mating connectors) 19" x 1RU rack mounting
Mains Input	90 – 260 V ac, 50-60Hz
Current Consumption	150mA @ 90V ac, 50mA @ 250V ac.

6.1.4.1 Connector Pin Out

Expansion In - D9 Fixed Socket

Pin	Function
1	Analyse Input
2	Enable Remote Boot
3	Ground
4	Transputer Link Out +
5	Transputer Link In +
6	Error signal Out
7	Reset In
8	Transputer Link Out-
9	Transputer Link In-

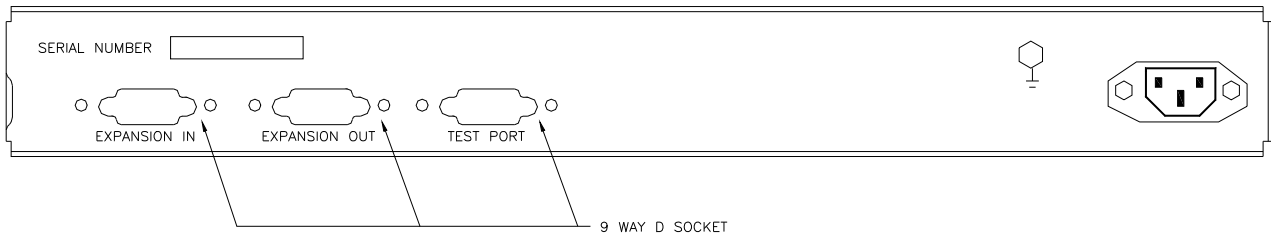
Expansion Out– D9 Fixed Socket

Pin	Function
1	Analyse Input
2	Enable Remote Boot
3	Ground
4	Transputer Link Out +
5	Transputer Link In +
6	Error signal in
7	Reset Out
8	Transputer Link Out-
9	Transputer Link In-

Test Port– D9 Fixed Socket

Pin	Function
1	Analyse Input
2	Enable Remote Boot
3	Ground
4	Transputer Link Out +
5	Transputer Link In +
6	Error signal in
7	Reset Out
8	Transputer Link Out-
9	Transputer Link In-

6.1.4.2 500-40-0x Series Control Panel Rear View



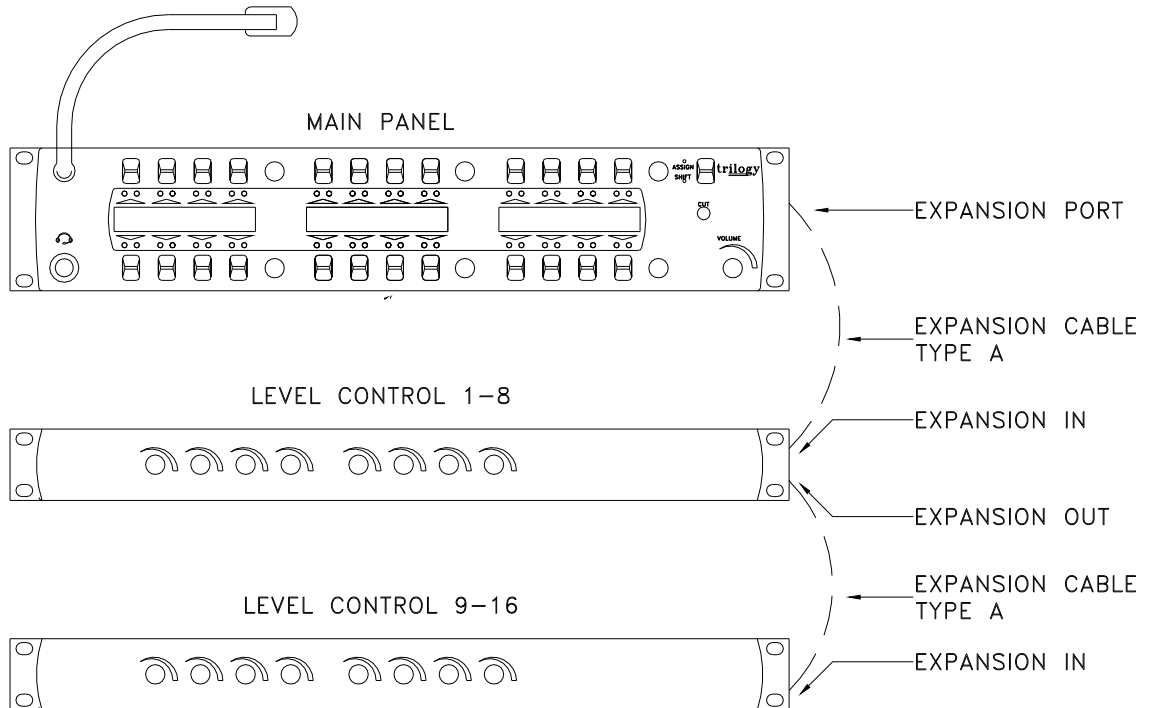
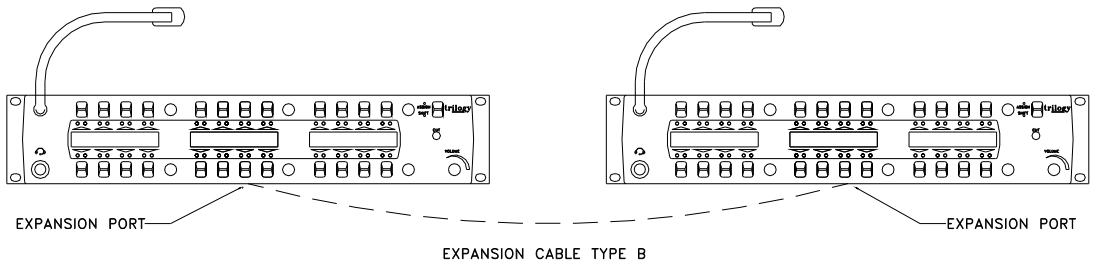
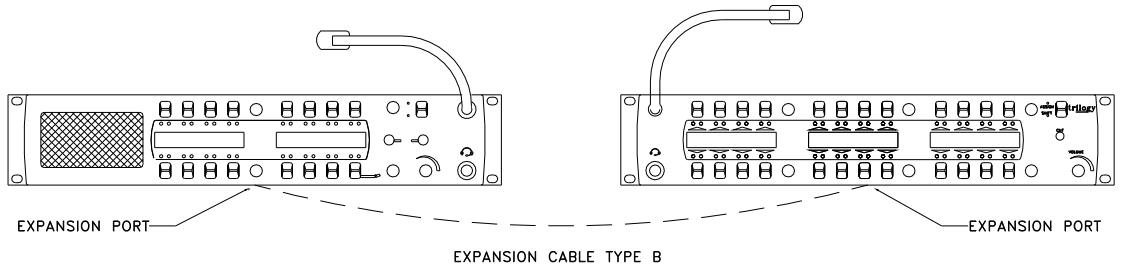
6.1.4.3 Typical expansion panel configuration

Since the 500-3x-3x series panels (“Standard” 8 / 16 / 24 key) only have a single expansion connection, they must form either the first or last panel in a chain. Expansion panels from the 500-40 range have both Expansion In and Expansion Out connectors, allowing them to be connected in a chain. The PathFinder configuration software includes full expansion panel support (from version 4.12 onwards). This controls the sequence in which the panels should be added to the configuration editor and the electrical interconnection sequence. Obviously, the panels may be assembled into the control desk in any preferred positions, cable lengths permitting. Two different cable types are required, Type A and Type B which are detailed in section 6.1.4.4.

The following rules need to be observed when connecting expansion panels onto a system:

- The standard series panels have only a single expansion port, used as “EXPANSION IN” or “EXPANSION OUT”. Therefore, these panels must be connected on the beginning or end of a chain only.
- Standard control panels (500-3x series) used in expansion mode need the internal DIP switch 1 set to “ON”. If the panels are supplied as part of a pre-configured system, this will be carried out by Trilogy and the panels marked accordingly. See Section 8.
- When a standard panel appears at the end of a chain, it must be connected using cable type B (see section 6.1.4.3).
- The audio only operates on the first panel of the chain: if required, the microphone may be removed from the second “standard” panel. Trilogy can supply a blank plug for the microphone fixing.
- The maximum suggested cable length for interlinking cables is 10 metres.
- A maximum of 5 panels may be configured within PathFinder. The other controlling limits are either 63 keys or 63 rotary encoders – whichever is reached first.

A number of different arrangements are shown below; others are possible.



6.1.4.4 500-3x-3x Series Expansion panel interconnection cables

Type A (max. length 10 metre)

D9 Free Plug - Pin	Function		Function	D9 Free Plug - Pin
4	Transputer Data out +	Pair 1	Transputer Data in +	4
8	Transputer Data out -		Transputer Data in -	8
5	Transputer Data In +	Pair 2	Transputer Data out +	5
9	Transputer Data In -		Transputer Data out -	9
3	Ground		Ground	3

Type B (max length 10 metres)

D9 Free Plug - Pin	Function		Function	D9 Free Plug - Pin
4	Transputer Data out +	Pair 1	Transputer Data in +	5
8	Transputer Data out -		Transputer Data in -	9
5	Transputer Data In +	Pair 2	Transputer Data out +	4
9	Transputer Data In -		Transputer Data out -	8
3	Ground		Ground	3

6.1.5 Connecting via structured cabling

All control panel types may be connected to the matrix by Category 5 structured cabling systems. Suitable adaptors are available from most electronic component distributors. The RS part numbers are listed below.

Panel Connection: RJ45 to D9 socket. RS 818-700

Matrix Connection: RJ45 to D9 plug. RS 818-693

As supplied, these adaptors require the pins to be inserted into the D type housing. Use the following table as a guide. The colour codes may not be correct for other brands.

D9 pin	RJ 45 pin	Colour (see above)
1	No connection	No connection
2	2	Yellow
3	6	Brown
4	4	Red
5	8	Blue
6	1	Black
7	3	Orange
8	5	Green
9	7	Grey

6.1.6 500-39-30 / 31 1U 12 key Panel with loudspeaker

This panel provides more basic facilities than the 500-30 range. It does not have LCD displays and only provides connection to the matrix, audio I/O and the test port at the rear. An installation specification is given below.

Dimensions	485mm wide x 44.5mm high x 150mm deep (excluding connectors) 200mm approx. (including mating connectors) 19" x 1RU rack mounting
Mains Input	90 – 260 V ac, 50-60Hz
Current Consumption	150mA @ 90V ac, 50mA @ 250V ac.

6.1.6.1 500-39-30 Connector Pin Out

Matrix – D9 Fixed Plug

Pin	Function
1	NC (Screen)
2	Data Out-
3	Data In-
4	Audio Out-
5	Audio In-
6	Data Out +
7	Data In +
8	Audio Out +
9	Audio In +

Test– D9 Fixed Socket

Pin	Function
1	Analyse Input
2	Enable Remote Boot
3	Ground
4	Transputer Link Out +
5	Transputer Link In +
6	Error signal Out
7	Reset In
8	Transputer Link Out-
9	Transputer Link In-

Headset - 5 Pin XLR Fixed Socket (front panel)

Pin	Function
1	Mic IN (Screen)
2	Mic IN
3	Headset Gnd
4	Headset Out
5	Headset Out

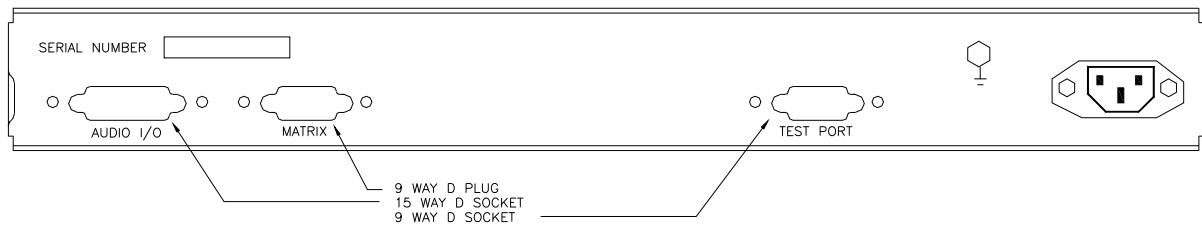
Audio I/O – D15 Fixed Socket

Pin	Function	Notes
1	Slave Mic Input	Line level, un-balanced
2	+15V Out (for slave mic panel)	NOT protected!
3	Clean Mic Out +	Line level, balanced, pair with 11
4	Ext CUT Input (for slave mic panel)	Parallel function to front panel Cut Switch. Ground to activate
5	Chassis Ground	
6	No connection	
7	External Input to LS Amp -	Line level, balanced, pair with 14
8	Matrix Audio Input to Panel / parallel output -	Line level, balanced, pair with 15
9	Ext Mic Cut output (to slave panel)	Normally grounded. O/P is open circuit when front panel cut selected.
10	-15V Out (for Slave mic panel)	NOT protected
11	Clean Mic Out -	Line level, balanced, pair with 3
12	Mic Ground	
13	Loudspeaker Output	8 ohm loudspeaker
14	External Input to LS Amp +	Line level, balanced, pair with 7
15	Matrix Audio Input to Panel / parallel output +	Line level, balanced, pair with 8

NB 15V supplies are also used to derive 12V for panel. (Thermally Fused @ 0.7A)

The **500-39-31** panel includes an additional expansion connector, logic GPIO signals and footswitch connector in the same format as the 500-3x-3x series expansion panels. It is only available to special order. See section 6.1.2.2 for connector details.

6.1.6.2 500-39-30 Rear View



6.1.7 500-3x-5x Series Control Panels

For information on the following legacy panels, please refer to section 4.5.

- 500-30-50 24 key panel (with internal loudspeaker)
- 500-31-50 16 key panel.
- 500-32-50 8 key panel.
- 500-32-51 8 key panel with dial pad.

6.1.8 500-43-51 1U, 8 REN level control panel

For information on the following legacy panels, please refer to section 4.6.

7. SPECIFICATION

7.1 Matrix General Specification

Number of Ports	18 or 36 if second audio card is fitted.
Size	19" W x 2RU H x 365mm D (483mm x 89mm x 365mm)
Weight	3.5kg
Power	90 – 260VAC, 30VA (18 port system), 50VA (36 port system)

7.2 Matrix Audio Specification

Port Type	4 wire electronically balanced
Frequency Response	-3dB @ 20Hz and 14.25kHz
Nominal Gain	0dB \pm 1dB
Gain Adjustment Range	+12dB / -37dB from PathFinder Lite
Maximum Input Level	+20dBu
Crosstalk	< -60dB worst case
Noise	< -60dBu CCIR weighted, quasi-peak
Distortion	< 0.2% THD @ 0dB gain
Input Impedance	~10kR
Output Impedance	Low (<20R)

7.3 Real Time Performance

Transmission time delay <50ms (defined as time taken from a key press to the audio reaching the destination). Based on statistical analysis of the likely number of key presses at any given instant.

7.4 Panels

Panel Communication	Balanced RS422 at 230.4 kbaud
Power	See individual sections
Maximum cable run	>600m.
Connection to Matrix	4 twisted pair cable. STP or FTP cable only..
L/S Volume Control	Max attenuation or hold off adjustable from -20 to -76dB in PathFinder Lite
Microphone amplifier gain adjustment	+14 to -16dB from PathFinder Lite
Loudspeaker amplifier	Nominal 5W into 8R

7.5 GPIO Specification

Number of physical Inputs	8, grounding contact
Number of physical Outputs	8, earth-free opto-isolated mosfet
Loopback I/O	Outputs 9 to 16 internally loped back to inputs 9 to 16.

7.6 P.C.

Type	Any IBM PC or compatible computer running Windows 95 / 98 / NT4 / 2000 / XP Pro.. We suggest a minimum CPU of 1GHz with a minimum 256MB of RAM This does depend on Operating System and other installed applications.
Connection to Matrix	From standard PC serial COM port (COM1 etc.) by RS232. Optionally via transputer link adaptor. Contact Trilogy Communications Limited for details.
Maximum Cable Length	Contact Trilogy Communications Limited for details

8. ADDITIONAL CONTROL PANEL INFORMATION

8.1 Internal Panel Switch Settings

Id	DIP Switch Action	DIP 1	DIP 2	DIP 3	DIP 4	DIP 5	DIP 6	DIP 7 Legacy Emul.	DIP 8 5/8 Char
0	8 Key or Desktop	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
1	8 Key Expansion	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF
2	16 Key	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF
3	16 Key Expansion	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF
4	24 Key	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF
5	24 Key Expansion	ON	OFF	ON	OFF	OFF	OFF	OFF	OFF
8	8 REN Expansion	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF
9	12 REN Expansion	ON	OFF	OFF	ON	OFF	OFF	OFF	OFF
10	32 Channel Level Control	OFF	ON	OFF	ON	OFF	OFF	OFF	OFF
11	12 Key 1U	ON	ON	OFF	ON	OFF	OFF	OFF	OFF
12	15 Key 1U Expansion	OFF	OFF	ON	ON	OFF	OFF	OFF	OFF

8.2 500-41 Desktop Panel Internal Settings

A three way connector inside the panel may be fitted with links in any of the three positions labelled H, L or M. These provide the same functionality as the switches accessible from the top edge of the 500-30 series control panel.

Cut Switch Action	H	L	M
No action	X	X	X
Changeover to HSet MIC (default)	Y	X	X
LS cut	X	Y	X
Changeover to HSet MIC and LS cut	Y	Y	X
MIC cut	X	X	Y
Changeover to HSet MIC and MIC cut	Y	X	Y
LS cut and MIC cut	X	Y	Y
Everything	Y	Y	Y

Y indicates link fitted

X indicates link not fitted

8.3 500-41 Desktop Panel T-Edit emulation

In addition, the 500-41 desktop panel is factory configured to operate with PathFinder Lite systems. To set the panel software to emulate T-Edit systems, solder a shorting link in the position labelled R130. This requires surface mount soldering tools: contact Trilogy for further advice.

9. ORATOR FIRMWARE RE-PROGRAMMING

The following section is included for reference only.

The Orator firmware is held in Flash RAM, independent of the configuration memory. To update the firmware, you will require: -

- the re-programming utility Orprog
- new firmware file (typically 4.21_1234.bin)
- a transputer adaptor card (Sundance PCMCIA)
- the correct re-programming cable (see below)

D9 Free socket (PC) Pin	D9 Free Socket (Orator) Pin
1	6
2	2
3	3
4	5
5	4
6	1
7	7
8	9
9	8

This operation would normally be carried out by a Trilogy engineer or when the unit is returned to the factory.

