



User Manual

2330 Controller

Automation and Router Control

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Safety Notices

Products Employing Lithium Batteries



This equipment contains a lithium battery. **There is a danger of explosion if this is replaced incorrectly.** Replace only with the same or equivalent type. Dispose of used batteries according to the instructions of the manufacturer. Batteries should only be replaced by trained service technicians.

Power Cable Supplied for the USA

The equipment is shipped with a power cord with a standard IEC molded free socket on one end and a standard 3-pin plug on the other. If you are required to remove the molded mains supply plug, dispose of the plug immediately in a safe manner.

The color code for the cord is as follows:

- GREEN lead connected to E (Protective Earth Conductor)
- BLACK lead connected to L (Live Conductor)
- WHITE lead connected to N (Neutral Conductor)



For Products With More Than One Power Supply Inlet



To reduce the risk of electric shock plug each power supply cord into separate branch circuits employing separate service grounds.

Rack Mounting the Enclosure



This product must not be rack mounted using only the front rack ears.

When rack-mounting the product, one of the following methods of installation must be used:

- place the unit on a suitably specified, and installed rack shelf and secure the product to the rack via the front rack ears or,
- fit the unit using the rear rack mount kit available from Snell by quoting the order code FGACK RACK-MNT-KIT.

Safety Standards

The Enclosure conforms to the following standards:

EN60950-1: 2001

Safety of Information Technology Equipment.

UL Listed

Professional Video Equipment File No. E193966.



EMC Standards

This unit conforms to the following standards:

EN 55103-1: 1997

Electromagnetic Compatibility, Product family standard for audio, video, audio-visual and entertainment lighting control apparatus for professional use. Part 1. Emission.

EN 55103-2: 1997

Electromagnetic Compatibility, Product family standard for audio, video, audio-visual and entertainment lighting control apparatus for professional use. Part 2. Immunity

Federal Communications Commission Rules Part 15, Class A:1998.

EMC Environment

The product(s) described in this manual conform to the EMC requirements for, and are intended for use in:

- The commercial and light industrial environment (including, for example, theatres) E2
- The controlled EMC environment (for example purpose-built broadcasting or recording studios), and the rural outdoor environment (far away from railways, transmitters, overhead power lines, etc.) E4.
- The applicable environment is stated in the *Technical Specification* section of the product operation manual under “*EMC Performance Information/Environment.*”

EMC Performance Information

Please refer to the *Technical Specification* section of the product operation manual.

EMC Performance of Cables and Connectors

Snell products are designed to meet or exceed the requirements of the appropriate European EMC standards. In order to achieve this performance in real installations it is essential to use cables and connectors with good EMC characteristics.

All signal connections (including remote control connections) shall be made with screened cables terminated in connectors having a metal shell. The cable screen shall have a large-area contact with the metal shell.

Coaxial Cables

Coaxial cables connections (particularly serial digital video connections) shall be made with high-quality double-screened coaxial cables such as Belden 1694 or BBC type PSF1/2M.

D-Type Connectors

D-type connectors shall have metal shells making good RF contact with the cable screen. Connectors having “dimples” which improve the contact between the plug and socket shells are recommended.

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1. Introduction

1.1 Description

The 2330 controller card is a PC card designed for both automation and router control. A controller card, or a number of cards (working individually, or as dual-redundant paired cards) can be fitted to the ICON 1050 rack frame. This is a 19 inch wide 3U high unit, which accommodates 2330 controller cards.

1.1.1 ICON Rack Frame

The ICON rack frame can accommodate up to six 2330 controller cards either in single mode or as dual-redundant pairs. Different rear panels can be fitted to the rack frame to cater for the different configurations.



Fig 1. Rack Frame

The main features of the rack frame are:

- hot-swappable dual power supplies
- alarm outputs for power supply and fan failure
- removable door
- robust construction
- fan assisted cross flow cooling

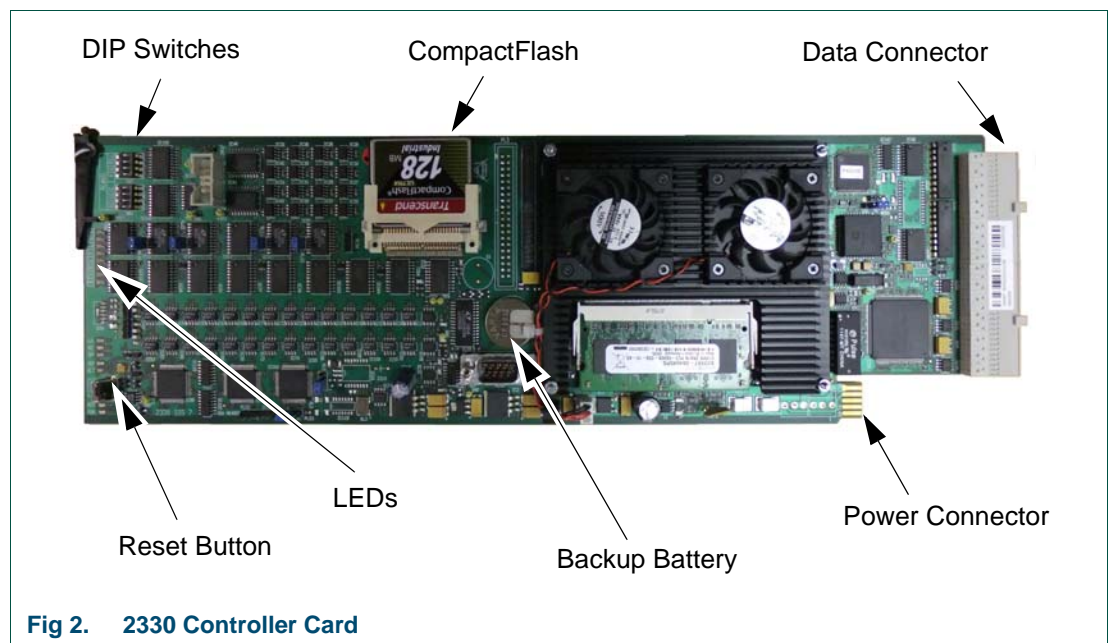
1.1.2 2330 Controller Card

These cards are where all the time critical commands for the system's broadcast devices are stored and executed.

The 2330 controller cards can be used in dual configuration where a backup card automatically takes over from a failed main card. In a dual redundant system, pulling out a live card has no effect on the system as its backup will seamlessly take over, thanks to the passive tri-state logic backplanes.

The configuration of the devices that each card controls is stored on a standard Compact Flash card. A new 2330 controller card can immediately take on the characteristics of any failed card by taking the Compact Flash from the failed card and slotting it into the spare card. A 2330 controller card will boot up in approximately 20 seconds.

Each card can control any combination of serial, IP and GPI controlled devices up to a maximum of eight devices. As the system is modular, command execution and latency are easily controlled by adding additional cards or frames. Many thousands of simultaneous commands or switches are achievable as there is no limit to the number of cards and frames that can be added to a system.



The main features of the 2330 controller cards are:

- Each controller card can control up to eight devices
- RS232, RS422, TCP/IP
- Timecode input
- Reference input
- 16 GPIO

2. Installation

2.1 Environment

Although constructed to meet the normal environmental requirements, it is important that there is a free flow of air to dissipate the heat produced during operation. Installations should be designed to allow for this.

The 1050 3U rack frame is designed for transverse air flow, so it is not necessary to leave vertical space between multiple frames. However, the rear and side vents must not be obstructed.

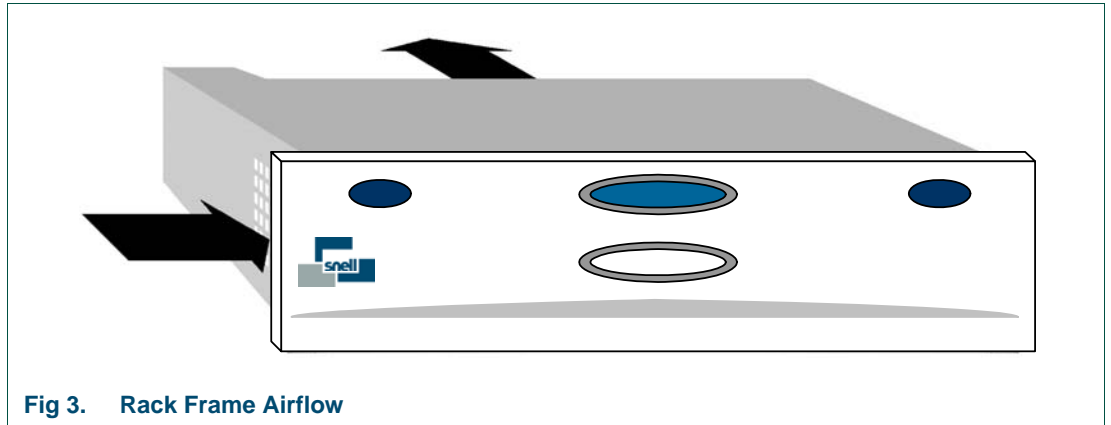


Fig 3. Rack Frame Airflow

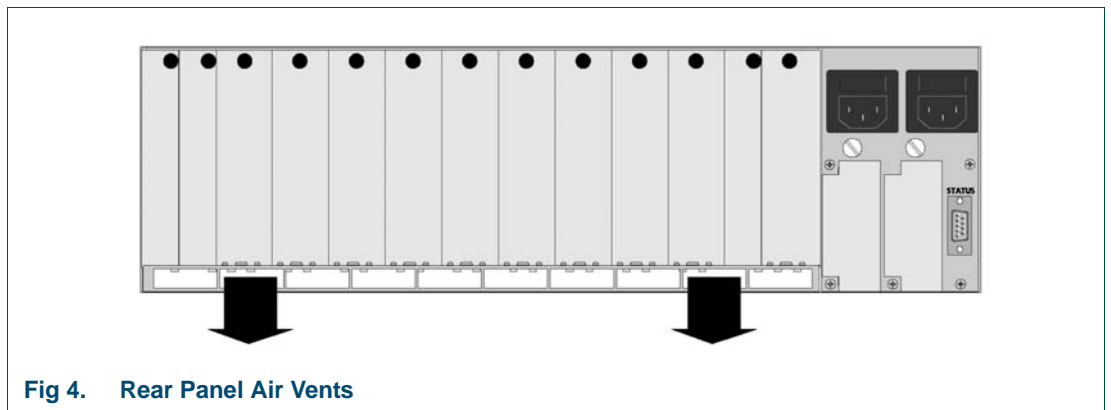


Fig 4. Rear Panel Air Vents

When rack mounting the equipment, support other than the rack mount ears must be provided.



The ventilation holes of the fan housing must not be obstructed or damage to the fan and the equipment may result.

The ventilation holes on the rear and front of the unit must not be obstructed or damage to the equipment may result

2.2 Power Connections

The enclosure provides two power supply inputs, one for each of the Dual PSUs fitted.



Before connecting power to the unit please refer to the safety warnings at the front of this manual.

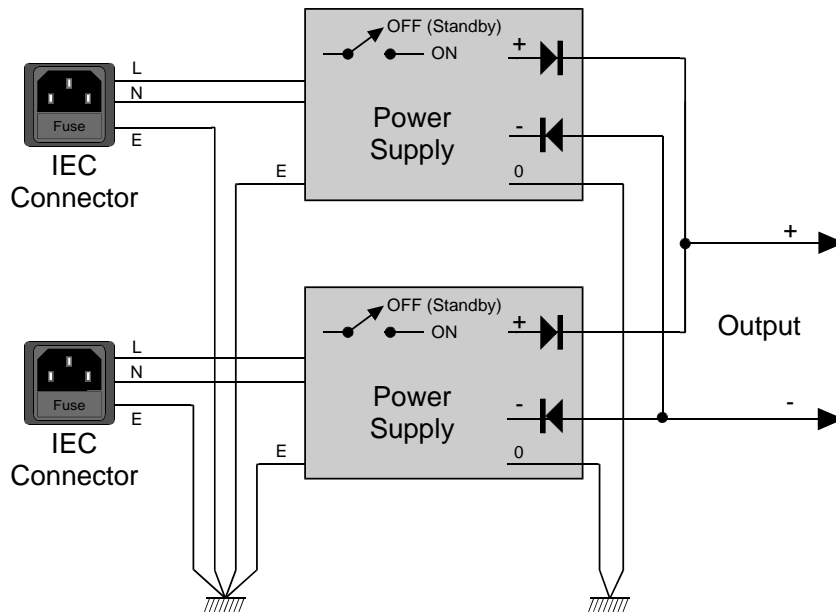
These are the IEC320 mains power connectors suitable for a standard IEC type power cable and contains a 4A(T) fuse.



When the unit is supplied fitted with two power supplies, ensure that both power supplies are installed correctly and are powered up.

2.3 Supply Voltage

The unit automatically senses the nominal supply voltage and sets itself up accordingly. No voltage adjustment procedure is required.



Each IEC connector supplies an independent feed of power to each of the two power supply modules as shown in the diagram above.

The 2330 Controller can support dual power supplies for redundancy; however, this is an option, therefore a second PSU may not be fitted.

2.4 Door Opening and Removal

The ICON door is held closed by sprung ball latches at either side. The door is opened by pulling outwards using the two finger pull recesses at the top.

The door can be removed from the frame by opening it approximately 30° and lifting upwards. It will not disconnect from the hinge at a greater angle. To re-fit the door, ensure that it is located centrally on the hinge.

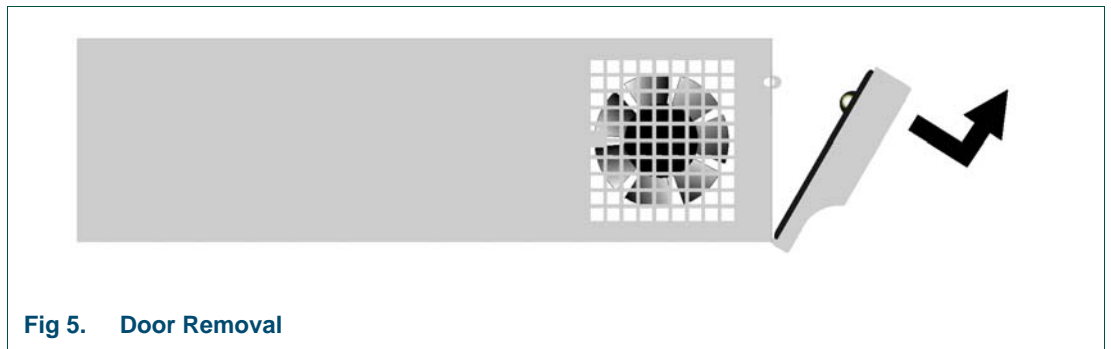


Fig 5. Door Removal

2.4.1 Frame Designation

A frame designation label may be fitted to the door label window to help identify the installed modules. The label can be created by printing the required text onto a suitable material such as acetate using a laser printer. A Microsoft® Word® template '3U Frame Designation Label' is available on the Snell web site at www.snellgroup.com in the Support/Customer Support/Documentation & Templates section.

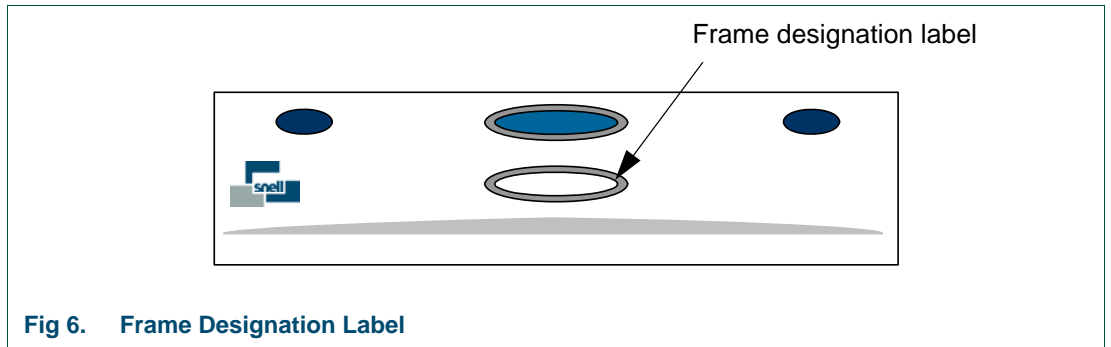


Fig 6. Frame Designation Label

The label is simply inserted into the slot in the rear of the door.

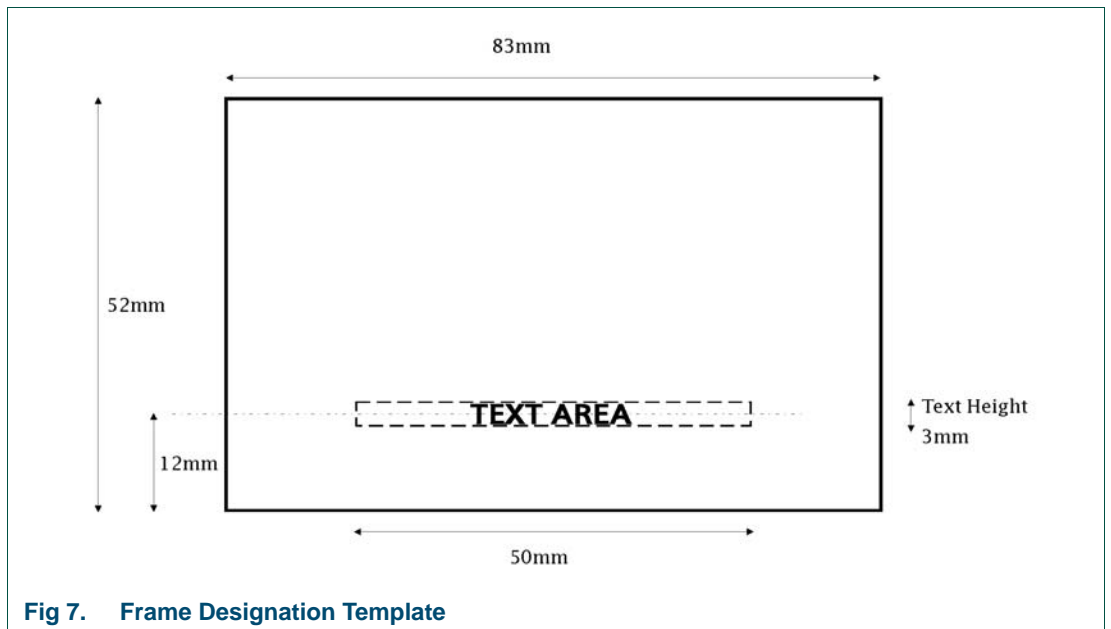


Fig 7. Frame Designation Template

2.5 Controller Card Installation and Removal

The controller cards fit into connector panels on the rear of the frame. There are different types of connector panel depending on whether using a single controller card, or a pair of dual-redundant controller cards.

- 1430 - double rear panel (16-port)
- 1433 - single rear panel (8-port)
- 1434 - double rear panel (8-port)

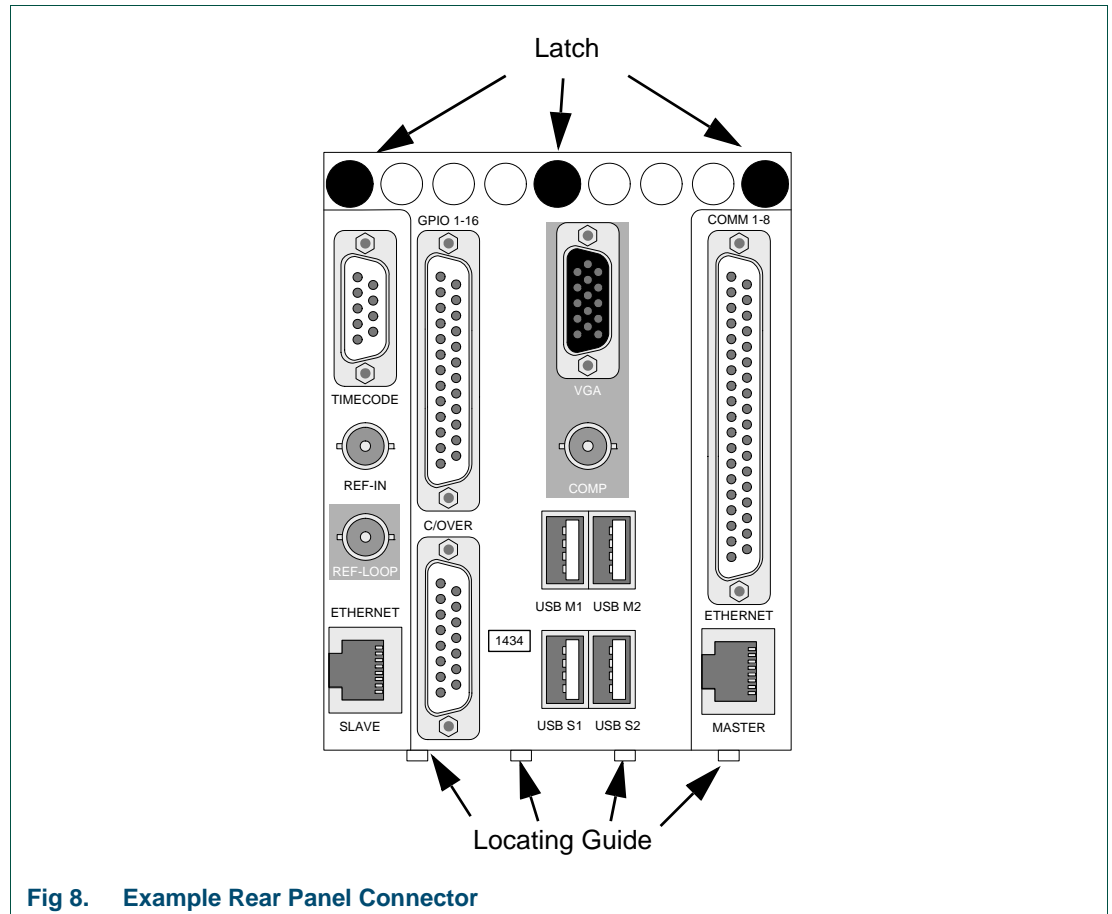


Fig 8. Example Rear Panel Connector

2.5.1 Insert a Rear Panel Connector

1. Ensure the plastic latch is fully retracted.
2. Slot the rear connector locating guides into the appropriate locating holes then push the latch fully into place.

Important:

Always insert the rear panel connector before inserting the controller card. Fitting the rear panel after the module is inserted may damage the connector.

2.5.2 Insert a Controller Card

Ensure that the controller card is correctly configured before installing. See "Controller Card Configuration" on page 17.

1. Slide the module along the guide rail of the required slot, until it marries up with both the rear connector and power and status monitoring connectors.
2. Ensure the controller card is pushed firmly into place.

Note: If the controller card is not inserted fully, it may appear to be working as LEDs will light, but the connections to the rear panel may not be properly made.

Fig 9. shows a side view section with a controller card inserted.

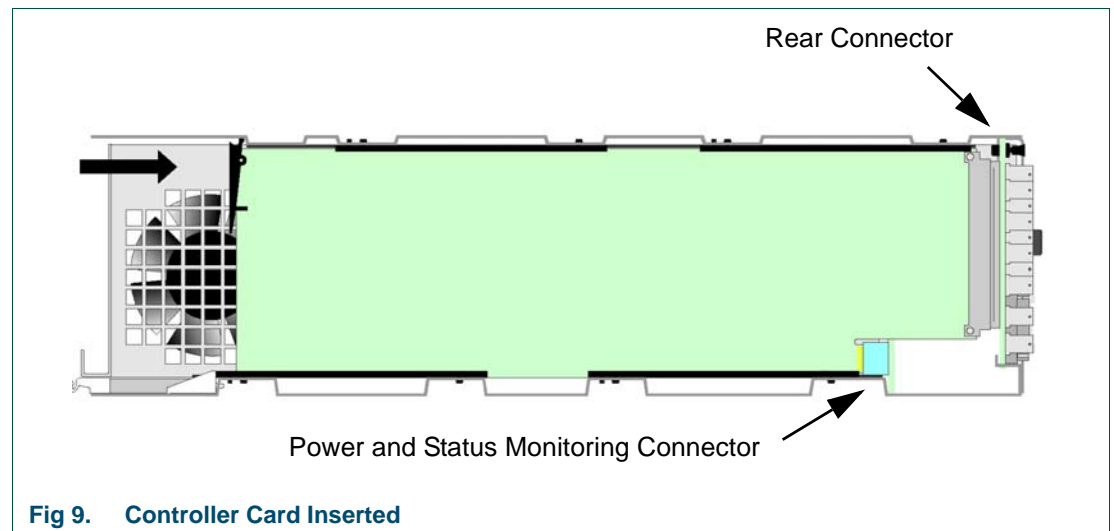


Fig 9. Controller Card Inserted

2.5.3 Fit a Module Locator

On the rack frame, the card guides and rear connector fitting holes use 10mm spacing. However cards can only be fitted at spacing, as determined by the chosen rear connectors.

To ease the fitting and removal of cards, once the rear panel connectors are installed for each rack's complement of cards, module locators may be fitted. The locators snap-in to 10mm spaced holes underneath the board guides.

Note: Cover unused rear panel space with the blank rear panels supplied.

2.5.4 Remove a Controller Card

Important: Observe normal static handling precautions when handling equipment or subassemblies.

1. Pull the card ejector lever.
2. Gently slide the card out along the rail until it is free of the enclosure.

Important: Do not remove the rear panel connector with the controller card in place, as rear connector pins may be bent or damaged.

3. Maintenance

3.1 Checking the Power Supply

The power supply indicators are dual color LEDs. In normal operation the power supply indicators illuminate green.

Power supply indicators are off:

- Check that the mains is connected
- Check that the fuses are intact

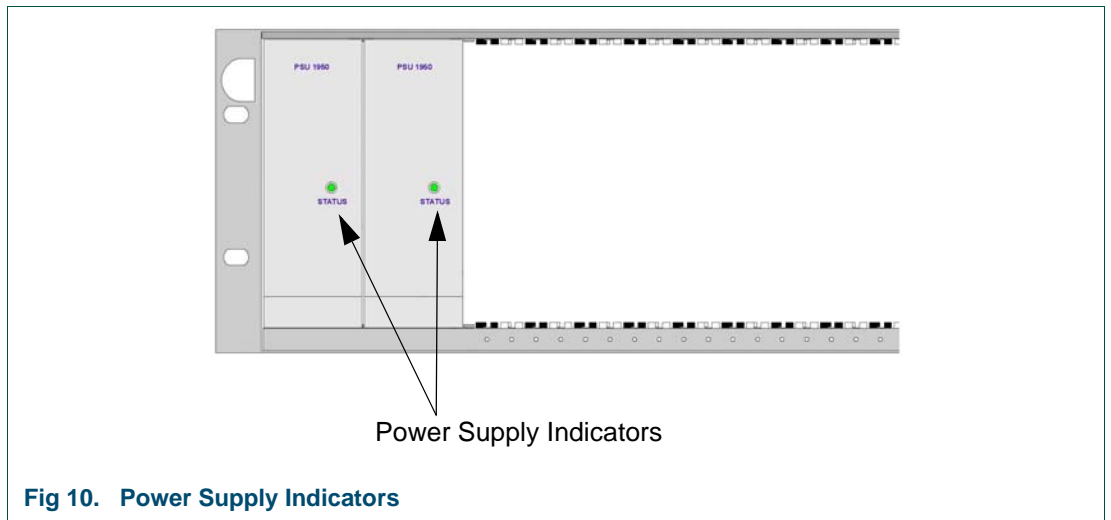


Fig 10. Power Supply Indicators

Power supply indicators are red:

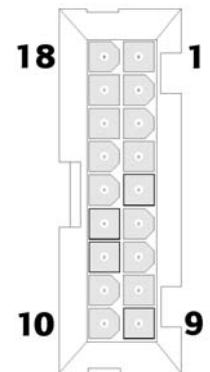
If the dual color LED changes to red then a fault condition exists and a replacement unit should be obtained. A red LED indicates that one of the following conditions is present:

- Voltage rails under or over voltage
- Fan defective
- Unit is over heating

In the event of a failure of one power supply the second unit will continue to supply the modules in the rack. In addition, the working unit will power the fan of the defective unit to prevent air flow obstruction. A replacement unit should still be obtained as soon as possible.

The rear connector of the power supply provides the following voltages to each card in the frame:

Pin		Pin	
1	+5 V	10	ALARM RELAY
2	+5 V	11	MODDATAOUT
3	0 V	12	MODENABLE
4	0 V	13	0 V
5	-13.5V	14	+13.5V
6	FAN	15	0 V
7	CLOCK	16	0 V
8	MODDATAIN	17	+5 V
9	FAN COMMON	18	+5 V



Replacing Fuses:

- With the mains power disconnected, pull out the fuse holder.

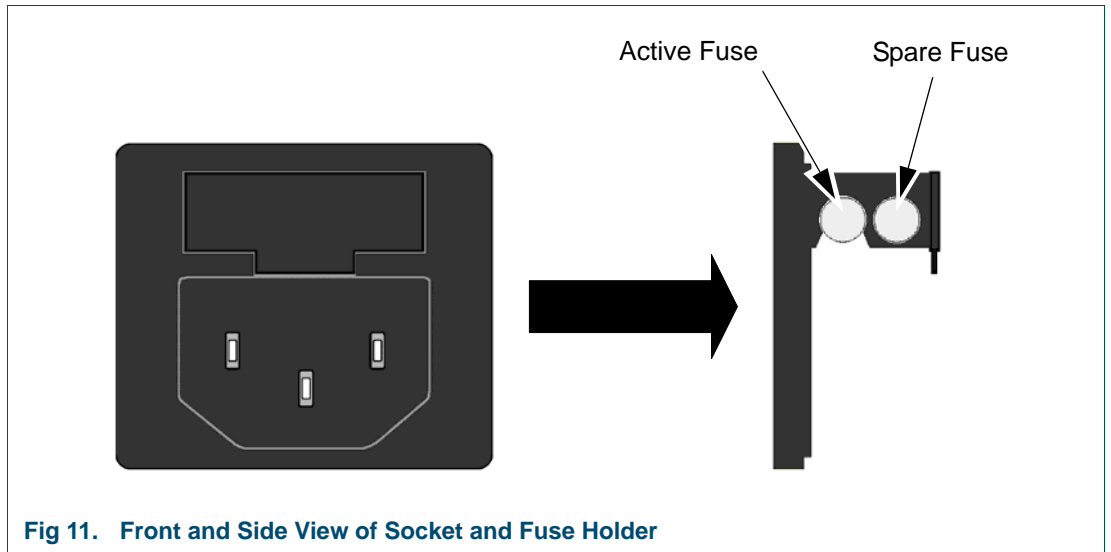


Fig 11. Front and Side View of Socket and Fuse Holder

Important:

For continued protection against fire, always replace fuse with a 250 V 3.15 A (T) 20 mm fuse as specified.

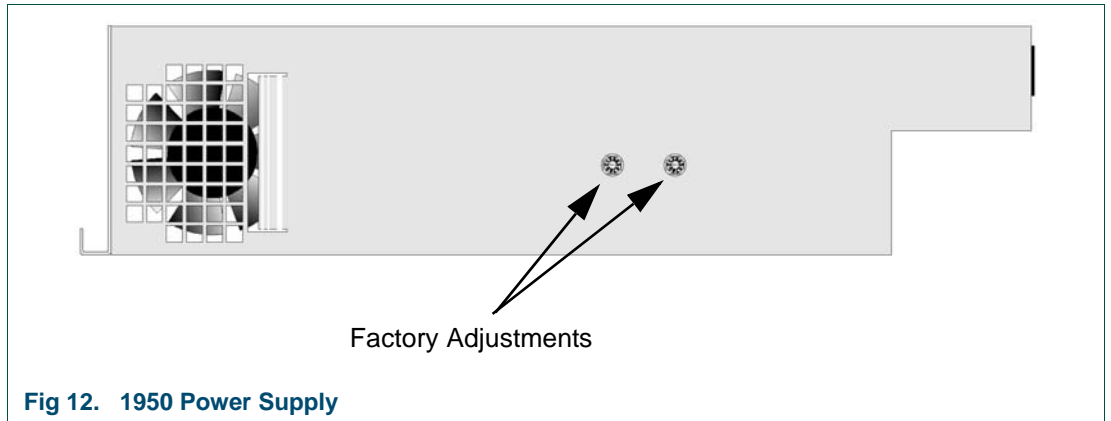
3.2 Monitoring the Power Supply Remotely

The status socket at the rear of the 3U frame allows the status of the PSU to be monitored remotely. Relay contacts indicate errors in DC output voltage, fan operation or over temperature for each power supply. Relay 1 is fitted on PSU 1 and relay 2 is fitted on PSU 2.

Pin	Description
1	Chassis
2	Relay 1, common
3	Relay 1, closed for fault
4	Relay 1, open for fault
5	Relay 2, common
6	Relay 2, closed for fault
7	Relay 2, open for fault
8	N/C
9	N/C

3.3 Inserting and Removing Power Supplies

The rack frame accepts both main and redundant 1950 universal power supplies which auto-sense input voltage between 90 and 253 volts and 50-60 Hz.



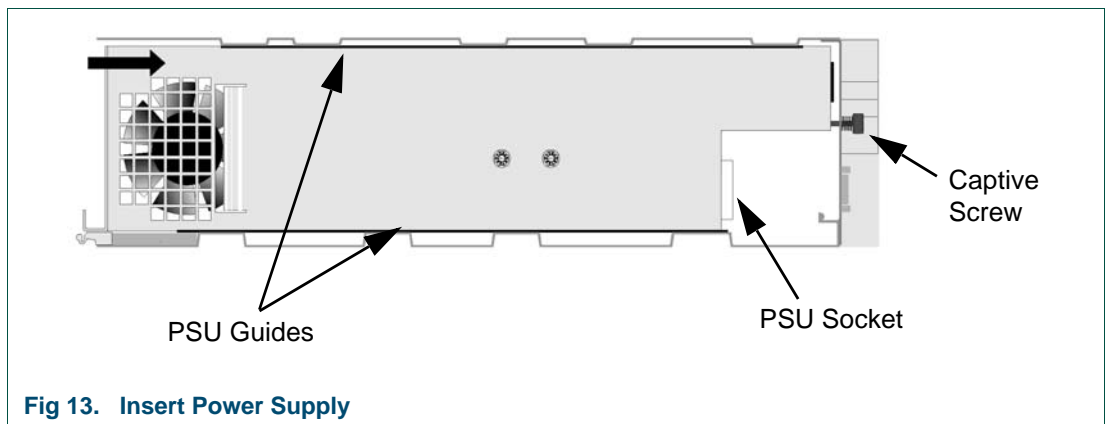
The power supply integral fan provides cooling for itself and all modules. There is an 80 mm deep space between the front of the controller cards and the door to allow the cross-flow cooling air to reach each controller card. However, the front door **must be kept closed** for this cooling to function.

The adjustments on this power supply unit are set at the factory and should not require re-adjustment.

3.3.1 Inserting a Power Supply

If only one power supply is required, use the left hand slot to encourage good air-flow.

1. Slide the power supply into one of the available slots at the left of the rack frame using the top and bottom PSU guides.
2. Tighten the captive screw at the rear of the frame.
3. Insert mains cable.
4. Repeat for the second power supply, if required.
5. Ensure front door is closed.



3.3.2 Removing a Power Supply

Important:

When dual power supplies are used, there are two mains cables. To remove the risk of shock remove both cables before.

1. Remove mains cable.
2. Loosen the captive screw at the rear of unit.
3. Slide out the power supply from the front.

Repeat for the second power supply, if necessary.

Note:

It may be necessary to remove a blanking plate covering the inner mains connector opening. To do this remove any adjacent rear connector panel, loosen the PSU retaining thumb screw and withdraw the blanking plate through the connector panel space.

4. Controller Card Configuration

4.1 Jumper Information

A number of jumpers on the 2330 controller card can be positioned to give different configurations. Do not change the jumpers when the card is in operation.

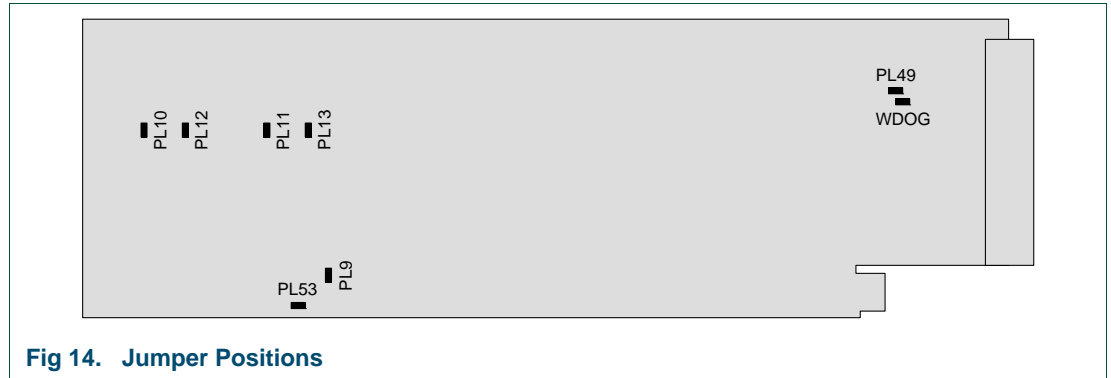


Fig 14. Jumper Positions

4.1.1 PL9

NTSC/PAL selection for composite video output. (NOT IMPLEMENTED)

Jumper on pins 1 & 2	PAL (DEFAULT)
Jumper on pins 2 & 3	NTSC

4.1.2 PL10 & PL12

Terminate the RS422 RX and TX lines for Port RTCOM1. DEFAULT = FITTED

Must be removed if Port RTCOM1 is used as an RS232 port.

4.1.3 PL11 & PL13

Terminate the RS422 RX and TX lines for Port RTCOM2. DEFAULT = FITTED

Must be removed if Port RTCOM2 is used as an RS232 port.

4.1.4 PL49

Forces the card active for development and testing and should not be fitted for normal operation. DEFAULT = NOT FITTED

4.1.5 PL53

TC/VGA selection for Timecode or Composite video for composite video output. (NOT IMPLEMENTED)

Jumper on pins 1 & 2	VGA (DEFAULT)
Jumper on pins 2 & 3	Timecode (Automation only)

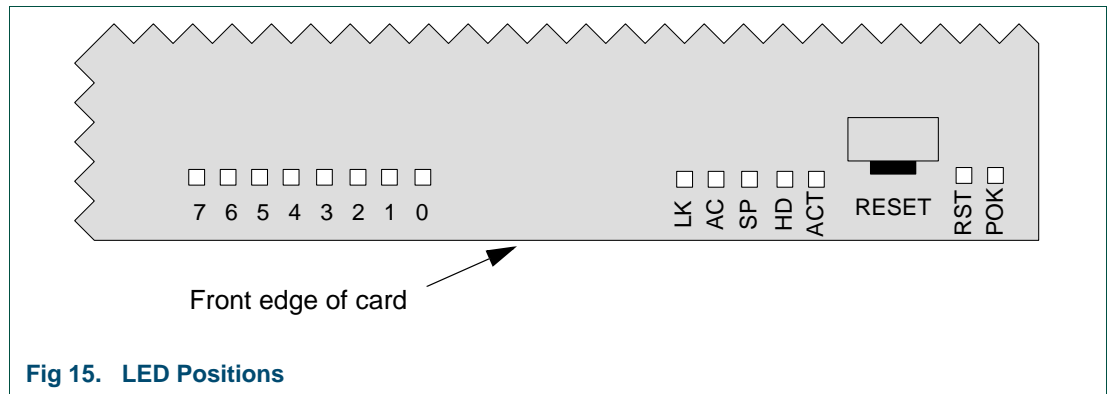
4.1.6 WDOG

Software Watchdog

Jumper on pins PC	Normal operation (DEFAULT)
Jumper on pins CLK	Disabled for software testing

4.2 Controller Card Edge Switches and LEDs

4.2.1 LEDs



The LEDs along the front edge of the card indicate the following:

LED	Automation	Routing
0	Card Health Monitor	ON - Controller Active OFF - Controller Idle
1	ON - Valid B&B Ref Present OFF - No B&B Ref	ON - Watchdog enabled OFF - Watchdog disabled
2	ON - Valid Timecode Present OFF - No Valid Timecode	Flashing - indicates controller running
3	Not used	
4	Not used	
5	Not used	
6	Not used	
7	Not used	
POK	Power OK	
RST	Card is being reset. Reboot follows.	
ACT	Indicates the active card of a redundant pair	
HD	Hard disk activity (if fitted)	
SP	Not used	
AC	Ethernet Activity. Flickers on send/receive.	
LK	Ethernet Link Status. Lights when active.	

4.2.2 DIP Switch Settings

DIP switches 0 - 6 are not used.

DIP switch 7 when set to on uses LEDs 0 - 7 strobed to display the last byte of the IP address.

To view the IP address, scan eyes smoothly across the LEDs to reveal the figures.

4.2.3 RESET Button

This hardware reset button resets the card hardware except the Ethernet adaptor.

4.3 Set the Controller Clock

For Routing applications there is no timecode available, so it may be useful to set the internal clock on the controller.

To set the clock:

1. Connect a monitor to the VGA socket on the rear panel.
2. Connect a keyboard to a USB connector on the rear panel.
3. Reset the card.
4. Enter the BIOS of the controller card and set the time accordingly.
5. Repeat for the second controller (when using dual-redundant controllers).

4.4 CompactFlash Configuration

2330 controller cards store configuration information on a standard CompactFlash card. If a new CompactFlash card is required then the Pbak Deployment tool, which is installed along with Centra Workbench and Morpheus software, is used to write the required configuration information to the boot sector of the CompactFlash card.

1. Open Pbak Deploy Tool From the Windows Start menu:

Start | All Programs | Snell | MCM | Utilities | Pbak Deploy Tool

or

navigate to the install directory of the software, and start **PbakDeploy.exe**

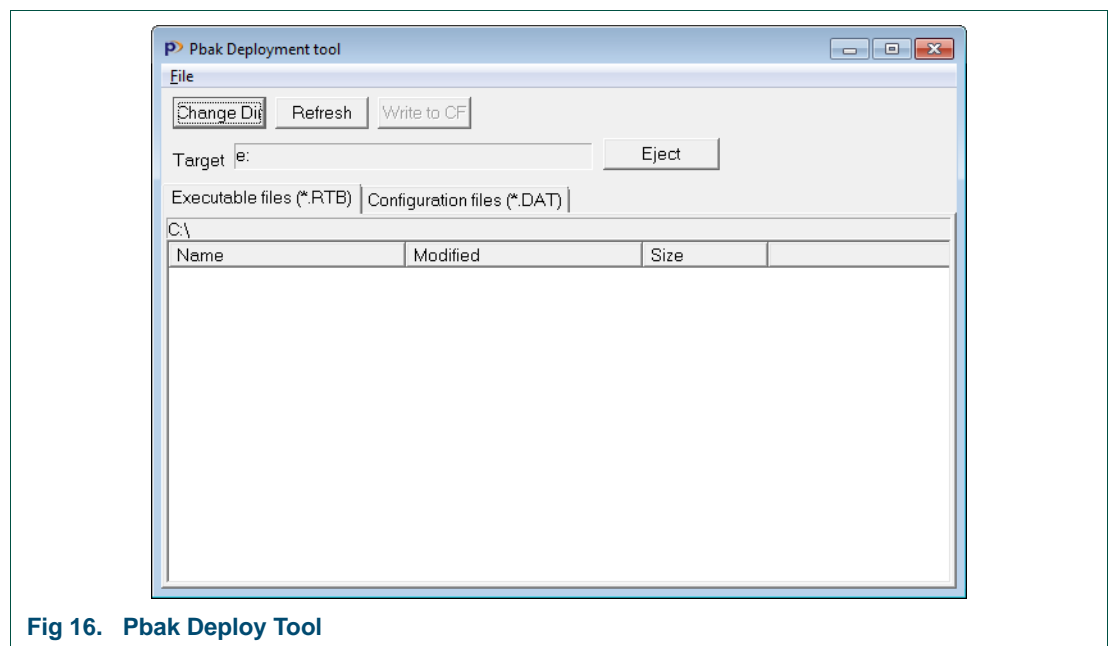


Fig 16. Pbak Deploy Tool

2. From the **File** menu, select **Configuration**.

The Settings dialog box displays.

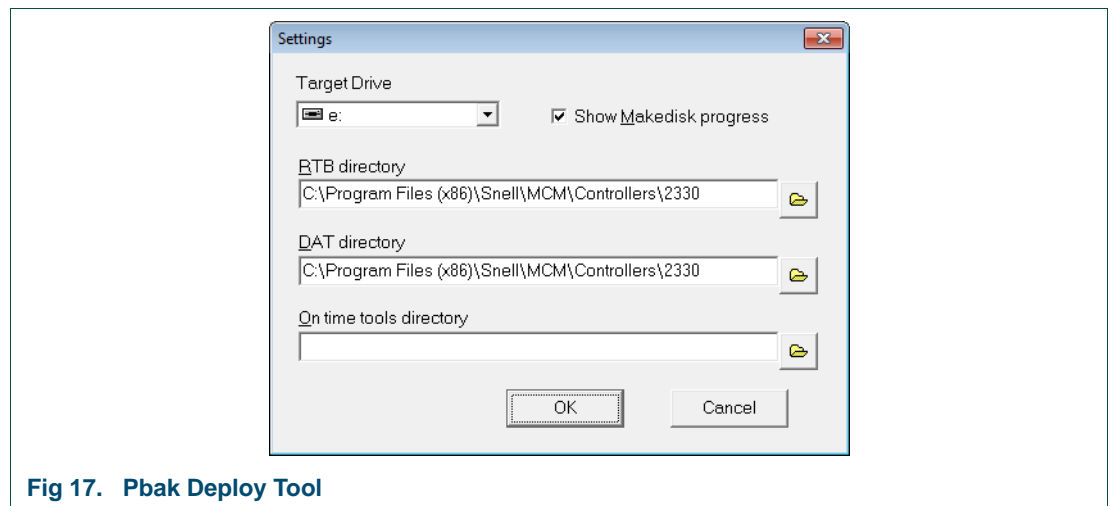


Fig 17. Pbak Deploy Tool

3. Select the folder and drive locations.

Target Drive	From the drop-down list, select the drive to which the CompactFlash card is attached.
RTB directory	Specify the directory that contains the RTB executable file. To ensure correct operation, use the most current router RTB file available.
DAT directory	The DAT directory contains configuration files required by the Morpheus Automation system. This is not relevant for Centra Workbench.
On time tools directory	Specify the directory that contains the PbakDeploy.exe file.
Show Makedisk progress	Select this option to display progress information when writing to the CompactFlash card.

Table 1. Pbak Deploy Settings

4. Ensure the Show Makedisk Progress checkbox is checked.
5. Click **OK**.
6. In the main window, select the Pbl2330Controller.RTB, and click on the **Write to CF** button.
7. When the configuration has been written to the CompactFlash card, click **OK**.
8. Update the config.xml file to reflect the controller's IP address and other networking and SNMP details.

By default, the file is located in the Centra Workbench or Morpheus installation folder ...\PbakDeploy. The following code shows a sample .xml file:

```
<Config>
<IP>
  <Adapter>
    <Number>0</Number>
    <DHCP>>false</DHCP>
    <Address>10.1.0.10</Address>
    <Port>2007</Port>
    <SubNetMask>255.255.254.0</SubNetMask>
    <DefaultGateway>0.0.0.0</DefaultGateway>
  </Adapter>
</IP>

<SNMP>
  <Enabled>>false</Enabled>
```

```
<Contact>Snell Employee</Contact>
<Location>Test Lab</Location>
<SysName>Test System</SysName>
<EnableSnellTraps>true</EnableSnellTraps>
<DisableInitialNotify>true</DisableInitialNotify>
<TrapManagers>
  <Address>172.31.7.133</Address>
</TrapManagers>
<CommunityGetNames>
  <Name>getonly</Name>
</CommunityGetNames>
<CommunitySetNames>
  <Name>setonly</Name>
</CommunitySetNames>
</SNMP>
```

```
<Clock>
  <!-- PAL configuration -->
  <Format>NonDropFrame</Format>
  <FrameRate>Pal</FrameRate>
  <VtcLine1>19</VtcLine1>
  <VtcLine2>21</VtcLine2>
  <GenerateVtc>>false</GenerateVtc>
  <BurnInColumn>100</BurnInColumn>
  <BurnInLine>50</BurnInLine>
  <SyncLine>7</SyncLine>
</Clock>
</Config>
```

9. Save the file and copy it to the CompactFlash card.

5. Specification

5.1 General

Frame size:	3U x 19 inch x 480 mm (depth behind rack)
Frame weight:	14 kg (typical, fully equipped)
Capacity:	3 x dual-redundant pair of controllers
	or 2 x dual-redundant pair of controllers + 2 single controllers
	or 1 x dual-redundant pair of controllers + 3 single controllers
	or 5 single controllers

5.2 PSU

PSU Type 1950 (main and redundant):

- Single AC input auto-sensing 90 to 253 volts, 50-60 Hz
- Fuse 3.15 A, 250 V, anti-surge 20 mm
- PSU OK indicator on each unit
- 9 pin 'D' socket on frame for PSU failure alarms

5.3 Rear Connector Panel Types

The rear connector panels provide different levels of connectivity for either single or dual redundant cards and the number of ports required. The panels share many similar connectors. All connectors are detailed in the Connectors section. See "Connectors" on page 24.

5.3.1 1430

This rear panel variant provides 16-port capability and dual redundancy.

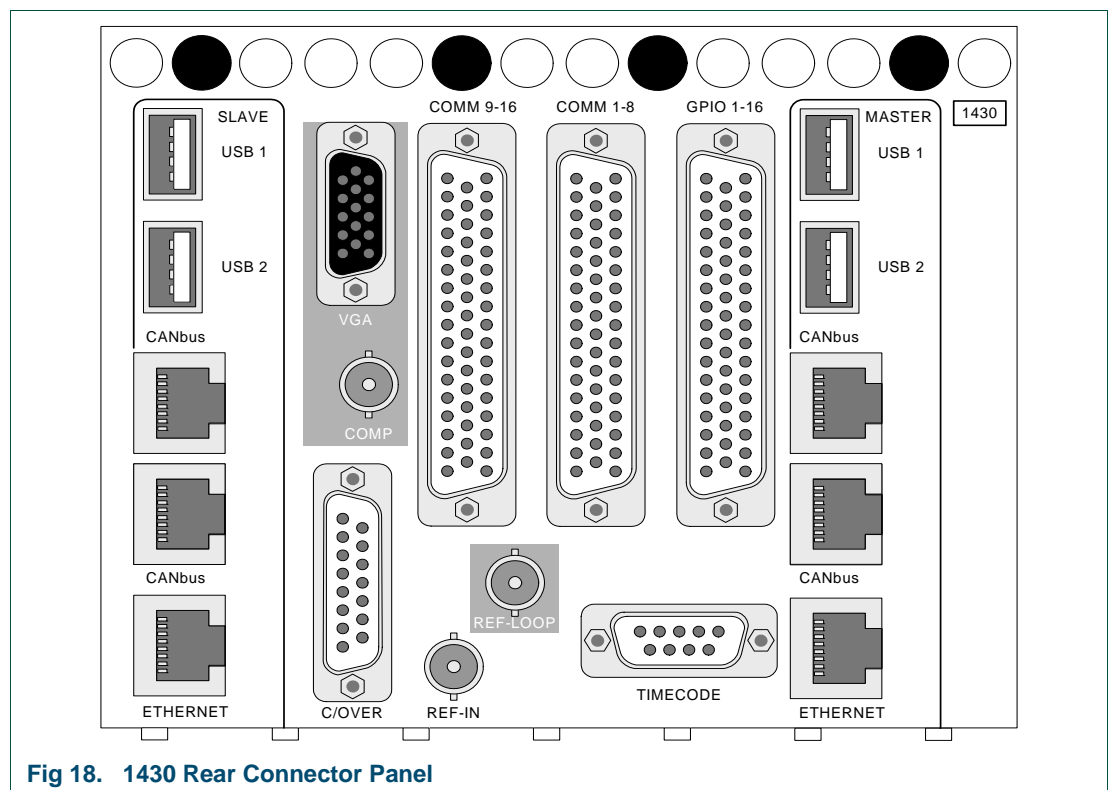


Fig 18. 1430 Rear Connector Panel

5.3.2 1433

This rear panel variant provides 8-port capability

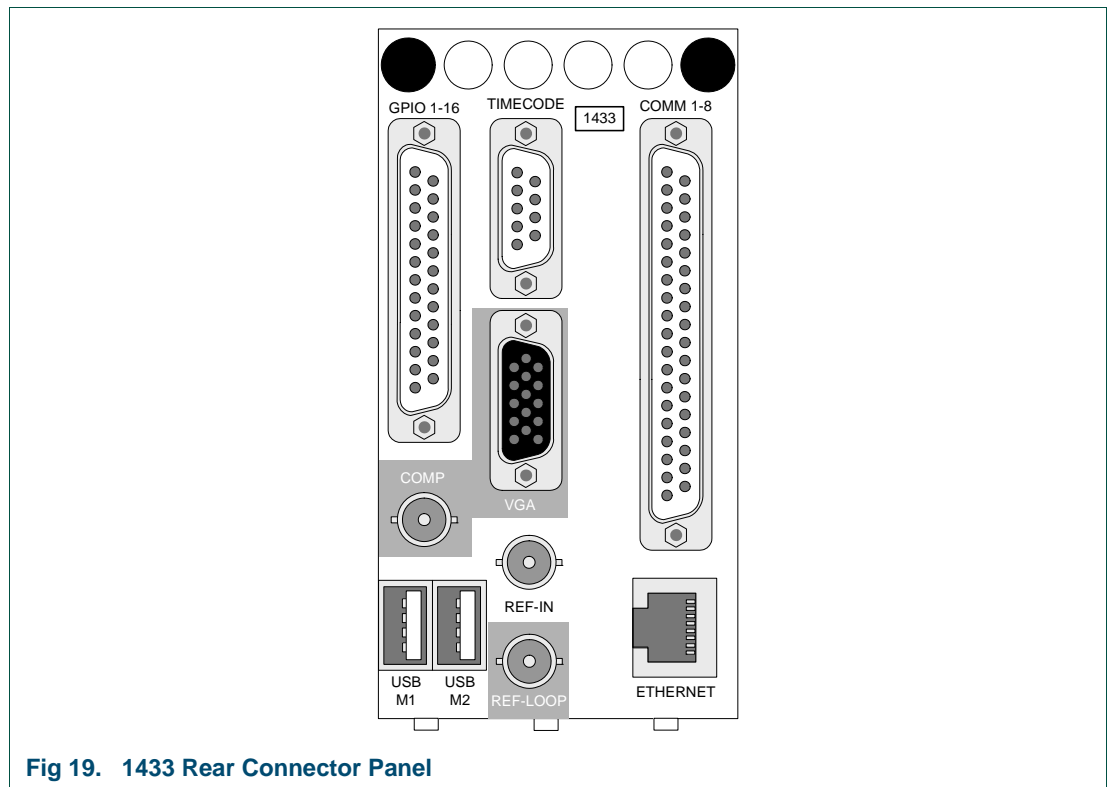


Fig 19. 1433 Rear Connector Panel

5.3.3 1434

This rear panel variant provides 8-port capability and dual redundancy

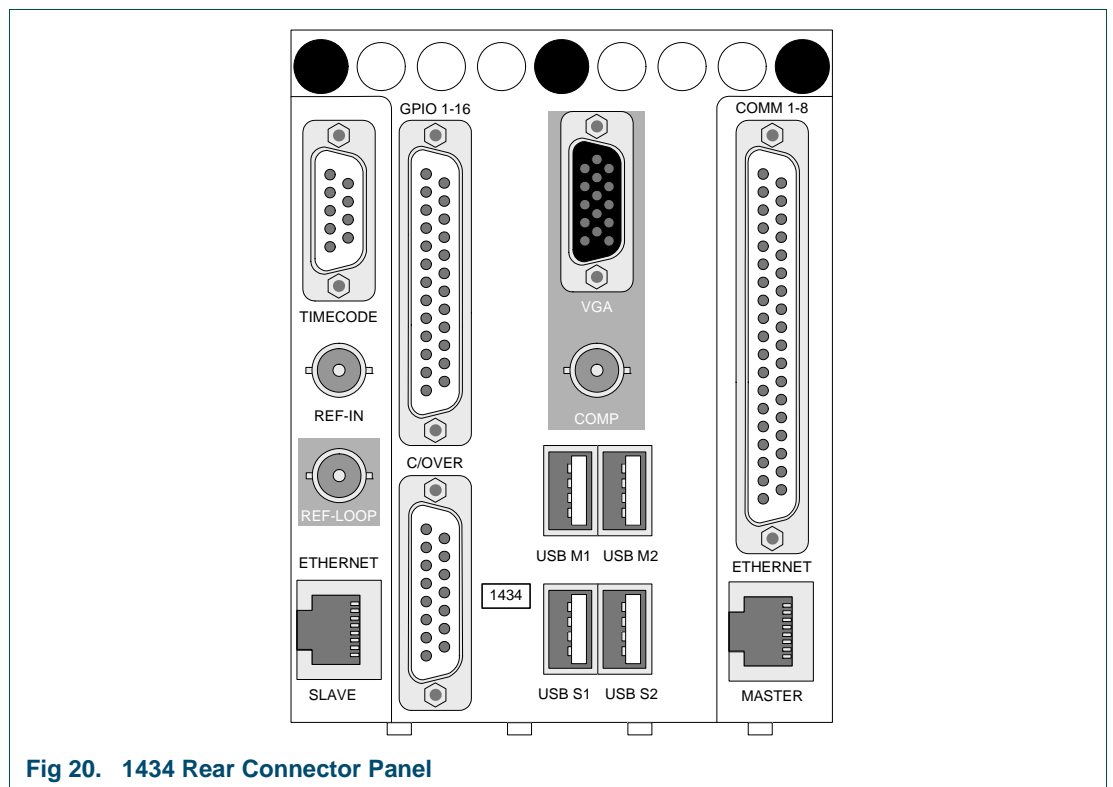


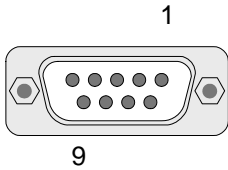
Fig 20. 1434 Rear Connector Panel

5.4 Connectors

5.4.1 Timecode

The Timecode connector is a 9-way D-type socket (DE-9F) with the following pinouts:

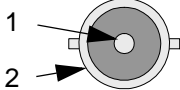
Pin	Signal
1	LTC In +
2	N/C
3	N/C
4	N/C
5	N/C
6	LTC In -
7	N/C
8	N/C
9	GND



5.4.2 Ref In

The Reference In connector is a BNC connector with the following connections:

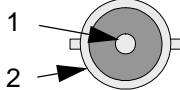
Pin	Signal
1	VIDEO_REF
2	GND



5.4.3 Ref Loop

The Reference Loop connector is a BNC connector with the following connections:

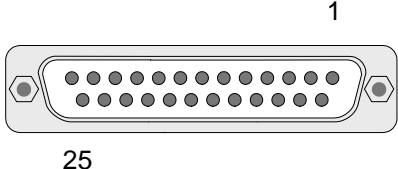
Pin	Signal
1	VIDEO_REF
2	GND



5.4.4 GPIO 1-16 (25-way)

The GPIO 1-16 connector is a 25-way D-type socket (DB-25F) with the following pinouts:

Pin	Signal	Pin	Signal
1	GPI_0	14	GPI_13
2	GPI_1	15	GPI_14
3	GPI_2	16	GPI_15
4	GPI_3	17	N/C
5	GPI_4	18	N/C
6	GPI_5	19	N/C
7	GPI_6	20	GND
8	GPI_7	21	GND
9	GPI_8	22	GND
10	GPI_9	23	GND
11	GPI_10	24	GND
12	GPI_11	25	GND
13	GPI_12		

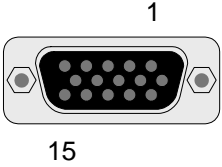


For input and output voltages applicable to these connectors, see “GPIO Details” on page 29.

5.4.5 VGA

The VGA connector is a high density 15-way D-type socket (DE-15F) with the following pinouts:

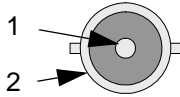
Pin	Signal	Pin	Signal
1	R_Out	9	VGA_PIN9
2	G_Out	10	GND
3	B_Out	11	N/C
4	N/C	12	DDDA_Out
5	GND	13	HSY_OUT
6	GND	14	VSY_OUT
7	GND	15	DDCK_OUT
8	GND		



5.4.6 Comp

The Reference In connector is a BNC connector with the following connections:

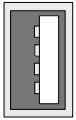
Pin	Signal
1	COMP_VIDEO
2	GND



5.4.7 USB M1, M2

Master USB 1 and Master USB 2 are standard Type A USB sockets with the following pinouts:

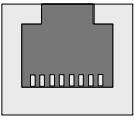
Pin	USB M1	USB M2
1	M_USB_VCC0	M_USB_VCC1
2	M_USB_0-	M_USB_1-
3	M_USB_0+	M_USB_1+
4	M_USB_GND0	M_USB_GND1



5.4.8 Ethernet (Master)

The Ethernet Master connector is an RJ-45 socket with the following pinouts:

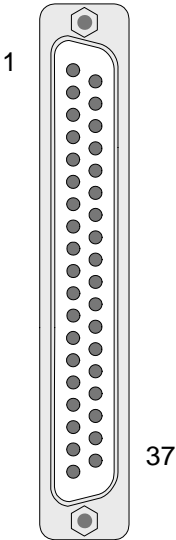
Pin	Signal
1	Tx +
2	Tx -
3	Rx +
4	N/C
5	N/C
6	Rx -
7	N/C
8	N/C



5.4.9 COMM 1-8 (37-way)

The COMM 1-8 connector is a 37-way D-type socket (DC-37F) with the following pinouts:

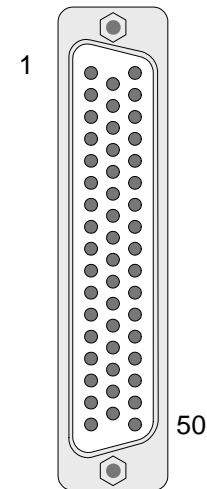
Pin	Controller Function	Device Function	RS232
1	Rx 1+	Tx 1+	
2	Rx 1-	Tx 1-	Tx 1
3	Rx 2+	Tx 2+	
4	Rx 2-	Tx 2-	Tx 2
5	Rx 3+	Tx 3+	
6	Rx 3-	Tx 3-	
7	Rx 4+	Tx 4+	
8	Rx 4-	Tx 4-	
9	Rx 5+	Tx 5+	
10	Rx 5-	Tx 5-	
11	Rx 6+	Tx 6+	
12	Rx 6-	Tx 6-	
13	Rx 7+	Tx 7+	
14	Rx 7-	Tx 7-	
15	Rx 8+	Tx 8+	
16	Rx 8-	Tx 8-	
17	GND	GND	GND
18	GND	GND	GND
19	GND	GND	GND
20	Tx 1+	Rx 1+	Rx 1
21	Tx 1-	Rx 1-	
22	Tx 2+	Rx 2+	Rx 2
23	Tx 2-	Rx 2-	
24	Tx 3+	Rx 3+	
25	Tx 3-	Rx 3-	
26	Tx 4+	Rx 4+	
27	Tx 4-	Rx 4-	
28	Tx 5+	Rx 5+	
29	Tx 5-	Rx 5-	
30	Tx 6+	Rx 6+	
31	Tx 6-	Rx 6-	
32	Tx 7+	Rx 7+	
33	Tx 7-	Rx 7-	
34	Tx 8+	Rx 8+	
35	Tx 8-	Rx 8-	
36	GND	GND	GND
37	GND	GND	GND



5.4.10 COMM 1-8 (50-way)

The COMM 1-8 connector is a 50-way D-type socket (DD-50F) with the following pinouts:

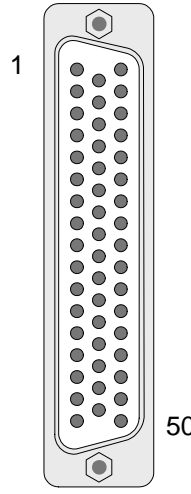
Pin	Controller Function	Device Function	RS232
1	GND	GND	GND
2	Rx 1-	Tx 1-	Tx 1
3	GND	GND	GND
4	Rx 2-	Tx 2-	Tx 2
5	GND	GND	GND
6	Rx 3-	Tx 3-	
7	GND	GND	GND
8	Rx 4-	Tx 4-	
9	GND	GND	GND
10	Rx 5-	Tx 5-	
11	GND	GND	GND
12	Rx 6-	Tx 6-	
13	GND	GND	GND
14	Rx 7-	Tx 7-	
15	GND	GND	GND
16	Rx 8-	Tx 8-	
17	GND	GND	GND
18	Rx 1+	Tx 1+	
19	Tx 1-	Rx 1-	
20	Rx 2+	Tx 2+	
21	Tx 2-	Rx 2-	
22	Rx 3+	Tx 3+	
23	Tx 3-	Rx 3-	
24	Rx 4+	Tx 4+	
25	Tx 4-	Rx 4-	
26	Rx 5+	Tx 5+	
27	Tx 5-	Rx 5-	
28	Rx 6+	Tx 6+	
29	Tx 6-	Rx 6-	
30	Rx 7+	Tx 7+	
31	Tx 7-	Rx 7-	
32	Rx 8+	Tx 8+	
33	Tx 8-	Rx 8-	
34	GND	GND	GND
35	Tx 1+	Rx 1+	Rx 1
36	GND	GND	GND
37	Tx 2+	Rx 2+	Rx 2
38	GND	GND	GND
39	Tx 3+	Rx 3+	
40	GND	GND	GND
41	Tx 4+	Rx 4+	
42	GND	GND	GND
43	Tx 5+	Rx 5+	
44	GND	GND	GND
45	Tx 6+	Rx 6+	
46	GND	GND	GND
47	Tx 7+	Rx 7+	
48	GND	GND	GND
49	Tx 8+	Rx 8+	
50	GND	GND	GND



5.4.11 GPIO 1-16 (50-way)

The GPIO 1-16 connector is a 50-way D-type socket (DD-50F) with the following pinouts:

Pin	Signal	Pin	Signal
1	GPI_0	26	N/C
2	GPI_1	27	N/C
3	GPI_2	28	N/C
4	GPI_3	29	N/C
5	GPI_4	30	N/C
6	GPI_5	31	N/C
7	GPI_6	32	N/C
8	GPI_7	33	N/C
9	GPI_8	34	N/C
10	GPI_9	35	N/C
11	GPI_10	36	N/C
12	GPI_11	37	N/C
13	GPI_12	38	N/C
14	GPI_13	39	N/C
15	GPI_14	40	N/C
16	GPI_15	41	N/C
17	N/C	42	N/C
18	N/C	43	N/C
19	N/C	44	N/C
20	N/C	45	N/C
21	N/C	46	N/C
22	N/C	47	N/C
23	N/C	48	N/C
24	N/C	49	GND
25	N/C	50	GND

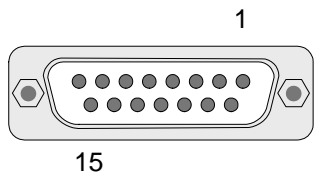


For input and output voltages applicable to these connectors, see “GPIO Details” on page 29.

5.4.12 C-Over (Changeover)

The Changeover connector is a 15-way D-type socket (DB-15F) with the following pinouts:

Pin	Signal	Pin	Signal
1	M_SET_ACTIVE_IN	9	M_IDLE_OUT
2	M_SET_IDLE_IN	10	M_FAIL_OUT
3	M_ACTIVE_OUT	11	N/C
4	M_IDLE_OUT	12	N/C
5	M_FAIL_OUT	13	CO_SUPPLY
6	S_SET_ACTIVE_IN	14	GND
7	S_SET_IDLE_IN	15	GND
8	S_ACTIVE_OUT		



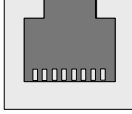
Active low inputs to be taken to 0V for correct operation.

Logic outputs are capable of sinking 3mA.

5.4.13 Ethernet Slave

The Ethernet Slave connector is an RJ-45 socket with the following pinouts:

Pin	Signal
1	Tx +
2	Tx -
3	Rx +
4	N/C
5	N/C
6	Rx -
7	N/C
8	N/C

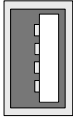


8 1

5.4.14 USB S1, S2

Slave USB 1 and Slave USB 2 are standard Type A USB sockets with the following pinouts:

Pin	USB S1	USB S2
1	S_USB_VCC0	S_USB_VCC1
2	S_USB_0-	S_USB_1-
3	S_USB_0+	S_USB_1+
4	S_USB_GND0	S_USB_GND1



4
1

5.4.15 GPIO Details

The specifications for the GPIO are the same for both of the 25-way and 50-way connectors.

5.4.15.1 Outputs

As Outputs, the GPIOs are arranged in two banks of eight outputs; the first eight GPIOs in bank 1, and the second eight GPIOs in bank 2. Each bank of eight outputs is capable of sinking a maximum of 1.0A. Each output is capable of sinking up to a maximum of 500mA. Two of the eight outputs could sink the maximum of 0.5A, but all outputs could sink 125mA and still be within the maximum limits.

Outputs can switch up to 50V.

5.4.15.2 Inputs

As Inputs the switch of the external equipment must be able to sink a minimum of 5mA with a maximum voltage of 5V.

5.5 Cables

5.5.1 Serial Breakout Cable - 37-way

The Serial Breakout Cable has a 37-way D-type plug (DC-37M) and eight 9-way D-type sockets (DE-9F).

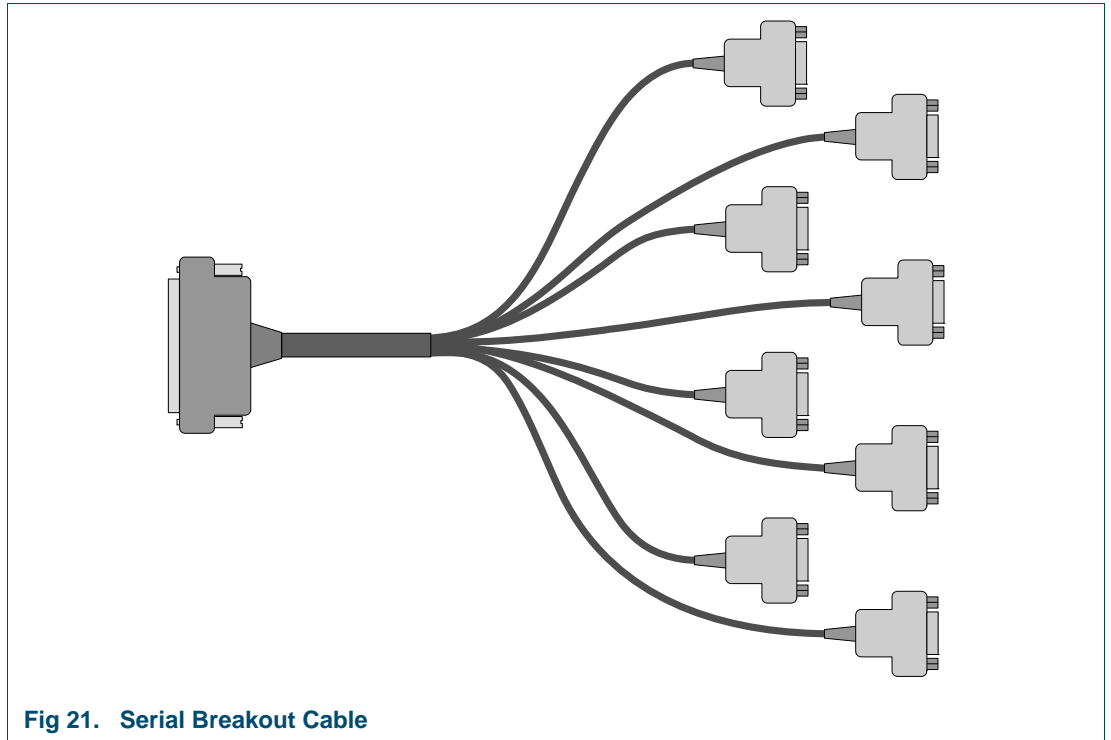
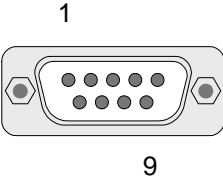


Fig 21. Serial Breakout Cable

For pin connections to the 37-way socket, See “COMM 1-8 (37-way)” on page 26.

Each of the eight 9-way D-type sockets has the following pinouts:

Pin	Signal [1]
1	N/C
2	A -
3	B +
4	GND
5	N/C
6	GND
7	A +
8	B -
9	GND



The diagram shows a 9-pin D-type socket with two screws on the sides. The pins are arranged in a 3x3 grid. The top-left pin is labeled '1' and the bottom-right pin is labeled '9'.

[1] Connection between Snell routers and Snell control panels require a pin to pin cable. Signal direction on the 9-way D-type is swapped internally when the ports are defined as either controller or device ports.

5.5.2 Serial Breakout Cable - 50-way

The Serial Breakout Cable has a 50-way D-type plug (DC-50M) and eight 9-way D-type sockets (DE-9F).

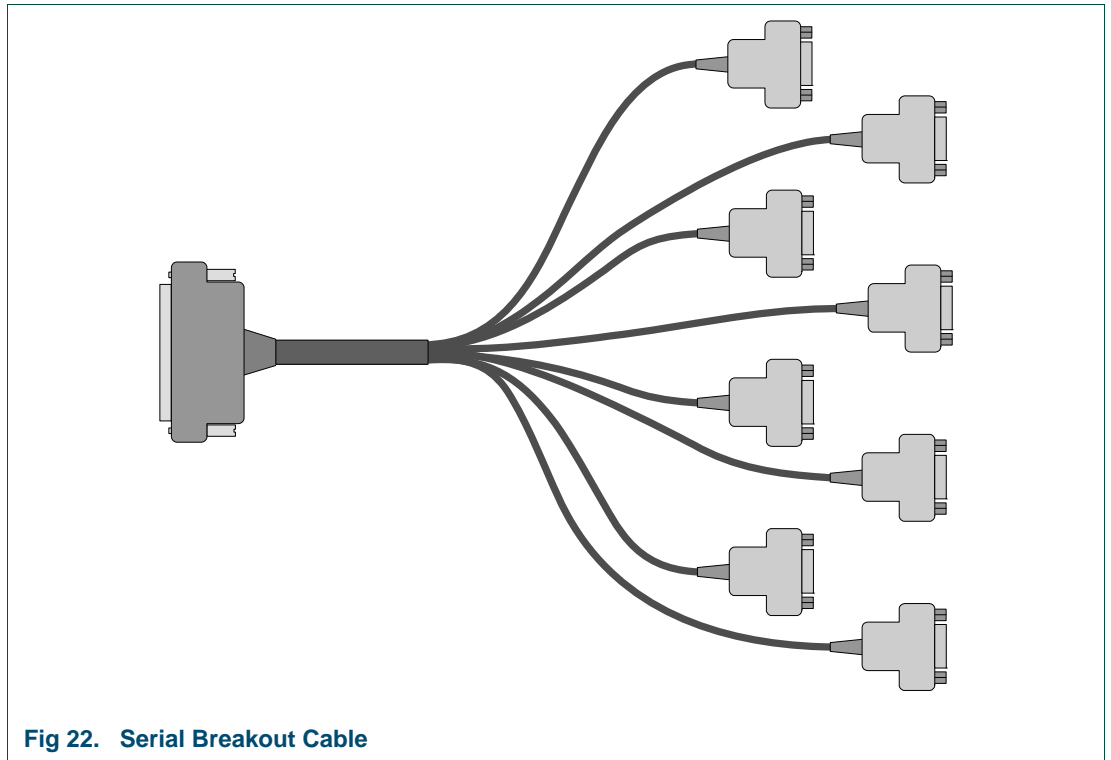
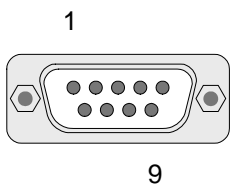


Fig 22. Serial Breakout Cable

For pin connections to the 50-way plug, See “COMM 1-8 (50-way)” on page 27.

Each of the eight 9-way D-type sockets has the following pinouts:

Pin	Signal [1]
1	N/C
2	A -
3	B +
4	GND
5	N/C
6	GND
7	A +
8	B -
9	GND



The diagram shows a top-down view of a 9-pin D-type socket. The pins are arranged in a 3x3 grid. The top-left pin is labeled '1' and the bottom-right pin is labeled '9'.

[1] Connection between Snell routers and Snell control panels require a pin to pin cable. Signal direction on the 9-way D-type is swapped internally when the ports are defined as either controller or device ports.