Indigo 2AE and Indigo 2SE CoolFlow

2U frames

Crystal Vision

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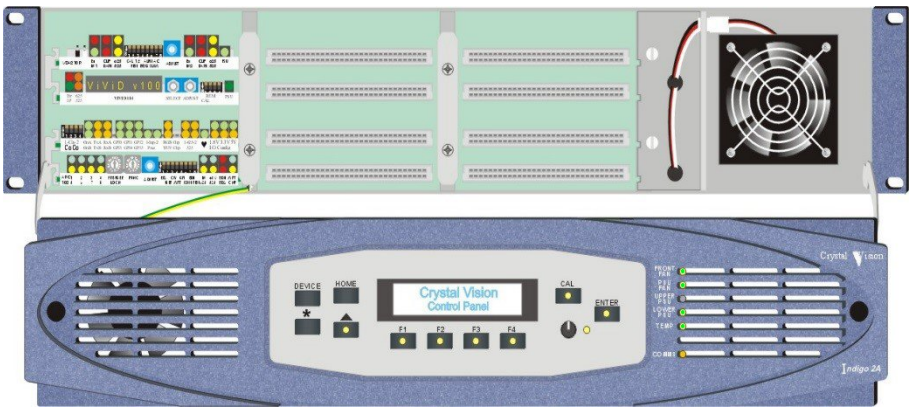
Revision 8	Ethernet control information added.	02/01/07
Revision 9	PSU-160i information added.	01/03/07
Revision10	Note added to Bus IO table, page 10.	29/08/08
Revision 11	Removed Indigo 2A & Indigo 2S frames (obsolete) and PSU-75i & PSU-150i (obsolete).	16/06/10
Revision 12	FCC Part 15 warning added to page 6.	22/06/11
Revision 13	Removed references to RS422, added frame software v4.6 info and moved old frame software info to Appendix.	23/10/13
Revision 14	Added frame software v5.2 and v5.3 info. Amalgamated 2AE and 2SE manuals	10/06/16
Revision 15	Configuration/Backup-Restore/Auto restore page changed from 32 slots to 24 slots on page 28.	15/06/17
Revision 16	Added note about new security introduced with frame software version V5.9 build 16216 to beginning of page 20.	05/07/18
Revision 17	Updated Configuration/Network information on Page 30. Updated information on number of images typically required for software upgrade on Page 31. Amended note on password protecting frames and slots on Page 36.	27/02/20

1 Introduction

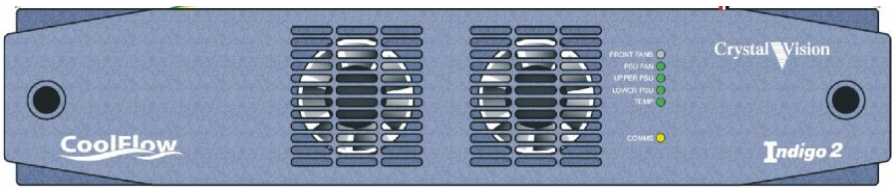
The Indigo 2AE and 2SE frames are 2U Ethernet enabled frames for up to 12 modules. The 2AE has an integrated front control panel with display; the 2SE has no integrated front control panel but has additional cooling and is designated the 'Indigo 2SE CoolFlow'.

There are configurable rear connectors and space for up to two plug-in power supplies. The dual supply facility allows for redundancy and continued operation in the event of a power supply failure.

All models have a hinged front panel that allows easy access to removable fan assemblies, power supplies and modules.



The Indigo 2AE frame with front control panel open



The Indigo 2SE Coolflow front panel.

On the 2SE there are three easily accessible fans. One is fitted on a detachable plate in front of the PSUs and the other two are attached to the rear of the front panel. The frame can be operated with the front panel open, with an optical sensor on the front panel switching the PSU fan on and the front panel fans off. The PSU fan only runs when the frame is open. If one of the front panel fans should fail or operate too slowly, the other front panel fan is automatically switched to full power and an alarm asserted. A frame temperature sensor mounted above the top central module position (slot 5) also controls fan speed. There are two cooling modes: automatic and maximum. With automatic cooling both front panel fans run continuously, increasing in speed as the temperature inside the frame goes up. In maximum cooling mode both front panel fans are set to maximum speed. This mode is ideal for equipment bays where noise is not a concern.

On the 2AE there are two easily accessible fans. One is fitted on a detachable plate in front of the PSUs and the other is attached to the rear of the front panel. Only one of the fans is essential in normal operation. If one of the fans should fail, the closed frame can still operate indefinitely with an ambient temperature of 40 degrees. A frame temperature sensor mounted

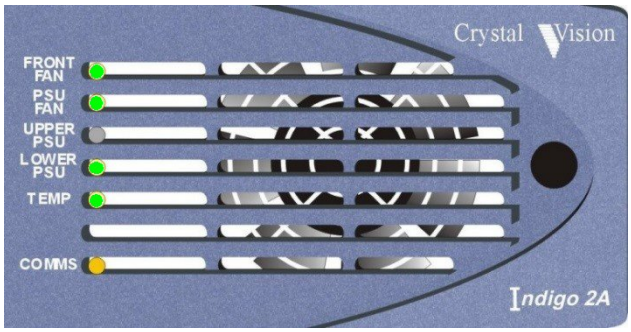
above the top central module position (slot 5) also controls fan speed. There are three cooling modes: quiet, normal and maximum. In normal operation both fans operate at reduced power to keep the unit cool but quiet. If the front panel is opened an optical sensor switches the PSU fan to fast operation and the panel fan off. A wire on the fan gives a reliable indication of its speed and if it fails or operates to slowly the other fan is automatically switched to full power and an alarm raised. Quiet mode is used with a lightly loaded frame with a low ambient temperature: where the frame temperature is below 45^0C the panel fan is switched off and the PSU fan runs at minimum speed.

Warning: *Although it is possible to operate the frame with the front panel open, the frame may not meet electromagnetic compatibility (EMC) requirements in this condition.*

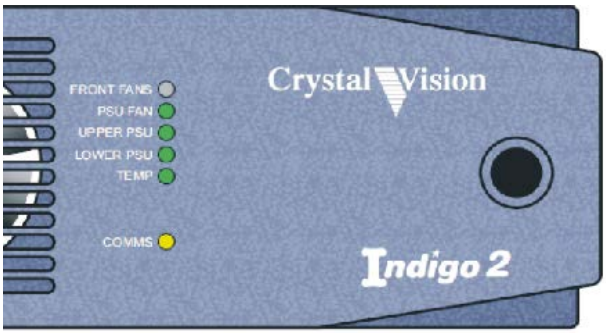
The Indigo PSUs have a built-in processor, which communicates with the front panel display processor (referred to as a PIC) and monitors power rail voltage levels (+5.75V and -6.0 V). The PSUs also store their own serial number in non-volatile memory.

The panel processor regularly receives status updates from the PSU processors about power rails. This allows the front panel to update its status LEDs and control the alarm changeover relay. The relay contacts are available on the Remote 2/4 connector on the rear of the frame.

There are five two-colour LEDs on a front panel, with green indicating a normal condition and red an abnormal condition. If the LED is unlit, this indicates an inactive condition such as a single PSU fitted or PSU fan not running with the front panel closed.



The Indigo 2AE status LEDs



Indigo 2SE Coolflow status LEDs

The following LED status indications may be seen:

LED	Colour	Notes
Front Fan	Unlit	Door open
	Green	Normal operation
	Red	Change the panel fan
PSU Fan	Unlit	Door closed and fan idle
	Green	Door open and fan operational
	Red	Change PSU fan
Upper PSU	Unlit	No upper PSU detected
	Green	Normal operation
	Red	Change upper PSU
Lower PSU	Unlit	No lower PSU detected
	Green	Normal operation
	Red	Change lower PSU
Temp	Green	Normal operation
	Red	Internal temperature too high (approx. 65^0C)
Comms	No function*	

***Note**: Serial RS422 control from Statesman or third party applications is no longer supported. All connections should be made via Ethernet. Crystal Vision AE and SE frames running v4.6 software or later support VisionWeb, Statesman Lite, ASCII and HTTP/JSON control protocols. An optional SNMP licence can be purchased to enable control and monitoring via SNMP. Contact Crystal Vision Support for protocol documentation.*

2 Installation

2.1 General Safety Summary

The following warnings are intended for user guidance and safety.

Ground

This product must be grounded through the grounding conductor of the power cord.

Power cable

Use only power cords that meet the required specification for this product.

Fuses

To avoid fire hazard use only fuses of the type and rating specified.

Service

These servicing instructions are for use by qualified personnel only. To reduce the risk of electric shock, do not perform any servicing other than that contained in this manual unless you are qualified to do so. Refer all servicing to qualified service personnel.

Apart from procedures described in this manual there are no user serviceable parts within the frame. If the frame requires any other servicing it should be returned to the manufacture or dealer.

On no account should the unit be powered whilst any covers are removed.

Ventilation

The unit must have adequate ventilation. Installation should be in standard 19" racks with cool air circulation available at the front. The left and right ventilation grilles must not be obstructed.

EMC

To comply with EMC regulations the following guidelines should be observed:

Do not operate this unit for extended periods with the front panel open.

Do not use the frame unless all the rear connector positions are filled, either with Crystal Vision Rear Modules, or with Crystal Vision blanking plates.

Do not operate the equipment with covers or panels removed.

General

To avoid electric shock do not operate this product in wet or damp conditions.

To avoid injury or fire hazard do not operate this product in an explosive atmosphere.

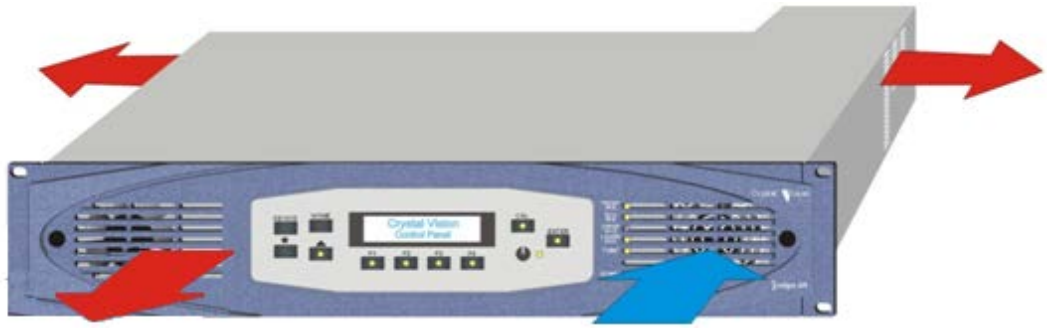
Only use this rack in conjunction with Crystal Vision modules designed for that purpose.

The Indigo 2AE and Indigo 2SE CoolFlow frames are capable of housing the Crystal Vision range of optical modules. Although these modules are not capable of causing personal injury, care should be exercised when exposing unshielded optical signals not to look directly into the light beam.

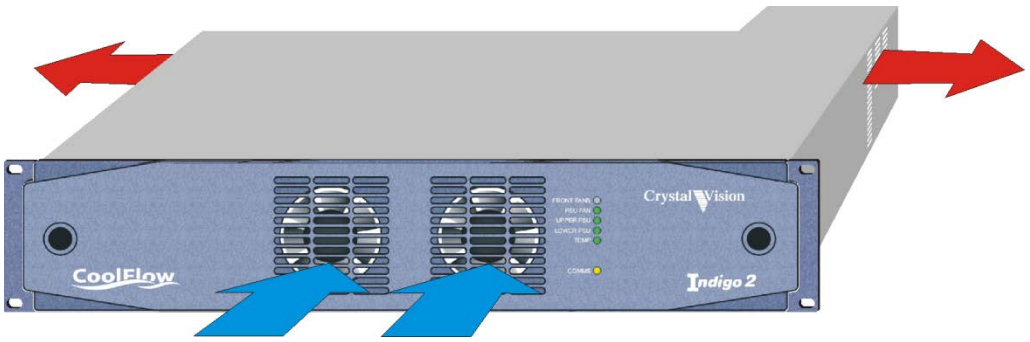
This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at their own expense.

2.2 Rack mounting and ventilation

The unit must have adequate ventilation. Install in standard 19" racks with cool air circulation at the front and with both side ventilation grilles unobstructed.



Indigo 2AE airflow



Indigo 2SE CoolFlow airflow

Install the Indigo frame in a standard 19-inch rack as follows:

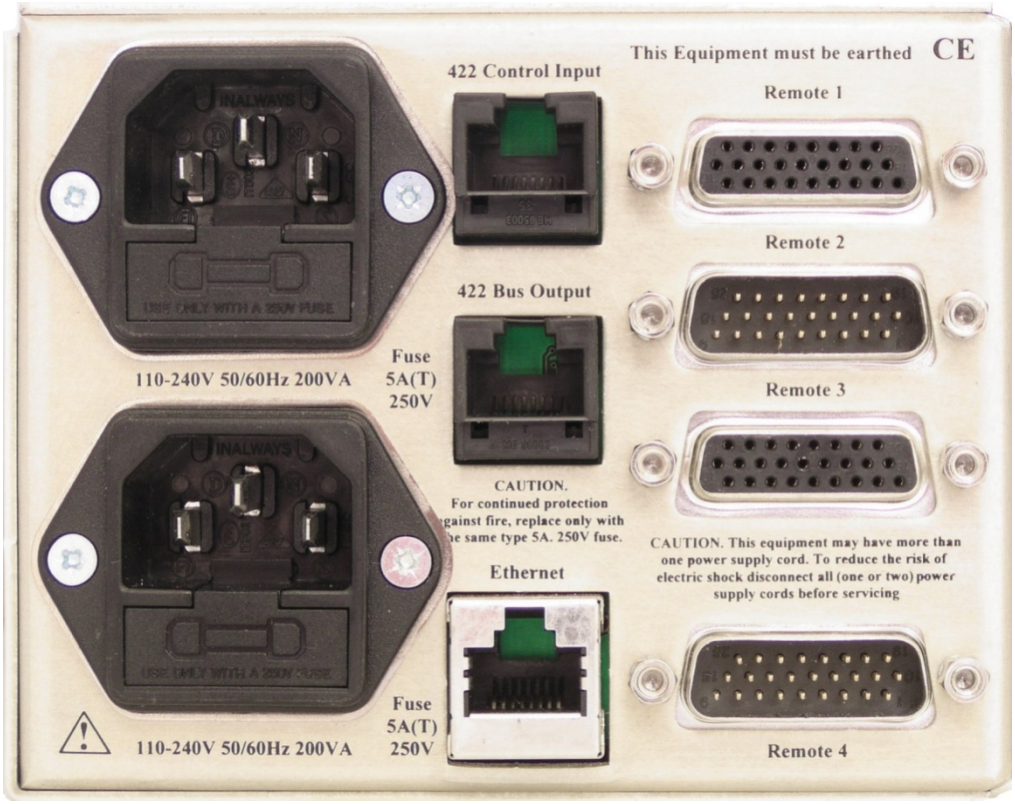
- Mount in the rack and secure via the rack ears
- Allow adequate space for the fan intakes at the front and the exhaust through the left and right sides

2.3 Frame connectors

The following connectors are available at the rear of the frame:

Connector	Function	Notes
IEC (top)	Upper PSU AC input	85 to 264V, fuse under flap
IEC (bottom)	Lower PSU AC input	85 to 264V, fuse under flap
Remote 1	GPI and DC out	Refer to pinout tables
Remote 2	GPI, serial, upper PSU alarm relay and DC out	Refer to pinout tables
Remote 3	GPI and DC out	Refer to pinout tables
Remote 4	GPI, lower PSU alarm relay and DC out	Refer to pinout tables
RS422 in/bus	RS422 control using CAT5 cabling	Refer to pinout tables
Ethernet	Ethernet control using CAT5 cabling	Refer to pinout tables

All frame connectors are grouped together behind the PSUs at the rear of the frame.



Indigo 2AE/2SE rear connectors

Connecting mains cables

To connect the Indigo 2AE/2SE frame to AC mains proceed as follows:

- Power the unit by connecting an IEC power cord(s) to the upper and/or lower IEC connectors depending on the number of installed power supply modules.

Mains cables must have a minimum current rating of 6A and are fitted with an IEC 320 female connector which includes a protective ground connection and meets relevant local safety standards.

Tip: *To reduce the risk of electric shock, if two power supply cords are used, plug each power supply cord into separate branch circuits employing separate service grounds.*

Note: *The fuse holder is part of the mains inlet. The mains cable must be disconnected before the fuse can be accessed. Replace the fuse only with one of the same type and rating. Refer to the Maintenance section of the Troubleshooting guide for more information.*

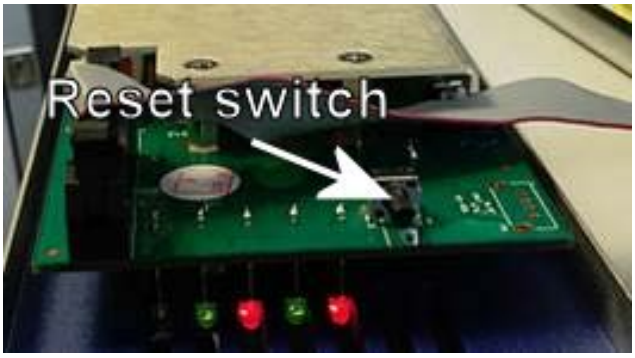
2.4 Configuration Switches

The Indigo 2AE and Indigo 2SE CoolFlow frames both make use of a 6-way DIL configuration switch mounted on the front panel CPU board to change the hardware configuration. The DIL switch functions are identical for both frame types although the CPU boards are different.

Indigo 2AE

On the upper edge of the Indigo 2AE front panel PCB, the 6-way DIL configuration switches and reset switch can be found. This PCB was fitted early 2015 – *see Appendix 3 for older frames*.

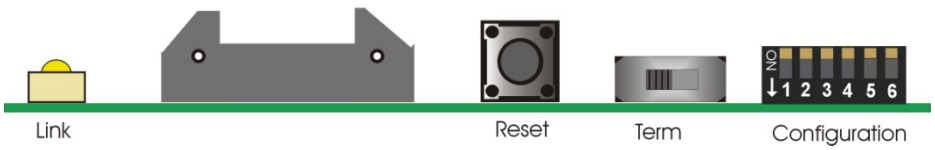
Indigo 2AE CPU board.



'Reset' switch on side of board

Indigo 2SE CoolFlow

The CPU board is mounted on the rear of the front panel. This PCB was fitted after August 2013 – *see Appendix 3 for older frames*. Also on this board is a status '**Link'** LED. This LED is useful for troubleshooting the network link. The link LED will be illuminated whenever the frame is connected to a network. Should this LED not be lit, check the cable connection between the frame and network outlet. The '**Term'** switch terminates the RS422 chain which was used by older pre-Ethernet enabled frames and is no longer supported by Crystal Vision.



Indigo 2SE CoolFlow CPU board

2.5 Configuration Switch Settings

The following applies to both the Indigo 2AE and the Indigo 2SE CoolFlow frames fitted with the 6-way DIL configuration switch (*see Appendix 3 for other, older arrangements*). ***Note: The switch is only read after reset or on power up***:

Switch	Function	Notes
1	Fan	Normally up (best cooling), down for quieter running.
2	Fan	Normally up (auto), down for front panel fans full speed.
3		Unused.
4	PSU	Normally up (two PSUs fitted), down if one PSU fitted.
5	Address Range	Should be left in default (up) position.
6	Default IP address	Normally up. Down sets recovery mode which forces the frame IP address to 10.0.0.201.and allows a new IP address to be set.

Indigo 2AE/SE configuration switch functions.

Cooling mode

Switches 1 and 2 of the four-position DIL switch control the three cooling modes - normal, quiet and maximum - as follows:

Switch 1 & 2	Function	Notes
Both up	Normal cooling	Both fans run continuously increasing in speed as the temperature inside the frame goes up.
1 down, 2 up	Quiet mode	For use with a lightly loaded frame for low ambient temperature. When the frame temperature is below approximately 45°C the panel fan is switched off and the PSU fan runs at minimum speed. If the frame temperature goes above 45°C it reverts to normal cooling and goes back to quiet mode when frame temperature falls below 42°C.
1 up, 2 down	Maximum cooling mode	In Maximum cooling mode both fans never run below near maximum speed. Fan speed increases to maximum at high frame temperature. This mode is ideal for equipment bays where noise is not a concern.
Both down	Reserved for future use	Operates as normal mode with current software.

Note: Quiet mode is dependent on PSUs and PSU fans not being in an alarm state.

For the Indigo 2SE only one of the fans is essential in normal operation and if one of the fans should fail, the closed frame can still operate indefinitely with an ambient temperature of 40°C.

Warning: Although it is possible to operate the frame with the front panel open, the frame may not meet electromagnetic compatibility (EMC) requirements in this condition.

PSU Configuration

If a power supply is not fitted in either the upper or lower slots, the position of configuration switch 4 on the top right of the front panel PCB must be set down. If both power supplies are fitted, switch 4 is set up. If the switch is set down and there are two power supplies fitted, the LOWER PSU LED will flash from GREEN to OFF every two to three seconds to warn that the switch is set incorrectly.

Address Range

The slot address range switch was used when two frames were paired together to make one large frame with 24 slots. As this practice is no longer used, switch 5 should be left in the up position.

Default IP address

Switch 6 in the down position sets the active front panel into recovery mode with the default IP address of 10.0.0.201. Recovery mode enables frame firmware updates and also forces the frame to accept network communications at address 10.0.0.201. Should the frame's IP address be unknown, then forcing to the default address will allow access by a web browser whereby the network settings may be changed.

See section Control for more information on establishing an Ethernet connection with a frame.

Reset switch

Press this switch to reset the CPU following a software upgrade or when resetting the IP address to its default value.

2.6 Connector pin out

Remote Control / GPI Connections

Each frame slot has six connections that are brought out to one or more of the four high density D-Type connectors on the rear of the frame labelled Remote 1 to 4. These connections are referred to as lines 'a' to 'f'. The functions assigned to them are dependent on the module inserted in each slot, but a typical use is as a GPI line. Refer to the documentation supplied with each Crystal Vision module to determine the actual functions assigned.

Pin number	Remote 1 - function	Remote 3 - function
1	+5.3V +/- 10% dc out	+5.3V +/- 10% dc out
2	Frame GND	Frame GND
3	Slot 9 GPI 'a'	Slot 11 GPI 'a'
4	Slot 6 GPI 'a'	Slot 8 GPI 'a'
5	Slot 5 GPI 'a'	Slot 7 GPI 'a'
6	Slot 5 GPI 'b'	Slot 7 GPI 'b'
7	Slot 2 GPI 'a'	Slot 4 GPI 'a'
8	Slot 1 GPI 'a'	Slot 3 GPI 'a'
9	Slot 1 GPI 'b'	Slot 3 GPI 'b'
10	Slot 10 GPI 'a'	Slot 12 GPI 'a'
11	Slot 10 GPI 'b'	Slot 12 GPI 'b'
12	Slot 9 GPI 'b'	Slot 11 GPI 'b'
13	Slot 6 GPI 'c'	Slot 8 GPI 'c'

14	Slot 6 GPI ‘b’	Slot 8 GPI ‘b’
15	Slot 5 GPI ‘c’	Slot 7 GPI ‘c’
16	Slot 2 GPI ‘b’	Slot 4 GPI ‘b’
17	Slot 2 GPI ‘c’	Slot 4 GPI ‘c’
18	Slot 1 GPI ‘c’	Slot 3 GPI ‘c’
19	Slot 10 GPI ‘c’	Slot 12 GPI ‘c’
20	Slot 10 GPI ‘d’	Slot 12 GPI ‘d’
21	Slot 9 GPI ‘d’	Slot 11 GPI ‘d’
22	Slot 9 GPI ‘c’	Slot 11 GPI ‘c’
23	Slot 6 GPI ‘d’	Slot 8 GPI ‘d’
24	Slot 5 GPI ‘d’	Slot 7 GPI ‘d’
25	Slot 2 GPI ‘d’	Slot 4 GPI ‘d’
26	Slot 1 GPI ‘d’	Slot 3 GPI ‘d’

Remote 1 and Remote 3 connections (26-way high density D-Type socket)

Note: *The total current available from the 5.3V dc outputs is limited to approximately 1.5 Amps. To maintain EMC compliance only good quality screened cable assemblies should be used.*

Pin number	Remote 2 - function	Remote 4 - function
1	Slot 5 GPI ‘e’	Slot 7 GPI ‘e’
2	Slot 5 GPI ‘f’	Slot 7 GPI ‘f’
3	Slot 6 GPI ‘a’	Slot 8 GPI ‘e’
4	Slot 6 GPI ‘f’	Slot 8 GPI ‘f’
5	Relay close on fault, upper PSU	Relay close on fault, lower PSU
6	Frame GND	Frame GND
7	RX+ bus RS422	N/C
8	TX- RS422 o/p	N/C
9	TX+ RS422 o/p	N/C
10	Slot 2 GPI ‘e’	Slot 4 GPI ‘e’
11	Slot 2 GPI ‘f’	Slot 4 GPI ‘f’
12	Slot 9 GPI ‘e’	Slot 11 GPI ‘e’
13	Slot 9 GPI ‘f’	Slot 11 GPI ‘f’
14	Relay common, upper PSU	Relay common, lower PSU
15	+5.3V +/- 10% dc out	N/C
16	RX- bus RS422	N/C
17	TX+ bus RS422	N/C
18	RX+ RS422 i/p	N/C
19	Slot 1 GPI ‘e’	Slot 3 GPI ‘e’
20	Slot 1 GPI ‘f’	Slot 3 GPI ‘f’
21	Slot 10 GPI ‘e’	Slot 12 GPI ‘e’
22	Slot 10 GPI ‘f’	Slot 12 GPI ‘f’
23	Relay open on fault, upper PSU	Relay open on fault, lower PSU
24	N/C	N/C
25	TX- bus RS422	N/C
26	RX- RS422 i/p	N/C

Remote 2 and Remote 4 connections (26-way high density D-Type plug)

Note: *The total current available from the 5.3V dc outputs is limited to approximately 1.5 Amps. To maintain EMC compliance only good quality screened cable assemblies should be used.*

Note: *Serial RS422 control from third party applications is no longer supported. All connections should be made via Ethernet.*

Power supply relay connections

The power supply module has a changeover relay to indicate if the frame is in an alarm state caused by a power supply problem, a fan stopping or an overheating frame.

Upper Power Supply Relay Connections:

Description	Pin number
relay common	Remote 2 pin 14
open on fault	Remote 2 pin 23
close on fault	Remote 2 pin 5

Lower Power Supply Relay Connections:

Description	Pin number
relay common	Remote 4 pin 14
open on fault	Remote 4 pin 23
close on fault	Remote 4 pin 5

Note: *The current though the relay contacts should be limited to a maximum of 200mA.*

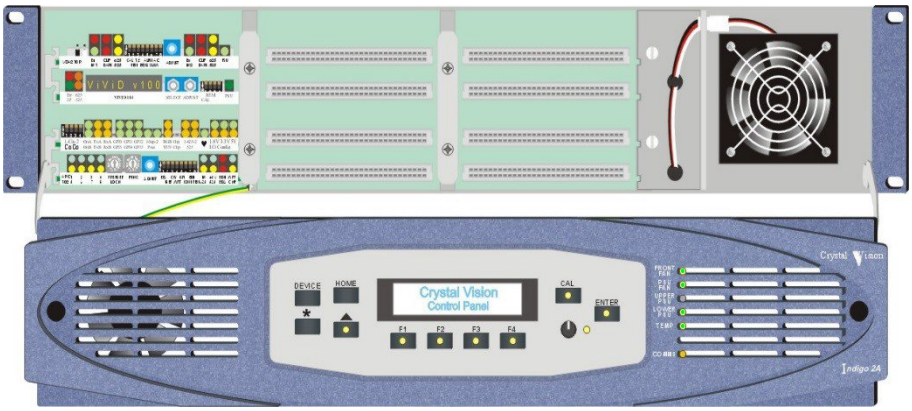
RJ45 Ethernet connector

Pin number	Function
1	TD+
2	TD-
3	RD+
4 and 5	Not used – 75 ohm resistor to GND in frame
6	RD-
7 and 8	Not used – 75 ohm resistor to GND in frame

2.7 Installing Crystal Vision modules

The Indigo 2AE/2SE frame has 12 slots for Crystal Vision video or audio cards. Signal connections are made through rear modules.

The inside of the frame can be accessed to change the modules by pulling forward the two black knobs, one on each side of the front panel.

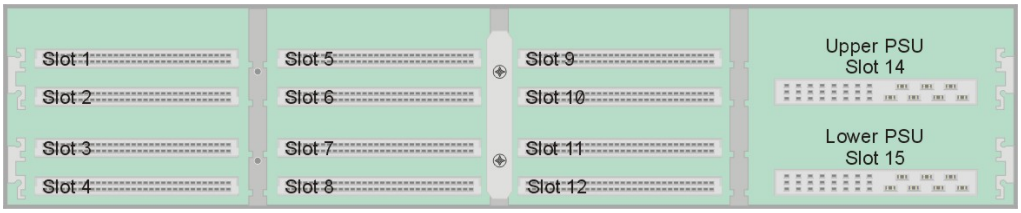


The Indigo 2AE frame with front control panel open

Warning: *Although the frame can be operated with the front panel open, the frame may not meet electromagnetic compatibility (EMC) requirements in this condition.*

Module positions

Module positions are numbered 1 to 12 as shown here:



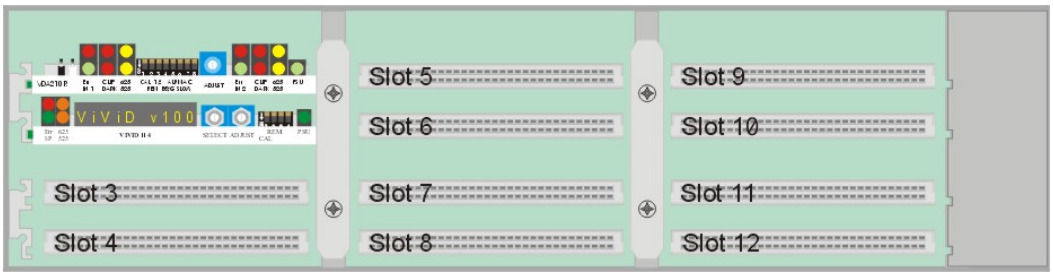
The Indigo 2AE/2SE frame showing slot numbers (and left hand retaining bracket removed)

Before fitting or removing signal modules one or more retaining brackets may need to be removed. Retaining brackets prevent the modules from being inadvertently removed or from coming out during transit. They may also prove useful in OB vehicles when travelling over rough ground.

Inserting modules

To insert a module proceed as follows:

- Remove the two screws holding the bracket adjacent to the slot intended for the module and keep both the screws and bracket in a safe place
- Insert the module into the appropriate guides and push it fully home
- Refit the retaining brackets if required



The Indigo 2AE/2SE frame with two modules fitted in slots 1 and 2

Removing modules

To remove single modules simply pull on the handle and withdraw them from the frame, with the retaining brackets removed.

All Crystal Vision cards can be inserted and removed whilst the frame is powered without damage.

Rear connectors

The frame will be supplied with an appropriate selection of rear connectors for any cards installed in it at the time of order. Unused slots will be fitted with blanking plates.

Details of signal types and pinouts are given in the documentation supplied with each Crystal Vision video or audio card.

The Indigo 2AE/2SE frame rear view with EMC covers removed for slots 1 to 4

The rear modules are screwed in place to ensure EMC compliance.

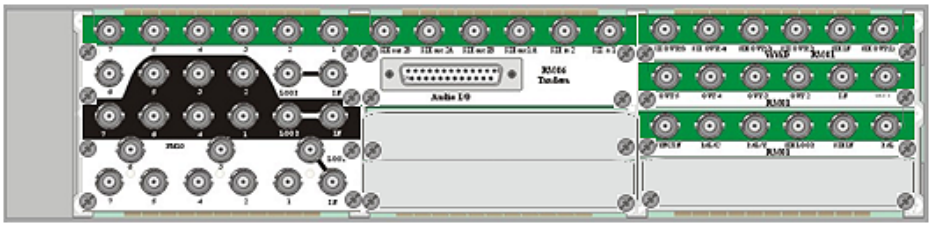
To access the rear connector motherboard the appropriate EMC covers and retaining screws must be removed.

Fitting rear connectors

To fit a rear connector, proceed as follows:

- Disconnect the mains power leads from the frame
- Remove the rear relevant EMC cover(s) at the rear of the frame by unscrewing the fixing screws
- Push fit the selected rear connector onto the appropriate frame slots
- Refit EMC covers and replace the fixing screws

The Indigo 2AE/2SE frame rear view with EMC covers fitted.



The Indigo 2AE/2SE frame showing the use of EMC covers and the use of single, double and quad rear connectors

Warning: ***To maintain product safety and EMC compliance the rear of the frame should be filled with Crystal Vision rear connectors and/or EMC covers and held in place with fixing screws before power is reapplied.***

2.8 Indigo power supplies

The Indigo 2AE/2SE frame is supplied with the 160W rated PSU-160i. It is possible to use the older PSU-75i and PSU-150i but it is preferred that these are not mixed in any one frame.

PSU-160i - top view

Note: *Care should be taken if mixing power supply types. It is not recommended to combine the PSU-75i with anything other than a second PSU-75i. The Indigo power supply modules are* ***not*** *compatible with similar PSUs used in FR2AV and FR1AV frames.*

Monitoring power supply status

A signal from the each of the power supplies is routed through the frame wiring to the front panel electronics. This allows an indication by the UPPER PSU LED and LOWER PSU LED of the status of one or both power supplies.

A faulty condition is indicated when the corresponding LED is red and a normal condition when it is green. If only one PSU is fitted, the corresponding LED will be unlit.

The status of the PSUs can also be investigated using VisionWeb control, the VisionPanel control panels, Statesman Lite PC control, as well as the Indigo 2AE integrated control panel as shown in the section *Operating the Active Panel*.

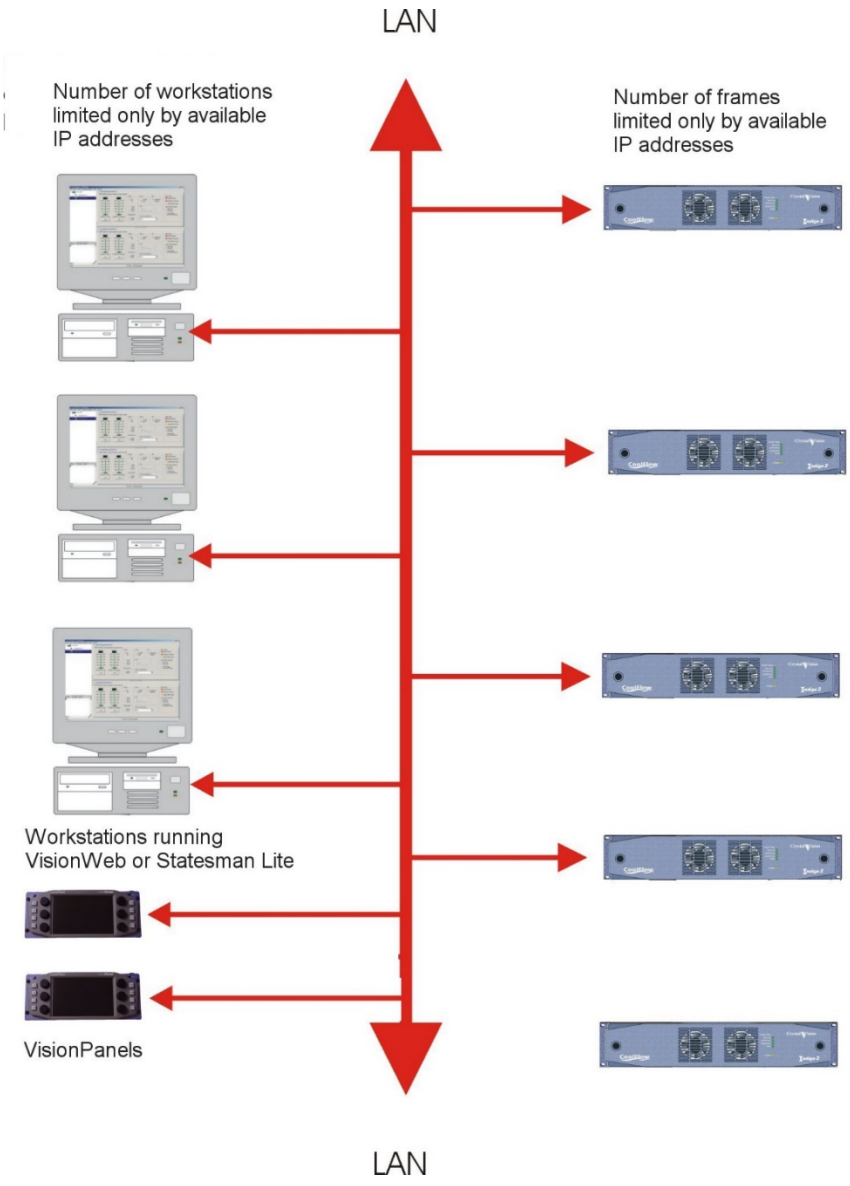
Configuring PSUs

The number of fitted PSUs must agree with the configuration switch settings – *see section PSU Configuration*.

3 Control

Indigo 2AE and 2SE frames support ping, FTP, HTTP, SNMP, Statesman and ASCII control protocols. From frame software version V5.9 build 16216, it is possible for a user to disable all services except ping in order to prevent unwanted access. It is also possible to remove the Network Configuration, SNMP Configuration and Software Upgrade menus should restricted access be required to these settings. Please contact support@crystalvision.tv for further information including the necessary frame login credentials.

Ethernet control is provided by the Indigo 2AE and 2SE frame. This allows PC control of a large number of Indigo 2AE/2SE series frames over a local area network by VisionWeb, Statesman Lite or by VisionPanel remote control panels.



Control of Indigo 2AE/2SE frames over Ethernet

3.1 Setting up and connecting

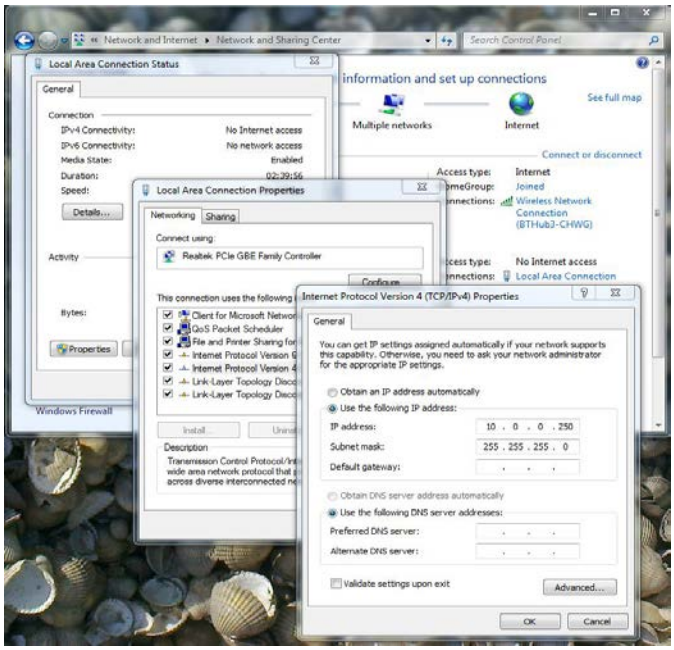
The frame can be connected to a network port or directly to a PC from the rear panel RJ45 port labelled 'Ethernet'. Usually, if connecting directly to a modern computer, a straight CAT5 cable only is needed. A crossover cable might be necessary with older equipment.

Indigo 2AE and 2SE frames are shipped with the default IP address 10.0.0.201 which will need changing if another network device has the same address. The frame's IP address can be changed at any time by:

- Selecting the 'Configuration/Network' menu from the integrated front control panel (Indigo 2AE only) – *see Changing the Network Settings*.
- Accessing the frame's internal 'VisionWeb' web pages with an Internet browser using the frame's current IP address – *see VisionWeb*.
- Putting the frame into 'Recovery Mode' with the front panel configuration switches and accessing the Network Setup web page with an Internet browser using the frame's default IP address 10.0.0.201.This method should be used if the frame's IP address is unknown – *see Default IP address.*

Set up the PC's Local Area Connection

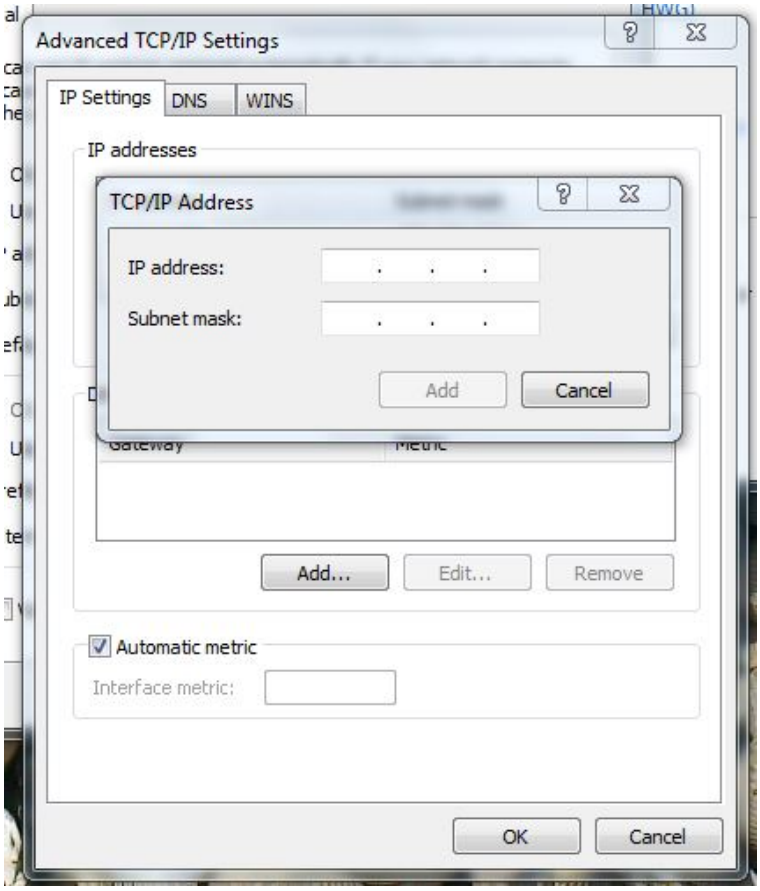
Set the PC's LAN controller's sub-mask (usually 255.255.255.0) and its IP address to within the frame's address range (e.g. 10.0.0.250 if the frame's IP address was 10.0.0.201). For Windows 7 users this is most easily achieved from the Network and Sharing Centre:



Setting up the PC's LAN controller with Windows 7

It is worth noting here that Windows does allow LAN controllers to operate with several IP addresses and sub-masks simultaneously, which can be useful if a number of frames need to be set up. Once a frame is programmed with its final IP address it may be that the PC will no longer be able to control the frame without changing its LAN controller's IP address. In this case setting

an additional IP address could save time if a large number of frames are to be configured. Additional IP addresses can be added via the 'Advanced' tab in Windows 7:



Windows 7 Advanced LAN settings

Alternatively, the LAN controller sub-mask can be extended to allow control of frames of similar IP addresses. For instance, if a frame is to be finally configured as 10.0.1.0 then a sub-mask of 255.255.0.0 would allow control of the frame in its default and final configuration.

Setting Default IP address

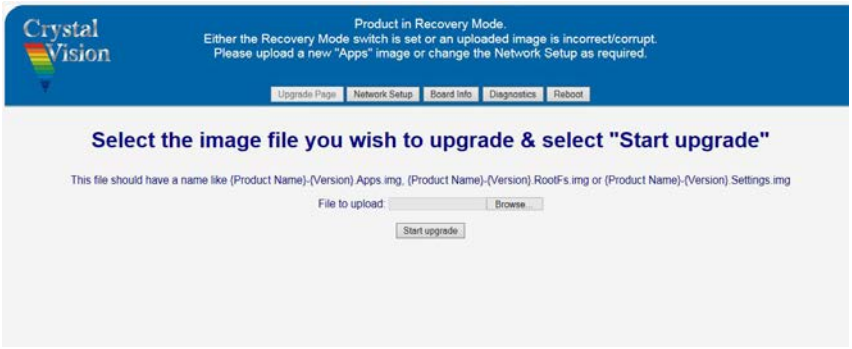
For Indigo 2AE users, the frame's current IP address is displayed on the integrated front control panel but should a frame's IP address be unknown, it is possible to temporarily set the frame to its default IP address (10.0.0.201) by moving configuration switch 6 to down. The front panel CPU must now be reset in order for changes in the switch settings to be implemented. This can be achieved by: either pressing the 'reset' button, briefly interrupting the power to the frame or removing the ribbon-cable connection to the front panel. Care must be taken not to bend any pins in the cable connect as attempting to re-straighten any bent pins will likely result in their fracture.

The frame will enter 'Recovery Mode' on reset or power up where it can be accessed by its default IP address 10.0.0.201.The network address can now be permanently changed with a browser.

Recovery Mode

On power up, Indigo 2AE/2SE will enter 'Recovery Mode' if it detects corrupt firmware, **or** if configuration switch 6 is in the down position. When the frame is accessed by an internet

browser using either the original IP address before firmware corruption occurred or the default IP address 10.0.0.201, the following is displayed:



The screen will ask the user to select an image file to repair or to upgrade the firmware. Do not attempt to do this without specific instruction from Crystal Vision or its representatives. If, however, configuration switch 6 has been put into the down position with a view to changing the IP address then the user can just select the 'Network Setup' page:

Enter the desired IP and netmask addresses. Enter the gateway address if necessary (else leave at 0.0.0.0).

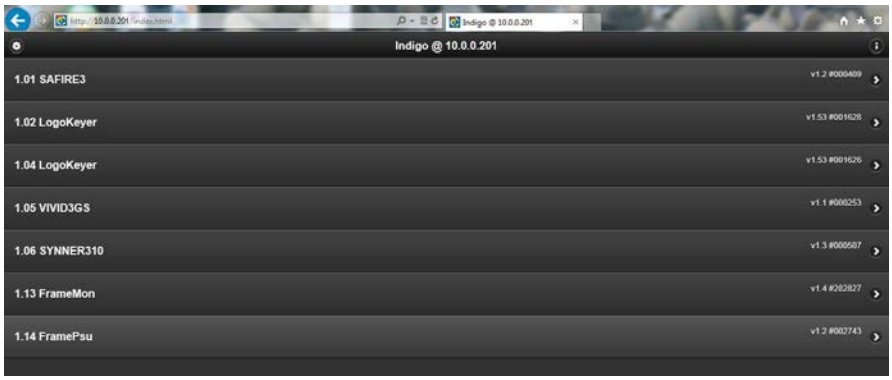
Press 'Set' to enter the values, then reboot when all fields have been entered. If configuration switch 6 is in the down position, it will be necessary to return it to the up position and reboot to prevent recovery mode being entered again.

4 VisionWeb

***Note**: For frame software versions earlier than v4.6 please refer to Appendix 2.*

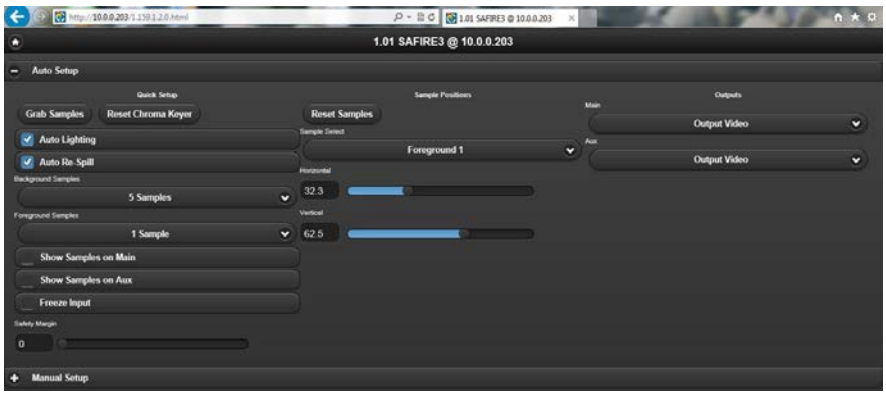
Indigo's internal web pages are called VisionWeb and enable the user to configure the frame, monitor status of the frame and cards, and to control cards from a PC running a web-browser*. To access the VisionWeb home page, open up your web browser and enter the frame's IP address which will be the default value 10.0.0.201 if the frame has yet to be configured. The web page displayed shows the names of the cards installed, the slot number they are fitted into, and the firmware version and serial number. This page will give status information about the frame, its power supplies and means to access each card's controls.

**Recommended web browsers include IE10, Google Chrome and Mozilla Firefox.*



VisionWeb 'Home' page

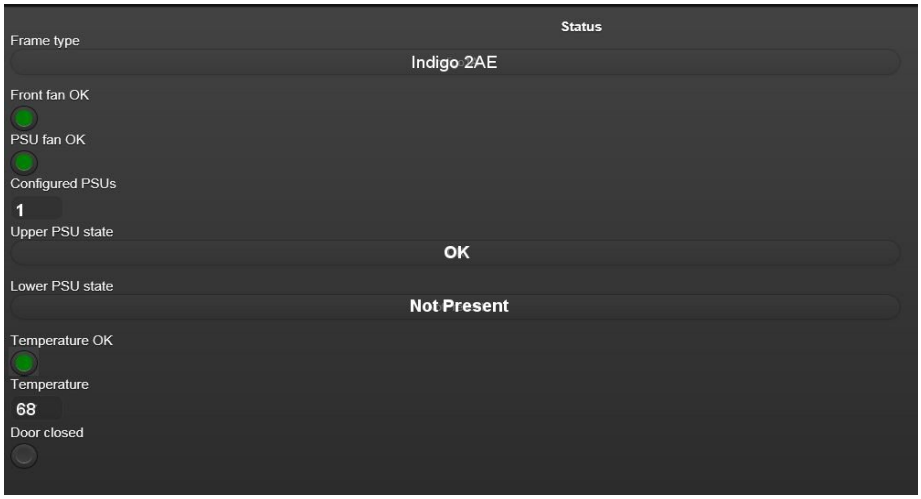
Click on any of the slots to access the card's home page which will give the user a full range of controls and status monitoring. For example, the Safire 3 chroma keyer:



Safire 3 'Auto Setup' page

See the card's User Manual for in-depth details of all controls.

Slot 13 is a virtual slot for the frame monitor. Accessing this slot will display information about the fans, power supplies, door open condition and frame temperature. The LEDs will be green for a 'true' condition' else greyed out.



Vision Web Frame Monitor status display

Slots 14 and 15 accommodate the PSUs and accessing these slots gives information about the power supply temperature:

4.1 VisionWeb Frame 'Options' page

Click on the circle at the top left of the Home page to open the 'Options' page:

Click on the 'house' icon to return to the Home page:

The 'Options' page gives access to other pages that enable adjustment and give information of Network, Hardware, SNMP settings and diagnostic information:

VisionWeb 'options' page

About

From the 'Options' page, clicking on the 'About' link will open a web page that shows, amongst other things, the frame's software version number and build:

VisionWeb 'About' page

The above example shows that the frame is equipped with Indigo SNMP software version 5.2, build version 12094. Crystal Vision may ask you to provide this information if there is a problem. Note that only frames fitted with Indigo SNMP software are capable of supporting an SNMP interface. An SNMP enabled Crystal Vision frame supports SNMP, ASCII and HTTP/JSON control protocols. A non-SNMP enabled frame supports ASCII and HTTP/JSON control protocols. Contact Crystal Vision customer support for protocol details.

Hardware ID

This page gives useful information about the frame. Crystal Vision may ask you for these details if there is a problem:

VisionWeb 'Hardware ID' page

'**MAC address** is the unique MAC address of the frame's network card.

'**CV_ProductName'** is the frame's product name – SNMP indicates that the frame supports optional SNMP control.

'**CV_HwSerialNumber** is the serial number of the frame entered during manufacture and will be the front panel serial number. The serial number will be in the range 1-999999 and is a useful aid for identification or auditing purposes.

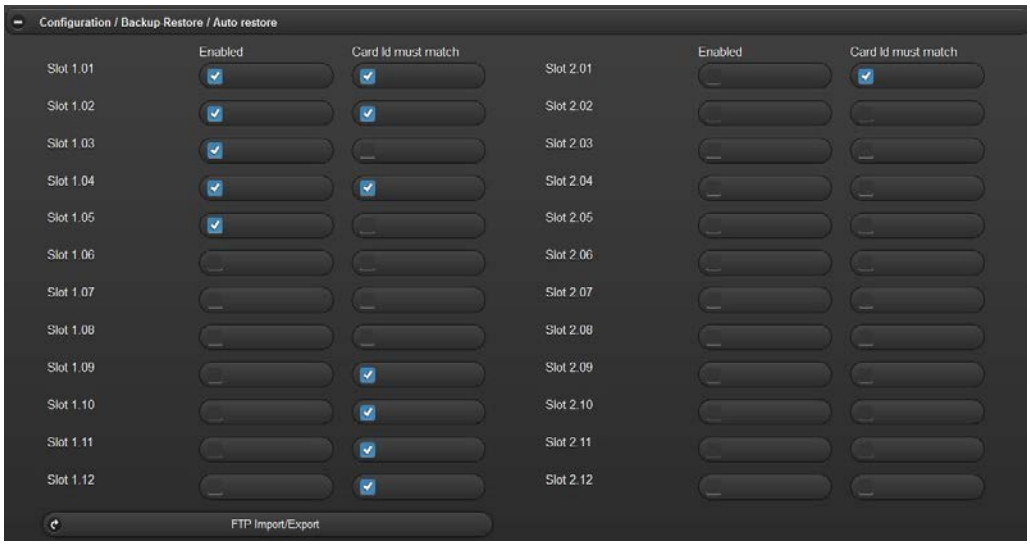
'**CV_Hwissue'** is the version of the frame hardware entered during manufacture.

'**CV_HwModLevel'** indicates modifications to the frame hardware.

Configuration / Backup-Restore / Auto restore

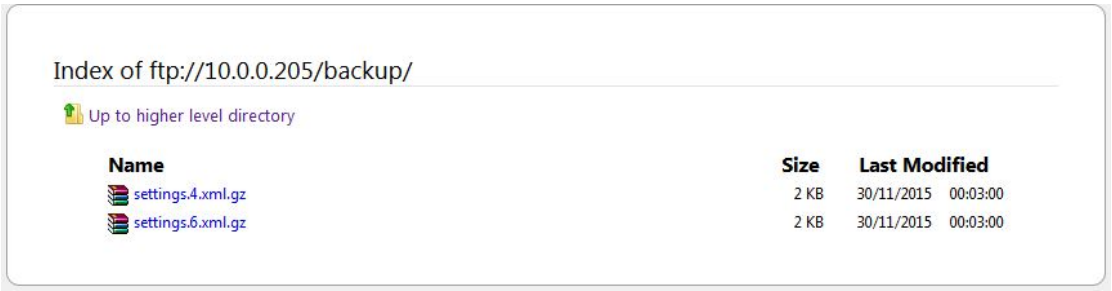
Whenever a card's settings are changed, a backup copy in the Frame Controller Processor (FCP) is automatically updated. This feature allows, for instance, a faulty card to be replaced live and its settings automatically transferred to the replacement.

This web page sets the conditions for the restore of the card's settings from the stored backup. If enabled, this process happens automatically whenever the frame is powered or reset, or whenever a card is plugged in live:



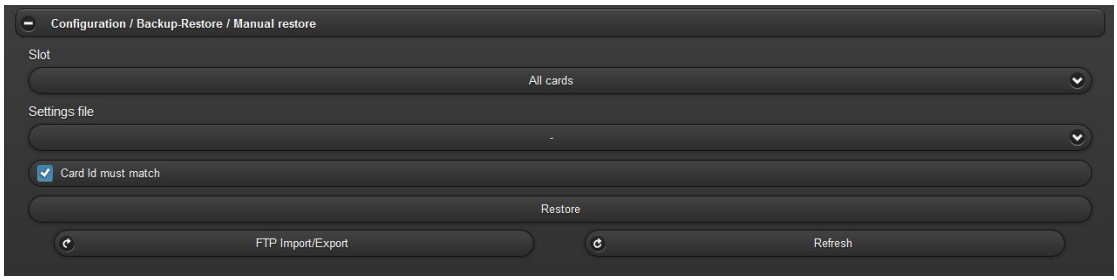
The process can be enabled or disabled for each slot in the frame. If the 'Card ID must match' box is checked then the restore process will only happen if the card currently in the slot is of an identical type to the card used to create the backup. If the box is NOT checked then the restore process will be applied to the card in the slot regardless of type. This will only be valid if the backup and restore are for cards of a similar generic group that may have different card IDs for the various options but common control and status registers (i.e. TANDEM 310, 320 etc.). If in doubt, check the box. Note that the Configuration/Backup-Restore/Auto restore page shows 24 slots. This is to provide 'virtual card' slots which is one made up of controls from several cards in a frame and allocated a unique slot number – see section *Virtual Cards*.

The 'FTP Import/Export' button opens an index to the 'backup' folder showing a list of the backup files that have so far been created:

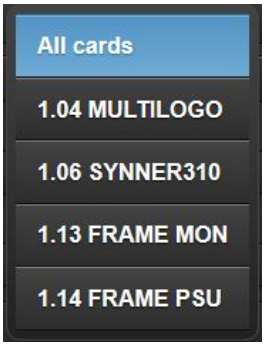


Each backup file has a file name with a slot number extension. Up to 24 files, one per slot (including 'virtual' slots), will be displayed. Clicking on a file will transfer it to the PC's 'Downloads' area where it can be saved for future use – *see section File Structure for more information.*

Configuration / Backup-Restore / Manual restore



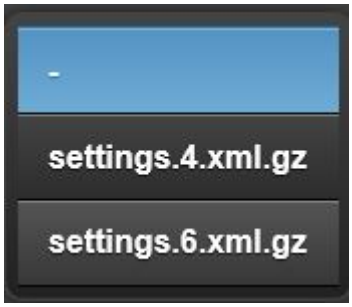
This page allows a user to select a backup file and to manually restore the settings for one or all of the slots. Firstly click on the 'Slot' button to select either a single card or all of the cards to restore:



The window opened will display all the cards currently fitted in the frame. Similar to the 'Auto restore' page the check box 'Card ID must match' should be checked to ensure that a slot's

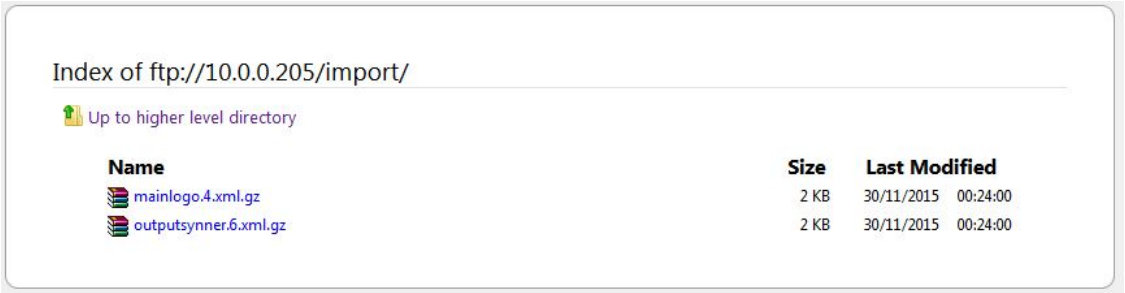
settings are only restored if the backup memory was derived from an identical card type. The box can be left unchecked if the backup file and the card in the slot are versions of the same type of card. As before – **check the box if in doubt**.

The 'Settings file' button will display a list of backup files that are available for manual restoration. These files are backup files that have been copied manually from the 'backup' folder to the 'import' folder via FTP and may have been renamed. - *see section File Structure for more information.*



Note also that a file created in a particular slot can be used to restore the settings into any or all slot positions. For example if a card has been set up in slot 1, a number of similar cards can be fitted to the frame and the backup file applied to one or all of the cards to set them up the same as the original card. The 'Refresh' button will update this list.

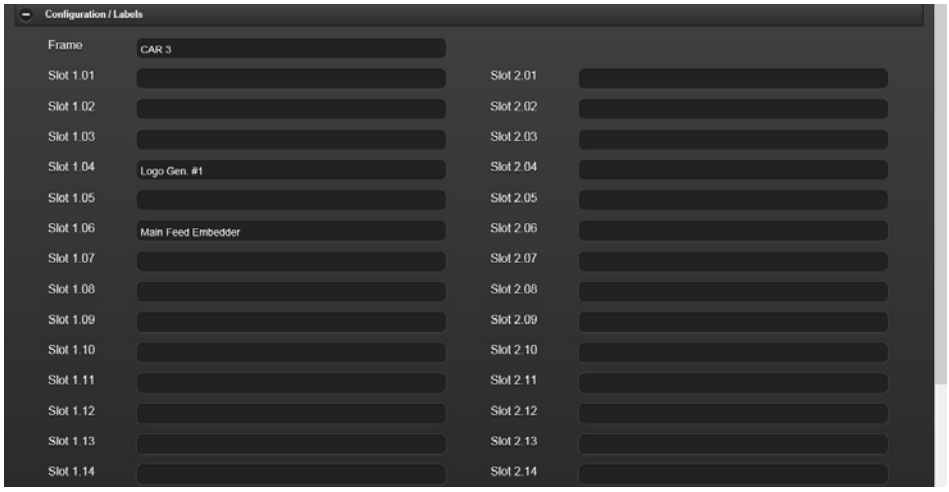
The 'FTP Import/Export' button opens a window to the 'import' folder showing a list of the backup files that have so far been manually copied there:



Finally, click on 'Restore' to overwrite the card(s) current settings from the selected backup file.

Configuration/Labels

This page (*frame software v5.1 or later*) enables the user to add an alpha-numeric label to the frame and to every slot.



VisionWeb 'Configuration/Labels' page

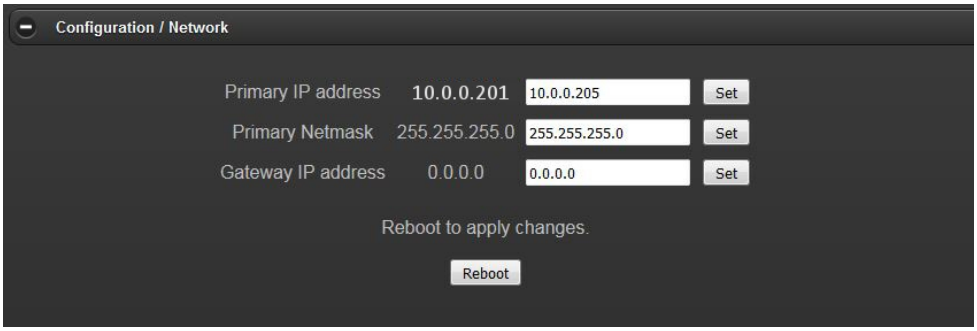
In the example above, slots 1.04 and 1.06 have been labelled, as has the frame itself. Note that the Configuration/Labels page shows 32 slots which is to provide slots for 'virtual cards'. A virtual card is one made up of controls from several cards in a frame and allocated a unique slot number. Once the labels have been created they are displayed on the 'Home' page:

VisionWeb 'Home' page showing labelled slots and frame.

Configuration/Network

From the 'Options' page, clicking on the Configuration/Network link will bring up the Network Setup page. If the installation includes more than one Indigo frame then the IP address may need changing as all frames need a unique IP address. Enter the new IP address in the **Primary IP address** edit box and click on 'Set'. In the example below, the IP address will be changed to 10.0.0.205 from its default value.

The **Primary Netmask** address can also be changed on this page if required. The Gateway IP address should be set to 0.0.0.0 in the **Gateway IP address** box unless a router is in circuit, in which case the correct gateway address should be entered. Click on 'Reboot' to implement the changes and the web page should refresh itself showing the updated parameters.

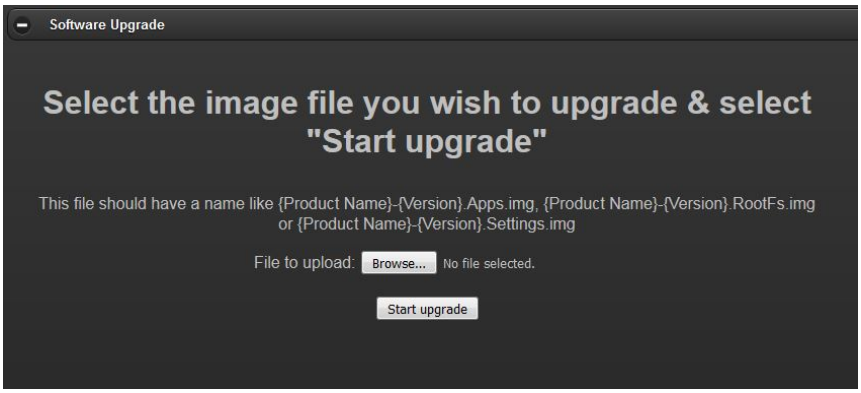


VisionWeb 'Configuration/Network' page

Software Upgrade

Clicking on the 'Software Upgrade' link will open a page that enables the frame software to be upgraded. You may be asked to perform an upgrade by Crystal Vision who will supply the software and instructions to perform this task.

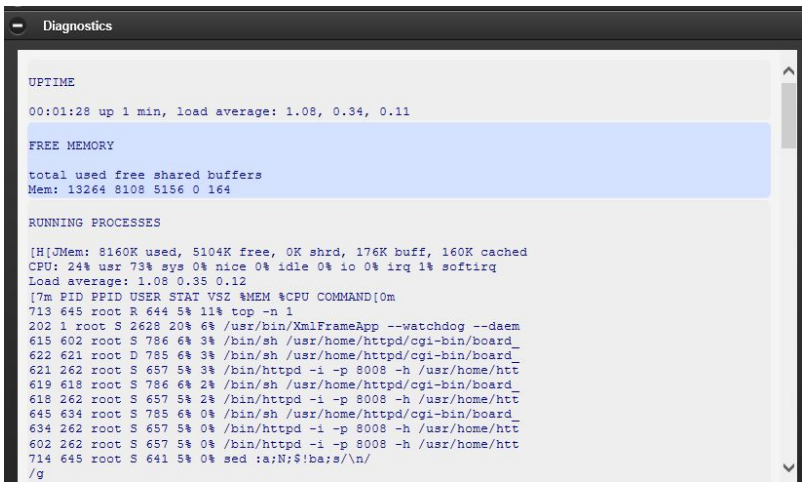
Typically there are two image files: Indigoxxx.RootFS and Indigoxxx.Apps. Each of the files is selected in turn and the upgrade performed on each before re-booting the frame. Do not attempt to do this without specific instruction from Crystal Vision or its representatives.



VisionWeb 'Software Upgrade' page

Diagnostics

The 'Diagnostics' link opens a page which will help Crystal Vision diagnose any faults encountered with your system. Crystal Vision may ask you to supply this information by copying and pasting part or all of the data:



VisionWeb 'Diagnostics' page

Configuration/SNMP

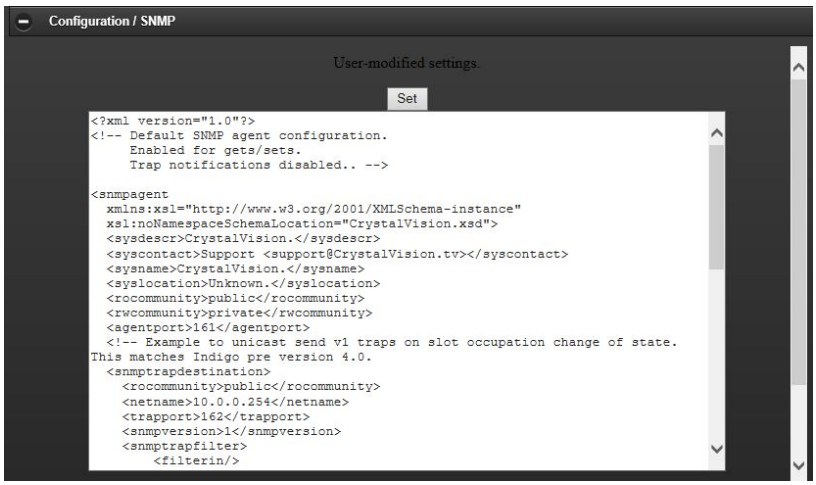
Access this window by clicking the link on the 'Options' page. Indigo SNMP enabled frames can control and report status of cards, PSUs and frames. SNMP traps can be used to trigger alarms – for example, say, when a signal has been removed, video standard changed or any of the many

monitored status variables changed. The SNMP window can be edited and changes applied by clicking on '**Set'**.

Indigo SNMP enabled front panels use the Net-SNMP agent and a Crystal Vision XML Schema Definition document to control its operation and the management information provided. The user-configurable SNMP configuration window easily allows the user to:

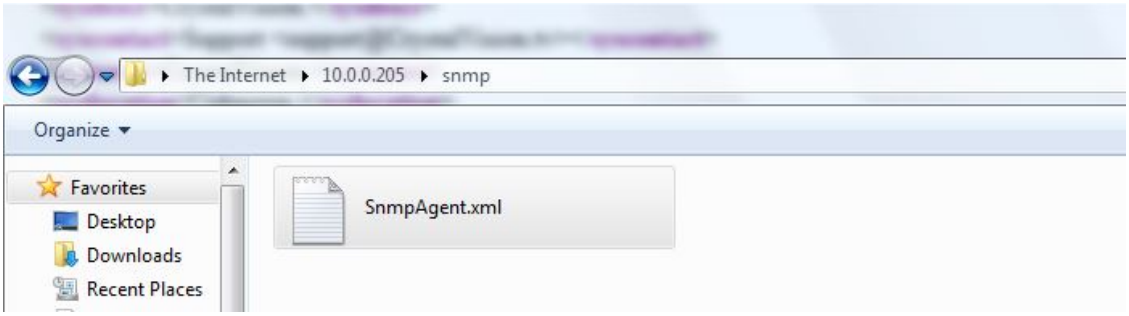
- Edit the list of configuration files.
- Program the IP and port address of the destination SNMP Manager.
- Enable or disable individual trap events individually by OID.
- Select SNMP v1 or v2 operation.

An optional SNMP licence must be purchased to enable control and monitoring via SNMP. The full list of available XML commands is contained within the Schema Definition document **CrystalVision.xsd** available from Crystal Vision.



Indigo 'SNMP' configuration page

The SNMP agent can also be accessed via FTP – *see section File Structure for more details*.



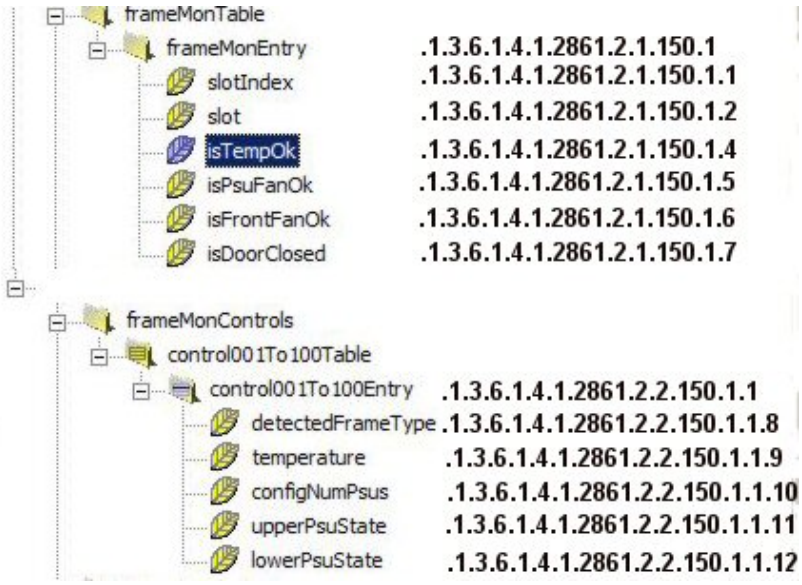
Management information base (MIB)

As is normal for an SNMP manager system, each of the remotely-controllable boards, frames and PSUs that are to be monitored have an associated MIB. Each MIB is a collection of object identifiers that identify all variables that can be read via SNMP and these MIBs are available from Crystal Vision. Use a MIB Browser to view all status and control possibilities.

Object Identifiers (OID)

For each variable to be monitored there is an object identifier or OID which can be distinguished from any other OID within the MIB tree by a unique number sequence coded within the MIB. As an example, from the FrameMon MIB (see tree below), the front panel status variable **isTempOK** is accessed by the OID **1.3.6.1.4.28681.1.2.1.150.1.4**. The OID will then be accompanied by a value to indicate its status, in this case, 1=NO, 2=YES. Any status change will cause the transmitting of a trap to the SNMP manager.

The following grab from a MIB Browser shows the FrameMon MIB tree with its identifying number sequences:



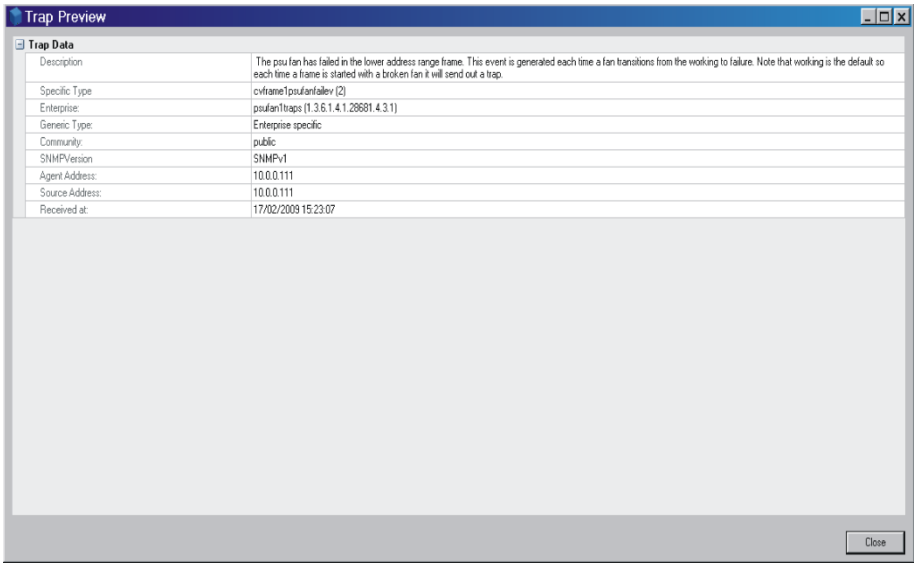
Partial tree of FrameMon MIB showing identifiers

The frame variables monitored by the FrameMon MIB are:

Name	Function	Syntax	Value
Slot	Frame's virtual slot number	INTEGER 0..31	1.1...2.16
isTempOk	Frame temperature OK?	INTEGER	1=NO, 2=TRUE
isPSUFanOk	Frame's PSU fan OK?	INTEGER	1=NO, 2=TRUE
isFrontFanOk	Frame's front panel fan OK?	INTEGER	1=NO, 2=TRUE
isDoor Closed	Frame's front panel closed?	INTEGER	1=NO, 2=TRUE
detectedFrameType	Type of Indigo frame	INTEGER	0=Indigo 1SE, 1=Indigo DTSE, 2=Indigo 4SE, 3=Indigo 2SE, 4=Indigo 1AE, 5=Indigo DTAE, 7=Indigo 2AE
temperature	Frame temperature	INTEGER 0..127	0...1...2...127
configNumPsus	No. of PSUs fitted	INTEGER	Number of PSUs e.g. 1, 2 etc.
UpperPsuState	Condition of upper PSU	INTEGER	0=OK, 1=Alarm, 2=Not present, 3=Configuration error
LowerPsuState	Condition of lower PSU	INTEGER	0=OK, 1=Alarm, 2=Not present, 3=Configuration error

Traps

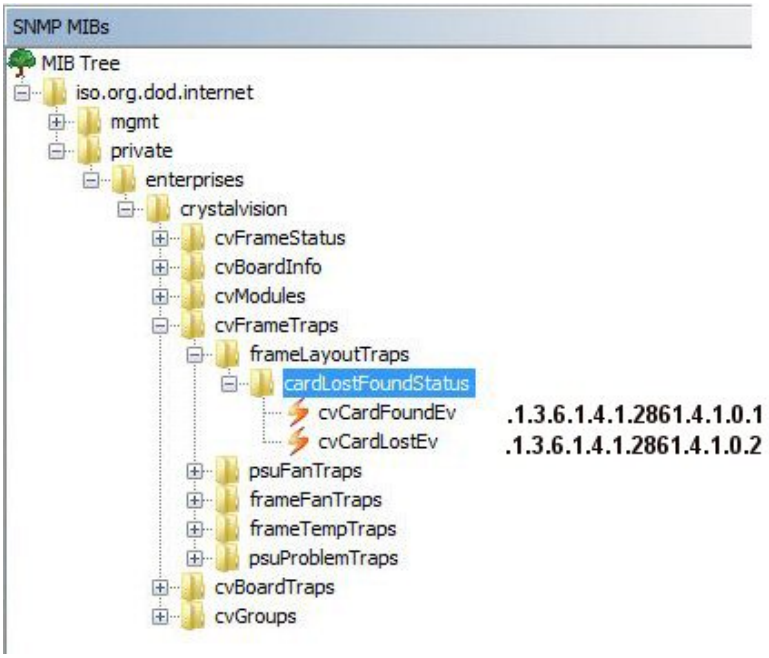
Whenever a status or control value changes, a trap will be sent to the SNMP manager unless filtered (see MIB for trap OIDs). By interrogating this trap it is possible to identify the status change and its consequences. It will be quite common for multiple traps to be sent for any one incident – for example, removing an input may typically trigger eight traps. It will then be down to the SNMP manager to sort these into a hierarchical order or mask as necessary.



Example of a trap received by the SNMP manager

Filters

Any status or control value change can potentially send a trap but these can be filtered by information in the configuration file. The following extract from the MIB tree shows two events with their OIDs that will generate traps if a card is found or lost:



Unless previously edited, the SNMP configuration window will show an example of enabling the trap filter using the events shown above:

```
<-- Example to unicast send v1 traps on slot occupation change of state.  This
matches Indigo pre version 4.0.
 <snmptrapdestination>
  <rocommunity>public</rocommunity>
  <netname>10.0.0.254</netname>
  <trapport>162</trapport>
  <snmpversion>1</snmpversion>
  <snmptrapfilter>
     <filterin/>
     <snmpoidmask>1.3.6.1.4.1.28681.4.1.0.1-2</snmpoidmask>
  </snmptrapfilter>
 </snmptrapdestination>
 -->
```

Extract from SNMP configuration window showing example of trap filtering

4.2 Password protecting frames and slots

From frame software v5.2 onwards it is possible to password protect different levels of access to frames and slots. The default state is no active passwords. When setting up a user you will be able to limit the slots that have full/read/write access. If no access list is specified all slots will be read/write.

To add a new user:

- Pick the user name and password – say, ‘Crystal’ and ‘Vision’.
- Generate the encrypted password information as an MD5 text string. This can be obtained from *http://onlinemd5.com/* or similar sites – Google ‘md5 generator’ for more sites.
- Enter the password to be encrypted, in this example ‘Vision’. The MD5 generator will produce the following string - 99A0628D9F7179C032E0CF59EFBC0FAD.
- Follow the instructions in section *File Structure* to copy the file passwd.http’ to your PC from the folder **‘/etc’**.
- Open the copied file with Notepad and edit the file to add every authorised user with a separate line of the format - username:MD5 Password [rw:slotlist]) as described in the file

itself. [rw:slotlist] is optional & specifies the card slots the user is able to access. With no rw option, all slots & the frame options pages are accessible. e.g.

User "fred" with password "password" with access to all slots -
:fred:5f4dcc3b5aa765d61d8327deb882cf99

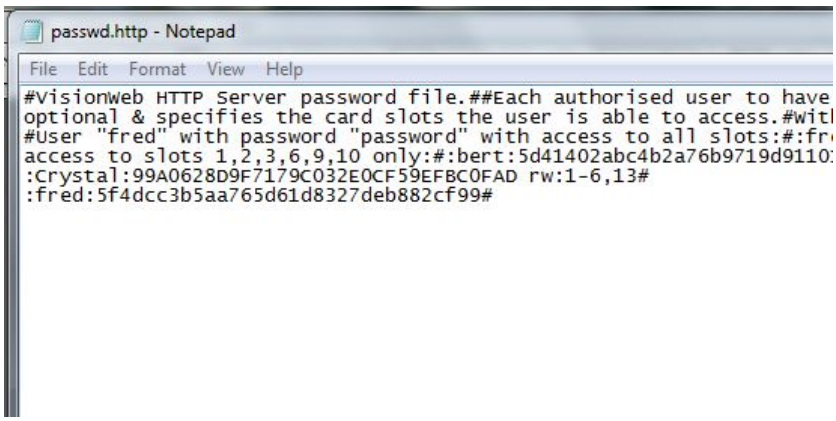
User "bert" with password "hello" with access to slots 1,2,3,6,9,10 only -
:bert:5d41402abc4b2a76b9719d911017c592 rw:1-3,6,9-10

For our example, with slots 1,2,3,4,5,6,13 only enabled, the new line will be -

:Crystal:99A0628D9F7179C032E0CF59EFBC0FAD rw:1-6,13

Note: Any user who has restricted access to slots with the rw option will not have access to the frame 'Options' page (via the cog).

Note: The # symbol indicates that the rest of the line is comment.



Editing the 'passwd.html' page in Notepad

- Exit and save changes.
- Copy the file back to the frame replacing the original version.
- Reboot the frame. Once the frame has rebooted the new access permissions will apply and a Windows Security window will open when a VisionWeb user attempts to access a slot or the frame's settings:

Windows Security window

You can add multiple new users at the same time if you want, by adding multiple lines at the file editing stage.

To delete a user:

To disable authentication, so that no username/password is required:

Delete all the users from the passwd.http file by deleting the relevant lines. Leave the rest of the file in place, in case you want to enable passwords in future. Needs a reboot to take effect.

Logging out from a password-restricted frame

The password system we use (HTTP Basic Access Authentication) is a standard system that works with web browsers. The browser generally stores the password information while the session is open, although it may time out after a long period of inactivity. That is a browser characteristic not controlled by the frame and if users want to prevent unauthorised access they should close the browser window (**not just the tab**) when they want to 'log out'. This will force a log in next time the frame is accessed.

If the user selects 'remember this password' when they type it in, then their PC will remember the password and the user is relying on the PC login to restrict access to the frame.

5 Virtual Cards

5.1 Introduction

A ‘virtual card’ is a collection of controls from a number of cards on the same frame that appear as a single extra card. The virtual cards feature can be used to limit user interaction, simplify operation or assemble features for specific control purposes. The virtual card creation process involves direct editing of an XML file which is then put into the frame front panel; this is offered as a chargeable service by Crystal Vision or can be carried out by someone familiar with XML editing. What follows is a guide to the process of creating a virtual card.

5.2 What you will need

1. A text editor – ideally Oxygen http://www.oxygenxml.com/ with the CV 'external tool' so you can see what your virtual card will look like on VisionWeb.
2. Telnet and FTP access to the frame containing the card(s) you want to incorporate into your virtual card.
3. The XML files for those cards. You can get these from the Registered Area of the CV website http://www.crystalvision.tv/support/registeredarea/registeredarea.html or from customer support.
4. The virtual card template file.

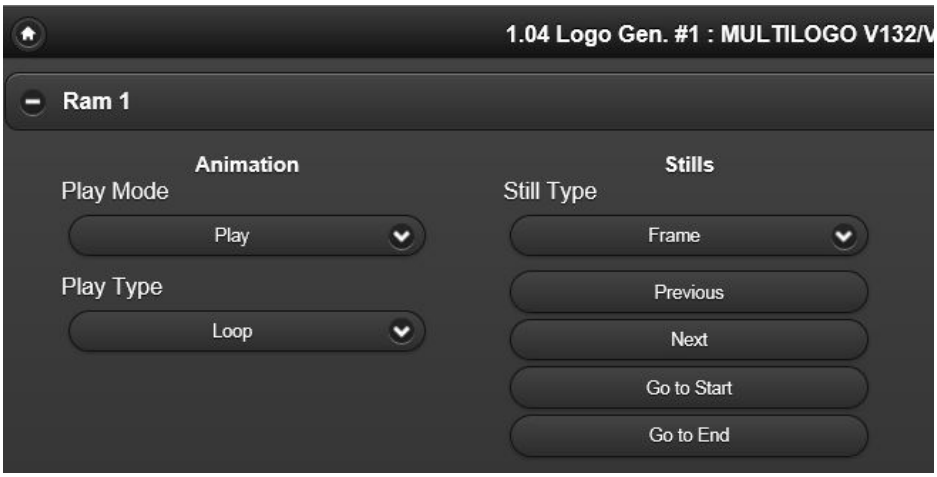
5.3 Summary of what you have to do

1. Decide what controls you want on your virtual card and how you want them grouped.
2. Get the XML files for the 'source' cards from the website.
3. Pick a 'virtual slot' number for the virtual card. Make a copy of the template file and save it with a filename including the 'virtual slot' number for the frame.
4. Customise your template file so that it refers to your specific virtual card.
5. Create the menu structure in it and populate the menu structure with controls copied from real card XML files, adding a reference to the real card (its slot) and the original control ID.
6. Check the validity of your XML file against the CV schema file. This is a standard XML editor function.
7. If you are using Oxygen with the CV tool you can also generate an HTML file to check the control arrangement is what you want. Copy the file into the correct directory on the frame.
8. Reboot the frame.
9. The virtual card will now be available for use.

5.4 Step by step Instructions with example

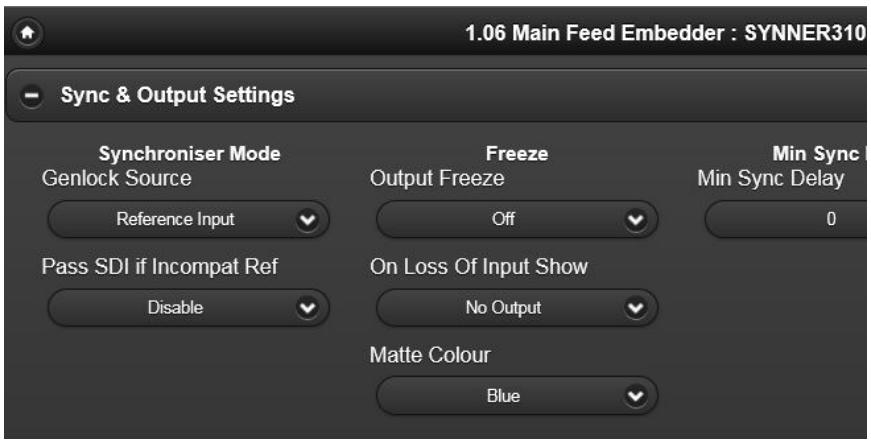
Choose the controls

The following is a screen grab of the ‘Play Mode’ control of a MultiLogo V132/V432 logo generator followed by a section of the XML file specific to that control. After that is a screen grab of the ‘Genlock Source’ control of a SYNNER 310 synchroniser with its associated XML file detail. In the following example we will create a simple virtual card that contains a single control only from these two cards:



```
- <control>
    <id>170</id>
    <name>Ram1PlayMode</name>
    <label>Play Mode</label>
    <labelfull>Play mode</labelfull>
  - <interface>
      <controlid>170</controlid>
    - <snmpcontrol>
        <id>70</id>
        <snmptableid>3</snmptableid>
      - <snmptrap>
          <snmptraponvalue/>
        </snmptrap>
      </snmpcontrol>
    </interface>
    <default>0</default>
  - <enum>
    - <enumitem>
        <value>0</value>
        <label>Stop</label>
      </enumitem>
    - <enumitem>
        <value>2</value>
        <label>Pause</label>
      </enumitem>
    - <enumitem>
        <value>1</value>
        <label>Play</label>
      </enumitem>
    </enum>
  </control>
- <control>
```

MultiLogo 'Playmode' control - XML detail



SYNNER 310 'Genlock Source' control – XML detail

Rename the template file

To provide an interface consistent with that of real cards, the frame allocates a slot address to each virtual card and the desired slot number is given in the filename. Make a copy of the template file ('VirtualTemplate0.xml') and rename it with a filename that includes the 'virtual slot' number and the unique identifier (no spaces allowed). Use the filename structure 'SlotID.CardDescription.xml'. In this example we will use slot 18 and the name 'VirtualCardTest' by renaming the file '18.VirtualCardTest.xml'. This file will appear in slot 18 (2.02) when the file is copied into a frame.

Edit the template file

Each Crystal Vision card type is given a reference (ID) number. The range 900-999 is reserved for virtual cards. The card ID should be unique within any frame.

<id>900</id>

The card also needs a name, which must:

- Be unique within the frame.

- Contain only letters and numbers (no spaces).
- Start with a capital letter.
- 'User900' to 'User999' (depending on the card type ID) will meet these requirements.

<name>User900</name>

And a label – the name shown on the user interface, which must:

- Be ten characters or less.
- Be made up of letters, numbers and spaces.

<label>TestCard</label>

Optionally the card can also have a 'hint', a single line of text that might be shown when a mouse is hovered over the card selection.

<hint>MultiLogoPlayMode</hint>

A group of controls is defined by the tag pair <controlgroup> and </controlgroup>. The same tags are used at all levels.

VisionWeb uses a complex set of rules to optimise the presentation of groups of controls, but typically different levels of <controlgroup> entries might appear as follows:

<card>
header section
<controlgroup>
this level appears as a new tab
<controlgroup>
this level appears as an accordion
<controlgroup>
this level appears as a sub-accordion
</controlgroup>
could have more sub-accordions in here
</controlgroup>
could have more accordions here
</controlgroup>
could have more tabs in here
</card>

Each <controlgroup> entry must have a name and can also have a label (maximum ten characters) and optionally a 'labelfull', a longer label of up to 24 characters. These labels can contain letters, numbers and spaces. The label is what appears on the control interface; graphical interfaces will use the 'labelfull' if it is present.

A <controlgroup> entry cannot be empty, it must contain one or more controls or additional <controlgroup> entries.

The next step is to fill the <controlgroup> entries with the desired controls. The process involves copying the relevant control definition from the XML file for the 'source' card – the real card with the real control. This definition is pasted into the appropriate control group in the virtual card XML and changed as follows:

- The control ID is the number right at the start of the control definition. This must be a unique value in the virtual card, no two controls can have the same ID number. If the virtual card contains controls from more than one real card then two might have the same ID, by chance or because they are the same control on different cards of the same type. One way to ensure a unique control ID is to change the ID number to a new value that goes up by one each time you add a control. Starting at 10 avoids overlapping with the ID numbers in the header section. Make a note of the original control ID before you overwrite it, you will need in the next few steps.

The remaining changes take place in the 'interface' section:

- The contents of the **'snmpcontrol'** section should be deleted. In principle you can have SNMP control of a virtual card, but SNMP control of a user-created virtual card does not make much sense and the file is smaller and simpler without it.
- Change the **'controlid'** to match the number put into the 'id' in step 1.
- Add a 'redirect' section, defined by the tags <redirect> </redirect>. The redirect section tells the frame which slot the real control is in and what its control number is.

For example, using the MultiLogo ‘Play Mode’ control 170 in slot 4:

Before	After
<interface> **<controlid>75</controlid>** **<snmpcontrol> <id>75</id>** **<snmptableid>2</snmptableid>** **<snmptrap>** **<snmptraponupdate/>** **</snmptrap>** **</snmpcontrol>** **</interface>**	**<interface>** **<controlid>10</controlid>** *number changed to match new id* **<redirect>** **<slotid>4</slotid>** *the slot number of the source card (1-12 in a 2U frame)* **<destid>170</destid>** *the control ID of the copied control as it appears on the source card* **</redirect>** **</interface>**

The **slotid** is the slot number that the source card is in. In a 2U frame this will be in the range 1 to 12, in a 1U frame it will be in the range 1 to 6.

The **'destid'** is the 'id' value of the control as it appears on the source card. This is the number that you made a note of in step 1.

Apart from changing the ID number and the interface section, the control should remain as copied from the source card file.

Repeat this process for each control you want to add.

So for the single MultiLogo ‘Play Mode’ control, we could edit the template XML file as follows:

```
- <controlgroup>
    <name>MultiLogo</name>
    <label>MultiLogo</label>
  - <layout>
      <horizontal/>
    </layout>
  - <control>
      <id>10</id>
      <name>Ram1PlayMode</name>
      <label>Play Mode</label>
    - <interface>
        <controlid>10</controlid>
      - <redirect>
          <slotid>4</slotid>
          <destid>170</destid>
        </redirect>
      </interface>
      <default>0</default>
    - <enum>
      - <enumitem>
          <value>0</value>
          <label>Stop</label>
        </enumitem>
      - <enumitem>
          <value>2</value>
          <label>Pause</label>
        </enumitem>
      - <enumitem>
          <value>1</value>
          <label>Play</label>
        </enumitem>
      </enum>
    </control>
</controlgroup>
```

The original control id has been replaced with 10 and re-directed to slot 4 control 170. Otherwise the XML code for the MultiLogo ‘Play Mode’ control is the same. The control has been included as the only control in the group ‘MultiLogo’.

Repeating this process for the additional control from the SYNNER 310 in slot 6:

```
- <controlgroup>
    <name>Synner310</name>
    <label>Synner 310</label>
  - <layout>
      <horizontal/>
    </layout>
  - <control>
      <id>11</id>
      <name>RgpVideoSyncSource</name>
      <label>Genlock Source</label>
    - <interface>
        <controlid>11</controlid>
      - <redirect>
          <slotid>6</slotid>
          <destid>29</destid>
        </redirect>
      </interface>
      <default>1</default>
    - <enum>
      - <enumitem>
          <value>0</value>
          <label>SDI Input</label>
        </enumitem>
      - <enumitem>
          <value>1</value>
          <label>Reference</label>
          <labelfull>Reference Input</labelfull>
        </enumitem>
      </enum>
    </control>
  </controlgroup>
</controlgroup>
```

The new control id 11 is created and then re-directed to slot 6 control 29. The new control has been included as the only control in the group ‘Synner310’.

Repeat this process for as many controls as required, nesting the controls to be within the correct groups.

Check the edited file against the XML schema

If you are using a dedicated XML editor, it should be able to check the XML file for validity against the Crystal Vision schema file (CrystalVision.xsd). The preferred 'Oxygen' XML editor does this automatically. The schema file is included with the XML files download from the Registered Area on the Crystal Vision website.

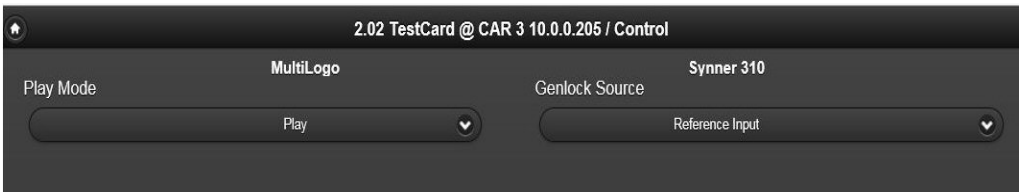
Transfer the file to the frame

Once you have got the controls you want you need to transfer the xml file to the **/virtualcard** directory in the frame. Follow the instructions in section *File Structure*.

Then reboot the frame. The virtual card will then be available in its new virtual slot to be accessed by VisionWeb, VisionPanel or by the Indigo 2AE active front panels:

Screen grab showing new virtual card 'TestCard' in slot 18 (2.02) in addition to the existing MultiLogo and SYNNER 310 cards in slots 4 and 6

Clicking on '2.02 TestCard' will open up the new virtual card:



For the simple example above, the new controls were each added to the two 2nd level <controlgroup> entries for 'MultiLogo' and 'Synner310', which were both included in the 1st level <controlgroup> 'Control'. The controls could have been combined into one group or allocated separate tabs by correct nesting of the XML control definitions within the hierarchy. The hierarchy of the <controlgroup> entries was created like this:

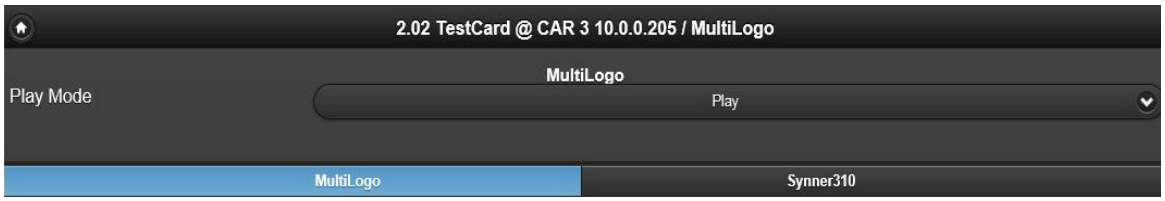
controlgroup	controlgroup	control
<controlgroup> <name>**Control**</name>		
	<controlgroup> <name>**MultiLogo**</name>	
		<control> <id>10</id> <label>**Play Mode**</label> </control>
	</controlgroup>	
	<controlgroup> <name>**Synner310**</name>	
		<control> <id>11</id> <label>**Genlock Source**</label> </control>
	</controlgroup>	
</controlgroup>		

More controls could have been included in either <controlgroup> entries for 'MultiLogo' or 'Synner310'.

If we were to change the above nesting by missing out the 2nd level of <controlgroup> entries but adding an additional 1st level <controlgroup> entry like this:

controlgroup	control
<controlgroup> <name>**MultiLogo**</name>	
	<control> <id>10</id> <label>**Play Mode**</label> </control>
</controlgroup>	
<controlgroup> <name>**Synner310**</name>	
	<control> <id>11</id> <label>**Genlock Source** </label> </control>
</controlgroup>	

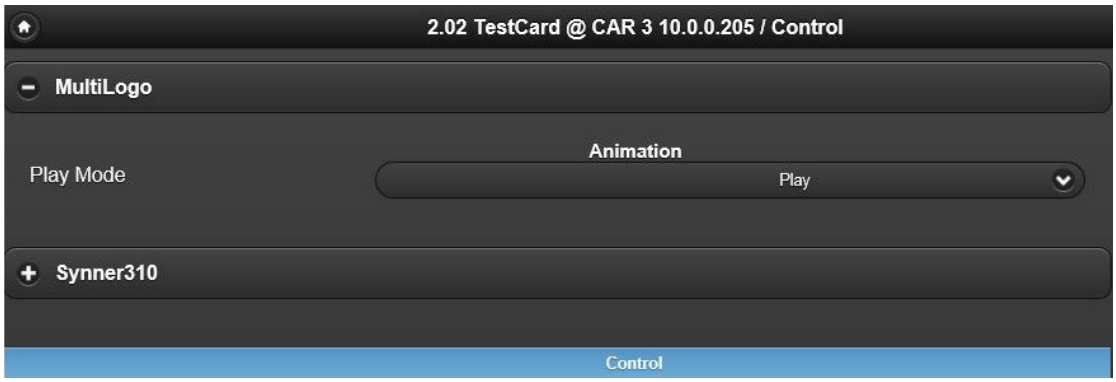
It will produce the following with two tabs:



Adding a third level of <controlgroup> entries like this:

controlgroup	controlgroup	controlgroup	control
<controlgroup> <name>**Control** </name>			
	<controlgroup> <name>**MultiLogo**</name>		
		<controlgroup> <name>**Animation**</name>	
			<control> <id>10</id> <label>**Play Mode** </label> </control>
		</controlgroup>	
	</controlgroup>		
	<controlgroup> <name>**Synner310**</name>		
		<controlgroup> <name>**Reference**</name>	
			<control> <id>11</id> <label>**Genlock Source** </label> </control>
		</controlgroup>	
	</controlgroup>		
</controlgroup>			

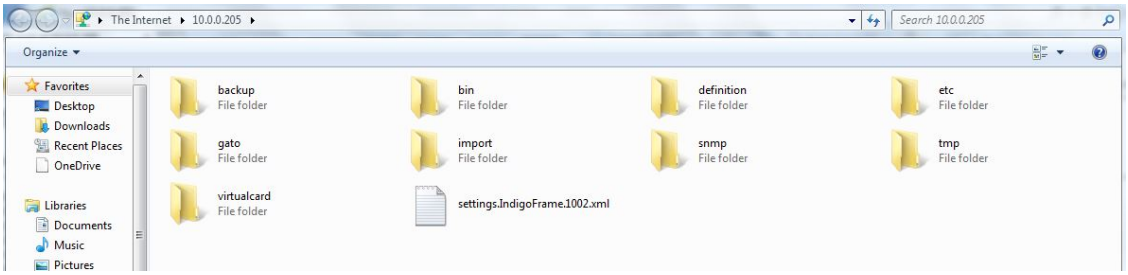
It will produce the following with a single tab ‘Control’ but with two groups that open when selected to reveal the included controls:



6 Frame memory

6.1 File Structure

Indigo has backup memory located in the Front Panel processor and is accessible via FTP. The file structure consists of a number of folders all of which contain files for different aspects of frame control. For example, some folders contain the files created by automatic backup of a card's settings, others contain files for manual restoration of a card's settings. To access a frame via FTP with Internet Explorer type: ftp:// followed by the frame's IP address i.e. ftp://10.0.0.205. Files can be copied to and from a PC folder via FTP.



Typical FTP file structure as viewed by Internet Explorer.

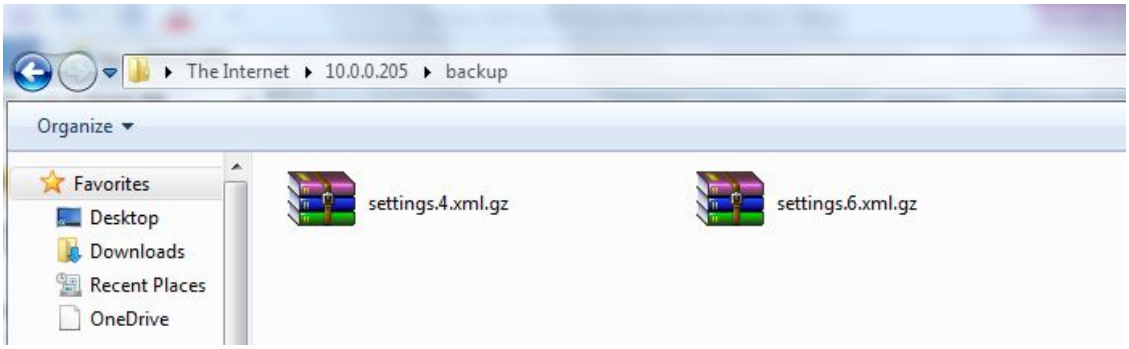
Folder (or file)	Function
backup	**Contains each slot's automatic backup files.**
bin	**No user content.**
definition	**No user content.**
etc	**Contains files for password protection.**
gato	**No user content.**
Import	**Contains settings files for manual restoration.**
snmp	**Contains the files for SNMP configuration.**
tmp	**No user content.**
virtualcard	**Contains virtual card's xml definition files.**

settings.frame.1004.xml	**File containing automatic backup of frame's settings.**
trace.log	**No user content.**

6.2 Cards

From v5.3, Indigo automatically backs up every card's settings whenever they are changed. These values can be restored automatically or manually as required – *see section VisionWeb for more details.*

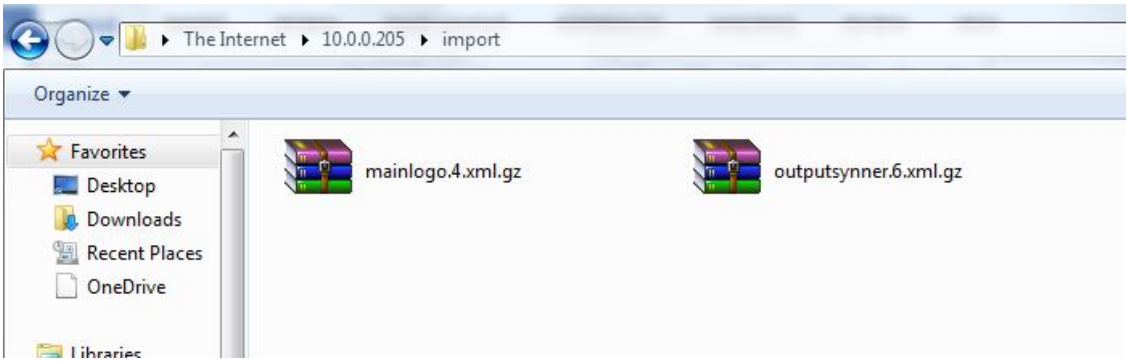
The settings files for automatic backups are stored on a slot by slot basis and have filenames 'settings.N.xml.gz' where 'N' is the slot number. These files are stored in a folder 'backup' which is accessible by FTP:



Typical contents of 'backup' folder showing settings for slots 4 and 6

If the 'Auto Restore' option is enabled then these files are automatically resent to the card in the slot on power up, reset and when a card is re-inserted.

With an FTP connection from a PC it is possible to copy these files, rename them if necessary, to make them more relevant, and use them for the manual restore operation. Settings files for manual restoration are stored in the folder 'import':



Typical contents of 'import' folder showing renamed settings files for two slots

Currently, files cannot be ‘dragged and dropped’ from the backup folder to the import folder but must be copied into a PC local folder first. The transferred file can be renamed to something more relevant to its function. Manual restore gives the option of using a single settings file from the import folder to be sent to one or more slots. This is particularly useful for initial setting up of multiple cards which need to be configured identically as only one has to be configured and then applied to the others. When copying any settings via FTP the frame will require a reboot in order for the new settings to take effect.

6.3 Frame

The frame automatically creates a backup file whenever its configuration is changed such as network or slot labelling.

The backup file for the frame is in the root directory and is labelled ‘settings.Indigoframe.1004.xml’. The filename may change according to the firmware fitted but will be of that form. It is worthwhile copying this file onto a PC in case the Frame Control Processor is replaced; then the file can copied back to restore previous settings.

When copying any settings via FTP the frame will require a reboot in order for the new settings to take effect.

7 Operating the Active Panel

The active control panel on the Indigo 2AE maintains a list of controllable modules, which is accessed by pressing the 'DEVICE' button. The display will give information about the number and location of all remote-enabled cards that are available.

Caution: Older modules that do not respond to panel interrogation cannot be controlled, unless updated with a firmware update (if available).

The reported number of cards available includes the PSU and front panel as the Indigo front panel PIC and the power supply each have an address and are treated as modules.

7.1 Using the front control panel

At power up, the LEDs of all eight control panel keys will illuminate briefly. Once the panel has completed its power up and configuration sequence the panel will enter its status mode and display the current software version and frame IP address.

'Status' menu showing current software version and IP address

Selecting a module

To continue with control panel operation or configuration, press the 'DEVICE' key once. The control panel will display the name of the card that first responds to the polling request together with its location number. The location number consists of the frame number plus the card position in the frame. Rotate the Shaft control to poll through the available cards. Use the F2 soft key to toggle between the card's serial number and issue number with modification level.

'Device' menu showing a TANDEM 310 in slot 1.01

In the example above, the card displayed (a TANDEM 310) is located in slot number one.

When the desired card is selected press the ENTER key to access that card's HOME menu.

The TANDEM 310 home menu

Rotate the shaft control to scroll through the menu structure and press ENTER to select the sub-menus. Press HOME at any time to return to the home menu.

Example of a module's sub-menu

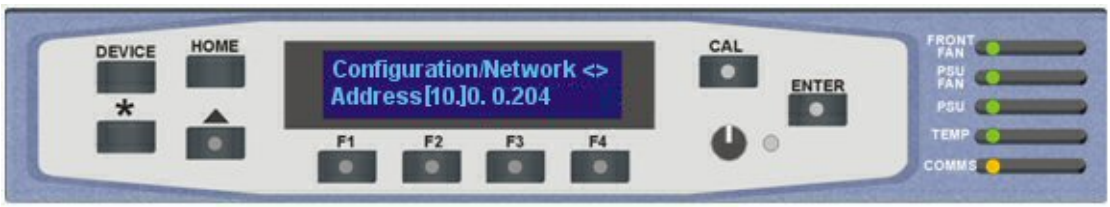
Press ENTER to select the sub-menu or SCROLL to display others. See the appropriate module's user manual for a full description of its menu structure.

Changing the Network Settings

Pressing ***** (Asterisk) will open the Configuration/Network home page where network settings can be modified:

Example of the Network Setup home page

The home page shows the current IP Address and pressing 'ENTER' will allow the address to be modified. The part of the address to be changed is bracketed:



Rotate the shaft control to scroll through to the desired value and press 'ENTER' to select the chosen value and move the brackets to the next part of the address. From the Network home page use the SCROLL control to select the Netmask or Gateway addresses:

When all the network parameters have been set, SCROLL through to the 'Reboot' page and select 'Confirm'. This will reboot the frame and make the changes:

Control Panel keys overview

The functions assigned to the control panel keys are:

- DEVICE – enters 'device' menu to select a card or show available cards.
- ASTERISK (*) – selects 'network configuration' menu.
- F1 to F4 – soft keys used by some modules.
- HOME – returns to top of module's menu structure. Shows frame's current IP address.
- ENTER – accept current selection.
- Up arrow – used to move up through the menu structure.
- Rotary control – shaft encoder used to select sub-menus or variable data.

See individual board handbooks for detailed menu structure.

Updating the display

The values displayed on an active front control panel are only updated when an adjustment is made and when changing menu level. If changes occur through the use of card edge controls or other remote control, the text displayed on the active front control panel will not be updated immediately. If necessary, use the upward arrow to leave and then re-enter a menu to update the display.

Slot numbers

In Indigo frames, the slot or location numbers are determined by the position of the card in the frame.

The front panel PIC controller and PSUs are allocated slot numbers as follows:

Device	Address in frame	Notes
Modules	1.01 to 1.12	Press ENTER for module Home menu
Frame Monitor	1.13	Press ENTER for frame s/n and temp
PSU Monitor	1.14 & 1.15	Press ENTER for PSU s/n and type

The Frame Monitor ‘module’ will display the air temperature, in degrees Celsius, inside the frame above slot 5 where the temperature sensor is located.

Node numbers

Whilst most Crystal Vision cards have their unique card location address assigned automatically, older cards and frames use a ‘node’ switch on each card.

In all of the current frames, this node switch should be set to zero (factory default).

For compatibility reasons, the Home menu for each module may display the module's node number (one less than its location or slot number).

Further details of control panel operation can be found in the Indigo Control Panel User Manual and details of module operation can be found in the documentation supplied with each module.

8 Maintenance

Warning: **These servicing instructions are for use by qualified personnel only. To reduce risk of electric shock, do not perform any servicing other than that contained in the Operating Instructions unless you are qualified to do so. Refer all servicing to qualified service personnel.**

Refer also to the General Safety Summary in the Installation chapter.

Inserting and removing power supplies

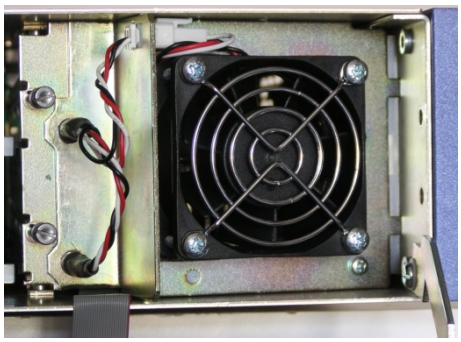
The PSU-160i power supply can be inserted and removed while the system is powered without damage. However, this must be done quickly as there will be no forced convection air, as the PSU fan assembly has to be removed.

To gain access to the Indigo PSUs proceed as follows:

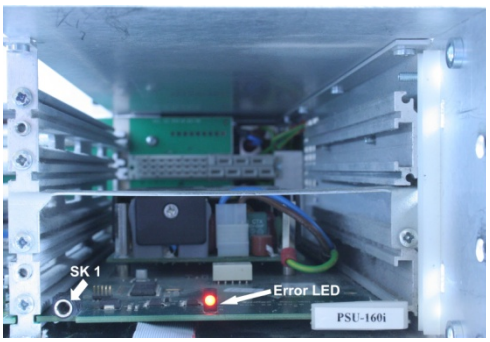
- If possible, power down the frame
- Pull down the front panel using the black knobs at either side of the panel
- Release the two captive screws to the left of the PSU fan
- Remove the fan assembly by applying sideways pressure on the fan assembly outwards and towards the right hand frame side

Note: Take care not to damage the panel ribbon cable when removing the fan assembly.

Once the fan assembly has been pulled backwards to free the fan connector plugs, the PSU fan will stop and the front panel PSU FAN LED will change from green to red.



Removing the PSU fan assembly



Lower PSU-160i – front view

In addition to the PSU and fan LEDs on the front control panel, there is also a red error LED on the PSU. This LED will flash slowly if there is no fan speed signal present on the fan connector SK1 when the PSU fan assembly is removed or if the PSU fan stops.

The error LED will light up continuously if power rail levels are outside operational limits. When the fan speed signal is present and power rails are normal the error LED is unlit.

Removing a PSU

To remove a PSU proceed as follows:

- Apply sideways pressure on the PSU handle towards the right and remove the PSU by pulling it forward
- Take care when removing the lower PSU not to damage the panel ribbon cable

Caution: There are no user serviceable parts inside the power supply module covers. The safety covers should not be removed even when the module is disconnected.

Note: Check that the 2/1 switch behind the control panel is set correctly for the number of PSUs installed to prevent redundant PSU warnings.

Inserting a PSU

To insert a PSU proceed as follows:

- Check that any second power supply is the same type as already fitted
- Offer up the PSU to the frame guide rails – it may help to turn the lower PSU handle fully outwards to clear the panel hinge
- Carefully push the PSU all the way into its socket

Notes: PSU modules should only fit into the PSU slots behind the PSU fan assembly. Do not attempt to fit a PSU into a video or audio module slot.

Check that the 2/1 switch behind the control panel is set correctly for the number of PSUs installed to prevent redundant PSU warnings.

Fitting the fan assembly

To replace the PSU fan assembly proceed as follows:

- Offer up the fan assembly ensuring that the two lugs fit into two slots in the right hand side of the frame just in front of a plastic stop
- Carefully move the fan assembly into position ensuring that the two PSU fan jacks fit into the PSU jack sockets (SK 1)
- Take care not to damage the panel ribbon cable
- Tighten the two captive screws to the left of the PSU fan ensuring that they are not too tight to be undone without a screwdriver.
- If the unit was unpowered it may now be powered and tested

Replacing the PSU fan

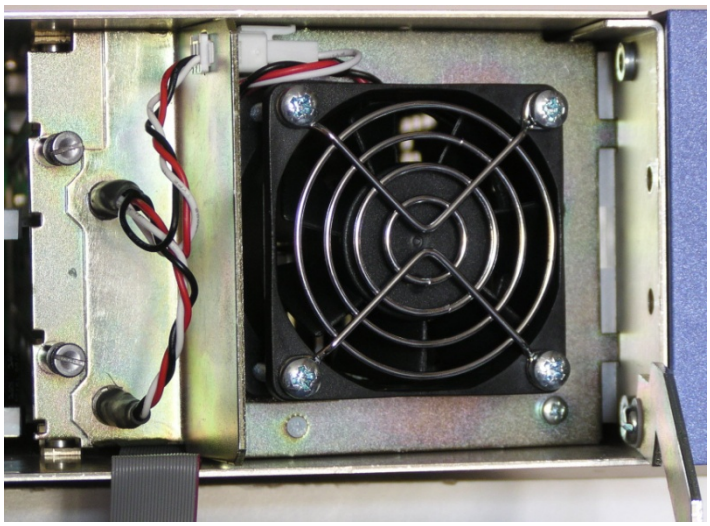
It is recommended that PSU fan replacement should be performed as quickly as possible if performed whilst the frame is powered, to prevent overheating.

Tip: Close the front panel whilst the PSU fan assembly is removed when the frame is powered to allow the front panel fan to operate and provide cooling.

To replace the fan proceed as follows:

- If possible disconnect the power cord(s) connected to the frame
- Remove the PSU fan assembly as shown in the preceding section
- Undo the three-way connector which is attached to three wires on the fan
- Remove the finger guard and fan by unscrewing the four retaining screws
- Replace the fan with a Crystal Vision supplied replacement part to ensure adequate cooling and continued fire protection
- Be sure to refit finger guards on the outer side of the mounting plate assembly
- Plug in the three-way connector from the new fan
- Replace the PSU fan assembly as shown in the preceding section
- Reconnect the power supply cords

If the frame is powered, the PSU fan should now be operating and the PSU FAN LED should be green.



PSU fan showing three-pin connector and finger guard

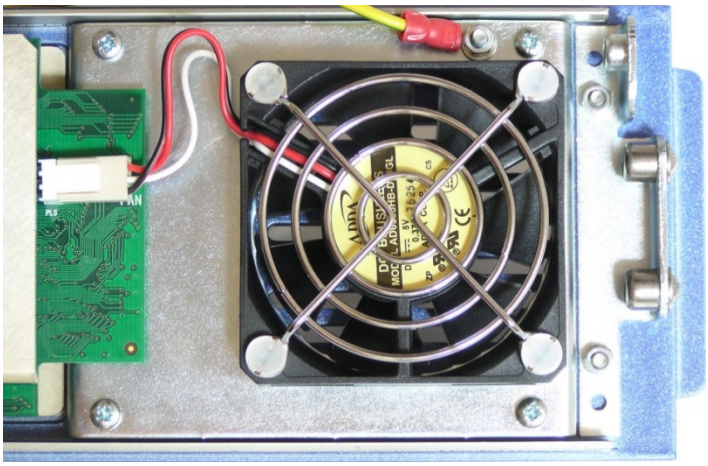
Replacing a front panel fan

To replace a front panel fan proceed as follows:

- If possible disconnect the power cord(s) connected to the frame

- Open the front panel. The display on an active control panel will indicate 'Front open'
- If the frame is powered, the fan on the front panel will stop and the PSU fan will automatically speed up to maximum speed
- Undo the three-way connector which is attached to three wires on the fan from the front panel PCB labelled FAN
- Using a screwdriver slacken the four plastic screws that hold the fan and fan's finger guard on a mounting plate which is on the front panel
- Remove the fan and finger guard completely
- Replace the fan with a Crystal Vision supplied replacement part to ensure adequate cooling and continued fire protection. Be sure to fit the finger guards on the outer side of the fan
- Reconnect the three-way connector – which is attached to three wires on the fan – on to the front panel PCB connector labelled FAN
- Close the front panel and reconnect the power supply cords

  The front panel fan should be operating and the FRONT FAN LED should be lit green. The display on an active control panel will indicate 'Fault cleared'.



Indigo 2AE front panel fan showing three-pin connector and finger guard

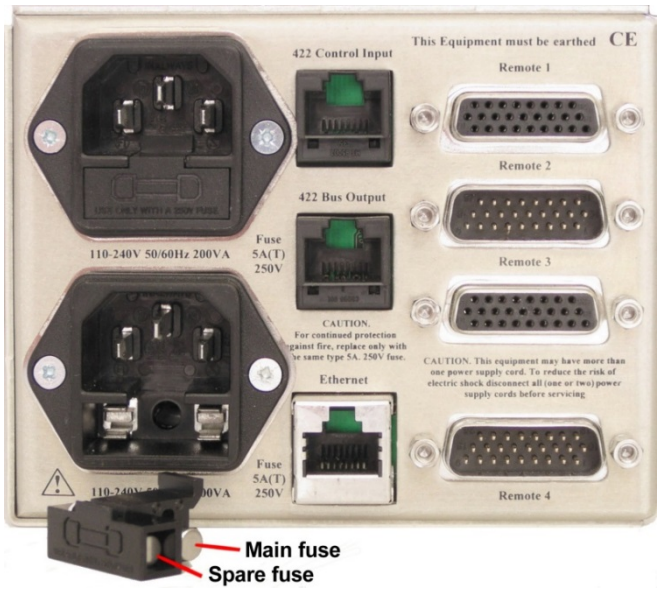
Indigo 2SE front panel fan showing 3-pin connector and finger guard

Replacing the mains input fuses

The mains input fuses are fitted inside the IEC 320 connectors at the rear of the frame. A spare fuse is also stored inside the connector. The fuse can only be accessed when the power cord is disconnected.

The sequence is as follows:

- Disconnect ALL the power cords (one or two depending on configuration) from the rear of the frame
- Using a flat bladed screwdriver or similar tool gently lever out the fuse drawer from the relevant IEC connector using the tab visible at the bottom of the connector depression
- Remove the defective fuse and replace with either the spare fuse or with a 5A, 250V time delay fuse
- Replace the fuse drawer and reconnect the power cords



Rear connectors showing IEC mains inputs and fuse tray with main and spare fuses

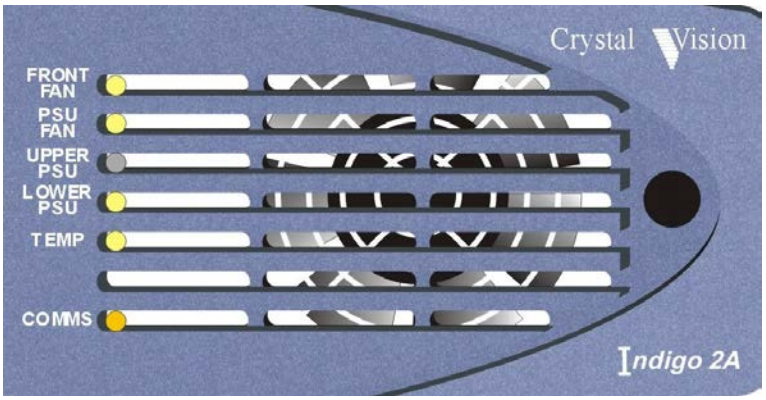
If a fuse blows repeatedly this indicates a fault either in the associated power supply module or elsewhere. Return the frame and/or power supply to the manufacturer or dealer for repair.

Note: Replace the fuse only with one of the same type and rating (5A, 250V time delay).

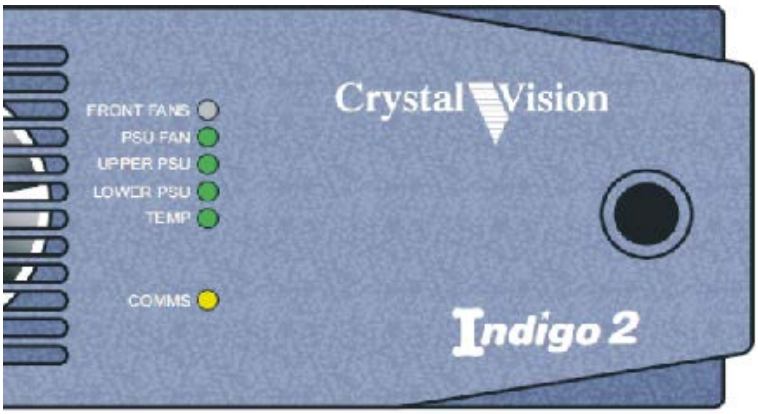
9 Troubleshooting

Reading front panel LED status

There are six two-colour LEDs on a front panel, with green indicating a normal condition and red an abnormal condition.



Indigo 2AE LEDs



Indigo 2SE LEDs

The following LED status indications may be seen:

LED	Colour	Notes
Front Fan(s)	Unlit	Door open
	Green	Normal operation
	Red	Change the panel fan
PSU Fan	Unlit	Door closed and fan idle
	Green	Door open and fan operational
	Red	Change PSU fan
Upper PSU	Unlit	No upper PSU detected
	Green	Normal operation
	Red	Change upper PSU

Lower PSU	Unlit	No lower PSU detected
	Green	Normal operation
	Red	Change lower PSU
Temp	Green	Normal operation
	Red	Internal temperature too high (approx. 65ºC)
Comms	No function	

If a PSU is not fitted, the corresponding LED will not illuminate unless the incorrect number of PSUs are selected when it will flash red.

VisionWeb users will be able to remotely monitor frame temperature and fan speed.

Power supply related faults operate a relay, the contacts of which are brought out to the Remote 2 and Remote 4 connectors. These contacts can be used to operate external indicators as desired.

Please refer to the Connector pinout section for more details.

PSU relays

Each PSU contains a relay, the contacts of which are brought out to the remote connectors. This relay is under frame control and will change state whenever a frame fault is present.

Note: If the frame is fitted with two PSUs the frame will control both relays simultaneously. These contacts can be used to operate external indicators as desired.

Note: In certain circumstances there may be a delay of several seconds between the first relay and any other relay's state changing.

Note: The red LED built into the front of the PSU will flash repeatedly (on for one second and off for one second). The same red LED will light up continuously if levels of the power rails (+5.75V or -6.0V) are outside operational limits.

Frequently asked questions

Why are there no LEDs illuminated?

Check that at least one frame PSU is functioning

Check that the frame is powered and that the fuse is intact

Check that the panel is cabled correctly

What should I do if the TEMP LED is red?

Check that cool air is able to circulate through the front panel grilles and out of the ventilation holes at each side of the frame

Check that the panel and PSU fans are operational and that the FRONT FAN and PSU FAN LEDs are not red

What should I do if the PSU FAN LED is red?

Check that the PSU fan is plugged in correctly

Try replacing the fan

What should I do if the FRONT FAN LED is red?

Check that all front control panel fans are plugged in correctly

Try replacing the fan(s).

What should I do if the UPPER or LOWER PSU LED is red?

Check that the mains cord is connected to the PSU indicating the fault

Try replacing the appropriate PSU

Why does the LOWER PSU LED flash from green to off?

This will occur if two PSUs are fitted when the 2/1 PSU switch at the rear of the front panel is set for only one PSU. Move the switch into the 2 position

Why doesn't the switch on the front panel that sets the slot address work?

Changing this switch only takes effect the next time the front panel is powered up

10 Specification

Indigo 2AE frame and Indigo 2SE CoolFlow frame

General

Dimensions:	482mm wide (19 inches), 89mm high (2U), 425mm deep. Weight 5 kg
Power requirements:	85 to 264 Volts, 47 to 400Hz
Operating conditions:	0 to 40 degrees C non-condensing Ventilation front to front, without air filters
Power supply:	Up to two plug-in power supplies (160 Watt PSU-160i)

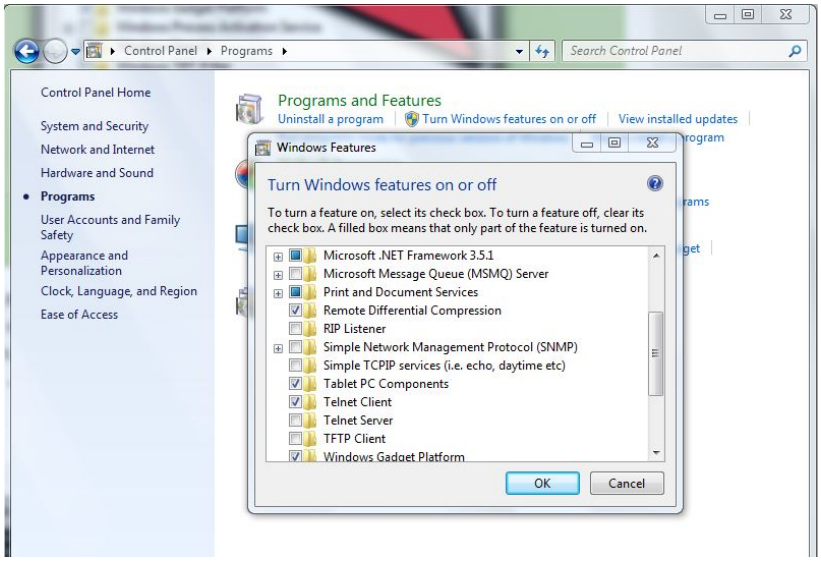
Module control

Remote options:	Six control lines per module. Assigned on module (e.g. GPI or RS422/RS232)
	Contact open/closure for any power supply or frame fault condition (supply out of range or failure, fan too slow or fail, overheat)
	RS485 loop system for front panel to all modules and rear connection (rear connection by way of 26-pin high density D-Type connector and RJ45 connector)
	Second serial port available via 26-pin high density D-Type connector and RJ45 connector.
	Ethernet control capable
	SNMP control and monitoring option

11 Appendix 1

11.1 Telnet access to a frame or card

- By default telnet is disabled on Windows 7. Enable the Telnet Client from Control Panel/Programs/Turn Windows Features on and off/Telnet Client.



Turn Windows feature on to enable client.

Check the Telnet Client box to enable.

- Once the telnet client is enabled, run it on the PC by clicking on 'Start' and typing telnet into the "search programs and files" box. Hit return.
- Open a telnet connection with the frame by typing ‘open xxx.xxx.xxx.xxx (but replace xxx.xxx.xxx.xxx with the IP address of the relevant frame).
- You should get a ‘BusyBox’ message and a ‘root:/ #’ prompt.
- Type 'touch /tmp/please.exit' to halt the card application.
- Type ‘reboot’ and hit return to reboot the frame or card. You should get a ‘connection to host lost’ message.
- Close the telnet window on the PC when you have finished (just to be tidy).

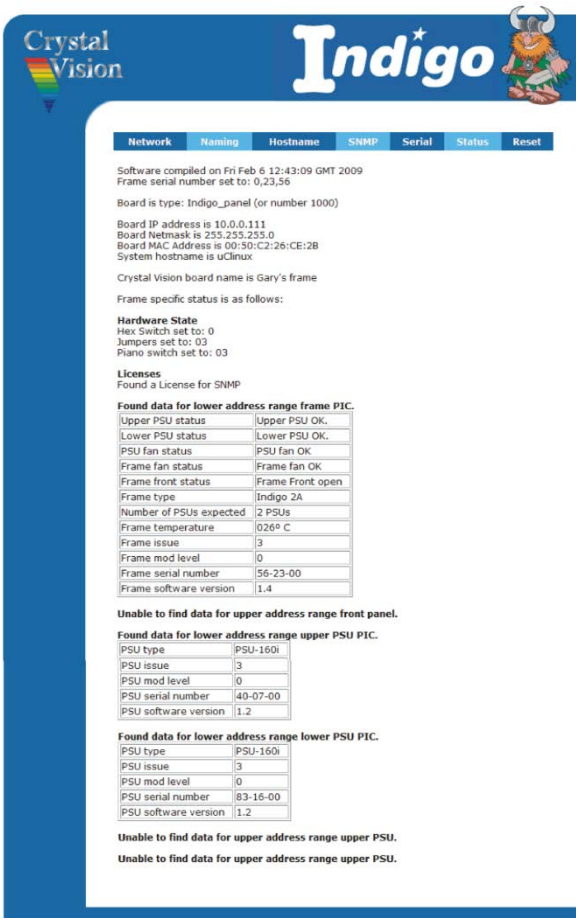
12 Appendix 2

12.1 Indigo Frame Software prior to v4.6

Prior to frame software version 4.6, Ethernet-enabled Indigo frames used an entirely different web interface. The following is documented for users of older frame software.

Setting up and connecting

The frame can be connected to a network port or directly to a PC from the rear panel RJ45 port labelled Ethernet. If connecting directly to a PC, a CAT5 crossover cable may be required. Connecting to a network port hub uses a straight CAT5 cable. To access the internal web page set the frame to the default IP address by setting the default IP address switch DIP4 to down. Open up your PC web browser and set its search to http://10.0.0.201 and select 'go to'. This is the default IP address, the sub-mask being 255.255.255.0. After a dialogue box has briefly appeared the Indigo main status page will be displayed.



Indigo Status page

This page will give a large amount of status information about the frame and its power supplies. From the web page several options are available such as changing the IP address and frame naming.

Note: *Once the IP address has been changed the status page will be accessible via this new address.*

Note: *It is possible to verify that the correct frame is being viewed by first recording the Hex switch setting (second line in status list) – this is the setting of the frame address switch. Rotate this switch to something other than the number displayed. Refreshing the browser will then reflect this change and verify that the correct frame is being communicated with.*

Status

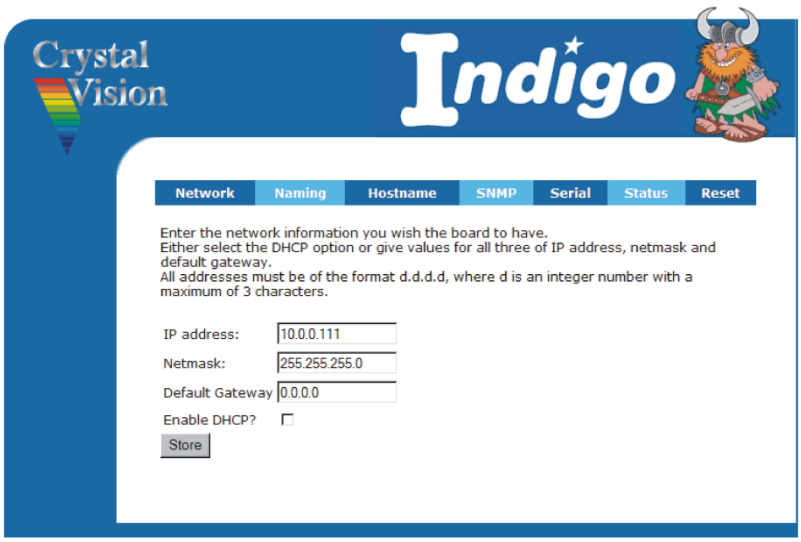
The status page gives an overview of the frame and its power supplies. The information that can be found here includes general information about the network attributes, frame name and serial number etc plus more frame specific information like internal temperature, fan status and PSU type. Further information is also given about the individual power supplies.

Changing the IP Address

An Ethernet-enabled frame will need to have its IP address set upon installation. This is made possible by setting the frame to act as a web server and then accessing an internal web page. Any software upgrades can also be downloaded to the frame via this web page.

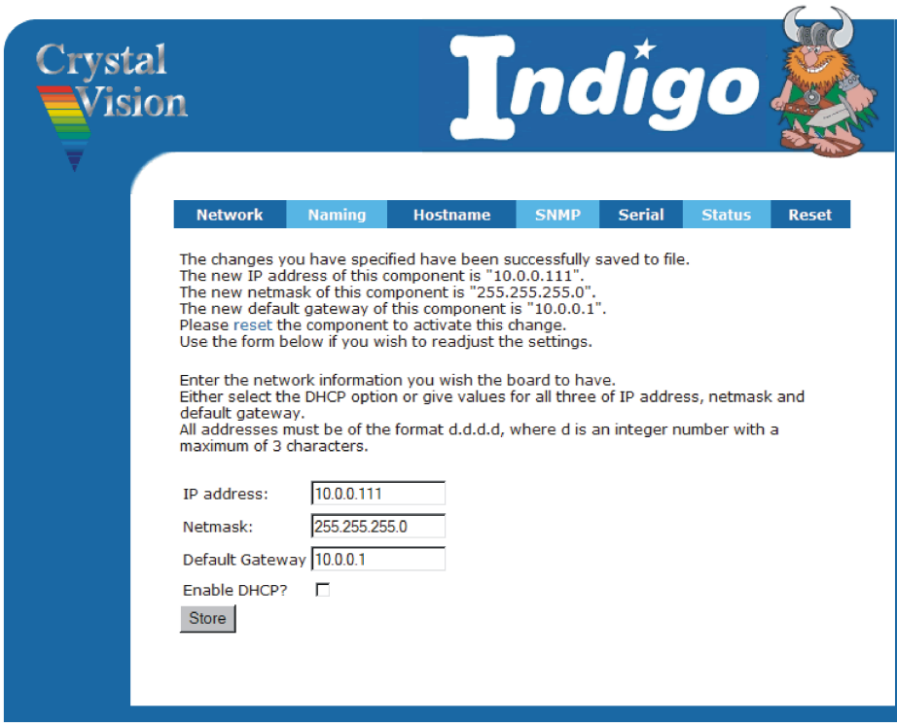
From this web page you are able then to change the IP address manually or automatically if DHCP is available. A frame serial number may also be entered.

To reset the IP address, from the status page select the Network link. A new page will open allowing entry of the required IP address and Netmask. Enter the new IP address and Netmask information and select ‘Store’. Should the frame be connected to a DHCP running network and a fixed IP address is not required, leave all the information blank and tick the DHCP box before selecting ‘Store’.



Network Window

Once ‘Store’ has been selected the Network screen will be replaced by a confirmation screen. As instructed lever four must be returned to the up position and the front panel power cycled. This can be achieved by either briefly interrupting the power to the frame or, if this is not convenient, removing the ribbon-cable connection to the front panel. Care must be taken not to bend any pins in the cable connect as attempting to re-straighten any bent pins is likely to result in their fracture.



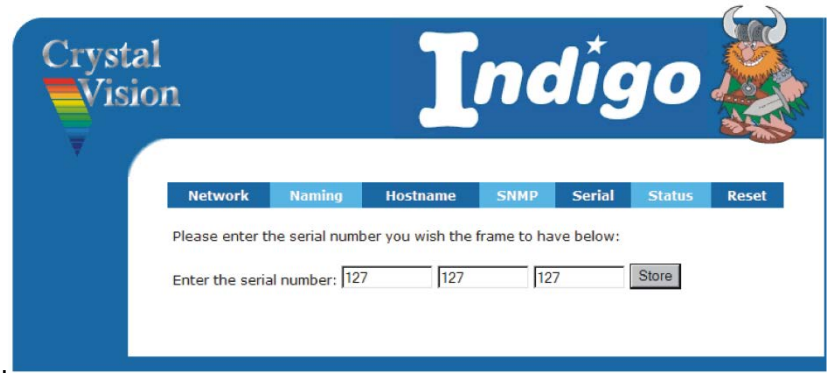
Confirmation Window

Should incorrectly formatted information be added, an error dialogue box will be displayed indicating the likely cause of the errors.

Adding a frame serial number

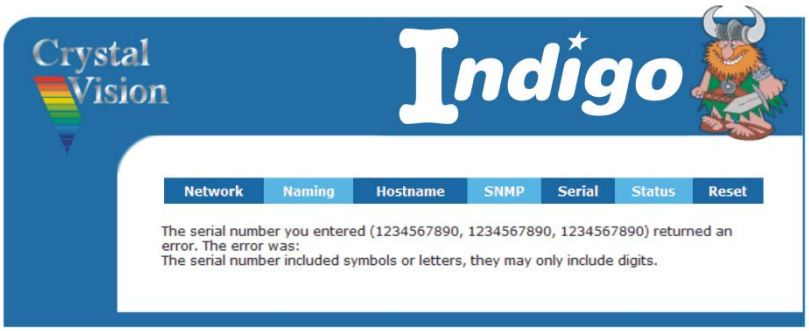
There is a facility to add a serial number to each frame to aid identification or for auditing purposes. The frame will have had a serial number entered during manufacture, this will be the front panel serial number. This serial number can be freely overwritten with any series of numbers within the specified range. The electronic serial number consists of three groups of numbers. These groups must only contain digits with no gaps and must fall into the range of 0-127. An example would be 0 0 0 or 127 127 127.

From the Status window select Serial and the following box will open:



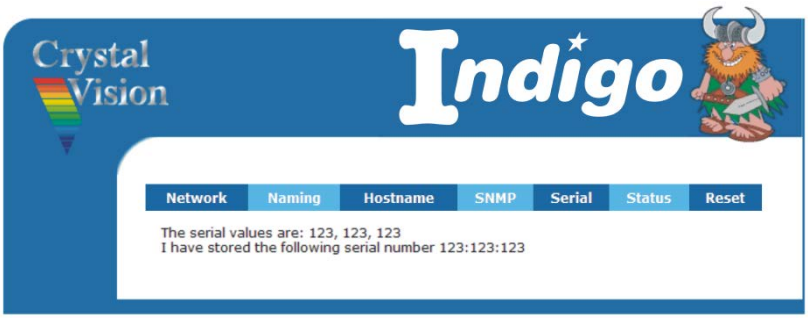
Serial number entry box

Once the desired serial number has been entered press the Store button to save it to memory. Should the chosen serial number contain an error or be out of range an error dialogue box will be displayed.



Error dialogue box

Once a serial number has been successfully entered a confirmation dialogue is displayed. The Status page will also echo the new serial number.



Serial number successfully added

Naming

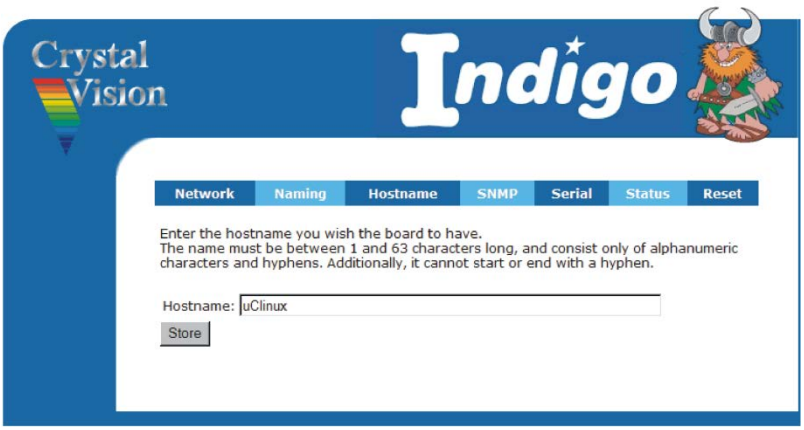
As well as having a discrete IP address it can be useful to give a frame its own unique name, perhaps to reflect its location. The naming tab allows this, with up to 20 characters and no spaces.

Naming the frame

Hostname

A **hostname** (occasionally also known as a **sitename**) is the unique name by which a network-attached device (which could consist of a computer, file server, network storage device, fax machine, copier, cable modem, etc.) is known on a network. The hostname is used to identify a particular host in various forms of electronic communication such as the World Wide Web, e-mail or Usenet.

The hostname tab enables such a name to be entered.



Hostname window

Reset

The reset button allows the frame front panel to be rebooted remotely, which is required when the IP address is changed.

Reset window

Note: *Restart only affects the front panel and not any other cards within the frame. No stored information will be lost.*

SNMP

The Indigo 2AE front panel uses the Net-SNMP agent which uses one or more configuration files to control its operation and the management information provided. The SNMP window provides a list of these config files. An in-depth explanation can be found by following the link from the SNMP window.

SNMP window

12.2 SNMP agent

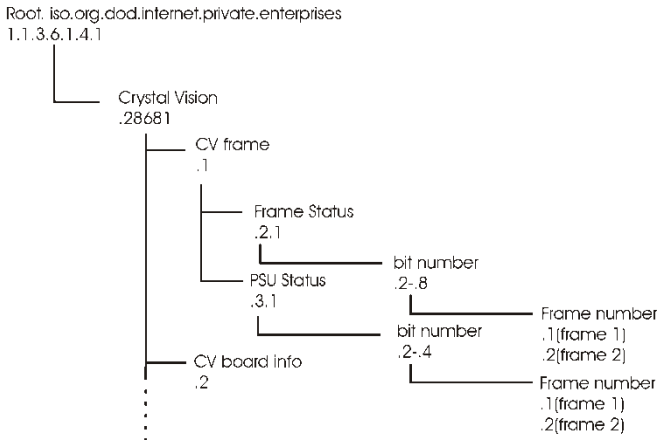
The Indigo 2AE frame comes with a pre-installed SNMP agent that can either report the status or generate traps on a status change of the PSU and frame systems. These SNMP traps can then be used to trigger alarms – for example, say when a signal has been removed, video standard changed or any of the many monitored status variables changed.

Note: *It will be necessary to import the frame MIB into the SNMP manager. See the manager instructions if necessary to accomplish this.*

Management information base (MIB)

As is normal for an SNMP manager system, each board to be monitored – in this case the front panel – has an associated MIB. Each MIB is a collection of object identifiers that identify all variables that can be read via SNMP.

The following diagram gives an overview of the OID sequences within the MIB tree.



MIB tree

Object identifiers (OID)

For each variable to be monitored there is an object identifier or OID which can be distinguished from any other OID within the MIB by its unique bit number.

As an example, the Front panel open status for the frame with slot addresses set to Lower (see section 2.4 for an explanation of slot addresses) is recorded by the OID 1.3.6.1.4.28681.**1**.2.1.**5**.**1** where **1** is the board type (Frame), the **5** is the bit number (Frame open) and the final **1** indicates that the frame slot addresses are set to lower. If the frame was set to upper slot, addressing the OID would be 1.3.6.4.28681.**1**.2.1.5.**2**. The OID will then be accompanied by a value to indicate its status. Any status change will cause the transmitting of a trap to the SNMP manager.

Note: The SNMP monitor allows for two frames to be connected as a frame pair. The second frame will be reported as Unknown when not present.

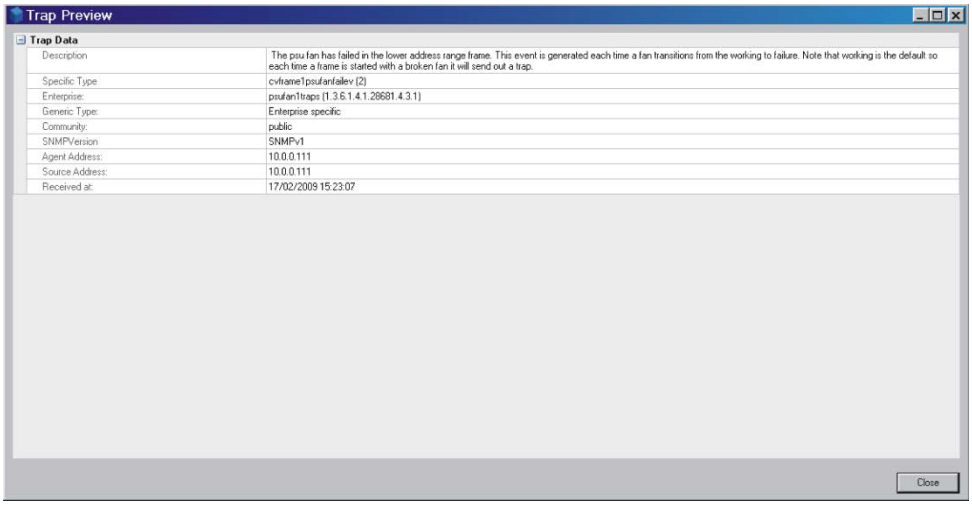
The frame variables monitored are:

Name	Value	Name	Value
Frame Present 1	Frame PIC found/not found	PSU Present 1	Found/not yet found
Frame Present 2	Frame PIC found/not found	PSU Present 2	Found/not yet found
Frame Type 1	Reserved/unknown	PSU Present 3	Found/not yet found
Frame Type 2	Reserved/unknown	PSU Present 4	Found/not yet found
Frame Temperature 1	Integer (temp)	PSU Type 1	PSU-160i/unknown
Frame Temperature 2	Integer (0)	PSU Type 2	PSU-160i/unknown
Frame Open 1	Front panel open/closed/unknown	PSU Type 3	PSU-160i/unknown
Frame Open 2	Front panel open/closed/unknown	PSU Type 4	PSU-160i/unknown
Frame PSU Fan Status 1	PSU fan OK/problem/unknown	PSU Status 1	PSU OK/problem/unknown
Frame PSU Fan Status 2	PSU fan OK/problem/unknown	PSU Status 2	PSU OK/problem/unknown

Frame Panel Fan Status 1	Panel fan OK/problem/unknown	PSU Status 3	PSU OK/problem/unknown
Frame Panel Fan Status 2	Panel fan OK/problem/unknown	PSU Status 4	PSU OK/problem/unknown
Frame Temperature Alarm 1	Frame temperature OK/too high/unknown	Expected but not fitted PSU	PSU not fitted or not powered
Frame Temperature Alarm 2	Frame temperature OK/too high/unknown		

Traps

Whenever a status value changes, a trap will be sent to the SNMP manager. By interrogating this trap it is possible to identify the status change and its consequences. It will be quite common for multiple traps to be sent for any one incident – for example, removing an input may typically trigger eight traps. It will then be down to the SNMP manager to sort these into a hierarchical order or mask as necessary.



Example of a trap received by the SNMP manager

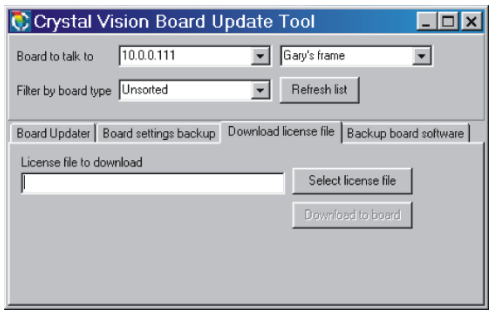
Downloading licences

The Indigo 2AE frame is pre-installed with an SNMP manager which will require a licence to be downloaded and installed. The licence is available by email from Crystal Vision's customer support. To obtain a licence the frame's MAC address will be required.

Once you have obtained the licence, the file is downloaded to the frame using the board update tool.

Click the "Refresh list" button and wait whilst the network is scanned. Once done then select the frame for upgrading from the "Board to talk to" drop-down list by IP address or name.

Select the "Download license file" tab and click on the Browse button. Navigate to the folder containing the Licence file. Click "Download to Board" and wait.



It will now be necessary to reboot the frame. This can be achieved by cycling the mains supply to the frame or, if not convenient, carefully removing the ribbon cable connector from the front panel PCB.

Note: Take great care when reinserting the front panel ribbon cable that none of the pins in the PCB connector become bent or misaligned.

12.3 SNMP Quick Start Guide

Introduction

This should provide the information you need to set up and check a Crystal Vision frame for operation with an SNMP manager.

Frame Setup

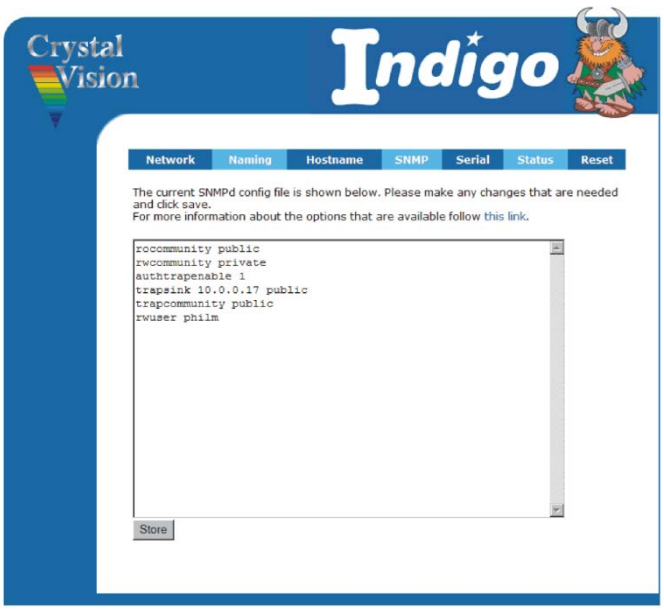
The frame must have a licence for SNMP operation for it to respond properly to SNMP requests. This can be checked by looking at the frame web page. Look at the frame IP address using a web browser. You should see a page like this:

If you click as indicated, you should go to the frame home page. This may happen automatically.

Frame Home page

Check that the 'Licenses' section shows "Found a License for SNMP". If no licence is found contact Crystal Vision to get an SNMP licence for this frame.

Once the frame is licensed for SNMP you will need to set the address to which you want it to send unprompted SNMP messages (traps). On the web page shown above, select the 'SNMP' tab.



SNMP page

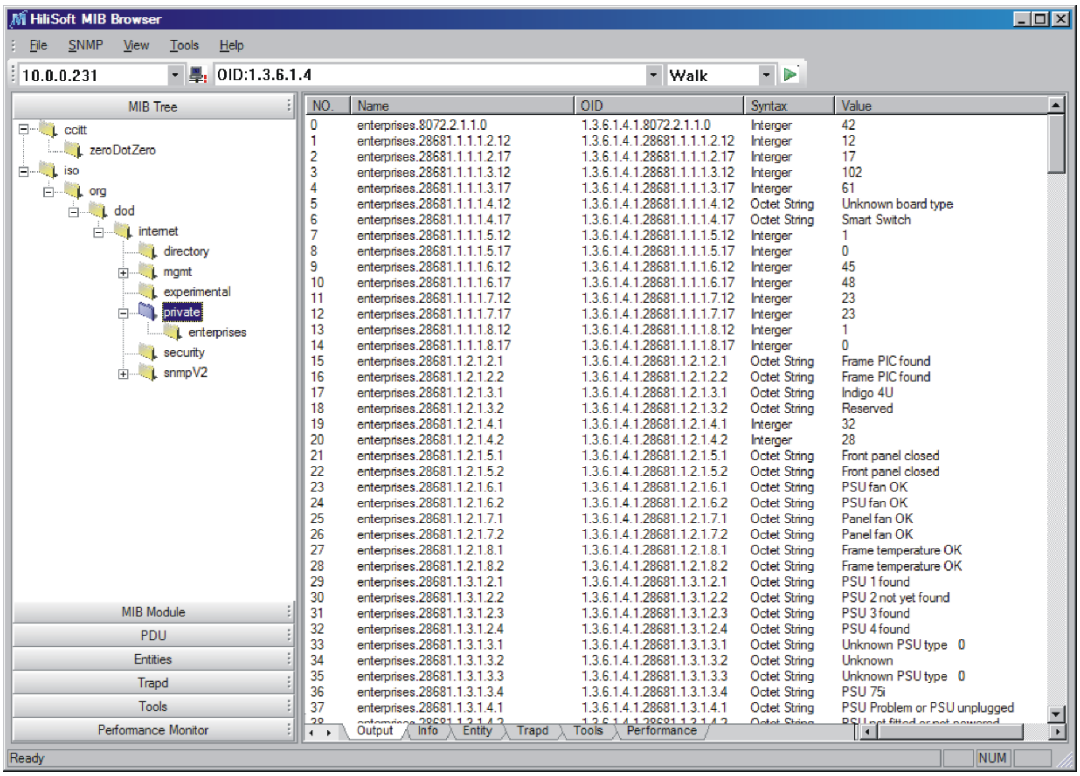
The SNMP Agent in the frame is highly configurable. However, the default settings are correct for most systems and it is likely that only the 'trapsink' address needs to be changed. Click and drag to select the trapsink IP address and type in the IP address of the SNMP manager being

used as the trap receiver. Then click on the ‘Store’ button to write the new value into the frame. This will take a few seconds. You will then need to re-boot the frame (as described in the "Resetting the Frame" below) for the setting to take effect.

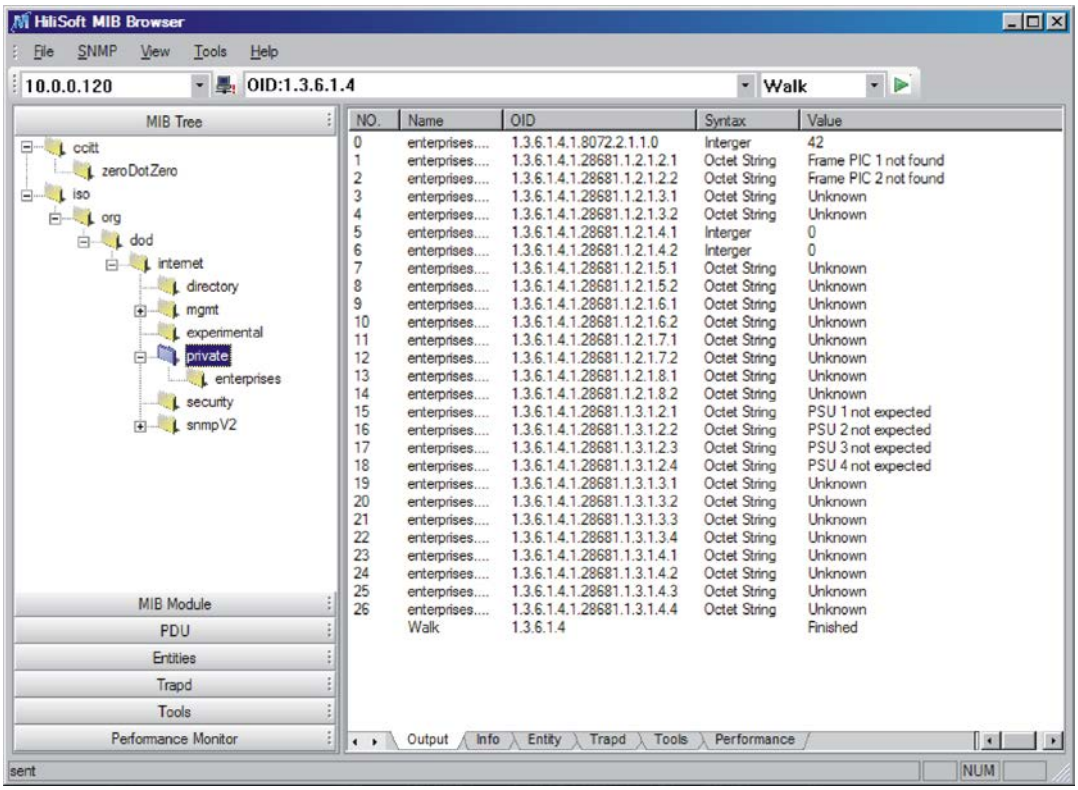
Checking

The frame should now be ready for SNMP operation. You can check this by setting a SNMP Manager, or MIB browser, to the frame IP address and performing an SNMP walk of the ‘private’ section of the Object ID tree.

See below for a screen shot of a successful walk; in this case of a (now obsolete) 4U frame containing two boards.



If you do not see something similar to this, then the frame may need to be reset to activate the SNMP licence. The frame will report the presence of the licence even if it has not been activated by a reset. The same walk of an unlicensed frame gives the results below.



Resetting the Frame

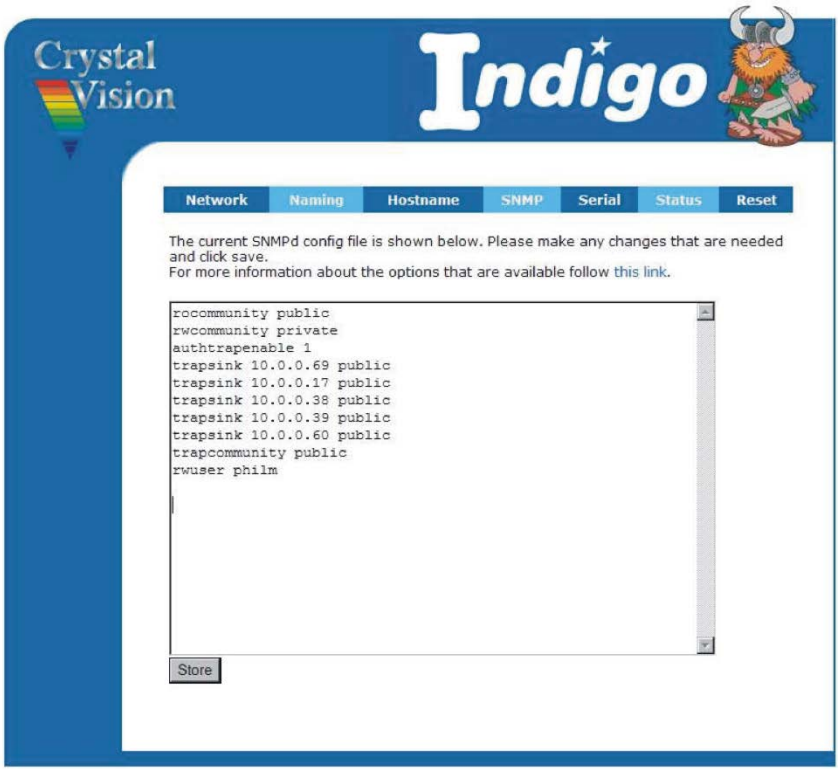
The frame can be reset from the web page. From the home page select the ‘Reset’ tab.

Click on the button to restart the frame. Note that if the frame has been set to DHCP it may come back at a different IP address.

The frame should now be set up to respond to SNMP requests and send traps to the desired IP address.

Sending traps to multiple addresses

To send traps to multiple addresses, define multiple trapsinks in the config file.

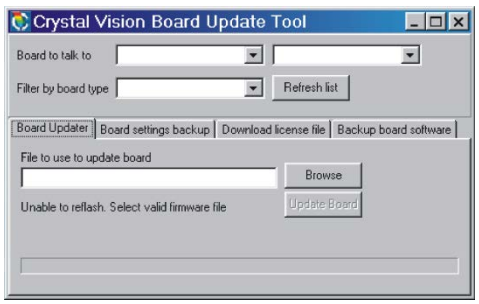


12.4 Updating software

From time to time software updates will be available to add additional functionality to the active front panel on the Indigo 2AE frame. The software updater is available from Crystal Vision customer support.

Once the updater software “cv_reflasher.exe” is on your pc double click it to run.

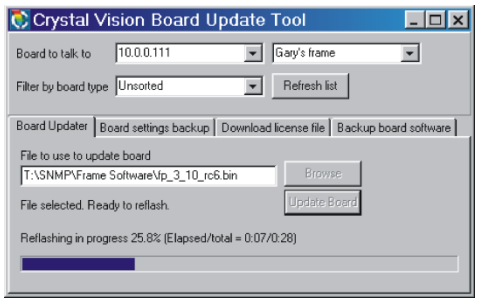
The following popup box will appear.



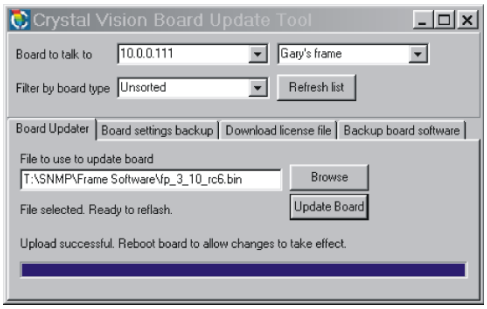
Note: This is a generic tool used for updating both cards and frames.

Click “Refresh list” button and wait whilst the network is scanned. Once done then select the frame for upgrading from the “Board to talk to” drop-down list by IP address or name.

If not already selected, select the Board Updater tab and click on the Browse button. Navigate to the folder containing the new software. Click “Update Board” and wait.



Once the download is complete the updater will confirm that the update was successful.



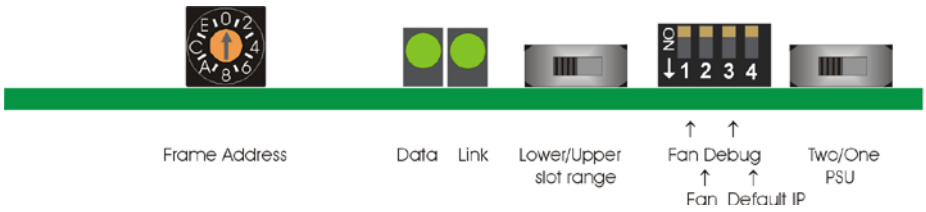
It will now be necessary to reboot the frame. This can be achieved by cycling the mains supply to the frame or, if not convenient, carefully removing the ribbon cable connector from the front panel PCB.

Note: Take great care when reinserting the front panel ribbon cable that none of the pins in the PCB connector become bent or misaligned.

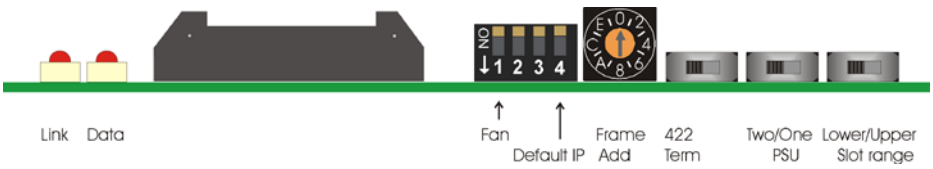
13 Appendix 3

13.1 Older frames

Indigo 2AE and 2SE CoolFlow frames are shipped with the latest versions of the CPU boards that currently use a 6-way DIL configuration switch. Older CPU boards for both models had a 4-way DIL configuration switch which have identical functions:



Indigo 2AE older board top-edge switches and LEDs



Indigo 2SE older board top-edge switches and LEDs

13.2 Configuration Switches

Piano switch

Lever	Function	Notes
1	Fan	Normally up (best cooling), down quieter running.
2	Fan	Normally up (auto), down front panel fans full speed.
3	Debug	Normally up, no user function.
4	Default IP address	Normally up, down sets IP address to default 10.0.0.201.

Selecting the Cooling Mode

Switches 1 and 2 of the four-position DIL switch control the three cooling modes as follows:

Levers 1 & 2	Function	Notes
Both up	Normal cooling	Both fans run continuously increasing in speed as the temperature inside the frame goes up.
1 down, 2 up	Quiet mode	For use with a lightly loaded frame for low ambient temperature. When the frame temperature is below approximately 45°C the panel fan is switched off and the PSU fan runs at minimum speed. If the frame temperature goes above 45°C it reverts to normal cooling and goes back to quiet mode when frame temperature falls below 42°C.
1 up, 2 down	Max cooling mode	In Maximum cooling mode both fans never run below near maximum speed. Fan speed increases to maximum at high frame temperature. This mode is ideal for equipment bays where noise is not a concern.
Both down	Reserved for future use	Operates as normal mode with current software.

Note: Quiet mode is dependent on PSUs and PSU fans not being in an alarm state.

For the 2SE CoolFlow, only one of the fans is essential in normal operation. If one of the fans should fail, the closed frame can still operate indefinitely with an ambient temperature of 40°C.

Warning: Although it is possible to operate the frame with the front panel open, the frame may not meet electromagnetic compatibility (EMC) requirements in this condition.

Terminating the RS422 Statesman chain

The RS422 communication chain was used by older, pre-Ethernet-enabled frames and is no longer supported by Crystal Vision. A frame should be terminated when it is the last device in a chain or a when the only device. It is unterminated for all other applications including when frames are used with a Statesman Hub. To change the RS422 communications termination access the RS422 term/unterm switch at the top of the front control panel by opening the panel and lifting it upwards.

To terminate the RS422 link move the switch to the left, to unterminate it move it to the right.

Frame Address

The frame address (which only relates to older, pre-Ethernet-enabled frames with active panels) is set to give a frame a unique address when used in serial 422 connected systems**. In Ethernet-enabled frames the frame address switch must be set to zero.**

Rotary Switch	Position	Description
Frame Address	Normally zero	This is usually the address of the frame from 0 to 15.

Note: *Set this switch to position 0, unless multiple frames communicate with a single PC port in a Statesman system, or if multiple control panels connect to a single frame via one multi-drop cable.*

Statesman will display the Hex switch settings 0 to E as frame addresses 1 to F; switch setting F will be displayed as frame address 10.

Status LEDs

These LEDs are useful for troubleshooting the network link. The link LED will be illuminated whenever the frame is connected to a network. Should this LED not be lit, check the cable connection between the frame and network outlet. The data LED flashing will indicate that communications between the frame and the network exists.

LED	Condition	Description
Data	Flashing	This LED will flash to indicate activity.
Link	Normally lit	This LED will be lit whenever the frame is connected to an Ethernet network.

Lower/Upper slot range

The slot address range switch was used when two frames were paired together to make one large frame with 24 slots. As this practice is no longer used, the switch should be left in the 'Lower' (left) position.

Configuring PSUs

If a power supply is not fitted in either the upper or lower slots, the position of the two-position slide switch on the top right of the front panel PCB must be set to one.

If both power supplies are fitted the slide switch is set to position two. If the switch is set to one and there are two power supplies fitted, the LOWER PSU LED will flash from GREEN to OFF every two to three seconds to warn that the switch is set to one instead of two.