

digital keying modular
interface audio
converters analogue video

Indigo DT

Desk top boxes

(Includes Indigo DT, DTA, DTAE, DTS and DTSE)

USER MANUAL

Crystal  Vision

Contents

1	Introduction	3
2	Installation	5
2.1	General Safety Summary	5
2.2	Rack mounting and ventilation	6
2.3	Frame connectors	6
	Connecting mains cables	7
2.4	Connector pinout	7
	Remote control / GPI connections	7
	Power supply relay connections	8
	RJ45 422 I/O (Statesman/link bus) connector	9
	RJ45 Ethernet connector	10
2.5	Controlling two frames from one panel	10
	Frame linking configurations	11
2.6	Setting frame (desk top box) addresses	13
2.7	Ethernet control	14
	Board settings	15
	Setting up and connecting	16
	Changing the IP Address	16
	Adding a frame serial number	19
2.8	Installing Crystal Vision modules	20
	Module positions	21
	Inserting modules	21
	Removing modules	21
	Rear connectors	21
	Fitting rear connectors	22
2.9	Select the cooling mode	22
3	Operating the active panel	24
	Slot numbers	24
	Node numbers	25

4	Trouble shooting	26
	Reading LED status and active display messages	26
	Panel diagnostics	27
	Frame diagnostics	27
4.1	Maintenance	28
	Replacing the mains input fuses	28
	Software upgrades	29
4.2	Frequently asked questions	30
5	Appendix	32
	Active panel setup	32
	Module addresses and node numbers	33
6	Specification	34

Revision 3	Ethernet information added	16-01-07
Revision 4	Cooling mode information amended	06-07-09

1 Introduction

The Indigo range comprises four frame types, 4U frames for up to 24 modules, 2U frames for up to 12 modules, 1U frames for up to six modules and a desk top box for up to two modules. There are three frame variants - passive front panel, active panel with controls and a display or a Statesman enabled version without controls or a display.

There are five desktop box variants - passive front panel, active panel with controls and a display or a Statesman enabled version without controls or a display. Both the active panel and Statesman enabled frames are also available with Ethernet capability.

This manual covers:

Indigo DT with passive front panel

Indigo DTA with active panel controls and display

Indigo DTAE Ethernet capable with active panel controls and display

Indigo DTS with active panel, no controls or display. Statesman enabled

Indigo DTSE Ethernet capable with active panel, no controls or display.

The Indigo DTA and DTAE versions also support Statesman.

Each desk top box can be used with any single or double slot rear module in the Crystal Vision range.

A removable front panel allows easy access to installed modules.

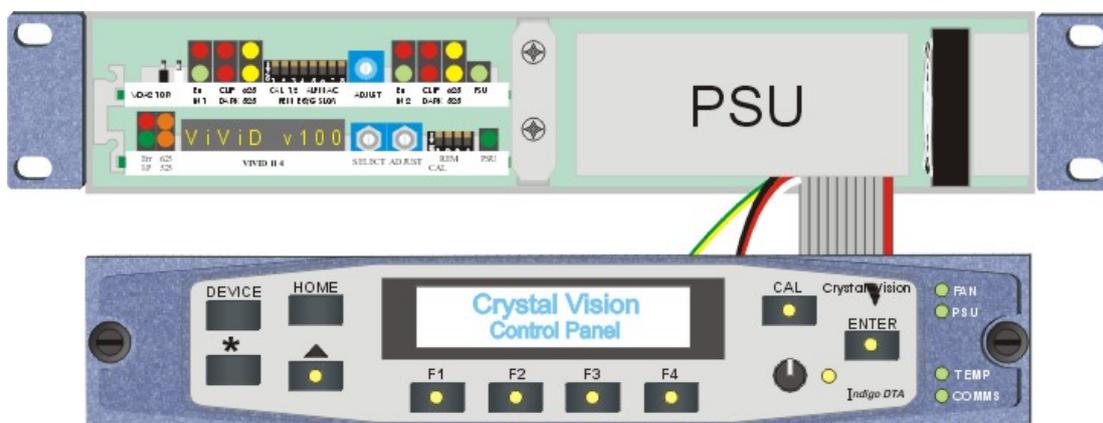


The Indigo DTA/DTAE Crystal Vision desk top box



The Indigo DT/DTS/DTSE Crystal Vision desk top box

The DTA version has an active control panel built into it, which may remain forward facing when removed, allowing panel operation even when the cards are exposed.



The Indigo DTA/DTAE Crystal Vision desk top box with front control panel removed

Each desk top box has a built in power supply and an internal fan on the right hand side.

There are three cooling modes: normal, quiet and maximum.

With normal cooling the fan runs continuously, increasing in speed as the temperature inside the frame goes up.

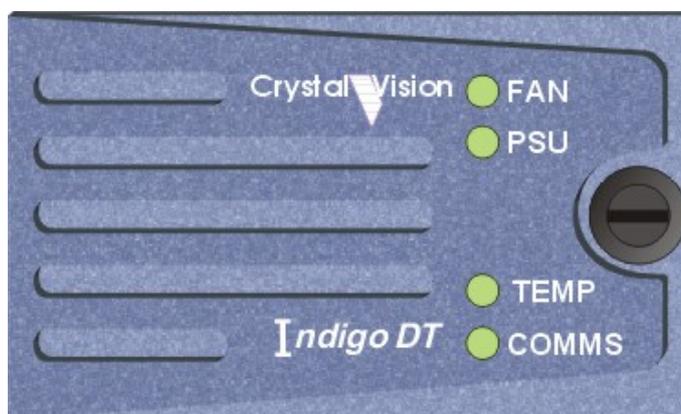
In quiet mode the fan does not run at temperatures below 45 deg C (as measured by the sensor inside the frame) and always runs at temperatures above 45 deg C. This mode is ideal where noise is an issue or where the ambient temperature is low.

In maximum cooling mode the fan is always turning at maximum speed. This mode is ideal for equipment bays where noise is not a concern.

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 DT, Indigo DTA/DTAE and Indigo DTS/DTSE have front panel processors. These processors monitor the power rail voltage levels (+5.5V and -6.0V) and the fan speed. Status information is indicated by the state of the FAN, PSU and TEMP LEDs on the front panel and the alarm relay. The relay contacts are available on the remote 2 connector on the rear of the frame.

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



The Indigo DT (passive panel) LEDs

The LEDs show the status of the internal fan, PSU, frame temperature and RS422 activity.

The COMMS LED monitors external RS422 activity and will flash amber when there is external communications with the frame.

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

Note: The term 'frame' and 'desk top box' are used interchangeably in this manual.

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 a power cord that meets 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 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 manufacturer or dealer.

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

Ventilation The unit must have adequate ventilation. The left and right ventilation grilles must not be obstructed. If installed in a standard 19" rack, cool air circulation should be available.

EMC To comply with EMC regulations the following guide lines 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.

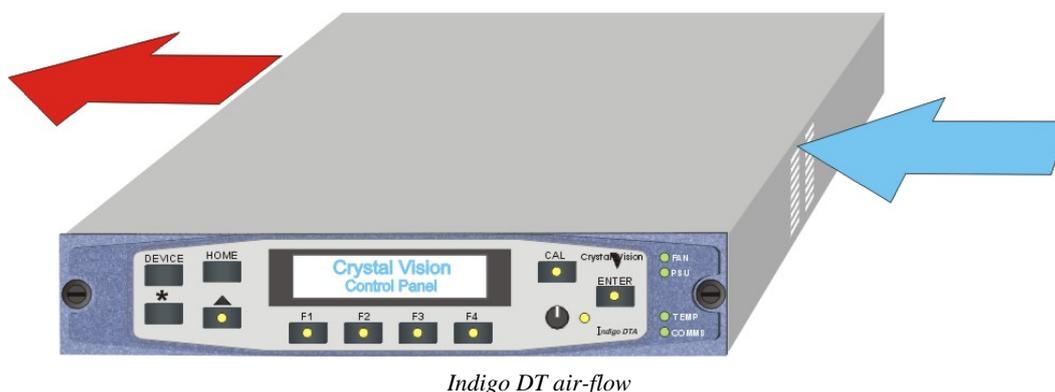
To avoid injury or fire hazard do not operate this product in an explosive atmosphere.

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

2.2 Rack mounting and ventilation

The Indigo series of desk top boxes are designed for tabletop use, however they must have adequate ventilation. On no account should the side ventilation grilles be blocked.

If the optional rack ears are fitted, and the unit is installed in a standard 19" rack, cool air circulation should be available and both side ventilation grilles should be unobstructed.



Indigo DT air-flow

Install the Indigo DT in a standard 19" rack as follows:

- Fit the optional rack ears
- Mount in the rack and secure via the rack ears
- Allow adequate space for the fan intake at the right hand side and the exhaust through the left hand side (viewed from front)

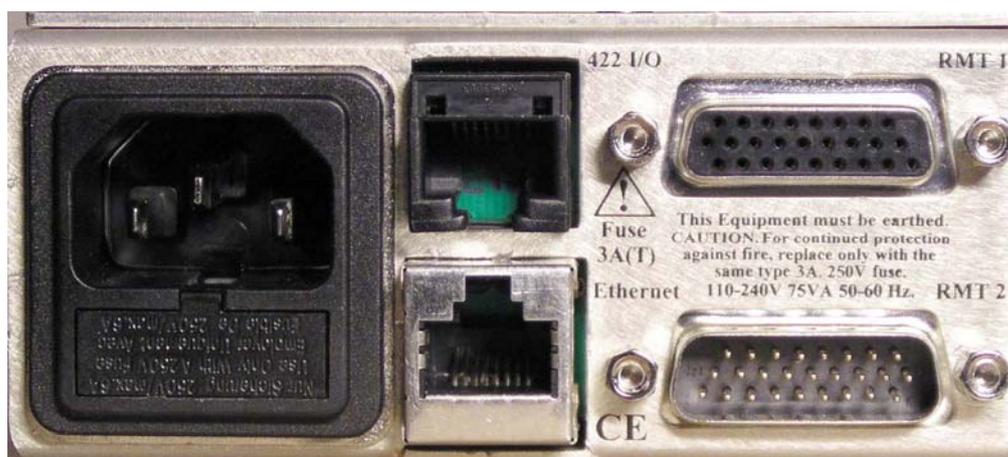
Note: It is possible to operate the frame with the front panel open, however the frame may not meet electromagnetic compatibility (EMC) requirements in this condition.

2.3 Frame connectors

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

Connector	Function	Notes
IEC	PSU AC input	85 to 264V, fuse under flap
RMT 1	GPI and DC out	Refer to pinout tables
RMT 2	GPI, serial/Statesman, PSU alarm relay and DC out	Refer to pinout tables
RS422 I/O	RS422 control/link bus using CAT-5 cabling	Refer to pinout tables
Ethernet	Ethernet control using CAT-5 cabling	Refer to pinout tables

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



Indigo DT rear connectors

Connecting mains cables

The desk top box is powered by connecting a power cord to the IEC connector.

Ensure that the power cord has a minimum current rating of 6A fitted with an IEC 320 female connector, includes a protective ground connection and meets relevant local safety standards.

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 trouble shooting guide for more information.

2.4 Connector pinout

Remote control / GPI connections

Each module slot has six connections that are brought out to one or more of the two high density D-Type connectors on the rear of the frame labelled RMT 1 and RMT 2. 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.

RMT 1 and RMT 2 connections (26-way high density D-Type socket)

Pin number	RMT (Remote) 1 - function	RMT (Remote) 2 - function
1	+5.3V +/- 10% dc out	N/C
2	Frame GND	N/C
3	N/C	N/C
4	N/C	N/C
5	N/C	Relay close on fault on PSU
6	N/C	Frame GND
7	Slot 2 GPI 'a'	RX+ RS422 - link bus i/p
8	Slot 1 GPI 'a'	TX- RS422 Statesman o/p

9	Slot 1 GPI 'b'	TX+ RS422 Statesman o/p
10	N/C	Slot 2 GPI 'e'
11	N/C	Slot 2 GPI 'f'
12	N/C	N/C
13	N/C	N/C
14	N/C	Relay common on PSU
15	N/C	+5.3V +/- 10% dc out
16	Slot 2 GPI 'b'	RX- RS422 – link bus i/p
17	Slot 2 GPI 'c'	TX+ RS422 – link bus o/p
18	Slot 1 GPI 'c'	RX+ RS422 Statesman i/p
19	N/C	Slot 1 GPI 'e'
20	N/C	Slot 1 GPI 'f'
21	N/C	N/C
22	N/C	N/C
23	N/C	Relay open on fault on PSU
24	N/C	N/C
25	Slot 2 GPI 'd'	TX- RS422
26	Slot 1 GPI 'd'	RX- RS422 Statesman i/p

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

Power supply relay connections

Fitted inside the unit is a relay to indicate if the frame is in an alarm state caused by a power supply problem, a fan stopping or an overheating frame.

Pinout is as follows:

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

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

RJ45 422 I/O (Statesman/link bus) connector

Pin number	Function
1	RX+ RS422 Statesman i/p
2	RX- RS422 Statesman i/p
3	TX+ RS422 Statesman o/p
4	TX+ RS422 – Link bus o/p
5	TX- RS422 – Link bus o/p
6	TX- RS422 Statesman o/p
7	RX+ RS422 – Link bus i/p
8	RX- RS422 – Link bus i/p

Note: These signals are also available on the RMT 2 connector.

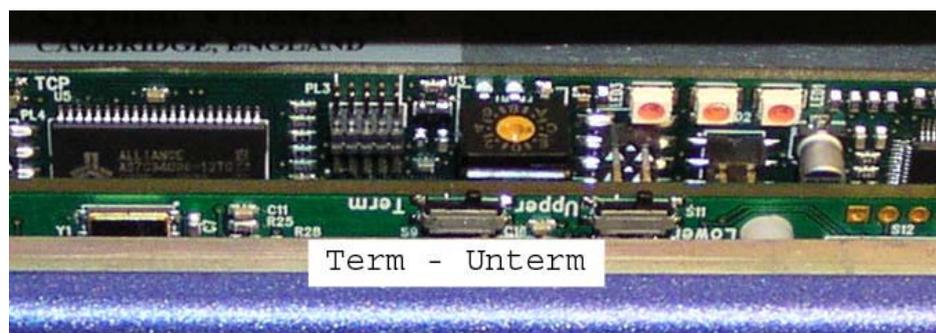
Using the RS422 frame link bus

Since the 422 I/O connector has no GND pin, two frames, desk top boxes or other pieces of equipment, which are linked using this connector, should ensure that the GND of the two frames are connected together. This will normally occur through the earth pin on the mains connector.

Terminating the RS422 Statesman chain

The RS422 communication used for Statesman should be terminated when a frame is the last device in a chain or a when a frame is 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.



Statesman RS422 term/unterm switch

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

Note: DT passive panels do not have a Term/Unterm switch and are not fitted with the second panel PCB (shown at the top in this picture).

RJ45 Ethernet connector

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

2.5 Controlling two frames from one panel

An active control panel or REMIND remote active panel can control up to two frames of cards by coupling the frame link bus ports of the two frames. The two frames do not need to be the same type so any combination of Indigo 1, Indigo 2 or Indigo DT can be used. The only exception to this is the Indigo 4 frame, which cannot be linked to other frames, as the card count will exceed the maximum. Linking two frames in this way constitutes a frame pair so one frame must be set to its upper slot address range and the other to its lower address range. One frame in the pair must be an active frame i. e. have an active control panel or be Statesman capable, although either frame can be set to be the upper or lower address.

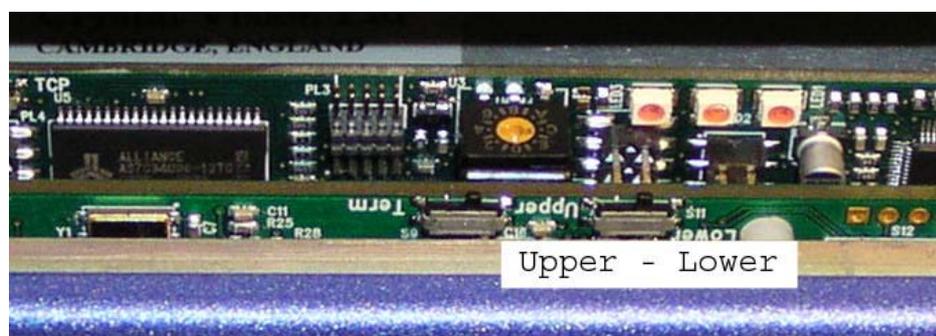
An important thing to note is that there must be only one active panel to a frame pair i.e. one active control or Statesman control panel, the second frame must be passive. If the Indigo REMIND remote control panel is used both frames in the pair must be passive. Connecting together two active frames will cause the processors to clash and give erroneous messages.

- A frame pair must consist of one active frame and one passive frame.
- Two passive panels must be used with a REMIND remote panel.

Note: If a frame pair has been established solely for Statesman control, one of the frames can have a Statesman panel and the other a passive panel.

A passive frame pair can be Statesman controlled via a REMIND control panel.

The two frames can be up to 10m apart depending on cable type and ambient electrical noise.



Setting slot number range

The position of the two-position slide switch labelled Upper / Lower on the top edge of the main front panel PCB must be placed in the Lower position for one frame and in the

Upper position for the other. For example it could be set to Lower position for the Indigo DTA frame and Upper for an Indigo 1 or Indigo 2 frame.

The number of modules reported to the active display includes the PSUs and front panel/frame as the Indigo front panel PIC and the power supply have an address and are treated as modules. Refer to the address range table in chapter 3 'Operating the active panel' for more information.

The two frames should be connected so that control can pass from one frame to the other using an RS422 serial link.

Note: The switch will only have an effect the next time the front panel is powered up.

Frame linking configurations

This can be accomplished with a special cable linking the Remote 2 connectors or by using a standard 4-pair CAT-5 patch cable linking the '422 I/O' connectors.

Using a CAT-5 patch cable

Active-Passive frame pair

A CAT-5 cable (TIA/EIA 568A CAT-5 PATCH) is plugged in the connectors labelled '422 I/O' on each frame.

REMIND-Passive frame pair

This combination will require two CAT-5 cables and a RJ45 splitter/doubler.



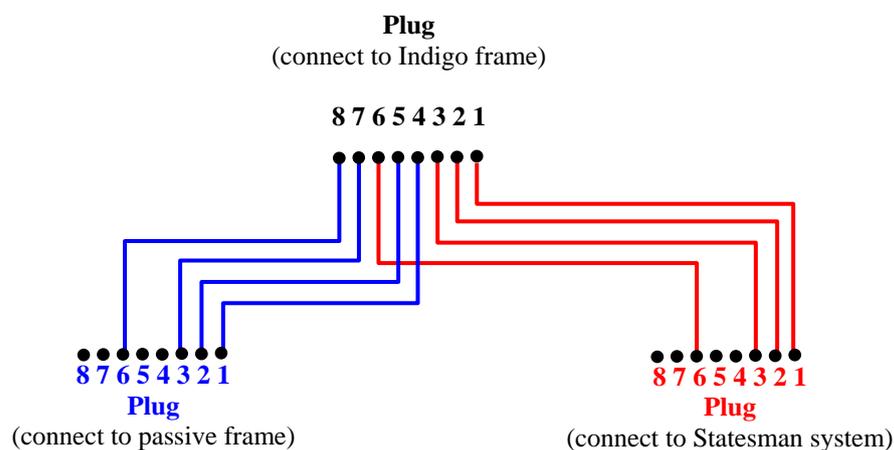
Commercially available RJ45 splitter/doubler

Depending on the relationship of the frames to each other the splitter/doubler can be placed on the rear of the REMIND panel with a CAT-5 cable to each frame, or on the rear of the first frame so the REMIND and frames can be connected 'daisy-chain' fashion.

Frame combinations with Statesman connection

Due to the compact nature of the 1U frame the Statesman and frame link buses share the same RJ45 rear frame connector. Because of this special care must be taken when making certain combinations of interconnected frames.

There are two main criteria to be considered when linking a number of active frames and passive frames to a Statesman control system. First, all passive frames must be in combination with an active frame or panel as a frame pair. Second, only the Statesman wiring can be 'daisy-chained' between active frames. A passive frame will ignore the Statesman commands but the frame link bus must not be connected across frame pairs due to processor clashing. This isolation between the Statesman bus and frame link bus can be achieved by the use of a commercially available RJ45e economiser or adapter cable.



Adapter cable wiring



Commercially available CATe economiser

Using Remote 2 connectors

A special cable is connected between the 'Remote 2' D-Type connectors of the two frames.

The cable required uses two female 26 way high density D-type sockets. These should be connected with screened twisted pair cable containing two pairs. All the wiring is pin to pin. Pins 16 and 7 should use one twisted pair, pins 17 and 25 the other. The screen should be connected to pin 6 on both connectors.

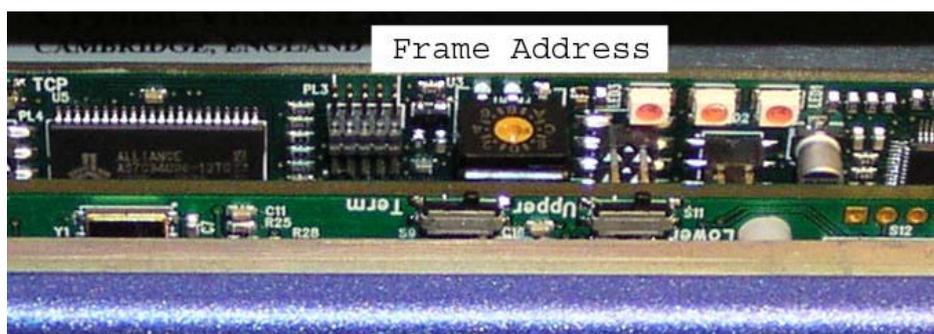
Frame link cable connections

Signal	Female 26-way high density D-Type plug pin No	Female 26-way high density D-Type socket pin No
GND	6 / Shell	6/ Shell
PBRX +	17	17
PBRX -	25	25
PBTX +	7	7
PBTX -	16	16

To ensure continued EMC compliance it is recommended to use high quality shielded twin pair cable for RS422 cabling.

2.6 Setting frame (desk top box) addresses

The frame address, which only relates to an active or Statesman (non-passive) panel, is normally set to zero. However unique frame addresses are required in Statesman systems where multiple frames communicate with a single PC port. The address of a frame pair is set by its non-passive panel.



Indigo active/remote/Statesman panel hardware settings – frame address

Note: Passive panels do not have a frame address switch and are not fitted with the second panel PCB (shown at the top in this picture).

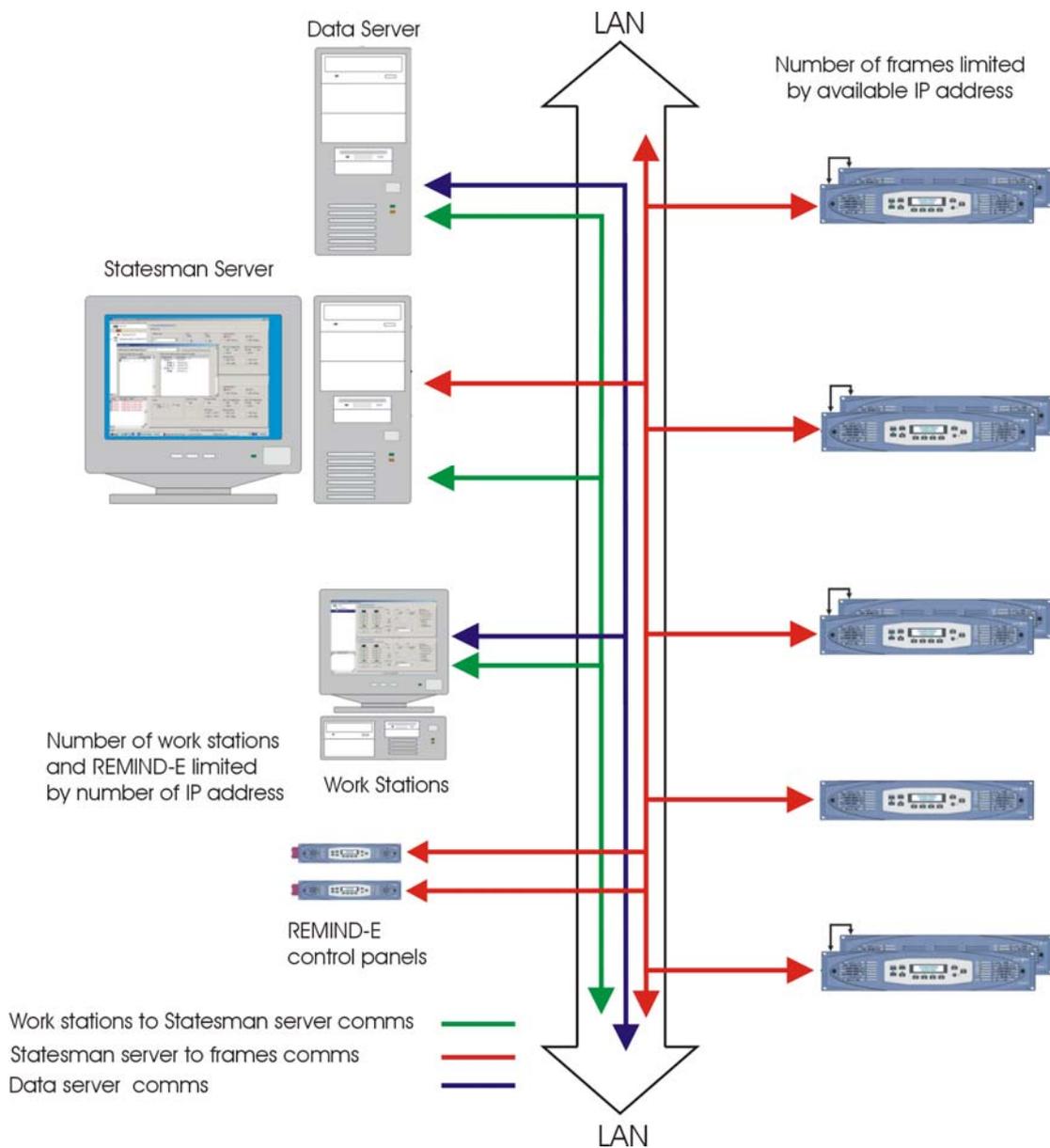
Position	Description
Frame Address	Normally zero This is usually the address of the frame from 0 to 15.

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 multidrop 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.

2.7 Ethernet control

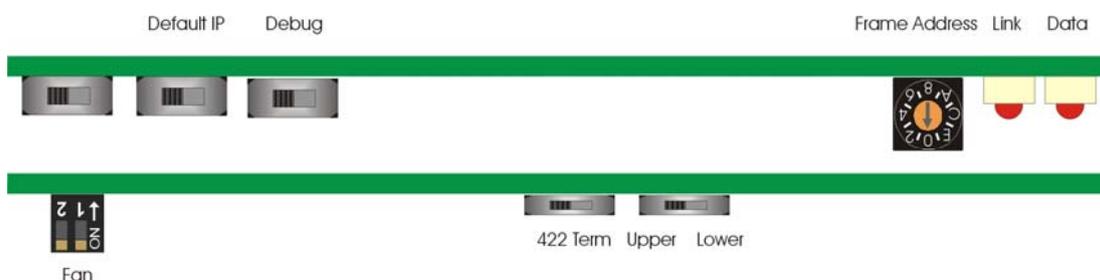
The Indigo DTAE and DTSE series of 1U desk top boxes are provided with Ethernet control. This allows the Statesman PC control system or remote active control panels to control a large number of the Indigo Ethernet series frames over a local area network.



Statesman control over the Ethernet of Indigo frames

Board settings

On the upper edge of the front panel PCB the config switches and status LEDs can be found.



Ethernet ready front panel board top-edge switches and LEDs

Frame Address

The frame address, which only relates to active panels such as the Statesman enabled or active control panel, is set to give a frame or frame pair a unique address when used in a serial 422 connected systems. In a TCP system 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 trouble shooting 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.

		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

This switch is used when configuring a frame pair where the two frames must have their individual slot addresses. The position of the two-position slide switch labelled Lower/Upper on the top edge of the front panel PCB must be placed in the lower position for one frame and in the upper position for the other. Which frame of a pair selected to be upper and lower is not important.

Refer to the address range table in the section entitled 'Selecting different modules' in chapter two for the module addresses assigned when frames are operated as a pair.

The two frames should be connected so that control can pass from one frame to the other using an RS422 serial link.

Default IP address

Switch four in the down position sets the active front panel to the default IP address of 10.0.0.201. This default address is necessary to be able to change the IP address during installation.

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 CAT-5 cross over cable will be required. Connecting to a network port hub uses a straight CAT-5 cable.

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.

To access the internal web page, set the frame to the default IP address by setting the default IP address switch to down or to the left for the 1U front. 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. This page will give a large amount of status information about the frame and its power supplies.

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.





Network	Serial	Status	Unused	Unused
<p>Current Frame Status is as follows. Hex Switch set to: 1 Jumpers set to: 03 Piano switch set to: 02 Software compiled on Thu Dec 14 11:13:19 GMT 2006 Frame serial number set to: 0,23,74</p> <p>Found data for lower address range frame PIC. Frame PIC info [12]: 40, 5E, 9B, FF, FF, FF, FF, FF, 8E, 80, Interpretation: Upper PSU OK. Lower PSU OK. Upper PSU fan OK Upper frame fan OK The frame front is open Frame is an Indigo 2A Panel expects 2 PSUs. Frame temperature is currently 027 deg C. Frame issue is 127. Frame mod level is 127. Frame serial number is 127-127-127. Frame PIC software version is 1.4.</p> <p>Unable to find data for upper address range front panel.</p> <p>Found data for lower address range upper PSU PIC. PSU PIC info [13]: BE, 80, 80, 84, 80, A3, 85, 80, 8C, 80, Interpretation: PSU type is 062. PSU issue number is 004. PSU mod level is 000. PSU serial number is 35-05-00. PSU PIC software version is 1.2.</p> <p>Found data for lower address range lower PSU PIC. PSU PIC info [14]: BE, 80, 80, 84, 82, A0, 8F, 80, 8C, 80, Interpretation: PSU type is 062. PSU issue number is 004. PSU mod level is 002. PSU serial number is 32-15-00. PSU PIC software version is 1.2.</p> <p>Unable to find data for upper address range upper PSU.</p> <p>Unable to find data for upper address range upper PSU.</p>				

The Indigo Status page

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 so verifying that the correct frame is being communicated with.

To reset the IP address, select the 'network' link from the status page. A new page will open, allowing entry of the required IP address and Netmask. Enter the new IP address and Netmask information and click the 'Change' button. 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 'Change'.



The screenshot shows the 'Indigo' network configuration interface. At the top left is the 'Crystal Vision' logo. The main title 'Indigo' is in large white letters on a blue background, with a cartoon character to its right. Below the title is a navigation bar with five tabs: 'Network' (selected), 'Serial', 'Status', 'Unused', and 'Unused'. The main content area has a white background and contains the following text and form elements:

Please enter the IP information you wish the frame to have below:

IP address:

Netmask:

Enable DHCP?:

Network Window

Once 'Change' has been selected, a confirmation screen will replace the Network 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 will likely result in their fracture.



The screenshot shows the 'Indigo' confirmation screen. It features the same 'Crystal Vision' logo and 'Indigo' title with the cartoon character as the previous window. The navigation bar has the same five tabs: 'Network', 'Serial', 'Status', 'Unused', and 'Unused'. The main content area has a white background and contains the following text:

IP address settings updated. Restart the panel and follow [this link](#)

NOTE: Indigo panel set to use default IP address (10.0.0.201). To use the stored settings flick lever 4 on the piano switch up.

Confirmation Window

Should an incorrect IP address be added an error dialogue box will be displayed indicating the likely cause of the error condition.

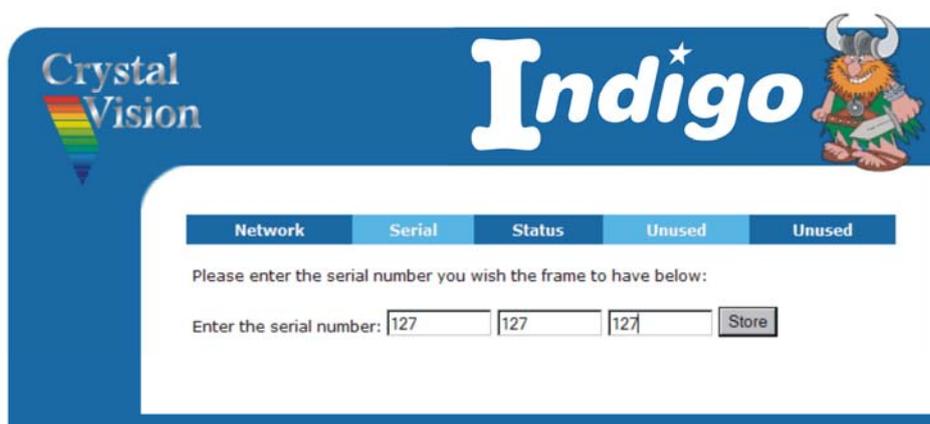
Adding a frame serial number

The facility is given 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; presently this is 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.

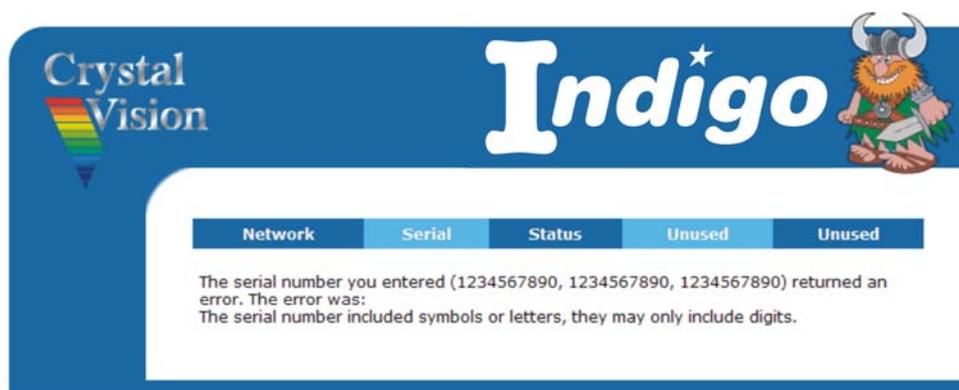
From the Status window select Serial. The following box will open.



The screenshot shows the 'Indigo' software interface. At the top left is the 'Crystal Vision' logo. The main title 'Indigo' is in large white letters on a blue background, with a cartoon character to its right. Below the title is a navigation bar with five tabs: 'Network', 'Serial', 'Status', 'Unused', and 'Unused'. The 'Serial' tab is selected. The main content area contains the text 'Please enter the serial number you wish the frame to have below:' followed by 'Enter the serial number:'. There are three input fields, each containing the number '127', and a 'Store' button to the right.

Serial number entry box

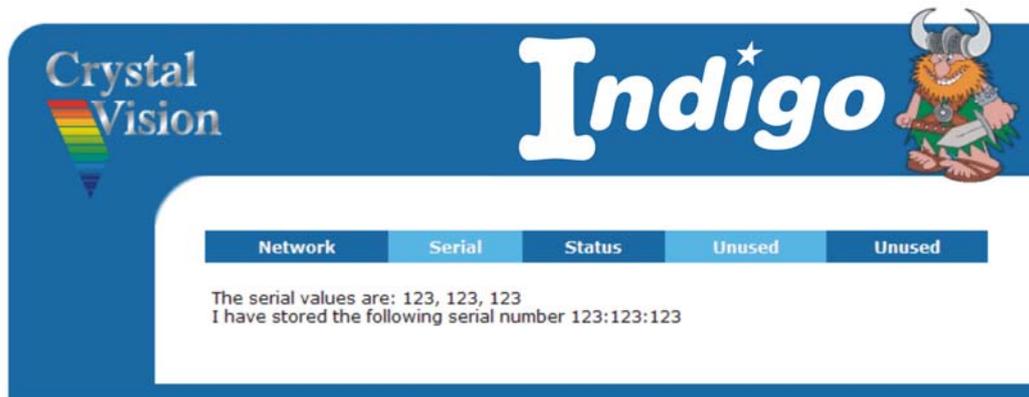
Once the desired serial number has been entered, press the 'Store' button to save it to memory. Should the chosen serial number contain an error or be out of range, an error dialogue box will be displayed.



The screenshot shows the 'Indigo' software interface with the 'Error dialogue box' open. The navigation bar is the same as in the previous screenshot. The main content area contains the text: 'The serial number you entered (1234567890, 1234567890, 1234567890) returned an error. The error was: The serial number included symbols or letters, they may only include digits.'

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.



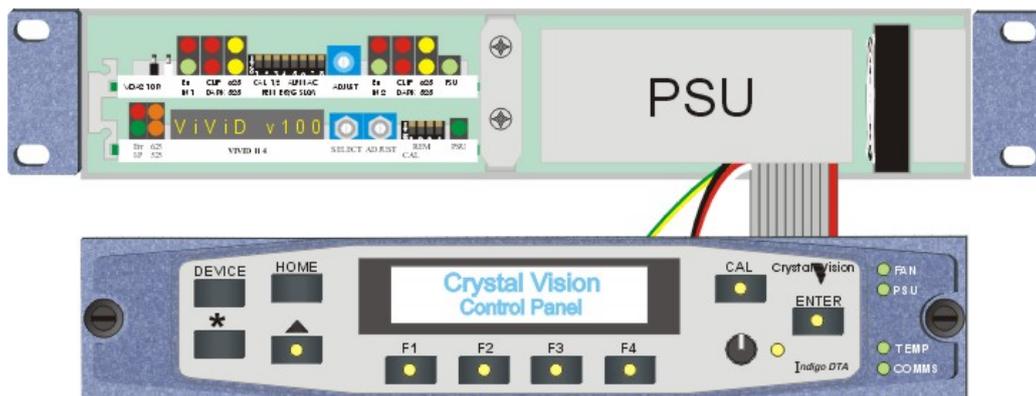
Serial number successfully added

2.8 Installing Crystal Vision modules

The Indigo desk top boxes each have two slots for Crystal Vision video or audio cards. Signal connections are made through single or double rear modules.

An optional rack mount kit IDT-RK allows the 1U Indigo desk top box to be mounted into a 19" rack mount frame.

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



The Indigo DTA/DTAE Crystal Vision desk top box with optional small rack mount ears. Extended rack mount ears are also available for 19" rack mounting.

Warning: Although the desk top box can be operated with the front panel open it may not meet electromagnetic compatibility (EMC) requirements in this condition.

Module positions

Module positions are numbered 1 to 2 as shown below:



The Indigo DT box showing slot numbers

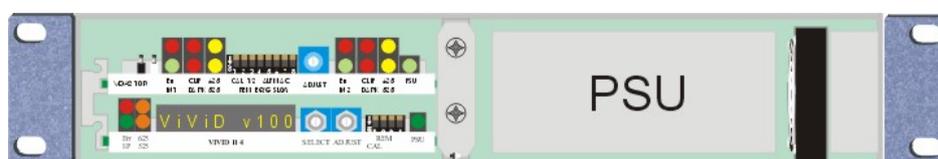
Before fitting or removing signal modules the retaining brackets may need to be removed. Retaining brackets prevent modules from being inadvertently disconnected or from coming out during transit. They may also prove useful in OB vehicles when travelling over rough ground.

Note: The internal PSU is fitted inside the right hand compartment.

Inserting modules

To insert a module proceed as follows:

- Remove the two screws holding the bracket 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 bracket if required



The Indigo DT box with two modules fitted in slots 1 and 2

Removing modules

To remove signal modules simply pull on the handle and withdraw them from the frame, with the retaining bracket 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 a blanking plate.

Details of signal types and pin-outs are given the documentation supplied with each Crystal Vision video or audio card.



The Indigo DT rear view with EMC cover removed for slots 1 and 2

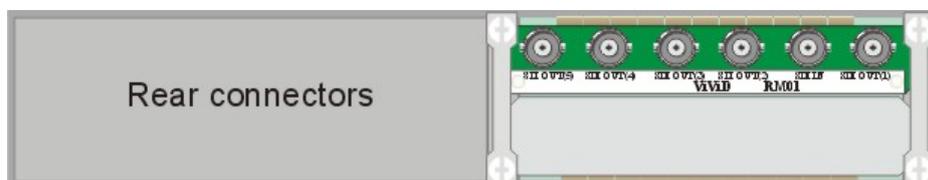
The rear modules are held in place by a retaining bar at each side. These run the height of the frame and provide mechanical support as well as ensuring EMC compliance.

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

Fitting rear connectors

To fit a rear connector proceed as follows:

- Disconnect the mains power lead from the frame
- Remove the rear relevant EMC cover(s) at the rear of the frame by unscrewing the adjacent retaining bars
- Push fit the selected rear connector onto the appropriate frame slots
- Refit a half size EMC cover if required and replace the retaining bars

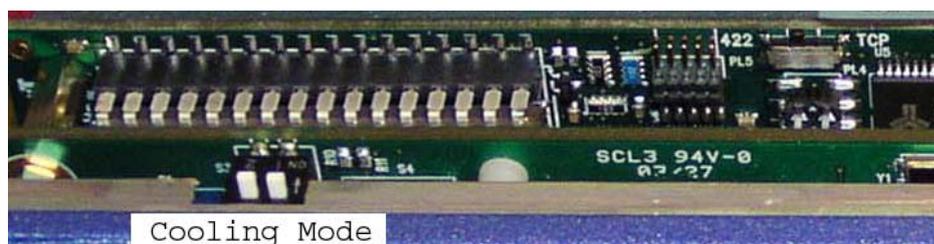


The Indigo DT with one half-size EMC cover and an RM01 connector fitted to slot 1

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 retaining brackets before power is reapplied.

2.9 Select the cooling mode

There are three cooling modes that can be selected using a switch at the rear of the control panel.



Indigo DT front panel hardware settings – cooling mode

The three modes are normal, quiet and maximum cooling.

The two-position DIL switch controls the three cooling modes as follows:

Piano Switch

Switches one and two configure the cooling fan modes.

Levers 1 & 2	Function	Notes
Both up	Normal cooling	The fan runs 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 fan is switched off. 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 the fan never runs 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 the frame temperature being below 45°C and not being in an alarm state.

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.

3 Operating the active panel

The Indigo active control panel supports a panel lockout feature. A password will be required to use the panel when it has been 'locked' to prevent unauthorised access.

Warning: It is **ESSENTIAL** that the clear-password procedure in the active panel setup in the Appendix is followed so that any old or unknown passwords are reset to all spaces prior to using the locked mode. If the panel is locked without knowing the password, the panel/frame will have to be power cycled to exit the locked mode.



Indigo DTA/DTAE active panel controls and LEDs

The active panel 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 fitted 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.

Slot numbers

In Indigo frames, the slot or location numbers are determined by the position of the card in the frame, and by the two-position address range switch on the top edge of front panel PCB labelled Upper/Lower. Refer to section 2.4 'Controlling two frames from one panel' for details of the address range switch.

Note: The switch will only have an effect the next time that the front panel is powered up.

The address range setting also affects the addresses of modules, panels and PSUs as the following table shows:

Device	Address in desk top box	Address in 2 nd frame*	Notes
Modules	1.01 to 1.02	2.01 to 2.06/2.12	Press ENTER for module home menu
Indigo PIC	1.00	2.00	Press ENTER for frame s/n and temp
PSU	1.14	2.14/2.15	Press ENTER for PSU s/n and type

*Assumes 2nd frame is either an Indigo 1 or Indigo 2

Turn the panel rotary knob to scroll through the available modules. Press ENTER to display information for the selected module. The Indigo PIC will display frame temperature in degrees centigrade.

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).

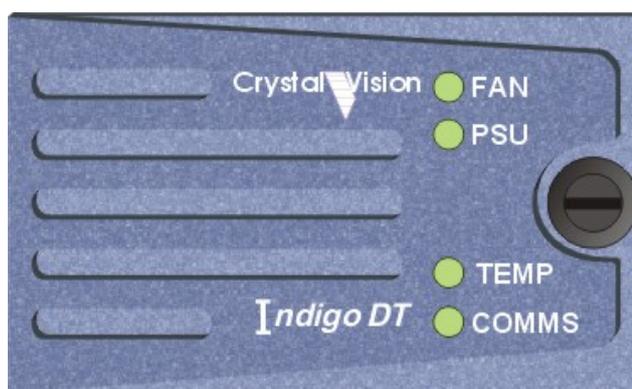
Please refer to the Appendix to find out how node numbers relate to slot numbers in particular frames and frame combinations.

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.

4 Trouble shooting

Reading LED status and active display messages

There are four two-colour LEDs on an active or passive front panel, with yellow/green indicating a normal condition and red an abnormal condition.



The Indigo DT LEDs

The following LED status indications and/or Indigo DTA/DTAE messages may be seen:

LED	Colour	Indigo DT message	Notes
FAN	Yell/Grn	None	Normal operation
	Red	Front fan speed low	Change fan
PSU	Yell/Grn	None	Normal operation
	Red	PSU fault	Change PSU
TEMP	Yell/Grn	None	Normal operation
	Red	FRAME TOO HOT	Frame temperature too high
COMMS	Unlit	None	Press Device in Statesman mode
	Flash amber	None	for COMMS status

If the front panel is open, the Fan LED will be unlit.

The COMMS LED indicates external communication with the frame. On a passive panel this will mean communication from the frame or an active control panel. On an active panel this will be communication with Statesman via an RS422 link or via Ethernet.

The COMMS LED flashes slowly at medium intensity if communication has been established. It will flash at higher intensity when the communication channel is active.

When a fault is cleared, the corresponding LED (if appropriate) will return to normal and an active panel will display 'fault cleared'. Press an active button to clear the display. The active front panel can also be used to interrogate the status of the front panel and installed PSUs by pressing Enter when those devices are listed in Device view.

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

Please refer to the connector pinout section for more details.

Panel diagnostics

The panel status/test will provide the following tests or information:

- Function test of all panel LEDs
- COMMS mode – 422 or TCP and shaft encoder test
- Panel key test and frame/panel address (Hex switch position) readout

To enter this menu press the CAL key as the panel powers up

Menu 1	Comment
Testing LEDs	Each LED is illuminated in sequence from left to right

When this test terminates, the PSU and shaft encoder status is displayed:

Menu 2	Comment
COMMS mode SHAFT 422 or TCP	Rotate the shaft encoder to test its function 00 - 999

Note: COMMS mode is the state of the RS422/TCP switch at the rear of the control panel. This switch should be left in the 422 position.

Press the CAL button again to move on to the switch and panel address test.

Menu 3	Comment
KEYS and HEX switch	Press each key to test function
F4 pressed	addr 00 Hex switch is read and setting displayed

Power cycle the panel to exit the diagnostic menus.

Frame diagnostics

The frame diagnostics display will show the following information:

- The status of the panel communications mode
- First frame node

To enter this menu, press the DEVICE key when in Statesman mode.

Status menu	Comment
COMMS* = 422/TCP	Shows COMMS mode
Node = 01 COMMS* = xxxx	First frame node and COMMS status

Note: COMMS (422/TCP) reflects the state of the RS422/TCP switch at the rear of the control panel. This switch should be left in the 422 position. See Reading COMMS mode and status below for further help.

The first expression in the bottom line gives the Statesman rack address = hex switch setting + 1.

Press CAL to exit the frame diagnostics menu.

*Reading COMMS mode and status

The top line indicates the mode of the external COMMS connection.

COMMS = 422 (TCP ok)	COMMS is in 422 mode, TCP is available as a service. If TCP mode is the only method of COMMS to the frame, this indicates the network connection has not been set up
COMMS = TCP active	COMMS in TCP mode. Network connection ok
COMMS = net failed	Network connection failure
COMMS = 422	COMMS in 422 mode. TCP is not available as a service
COMMS = TCP n/a	TCP mode selected but unavailable in this software version

The second expression in the bottom line provides further COMMS status with four character positions, COMMS = xxxx, each of which can be either 'y' or 'n'.

Character position	Meaning when 'y' appears in given position
--------------------	--

1	y = valid COMMS from PC received by front panel
2	y = COMMS to PC transmitted from panel
3	y = valid COMMS received from boards by front panel
4	y = COMMS transmitted from panel to boards.

Example

A frame containing boards, but not connected to a PC could therefore have the display:

```
COMMS [mode] =422
node = 03 COMMS [status] =nnyy
```

4.1 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.

Replacing the mains input fuses

The mains input fuse is fitted inside the IEC 320 connector 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 the power cord from the rear of the frame
- Using a flat bladed screwdriver or similar tool gently lever out the fuse drawer from the 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 cord



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

If a fuse blows repeatedly this indicates a fault either in the 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).

Software upgrades

For the Indigo DTA and DTS the software for the active or Statesman panel is contained in a single EPROM in position U10 on the second (top) PCB. A passive panel does not have an upgradeable EPROM.

To change the EPROM proceed as follows:

- Switch off the power and remove or drop down the front panel
- Remove and retain the six screws securing the top panel PCB
- The EPROM can now be accessed and removed from its holder
- Fit the new EPROM ensuring it is placed the correct way round (note the position of pin 1)
- Replace the top PCB using the screws retained, taking care not to bend any of the header pins



Front panel top PCB showing firmware EPROM in the bottom right corner.

Note: It is normal for two of the pins on PL2 to NOT mate with its header socket on the main PCB.

Note. The Indigo DTAE and DTSE front panel does not have a removable EPROM. Software upgrades are done via the Ethernet connection. See the Indigo active front panel manual for information concerning remote software up-loading.

4.2 Frequently asked questions

Why is the display black and/or no LEDs illuminated?

- Check that the 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 and/or the FRAME TOO HOT message is displayed?

- 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 FAN LED is not red

What should I do if the FAN LED is red?

- Check that the fan is plugged in correctly
- Try replacing the fan

Why do some cards not appear in the available cards list?

- Some cards take longer than others to finish their initialisation routines - try waiting at least 30 seconds for all cards to initialise
- Check that any cards with remote/local switches are set for remote control
- Check that any hex node switches are set to zero

The panel is locked and the password is not known. What do I do?

- Ask your system administrator for the password
- Clear the old password as explained in the Active panel setup in the Appendix

Is there a way to check all panel switches and LEDs?

- Hold the CAL button down as the panel powers up to enter the panel diagnostics mode

How do I check PSU or RS422 COMMS status?

- Press the DEVICE key in Statesman mode to display frame diagnostics
- Look at the COMMS LED. It should flash slowly at medium intensity when a valid communication link is present. It will flash brightly when the communication link is active

Why do control panels behave erratically when using a Statesman Hub?

- Check that each control panel has a unique address

Why has Statesman and/or two-panel link serial communication failed?

- Check that the appropriate cabling is connected correctly and is intact
- Check that the 422/TCP panel switch is in the RS422 position

Can both panels in a frame pair have active (or Statesman) panels?

- No, only one frame in a frame pair can have an active front panel

Why does the Home menu not use custom card names?

The rename feature only changes card names as shown in the Device menu

Why does a custom card name change to the default name when I plug in a card of the same type?

A custom name is only retained if a card is plugged in to a slot that had held a custom named card of exactly the same type and version

Why does more than one password unlock the panel?

The password is not case sensitive and if a password contains a space then it is assumed that the previous character was the last valid one. If the set-up password is 'a cd' then the following would all pass the test conditions 'abcd' 'ABCD' 'A ' and 'A zz'.

Why does the lock menu not lock the panel when I enter the correct password?

The lock panel menu does not require a password to lock the panel. The panel is locked the moment the previous menu (Really lock the panel?) is left by pressing F1 (Yes)

The password is used in the resulting panel lock menu (Locked Password =) to unlock it

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

5 Appendix

Active panel setup

The control panel supports the use of NVRAM to store product information and a panel lockout feature. A password will be required to use the panel when it has been 'locked' to prevent unauthorised access.

Warning: It is **ESSENTIAL** that the Clear Password procedure is followed and any old or unknown passwords are reset to all spaces prior to using the locked mode. If the panel is locked without knowing the password, the panel/frame will have to be power cycled to exit the locked mode.

To enter the Panel setup procedure hold the DEVICE, ENTER or any 'F' key down whilst powering the panel/frame. After a few seconds the display will change and the first menu will appear.

Note: **DO NOT CHANGE THE DATA IN ANY MENUS OTHER THAN THE CLEAR PASSWORD MENU (MENU 3)**

Menu 1	Ethernet MAC address:	Comment
	Mac Address Set: 00:50:C2:26:26:C0:0B	This address should be unique on the network that the panel is used. Do not alter this address if you are not sure.

Press ENTER to go to menu 2.

The number of user alarms enabled can be selected as follows:

Menu 2	User Alarms:	Comment
	User Alarms Enabled temp psus fans misc	Rotate the shaft encoder to select alarms enabled (default all enabled)

Press ENTER to go to menu 3.

The front panel has a lock out password, which can be used to prevent unauthorised access. This menu provides a means of changing the password if it has been forgotten.

Menu 3	Clear password:	Comment
	Reset password to: all spaces. Yes No	Press F3 to reset the password to all spaces

Press F3 to reset the password or F4 to abort and continue to the next menu.

Menu 4	Company menu:	Comment
	Front Panel Company Crystal Vision	Rotate the shaft encoder to select from list

Press ENTER to pass over menu 4 and re-boot the panel.

The front panel should now boot up as normal.

Module addresses and node numbers

The following table shows the Upper/Lower address or slot number range on the panel PIC, PSUs and installed modules for a variety of Indigo frames.

Device/Indigo frame	Lower address in 1 st frame	Upper address in 2 nd frame
Modules in 2U frames	1.01 to 1.12	2.01 to 2.12
Modules in 1U frames	1.01 to 1.06	2.01 to 2.06
Modules in desk top frames	1.01 to 1.02	2.01 to 2.02
Panel PIC in all frames	1.00	2.00
Upper PSU in 2U frames	1.14	2.14
Lower PSU in 2U frames	1.15	2.15
PSU in 1U frames	1.14	2.14

Most Crystal Vision cards have their unique node or card location address assigned automatically by the panel processor based on the slot occupied in the frame and the Upper/Lower range address setting.

Older cards may have a special 16-position node switch for use with older frames such as the FR2-12 or FR1-6.

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

When a card is detected by the front panel processor, some older cards will identify their location with a node address instead of a slot address.

The relationship between the two methods of referring to card addresses is as follows.

In the Indigo desk top box the node address is calculated as follows:

- slot number minus 1 – giving a range of 0 - 1 in frame 1 and 16 - 17 in frame 2

In the 1U frame the node address is calculated as follows:

- slot number minus 1 – giving a range of 0 - 5 in frame 1 and 16 - 21 in frame 2

In the 2U frame the node address is calculated as follows:

- slot number minus 1 – giving a range of 0 - 11 in frame 1 and 16 - 27 in frame 2

6 Specification

Indigo desk top box

General

Dimensions: 223mm wide, 44.5mm high (1U), 365mm deep. Weight 2.5 kg

Power requirements: 85 to 264 Volts, 47 to 400Hz

Operating conditions: 0 to 40 degrees C non-condensing
Ventilation front to right hand side, without air filter

Power supply: Single built in power supply

Module control

Remote options: Six control lines per module. Assigned on module (eg. GPI or RS422/RS232)

Contact open/closure for power supply or frame fault condition (supply out of range or failure, fan too slow or fail, over-heat)

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)

For shared control, frame address selectable on front panel for first or second frame in a pair

Second serial port available for Statesman control (connection via 26-pin high density D-Type connector and RJ45 connector)

Ethernet control capable (for future upgrade)

Statesman and active frame can control a second passive frame

One or two passive frames can be controlled via a remote active panel