Crystal Vision

INDIGO FRAMES

Five frames in three different sizes provide stylish and practical housing for Crystal Vision's Indigo modular product range

Indigo SYSTEM	Indigo 2SE	Indigo 1AE-DP	Indigo 1SE-DP	Indigo DT	Indigo DTSE
Height and type	2U rack unit frame	1U rack unit frame	1U rack unit frame	Desk top box (1U high)	Desk top box (1U high)
Width	19"	19"	19"	223mm	223mm
Depth	425mm	425mm	425mm	365mm	365mm
Weight	3.63kg empty and 7.4kg max loaded	3.1kg empty and 5.0kg max loaded	3.1kg empty and 5.0kg max loaded	1.9kg empty and 2.4kg max loaded	1.9kg empty and 2.4kg max loaded
Front panel type	Active with no display nor integrated control panel	Active with display and integrated control panel	Active with no display nor integrated control panel	Passive	Active with no display nor integrated control panel
Maximum number of boards housed	12	6	6	2	2
Hot swappable boards	●	●	●	●	●
Power supplies used	PSU-160i	PS-80i	PS-80i	Internal	Internal
Number of power supplies fitted	1 or 2	2	2	1	1
Provides power redundancy	Optional	Compulsory	Compulsory		
Hot swappable PSUs	● (if second PSU fitted)	●	●		
CoolFlow frame	●				
Number of fans	3 (2 front panel fans and 1 PSU fan)	3 (2 front panel fans and 1 PSU fan)	3 (2 front panel fans and 1 PSU fan)	1 (1 PSU fan)	1 (1 PSU fan)
Hot swappable fans	●	●	●		
Status monitoring LEDs	5 (Front fans, PSU fan, Upper PSU, Lower PSU and Temp)	4 (Front fans, PSU fan, PSUs and Temp)	4 (Front fans, PSU fan, PSUs and Temp)	3 (Fan, PSU and Temp)	3 (Fan, PSU and Temp)
Rear modules able to be fitted	Single slot, double slot, quad slot	Single slot and double slot	Single slot and double slot	Single slot and double slot	Single slot and double slot
Allows Ethernet connection	●	●	●		●
Works with Statesman Lite and VisionWeb Control	●	●	●		●
Works with SNMP	●	●	●		●
Works with VisionPanel and SBB-4	●	●	●		●
Works with CoCo 3G Controller and SW808 Controller	●	●	●	●	●

THE FRAMES – AN OVERVIEW

Crystal Vision's interface and keying products are individual modules that need to be housed in rack frames. Indigo is a state-of-the-art frames system, providing a range of five low-cost frames to suit all applications.

FRAME SIZES AND CONTROL OPTIONS

The Indigo frames are available in three sizes – 2U, 1U and desk top box – meaning you can choose an appropriate frame for your application whether you need to house 12 boards or two. These space-saving frames provide one of the highest packing densities available – with up to 12 boards fitting in just 2U of rack space.

The Indigo frames offer different levels of control to suit all preferences. The Indigo DT desk top box features a passive front panel for board edge operation. The 'AE' and 'SE' frames feature an active front panel allowing remote operation, with an integrated control panel included on the 'AE' frames. The 'AE' and 'SE' frames allow full Ethernet connection to VisionWeb and the Statesman Lite PC software as well as SNMP, while up to 16 of the frames can be controlled by a VisionPanel 3U touch screen control panel over Ethernet and control is also available from the Ethernet-powered SBB-4 smart button box.

WHAT CAN YOU PUT IN THEM?

You can put anything in them. Indigo is a fully compatible frames system, with every Indigo board fitting in every Indigo frame. You can mix any boards from our Indigo range in the same frames – video, audio, analogue, digital, 3Gb/s, High Definition, Standard Definition and fibre optics.

Mix any Indigo boards in the frames

PRACTICAL FEATURES

The Indigo frames combine stylish looks with effortlessly easy access and maintenance. Everything about the frame has been devised to make daily operation easy. The front panel is attached to the frame by a carefully designed hinge, making it very easy to open and close. This has particular benefit for the Indigo 1AE-DP frame with its integrated control panel as it allows the panel to face forwards and be operated in the open position. Maintenance is easy too: boards, power supplies and fans can all be easily removed while the unit is still powered. Crystal Vision frame location cards are available for the 2U frame and can be attached to the outside of the front panel to help engineers identify which boards are inside the frame without opening it.

POWER SUPPLIES

There are two plug-in power supplies available providing sufficient power for any combination of boards in the frame: the 160W PSU-160i for the Indigo 2SE frame and the 80W PS-80i for the Indigo 1-DP frames. The desk top boxes have a built-in 60W power supply. The plug-in power supplies fit neatly behind the PSU fan, and are easily accessed by removing this fan should they need to be changed. They feature an internal micro controller meaning they can be remotely monitored, with a readable serial number and alarms. Power supply redundancy is available and is popular with those working live for extra peace of mind. Redundancy is optional on the Indigo 2SE frame and obligatory on the Indigo 1-DP frames.

KEEPING COOL

Indigo's exceptional cooling system means any boards can be combined in one frame. On the rack frames, fans are located on both the inside of the front panel and in front of the power supplies – with the number of fans depending on the frame size and type. The fans are easily accessible and very simple to change as they just pull out of position. There is a temperature sensor on the frame, with remote monitoring of the frame temperature and fan speed.

As we move from SD to HD to 3Gb/s there's an increasing amount of processing that's being done by a single large FPGA – making it important to ensure there is good airflow across the whole board. The CoolFlow frame was developed with this in mind and offers the ultimate cooling system, with its extra fans and enhanced heat distribution perfect for housing the more functionality-packed modules. CoolFlow is available on the Indigo 2SE 2U frame – chosen as it is frequently used for large systems which generally involve the boards fitted with the more power-hungry chips, such as up and down converters and audio embedders.

Plastic runners are fitted on the 2U frame and help increase the overall ventilation as well as saving frame weight. Three fans are also available on the 1U frames for increased cooling.

HOW THE COOLING WORKS

On the CoolFlow frame (Indigo 2SE)...
The Indigo 2SE has three fully redundant fans – two on the front panel and one in front of the power supplies. When the front panel is closed, all the panel fans run and the PSU fan is switched off. There are two cooling modes: automatic and maximum. With automatic cooling both panel fans run continuously, increasing in speed as the temperature inside the frame goes up, while maximum cooling mode sets these fans to maximum speed. The front panel fans are redundant: only one is essential in normal operation and should one fan fail or operate too slowly, the other front panel fan is automatically switched to full power and an alarm asserted. The frame can also 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 – meaning that it does not wear itself out during normal operation. It is also possible to run the frame for a short time with no fan, should you need to change a power supply or replace the fan assembly.

On the 1U frames...
There are three fans – two on the front panel and one in front of the power supply – with one redundant. The three cooling modes are quiet, normal and maximum. The monitoring is switched from one fan to the other, every few seconds, and if one fan fails an alarm will be raised and the other fans forced to full speed while monitoring the failed fan. These repeated bursts of extra cooling will keep the frame operational until the faulty fan is replaced.

On the desk top boxes...
The desk top boxes have one fan located on the side of the box and have the same cooling modes (quiet, normal and maximum) as the other non-Coolflow frames.

STATUS MONITORING

The Indigo frames feature sophisticated status monitoring – with front panel LEDs that show you the status of the fans, power supplies and frame temperature so you know what's happening inside the frame at a glance. Yellow or green indicates a normal condition and red an abnormal condition. The fan indications will show green if the fans are working correctly and red if they are turning too slowly or have stopped, while the PSU fan LED will additionally flash green when this fan has stopped with the front panel open. The PSU indications will be off if a power supply is not fitted, green if okay and red if there is a fault or the output voltage is too low. The Temp LED is normally green but goes red if the frame temperature goes above the alarm threshold.

EXTERNAL CONNECTIONS

The frames have an excellent connection to control systems using CAT5 cabling. On the rear panel there is an RJ45 connector dedicated for direct Ethernet connection to the frame, while RS422 control can also be wired using RJ45 connectors. Individual connections are available at the frame remote sockets which are normally used for GPIs but may also be used for secondary serial control by dedicated remote control panels such as the CoCo 3G Controller.

SOFTWARE – FROM SETTING UP THE FRAMES TO SNMP

The Ethernet-enabled frames can be set to act as a web server to access an internal web page which is then viewed on a computer web browser. The Indigo main status web page gives extensive status information about the frame and its power supplies, and can also be used to set the IP address (manually or automatically if DHCP is available), enter a frame serial number or give the frame a useful name to reflect its location. Any software upgrades giving additional functionality and available from Crystal Vision's customer support can also be downloaded to the frame via this web page.

The AE and SE frames run the uCLinux operating system software which allows the use of standard software such as an SNMP Proxy Agent. These frames come with a pre-installed SNMP agent that can either report the status or generate traps and trigger alarms on a frame status change. To activate the SNMP manager a licence needs to be installed, which is obtained from Crystal Vision's customer support and downloaded to the frame using the board update tool.

FLEXIBLE SECURITY

Frame software version 5.9 added flexible security to the Indigo frames, with the ability to switch off services that are not required. It is possible for a user to disable all services except ping in order to prevent unwanted access to the frames. Statesman Lite, FTP, HTTP, SNMP and ASCII can all be disabled. It is also possible to remove the Network Configuration, SNMP Configuration and Software Upgrade menus, should this be required. Restricting access to the frames is particularly useful in large installations where many people have access to the control network.

THE REAR MODULES

To access the signals on the boards you need rear modules, which slot on to the back of the frames. Crystal Vision offers a wide choice of these Indigo rear modules which offer varying numbers of inputs, outputs and loop-through options along with the choice of BNCs, D-Type, RJ45 and optical connectors. The single and double slot rear modules can be used with all three frame sizes, while the quad slot just fit the 2U frame. Each rear module has a selection of labels suitable for different products.

Traditionally the rear modules were held on by retaining straps, whereas the current screw-in rear modules are individually retained by two screws which makes it easier to change the rear module if required. The latest generation of frames have been designed with additional fixing holes to accommodate these screw-in rear modules, but even if you're still using the older frames and rear modules there's full compatibility: you can use the retaining-strap rear modules on the newer frames and you can use the screw-in rear modules on the older frames – you just take the screws out. Different issue numbers indicate which frames include the fixing holes for the screw-in rear modules – contact Crystal Vision's customer support for more information.

WHAT ARE THE BOARD POSITIONING RULES?

Two slot high rear modules: The board is always placed in the upper of the two slots (the RM74 is the only exception – it sits in the bottom slot). These rear modules must occupy either the upper or lower pair of frame slots.

Quad slot 'video' rear modules: The boards should be placed in the top slot, the next slot down and the bottom slot.

Quad slot 'audio' rear modules: The boards are placed in the top three slots.

Fibre boards: A fibre board (or board fitted with a FIP, FOP or FIO fibre option) can be housed in any frame slot position but due to its extra height it is not possible to place most Standard Definition or audio boards directly above it when the fibre board is in even numbered slot positions.

Rear modules are available in three sizes

Single slot

Double slot
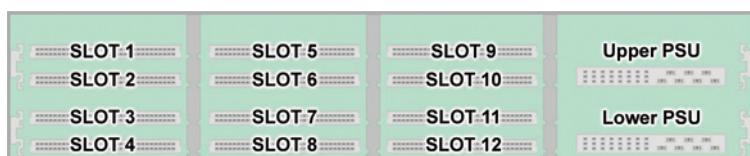

Quad slot

THE 2U FRAME

Crystal Vision offers one 2U frame –Indigo 2SE – which can be used with all the standard boards, rear modules, power supplies and control cables.

Traditionally Crystal Vision's most popular size of frame, the 2U frame has Indigo's usual extremely high-packing density and can house up 12 boards, depending on the rear module fitted. The frame is used with the 160 Watts PSU-160i power supply, and gives the option of a second redundant power supply.

Indigo 2SE is available as a CoolFlow frame, and has three fully redundant and easily accessible fans – one is fitted on a detachable plate in front of the power supplies while the other two are attached to the inside of the front panel. Front panel LEDs report the status of the front fans, PSU fan, upper power supply, lower power supply and frame temperature.

Indigo 2SE is a CoolFlow 2U frame with an active front panel fitted with a smart CPU which allows VisionWeb, Statesman Lite and SNMP control via Ethernet. It has optional power redundancy and holds any mixture of up to 12 boards.

Indigo 2SE control options			
Board edge switches	●	Frame integrated control panel	
VisionPanel Ethernet remote control panel	●	SBB-4 smart button box	●
Dedicated control panels	●	VisionWeb Control	●
Statesman Lite PC software	●	SNMP	●
ASCII and JSON protocols	●	GPIs	●

Rear view of Indigo 2SE

SLOT 1	SLOT 5	SLOT 9	Upper PSU
SLOT 2	SLOT 6	SLOT 10	
SLOT 3	SLOT 7	SLOT 11	Lower PSU
SLOT 4	SLOT 8	SLOT 12	

The slot numbering in a 2U frame

The PSU-160i power supply

Internal view of Indigo 2SE, which holds up to 12 boards

THE 1U FRAMES

Where space and cost are at a premium, the Indigo 1-DP frames are ideal, taking up a mere 1U of rack space for up to six boards.

Ideal for applications involving only a few boards in a frame, Crystal Vision offers two 1U frames, both with power redundancy (Indigo 1AE-DP and Indigo 1SE-DP). The 1U frames are used with all the standard boards and control cables, and with the single slot and double slot rear modules only.

The Indigo 1-DP range has been designed for any application that does not need 2U of rack space but *does* need redundancy to provide protection in the event of power failure. The Indigo 1-DP frames are sold with two PS-80i power supplies already fitted to provide this compulsory power redundancy.

For sophisticated cooling there are three easily accessible front fans – two located on the front panel and the other just in front of the power supply – with one of the fans redundant. Front panel LEDs report the status of the front fans, PSU fan, power supplies and frame temperature.

Rear view of Indigo 1SE-DP

The slot numbering in a 1U frame

Internal view of Indigo 1AE-DP, which holds up to six boards

Indigo 1AE-DP

Indigo 1AE-DP is a 1U frame with an integrated control panel which allows easy menu-driven control of all remote-enabled boards as well as VisionWeb, Statesman Lite and SNMP control via Ethernet. It has compulsory power redundancy and holds any mixture of up to six boards.

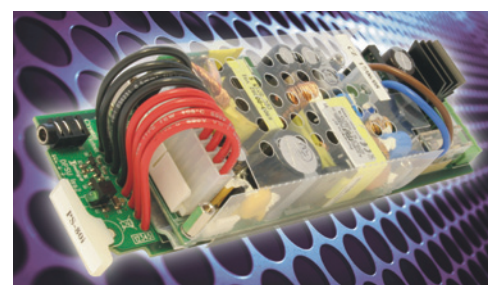| Indigo 1AE-DP control options			
Board edge switches	●	Frame integrated control panel	●
VisionPanel Ethernet remote control panel	●	SBB-4 smart button box	●
Dedicated control panels	●	VisionWeb Control	●
Statesman Lite PC software	●	SNMP	●
ASCII and JSON protocols	●	GPIs	●

Indigo 1SE-DP

Indigo 1SE-DP is a 1U frame with an active front panel fitted with a smart CPU which allows VisionWeb, Statesman Lite and SNMP control via Ethernet. It has compulsory power redundancy and holds any mixture of up to six boards.

Indigo 1SE-DP control options			
Board edge switches	●	Frame integrated control panel	
VisionPanel Ethernet remote control panel	●	SBB-4 smart button box	●
Dedicated control panels	●	VisionWeb Control	●
Statesman Lite PC software	●	SNMP	●
ASCII and JSON protocols	●	GPIs	●

The PS-80i power supply – designed for the Indigo 1-DP frames

THE DESK TOP BOXES

Crystal Vision offers two desk top boxes – Indigo DT and Indigo DTSE – selected depending on the level of control required.

These compact boxes are suitable for non-rack mounted installations requiring a maximum of two modules and are the best value solution when buying only one or two boards. 1U ears can be fitted to facilitate mounting in a control desk, while the IDT-RK rack mounting kit allows them to be fitted in a 19" rack if required. The desk top box front panels do not have a hinge but are simply removed.

The Indigo DT are used with all the standard Indigo boards and control cables, and with the single slot and double slot rear modules only. The desk top boxes are fitted with a 60W fixed power supply to handle any two boards. The single fan – located on the side of the box – features the sophisticated cooling system found in the larger frames. There are four front panel LEDs, monitoring the fan, power supply, frame temperature and communications activity.

Rear view of Indigo DT

The slot numbering in a desk top box

Indigo DT

Indigo DT is a desk top box with a passive front panel which holds any mixture of up to two boards. It has no power redundancy.

Indigo DT control options			
Board edge switches	●	Frame integrated control panel	
VisionPanel Ethernet remote control panel		SBB-4 smart button box	
Dedicated control panels	●	VisionWeb Control	
Statesman Lite PC software		SNMP	
ASCII and JSON protocols		GPIs	

Indigo DTSE

Indigo DTSE is a desk top box with an active front panel fitted with a smart CPU which allows VisionWeb, Statesman Lite and SNMP control via Ethernet. It holds any mixture of up to two boards. It has no power redundancy.

Indigo DTSE control options			
Board edge switches	●	Frame integrated control panel	
VisionPanel Ethernet remote control panel	●	SBB-4 smart button box	●
Dedicated control panels	●	VisionWeb Control	●
Statesman Lite PC software	●	SNMP	●
ASCII and JSON protocols	●	GPIs	●

Internal view of Indigo DT, holding up to two boards

MECHANICAL DIMENSIONS

Indigo 2SE
2U 19" rack unit. Height 89mm, width 482mm, depth 425mm. Empty weight 3.63kg. Maximum loaded weight 7.4kg.

Indigo 1AE-DP/1SE-DP
1U 19" rack unit. Height 44.5mm, width 482mm, depth 425mm. Empty weight 3.1kg. Maximum loaded weight 5.0kg

Indigo DT/DTSE
Desk top box. Height 44.5mm, width 223mm, depth 365mm. Empty weight 1.9kg. Maximum loaded weight 2.4kg

POWER REQUIREMENT OF ALL FRAMES
90-264VAC, 47-63Hz

POWER SUPPLIES
Rack mounted frames have plug-in power supplies fitted which are ordered separately:

- Indigo 2SE takes one or two 160W PSU-160i power supplies
- Indigo 1AE-DP/1SE-DP take two 80W PS-80i power supplies. PS-80i is available in left and right hand versions

Indigo DT/DTSE have one built-in 60W power supply

Compulsory power redundancy is available on Indigo 1AE-DP and 1SE-DP

Optional power redundancy is available on Indigo 2SE

The PSU-160i and PS-80i have on-board processors to report to the frame both PSU status and PSU fan status

FRAME REAR MODULES
Crystal Vision offers a wide choice of Indigo rear modules which slot on to the back of the frames

Available with BNCs, D-Type, RJ45 and optical connectors

Single slot rear modules: used in 2U, 1U and desk top box

Double slot rear modules: used in 2U, 1U and desk top box

Quad slot rear modules: used in 2U

Rear modules are individually retained by two screws

OPERATING CONDITIONS
0 to 40°C non-condensing

CoolFlow 2U frame: Ventilation front to sides/rear, without air filters

1U frames: Ventilation front to rear, without filters

Desk top boxes: Ventilation side to side, without filters

FRAME OPERATING SOFTWARE
The AE and SE frames run uCLinux which allows the use of standard software such as an SNMP Proxy Agent

FRAMES MONITORING
The frames monitor and report frame fan status and temperature

If any parameter should fall outside its range, the frame status will indicate a fail condition on both the front panel indicators and by the change over relay contacts accessible from the rear interface connectors. The fail condition will also be diagnosable via VisionWeb, Statesman Lite or SNMP on the 'AE' and 'SE' frames

REMOTE CONTROL
Six control lines per module. Assigned on module (eg. 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, over-heat)

RS485 loop system from front panel to all modules and rear connection (rear connection by way of 26-pin high density D-Type connector and RJ45 connector)

Control available from VisionPanel remote panel

Control available from SBB-4 smart button box (must be used with PoE enabled switch)

VisionWeb Control is available via the web server on the frame and allows control and monitoring using a standard web browser on a computer, tablet or phone

Allows Ethernet connection to a PC running Statesman Lite

SNMP monitoring and control available as a frame option. 'AE' and 'SE' frames are preinstalled with an SNMP manager which will require a licence to be downloaded and installed

Control using ASCII and JSON protocols

Statesman Lite, FTP, HTTP, SNMP and ASCII can be individually disabled should extra security be required

ORDERING INFORMATION

Indigo 2SE	CoolFlow 2U frame with active front panel featuring smart CPU and optional power supply redundancy for up to 12 Crystal Vision modules
Indigo 1AE-DP	1U frame with active front panel featuring smart CPU and integrated control panel and power supply redundancy for up to six Crystal Vision modules
Indigo 1SE-DP	1U frame with active front panel featuring smart CPU and power supply redundancy for up to six Crystal Vision modules
Indigo DT	Desk top box with passive front panel for up to two Crystal Vision modules
Indigo DTSE	Desk top box with active front panel featuring smart CPU for up to two Crystal Vision modules
IDT-RK	Rack mounting kit allowing desk top box to be mounted in a 19" rack
PSU-160i	160 Watts power supply for Indigo 2SE
PS-80i	80 Watts power supply for Indigo 1AE-DP and 1SE-DP. Available in left and right hand versions
RMxx	Selection of frame rear modules, available in single slot, double slot and quad slot sizes
VisionPanel	3U Ethernet remote control panel with touch screen
SBB-4	Smart button box with four programmable LCD switches
VisionWeb Control	VisionWeb web browser control included within frame software
Statesman Lite	PC Control System
SNMP	SNMP monitoring and control available as a frame option