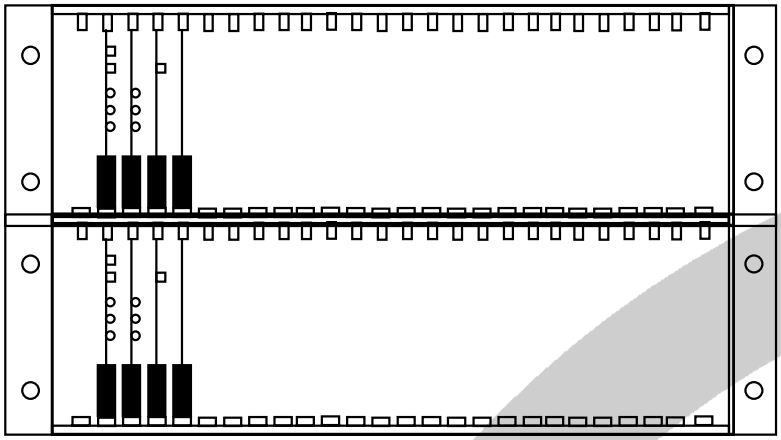
BEWATOR

Uniclass L7626	EPIC M231
CI/SfB (64.11) X	

Visilynx 3 Modular Matrix Switcher



Installation & Maintenance Manual

Manual: INS00286 Issue: 1.0

IMPORTANT NOTES

Please read this manual in its entirety before installing the Visilynx 3 Modular Matrix Switcher rack frame equipment.

It is recommended that the installation of this unit complies with the latest national standards:

NACOSS National Approval Council for Security Systems.

NACP20 Code of Practice for Installation and Maintenance of Closed Circuit Television Systems.

IEE 16th Edition Regulations for electrical installations, BS7671

SELECT SUITABLE EQUIPMENT!

Please ensure that all equipment is suitable for the application and the environment for which it is intended. Ensure all applicable specifications are adhered to.

Please take particular care ensuring that interconnected equipment is fully compatible and suitable for such use. Check load ratings, dimensions, etc.

SECURELY MOUNT THE ASSEMBLY!

This unit must be properly and securely mounted. Care should be exercised to select a suitable 19" rack cabinet to install the unit.

Always use the recommended fixing screws for the selected rack cabinet. Failure to comply with these recommendations could result in the unit coming loose from the cabinet and falling with resultant damage or injury to anyone or anything struck by the falling unit.

INSTALL CORRECTLY!

The installation should be made by a qualified installer. Specific tools may be required for installation purposes dependent upon the site in which the assembly is to be installed.

Refer to local and national standards for wiring and follow recommendations. The installation should comply with local codes. Check that correct cable types are used.

WARNING: This apparatus must be connected to Earth!

An appropriate disconnection device must be fitted when installing the electrical supply.

Always disconnect and remove the power before working on the Visilynx 3 Modular system.

Ensure the power CANNOT be re-connected by external sources while the unit is being worked on.

INSTALLATION CHECKLIST

1. Ensure that the mains supply has an adequate earth connection.
2. Ensure that each power supply unit is connected to no more than two rack frame units.
3. Ensure that each active card has a corresponding connector card.
4. Ensure that the active cards are positioned with respect to their connector cards according to the Installation In Rack Frame sections in Chapter 3.
5. Where two or more rack frame units are connected in an expanded video bus arrangement, ensure that all bus expansion cables are fitted.
6. Ensure that all video input switch cards are connected to the same number of corresponding switch expansion connector cards, using switch expansion cables.
7. Ensure that all expansion rack frames are connected to the main rack frame using control expansion cables.
8. Ensure that no more than 3 keyboards are powered by the Control CPU card keyboard port. Additional keyboards must have their own local power supply units.
9. Ensure that the network address switches of all nodes are set to different addresses.
10. Ensure that each collection of between 1-16 rack frame units making up a node have a Control CPU card in the first rack frame only.
11. All power supplies serving a node should be switched on together.
12. After powering up, ensure that all red status lights on all cards go out.
13. After powering up, ensure that all keyboards go to their Main Menu or their ID request menu.

GLOSSARY

Active Card	Any of the installable parts of Visilynx 3 that fit in the front of a Rack Frame.
Alarm Input	A signal from external equipment indicating an alarm condition.
Autodetection	A process during which the Control CPU card detects the positions and types of all other Cards, and numbers all cameras and other entities.
Connector Card	Any of the installable parts of Visilynx 3 that fit in the rear of a Rack Frame and provide video, power and control connections.
CPU	Central Processor Unit, the Card controlling a Node.
C-Type Telemetry	A serial data protocol that connects to a Receiver down the same coaxial cable that carries the camera output video.
D-Type Telemetry	A serial data protocol that connects to a Receiver using an RS-485 data cable.
Expansion Input	A connection from another Rack Frame's Video Bus.
Expansion Output	A connection to another Rack Frame's Video Bus.
Logical Camera	The number of a camera as used by a keyboard operator.
Matrix	A system such as Visilynx 3 that allows video inputs to be switched to video outputs.
Network	Two or more Visilynx 3 Nodes linked by Trunks.
Network Address	The identity of a Node on a Network.
Node	A single Matrix on a Network, identified by an Address.
NTSC	National Television Standards Committee: the 525-line TV system used in America and Japan.
PAL	Phase Alternation Line: the 625-line TV system used in the UK and Europe.
Physical Camera	The number of a camera as determined by its connection to Visilynx 3.
Rack Cabinet	A standard 19-inch enclosure housing one or more Rack Frames and their power supplies.
Rack Frame	The enclosure housing Active Cards and Connector Cards.
Receiver	A device that converts telemetry signals into control voltages used to move or adjust a camera.
Roll-Free Switch	A switching technique that blanks a video output for a short time, to prevent the monitor image from rolling while switching between camera inputs.
RS-232	A point-to-point serial data connection type with limited noise immunity and cable length.
RS-485/422	A point-to-point serial data connection type with good noise immunity and cable length.
RS-485	A multi-drop serial data connection type with good cable length and noise immunity.
Status LED	A red indicator on all Visilynx 3 Active Cards, which when lit indicates that power-up is in progress or the card is not used by the current User Configuration.
Switch Expansion	A cable that connects between input Connector Cards in the same or different Rack Frame, to connect 16 camera signals to a different Video Bus.
Trunk	Video and data connection between Nodes.
User Configuration	The set of data loaded from VisiPC to a Visilynx 3 CPU that determines the operation of the Matrix.
Video Bus	A set of 16 video output signals passed horizontally between Visilynx 3 Cards.
Video Expansion	A cable that connects the Expansion Output card from one Rack Frame's video bus to the Expansion Input card of another.
VisiWire	The name of the Network data protocol used to connect Visilynx 3 Nodes.
VisiPC	Configuration and test software.

Table Of Contents

1 INTRODUCTION

1.1 System Description

Visilynx 3 Modular is a colour CCTV switching system that can be used to build a video matrix node anywhere from 16 camera inputs and 16 monitor outputs up to 511cameras and 128 monitors, using from 1 to 16 rack frames.

Each rack frame in a node is populated with cards, which provide the functionality of each rack frame. Only the first rack frame in a node has to have a Control CPU card.

Up to 127 nodes may be connected together using the VisiWire network system, to provide any keyboard with access to any camera and any alarm on the system.

The main user interface device of the Visilynx 3 Modular system is the Visilynx 3 keyboard. Up to 32 are supported by a single matrix.

Visilynx 3 Modular is supplied with a CD-ROM package containing configuration and test software called VisiPC, which should be installed onto a suitable PC. It is both user friendly, and comprehensive, and forms the heart of the system's configuration and test capability.

The CD-ROM contains electronic copies of this manual, the VisiPC and keyboard manuals, the PCCON3 remote control protocol manual, and installable Visilynx 3 and VisiPC software.

The VisiPC Configurator sub-program includes features to aid the creation and adjustment of “Configuration Files” (.V3) for an installed Visilynx 3 system.

The VisiPC Visilynx Tester & Simulator sub-program includes features for the functional testing of Visilynx 3 systems.

1.2 Reference Documents

System Build Configuration Record

Each Visilynx 3 Modular system is shipped with a build configuration record peculiar to each system, listing the components and their capabilities.

Control CPU Card Software

The CD-ROM supplied with Visilynx 3 Modular contains copies of the Control CPU card software components loaded during manufacture. These include the Main Controller Software part number SW220, the Flash Boot Loader Software part number SW221, and the Controller FPGA Firmware part number SW222. A release notes document is included.

VisiPC Software and Manuals

The CD-ROM also contains VisiPC software part number SW224 and release notes, and the two-part user manual:

a) Part 1 describes the “Visilynx Configurator” sub-program and is provided in Bewator Limited document INS00231.

b) Part 2 describes the “Visilynx Tester & Simulator” sub-program and is provided in Bewator Limited document INS00237.

Keyboard User Manual

The User Manual for the Visilynx 3 Keyboard, with software part number SW218, is provided in Bewator Limited document INS00232. All operational details are covered in this document.

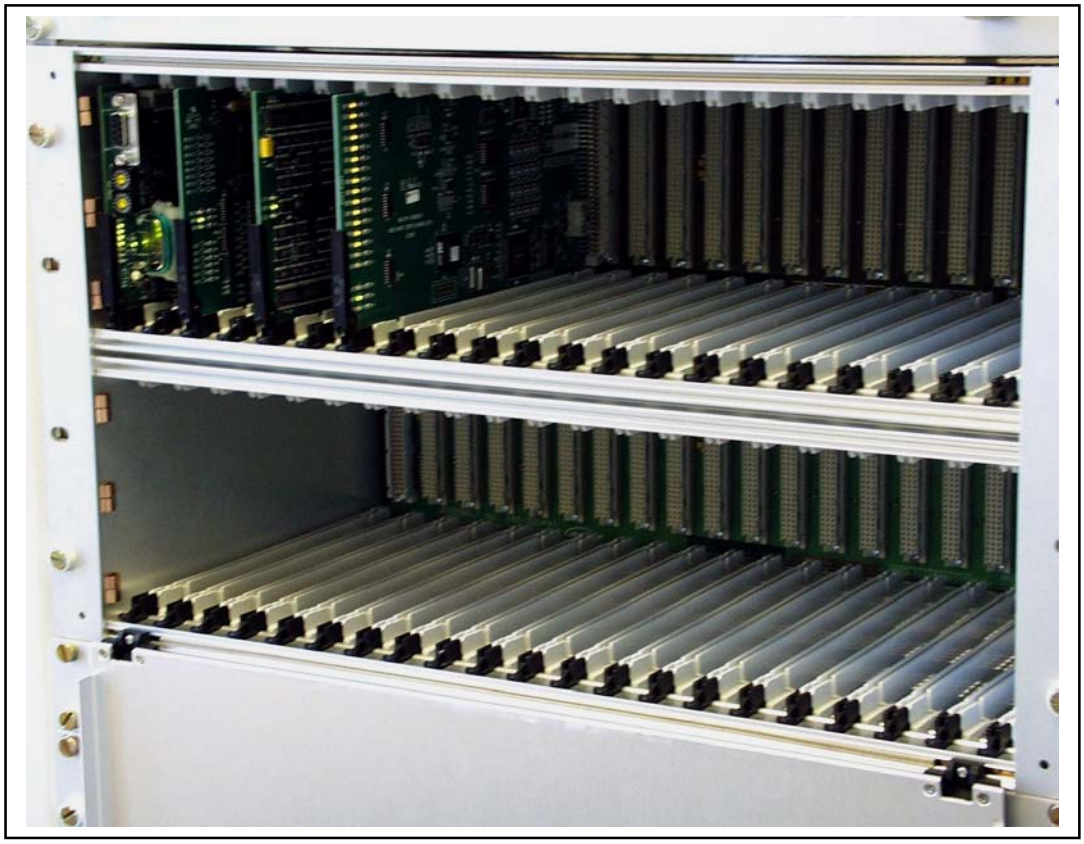
PCCON3 Remote Control Protocol User Guide

The User Guide for this comprehensive and flexible remote control protocol, which allows other systems to control a Visilynx 3 matrix, is provided in Bewator Limited document INS00296, also on the CD-ROM.

2 THE VISILYNX 3 RACK FRAME

2.1 General Description

Figure 1 Rack Frame



- All Visilynx 3 Modular cards are mounted in a standard 6U high 19" rack frame.
- The rack frame is divided horizontally into two rows of 21 slots, each with a backplane PCB (part T223).
- Each row supports 16 monitor outputs, making a total of up to 32 per rack frame.
- A single rack frame can accept from 16 to 128 camera video inputs, in increments of 16.
- An external mains power supply provides DC power.

2.2 Tools Required

A small flat-blade screwdriver is required to open the rack frame front cover.

2.3 General Installation Procedure for Rack Frame Cards

1. Fit all 6U-high connector cards first, in the rear of the rack frame.
2. Note that connector cards vary in width from 1 to 2 card slots, and consequently determine the position and number of active cards that can be fitted in the front of the rack frame.
3. Fit each 3U-high active card to the front of the rack frame, in either of the two rows as appropriate, in a position corresponding to the rear connector card.
4. Note that active cards are fitted with a standard release catch, which should be used to lock each card in position and to eject each card on removal. Undue pressure should not be used to insert or withdraw active cards.

Note: Visilynx 3 cards are NOT hot swappable. They should only be removed or inserted with the power supply switched off.

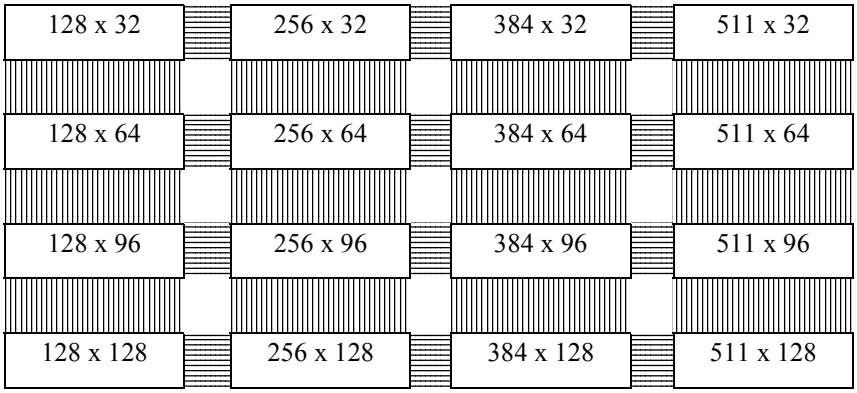
2.4 Card Positions

- The rack frame backplane PCB has a different connector for the top left active card slot. This can only accept a Control CPU card (1st rack frame in node), or a control expansion card (other rack frames in node).
- Active cards should only be installed in the same slot as their corresponding connector card.
- Different types of active cards must not share the same connector card.
- The positions of single active cards or pairs of active cards with respect to their connector cards are described in the 'Installation in Rack Frame' sections in Chapter 3.

2.5 Combining Rack Frames

- Rack frames are combined to expand the size of the switching matrix, in terms of either camera, or monitors, or both.
- A matrix consisting of two to 16 rack frames is best imagined as a grid of rack frames, although in practice they will usually be mounted in rack cabinets.
- Extra cameras are connected by adding columns to the grid, up to 4 maximum.
- Extra monitors are connected by adding rows to the grid, up to 4 maximum.
- Up to a maximum of 16 rack frames can therefore be combined, making the largest matrix 511 (cameras) x 128 (monitors), as shown in Figure 2.

Figure 2 Rack Frame Combinations



2.6 Matrix Sizes

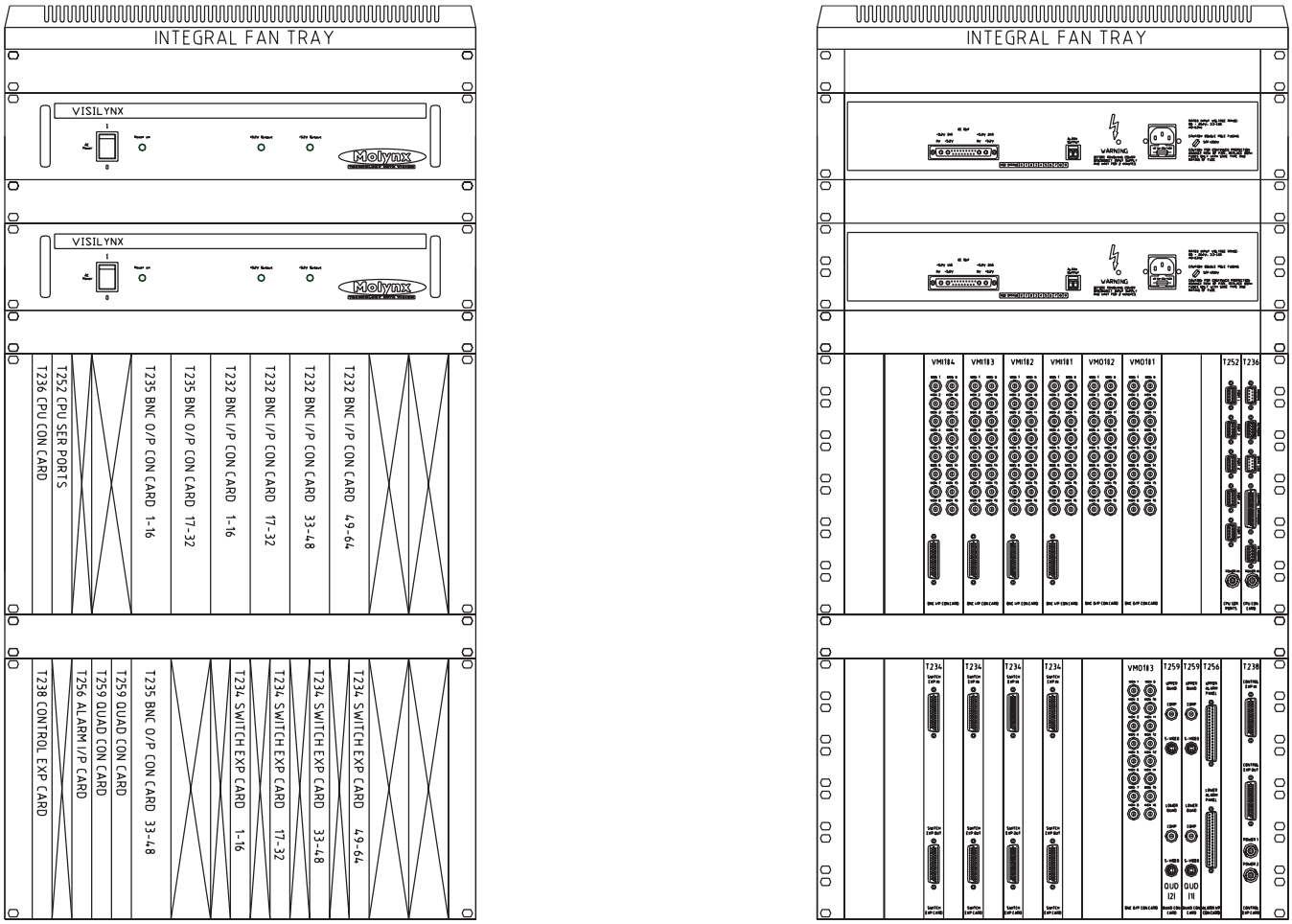
- Figure 2 shows the size of different matrix nodes when built up as an oblong grid of rack frames, always starting at the top left. The size of the resulting matrix is given by the figures in the bottom right rack frame.
- The horizontal lines joining rack frames represent bus expansion cables, which carry video from right to left.
- The vertical lines joining rack frames represent switch expansion cables, which carry video from top to bottom.
- All rack frames are also joined (in any series order) by control expansion cables (not shown).
- For example, a 384-input by 64-output matrix is built up from six rack frames, consisting of two rows of three frames starting at the top left.
- Only the top left rack frame is fitted with a Control CPU card; all others are fitted with Control Expansion cards.
- The smallest possible matrix consists of one rack frame, a Control CPU card, a video input switch card, a video output card, and their respective connector cards.

2.7 Power Supply Units

- Each rack frame is normally connected to one power supply unit via an interconnecting cable.
- One power supply unit can serve up to two fully loaded rack frames.
- Alternatively, a dual-redundant power scheme can be set up by connecting two power supply units to each rack frame, by means of a special power supply output cable which provides dual redundancy and fault tolerance. Either unit is capable of supplying power to the whole rack frame in the event of a failure of the other one.
- A failure in a Power Supply Unit results in an alarm at the CCTV controller.
- See Chapter 4 for more details.

2.8 Example Matrix Installation

Figure 3 Front and Rear Views of a 64x48 Matrix



2.9 User Configuration

The VisiPC configuration software can be used to specify the number of system functions and peripheral devices for the entire node, as required for the installation.

Table 1 lists the user configuration functions and devices that can be configured using VisiPC, together with the active cards required.

Table 1 User Configuration

Function or device	*Maximum per node*	*Active card(s) required*	*Description*
Alarm	1189	Alarm input, video input switch	Up to 511 video loss alarms (16 per video input switch card), 512 digital alarm inputs (128 per alarm input card) and 165 self test alarms, including conditions from external multiplexers and VCRs. Individual acknowledgement via keyboards
Alarm map	1	-	Each alarm source can be indicated using a different number, to provide a more convenient numbering scheme
Camera	511	Video input switch, D-type telemetry	One camera per video input (16 cameras per video input switch card). Supports D-type telemetry
Camera map	1	-	Each camera input can be controlled using a different number, to provide a more convenient numbering scheme or to increase fault tolerance
Communication port	43	Control CPU, Communication	Ports comprise RS-232, RS-485/422 and RS-485. 6 on Control CPU card (plus extra 5 using CPU Serial Ports Connector card), plus 4 on each Communication card. Configurable as remote control input, network control, device control output, time reference input
Keyboard	32	Control CPU	Operator control interface
Monitor	128	Video output	One monitor per video output (16 outputs per video output card)
Multiplexer	32	Control CPU, Communication	Remote control of selected manufacturers' devices (1 communication port required per device)
Preset	99 per camera	-	Combination of pan, tilt, zoom and focus settings, saved under a single number. May be run as a preset sequence or tour per camera
Relay	255	Relay output	Each configured as latched or momentary (8 relays per relay card)
Sequence	64	-	Timed series of up to 63 cameras or views
Timed event	128	-	Control alarms, relays, sequences and cameras on a timed or regular basis
User	64	-	Endows device access rights and priority to a keyboard or PCCON user
VCR	32	Control CPU, Communication	Remote control of selected manufacturers' devices (1 communication port required per device)
View	256	-	Combination of a camera and a preset position
Zone	256	-	Set of up to 8 camera-to-monitor assignments

3 VISILYNX 3 MODULAR CARD DESCRIPTIONS

This chapter contains a detailed description of each of the active cards and their associated connector cards.

3.1 Rack Frame Card Types

Table 2 Summary of Visilynx 3 Modular Card Types

Active card type	*Active card code*	*Max active cards per rack*	*Max active cards per node*	*Max per connector card*	*Connector card code*	*Active card description*
Alarm Input	T254	4	4	2	T256	128 alarm inputs
Backplane Expansion Input	T228	2	24	2	T237	Connects 16 backplane monitors from next rack
Backplane Expansion Output	T229	2	24	2	T237	Connects 16 backplane monitors to next rack
Communication	T266	8	8	1	T267	4 ports, each configurable as RS-232 or RS-485/422
Control CPU	T226	1	1	1	T236	6 serial ports and expansion connector
					T252	Adds 5 extra RS-485/422 serial ports
Control Expansion	T231	1	15	1	T238	Replaces Control CPU in expansion racks
D-type Telemetry	T253	20	32	1	T262	16 three-terminal telemetry ports
Quad	T258	8	32	2	T259	Digital quad card. Supports quadrant freeze and full screen. Text (20 x 14) per quadrant.
Relay Output	T255	32	32	2	T257	8 single-pole double-throw relays
Video Input Switch	T224	18	256	2	T232	Connects 16 cameras to backplane
					T234	Connects 16 cameras to next expansion rack
Video Output	T225	2	8	1	T235	Buffers and injects text (40 columns x 14 rows) on 16 monitors

Expansion Cards

Some Visilynx 3 Modular cards are used for matrix expansion as follows:

- The Backplane Expansion Connector Card (T237) provides a signal path from the rack frame rear panel external connectors, through the backplane to the active card(s) at the front of the rack frame.
- The Backplane Expansion Input Card (T228) extends the “horizontal” monitor switch buses between the rack frames thereby providing more video camera inputs. The input card is the “receive” end of the pair.
- The Backplane Expansion Output Card (T229) extends the “horizontal” monitor switch buses between rack frames thereby providing more video camera inputs. The output card is the “transmit” end of the pair.
- The Switch Expansion Connector Card (T234) provides external connectors on the rack frame rear panel; however it also contains active circuitry. It extends the “vertical” camera switch buses between rack frames thereby providing more video monitor outputs. It receives the video bus from a previous rack frame as well as buffering it on to the next. See Section 3.2.
- The Control Expansion Card (T231) interfaces rack frames to the Control CPU Card in the first rack frame. It receives and transmits control signals between the Control CPU Card and the backplane.
- The Control Expansion Connector Card (T238) provides conversion between single-ended and differential for control signals being passed between rack frames.

3.2 Control CPU Card (T226)

Figure 4 Control CPU Card (T226)

Purpose

- The Control CPU Card is responsible for the control and configuration of all rack frames in the node.

Installation in Rack Frame

- Only in top left slot (slot 1 in top row) of rack 1.
- One CPU card per Control CPU Connector Card.
- An optional CPU Serial Ports Connector Card allows access additional communication ports.

Setting the Card for Operation

1. Ensure PCB jumpers J1, J2, J5, J6 and J7 are fitted. Jumper J4 inhibits watchdog resets and should be removed for normal operation.
2. Set the network address switches to determine the identity of the node in a network. See Figure 5.

Specification

- Hitachi H8S micro-controller (16-bit, 20MHz).
- FLASH (2Mb) for software and configuration storage, upgraded on site using VisiPC.
- SRAM (1Mb) for operating data storage.
- Battery backed SRAM (512Kb) for state storage.
- Real time clock and watchdog.
- Extensive diagnostic self test with results logged for later upload to VisiPC.
- Status LED's indicating activity. See Figure 6 and Table 3.

Figure 5 Control CPU - Front Edge Detail

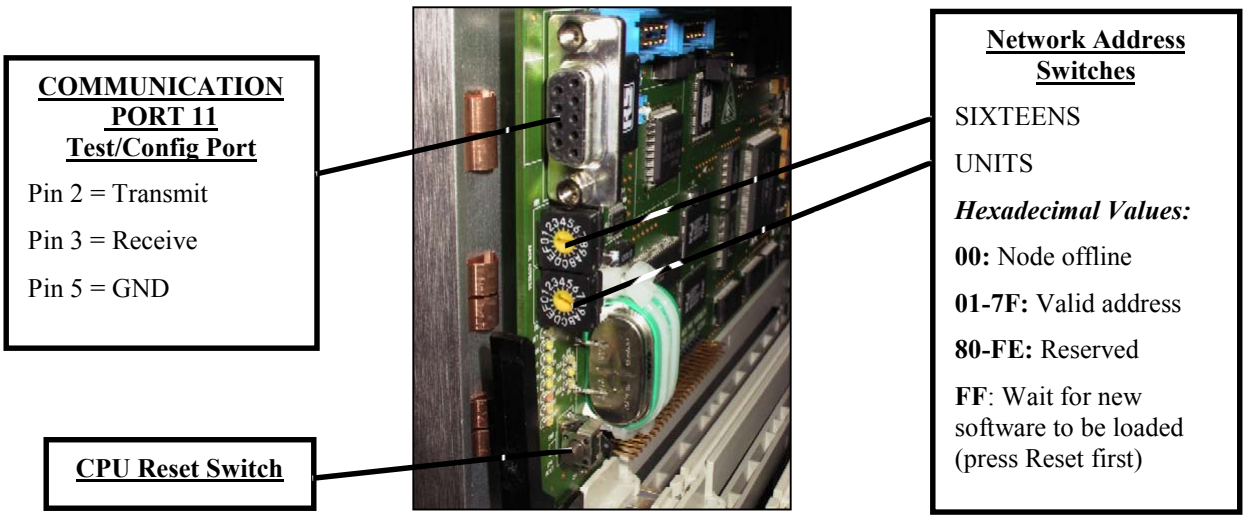


Figure 6 Control CPU Card Front Edge Layout Showing Controls and Indicators

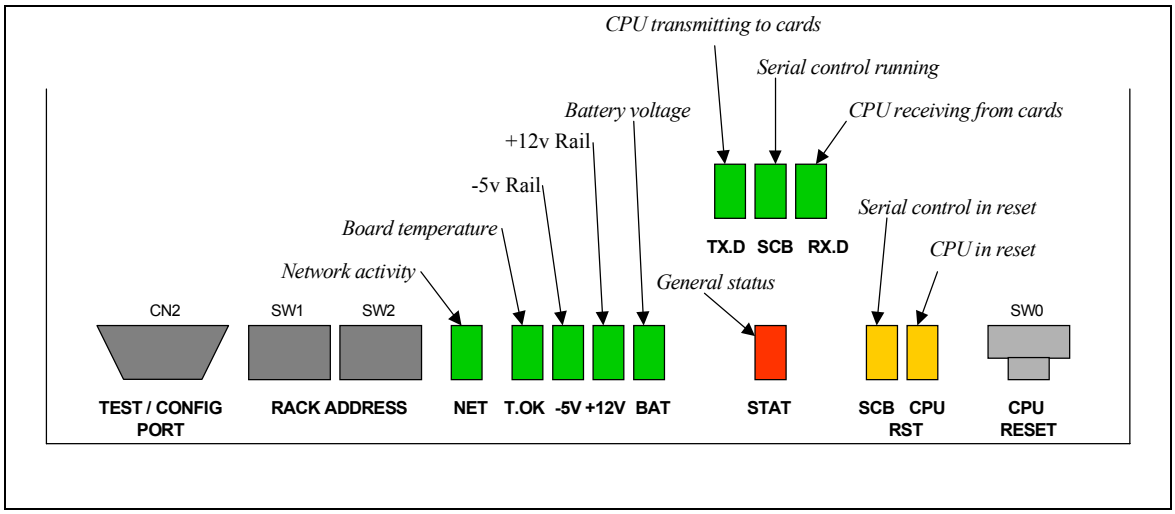


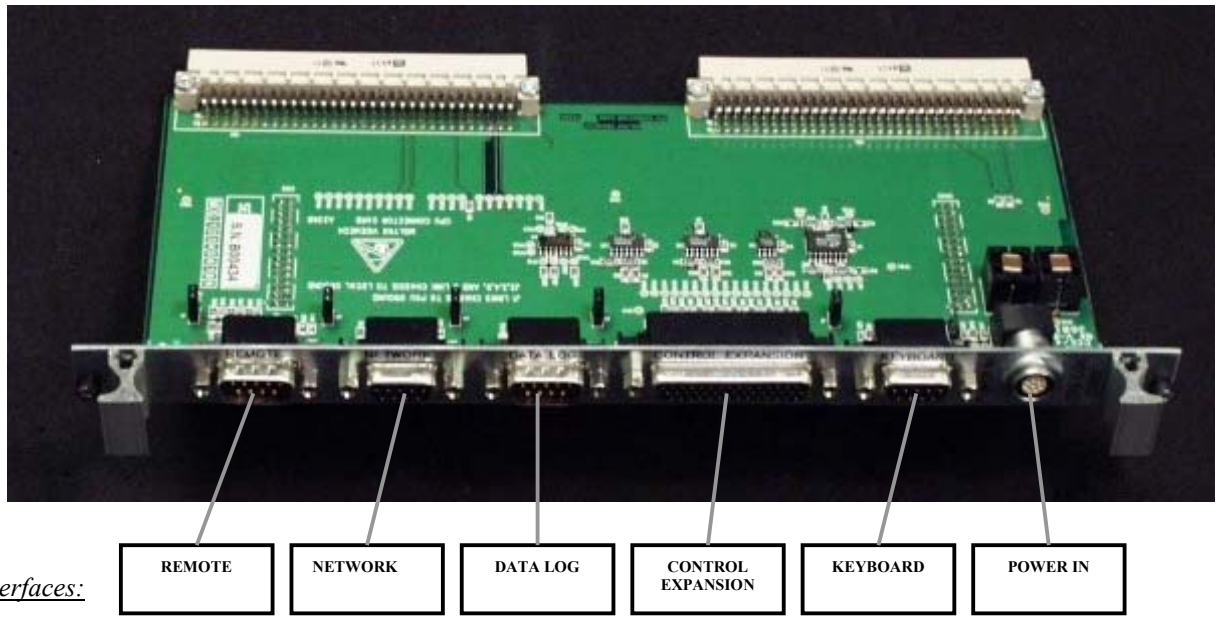
Table 3 Control CPU Card LED Indicator Descriptions

Normal LED states are shown in **bold**.

Name	*Description*	*Colour*	*On*	*Flashing*	*Off*
NET	Valid network data received	Green		**Receiving valid data from VisiWire network**	**No valid data being received**
T.OK	Temperature OK	Green	**Card temperature is within limits**	Card temperature is outside limits	
-5V	-5V supply OK	Green	**Supply is within limits**	Supply is outside limits	Supply has failed
+12V	+12V keyboard supply OK	Green	**Supply is within limits**	Supply is outside limits	Supply is disabled (no keyboard port defined in VisiPC configuration)
BAT	Battery OK	Green	**Battery voltage is within limits**	Battery voltage is outside limits	Battery has failed
STAT	CPU card general status	Red	(a) Hardware failure; or (b) new card with no software	(a) Slow flash: self-test failure (b) Fast flash: waiting for another software component from VisiPC	**All software components are loaded and self-tests have passed. Main controller software is running.**
SCB RST	Serial Control Bus reset	Amber	The CPU is resetting the Serial Control Bus interface to all other cards (at startup only)		**CPU is controlling other cards normally**
CPU RST	CPU reset	Amber	The CPU is in reset, but power is present (at startup only)		**CPU is running normally**
TX.D	Command and Control Bus transmit data	Green		**A command has been sent from the CPU to a card**	
RX.D	Peripheral Return Bus receive data ready	Green		**Data is ready to be read from a Comms or Telemetry card**	
SCB	Serial Control Bus active	Green	**The CPU card is communicating with other cards**		Other cards are not yet being used (at startup only)

3.3 Control CPU Connector Card (T236)

Figure 7 Control CPU Connector Card (T236)



Interfaces:

Purpose

- The Control CPU Connector Card provides access to all standard external interfaces on the Control CPU Card, including the rack frame power supply input.

Installation in Rack Frame

1. Fit this connector card in the far-left rear slot of the rack frame.
2. Fit one Control CPU Card in the top slot served by this connector card.

Setting the Card for Operation

- Ensure PCB jumpers J2-J6 are fitted.
- Jumper J1 isolates the POWER IN connector from chassis ground and should be removed for normal operation.

Specification

All interfaces are listed in

- Table 4.

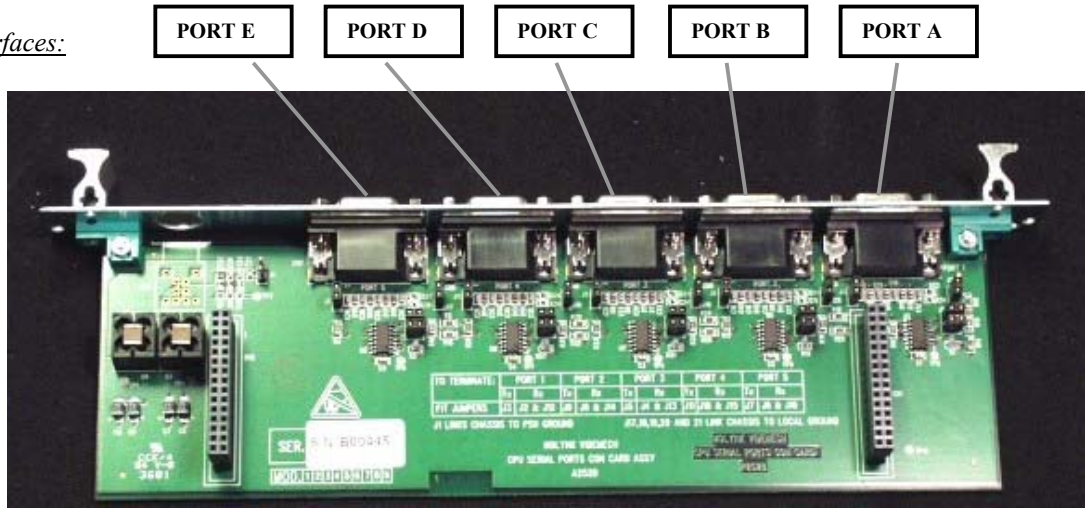
Table 4 Control CPU Connector Card Interfaces

POWER IN (8-pin female Odu)									
KEYBOARD RS-485 data port (9-pin female D)								**COMMUNICATION PORT 10**	
Pin	1	2	3	4	5	6	7	8	9
Signal	+12V	+12V	n/c	n/c	DATA-	GND	GND	n/c	DATA+
CONTROL EXPANSION data port (44-pin female compact D)									
DATA LOG RS-232 data port (9-pin male D)								**COMMUNICATION PORT 9**	
Pin	1	2	3	4	5	6	7	8	9
Signal	n/c	RX	TX	n/c	GND	n/c	n/c	n/c	n/c
NETWORK RS-485/422 data port (9-pin female D)								**COMMUNICATION PORT 2**	
Pin	1	2	3	4	5	6	7	8	9
Signal	n/c	n/c	n/c	TX-	RX-	GND	GND	TX+	RX+
REMOTE RS-232 data port (9-pin male D)								**COMMUNICATION PORT 1**	
Pin	1	2	3	4	5	6	7	8	9
Signal	DCD	RX	TX	DTR	GND	DSR	RTS	CTS	RI

3.4 CPU Serial Ports Connector Card (T252)

Figure 8 CPU Serial Ports Connector Card (T252)

Interfaces:



Purpose

- The CPU Serial Ports Connector Card provides access to an additional five external communication ports on the Control CPU Card.

Installation in Rack Frame

1. Plug the CPU Serial Ports Connector Card on to the Control CPU Connector Card so that all panel connectors face the same way.
2. Install the Control CPU Connector Card in the rack frame as a single unit, in the top left rack frame slot.

Setting the Card for Operation

- Ensure all PCB jumpers are fitted for remote control applications. For other port applications such as camera telemetry, fit the jumpers according to the table printed on the card.

Specification

All interfaces are listed in

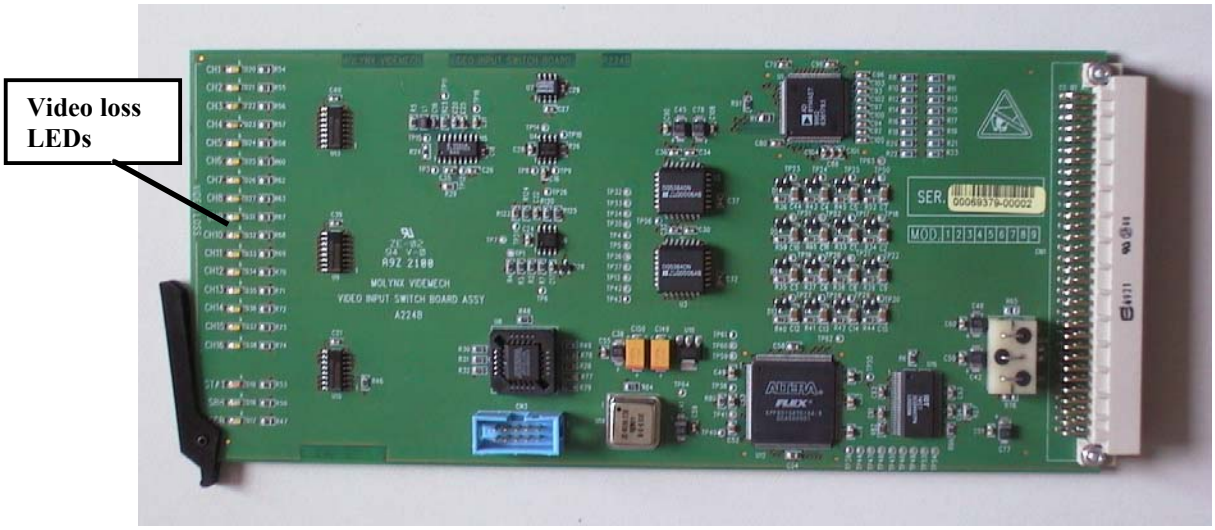
- Table 5.

Table 5 CPU Serial Ports Connector Card Interfaces

PORT A RS-485/422 data port (9-pin female D)							**COMMUNICATION PORT 5**		
Pin	1	2	3	4	5	6	7	8	9
Signal	n/c	n/c	n/c	TX-	RX-	GND	GND	TX+	RX+
PORT B RS-485/422 data port (9-pin female D)							**COMMUNICATION PORT 6**		
Pin	1	2	3	4	5	6	7	8	9
Signal	n/c	n/c	n/c	TX-	RX-	GND	GND	TX+	RX+
PORT C RS-485/422 data port (9-pin female D)							**COMMUNICATION PORT 7**		
Pin	1	2	3	4	5	6	7	8	9
Signal	n/c	n/c	n/c	TX-	RX-	GND	GND	TX+	RX+
PORT D RS-485/422 data port (9-pin female D)							**COMMUNICATION PORT 8**		
Pin	1	2	3	4	5	6	7	8	9
Signal	n/c	n/c	n/c	TX-	RX-	GND	GND	TX+	RX+
PORT E RS-485/422 data port (9-pin female D)							**COMMUNICATION PORT 3**		
Pin	1	2	3	4	5	6	7	8	9
Signal	n/c	n/c	n/c	TX-	RX-	GND	GND	TX+	RX+

3.5 Video Input Switch Card (T224)

Figure 9 Video Input Switch Card



Purpose

- Switches any camera input to any monitor output.

Installation in Rack Frame

- One or two cards may be fitted per BNC Input Connector Card or Switch Expansion Connector Card.
- A single card must be in the top rack frame row.

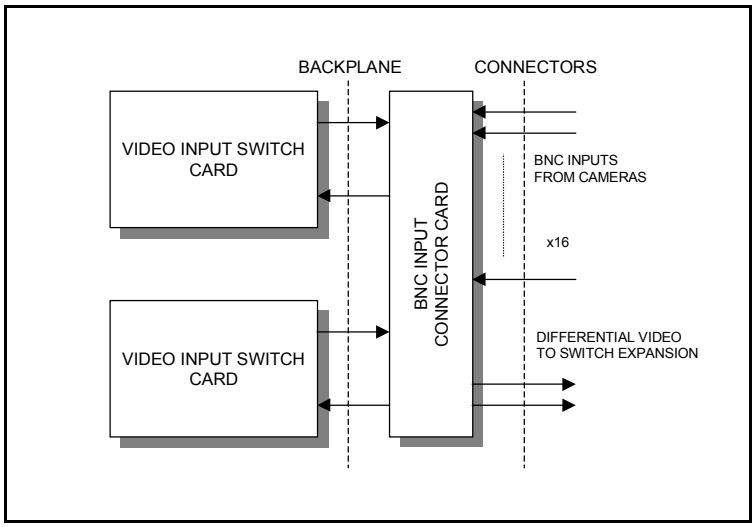
Setting the Card for Operation

- No settings are required for this card.

Specification

- 16 x 16 cross point switch.
- Video sync loss detection per channel.
- Picture level loss detection per channel, with picture level threshold configurable by VisiPC.
- One video loss LED per channel, lit when no video.
- Video DC clamp per channel.
- Each camera input is terminated with 75 ohms.

Figure 10 Video Input Switch Cards and BNC Input Connector Card



3.6 BNC Input Connector Card (T232)

Figure 11 BNC Input Connector Card (T232)

Purpose

- Allows camera input cables to be connected to one or two Video Input Switch Cards.
- Provides a simple switch expansion interface to a Switch Expansion Connector Card.

Installation in Rack Frame

- May be installed in any rack frame position except slot 1.
- Occupies two adjacent rack frame slots; the PCB plugs in to the higher-numbered of the two slots.
- BNC input connector cards are used in rack frames serving monitors 1 to 32. Other rack frames should use Switch Expansion Connector Cards.

Setting the Card for Operation

- No settings are required for this card.

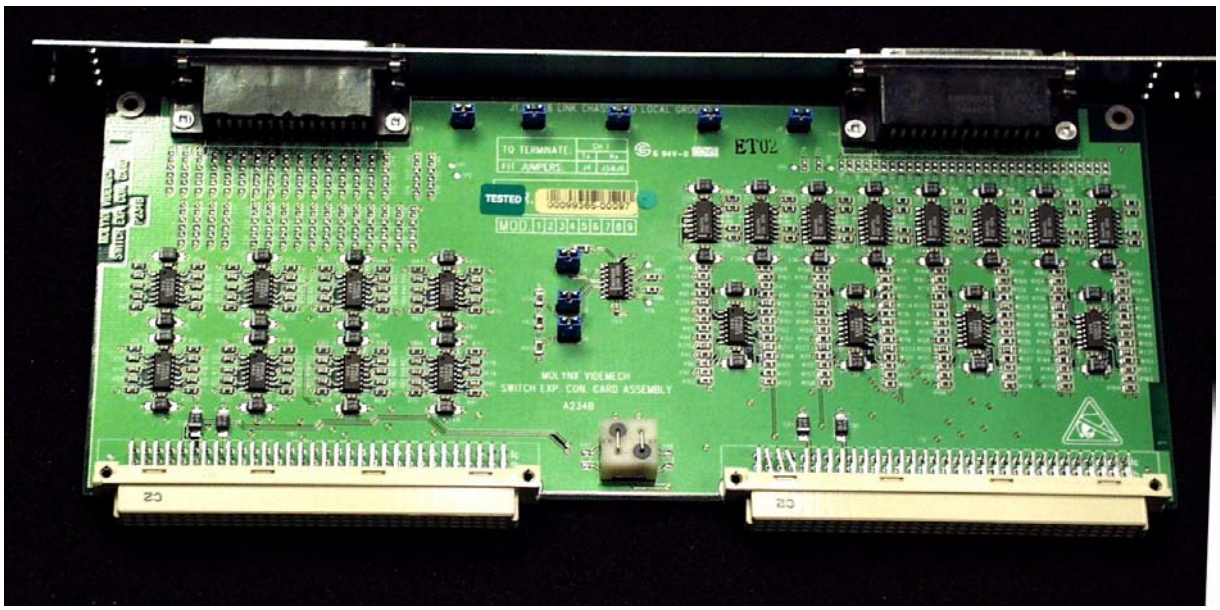
Specification

- 16 BNC input connectors.
- One 44-way miniature D expansion output connector.

3.7

BNC Switch Expansion Connector Card (T234)

Figure 12 BNC Switch Expansion Connector Card (T234)



Purpose

- Allows camera inputs from BNC Input Connector Cards to be connected to one or two Video Input Switch Cards.

Installation in Rack Frame

- May be installed in any rack frame slot except slot 1.
- Occupies two adjacent rack frame slots; the PCB plugs in to the higher-numbered of the two slots.
- BNC Switch Expansion Connector Cards are only used in expansion rack frames serving monitors 33 and above. They are connected to BNC Input Connector Cards in other rack frames via switch expansion cables.
- Figure 13 shows a 256 x 64 matrix using 4 rack frames. Camera cables are connected only to the top row of rack frames; lower rows are connected by switch expansion cables.

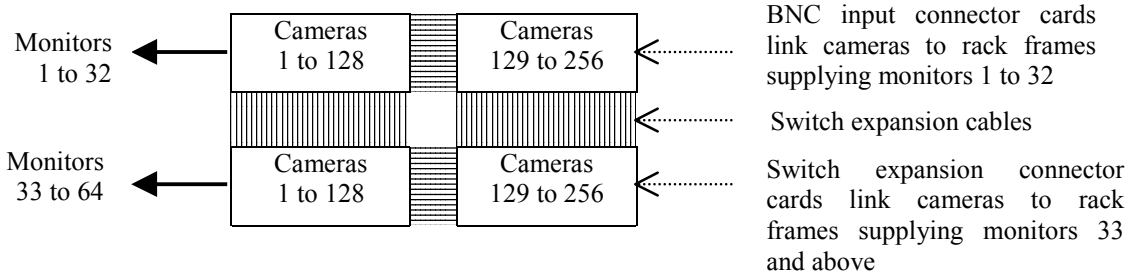
Setting the Card for Operation

- No settings are required for this card.

Specification

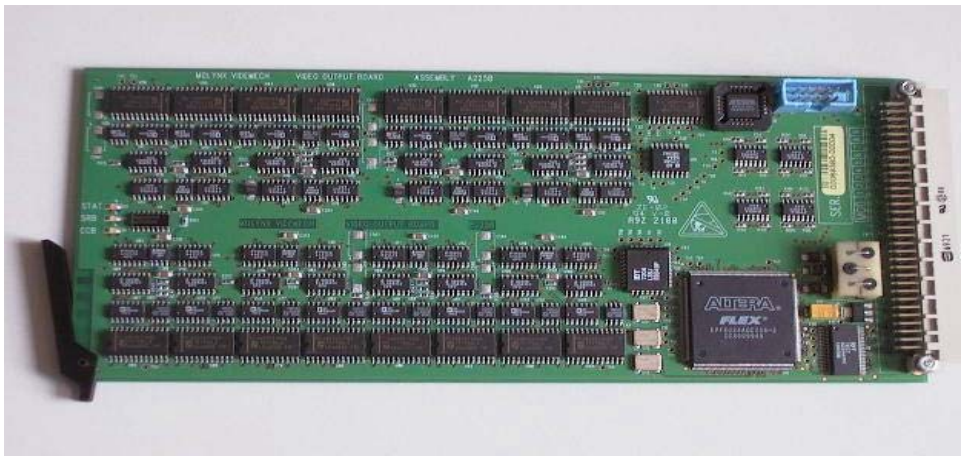
- One 44-way compact D expansion input connector (top of connector plate).
- One 44-way compact D expansion output connector (bottom of connector plate).

Figure 13 Use of BNC Input Connector Cards and Switch Expansion Connector Cards



3.8 Video Output Card (T225)

Figure 14 Video Output Card (T225)



Purpose

- Injects text on the shared video outputs taken from the backplane, and drives the monitor outputs on the rear panel BNC Connector Card.

Installation in Rack frame

- Only one output card per connector card, in either the top or bottom slot.

Setting the Card for Operation

- No settings are required for this card.

Specification

- 16 BNC output connectors.
- Line impedance is 75 ohms.
- Text overlay per monitor channel, 40 columns by 14 rows.
- Automatic gain control and DC restoration on each channel.
- Frame synchronised video blanking for roll free switching.

3.9 BNC Output Connector Card (T235)

Figure 15 BNC Output Connector Card (T235)

Purpose

- Provides rear panel BNC connectors for video output.

Installation in Rack Frame

- May be installed in any rack frame position except slot 1.
- Occupies two adjacent rack frame slots; the PCB plugs into the higher-numbered of the two slots.

Setting the Card for Operation

- No settings are required for this card.

Specification

- 16 BNC output connectors.

3.10 Quad Card (T258)

Figure 16 Quad Card (T258)

Purpose

- Displays 4 high-colour pictures on a single video output in real time, with each segment controllable as a separate monitor number

Installation in Rack Frame

- One or two cards per Quad Connector Card, in any rack frame slot except slot 1.
- A single card may be fitted in either row of the rack frame.

Setting the Card for Operation

- No settings are required for this card.

Specification

- Accepts CCIR colour or monochrome cameras.
- 24 bit colour digital video.
- 50 Fields/Sec display with 768 x 576 pixel resolution (PAL).
- 1 multi-segment output that will display the 4 inputs in quad format in a specified order, or any 1 input as full-screen.
- Each segment can be independently frozen.
- 16 – 4 multiplexer on the inputs allows the Quad to pick up any 4 of the 16 signals on the rack frame video bus.
- Separate Composite and S-Video outputs.
- Time base correction of video inputs ensures high quality pictures without the need for external camera synchronisation.
- Each picture segment is frozen when the input source is switched, in both full screen and Quad mode, to prevent picture roll.
- All the video inputs have AGC to preserve clear images independent of differences in input levels.
- Colour text insertion on the monitor output, with texts supplied by the CPU Card.
- Up to 32 cards per node.
- Dedicated self-test failure alarm per card.

3.11 Quad Connector Card (T259)

Figure 17 Quad Connector Card (T259)

Purpose

- Provides access to composite video and S-video outputs from one or two independent quad cards.

Installation in Rack Frame

- May be installed in any rack frame slot except slot 1.

Setting the Card for Operation

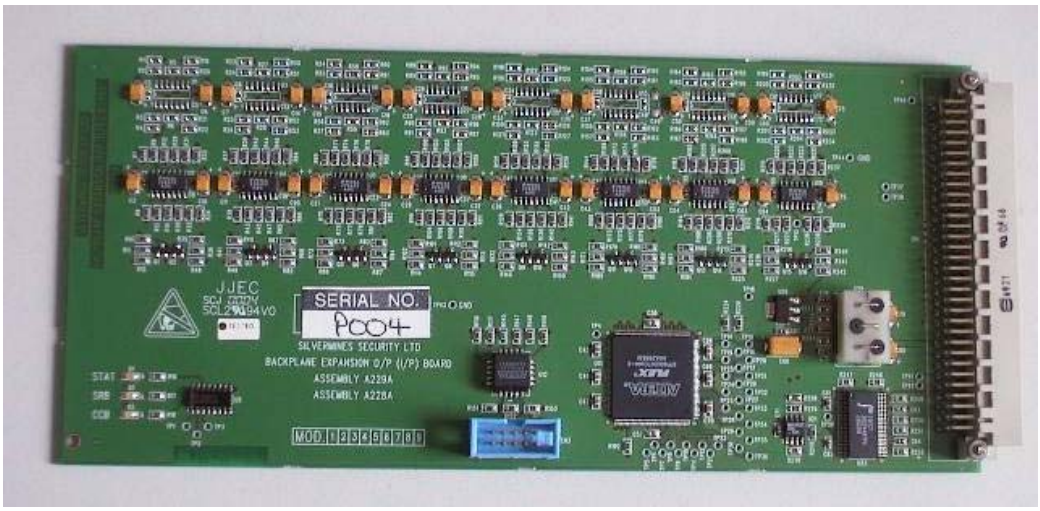
- Jumpers J1 and J2 link the connectors to power supply ground and should be fitted. Only remove to solve earth loop problems.

Specification

- Two 4-pin mini DIN connector for S-Video outputs.
- Two BNC sockets for composite video outputs.

3.12 Backplane Expansion Input Card (T228)

Figure 18 Backplane Expansion Input Card (T228)



Purpose

- Receives differential video bus outputs from a Backplane Expansion Output Card fitted in an expansion rack frame.

Installation in Rack Frame

- Normally installed in slot 21 (far right slot) on either row of a rack frame, but can be installed in any slot except slot 1.

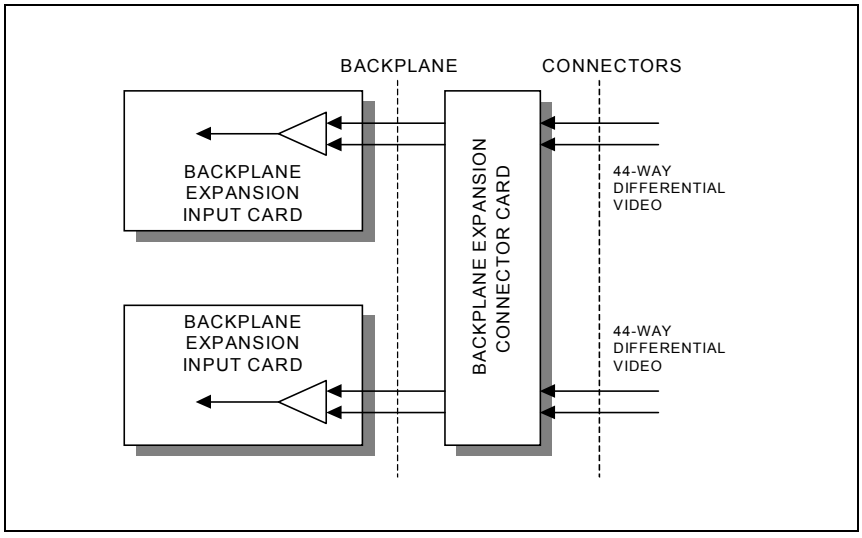
Setting the Card for Operation

- No settings are required for this card.

Specification

- Translates differential video to single-ended video on the rack frame video bus.
- Outputs can be driven or hi-impedance, as required by the CPU card.

Figure 19 Backplane Expansion Input Card and Connector Card



3.13 Backplane Expansion Output Card (T229)

Figure 20 Backplane Expansion Output Card (T229)

Purpose

- Sends a differential video bus from an expansion rack frame to a Backplane Expansion Input Card fitted in another rack frame.

Installation in Rack Frame

- Normally installed in rack frame slot 2 next to the control expansion card, but can be installed in any slot except slot 1.

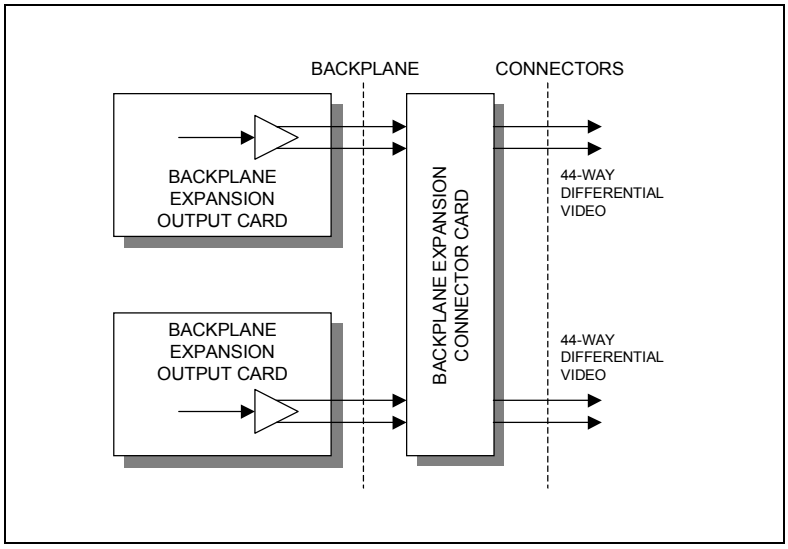
Setting the Card for Operation

- No settings are required for this card.

Specification

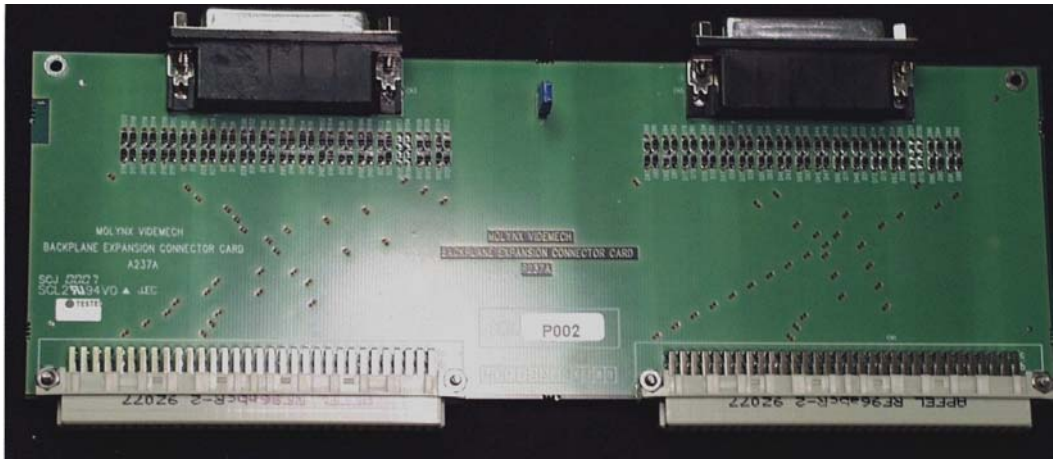
- Translates single-ended video to differential video for transmission over expansion cable.

Figure 21 Backplane Expansion Output Card and Connector Card



3.14 Backplane Expansion Connector Card (T237)

Figure 22 Backplane Expansion Connector Card (T237)



Purpose

- Passes differential video between Backplane Expansion Input and Output Cards via Backplane Expansion Cables.

Installing in Rack Frame

- As for the corresponding Backplane Expansion Input or Output Card.

Setting the Card for Operation

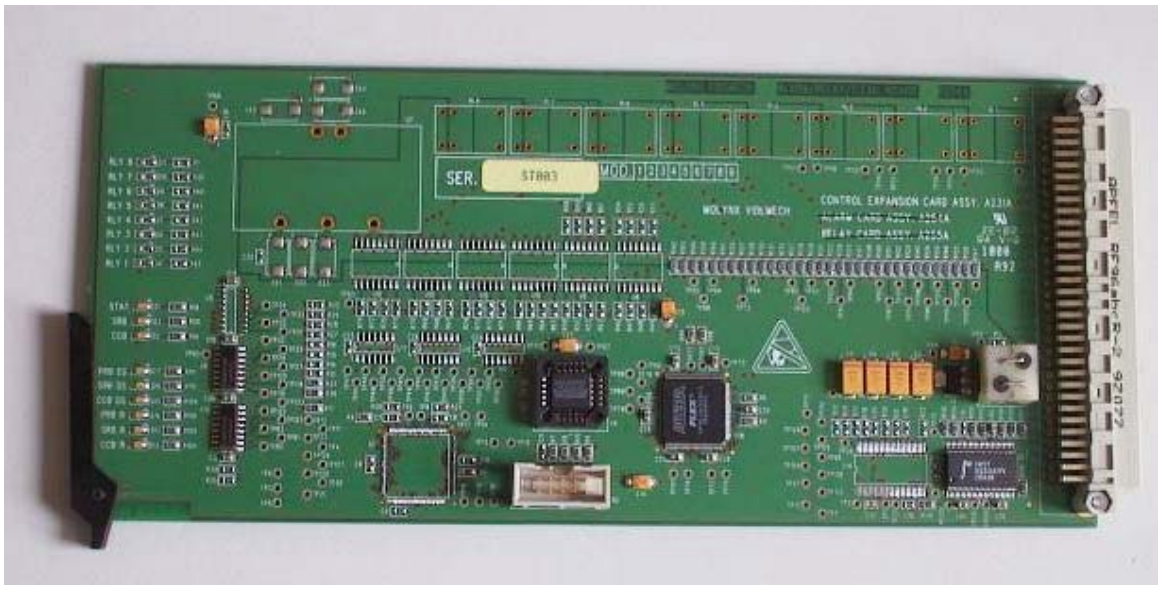
- No settings are required for this card.

Specification

- Two 44-way compact D-Type connectors for connecting to Bus Expansion Cables.

3.15 Control Expansion Card (T231)

Figure 23 Control Expansion Card (T231)



Purpose

- Contains buffering, decoding and timing controls to make the expanded rack frame appear to the Control CPU in the first rack frame as an extension of the same backplane.

Installation in Rack Frame

- Must be installed in rack frame slot 1.

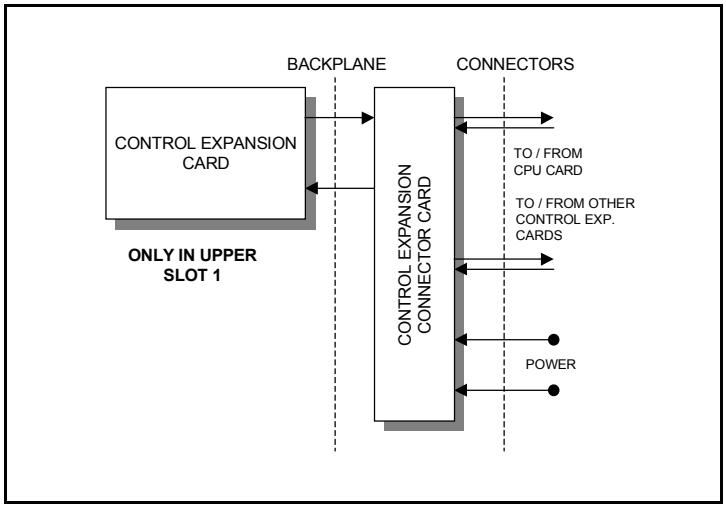
Setting the Card for Operation

- No settings are required for this card.

Specification

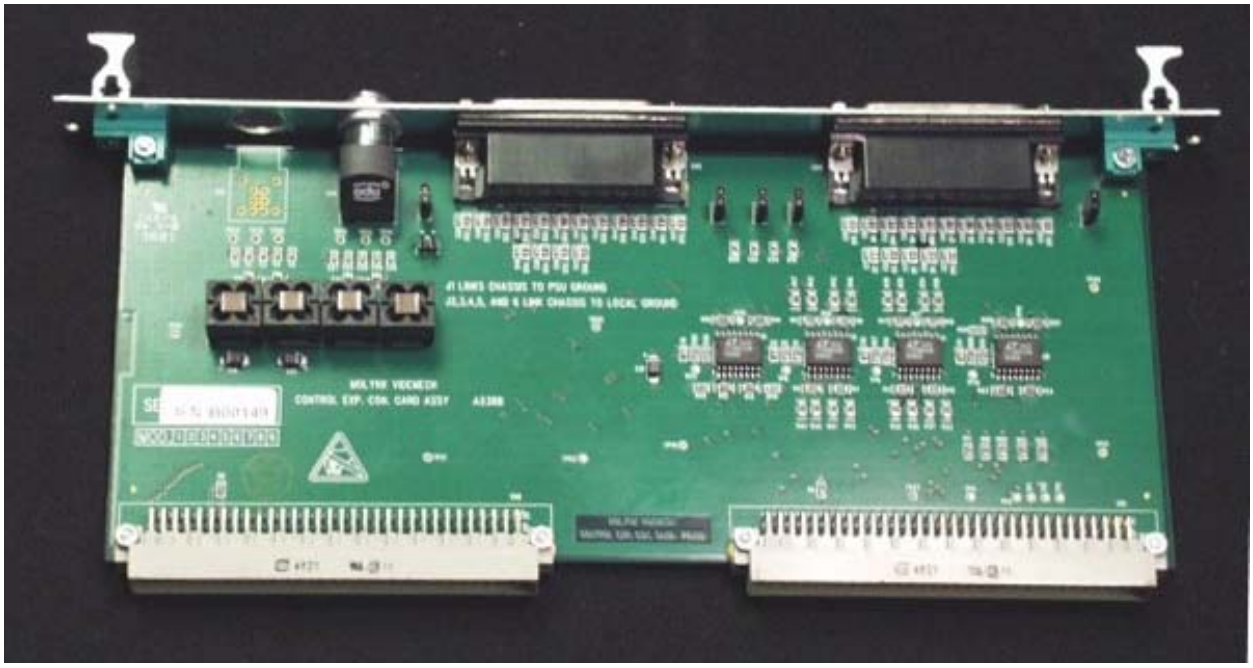
- Serial Control Bus decoding and regeneration to boost signals between distant rack frames.
- Timing control to avoid clock skew between backplanes.

Figure 24 Control Expansion Card and Connector Card



3.16 Control Expansion Connector Card (T238)

Figure 25 Control Expansion Connector Card (T238)



Purpose

- Connects to Control Expansion Connector Cards and Control CPU Connector Cards in other rack frames via Control Expansion Cables.

Installation in Rack Frame

- Must be installed in rack frame slot 1.

Setting the Card for Operation

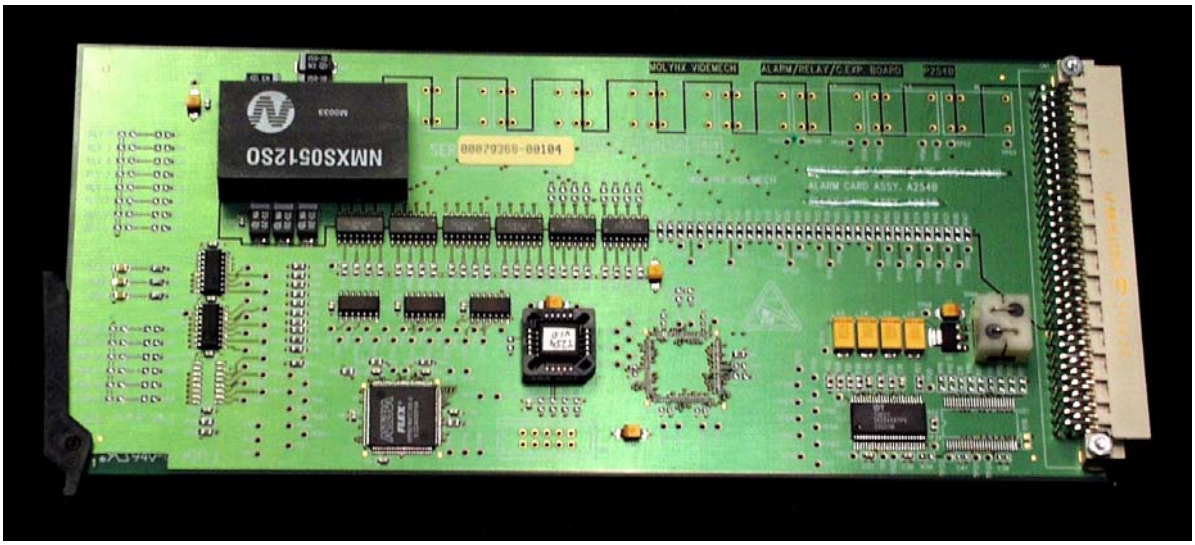
- Ensure PCB jumpers J2-J6 are fitted.
- Jumper J1 isolates the POWER IN connector from chassis ground and should be removed for normal operation.

Specification

- Two 44-way high-density D-Type connectors for connections to other rack frames.
- Two power connectors for powering rack frames in dual redundant fashion.
- Conversion between differential (RS422) and single-ended (TTL) digital signals for higher speed and higher reliability data transfer between rack frames.

3.17 Alarm Input Card (T254)

Figure 26 Alarm Input Card (T254)



Purpose

- Scans external alarm input signals from other devices and systems, such as door switches, PIR detectors and VCRs with alarm relay outputs.

Installation in Rack Frame

- May be installed in any rack frame slot except slot 1.
- One card may be used in either the top or bottom slot with one connector card.
- Two cards may share the same connector card.

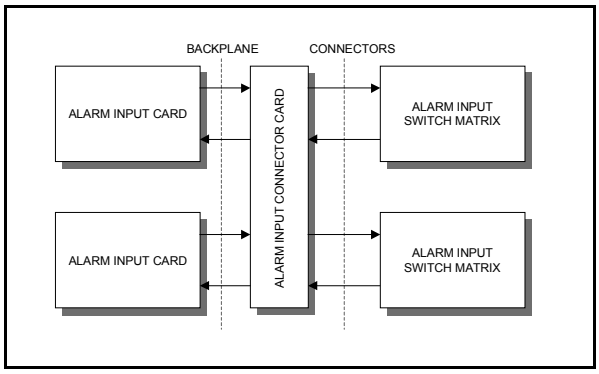
Setting the Card for Operation

- No settings are required for this card.

Specification

- Scanning of up to 128 external volt-free contacts.
- Accepts normally open or normally closed clean contact inputs.
- Provides electrical isolation between the Alarm Panel and the video matrix.

Figure 27 Alarm Input Cards and Connector Card



3.18 Alarm Input Connector Card (T256)

Figure 28 Alarm Input Connector Card (T256)

Purpose

- Connects one or two external Alarm Panels (PCBV311) to one or two independent Alarm Input Cards (T254).

Installation in Rack Frame

- This card may be installed in any rear rack frame position except slot 1.

Setting the Card for Operation

- Jumpers J1 to J5 provide isolation from the Alarm Panel and the rack frame power supply, and should normally not be fitted.

Specification

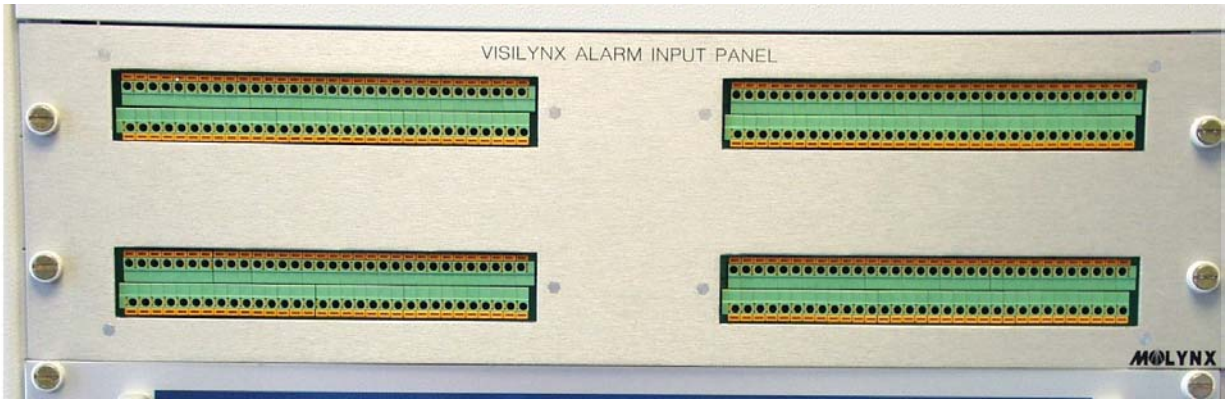
- Two Alarm Panel connectors.
- Provides EMC, transient suppression and electrical isolation from external contacts.

.

3.19

Alarm Panel (PCBV311)

Figure 29 Alarm Panel (PCBV311)



Purpose

- Connects up to 128 alarm input signals to one Alarm Input Card.

Installation in Rack Frame

- The Alarm Panel can be located in the same rack cabinet as Visilynx 3 rack frames, subject to the length of the connecting cable.

Setting the Card for Operation

- No settings are required for the card on the Alarm Panel.

Specification

- A 37-way to 37-way cable connects the Alarm Panel to the Alarm Input Connector Card.
- All individual alarm connections (1 pair of wires for each alarm) are made via two terminals on the Alarm Panel.
- Each alarm input can be configured as a Normally Open (N/O) or a Normally Closed (N/C) contact.

Figure 30 Alarm panel terminal input block numbering

1-16	17-32
Common	Common

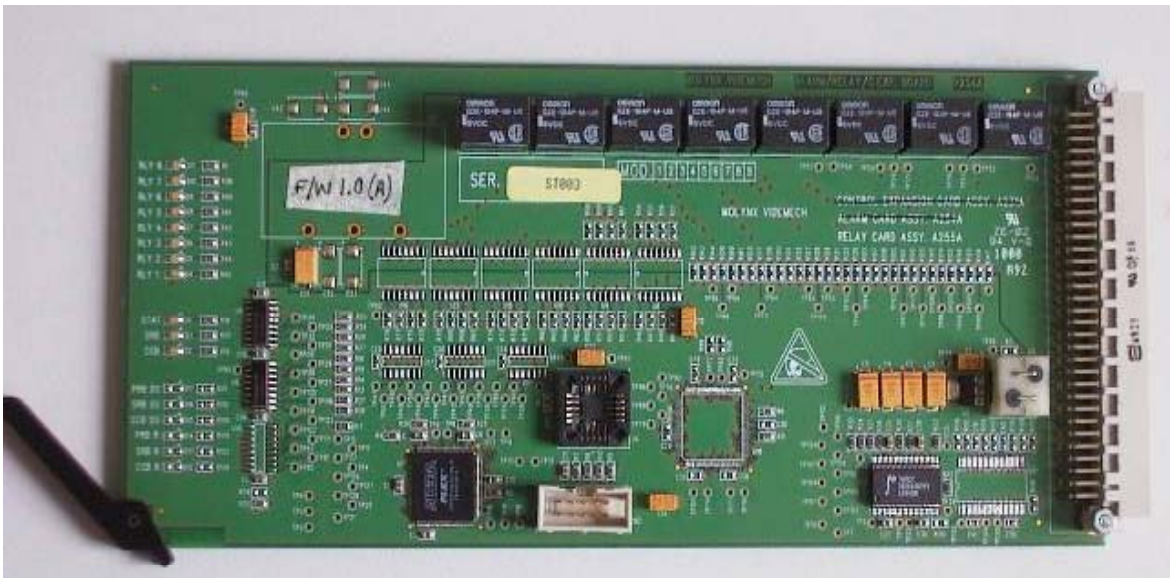
33-48	49-64
Common	Common

65-80	81-96
Common	Common

97-112	113-128
Common	Common

3.20 Relay Output Card (T255)

Figure 31 Relay Output Card (T255)



Purpose

- Provides relays for control of third-party external equipment.

Installation in Rack Frame

- One or two cards may be used per Relay Output Connector Card.
- A single card may be in either rack frame row.
- Any rack frame slot may be used except slot 1.

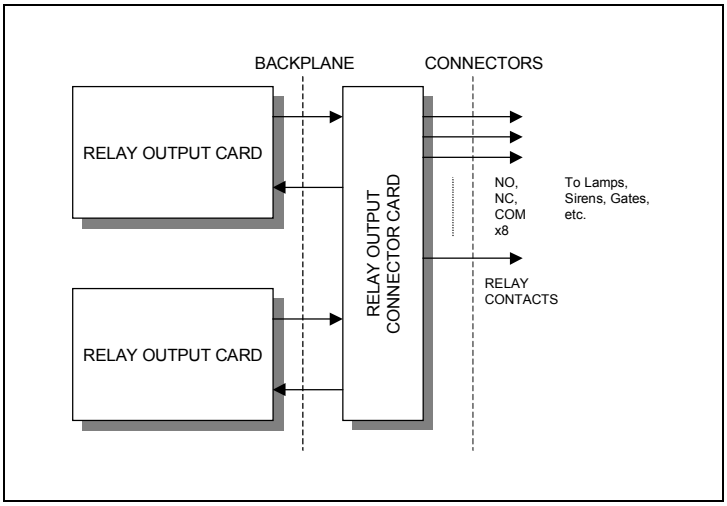
Setting the Card for Operation

- No settings are required for this card.

Specification

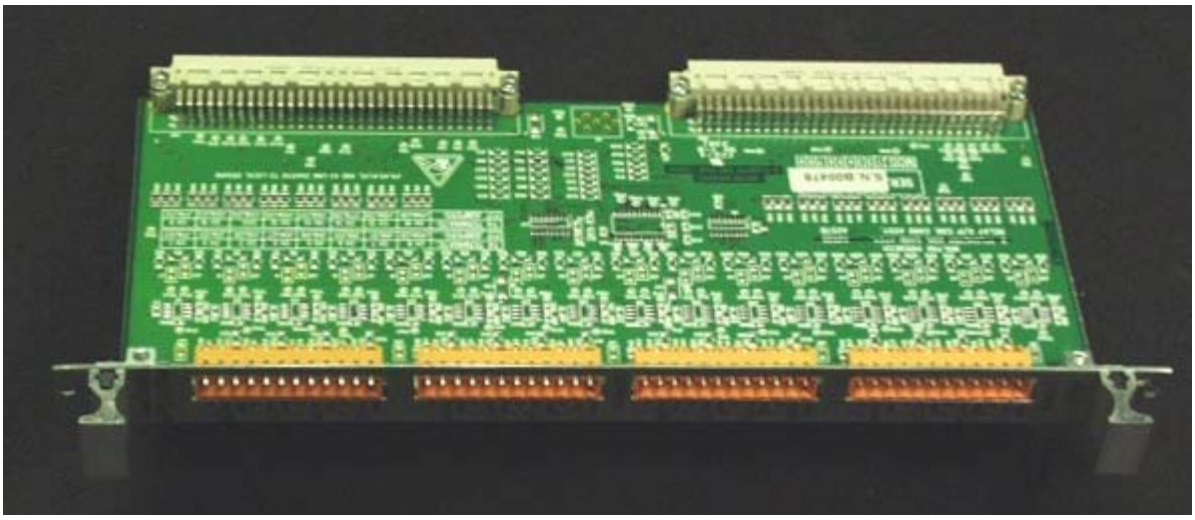
- 8 clean-contact relay output channels per card.
- Each relay is single-pole double-throw.
- Outputs can be connected as normally open or normally closed.
- Each relay is isolated from the others, i.e. the common pin of each is not shared.

Figure 32 Relay Output Card and Connector Card



3.21 Relay Output Connector Card (T257)

Figure 33 Relay Output Connector Card (T257)



Purpose

- Provides rear-panel connection to one or two Relay Output Cards (T255).

Installation in Rack Frame

- Any rack frame slot may be used except slot 1.

Setting the Card for Operation

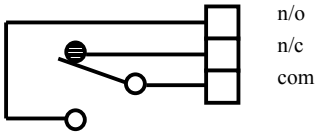
- No settings are required for this card.

Specification

- One removable screw terminal connector block per 4 relays.

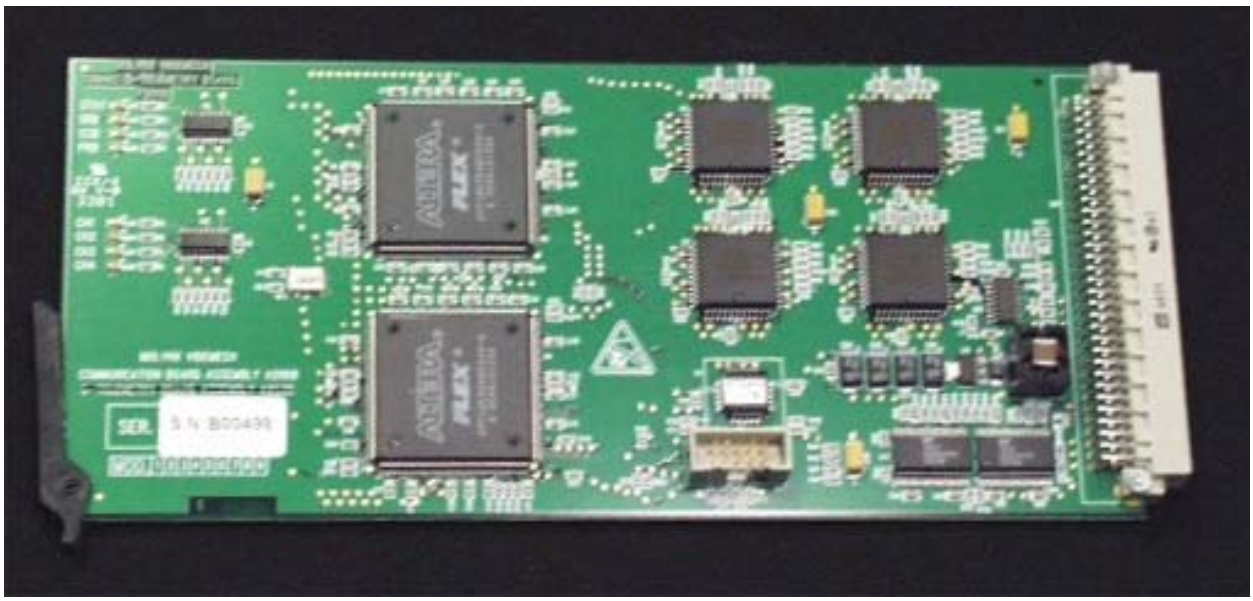
Figure 34 Relay Terminal Wiring

Each relay uses a set of 3 terminals on the connector card:



3.22 Communication Card (T266)

Figure 35 Communications Card (T266)



Purpose

- Provides 4 serial ports for control of external devices such as VCRs, multiplexers, and D-Type telemetry receivers.
- The ports can be used for network connection to other nodes. They do not support the V3R communication protocol or Visilynx keyboards.

Installation in Rack Frame

- Only one Communication Card can be used per Communication Connector Card.
- The Communication Card can be in either the upper or lower rack frame slot, but not both.

Setting the Card for Operation

- No settings are required for this card.

Specification

- Supports continuous data rates up to 19k2 Baud.
- Software configurable to be RS232 or RS485/422 I/O.

3.23

Communication Connector Card (T267)

Figure 36 Communication Connector Card (T267)

Purpose

- Provides rear panel connection to the Communication Card.

Installation in Frame Rack

- May be installed in any rack frame slot except slot 1.

Setting the Card for operation

- See the jumper tables printed on the PCB – all jumpers are normally fitted.

Specification

- Two connectors per port, one for RS485/422 and one for RS232, configurable using VisiPC.
- See Figure 37 and Figure 38 for connector pin assignments.
- Only one connector per port may be used at once.
- The way communication card ports are numbered by VisiPC depends on each card's slot position with respect to the Control CPU card. See Figure 39.

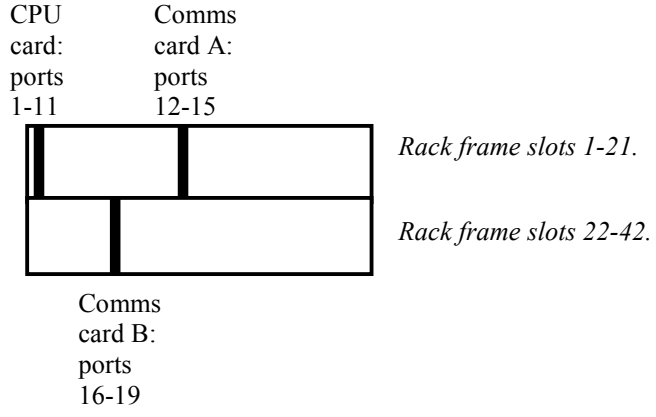
Figure 37 Communication Card RS485/422 Port

PORT 1-4 RS-485/422 data port (9-pin female D)									
Pin	1	2	3	4	5	6	7	8	9
Signal	n/c	n/c	n/c	TX-	RX-	GND	GND	TX+	RX+

Figure 38 Communication Card RS232 Port

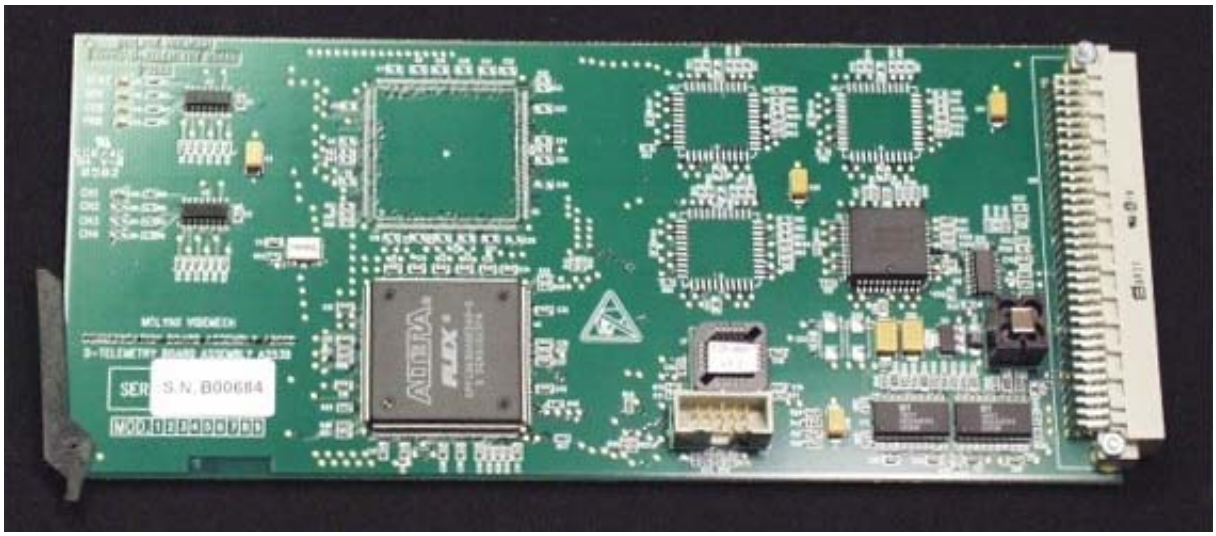
PORT 1-4 RS-232 data port (9-pin male D)									
Pin	1	2	3	4	5	6	7	8	9
Signal	n/c	RX	TX	DTR	GND	DSR	RTS	CTS	n/c

Figure 39 Example of Communication Port Numbering



3.24 D Type Telemetry Card (T253)

Figure 40 D Type Telemetry Card (T253)



Purpose

- Sends and receives D-type telemetry signals to and from camera telemetry receivers, using the RS485 multi-drop protocol.

Installation in Rack Frame

- Only one D Type Telemetry Card can be used per D Type Telemetry Connector Card.
- A single D Type Telemetry Card can be in either the upper or lower rack frame slot, but not both.
- Any rack frame slot may be used except slot 1.

Setting the Card for Operation

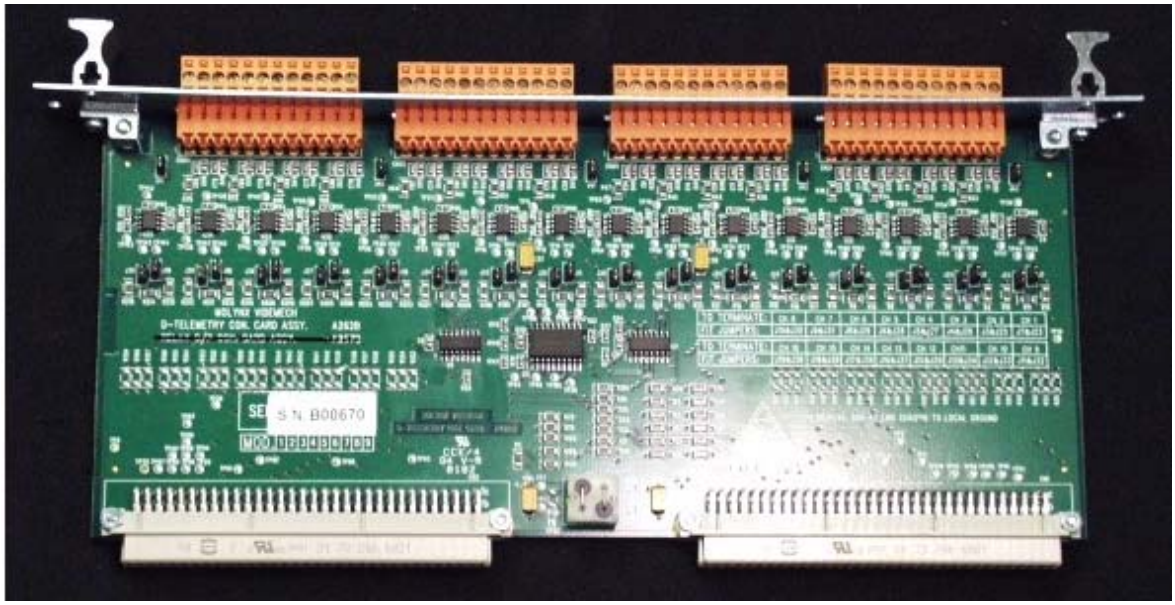
- No settings are required for this card.

Specifications

- Controls one UART and multiplexes both transmit and receive data to the D Type Telemetry Connector Card.
- Offers RS485 (Unidirectional or Bi-directional Half Duplex) to a maximum of 19k2 baud.

3.25 D Type Telemetry Connector Card (T262)

Figure 41 D Type Telemetry Connector Card (T262)



Purpose

- Connects the D Type Telemetry Card to screw terminal contact blocks for connection to the telemetry receivers.

Installation in Rack Frame

- Any rack frame slot may be used except slot 1.

Setting the Card for Operation

- See the jumper tables printed on the PCB – all jumpers are normally fitted.

Specifications

- Converts signal levels to and from RS485.
- Provides transient and EMC suppression.
- Each channel can be wired either to a single telemetry receiver (preferred), or to a daisy chain of up to 32 telemetry receivers.
- One removable screw terminal connector block per 8 cameras.

4 POWER SUPPLY UNIT

Figure 42 Power Supply Unit (ZT088A)

Purpose

- A custom-built 200W dual output AC-DC converter. It is capable of supplying up to two fully loaded Visilynx 3 Rack Frames.

Installation

- The Power Supply Unit is located in the same rack cabinet as Visilynx 3 Modular.

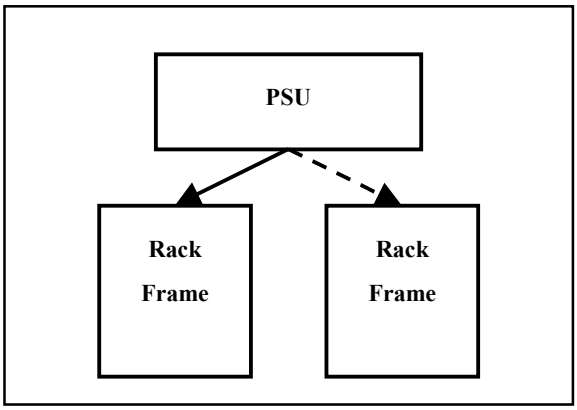
Specification

- 19" rack, 2U high, depth 320mm.
- Front Panel
    - Brushed aluminium face
    - On/off switch
    - Green neon indicator – (Input) Power On
    - Green neon indicator – + 5.2V Output Good
    - Green neon indicator - - 5.2V Output Good.
- Rear Panel
    - IEC mains input connector
    - Custom DC output connector
    - Alarm contact relay output.
- Power Input
    - 88V AC - 284V AC, 47 Hz - 63 Hz.
- Power Output
    - Output 1 +5.2V DC, 2.5A min. load Rated power 24A
    - Output 2 -5.2V DC, 250mA min. load Rated power 14A.
- Dual redundant operation
    - Up to two rack frames may be powered by two power supply units
    - These units are hot-swappable in the event of a failure.

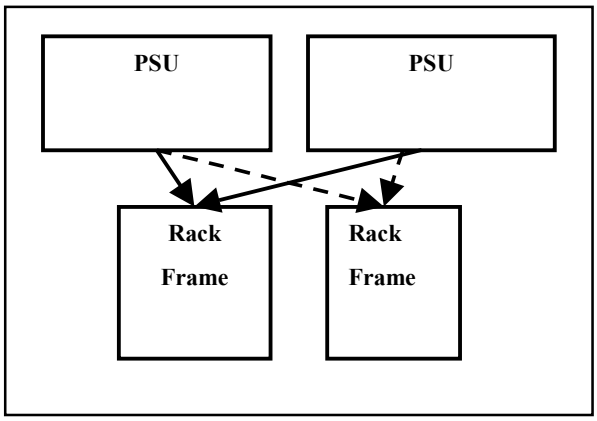
5 SYSTEM INTEGRATION

5.1 Power Supply Unit Wiring

- Single supply serving one or two rack frames.



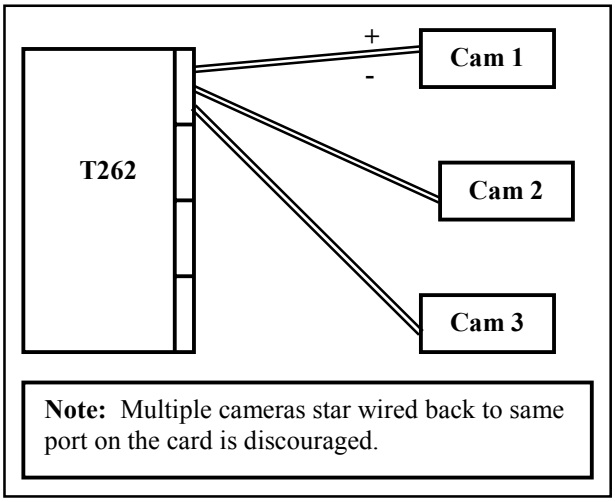
- Two supplies serving one or two rack frames (dual-redundant).



5.2 Camera Telemetry Receiver Wiring To D Type Telemetry Connector Card (T262)

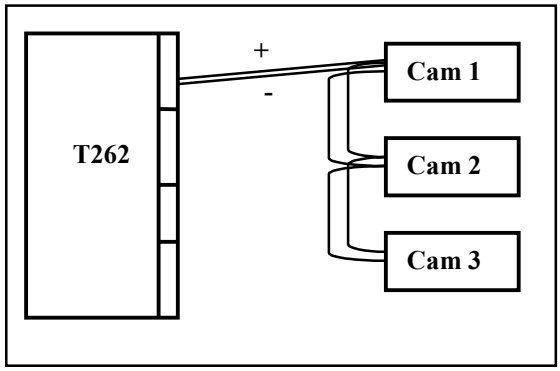
RS485 Unidirectional Communication

- Star-wired to separate ports.



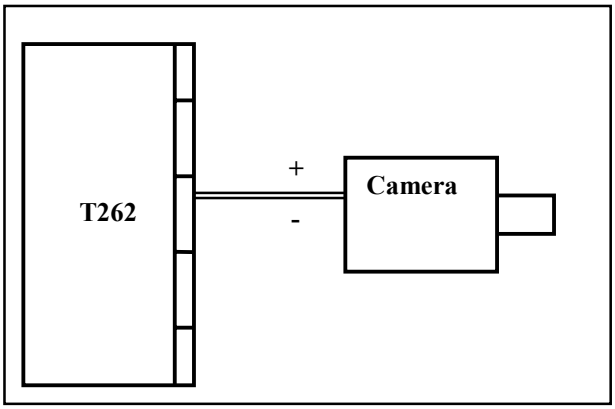
Note: Multiple cameras star wired back to same port on the card is discouraged.

- Daisy chaining from single ports.
  Up to 32 cameras supported.

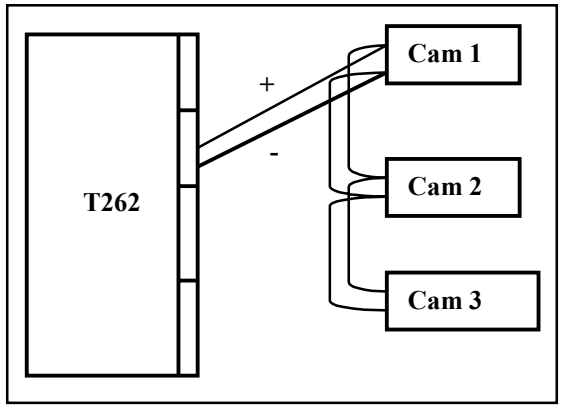


RS485 Half Duplex Bi-directional Communication

- Single camera.



- Multiple camera daisy chain.



Network Termination

The cause of most uncertainty when dealing with RS485 network communication is termination. The two furthest ends of an RS485 network must be terminated.

Termination of the RS485 signals at the D Type Telemetry Connector Card (T262) is achieved by the removal of jumpers in accordance with the Table printed on the PCB.

5.3 Remote Control Inputs

PCCON Protocol Input

- Any full duplex communication port, up to 2 ports max.

V3R Protocol Input

- Any full duplex CPU card communication port, up to 4 ports max.

VisiPC

- As for V3R protocol; additionally, only the test/config port or data log port support software upgrades.

Clock Reference Input

- Any non-keyboard communication port.

5.4 MPX and VCR Video Control

MPX Video

- Can be fed back to camera inputs, input can be configured to suppress text to avoid obscuring MPX and VCR text.

MPX and VCR Remote Control

- Supported from any full duplex communication port
- Interface faults detected as numbered alarms.

5.5 Visilynx 3 Keyboard Wiring

- Up to three Visilynx 3 Keyboards can be powered from the Visilynx 3 Modular rack frame Control CPU card (T226), using the Keyboard "D" connector. A total of 32 keyboards are supported by this half-duplex RS485 connector. If more than three Visilynx 3 Keyboards are specified then local 12v DC/500mA power supplies are necessary.
- Alternatively, a single Visilynx 3 Keyboard may be connected, using full-duplex RS422, to the Control CPU Connector Card Network connector, or to any of the CPU Connector Card Serial Ports. This requires the keyboard interface type to be set accordingly at the Visilynx 3 Keyboard LCD menu. This allows the use of a fibre-optic link to connect the keyboard to the rack frame, without suffering from line turnaround problems caused by delays in fibre-optic transceivers.
- Details of the connections on the rear of the Visilynx 3 Keyboard are supplied in the Keyboard User Manual (See Section 1.2).

5.6 Quad Return Inputs

- The video output from a Quad Card can be wired back to the rack frame as a camera input. The input is then configured as a quad return input.
- This provides a special control menu on the Visilynx 3 Keyboard, which is detailed in the Keyboard User Manual (see Section 1.2).

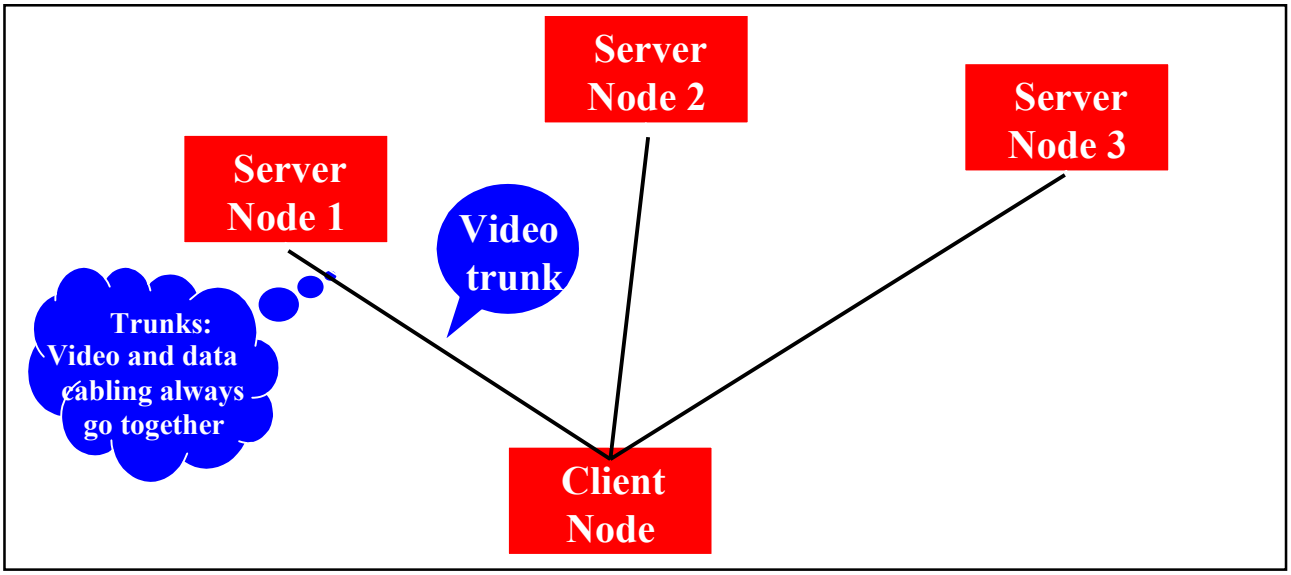
5.7 Rack Expansion Examples

Examples of how rack frames may be combined to expand the size of the switching matrix are provided in Sections 2.5 and 2.6.

5.8 Network Examples

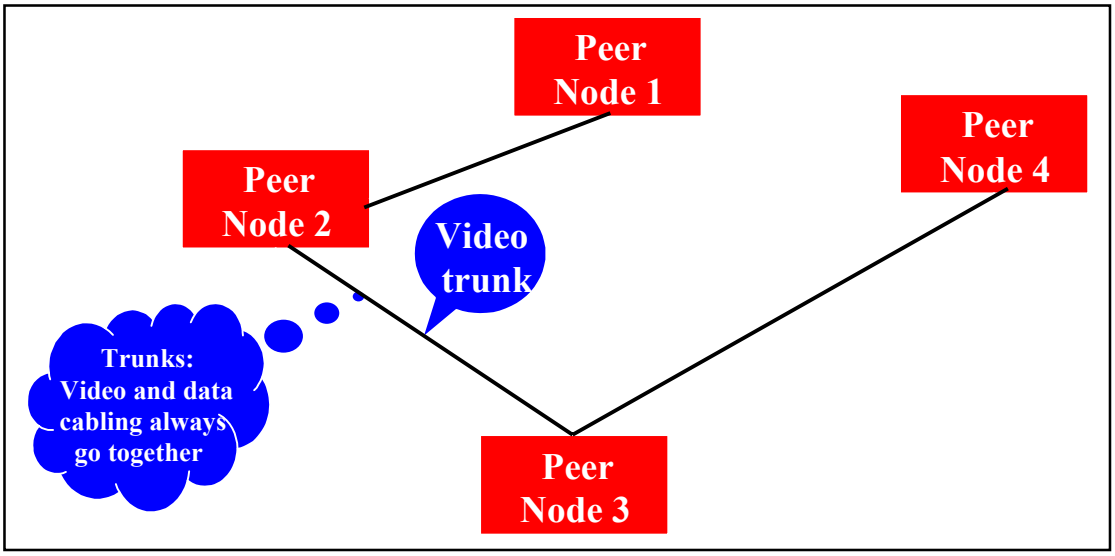
Star Layout

- 1 main node
- Up to 20 neighbour nodes (21 nodes total)
- Switching delay: 100ms



Multi-hop Layout

- Each node has up to 10 neighbours
- Up to 127 nodes total
- Switching delay: 100ms plus 20ms per hop node
- Telemetry delay: 10ms per hop mode



5.9 Trunk Delay Compensation

Causes of network trunk delays

Visilynx 3 networking routes video from a remote camera node to a local monitor node via a "trunk" cable. Such trunk cables may be implemented using CODEC (encoder – decoder) devices. This requires Visilynx 3 to co-ordinate 2 video switches – one from camera to trunk at the remote node and one for trunk to monitor at the local node.

There may be delays in the CODEC channels of around 0.75 – 1s, especially if MPEG 2 compression is used. When there is a transition in the picture (i.e. during a video switch), the delay may be longer, again due to the compression algorithm.

Automatic trunk delay compensation

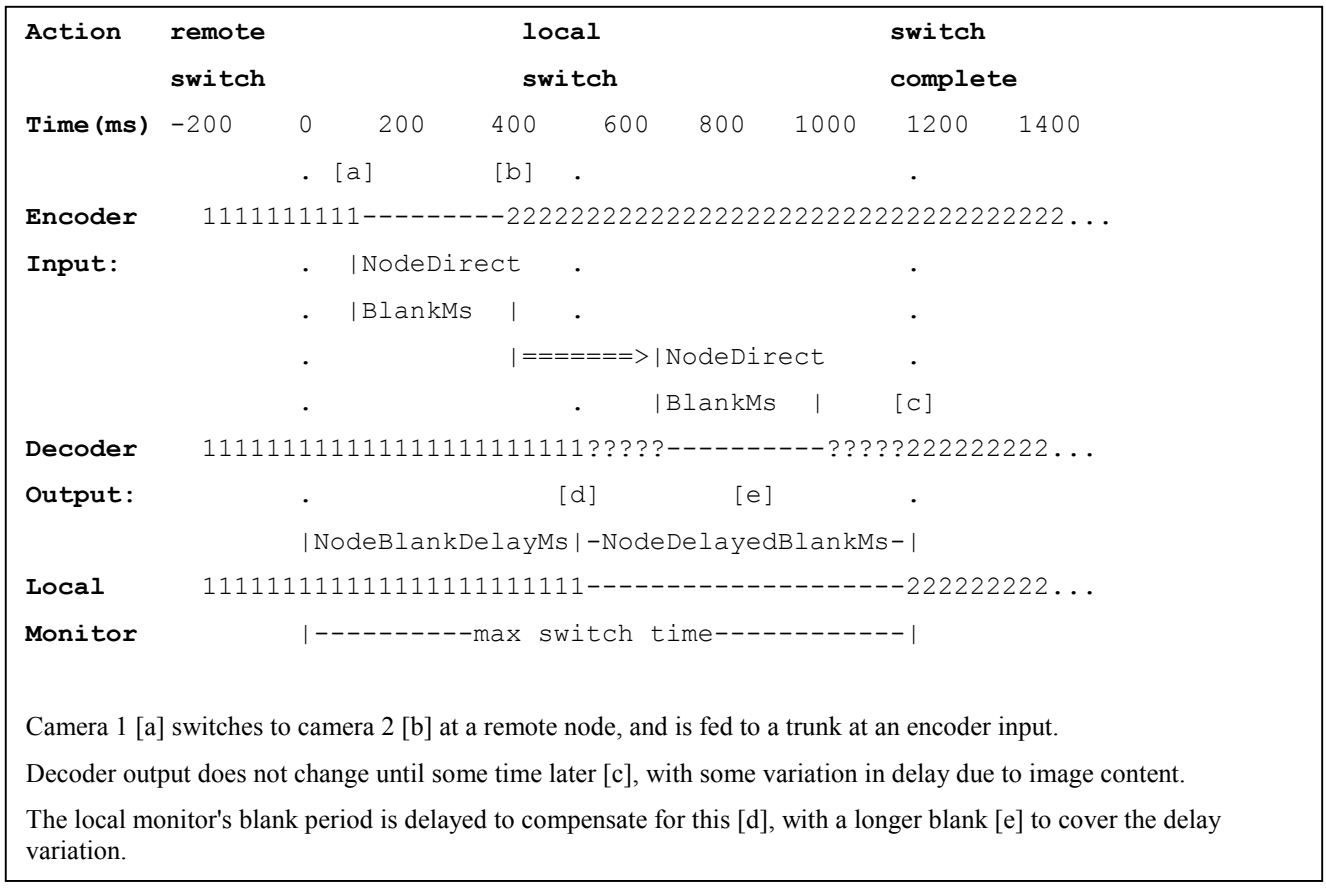
For the reasons described above, Visilynx 3 implements a programmable delay when switches trunks, which effectively masks the CODEC delay. Without this, a simultaneous switch at both the remote and the local nodes results in an unsightly “double switch” seen at the monitor, where the previous image on a selected trunk is seen for the “delay time” (around 1s) before the new picture has had time to propagate through the CODEC channel.

The textual diagram below attempts to explain this. Delay values can be set in 100ms increments to operator preference, and the configuration files currently contain the following settings, which have been found optimal. **Note:** NodeDirectBlank is required to be a minimum of 300ms for roll-free switching.

Table 6 Parameters Controlling Trunk Delay Compensation

Symbol in VisiPC configuration file	*Field on VisiPC Node Settings display*	*Value used below*
NodeBlankDelayMs	Switching Blank Delay	500
NodeDelayedBlankMs	Switching Delayed Blank	700
NodeDirectBlankMs	Switching Direct Blank	300

Figure 43: Trunk Delay Compensation Timing



Camera 1 [a] switches to camera 2 [b] at a remote node, and is fed to a trunk at an encoder input.

Decoder output does not change until some time later [c], with some variation in delay due to image content.

The local monitor's blank period is delayed to compensate for this [d], with a longer blank [e] to cover the delay variation.

6 ROUTINE MAINTENANCE

6.1 Visilynx 3 Modular Cleaning

The only Routine Maintenance task to be conducted on the Visilynx 3 Modular system is cleaning at regular intervals. Strong abrasive detergents should not be used. Wiping over with a soft dry cloth will normally suffice. The regularity of the cleaning task will depend on the environmental conditions.

7 CORRECTIVE MAINTENANCE

7.1 Policy

A suggested policy to be adopted for the unscheduled maintenance of the Visilynx 3 Modular system, supplied by Bewator Limited is:

- All unscheduled maintenance tasks relate to the removal and refit of the Line Replaceable Units (LRUs) identified in Table 7.
- Items considered repairable will be returned to the supplier (Bewator Limited) for investigation and possible repair.

7.2 Line Replaceable Units (LRUs)

The Line Replaceable Units (LRUs) of the Visilynx 3 Modular system are the cards, the Power Supply Unit and the interconnecting cables. All of the LRUs, together with their Bewator Limited part numbers, are identified in Table 7.

Because of the modular nature of the system, not all of the LRUs may be fitted in a delivered system.

Table 7 VISILYNX 3 Modular System - Line Replaceable Units

Equipment Description	Bewator Ltd Part Number
Backplane Card	T223
Control CPU Card	T226
Control CPU Connector Card	T236
CPU Serial Ports Connector Card	T252
Video Input Switch Card	T224
BNC Input Connector Card	T232
Switch Expansion Connector Card	T234
Video Output Card	T225
BNC Output Connector Card	T235
Quad Card	T258
Quad Connector Card	T259
Backplane Expansion Connector Card	T237
Backplane Expansion Input Card	T228
Backplane Expansion Output Card	T229
Switch Expansion Connector Card	T234
Control Expansion Card	T231
Control Expansion Connector Card	T238
Alarm Input Card	T254
Alarm Input Connector Card	T256
Alarm Panel	PCBV311
Relay Output Card	T255
Relay Output Connector Card	T257

Equipment Description	Bewator Ltd Part Number
Communication Card	T266
Communication Connector Card	T267
D Type Telemetry Card	T253
D Type Telemetry Connector Card	T262
Power Supply Unit	ZT088A
PSU Cable	To suit installation
Video Input Cable	To suit installation
Video Output Cable	To suit installation
Video Switch Expansion Cable	ZP735A
Control Expansion Cable	ZP734A
Backplane Expansion Cable	ZP733A

3.1 Fault Indications

There are five ways that faults in the Visilynx 3 Modular system will be observed by the user:

1. Alarms.
2. Error Messages received on the Visilynx 3 keyboard.
3. The system did not function as expected.
4. Red LED on card (PCB) is lit.
5. Green Neon indicators on Power Supply Unit are not lit.

Alarms

Alarms are generated by a variety of sources in the CCTV system. Depending on the installation, they are mostly fed to the Visilynx 3 Modular rack frame, where their actions are determined by the software Configuration File. However in large installations, some alarms (e.g. rack frame power failure) may be wired directly to an integrated Control Room.

If a data log device is fitted and configured (usually a printer with an RS232 interface connected to the Data Log serial port on the Control CPU card), all alarm events can be read from the data log printout. These events include operator actions taken in response to alarms as well as the alarms themselves.

A schematic showing Visilynx 3 Modular alarm processing is shown in Figure 44.

The Visilynx 3 Modular system is capable of presenting “logical alarm numbers” and their on/off status to an integrated Control Room, as and when required.

Alarms may be individually enabled for handling by the Visilynx 3 keyboards. Some error messages are presented via the keyboard LCD display, but these are not classed as alarms.

Keyboard Error Messages

A number of error messages can appear on the Visilynx 3 keyboard. The error messages are defined in the Keyboard User Manual (see Section 1.2).

System Malfunction

The operator may observe that the system did not respond as expected to a command. These observations should be logged as an aid to the system fault finding process.

Card LEDs

All Cards have a Red STAT (status) LED fitted which is lit when either:

a) The card is not used by the software Configuration File.

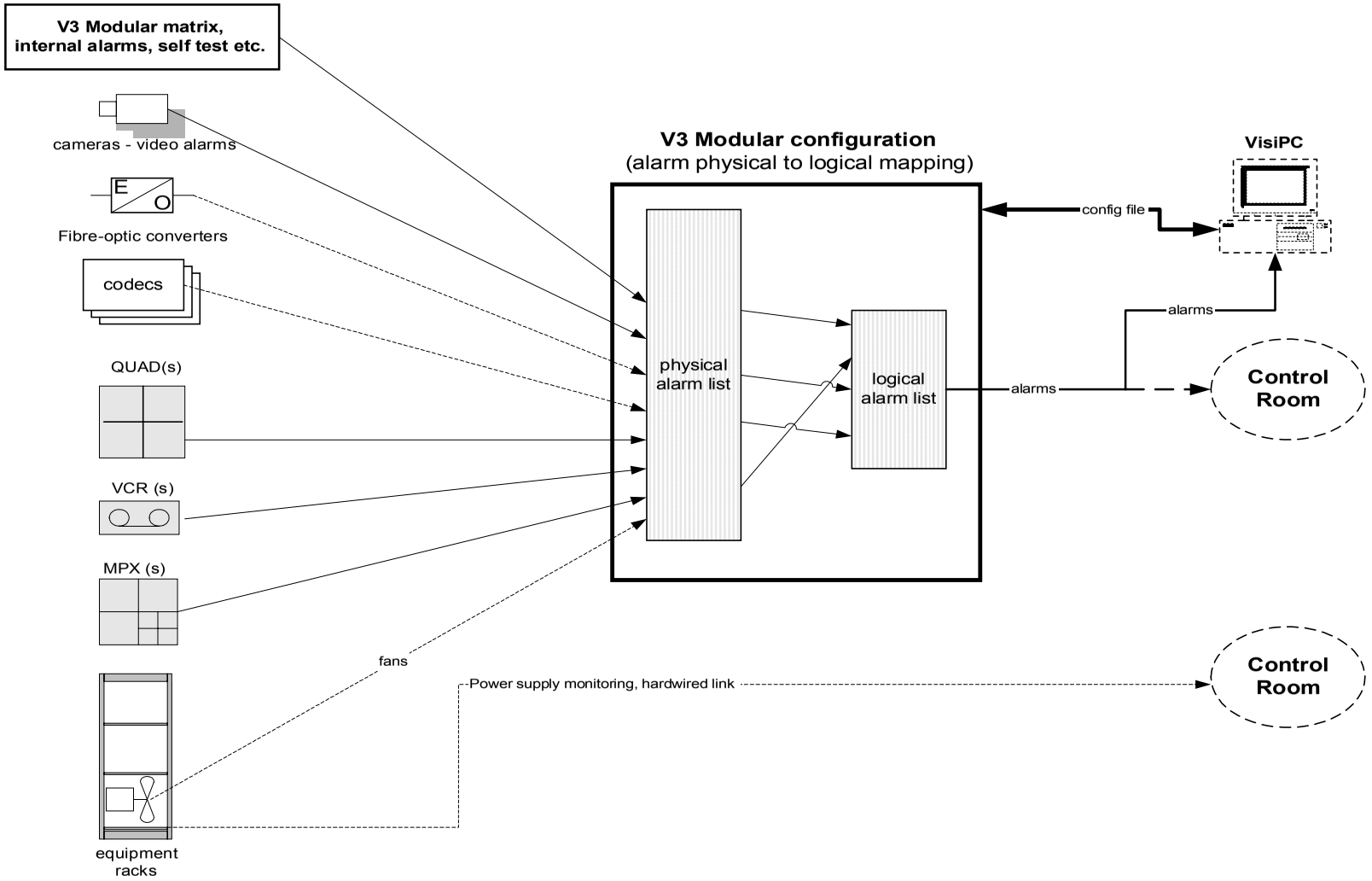
b) The card has a fault.

c) The card is in the wrong place in the rack frame.

Power Supply Unit Indicators

The Visilynx 3 Modular Power Supply Unit has 3 green neon indicators fitted that show that the AC mains input voltage and the 2 DC output voltages are good.

Figure 44 Visilynx 3 Modular Alarm Processing



7.3 System Fault Finding Process

Because of the complexity of the Visilynx 3 Modular Colour Video Matrix rack frame system and the number of ways a fault can be observed, it is recommended that fault finding should always follow a predetermined logical process.

Fault finding Flow Charts are shown in Figure 45 (6 pages).

NOTE: The Visilynx 3 rack frame system must be powered down before any LRU(s) are replaced.

Diagnostic Tool

The main diagnostic tool for the Visilynx 3 Modular system is the VisiPC software, which should be installed on a PC situated near the Visilynx system, or otherwise on a laptop PC.

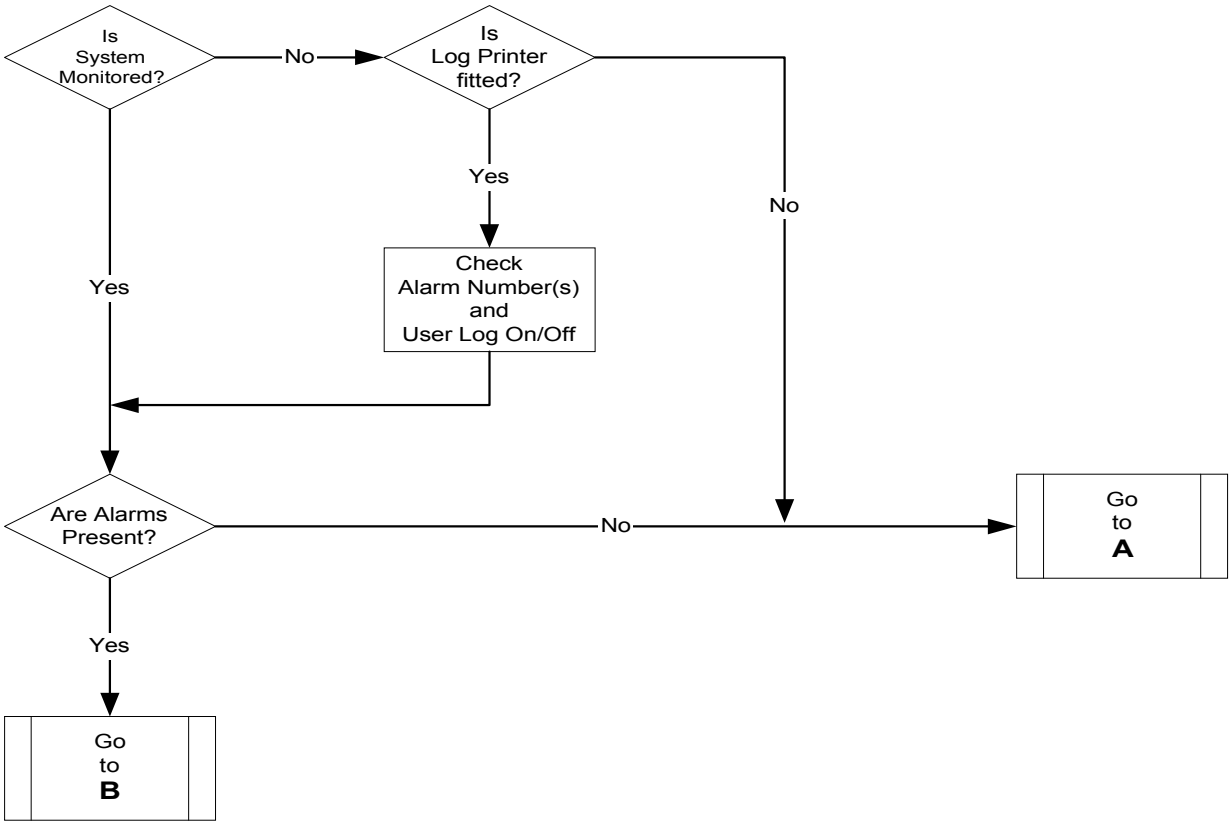
A test lead is required to interface the PC communication port to the Control CPU Card (T226). The VisiPC Software is described in the User Manual (See Section 1.2).

Power Supply Failures

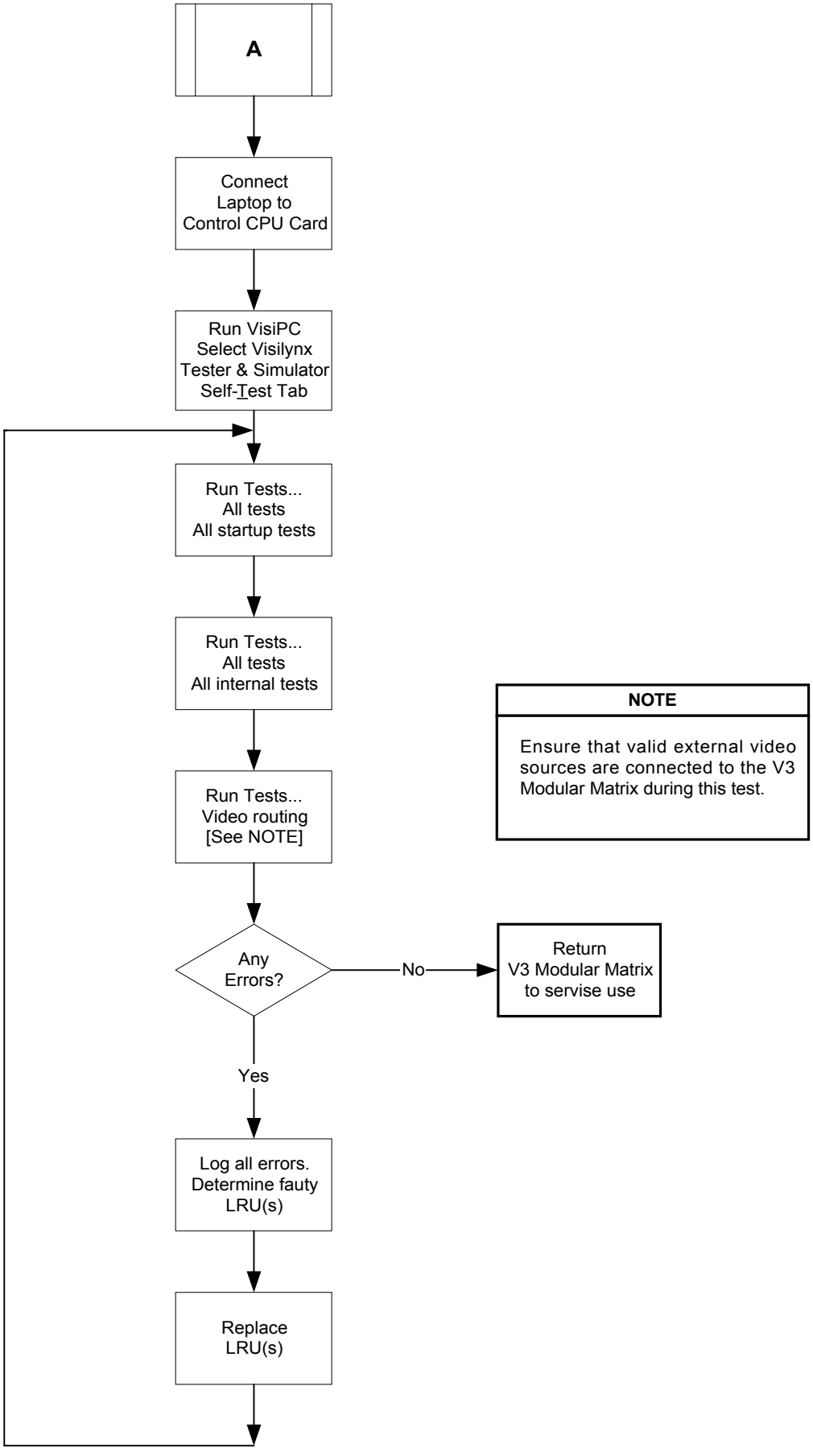
A failure of a Power Supply Unit will result in an alarm, if enabled by configuration. Any faults indicated by the Neon indicators on a Power Supply Unit should be confirmed and the item replaced.

To avoid having to power down the Visilynx 3 Modular system rack frame during the replacement of a Power Supply Unit, dual-redundant power supplies should be used. See Section 4.

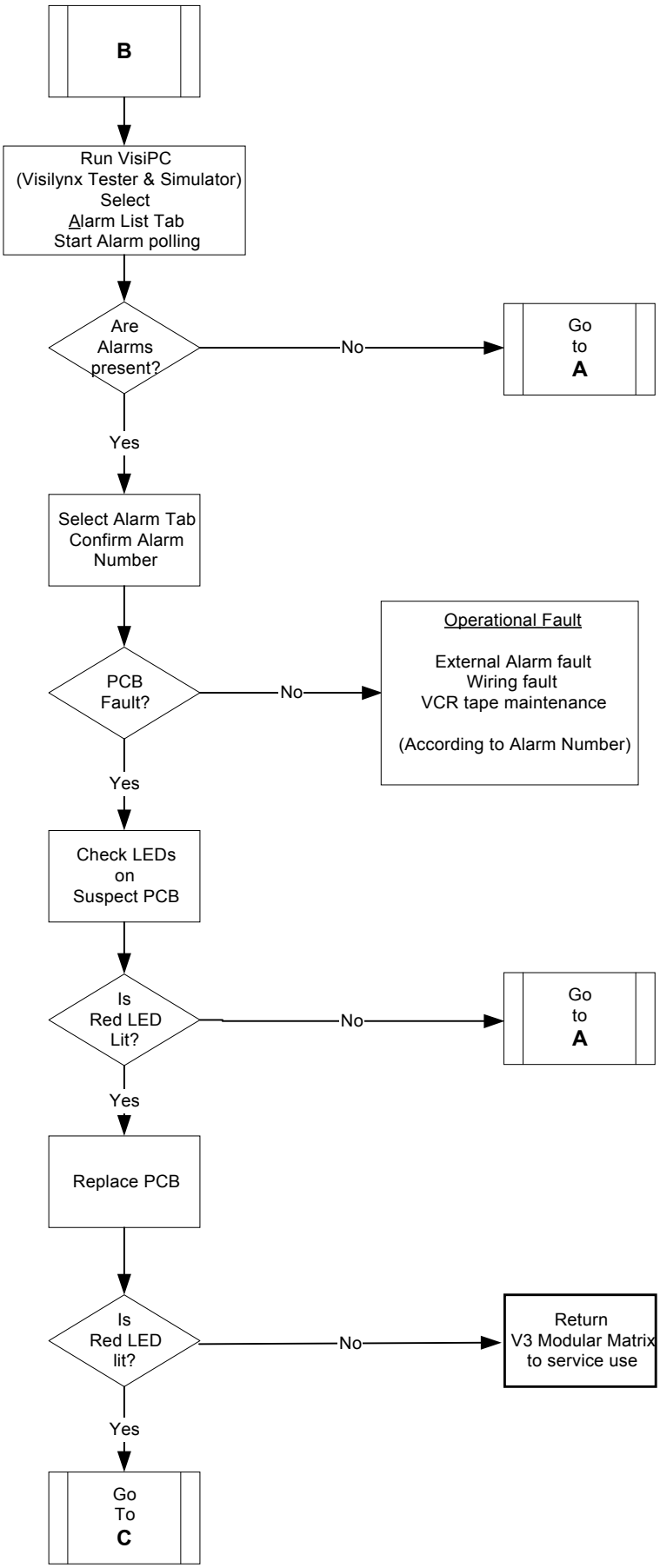
Figure 45 Visilynx 3 Modular System – Fault Finding (1 of 6)



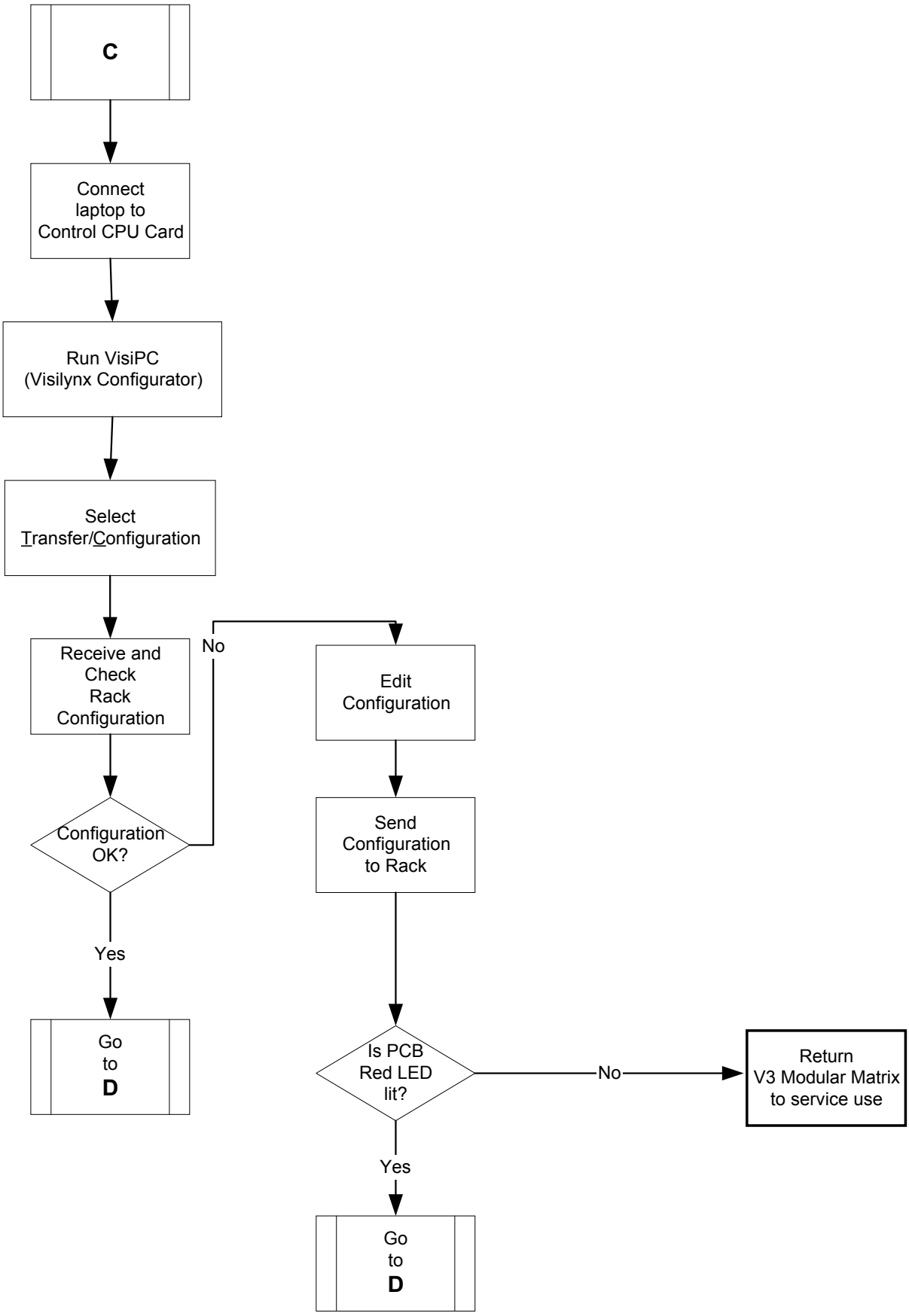
Visilynx 3 Modular System - Fault Finding (2 of 6)



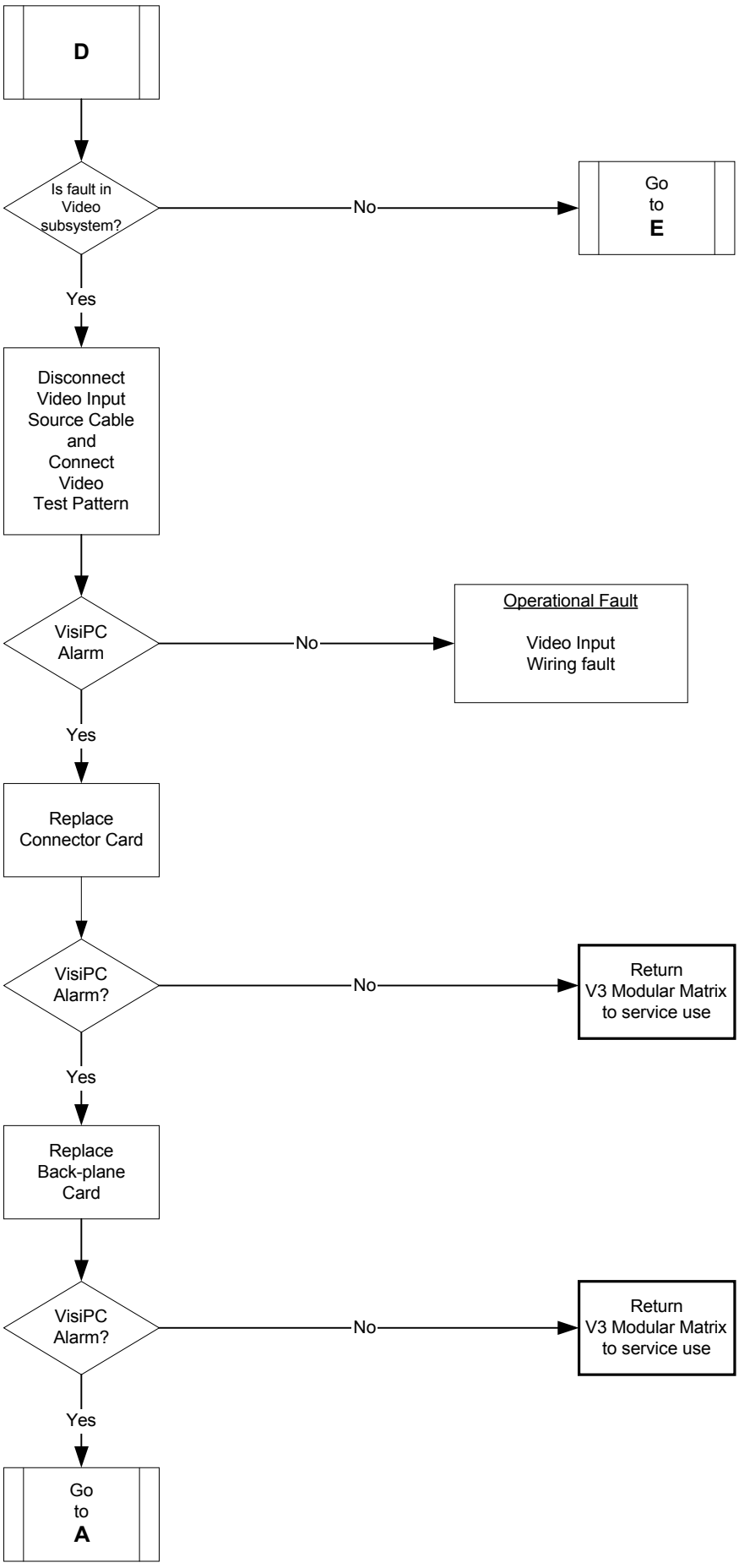
Visilynx 3 Modular System – Fault Finding (3 of 6)



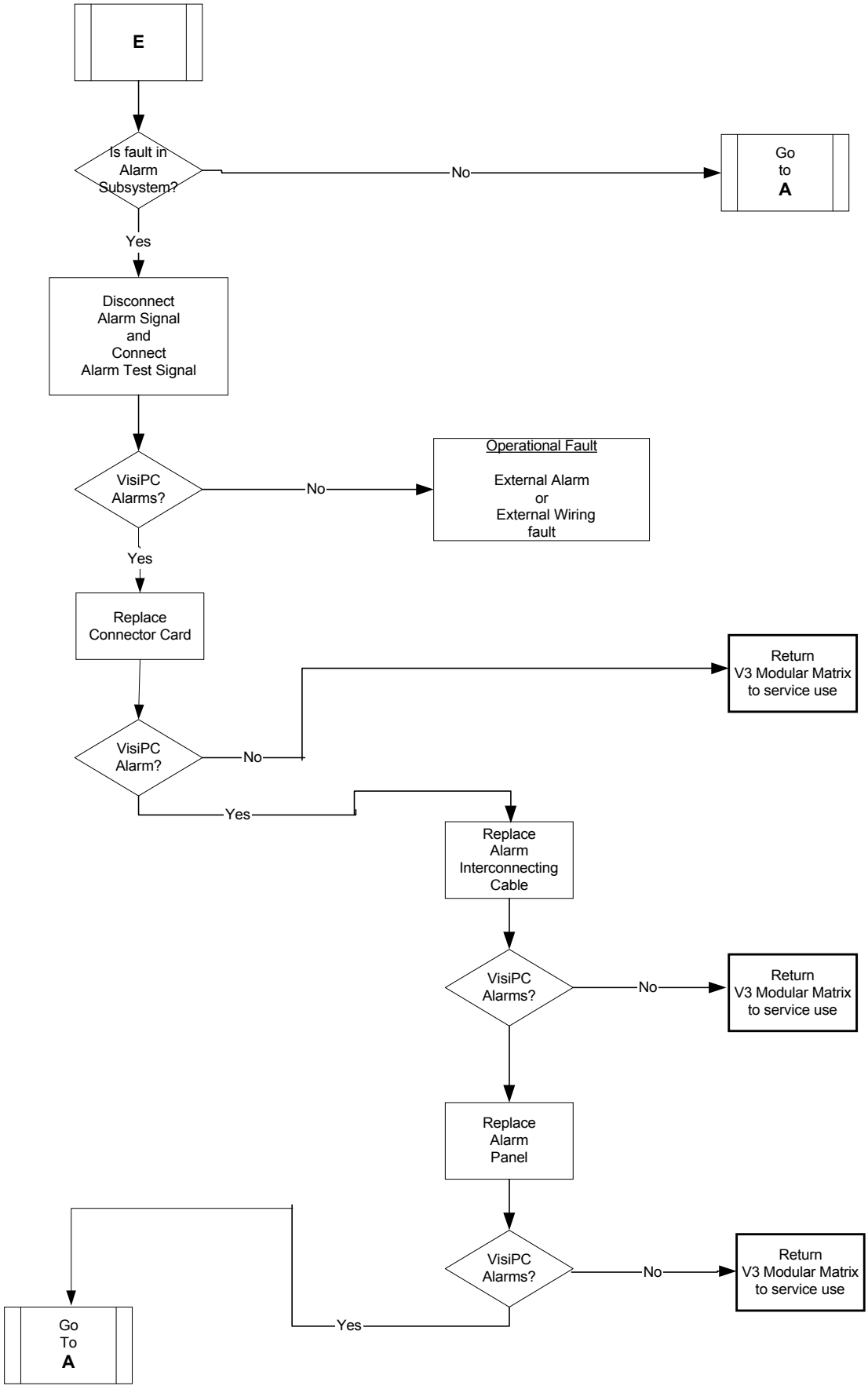
Visilynx 3 Modular System – Fault Finding (4 of 6)



Visilynx 3 Modular System – Fault Finding (5 of6)



Visilynx 3 Modular System – Fault Finding (6 of 6)



7.4 Self-Test Alarms

The Configuration Files that are loaded into the Visilynx 3 Modular Control CPU Card, using the VisiPC software, contain descriptions of all alarms that are reported by VisiPC.

Each Configuration File also includes an optional mapping of the Physical Alarms to the Logical Alarms. By default, the mapping is one-to-one, so logical alarms match their corresponding physical alarms. This is often adequate.

Physical alarms are the alarm numbers determined by wiring (cameras to BNC input connector cards, alarms to alarm input connector cards) and by self-test (see Table 8), all of which can be mapped to logical numbers if a more convenient numbering scheme is required.

It is the logical alarm numbers that are seen in alarm lists at VisiPC, PCCON and keyboards.

NOTE: It should be noted that not all alarms denote failures of Visilynx 3 Modular rack frame LRUs. Some are due to failures of cabling or controlled devices such as VCRs and multiplexers.

Table 8 VisiPC Self-test Alarms

Physical Alarm	Cause	Suspect LRU	Notes
1025	Matrix failure	Video Input Switch Card (T224) Backplane Expansion Cards (T237, T228, T229) Video Output Card (T225)	Possible card failure. Cards moved, added pr removed since configuration was last loaded. Try reloading configuration.
1026	Program corrupt	Control CPU Card (T226)	FLASH validation failure
1027	Data corrupt	Control CPU Card (T226)	Ignore after loading new configuration; restart Visilynx 3 rack frame to check true state
1028	Internal power supply failure	Control CPU Card (T226)	
1029	I/O failure:	Control CPU Card (T226) Relay Output Card (T255) Alarm Input Card (T254) D-type Telemetry Card (T253) Communication Card (T266) Control Expansion Card (T231)	
1030-1061	VCR/DVR 1-32 failure	VCR/DVR	Possibly operational. Data cable disconnected or device switched off.
1062-1093	VCR/DVR 1-32 media missing	VCR/DVR	Operational, not fault. Replace tape or disk caddy.
1094-1125	VCR/DVR 1-32 end of media reached	VCR/DVR	Operational, not fault. Can be avoided by setting VCR recording mode to "Overwrite at end of media"
1126-1157	MPX 1-32 failures	Multiplexer	Possibly operational. Data cable disconnected or device switched off.

Physical Alarm	Cause	Suspect LRU	Notes
1158-1189	Quad card 1-32 failure	Quad Card (T258)	Card removed or failed since configuration last loaded.

7.5 VisiPC Self-test Log

General

The Visilynx 3 software self-test task is responsible for:

- Running start-up tests.
- Auto-detecting installed hardware.
- Running all the tests that are user specified by a self-test request from VisiPC.
- Storing auto-detection and self-test results in the self-test log.
- Generating self-test alarms.

A Self-test is run by selecting the VisiPC 'Self-Test' Tab and selecting the 'Test Type' and 'Test Level' from the **Run Tests** button. Refer to the VisiPC User Manual (See Section 1.2).

The results logged from the Self-test are retrieved using the **Self-test Results** button, with the latest results being placed at the bottom of the log. If any tests fail severely then a Self-test Alarm (ALRM) is generated (see Table 8). The results can be copied to the Clipboard for later analysis, by clicking on the results window and pressing Ctrl-C.

Self-test Results

This is the logical structure of Self-test Results, which is part of the Self-test Log store. It comprises test result records and test exception records.

Each Self-test record consist of up to a maximum of 5 lines of text:

- Line 1 contains the Test Description.
- Lines 2 to 4 contain the status of the individual tests and their result(s), as required.
- Lines 3 to 5 contain the Pass/Fail status of the test, with the Date and Time.

Each test record is classified as Pass, Warning or Fail.

A full list of all the possible Self-test results is provided in Table 9. The actual test records provided will depend on the tests that are run following the selection of the Test Type and the Test Level during the VisiPC Self-test Request.

All test record listings include a Results Summary, as the last record.

Table 9 VisiPC Self-test Results

Test Description	Item(s) logged	Record code	Record data
Address Decoder Test Results			
PLD firmware version	Firmware versions	1	latest version supported = version read =
PLD register integrity.	Register values	2	Value written = value read =
FLASH Test Results			

Test Description	Item(s) logged	Record code	Record data
FLASH boot loader FLASH CRC	None	3	None
Controller FLASH CRC	None	4	None
FPGA FLASH CRC	None	5	None
User configuration CRC/checksum.	Test Results 0 = Not Tested 1 = Checksum Passed 2 = CRC Passed 3 = Test Failed	6	Fixed area = Variable area = Factory defaults =
Power Supply Test Results			
+12 V supply =	Voltage read	7	Signed volts
-5V supply =	Voltage read	8	Signed volts
VBATT supply =	Voltage read	9	Signed volts
SRAM Test Results			
Static RAM size =	Memory size detected	10	Size in k bytes
Battery-Backed SRAM Test Results			
Command status data validation	None	11	None
RTC Test Results			
Timer interrupt period =	Period measured	12	Period in ms
RTC Register integrity	Bad registers	13	Register count. 1st bad value.
SCB Registers Test Results			
SCB Register integrity	Location of 1st bad register	14	Register offset from start of SCB
CPU Temperature Test Results			
CPU temperature	Temperature read	15	Degrees C (Signed)
Serial Ports Test Results (43 sets of internal loopback results, one per CPU and Communication card UART channel.			
Serial ch. (n) sent (byte count), received (byte count) bytes (int. loopback) [*Data transmission and reception*]	# bytes received	16	Channel number (n) Byte count sent Bytes received.
Serial ch. (n) data integrity: (byte count) bytes not matched (Int. loopback) [*Data integrity]*	# bytes not matching	17	Channel number (n) Byte count.

Test Description	Item(s) logged	Record code	Record data
Serial Ports Test Results (43 sets of external loopback results, one per CPU and Communication card UART channel. Note that keyboard channel 10 cannot be looped back.			
Data transmission and reception	# bytes received	18	Channel number Byte count sent Bytes received.
Data integrity	# bytes not matching	19	Channel number Byte count.
Cards Test Exceptions (Either record 20 or 1 to 30 instances of records 21 to 27 may be logged.			
Card tests passed =	Total cards tested	20	Total cards
Card firmware version is incompatible.	Card with wrong version	21	Rack frame. Slot. Version found.
Card PCB version is incompatible	Card with wrong version	22	Rack frame. Slot. Version found.
Card LED register not responding.	Card with bad register	23	Rack frame. Slot. Type.
Comms card loopback failure	Card that failed	24	Rack frame. Slot. Channel.
Telemetry card loopback failure	Card that failed	25	Rack frame. Slot. Channel.
Card test exception buffer full.	None	27	None
Auto-Detection Test Exceptions (either record 28 or 1 to 30 instances of records 29 to 45 may be logged.			
Auto-detection tests passed. Total rack frames = (r),Total cards = (c)	Total rack frames and cards detected	28	Rack frames (r). Cards (c).
Card type is unknown.	Card with wrong type	29	Rack frame. Slot. Type.
Slot 1 of any rack frame does not contain a CPU or controller expansion card.	Card type found in slot	30	Rack frame. Slot. Type.
Bus expansion card is in wrong rack frame.	Card found in wrong place	31	Rack frame, Slot

Test Description	Item(s) logged	Record code	Record data
Bus expansion card not connected to another bus expansion card.	Card found	32	Rack frame, slot
Too many cards of one type.	Card type details	33	Type. Number allowed. Number detected.
More than one Video Output card on a backplane.	First superfluous card found	34	Rack frame. Slot. Type.
More than 4 Quad cards on a backplane.	First superfluous card found	35	Rack frame. Slot. Type.
The card in a rack frame above or below a Video Output Card is not blank.	Non-blank card found	36	Rack frame. Slot. Type.
Video Output and Quad cards are not in the first rack frame in a backplane.	Card found in wrong rack frame	37	Rack frame. Slot. Type.
The card above or below a Quad, Alarm Input or Relay card in a rack frame is not the same type or blank.	Wrong card found	38	Rack frame. Slot. Type.
Video Input and Train Input cards are mixed in the same rack frame.	Rack frame with error	39	Rack frame
Video Input Card ID in the top backplane of a rack frame are invalid. i.e. 0xff.	Card with wrong ID	40	Rack frame. Slot. Type
Card below a Video input card in a rack frame is of a different type.	Card with wrong type	41	Rack frame. Slot. Type.
A card with C type telemetry is not the top card in a video input bus.	Card in wrong place	42	Rack frame. Slot. Type.
A switch expansion chain of video input switch cards is of different length to the majority of chains.	Last card in bad chain	43	Rack frame. Slot. Type.
Valid Flash hardware configuration is different from auto-detected one. Flash configuration used	None	44	None
Auto-detection test exception buffer full.	None	45	None
Video Routing Test Exceptions (either record 46 or 1 to 30 instances of records 47 to 53 may be logged.			

Test Description	Item(s) logged	Record code	Record data
Video routing tests passed. Total routes tested = (r)	Total routes tested	46	Routes (r)
No input video source detected	None	47	None
No input switch cards or video output cards detected	None	48	None
Video syncs vary between from chained video input cards.	Card and camera difference found on	49	Rack frame Slot Camera
Sync not detected at correct output channel	Camera and correct monitor	50	Camera. Monitor.
Sync detected at wrong output channel	Camera and wrong monitor	51	Camera. Monitor.
No sync detected at any output channel	Camera	52	Camera
Video routing test exception buffer full.	None	53	None
SRB Error Exceptions (0 to 30 of the following records may be logged.			
SRB slot status register	Register contents	54	Rack frame. Slot. Register value.
SRB error exception buffer full.	None	55	None
Self-test Results Summary			
Summary: (p) pass(es), (w) warning(s), (f) failure(s)	Summary of all test results	56	Passes (p) Warnings (w) Failures (f)

8 EC DECLARATION OF CONFORMITY

BEWATOR

EC DECLARATION OF CONFORMITY

Name of Manufacturer: Bewator Ltd

Address of Manufacturer: Albany Street
Newport
South Wales
NP20 5XW
United Kingdom

Declares under our sole responsibility that the product(s):

Product Name : **Visilynx 3 (Modular)**

Model Number(s) : V3

Product Options : T254, T256 (Alarm input), T228, T237 (Backplane expansion input), T229, T237 (Backplane expansion output), T266, T267 (Communication card), T226 T236, T252 (Control CPU), T231, T238 (Control expansion), T253, T262 (D-type telemetry), T258, T259 (Quad), T255, T257 (Relay output), T224, T232, T234 (Video input switch), T225, T235 (Video output),110V, 230V, 50Hz and 60Hz.

Conform to the provisions of the EMC directive (89/336/EC, as amended).
Conform to the provisions of the Low Voltage Directive (73/23/EC, as amended).

The following Harmonised European Standards have been applied:

EN 50 081-1: 1992	Electromagnetic Compatibility - Generic emission standard.
EN 50 082-1: 1997	Electromagnetic Compatibility - Generic immunity standard.
EN 60 950: 1992	Safety of information technology equipment, including electrical business equipment.

In accordance with the "CE Marking" Directive 93/68/EEC The mark will be applied to the product.

I declare that as the authorised responsible person, that the products herewith are in conformity with the stated standards and other related documents.

Newport
Date: 27-05-2002

Carl-Johan Håkansson (Technical Director)

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9 NOTES

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