grass valley

Triton Plus

ANALOG VIDEO ROUTERS

User Manual

Revision 11

JANUARY 2009

THOMSON
images & beyond

KEMA

Affiliate with the N.V. KEMA in The Netherlands

CERTIFICATE

Certificate Number: 510040.001

The Quality System of:

Grass Valley, Inc.

400 Providence Mine Road
Nevada City, CA 95945
United States

15655 SW Greystone Ct.
Beaverton, OR 97006
United States

10 Presidential Way
3rd Floor, Suite 300
Woburn, MA 01801
United States

Nederland B.V.
4800 RP BREDA
The Netherlands

Weiterstadt, Germany
Brunnenweg 9
D-64331 Weiterstadt
Germany

Rennes, France
Rue du Clos Courtel
Cesson-Sevigne, Cedex
France

Technopole Brest Iroise
CS 73808
29238 Brest Cedex 3
France

17 rue du Petit Albi-BP 8244
95801 Cergy Pontoise
Cergy, France

2300 South Decker Lake Blvd.
Salt Lake City, UT 84119
United States

7140 Baymeadows Way
Suite 101
Jacksonville, FL 32256
United States

Including its implementation, meets the requirements of the standard:

ISO 9001:2000

Scope:
The design, manufacture and support of video hardware and software products and related systems.

This Certificate is valid until: June 14, 2009
This Certificate is valid as of: August 30, 2006
Certified for the first time: June 14, 2000

H. Pierre Sallé
President
KEMA-Registered Quality

The method of operation for quality certification is defined in the KEMA General Terms And Conditions For Quality And Environmental Management Systems Certifications. Integral publication of this certificate is allowed.

KEMA-Registered Quality, Inc.
4377 County Line Road
Chalfont, PA 18914
Ph: (215)997-4519
Fax: (215)997-3809

CRT 001 073004

Accredited By:
ANAB

ANAB ACCREDITED

grass valley

Triton Plus

ANALOG VIDEO ROUTERS

User Manual

Revision 11

JANUARY 2009

THOMSON
images & beyond

Contacting Grass Valley

International Support Centers	**France 24 x 7**	+800 8080 2020 or +33 1 48 25 20 20 +800 8080 2020 or +33 1 48 25 20 20	**United States/Canada 24 x 7**	+1 800 547 8949 or +1 530 478 4148
Local Support Centers (available during normal business hours)	**Asia**	**Hong Kong, Taiwan, Korea, Macau:** +852 2531 3058 **Indian Subcontinent:** +91 22 24933476 **Southeast Asia/Malaysia:** +603 7805 3884 **Southeast Asia/Singapore:** +65 6379 1313 **China:** +861 0660 159 450 **Japan:** +81 3 5484 6868		
	Australia and New Zealand: +61 1300 721 495		**Central/South America:** +55 11 5509 3443	
	Middle East: +971 4 299 64 40 **Near East and Africa:** +800 8080 2020 or +33 1 48 25 20 20			
	Europe	**Belarus, Russia, Tadzikistan, Ukraine, Uzbekistan:** +7 095 2580924 225 **Switzerland:** +41 1 487 80 02 **S. Europe/Italy-Roma:** +39 06 87 20 35 28 **-Milan:** +39 02 48 41 46 58 **S. Europe/Spain:** +34 91 512 03 50 **Benelux/Belgium:** +32 (0) 2 334 90 30 **Benelux/Netherlands:** +31 (0) 35 62 38 42 1 **N. Europe:** +45 45 96 88 70 **Germany, Austria, Eastern Europe:** +49 6150 104 444 **UK, Ireland, Israel:** +44 118 923 0499		

Grass Valley Web Site

The www.thomsongrassvalley.com web site offers the following:

Online User Documentation — Current versions of product catalogs, brochures, data sheets, ordering guides, planning guides, manuals, and release notes in .pdf format can be downloaded.

FAQ Database — Solutions to problems and troubleshooting efforts can be found by searching our Frequently Asked Questions (FAQ) database.

Software Downloads — Download software updates, drivers, and patches.

grass valley

END-OF-LIFE PRODUCT RECYCLING NOTICE

Grass Valley's innovation and excellence in product design also extends to the programs we've established to manage the recycling of our products. Grass Valley has developed a comprehensive end-of-life product take back program for recycle or disposal of end-of-life products. Our program meets the requirements of the European Union's WEEE Directive, the United States Environmental Protection Agency, and U.S. state and local agencies.

Grass Valley's end-of-life product take back program assures proper disposal by use of Best Available Technology. This program accepts any Grass Valley branded equipment. Upon request, a Certificate of Recycling or a Certificate of Destruction, depending on the ultimate disposition of the product, can be sent to the requester.

Grass Valley will be responsible for all costs associated with recycling and disposal, including freight. However, you are responsible for the removal of the equipment from your facility and packing the equipment to make it ready for pickup.

For further information on the Grass Valley product take back system please contact Grass Valley at + 800 80 80 20 20 or +33 1 48 25 20 20 from most other countries. In the U.S. and Canada please call 800-547-8949 or 530-478-4148, and ask to be connected to the EH&S Department. Additional information concerning the program can be found at: www.thomsongrassvalley.com/environment

THOMSON images & beyond

Contents

Triton Plus Analog Video Routers

Product Overview

Thomson Grass Valley is proud to present the second generation of the compact small and medium routing switcher family – Triton Plus. With Triton Plus, Thomson Grass Valley now provides a stable and proven product line including the most complete signal format and size offering available.

With the new ultra-slim, multi-format and flexible product range, Triton Plus fulfils the most demanding requirements from the professional broadcast market.

This User Manual presents the features listed below, installation and operation procedures of the SD and 3G HD/HD routers of the Triton Plus range.

- Router range from 8x8 to 64x64
- RS-232 and NCB Control (RJ45)
- Multi- single- and dual-bus control panels
- Ultra-slim frame depth
- Low power, high reliability design
- Redundant power supply system with front indicators
- Interoperability with existing Triton Plus routers
- Future-proof and flexible product range

Triton Plus provides many of the powerful control features that drove the Triton Modular range to success. Triton Plus is ideal for general purpose facilities, on-air routing, mobile outside broadcast applications, and sophisticated A/V applications.

Product Versions

The following versions of the Triton Plus Analog Video Routers are available:

- Analog Video – 19 in., 1 RU, Depth - 5 cm (see Table 1)
- Analog Video – 19 in., 2 RU, Depth - 5 cm (see Table 2)
- Analog Video – 19 in., 4 RU, Depth - 5 cm (see Table 3)

Table 1. Analog Video – 19 in., 1 RU, Depth - 5 cm

Model	Description
TPS-V0808/ TPS-V0808CP	8x8 Analog Video Router (125MHz). Router partitioning, X-Y control panel (on CP version)
TPS-V1616 / TPS-V1616CP	16x16 Analog Video Router (125MHz). Router partitioning, X-Y control panel (on CP version)
TPS-V1602 / TPS-V1602CP	16x2 Analog Video Router (125MHz). Router partitioning, dual bus control panel (on CP version)

Table 2. Analog Video – 19 in., 2 RU, Depth - 5 cm

Model	Description
TPS-V3232/ TPS-V3232CP	32x32 Analog Video Router (125MHz). Router partitioning, X-Y control panel (on CP version)

Table 3. Analog Video – 19 in., 4 RU, Depth - 5 cm

Model	Description
TPS-V6464/ TPS-V6464CP	64x64 Analog Video Router (125MHz). Router partitioning, X-Y control panel (on CP version)

The following control panel versions are available for the Triton Plus series:

- 19 in. 1 RU (Table 4)
- 19 in. 2 RU (Table 5)
- 19 in. 4 RU (Table 6)

Table 4. 19 in. 1 RU Control Panels

Control Panel Model	Descriptions
TPS-16XY-CP	Multi bus X-Y 16x16 panel
TPS-8XY-CP	Multi bus X-Y 8x8 panel
TPS-16D-CP	Dual bus 16x2 panel
TPS-32S-CP	Single bus 32x1 panel
TPS-32S-CP-GPI	Single bus 32x1 panel with GPI/Joystick/Tally interface
TPS-16S-CP	Single bus 16x1 panel
TPS-16S-CP-GPI	Single bus 16x1 panel with GPI/Joystick/Tally interface
TPS-8S-CP	Single bus 8x1 panel
TPS-8S-CP-GPI	Single bus 8x1 panel with GPI/Joystick/Tally interface
TPS-16XY-CP	Multi bus X-Y 16x16 panel

Table 5. 19 in. 2 RU Control Panels

Control Panel Model	Descriptions
TPS-32XY-CP	Multi bus X-Y 32x32 panel
TPS-64S-CP	Single bus 64x1 panel
TPS-64S-CP-GPI	Single bus 64x1 panel with GPI/Joystick/Tally interface

Table 6. 19 in. 4 RU Control Panels

Control Panel Model	Descriptions
TPS-64XY-CP	Multi bus X-Y 64x64 panel

Connection Details

Available connectors at the back panel of the Triton Plus Routers are shown in Figure 1.

Note Figure 1 shows a 1 RU Triton Plus router. However, the connectors are identical to the 1 RU also on the 2 RU and 4 RU units. The only connectors that differ are the applicable signal connectors.

Figure 1. Triton Router Connectors

- SYNC: Synchronization signal (in). Black burst/composite/tri-level sync reference input with passive loop-through for vertical interval switching.
- LOOP: Synchronization signal (out). Loop-through of SYNC input.
- NCB IN: Network Control Bus Input. The protocol of this bus is equal, and compatible to the MIDI bus protocol.
- NCB OUT: Network Control Bus Output.
- ETHERNET: Not supported at this time.
- RS-232: RS-232 for external control protocols.
- POWER A: ±15VDC Power Input.
- POWER B: ±15VDC Power Input, redundant supply.
- CONFIGURATION: Configuration switches (8 pcs).

Power Supply Pinouts

The DB9 power pinouts for Triton Plus routers and Control Panels are given in Table 7.

Table 7. Power Supply Pinouts

Pin Number	Description
1	GND
2	Not Connected
3	Not Connected
4	+15 VDC
5	Not Connected
6	Not Connected
7	Not Connected
8	-15 VDC
9	Not Connected

Configuration

In order to get an overview of the parts that form the Triton Plus Analog Video Router, this section highlights some of the main components.

Router Level

Switches 1-4 on the configuration switch set the router's level for communication with the Router Management System and other units in the NCB system. The panels on the NCB dedicated to operate with the router must be configured to the same level as that router.

If several routers are combined to form an Audio Follow Video, RGB or similar system, these routers must be configured to the same level.

The levels can be switched according to the patterns given in Table 8. The default level is 1.

Table 8. Level Switch Patterns

SW 1	SW 2	SW 3	SW 4	Level	NCB Address
Off	Off	Off	Off	1	0
Off	Off	Off	**On**	2	1
Off	Off	**On**	Off	3	2
Off	Off	**On**	**On**	4	3
Off	**On**	Off	Off	5	4
Off	**On**	Off	**On**	6	5
Off	**On**	**On**	Off	7	6
Off	**On**	**On**	**On**	8	7
On	Off	Off	Off	9	8
On	Off	Off	**On**	10	9
On	Off	**On**	Off	11	10
On	Off	**On**	**On**	12	11
On	**On**	Off	Off	13	12
On	**On**	Off	**On**	14	13
On	**On**	**On**	Off	15	14
On	**On**	**On**	**On**	16	15

Router Mode

Router Mode on NxN Square Routers

The Triton Plus A/V router allows switching in different modes.

For a 1 RU Triton Plus router you can choose among the modes given in Table 9.

Table 9. 1 RU Triton Plus Modes

Router Layers	8x8 Router	16x16 Router
1 layer	8x8	16x16
2 layers	4x4	8x8
3 layers	N/A	5x5
4 layers	2x2	4x4

For a 2 RU Triton Plus router you can choose among the modes given in Table 10.

Table 10. 2 RU Triton Plus Modes

Router Layers	32x32 Router
1 layer	32x32
2 layers	16x16
3 layers	10x10
4 layers	8x8

For a 4 RU Triton Plus router you can choose among the modes given in Table 11.

Table 11. 4 RU Triton Plus Modes

Router Layers	32x32 Router
1 layer	64x64
2 layers	32x32
3 layers	21x21
4 layers	16x16

Switches 5 - 6 on the configuration switch set the router's mode. The Router Management System software must be configured according to the mode chosen on the router.

The default mode is 1 router layer (**SW 5** and **SW 6** off).

The modes can be switched according to the pattern given in Table 12.

Table 12. SW 5 and SW 6 Router Modes

SW 5	SW 6	Router Mode
Off	Off	1 router layer
Off	On	2 router layers
On	Off	3 router layers
On	On	4 router layers

Based on the configuration above, the I/O is connected to the router according to the following schemes in Table 13 through Table 24 where the physical limitations depend on the type of router that is purchased (8x8, 16x16, 32x32, or 64x64). Each table title identifies the number of router layers based on the router type:

Table 13. 1 Router Layer

Signal	Input	Signal	Output
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9
10	10	10	10
11	11	11	11
12	12	12	12
13	13	13	13
14	14	14	14
15	15	15	15
16	16	16	16

Table 14. 2 Router Layers Based on an 8x8 Router

Layer 1	Input	Layer 1	Output
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
Layer 2	**Input**	**Layer 2**	**Output**
1	5	1	5
2	6	2	6
3	7	3	7
4	8	4	8

Table 15. 2 Router Layers Based on an 16x16 Router

Layer 1	Input	Layer 1	Output
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
Layer 2	**Input**	**Layer 2**	**Output**
1	9	1	9
2	10	2	10
3	11	3	11
4	12	4	12
5	13	5	13
6	14	6	14
7	15	7	15
8	16	8	16

Table 16. 2 Router Layers Based on an 32x32 Router

Layer 1	Input	Layer 1	Output
1	1	1	1
2	2	2	2
3	3	3	3
...	...	...	...
8	8	8	8
...	...	...	...
...	...	...	...
16	16	16	16
Layer 2	**Input**	**Layer 2**	**Output**
1	17	1	17
2	18	2	18
3	19	3	19
...	...	...	...
8	24	8	24
...	25	...	25
...	...	...	...
16	32	16	32

Table 17. 2 Router Layers Based on an 64x64 Router

Layer 1	Input	Layer 1	Output
1	1	1	1
2	2	2	2
3	3	3	3
...	...	...	...
16	16	16	16
...	...	...	...
...	...	...	...
32	32	32	32
Layer 2	**Input**	**Layer 2**	**Output**
1	33	1	33
2	34	2	34
3	35	3	35
...	...	...	...
16	48	16	48
17	49	17	49
...	...	...	...
32	64	32	64

Table 18. 3 Router Layers Based on an 16x16 Router

Layer 1	Input	Layer 1	Output
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
Layer 2	**Input**	**Layer 2**	**Output**
1	6	1	6
2	7	2	7
3	8	3	8
4	9	4	9
5	10	5	10
Layer 3	**Input**	**Layer 3**	**Output**
1	11	1	11
2	12	2	12
3	13	3	13
4	14	4	14
5	15	5	15

Table 19. 3 Router Layers Based on an 32x32 Router

Layer 1	Input	Layer 1	Output
1	1	1	1
2	2	2	2
3	3	3	3
...	...	...	...
10	10	10	10
Layer 2	**Input**	**Layer 2**	**Output**
1	11	1	11
2	12	2	12
3	13	3	13
...	...	...	...
10	20	10	20
Layer 3	**Input**	**Layer 3**	**Output**
1	21	1	21
2	22	2	22
3	23	3	23
...	...	...	...
10	30[1]	10	30[1]

[1] Inputs/Outputs 31 and 32 are not used in this setup.

Table 20. 3 Router Layers Based on an 64x64 Router

Layer 1	Input	Layer 1	Output
1	1	1	1
2	2	2	2
3	3	3	3
...	...	...	...
21	21	21	21
Layer 2	**Input**	**Layer 2**	**Output**
1	22	1	22
2	23	2	23
3	24	3	24
...	...	...	...
21	42	21	42
Layer 3	**Input**	**Layer 3**	**Output**
1	43	1	43
2	44	2	44
3	45	3	45
...	...	...	...
21	63[1]	21	63[1]

[1] Input/Output 64 is not used in this setup.

Table 21. 4 Router Layers Based on an 8x8 Router

Layer 1	Input	Layer 1	Output
1	1	1	1
2	2	2	2
Layer 2	**Input**	**Layer 2**	**Output**
1	3	1	3
2	4	2	4
Layer 3	**Input**	**Layer 3**	**Output**
1	5	1	5
2	6	2	6
Layer 4	**Input**	**Layer 4**	**Output**
1	7	1	7
2	8	2	8

Table 22. 4 Router Layers Based on an 16x16 Router

Layer 1	**Input**	**Layer 1**	**Output**
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
Layer 2	**Input**	**Layer 2**	**Output**
1	5	1	5
2	6	2	6
3	7	3	7
4	8	4	8
Layer 3	**Input**	**Layer 3**	**Output**
1	9	1	9
2	10	2	10
3	11	3	11
4	12	4	12
Layer 4	**Input**	**Layer 4**	**Output**
1	13	1	13
2	14	2	14
3	15	3	15
4	16	4	16

Table 23. 4 Router Layers Based on an 32x32 Router

Layer 1	**Input**	**Layer 1**	**Output**
1	1	1	1
2	2	2	2
...	...	...	...
8	8	8	8
Layer 2	**Input**	**Layer 2**	**Output**
1	9	1	9
2	10	2	10
...	...	...	...
8	16	8	16
Layer 3	**Input**	**Layer 3**	**Output**
1	17	1	17
2	18	2	18
...	...	...	...
8	24	8	24
Layer 4	**Input**	**Layer 4**	**Output**
1	25	1	25
2	26	2	26
...	...	...	...
8	32	8	32

Table 24. 4 Router Layers Based on an 64x64 Router

Layer 1	**Input**	**Layer 1**	**Output**
1	1	1	1
2	2	2	2
...	...	...	...
16	16	16	16
Layer 2	**Input**	**Layer 2**	**Output**
1	17	1	17
2	18	2	18
...	...	...	...
16	32	16	32
Layer 3	**Input**	**Layer 3**	**Output**
1	33	1	33
2	34	2	34
...	...	...	...
16	48	16	48
Layer 4	**Input**	**Layer 4**	**Output**
1	49	1	49
2	50	2	50
...	...	...	...
16	64	16	64

Power Alarm

The power alarm can be switched with **SW 7** according to the pattern given in Table 25. The default setting is power alarm disabled.

Table 25. SW 7 – Power Alarm

SW 7	Power Alarm
Off	Disables power alarm
On	Enables power alarm

Power-up Mode

Switch **SW 8** on the configuration switch defines the power up mode on NxN square routers. The Triton Plus router provides two modes for powering up the system. The power up options can be switched according to the following pattern given in Table 26:

Table 26. SW 8 – Power Up Mode

SW 8	Power Up Mode
Off	Switches all outputs according to the buffered information in the routers processor system.
On	Switches all outputs to input 1.

The Default setting switches all outputs according to the buffered information in the routers processor system.

Configuring Output on Single Bus Panels

Refer to *Input* on page 29 for more information on configuring the default output to be controlled from a single bus control panel.

LED Status Indication

Start Up

The LED located at the front of the router indicates the status of the router. At start-up, the LED will alternate between red (R) and green (G) every 500ms for about two seconds. After the start-up sequence the LED will indicate the Alarm state of the router.

Alarm States

The LED can either be red (R), green (G), or have no light (N).

The LED state is described in Table 27 below with twenty letters, each representing 100ms, which totals an alarm sequence of two seconds. The X indicates that the LED keeps the color it has the moment the alarm sequence begins (green or no light).

Table 27. LED Alarm States

Description	LED State	Alarm	Comment
Continuous Green Light	GGGGG GGGGG GGGGG GGGGG	No Alarm Status OK	
Long Red Blinking	RRRRR NNNNN RRRRR NNNNN	Power is too low	
One Short Red Blink	RXXXX XXXXX XXXXX XXXXX	Power A failed	Only active if power alarm DIP is set.
Two Short Red Blinks	XXXXX XXXXX RXRXX XXXXX	Power B failed	

Router Communication

You gain access to router for communication purposes by connecting the router's serial port to your computer.

Serial Connection

Connection can by made through the serial port(s) of the router; see also *Connection Details* on page 10 for connection details.

The communication parameters are configurable. Please refer to the protocol documentation of the appropriate communication/control protocol.

Example: The protocol parameters of the Triton Plus Compact routers are as follows:

- Bit rate: 19200 bit/s
- Data bits: 8 bits
- Stop bits: 1
- Parity: No parity

For further detail concerning this protocol, please refer to the following manual: *Compact Router Control Protocol*.

The DB9 female connector for the serial port(s) of the router has the following pinout (Table 28):

Table 28. Serial Connection Pinout

Pin #	RS-232 Mode
1	Not in use
2	Tx
3	Rx
4	Not in use
5	GND
6	GND
7	RTS
8	CTS
9	Do Not Connect!

Note If the standard RS-232 cable specification (DCE) is followed:

A cable with Male+Male or Female+Female connectors at the cable ends is used for Rx/Tx crossed connection.

A cable with Male+Female connectors at the cable ends is used for a straight through connection.

Maximum Cable Length (RS-232)

IEEE has specified the maximum cable length for an RS-232 connection to 15m. Longer distances can be installed depending on the environmental conditions of the installation site. It is the responsibility of the installer/user to secure a proper installation of the RS-232 connection.

NCB Connection

Via the Network Control Bus system, several routers and control panels can be interconnected.

Up to 16 levels of routers, or combinations of routers, can be controlled. The NCB system and all RS-232 ports interchange the system status. This means that any control system, either from Grass Valley, or from a third party manufacturer, connected to any RS-232 port in the NCB loop, will have access to all communication data on the bus.

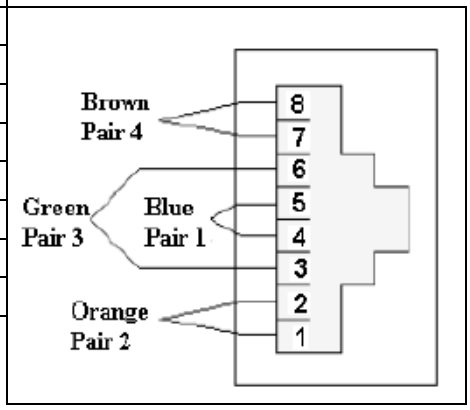
Connecting Control Panels

To get a control panel working with a specific router, configure the control panel to the same level as the router. Several panels can be configured to control the same router. Panels can also be connected to a router via the RS-232 interface. Please refer to your control panel manual for installation.

Pinout and Cable Type

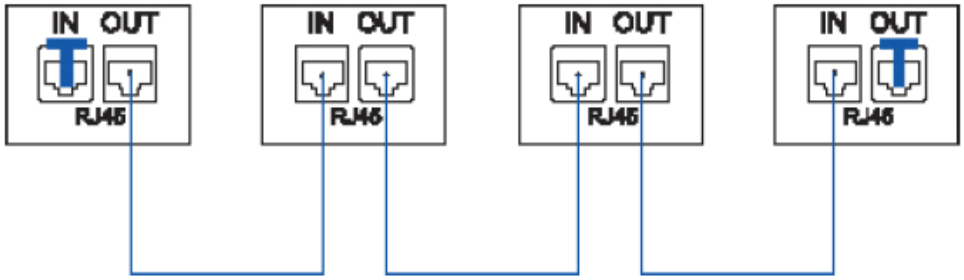
Triton Plus routers and Control Panels use RJ45 connectors for the Network Control Bus ports. The following pinout shown in Table 29 is used:

Table 29. RJ45 Connector Pinouts

Pin #	Description	Illustration
1	Not Connected	
2	Not Connected	
3	Data (router)	
4	Data	
5	Data	
6	Data (router)	
7	Not Connected	
8	Not Connected	

The following connection example (Figure 2) shows connection of four Triton Plus devices with RJ45 connectors and bus termination:

Figure 2. Four Devices Connected Together Using RJ45



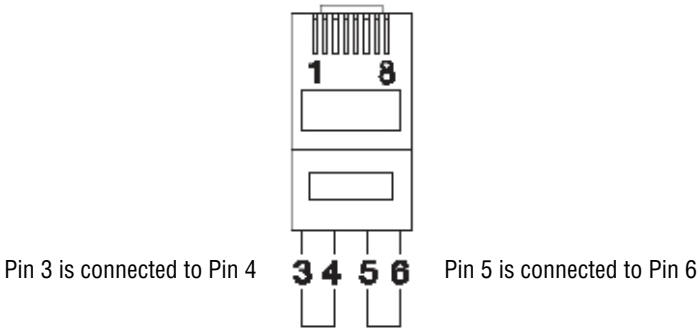
Note Each device at the end of the chain has a termination plug, indicated with the letter T. This termination plug must be inserted in the correct connection port. If not, no NCB communication is possible.

Termination Plug

The termination plug that is mentioned in the previous chapter is necessary when you want to avoid closing the loop be a (long) cable.

The termination plug is a standard RJ45 plug with the following internal wiring shown in Figure 3.

Figure 3. RJ45 Termination Plug Wiring



Control Bus Structure

The Network Control Bus structure follows the standard MIDI bus definition. The NCB is defined as a closed chain of units. This means that the NCB OUT of the last unit must be connected to the NCB IN of the first unit in the NCB chain. To avoid problems with the control of Triton Plus units the installer/user has to assure that the bus structure is installed according to this definition.

Note The total number of Triton Plus devices in an NCB chain is limited to 50.

Maximum Distance Between NCB Devices

The standard MIDI definition allows a maximum cable length of 200-250 meters between two devices. Longer distances can be made with MIDI repeater units. To avoid grounding problems all NCB ports have opto-coupled inputs.

Connecting Signal Cables to the Triton Plus Router

Video Signals

The Triton Plus Video Router offers standard 75 ohm BNC connectors for video inputs and outputs. All video inputs are terminated with 75 ohm terminations.

Control Panel Operation

Note This section is only applicable for routers with the optional local control panel.

All local control panels are given a default configuration, which includes the buttons **A/V Toggle**, **Panel Enable**, **Take On/Off**, and **Take**. In addition, **Input** and **Output** buttons are pre-configured.

Button Description

A/V Toggle

The **A/V Toggle** button enables/disables audio and video on a specified address. The address can either be read from the DIP switches or be fixed. The button toggles between three states.

Note If the button is pressed for more than 1 second, it will go into a fourth state where both audio and video are disabled.

In this state the button will be dimmed. If the button is pressed for more than 1 second again, it will enable both audio and video if present. Refer to Table 30.

Table 30. A/V Toggle Button

Button Color	Video Enabled	Audio Enabled
Yellow	Yes	Yes
Green	Yes	No
Red	No	Yes
Dimmed	No	No

If neither audio nor video is present, it will be marked as disabled and the toggle state will not be used.

Toggle status changes will be stored in flash and used when the panel is powered up later.

Panel Enable

The panel will start up in a disabled state. In this state the button will be red and all the other buttons will be disabled. When pressing the button the panel will be enabled and the color will change to green. A status request will also be sent to get information on active levels.

Take On/Off

The **Take On/Off** button enables or disables the **Take** button. On first start-up the **Take** button is enabled. Later it will read the last status from the flash memory.

Take

The **Take** buttons LED is normally off. If the **Take On/Off** button is set to on, no commands will be sent from the panel until the **Take** button is pressed. The last selected buttons and the **Take** button will blink, until the **Take** button is pressed and the command is sent from the panel.

Output

An **Output** button is used for selecting an output. Selecting an output activates it, so that it is switched to the next input that is selected.

Input

An **Input** button switches the active output to the selected input. If the **Take** button is enabled, the switch will not be executed until the **Take** button is pressed.

When switching using the **Input** button, all enabled audio- and video-levels will be switched from the selected input to the active output.

Note The **Input** button can also be used to select the active output. This is useful on single bus panels. When the panel is enabled, press the **Panel Enable** button and hold it while selecting the active output by pressing an **Input** button. Then release the **Panel Enable** button. The panel will now be disabled. Press the **Panel Enable** button again to enable it.

Specifications

Note All specifications are subject to change without notice.

Table 31. Triton Plus Analog Video Specifications

Parameter		Value
Analog Video		
Supported Formats		
	Broadcast	• Composite analog video, PAL and NTSC • Composite analog video, SECAM • Analog RGB, and • Analog YCrCb
Electrical Signals		
	Frequency response	• 100kHz to 5MHz: +0/-0.1 dB • 100kHZ to 30MHz: ±0.5dB • 0Hz to 125MHz: +0.5/-3dB
	Return loss	• >40dB @5.5MHz, 75 ohm BNC • >35dB @10MHz
	Output DC offset error	< 15mV DC
	Gain	0dB ±0.1dB
	Crosstalk	<-60dB up to 5MHz
	Differential gain	• <0.1%, for routers up to 16x16 • <0.2%, for 32x32 and 64x64 routers
	Bar tilt	<0.1%
	Lum. non-linearity	• <0.1%, for routers up to 16x16 • <0.2%, for 32x32 and 64x64 routers
	Video s/n	>70dB, unweighted
	Max signal level	> 2V p-p
	Delay difference, any input to one output	< ±1nsec
	Connector	75 ohm BNC female
	Impedance	75 ohm nominal
Reference Inputs		
	Connector	75 ohm BNC female, loop-through
	Return loss	• > 40dB (100kHz to 5MHz) • > 35dB (5 to 10MHz
	Signal format	NTSC or PAL Black Burst
	Signal level	Nominal 1.0V p-p
	Switching field	Field 1
	Timing	• PAL: 30us ±5us after Hsync in Line 6 • NTSC: 30us ±5us after Hsync in Line 10

Table 31. Triton Plus Analog Video Specifications

Parameter	Value
Power Supply	
TPS-PWR-40	40W power supply unit for 8x8 to 32x32
TPS-PWR-90	90W power supply unit for 64x64 versions
AC supply voltage range	• 100-240VAC, 50-60Hz • Max 1.6A (TPS-PWR-40)/max 3W (TPS-PWR-90)
AC mains connector	IEC 320
DC output	• +15V, max. 2.2A/-15V, max 1.35A. Maximum 43W for 8x8–32x32 versions • +15V, max. 4A/-15V, max 2.5A. Maximum 90W for 64x64 versions
DC connector	DB9, female
Status monitoring	Via LED in front of router/CP
Control	
Standard Features	
Serial port	RS-232 for protocol conversion, to Triton Plus compact control protocol, or to 3rd party protocols
Connector	DB9, female
NCB ports	For integration with Triton Plus compact router configuration
Connectors (2)	RJ45 (1 in/1 out)
Ethernet	10/100baseT Ethernet is not supported at this time
Connector	RJ45
Synchronization	• Analog Black Burst, Looped; Both PAL and NTSC supported • Tri-level, Looped; For HD signal formats only • Distribution of synchronization signals between several routers
Connector(s)	BNC
Optional Features	
Control panel	• Optional, built-in control panel available • External control panels available
Environmental	
Equipment will meet guaranteed performance specifications under the following conditions:	
Operating room temperature range	0^{o} C to 45^{o} C
Operating relative humidity range	< 95% (non-condensing)
Equipment will operate without damage under the following conditions:	
Temperature range	-10^{o} C to 55^{o} C
Relative humidity range	< 95% (non-condensing)
Mechanical	
Dimensions	• HxWxD = 44x483x50mm (19 in., 1 RU) • HxWxD = 88x483x50mm (19 in., 2 RU) • HxWxD = 176x483x50mm (19 in., 4 RU)
Safety/Emission standards	Compliant with CE EN55103-1 and 2