

Triton Plus

PORTED RS-422 DATA ROUTER

User Manual

Revision 5

JANUARY 2009



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

Weierstadt, Germany
Brunnenweg 9
D-64331 Weierstadt
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



Triton Plus

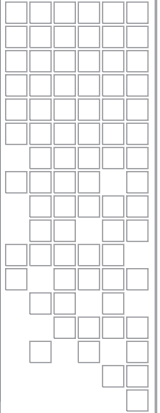
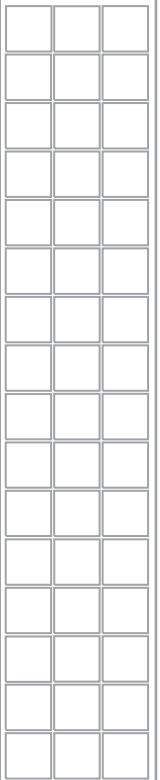
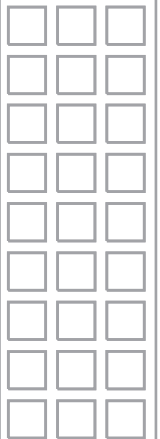
PORTED RS-422 DATA ROUTER

User Manual



Revision 5

JANUARY 2009



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		

Copyright © Thomson. All rights reserved.

This product may be covered by one or more U.S. and foreign patents.

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.



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



Contents

- Triton Plus Ported RS-422 Data Routers** 7
 - Product Overview 7
 - Connection Details 8
 - Power Supply Pinouts 9
 - Configuration 10
 - Configuration Switches 10
 - Audio/Video Mode 11
 - D1616 Mode 11
 - Power Alarm 11
 - Power Up Mode 12
 - Router Orientation 12
 - LED Status 14
 - Alarm States 14
 - Router Communication 15
 - Serial Connection 15
 - Maximum Cable Length (RS-232) 16
 - NCB Connection 16
 - Connecting Control Panels 16
 - Pinout and Cable Type 16
 - Termination Plug 17
 - Control Bus Structure 18
 - Maximum Distance Between NCB Devices 18
 - Connecting RS-422 Signal Cables To Data Router 19
 - Applications 20
 - Dynamic 20
 - Fixed 20
 - Specifications 21

Triton Plus Ported RS-422 Data Routers

Product Overview

Professional broadcast installations often include a number of tape recorders and other devices that require RS-422 machine control for remote operation. To meet these requirements, Thomson Grass Valley introduces the Triton Plus TPS-D32P Ported Data Router.

Complex installations, cable cost and system design is kept at a minimum.

Where user friendliness and operational flexibility is appreciated, the TPS-D32P will fit in perfectly.

The Ported Data Routers are bi-directional ports rather than XY. A traditional 32x32 router will have a total of 64 connectors (32 in/32 out). A ported 32 Router will have a maximum of 32 connectors, all configurable to be operated either as Controller or Device.

In the TPS-D32P Ported Data Router the terms Controller and Device are used instead of In/Out, Source/Destination. I.e. a Ported Data Router Controller can be both signal Source or Destination.

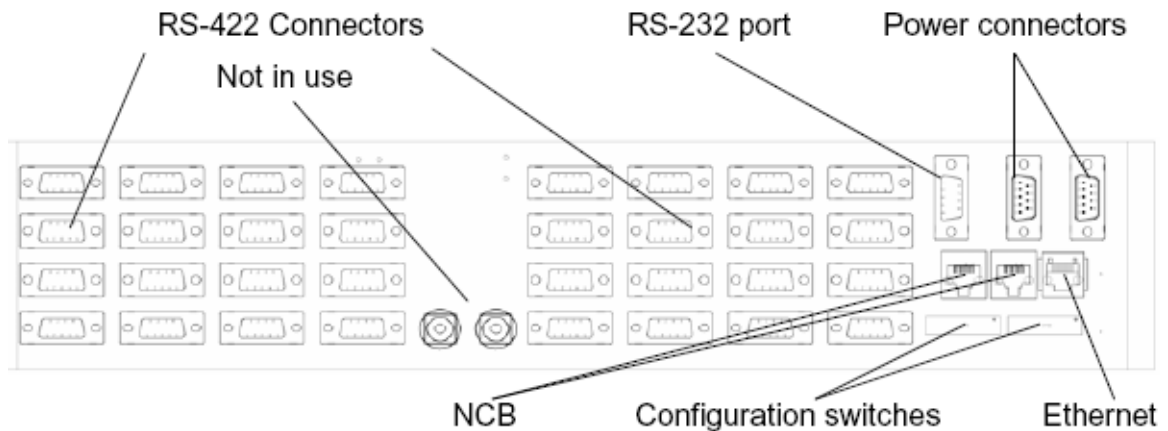
All ports are coupled according to SMPTE-207M machine control standard.

Connection Details

Available ports and connectors at the back of the Triton Plus TPS-D32P data router are shown in [Figure 1](#) and listed below:

- **RS-422 connectors:** 32 device connectors
- **RS-232 Port:** RS-232 for external control
- **Power Connectors**
 - **A:** ±15VDC power input
 - **B:** ±15VDC power input, redundant supply
- **NCB**
 - **IN:** Network Control Bus input
 - **OUT:** Network Control Bus output
- **Configuration switches:** DIP switches for configuration settings
- **Ethernet:** Not used at this time.

Figure 1. Triton Plus TPS-D32P Ports and Connectors



Power Supply Pinouts

The DB9 power pinouts for Triton Plus routers and control panels are given in [Table 1](#).

Table 1. 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

It is possible to use the router out-of-the-box. Changes to the factory settings can be set with the DIP switches found in the back of the router.

As factory setting, the TPS-D32P is shipped with Dynamic ports. This means every port can be controller or device depending on the connected equipment.

Configuration Switches

You will find 2x10 DIP switches on the backplane of the router (see [Figure 1 on page 8](#)).

Switches 1 - 4 set the router Level and the Physical Address for this unit. By setting routers and Control Panels on same level, routers can be controlled as one, i.e. Audio-follow-Video.

Panels in a NCB loop must be configured to the same level as the router(s).

The Levels/Physical Addresses can be set according to the following pattern given in [Table 2](#). The default level is 1.

Table 2. Levels and Physical Addresses Switch Patterns

SW 1	SW 2	SW 3	SW 4	Level	Physical 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

Audio/Video Mode

The TPS-D32P router can be assigned to either the video level or the audio level of a router system, selectable with switch **SW 5** on the configuration switch. If you're using the Data Router in an Audio-follow-video setting, the Data Router can be set as Video, giving an Audio-follow-Data function. Breakaway is also possible with this set-up. [Table 3](#) gives the settings for SW 5. The Default mode is **Off**.

Table 3. Audio/Video Modes – SW 5

SW 5	Router Mode
Off	Controlled as Audio
On	Controlled as Video

D1616 Mode

If The TPS-D32P Ported Data Router is to be configured as a D1616 router, this DIP switch (**SW 6**) must be ON. The TPS-D32P will then be configured as 16 inputs (1-16) and 16 outputs (17-32) and will be identical with the existing Triton Plus D1616 Data Router. [Table 3](#) gives the settings for **SW 6**. The Default mode is **Off**.

Table 4. D1616 Mode – SW 6

SW 6	D1616 Mode
Off	TPS-D32P mode
On	D1616 mode

Power Alarm

The Power Alarm is set with DIP switch **SW 7**. When using a redundant power supply, the power alarm should be ON. If only one power supply is connected, this DIP must be off. Settings are shown in [Table 5](#). The default mode is **Off**.

The TPS-D32P will give an alarm and the front LED will blink red when one of the power supplies connected fails.

Table 5. Power Alarm Settings – SW 7

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

Power Up Mode

Switch **SW 8** on the configuration switch defines the power up mode. The TPS-D32P router provides two modes for powering up the system:

- **Mode 1** switches all ports as disconnected.
- **Mode 2** switches all ports according to the latest setting buffered in the router's processor system.

Settings for **SW 8** are given in [Table 6](#). The default mode is **Off**.

Table 6. Power up Settings – SW 8

SW 8	Power Up Mode
Off	Mode 2
On	Mode 1

Router Orientation

Crosspoint commands in control protocols are using source and destination when controlling routers. This must be mapped to ports in the router. When controlling RS-422, every port is bi-directional and includes both a source and a destination. The mapping is different in D1616 mode and TPS-D32P mode.

Router Orientation in TPS-D32P Mode

By default, the router is destination oriented (**SW 9** DIP is OFF). A bi-directional connection is made between the two ports. If both ports are configured as dynamic, the port referred as source will be used as a controller and the port referred as destination will be used as a device.

When the router is source oriented (**SW 9** DIP is ON) the mapping is different. If both ports are configured as dynamic, the port referred as source will be used as a device and the port referred as destination will be used as a controller. This makes it possible to use a single-bus panel to select one-of-several machines to control from a single location.

Router Orientation in D1616 Mode

In D1616 mode all ports are fixed, port 1-16 as controllers and port 17-32 as devices. The control system will see the router as a 16x16 matrix. When the router is destination oriented, destinations 1-16 are mapped to ports 17-32 while sources 1-16 are mapped to ports 1-16.

When the router is source oriented, destinations 1-16 are mapped to ports 1-16 while sources 1-16 are mapped to ports 1-16. As in TPS-D32P mode this makes it possible to use a single-bus panel to select one-of-several machines to control from a single location.

Switch **SW 9** on the configuration switch defines the router orientation as shown in [Table 7](#). The default setting is **Off**.

Table 7. Router Orientation Settings – SW 9

SW 9	D1616 Mode
Off	Destination oriented
On	Source oriented

Future Use

Switches 10 -17 are currently not in use.

Ext Address

Switches 18 -20 are currently not in use.

LED Status

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 8](#) 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 8. 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 the router for communication purposes by connecting the router's serial port to your computer.

Serial Connection

Connection can be made through the serial port(s) of the router; see also [Connection Details on page 8](#) 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 9](#)):

Table 9. 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 15 meters. 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

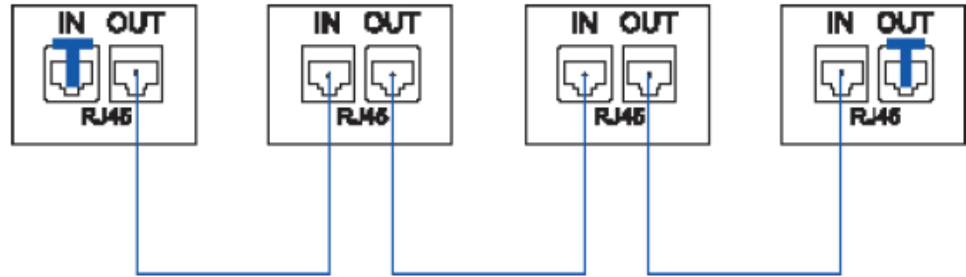
Triton Plus routers and Control Panels use RJ45 connectors for the Network Control Bus ports. The following pinout shown in [Table 10](#) is used:

Table 10. RJ45 Connector Pinouts

Pin #	Description	Illustration
1	Not Connected	
2	Not Connected	
3	Data (return)	
4	Data	
5	Data	
6	Data (return)	
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



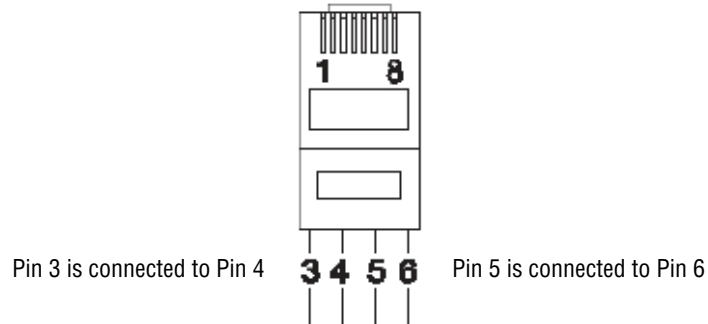
Note Each device at the end of the chain has a termination plug, indicated with the letter T. This termination plug must be inserted in the correct connection port. If not, no NCB communication is possible.

Termination Plug

The termination plug that is mentioned in the previous section is necessary when you want to avoid closing the loop with 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 RS-422 Signal Cables To Data Router

All router ports on the TPS-D32P are coupled in accordance to the SMPTE-270M standard. This is the broadcast standard for RS-422 machine control.

Refer to [Table 11](#) for pin connections.

Table 11. RS-422 Signal Connections

Device		Controller	
Pin # 2	Tx-	Pin # 2	Rx-
Pin # 3	Rx+	Pin # 3	Tx+
Pin # 4	GND	Pin # 4	GND
Pin # 5	Future use	Pin # 5	Future use
Pin # 6	GND	Pin # 6	GND
Pin # 7	Tx+	Pin # 7	Rx+
Pin # 8	Rx-	Pin # 8	Tx-

The RS-422 connectors on the rear of each unit are arranged as given in [Table 12](#):

Table 12. RS-422 Connector Arrangement

1	5	9	13	17	21	25	29
2	6	10	14	18	22	26	30
3	7	11	15	19	23	27	31
4	8	12	16	20	24	28	32

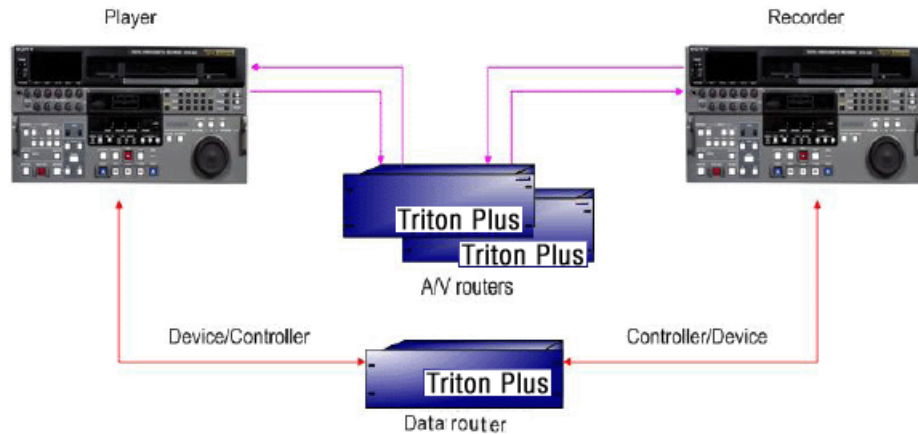
Applications

Dynamic

The first example (Figure 4) shows how to connect two Video Tape Recorders (VTRs) with traditional AV Routers for signal transport and a TPS-D32P Ported Data Router for RS-422 Machine Control.

Both VTRs can be used as Player or Recorder depending on their local/remote setting.

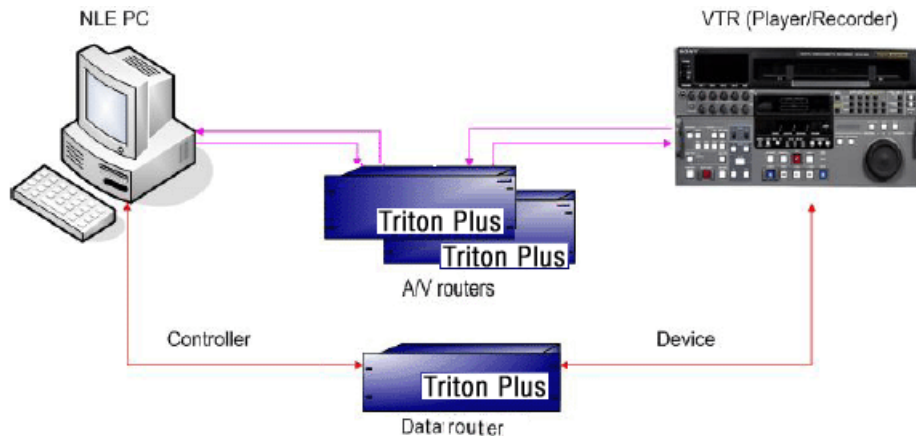
Figure 4. Dynamic Application Example



Fixed

The second example (Figure 5) shows a VTR and NLE Computer (i.e. NLE=Non-Linear Editor). The units can both be Player or Recorder for audio and video, while the Computer is Controller (Master) and always controlling the device/VTR (Slave). This leaves RS-422 Machine Control Data to always operate in one mode, **Fixed**.

Figure 5. Fixed Application Example



Specifications

Note All specifications are subject to change without notice.

Table 13. Triton Plus Ported RS-422 Data Router Specifications

Parameter	Value
Router	
Signal type	RS-422 data
Data rate	115200 kbps
Connector	DB9 pin female, according to SMPTE-207M
AC power	External power supplies 100-260VAC
Maximum power consumption	<20W
Mechanical	
Dimensions	483 x 45 mm (19 in., 2RU)
Safety/Emissions standards	Compliant with CE EN55103-1 and 2, FCC part 15
Power Supply	
TPS-PWR-40	40W power supply unit Triton Plus router series
AC supply voltage range	100-240VAC, 50-60Hz, max 1.6A
AC mains connector	IEC 320
DC output	+15V, max. 2.2A/-15V, max 1.35A. Maximum 43W
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	1 in/ 1 out
Connectors (2)	RJ45
Ethernet port	10/100BaseT Ethernet is not supported at this time
Connector	RJ45
Optional Features	
Control panel	External control panels available
Environmental	
Equipment will meet guaranteed performance specifications under the following conditions:	
Operating room temperature range	0° C to 45° C
Operating relative humidity range	< 95% (non-condensing)
Equipment will operate without damage under the following conditions:	
Temperature range	-10° C to 55° C
Relative humidity range	< 95% (non-condensing)

