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## REVISION HISTORY

<u>REVISION</u>	<u>DESCRIPTION</u>	<u>DATE</u>
1.0	First release	Sep 2016
1.1	Added notes, fixed GPI/GPO drawings. Firmware 1.00 b182	Dec 2016
1.2	Firmware 1.00 b182	Jan 2017

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Although every attempt has been made to accurately describe the features, installation and operation of this product in this manual, no warranty is granted nor liability assumed in relation to any errors or omissions unless specifically undertaken in the Evertz sales contract or order confirmation. Information contained in this manual is periodically updated and changes will be incorporated into subsequent editions. If you encounter an error, please notify Evertz Customer Service department. Evertz reserves the right, without notice or liability, to make changes in equipment design or specifications.

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## 1 OVERVIEW

The 7800TR-32X24 is a Tally Router module that is housed in a 7700FR or 7800FR MultiFrame. It provides an Ethernet-controlled interface for 32 General Purpose Outputs (GPOs) and 24 General Purpose Inputs (GPIs). All General Purpose I/O (GPIO) are provided on two, 62-pin high density D-Sub connectors on the rear plate. A gigabit 1000baseT Ethernet connection is used to configure and control the unit.

The unit is configured with SNMP using the VistaLINK™ software. Advanced features such as edge triggering on inputs, and variable-length pulse outputs are easily setup with the graphical user interface. Each input or output can be set to normal logic (normally-open) or inverted logic (normally-closed). In addition, the state of the inputs and outputs can be monitored or changed manually for debugging purposes.

The Tally Router provides wet power on both of the rear 62-pin D-Sub connectors. This can be used to power passive devices (tally lights, buttons, buzzers, etc) and to simplify wiring to GPIs and GPOs. The wet power can be configured to come from either a 5V or 12V internal power source.

The MAGNUM control system with the MAGNUM-TALLY software module integrates the GPI and GPO from the Tally Router into a single unified interface. The GPI and GPO of the Tally Router are represented graphically as a virtual tally pin grid. Each GPI and GPO signal is given a source and destination name. Custom triggers and behaviors can be easily setup to activate tally lights on cameras, trigger Under Monitor Displays (UMDs), activate switchers, replay and record systems, and more.

The 7800TR-32X24 occupies two slots in a 7700FR or 7800FR multiframe. The rear plate contains all I/O connectors and is fixed to the rear of the frame. The 7800TR-32x24 module is hot-swappable from the front of the frame. This means the module can be removed and re-inserted without disconnecting the rear plate or any of the cabling.



**Figure 1-1: 7800TR-32x24 with Accompanying Rear I/O Module (Rear plate)**

**Features & Benefits:**

- 32 General Purpose Outputs and 24 General Purpose Inputs on rear 62-pin D-Sub connectors.
- Wet power source selectable between internal 5V and 12V power sources.
- General Purpose Inputs are protected by optoisolators. Wide voltage range up to 24V.
- General Purpose Outputs are protected by polyfuses.
- Can configure General Purpose Inputs for edge, high, or low triggering.
- Can configure General Purpose Outputs as pulse or steady outputs.
- All General Purpose I/O can be setup as normal (normally-open) or inverted (normally-closed).
- Available 7800TR-BHP bulkhead panel to breakout rear GPIO.
- Gigabit Ethernet & Serial ports for SNMP configuration and Quartz Protocol control.

## 2 SPECIFICATIONS

### 2.1 REAR GENERAL PURPOSE INPUTS

<b>Number of GPIs:</b>	24
<b>Connectors:</b>	2 x D-Subminiature DC-62 female sockets, each with 12 GPI
<b>Maximum Voltage:</b>	+/- 24 Volts DC
<b>Protection:</b>	Current limit, approximately 10mA – 15mA.
<b>Wet Power:</b>	Provided on +WET and –WET pins (isolated from chassis ground)
<b>Timing:</b>	GPI trigger to “.UV” Quartz protocol Ethernet packet transmission: 2ms – 30ms

### 2.2 REAR GENERAL PURPOSE OUTPUTS

<b>Number of GPIs:</b>	32
<b>Connectors:</b>	2 x D-Subminiature DC-62 female sockets, each with 16 GPO
<b>Maximum Voltage:</b>	+/- 24 Volts DC
<b>Protection:</b>	Polyfuse, 0.15 Amps maximum
<b>Wet Power:</b>	Provided on +WET and –WET pins (isolated from chassis ground)
<b>Timing:</b>	GPO relay closure upon receipt of “.SA” Quartz protocol command: < 2ms

### 2.3 ETHERNET PORT

<b>Network Type:</b>	Gigabit Ethernet 1000Base-T IEEE 802.3z
<b>Connector:</b>	RJ-45
<b>SNMP Standard:</b>	SNMP v1 compliant (RFC-1157, RFC-1213)

### 2.4 ELECTRICAL

<b>Voltage:</b>	+ 12V DC
<b>Power Consumption</b>	
<b>Wet Power Off:</b>	10 watts typical (Wet power not being used)
<b>Wet Power On:</b>	50 watts max (internal 5V or 12V power being used)
<b>EMI/RFI:</b>	Complies with FCC regulations for class A devices. Complies with EU EMC directive.

### 2.5 PHYSICAL

<b>Number of Slots:</b>	2
<b>Enclosures:</b>	
<b>7700FR-C:</b>	200W 3RU Multiframe – holds up to 15 single slot modules.
<b>7800FR(-QT):</b>	360W 3RU Multiframe with genlock – holds up to 15 single slot modules.
<b>350FR:</b>	160W 3RU Portable Multiframe – holds up to 7 single slot modules.
<b>7801FR:</b>	100W 1RU Multiframe – holds up to 4 single slot modules.
<b>Operating Temperature:</b>	0°C to +40°C (32°F to 104°F) ambient

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### 3 INSTALLATION

#### 3.1 REAR PANEL

Figure 3-1 is an illustration of the rear plate I/O module that accompanies the 7800TR-32x24. The rear plate occupies two slots in a 7700FR multiframe. There are two female high-density 62-pin D-Sub connectors for the 32 general purpose outputs, 24 general purpose inputs, and wet voltage. There is also a gigabit Ethernet jack for configuration and control. Install the rear plate onto the rear of the multiframe in a free location of your choice. Secure the rear plate using the four provided M2.5 x 8mm screws. Take note of the two slot numbers the rear plate occupies.

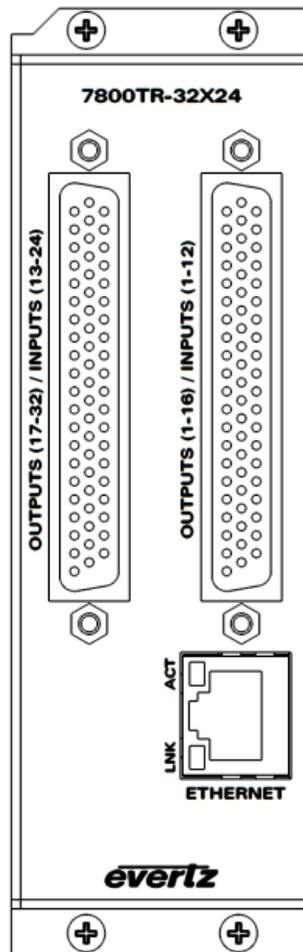


Figure 3-1: 7800TR-32x24 Rear Plate

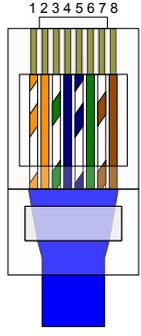


A ribbon cable joins the two boards inside the rear plate. When installing the rear plate into a frame, take care that this ribbon cable does not become dislodged at either end or pinched against the frame metal.

### 3.2 ETHERNET CONNECTION

The 7800TR-32x24 is equipped with a Gigabit Ethernet port. It can be used with either 100base-TX (100 Mbps) or 1000base-T (1 Gbps) twisted pair Ethernet networks. Category 5e UTP cable or better is required with a maximum length of less than 100 meters (328 feet). The cable must be “straight through” with an 8-pin modular connector at each end. Make the network connection by plugging one end of the cable into the tally router and the other end into an Ethernet hub or switch.

The straight-through Ethernet cable can be purchased or can be constructed using the pinout information in Table 3-1. A color code wiring chart is provided in Table 3-1 for the current Ethernet standards (AT&T 258A or EIA/TIA 258B color coding shown). Also refer to the notes following the table for additional wiring guide information.

	Pin#	EIA/TIA 568A	AT&T 258A or EIA/TIA 568B	100Base-TX	1000Base-T
1	1	White/Green stripe	White/Orange stripe	Transmit +	TxRx A+
2	2	Green	Orange	Transmit -	TxRx A-
3	3	White/Orange stripe	White/Green stripe	Receive +	TxRx B+
4	4	Blue	Blue	Not Used (required)	TxRx C+
5	5	White/Blue stripe	White/Blue stripe	Not Used (required)	TxRx C-
6	6	Orange	Green	Receive -	TxRx B-
7	7	White/Brown stripe	White/Brown stripe	Not Used (required)	TxRx D+
8	8	Brown	Brown	Not Used (required)	TxRx D-

**Table 3-1: Standard 8-pin Modular Connector Wiring Color Codes**

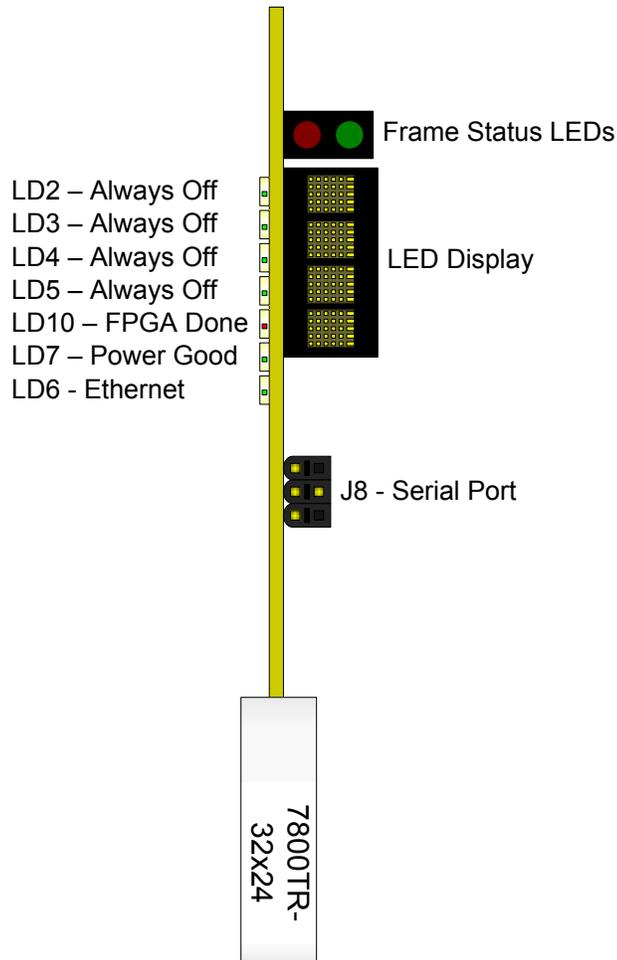
The gigabit Ethernet port has two green LEDs marked “LNK” and “ACT”. The “LNK” LED will illuminate green when the connection speed is 1000base-T and will be off for 100base-T. The “ACT” LED will blink green with Ethernet activity. The Ethernet standard mandates auto-negotiation so crossover cables are no longer required. The initial TCP/IP settings of the unit can be set through the configuration serial port.



**The current firmware (v1.00 b182) does not support 10baseT link speeds. The link may come up, but no data will be transmitted.**

### 3.3 CARD EDGE

The front card edge of the module can be accessed by opening the frame door. There are several diagnostic LEDs and a card edge serial port connection. This serial port is used to set the initial configuration of the card and can also be used for debugging.



**Figure 3-2: Card Edge LEDs and Serial Port**

#### 3.3.1 LED Indicators

Most of the small LED indicators are currently reserved for factory use.

LD7 indicates the power status of the card. This LED should always be illuminated Green. If it is off, this indicates a problem with the power supply of the card.

LD10 should always be off during normal operation. If this LED is Red, this indicates that the card is not booting properly.

LD6 will illuminate Green where there is no Ethernet link. It should be off under normal operation.

### 3.3.2 Card Edge Serial Port

The 4-pin header at the card edge (J8) contains a serial port that must be used to set the IP address of the card. This requires an Evertz WA-S76 rainbow cable, also known as a 7700 Upgrade Cable. This cable is shipped with every Multiframe and is common to all 7700/7800 modular cards.



Figure 3-3: 7700 Upgrade Cable Picture (WA-S76)

7800TR-32x24 (J8) End 2 row x 3 pin Berg	Pin	6 Conductor Ribbon	PC End (RS-232)	
			9 pin D-Sub Female	Pin
Reserved	1	Brown	---	-
KEY	2	Red	---	-
Ground	3	Orange	Ground	5
Rx	4	Yellow	Tx	3
Tx	5	Green	Rx	2
KEY	6	Blue	---	-

Table 3-2: 7700 Upgrade Cable Wiring (WA-S76)

Connect the rectangular 3x2 pin connector of the WA-S76 cable to the card edge connector J8. The connector is keyed so that it will only go on one way. Connect the 9-pin female D-Sub connector to a COM port on a laptop or PC. You will need to start a terminal program such as Hyperterminal or Teraterm, and open the respective COM port. Configure the COM port settings as follows:

Baud	<b>115200</b>
Data Bits	<b>8</b>
Parity	<b>None</b>
Stop Bits	<b>2</b>
Flow Control	<b>None</b>

Table 3-3: COM Port Settings

The card edge serial port is used for configuration, debug, and for upgrading the firmware on the card. Press ENTER in the terminal program and a “CLI>” prompt will be displayed. It is not recommended to play around with the command line interface unless under direction of Evertz customer support. The following commands may be used to configure, upgrade, or find information about the unit:

<b>Command</b>	<b>Description</b>
<b>ver</b>	Will display hardware and software version of the tally router
<b>ifconfig</b>	Used to configure the TCP/IP settings for the Ethernet port. Enter on one line: <code>ifconfig 0 inet [IP] netmask [SUBNETMASK] broadcast [BROADCAST] gateway [GATEWAY]</code>
<b>reset</b>	Will reboot the unit (in order to perform a serial software upgrade)

**Table 3-4: Command Line Interface Commands**

### **3.3.3 Frame Status LEDs**

These two LEDs indicate the overall health of the card. During normal operation the Green LED will be on, and the Red LED will be off. If the Green LED is off or the Red LED is on, this indicates a problem with the card. This fault condition can trigger the global frame status if jumper J15 is placed in the FAULT position. This will cause the Frame Status LEDs on the power supply of the frame to turn Red, and will also cause the GROC connection on the back of the frame to go into the fault position. A triggered frame status can also be detected by the frame controller, if one is installed in the frame.

### **3.3.4 LED Display**

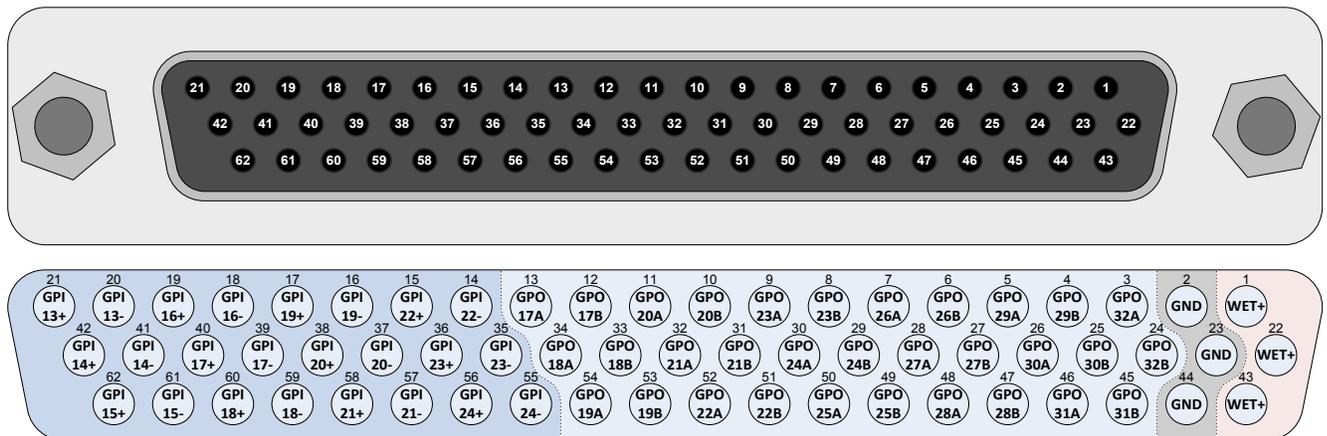
The dot matrix LED display is used to display the product name (7800TR-32x24), and also the current firmware version and build, as well as the currently configured IP address. These three pieces of information will scroll alternately across the display.

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### 3.4 REAR GENERAL PURPOSE INPUTS/OUTPUTS

There are two 62-pin Female D-Sub connectors on the rear plate of the unit. These contain the 32 General Purpose Outputs (GPOs) and 24 General Purpose Inputs (GPIs). There are also power pins for wet voltage and ground. The pinouts are shown below in Figure 3-4. Each unit ships with two 62-pin male D-Sub connectors (Assmann A-HDS 62 LL/Z) and backshells (FCI 8655MH3701BLF) to allow creation of custom cables.

## OUTPUTS (17-32) / INPUTS (13-24)



## OUTPUTS (1-16) / INPUTS (1-12)

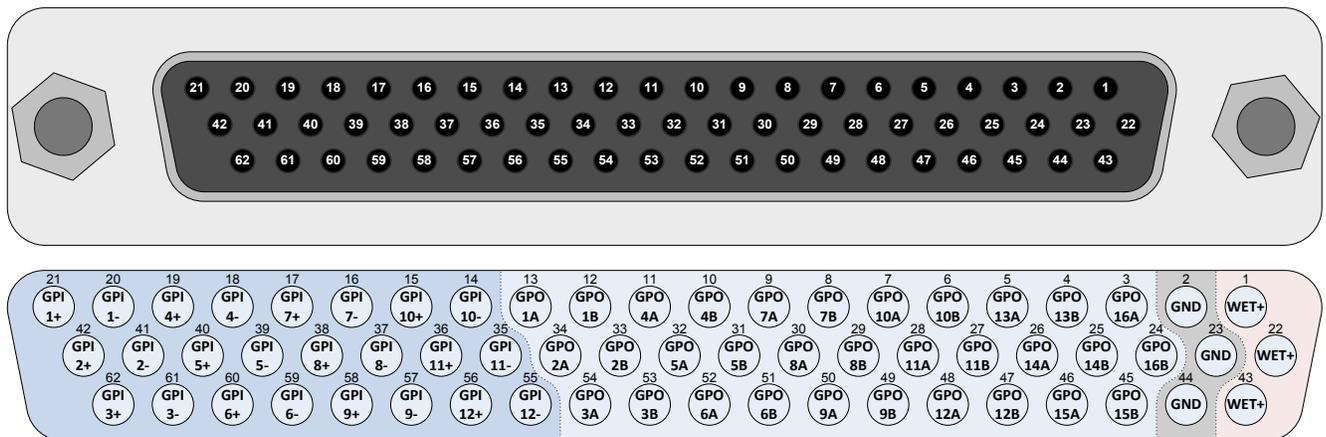
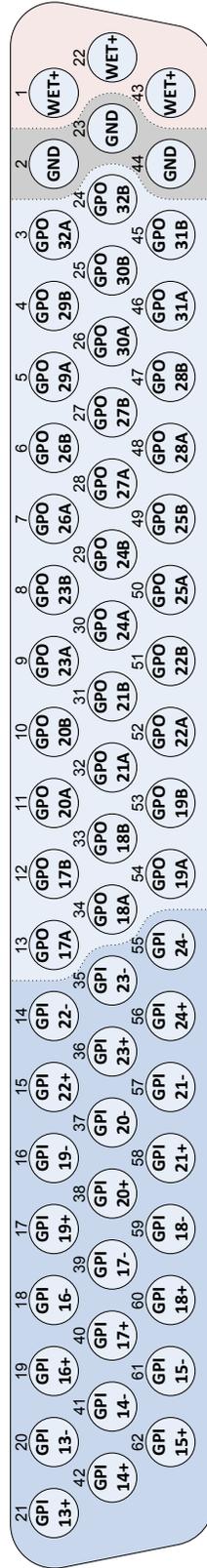
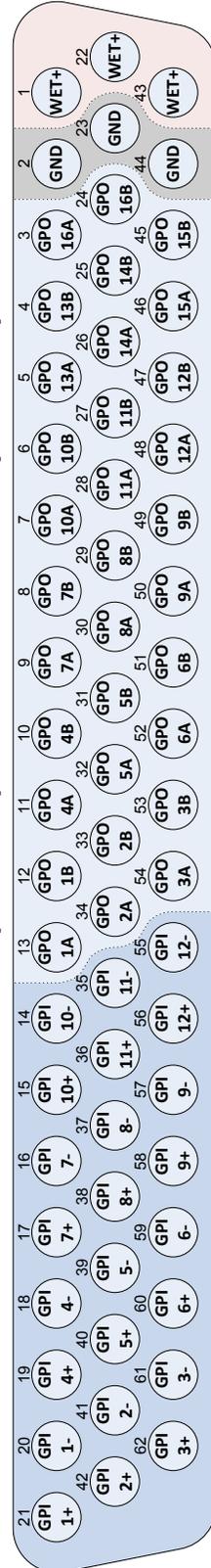


Figure 3-4: Rear Plate 62-pin D-Sub Connectors Pinouts

## OUTPUTS (17-32) / INPUTS (13-24)



## OUTPUTS (1-16) / INPUTS (1-12)



### 3.5 GENERAL PURPOSE INPUTS

There are 24 General Purpose Inputs (GPIs) available on the two 62-pin D-Sub connectors on the rear plate. The GPIs are “wet” meaning they need external voltage to function. The GPI ports are used to read the tallies (GPOs) from products such as a vision mixer (production switcher). The pinout of these connectors is shown in Figure 3-4.

Note that the GPI inputs are polarity sensitive. The circuit diagram is shown in Figure 3-5 and the electrical specifications are in Table 3-5 and also in Section 2.1. The GPI input is protected by a current source which limits the current into an optoisolator. The optoisolator is used to protect the tally router’s internal circuitry, and also to isolate the GPIs from each other. If more than +/- 24 volts is applied to a GPI it may become damaged but the damage will be isolated to the particular GPI.

The selected Wet Power source is available on three pins of each D-Sub connector as WET+ and GND. This wet power can be used to wire the GPIs as “Dry”. Please see Section 3.8 for more information on the wiring and the Wet/Dry terminology.

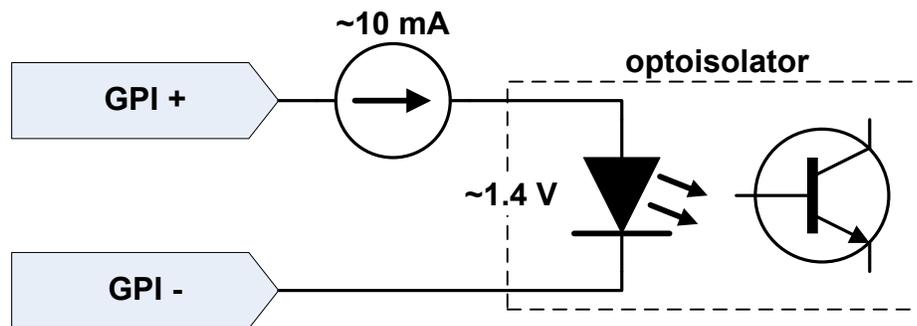


Figure 3-5: Rear GPI Input Schematic

Maximum GPI Voltage	+24 Volts DC
Maximum Reverse GPI Voltage	-24 Volts DC
Voltage to Turn GPI On	> +2.0 Volts
Voltage to Turn GPI Off	< +1.0 Volts
GPI Current Limiting	~10mA @ +5V
	~12mA @ +12V
	~15mA @ +24V

Table 3-5: Rear GPI Input Electrical Specifications



**Do not apply a voltage higher or lower than the maximums or the GPI may be permanently damaged.**

### 3.6 GENERAL PURPOSE OUTPUTS

There are 32 General Purpose Outputs (GPOs) available on the two 62-pin D-Sub connectors on the rear plate. The rear GPOs are “Dry”. The GPOs can be used to activate tally lights or send triggers to equipment such as the Evertz VIP multiviewers, switchers, and keyers. They can also be used to drive camera tally lamps. The pinout of these connectors is shown in Figure 3-4.

The General Purpose Outputs are not polarity sensitive. Each GPO has two pins marked “A” and “B”. The GPO consists of an isolated relay contact. When the GPO is closed, the two contacts “A” and “B” will be electrically connected to each other. See Figure 3-6 for the circuit diagram of a GPO. The GPO specifications are listed in section 2.2.

Each GPO is protected against excessive current with a polyfuse. Polyfuses operate by means of thermal limiting. The maximum allowable current is shown in Table 3-6. If excessive current is applied to the GPO the polyfuse will heat up and open. This process happens very quickly if the current is high but may take hours if the current is only a little above the maximum. When the polyfuse opens, it immediately begins to cool and will eventually reset on its own. If the fault is not removed, the process will repeat itself any may cause a “strobing” effect on some load devices connected to the GPO.

The currently selected Wet Power source is available on three pins of the D-Sub connector. The **WET+** voltage can be used to wire the GPOs as “Wet”. Please see section 0 for more information.

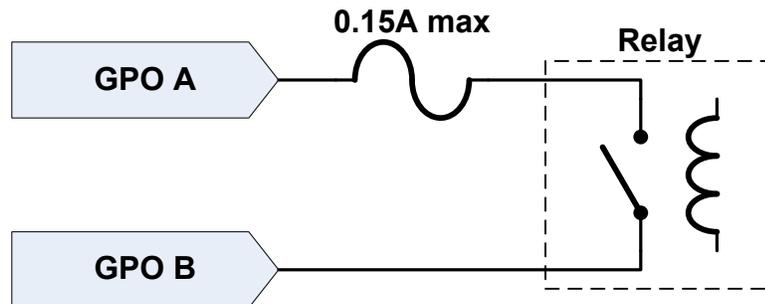


Figure 3-6: Rear General Purpose Output Circuit Diagram (Dry)

Maximum Current	0.15 Amps
Maximum Voltage	+/- 24V DC
Closed Contact Resistance	< 3.0 Ω

Table 3-6: Rear General Purpose Output Electrical Specifications



**Do not exceed the maximum voltage specified or the GPO may be damaged.**

### 3.7 WET POWER

The 7800TR-32X24 has wet power sources that are available on the two D-Sub connectors on the rear plate. They can be used to provide voltage to GPIs and GPOs. This allows the GPIO to be either powered or unpowered depending on the requirements of the equipment that needs to be interfaced to (see section 0). This wet power source is available on the **WET+** and **GND** pins.

The tally router's wet power is software-selectable between two sources:

<b>Wet Power Source</b>	<b>Description</b>
+5V	The internal +5V power will be connected to <b>WET+</b> . The <b>GND</b> pins act as the return (chassis ground).
+12V	The internal +12V power will be connected to <b>WET+</b> . The <b>GND</b> pins act as the return (chassis ground).

**Table 3-7: Wet Power Source Selections**

The wet power source **WET+** is protected by a 1.5 Amp polyfuse, no matter which voltage source is selected. Care must be taken to limit the cumulative **WET+** current draw out of the rear D-Sub connectors to 1.5 Amps or less.

If more current than the maximum is drawn, to the WET voltage polyfuse will heat up and open. This process happens very quickly if the current is high, but could take hours if the current is only a little above the maximum. When the fault is removed the polyfuse will begin to cool and will eventually reset on its own. Note that with some types of faults this heating/cooling (fault/reset) process can happen repeatedly, causing a "strobing" effect on the WET power to the load.



**After changing the wet power source, allow 30 seconds for the setting to save before rebooting or removing power from the card.**

### 3.8 GENERAL PURPOSE I/O MODES

The 7800TR-32X24 tally router is designed to have flexible General Purpose I/O to allow them to be used for a wide range of purposes such as illuminating lamps, and reading the state of switches. The GPIs and GPOs can be hard-wired in Wet or Dry mode to interface with both powered and unpowered devices using the provided WET voltage pins. The GPIs have a wide voltage range and high sensitivity (see Table 3-5). The GPO relay contacts can support a relatively high current flow (see Table 3-6).

#### 3.8.1 Tally Wet and Dry Terminology

The Tally Router is named after the most common use which is driving tally lights on cameras. In a live recording studio with multiple cameras, each camera has a tally light which indicates it is the one that is currently being broadcast. The director sends commands to switch between the cameras. The main video router switches the video feed between the cameras, and the tally router follows by switching the corresponding tally light GPOs.

Throughout this manual the “wet” and “dry” terminology is used to describe whether a GPO and GPI provides/requires an external voltage source to operate. This terminology is arcane and confusing outside its narrow scope of usage. The term “Wet” means that voltage is present and “Dry” means no voltage, **always from the perspective of the output port** (General Purpose Output).



When connecting a GPO to a GPI, remember “**Wet**” to “**Wet**” and “**Dry**” to “**Dry**”. Never connect “**Wet**” to “**Dry**” or vice-versa.

A General Purpose Output has two contacts marked “A” and “B”. A “Dry” GPO opens these two contacts when OFF, and closes them when turned ON. No voltage is supplied. A “Wet” GPO provides **+WET** voltage when it is activated in order to provide power to a downstream device such as a light bulb, buzzer, or Wet GPI. See section 3.6 for more information.



A “**Wet**” GPO **provides** voltage to the downstream device.  
A “**Dry**” GPO **does not provide** voltage to the downstream device.

The General Purpose Inputs are used to read the state of another device. This may be a passive device such as a pushbutton or switch, but is often connected to a GPO. A “Wet” GPI is named such that it is wired to connect to a “Wet” GPO. This means a “Wet” GPI does not provide its own voltage source. A “Dry” GPI is meant to interface to a “Dry” GPO. This means that it provides a **+WET** voltage which the external device must return in order to activate the GPI. See section 3.5 for more information.



A “**Wet**” GPI **requires** an external voltage to be applied in order to activate it.  
A “**Dry**” GPI **requires** only an external contact closure to return its own voltage to activate it

### 3.8.2 General Purpose Output Modes

The default state of GPOs is “normally-open” mode with pulse mode disabled. When the GPO is off, the “A” and “B” contacts are open (normally-open). When the GPO is turned on, the contacts close.

If pulse mode is enabled, the GPO behaves in a one-shot fashion. When the GPO is off, the contacts are open (normally-open). When the GPO is turned on, the contacts pulse closed for a period of time, then open again. Pulse mode can be individually enabled for any GPO (see section 4.3) and the pulse width can be changed between 50 milliseconds, 100 milliseconds, 200 milliseconds, or 300 milliseconds.



Changing the pulse width on one GPO affects all pulse-enabled GPOs within the connector. There are two connectors, one for Outputs 1-16 and one for Outputs 17-32.

Each General Purpose Output can have its logic inverted. This is called “normally-closed” mode. When placed into “normally-closed” mode, a GPO will have its contacts closed when it is off. When the GPO is turned on, its contacts will open. Note that the “normally-closed” mode does not affect pulse mode. If pulse mode is enabled, the GPO will always be normally open and pulse closed.



When the unit boots up, all GPOs will default to Off (either normally-open or normally-closed). The GPO state is not retained on power loss, but the configuration is.

### 3.8.3 General Purpose Input Modes

The default state of GPIs is “normally-open” mode with edge triggering disabled. When a GPI is not activated it reports that it is Off. While a GPI is activated by an external voltage source, it reports that it is On. The GPI reports the level that is applied to its inputs.

Each GPI can be individually set to have edge triggering enabled. When in edge triggering mode, the GPI turns on and off only when it transitions from an inactive to an active state (rising edge). On a rising transition it will turn on, and on the next rising transition it will turn off. The trigger edge can be changed to the falling edge as well (see section 4.3).

Each GPI can also have its logic inverted. This is called “normally-closed” mode. When placed into “normally-closed” mode, the GPI behaviour is identical except that it reports the opposite On/Off state as when in the default “normally-open” mode.

## 3.9 OPTIONAL 7800TR-BHP BULKHEAD PANEL

The 7800TR-BHP is a separate ordering item. It is a 3RU panel that is used to break out the 32 General Purpose Outputs and 24 General Purpose Inputs from the two 62-pin D-Sub connectors on the rear plate. It ships with two 8-foot (2.5 meter) cables to allow remote placement of the bulkhead panel.

There is an LED to indicate if Wet Power is currently present. Each GPO and GPI can be switched between Wet and Dry modes by means of slide switches. All GPIO are broken out to 2-pin removable terminal blocks to allow easy wiring and re-wiring of the panel. A cable strain relief bar runs across the middle of the panel to provide a tie point for cables to prevent accidental removal.

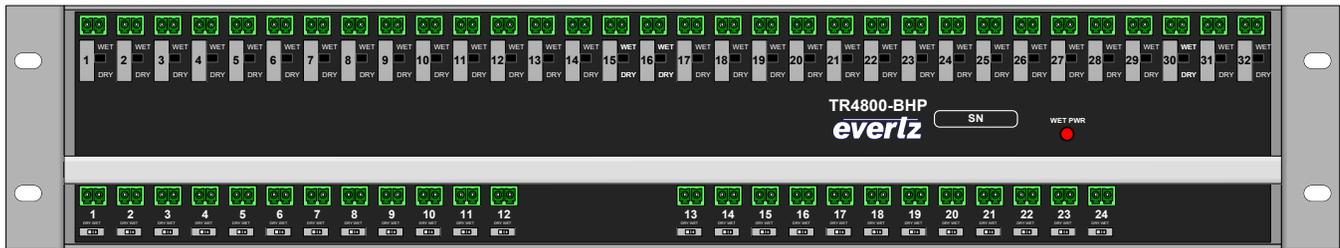


Figure 3-7: Optional 7800TR-BHP Bulkhead Panel



When connecting the rear D-Sub cables, be careful to connect the correct cable to the ports on the rear of the 7800TR-BHP.

### 3.9.1 7800TR-BHP General Purpose Output Connections

The rear 32 General Purpose Outputs from the tally router are broken out to 48 terminal blocks across the top of the bulkhead panel. Each GPO has a slide switch below it to select between Wet and Dry modes (see section 3.8.1). The circuit diagrams for the GPOs in both modes are shown in Figure 3-8 and Figure 3-9.

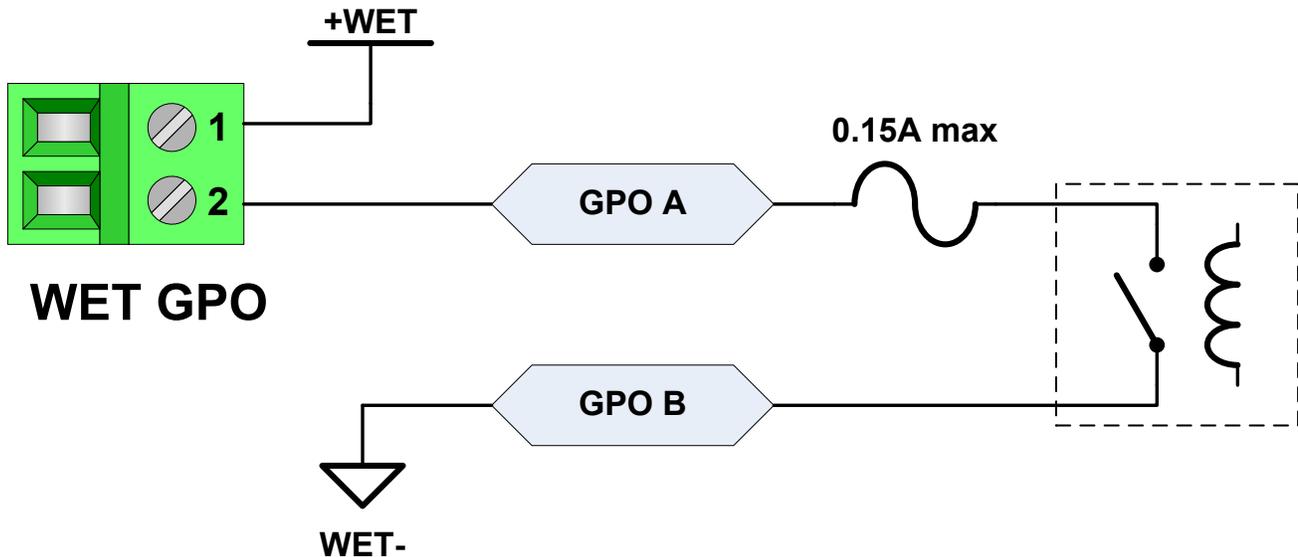


Figure 3-8: 7800TR-BHP GPO in Wet Mode Circuit Diagram

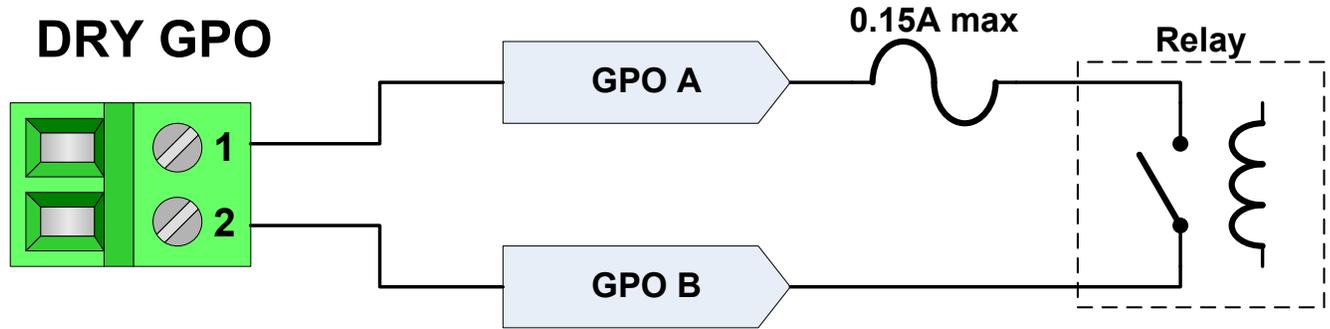


Figure 3-9: 7800TR-BHP GPO in Dry Mode Circuit Diagram

### 3.9.2 7800TR-BHP General Purpose Input Connections

The rear 24 General Purpose Inputs from the tally router are broken out to 24 terminal blocks across the bottom of the bulkhead panel. Each GPO has a miniature slide switch below it to select between Wet and Dry modes (see section 3.8.1). The circuit diagrams for the GPIs in both modes are shown in Figure 3-10 and Figure 3-11.

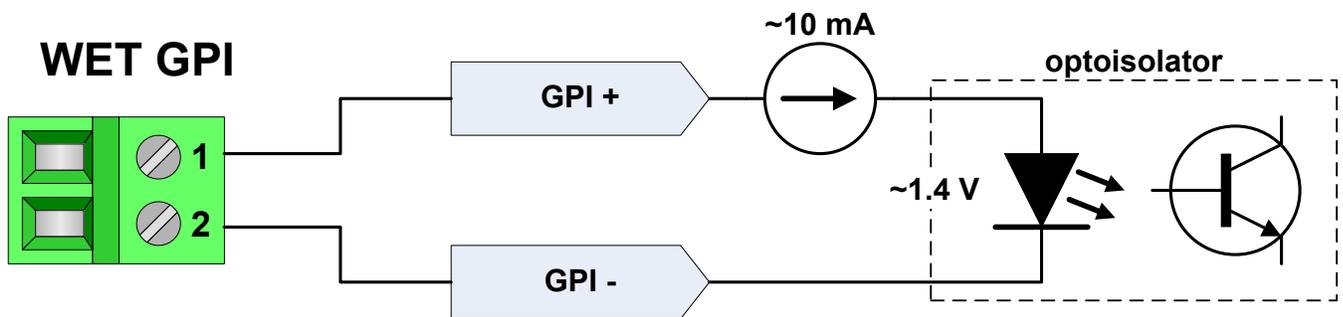


Figure 3-10: 7800TR-BHP GPI in Wet Mode Circuit Diagram

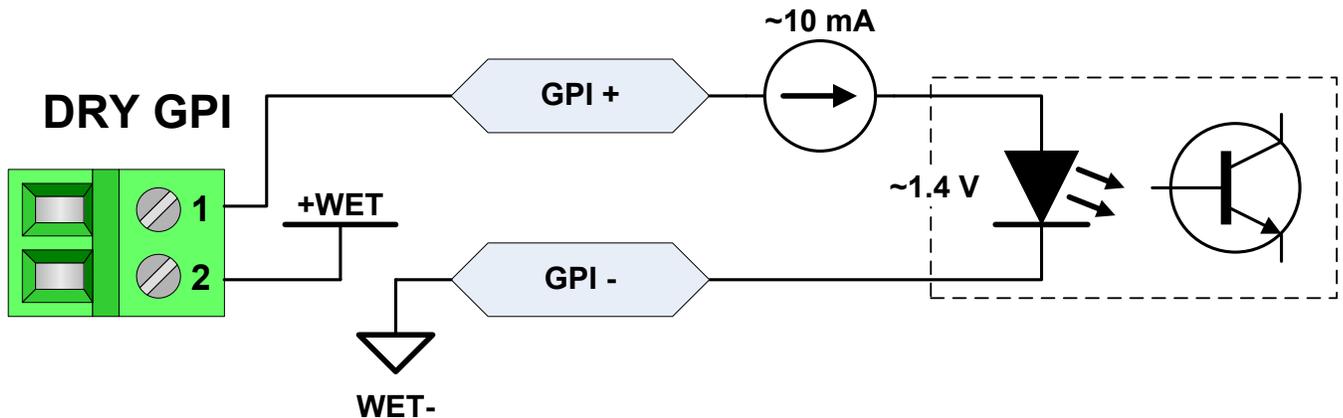


Figure 3-11: 7800TR-BHP GPI in Dry Mode Circuit Diagram

## 4 CONFIGURATION

The 7800TR-32X24 Tally Router is primarily configured and controlled through the Ethernet port using the SNMP and Quartz protocols.

### 4.1 SETTING THE IP ADDRESS

Usually the first configuration step is to assign an IP address to the tally router. The process of accessing the card edge serial port is described in section 3.3.1. To summarize:

1. Connect the COM port of a PC or laptop to the card edge using a WA-S76 upgrade cable.
2. Open the serial port using a terminal program such as HyperTerminal.
3. Configure the port for 115200 BAUD, 8 data bits, no parity, and 2 stop bits.
4. Ensure that the 7800TR-32x24 is fully inserted into the frame and powered up.
5. Press ENTER in the terminal and the “CLI>” command line interface prompt should appear.

The IP address of the unit can be set with the “ifconfig” command. The general format of the command is shown as follows:

```
ifconfig 0 inet [IP] netmask [SUBNETMASK] broadcast [BROADCAST] gateway [GATEWAY]
```

Assign an unused IP address that is compatible with your network’s addressing scheme. Below is an example of a typical command:

```
ifconfig 0 inet 172.21.1.75 netmask 255.255.255.0 broadcast 172.21.1.255 gateway 172.21.1.1
```

Once the command has been entered, the tally router will start using the IP address immediately. Perform a “ping” test to see if the connection is working.



**A reboot is not necessary after changing the IP address, however the card requires 30 seconds to save the new settings to the flash (NVRAM). Avoid rebooting or powering down the card until this time period has elapsed.**

## 4.2 UPDATING AND USING VISTALINK PRO

The 7800TR-32X24 supports the Simple Network Management Protocol (SNMP) for remote monitoring and control through an IP network. The tally router implements SNMP version 1 as outlined in RFC 1157 and RFC 1213. The protocol works by exchanging UDP messages between an SNMP client (normally a computer running an SNMP client program) and a device such as the tally router.

There are three main types of SNMP messages. An SNMP Get Request is sent from a client to a device and is used to read a value from the device. An SNMP Set Request is sent from a client to a device and is used to change a value on the device. An SNMP Trap is sent from a device to a logging client whenever a certain event takes place. Traps are usually sent in order to notify the client that an error or other event has occurred on the device that requires attention.

Evertz offers VistaLINK<sup>®</sup> Pro, a powerful software suite for SNMP monitoring and control suitable for management of both small and large systems. The VistaLINK<sup>®</sup> Pro client is a powerful SNMP client that is offered as a free download from the Evertz website ([www.evertz.com](http://www.evertz.com)). It can be used for monitoring and configuring Evertz gear. The full version of VistaLINK<sup>®</sup> provides a server application for centralized alarm management, which monitors, reports, and logs all incoming trap events and dispatches alerts to all the VistaLINK<sup>®</sup> clients connected to the server. Advanced scripting, customizable graphical user interfaces, and more can be created for advanced automation and control purposes.

Device configuration through the VistaLINK<sup>®</sup> Pro client can be performed on an individual or multi-unit basis. The configuration of devices can be managed using simple copy and paste functions, which reduces the time required to configure each unit separately. VistaLINK<sup>®</sup> allows the user to configure all devices on the network from a central station using simple visual controls and receive feedback that the configuration has been successfully carried out.

#### 4.2.1 Updating VistaLINK® with a New JAR File

The VistaLINK® Pro client provides an interactive and visual interface to configure and monitor the tally router. This interface is stored in a *JAR* file. The *JAR* file for the 7800TR-32X24 is named “VLProProd\_7700TR.jar”. In order to recognize and display the graphical configuration for the tally router, VistaLINK® Pro must first be updated with this *JAR* file. Future versions of VistaLINK® Pro will have the 7800TR-32X24 *JAR* built-in, however newer versions of the *JAR* will occasionally be released by Evertz, usually in conjunction with new versions of firmware.

To see which version of the *JAR* is being used, open the VistaLINK® Pro client and select the “Tools” menu, go to “Products” and select the “Version Information...” menu item.



It is critical that the *JAR* version used is matched to the firmware version of the unit, otherwise some controls may not operate properly. All *JAR* updates are available on the Evertz website ([www.evertz.com](http://www.evertz.com)). The 7800TR-32X24 is listed under the “Routers” section.

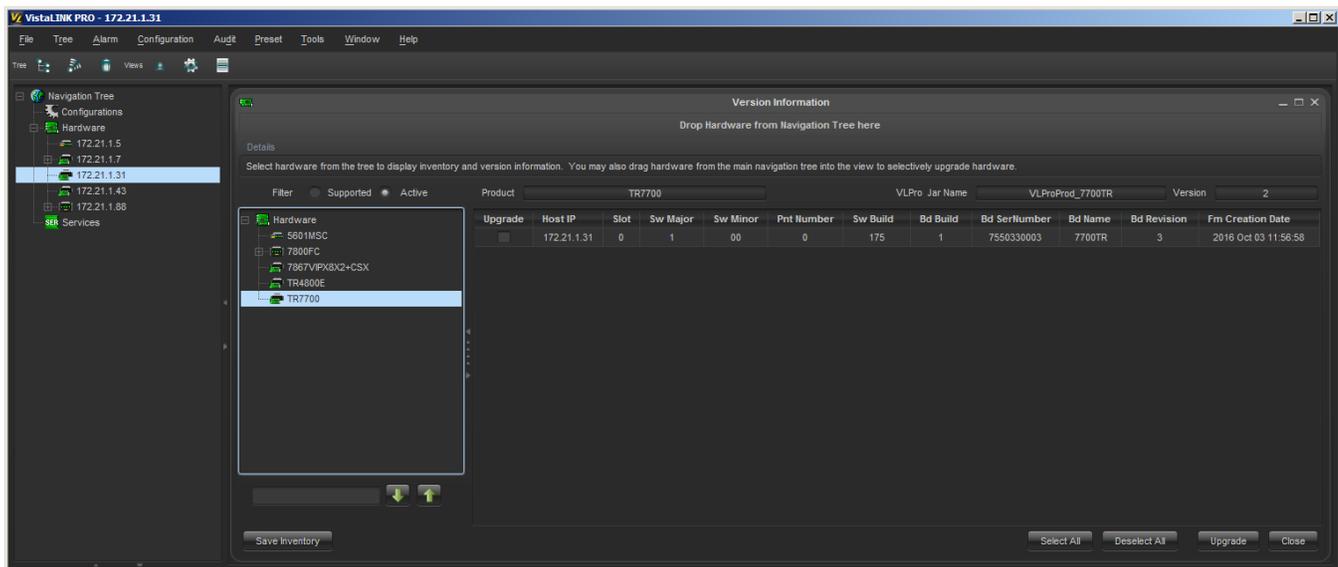


Figure 4-1: VistaLINK® Pro Version Information

In the Version Information dialog window, all of the *JAR* files that are contained within the VistaLINK® Pro client are listed on the left. Scroll down the list to the **TR7700**. Once selected, the product version is displayed. In the example above, the *JAR* file version 2 is being used. If the **TR7700** does not appear in the list, then VistaLINK® will have to be updated.



The firmware version on the unit is shown in the Version Information dialog window. The “Sw Build” number shows that the unit is running build 175 firmware.

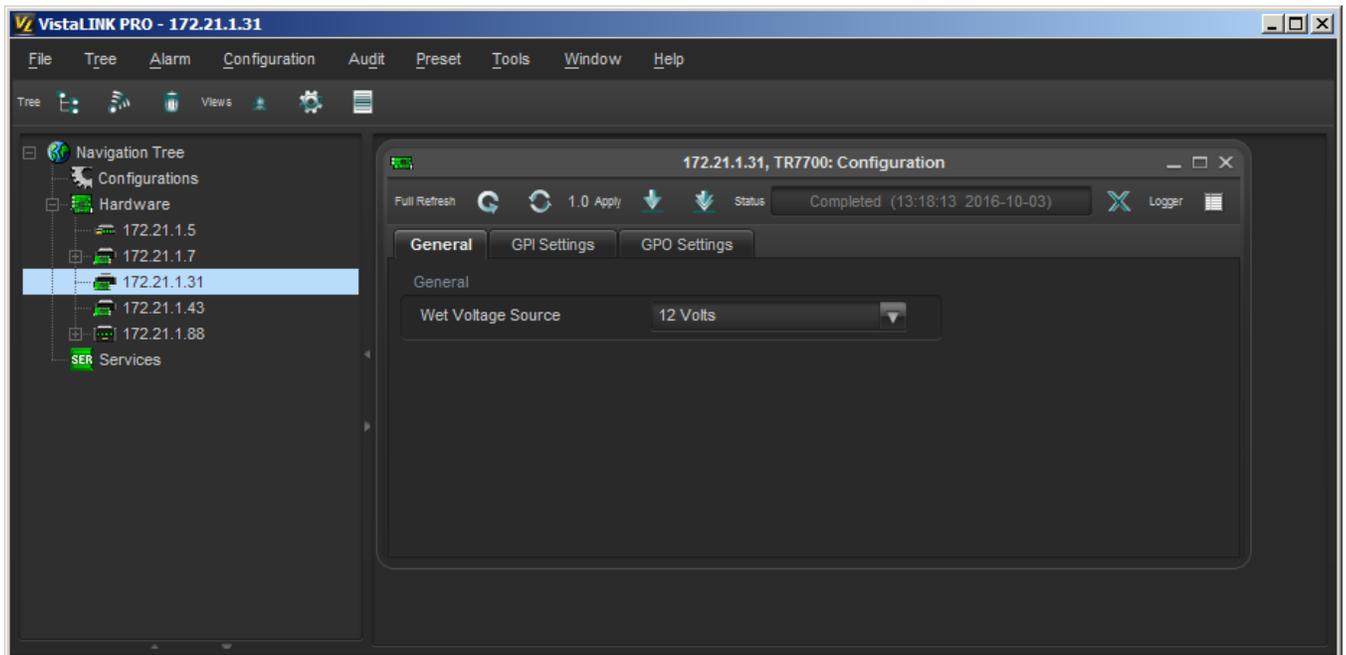
### 4.2.2 Applying a JAR update VistaLINK® Pro

To update the VistaLINK® Pro software with a new JAR file, activate the “Help” menu then select the “Apply Update” menu item. In the next pop-up menu, choose the “Product...” menu item. Browse to the folder containing the JAR update and select the “VLProProd\_7700TR.jar” file.

Once the file JAR file has been opened, a message will appear stating that the VistaLINK® Pro software must be restarted before the update can be applied. The restart can be performed at any convenient time by closing and re-opening the application. Note that when the server is restarted it will force any clients that are currently connected to terminate.

### 4.2.3 Opening the Configuration View for the 7800TR-32X24 in VistaLINK® Pro

When the VistaLINK® Pro software has been updated with the latest JAR, the client should automatically detect any 7800TR-32X24 units connected to the network during the next discovery. Open the “Tree” menu and select “Refresh” to perform a network discovery immediately. Discovered devices are displayed on the left side of the screen in the Navigation Tree under the Hardware node. If the navigation tree is not visible, check that it has not been hidden by opening the “Tree” menu and selecting “Hide/Show Tree”. If the hardware node is not visible, check that it is enabled in the “Tree” menu under “Properties”. The 7800TR-32X24 should show up as a 1RU network graphic, listed by its IP address. The network tree entry for the 7800TR-32X24 can be renamed to any helpful description by choosing the “Update Description” menu item.



**Figure 4-2: VistaLINK® Pro Configuration View**

The configuration view is used to graphically configure and monitor the 7800TR-32X24. It can be accessed by right-clicking on the device in the navigation tree and selecting “View Configuration”. The configuration view will appear and automatically load all settings from the tally router. The refresh operation may take a few seconds, depending on network traffic conditions.

#### 4.2.4 Opening the Alarm View for the 7800TR-32X24 in VistaLINK® Pro

The Alarm view can be accessed by right-clicking on the 7800TR-32X24 in the Navigation Tree and selecting “View Alarm”. This will open up an alarm window that pulls the alarm log from the VistaLINK® Pro server. The server is responsible for logging all traps it receives from the tally router and provides this information to the clients. The Alarm view is not available in the client-only version of VistaLINK®.

Alarms are listed in the order which they were received. The “Cor” column shows which faults have since corrected or cleared themselves. When an alarm is received, the border of the client will flash red, as will the device icon under the navigation tree. When the fault is cleared, the flashing will change to a green color. To clear the fault, it must be acknowledged by clicking the button in the “Ack” column.

### 4.3 CONFIGURING THE TALLY ROUTER

The 7800TR-32X24 tally router is configured through SNMP using the VistaLINK® Pro software. The various configuration tabs are listed in Table 4-1. Each of the screens and the configuration options are discussed in the following sections.

Tab Name	Description
General	Allows selecting the Wet voltage source
GPI Settings	Configures the General Purpose Inputs on the rear 62-pin D-Sub connectors.
GPO Settings	Configures the General Purpose Outputs on the rear 62-pin D-Sub connectors.

**Table 4-1: VistaLINK® Pro Configuration Tabs**

#### 4.3.1 Selecting the Wet Voltage Source

The Wet voltage that is applied to the rear 62-pin D-Sub connectors can be selected in the “General” tab. See section 3.7 for more information. The selections are as follows:

- “12 Volts” - The wet power will come from the internal +12V power source.
- “5 Volts” - The wet power will come from the internal +5V power source.

### 4.3.2 Configuring the GPI

There are a total of 24 GPIs on the rear plate of the unit that are configured in the “GPI Settings” tab. The GPI to be configured (1-24) is first select the “Select GPI” control. Once the GPI is selected, any changes below will be applied to that GPI only. There are 2 controls that are used to configure the GPI:

1. A GPI may be put into “Edge Trigger” mode with the “Trigger” control.
2. When a GPI has edge triggering enabled, the “Trigger Edge” control selects which transition the GPI will toggle its state upon.
3. The “Input Level” displays the current state of the selected GPI.

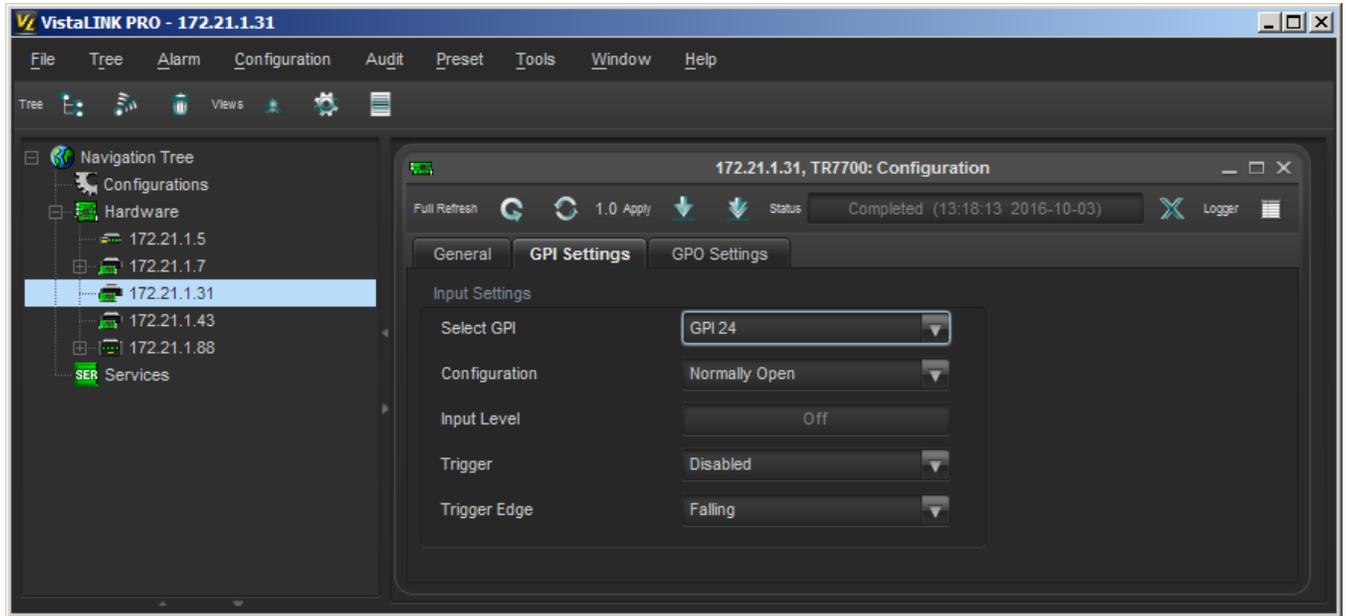


Figure 4-3: VistaLINK Pro GPI Settings Tab

### 4.3.3 Configuring the GPO

There are a total of 32 GPOs on the rear plate of the unit that are configured in the “Rear GPO Settings” tab. The GPO to be configured (1-32) is first select the “Select GPO” control. Once the GPO is selected, any changes below will affect that GPO only. There are 4 controls that are used to configure the GPO:

1. The “Relay State” control can be used to manually turn the GPO On or Off.
2. A GPO may be put into “Pulse” mode with the “Pulse” control.
3. When a GPO has pulse mode enabled, the “Pulse Width” control selects how long the GPO will turn On before turning back Off again. Note that all the GPO on a connector share the same pulse width setting.
4. The “Output Busy” will indicate the GPO is busy if it is in the middle of a pulse in “Pulse” mode.

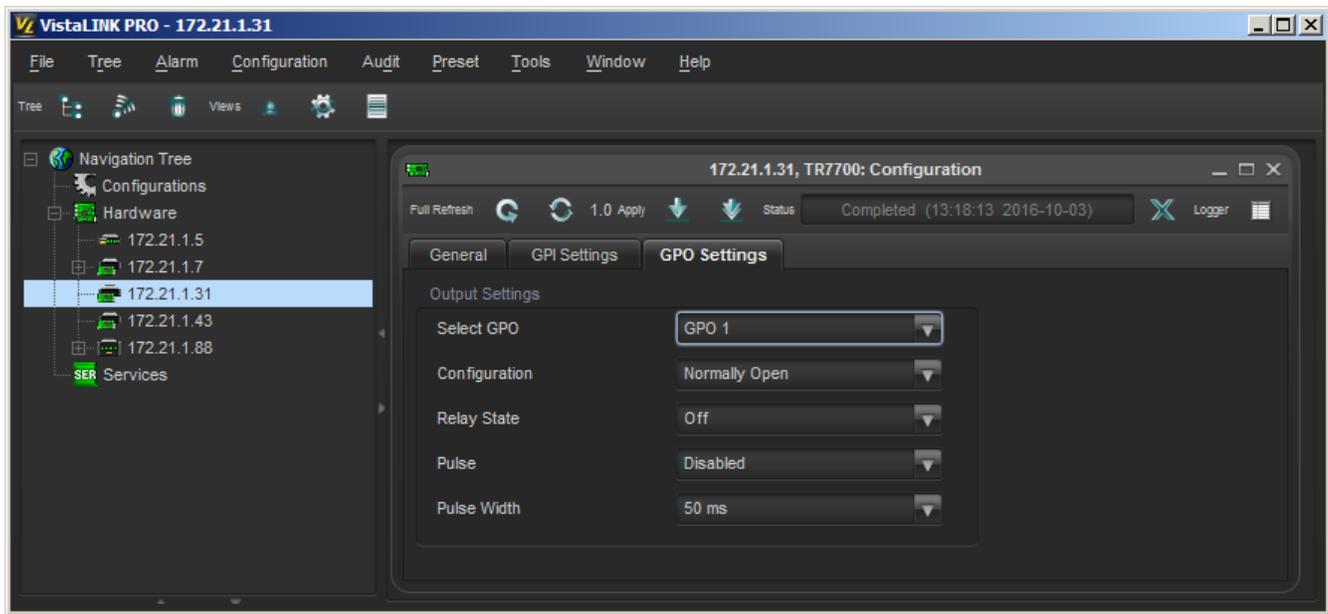


Figure 4-4: VistaLINK Pro GPO Settings Tab

## 5 OPERATION

The 7800TR-32X24 is designed to be integrated into the MAGNUM unified control system. This requires the addition of the MAGNUM-TALLY software option. This allows MAGNUM to interface with the 7800TR-32X24 to provide an intuitive, visual, point-and-click web page interface for managing the tally inputs and assigning actions to be performed when an input goes active. This can include, but is not limited to, automatically triggering actions on one or more tally outputs.

### 5.1 QUARTZ REMOTE CONTROL PROTOCOL

A full discussion on the Quartz protocol is outside the scope of this document. Please refer to Evertz application note AN65 for detail on the format of the Quartz protocol. The Quartz protocol control can be done through the Serial2 port, or more commonly through a TCP/IP connection. The MAGNUM control software uses Quartz protocol to integrate the tally inputs and outputs into a broader infrastructure control system.



**The Tally Router Quartz over IP port is 9676.  
Upon connection the tally router will automatically report the status of all GPIs.  
There is a maximum of 5 active sessions on this port.**

The General Purpose Inputs are mapped to level “V”, destinations 1-24. The tally router reports changes to GPIs by sending unsolicited “.U” update messages. For example, “.UV017,002” indicates that GPI 17 has been activated. The message “.UV017,001” indicates that GPI 17 has been deactivated. The status of any GPI can be queried by sending a Interrogate Destination message. The message “.IV005” will request the status of GPI 5. The tally router will respond with a “.AV005,00X” message.



**A source value of 1 means “Off”  
A source value of 2 means “On”**

The General Purpose Outputs are mapped to level “A”, destinations 1-32. The GPOs can be turned on by routing them to source 2. For example the command “.SA027,002” will turn on GPO 27. The tally router will respond with a “.UA027,002” to acknowledge the GPO has been changed. The command “.SA027,001” will turn off GPO 27 causing a response of “.UA027,001”.

## 5.2 MAGNUM INTEGRATION

The installation and configuration of a MAGNUM server is beyond the scope of this manual. The following steps assume that a functional MAGNUM server is licensed and operational. The MAGNUM server should be available on the network at a known IP address.

Launch a web browser of your choice (Firefox is recommended) and enter the IP address of the magnum server into the address bar followed by “/magnum”. For example:

`http://172.21.1.200/magnum`

This should open up the MAGNUM server web configuration tool. You must **Login** with a username and password. The default user name is “admin” with password “admin”.

### 5.2.1 MAGNUM-TALLY License

In addition to the normal MAGNUM license, the optional MAGNUM-TALLY license is required to allow MAGNUM to work with tally routers. Click the **ADMIN** button and select “License Management”. The minimum required licensed modules to use Magnum with Tally Routers are:

**Magnum-Router**  
**Magnum-Tally**  
**Magnum-Multiviewer**



**Figure 5-1: Magnum License Management Screen**

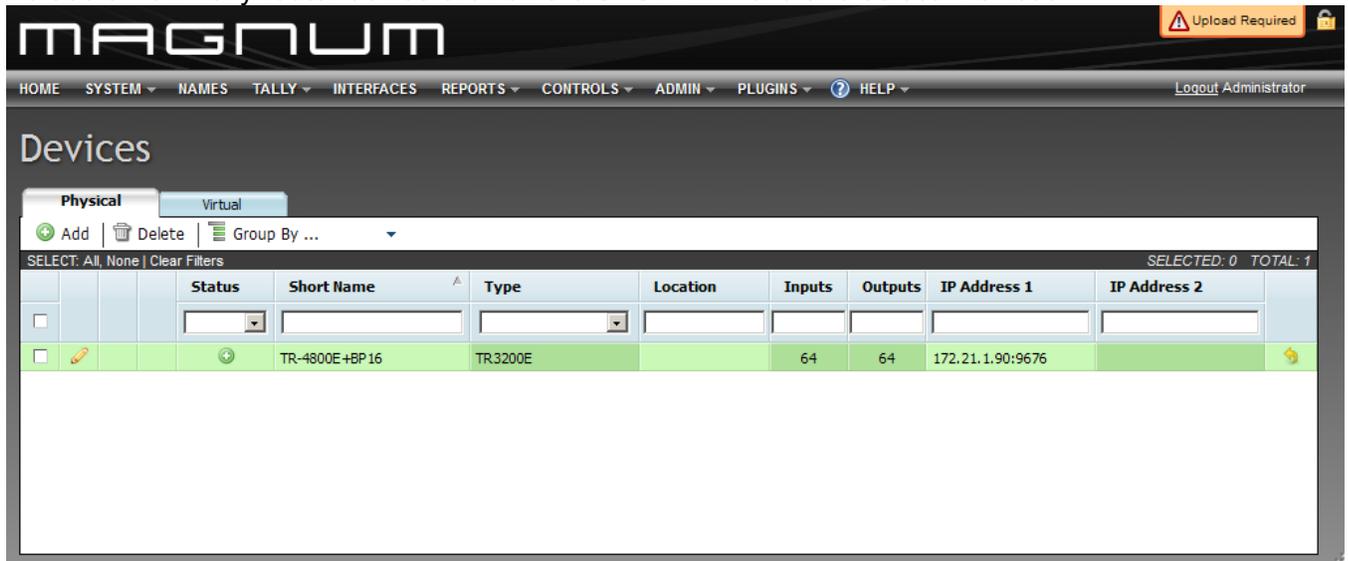
In order to add a license to magnum the Server ID is required. Press the “Get ID” button to obtain the Server ID. It will be 10 groups of 4 characters separated by dashes:

Example: 2a29-bc35-ea1a-c639-2f3f-c48e-7ef1-2a5f-6fb9-b31c

Contact Evertz customer support to add licensed modules to the Magnum server. You will obtain a license file (.etl) which can then be imported into the Magnum server.

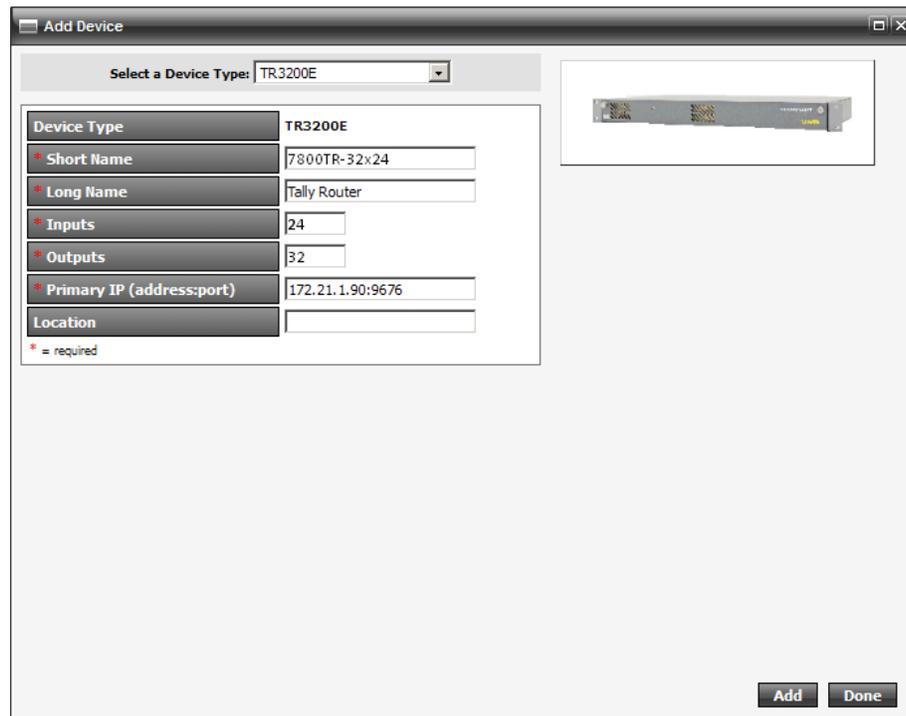
## 5.2.2 Adding the Tally Router to MAGNUM

To add a new Tally router device click on the **SYSTEM** menu and select “Devices”.



**Figure 5-2: Magnum Devices View**

Click the **Add** button to configure a new device. Currently the Tally Router must be added as a **TR3200E**. Magnum uses the same control protocol for both the TR-3200E and the 7800TR-32X24 products. The only difference is the number of GPI and GPO available. The 7800TR-32X24 should be configured with 24 inputs and 32 outputs. Enter the IP address of the tally router for the “Primary IP”. Make sure to use port 9676. Repeat this for every tally router in your system. Click **Done** when finished adding devices.



**Figure 5-3: Adding a Tally Router Device to Magnum**

Once all devices are added, an **Upload Required** notice will appear in the top-right corner. Click on this and then commit the configuration changes to the Magnum server.

### 5.2.3 Setting up the MAGNUM Tally Grid

Once all devices are configured, the GPI and GPO on the Tally Routers can be linked to actions on routers or GPIO on other Tally Routers. To configure this, go to the **TALLY** menu and select **Grid**.

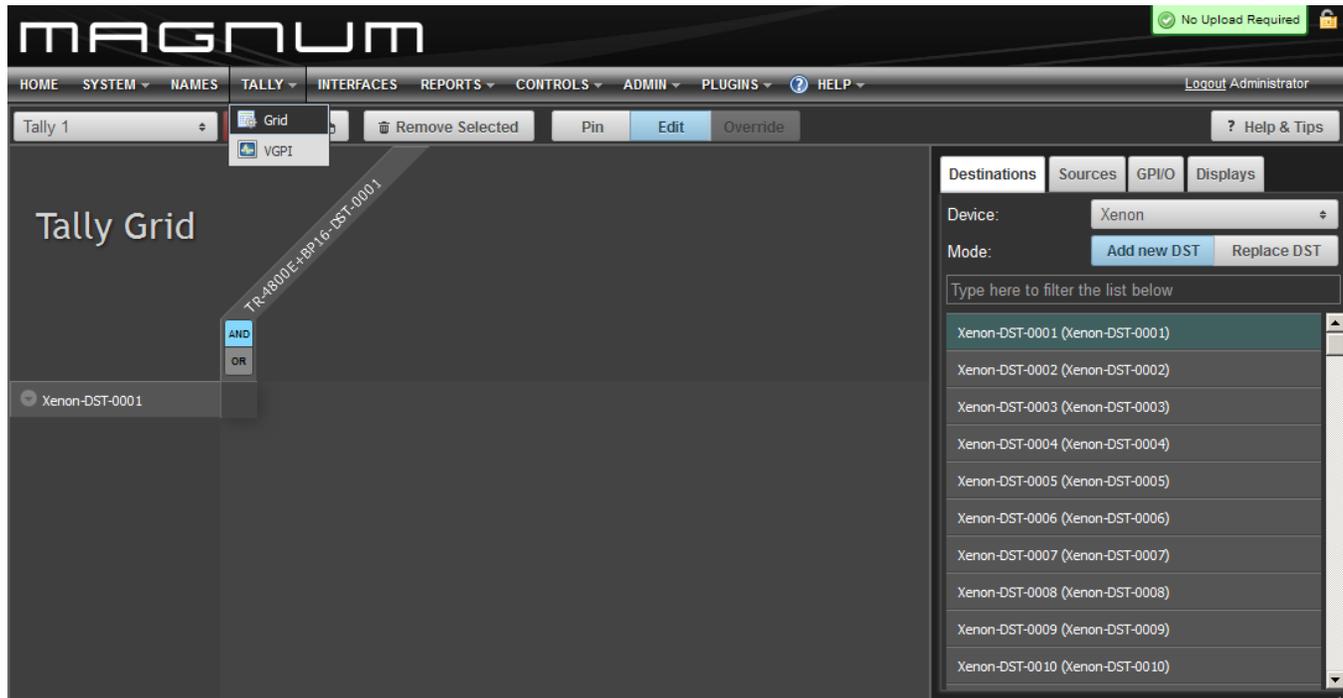


Figure 5-4: Magnum Tally Grid Configuration View

Click on the **EDIT** button to make changes to the Tally Grid. The Tally Router devices will appear under the **GPI/O** tab on the right side of the screen. The Tally Router sources (SRC) are GPIs, and the tally router destinations (DST) are GPOs. All the configured router sources and destinations are shown as well. It is easy to map a router source change to a tally router destination (GPO) activation. Once changes have been made to the tally grid, the “Save Changes” button must be pressed.

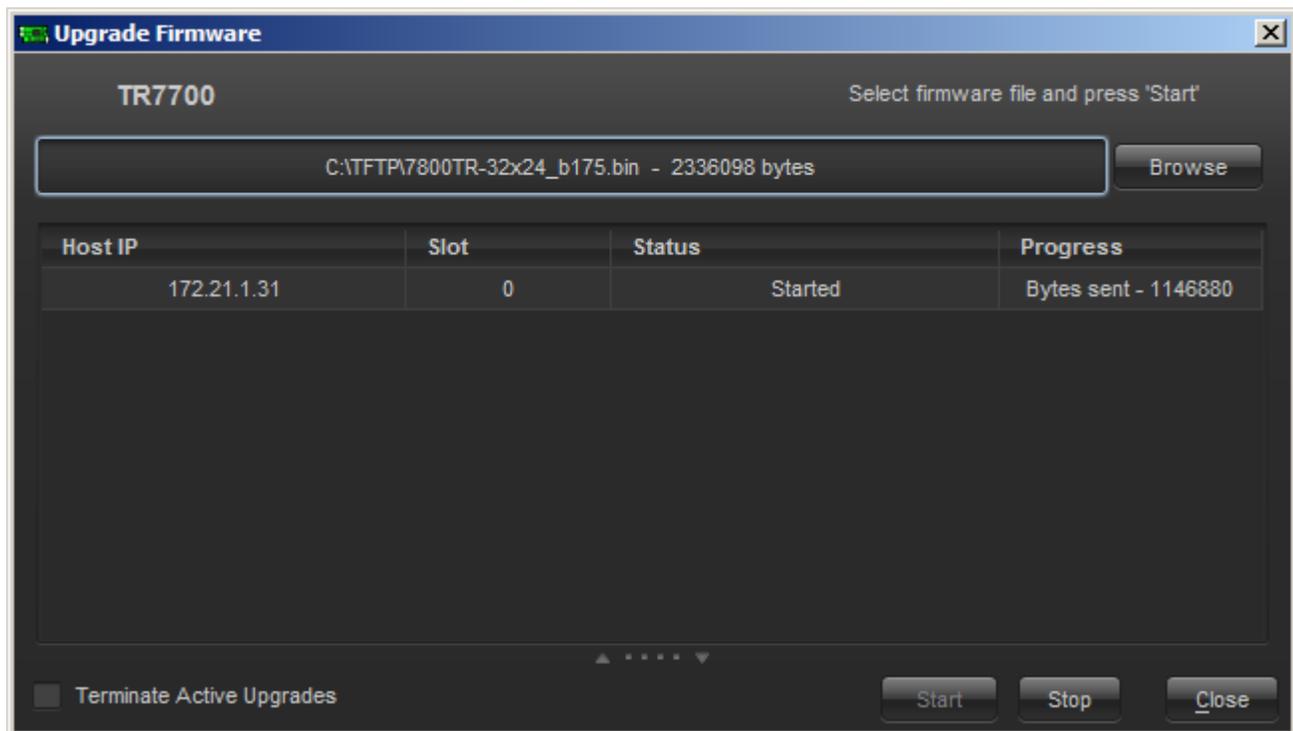
Multiple tally grids can be configured. The drop-down box selects between the tally grids. Only one grid can be active at a time. Click the “activate” button to make the current tally grid active. Once activated, Magnum will monitor all triggers and activate the selected GPOs in response in real-time.

## 6 UPGRADING THE FIRMWARE

The firmware in the 7800TR-32X24 is stored in a FLASH EEPROM. From time to time firmware updates will be provided to add additional features to the unit. Check the Evertz web site for information on firmware releases ([www.evertz.com](http://www.evertz.com)). The firmware is updated through the Ethernet port using VistaLINK® Pro. It can also be updated through the card edge serial port. Note that each firmware update is released with a JAR file for updating VistaLINK® Pro. If the firmware is updated the JAR file must also be updated to match.

### 6.1.1 Performing a Firmware Upgrade with VistaLINK® Pro

The upgrade is performed through the version information dialog (see section 4.2.1). This dialog also displays the current firmware version of the unit. Access this dialog in the VistaLINK® Pro client by going to the Tools menu, Products..., and selecting Version Information. Select the “Active” filter and click on the **TR7700**. There is an “Upgrade” checkbox that should be checked for every unit that is being upgraded. Finally click the “Upgrade” button in the bottom-right corner.



**Figure 6-1: VistaLINK® Pro Upgrade Firmware Dialog**

Click the Browse button and select the new firmware BIN file that was downloaded from the Evertz website (Image file). Then click the Start button. Answer “Yes” if you are sure you want to upgrade. The firmware upgrade process should take around 20 seconds then the tally router will reboot itself.

## 6.1.2 Performing a Firmware Upgrade through the Card Edge Serial Port

A firmware upgrade can also be performed through the card edge serial port. This takes much longer than through Ethernet, and will require access to the front of the card by opening the frame door. The card will also be non-responsive for the duration of the upgrade. See section 3.3.1 for instructions on connecting the card edge serial port to a PC. Once the terminal program is connected, press ENTER to get to the “CLI>” Command Line Interface prompt. The current software version can be displayed by typing “ver” and pressing ENTER.

```
CLI> ver
7800TR-32x24

Hardware
Board       : 7700TR
Product    : 7800TR
Rev        : 3
Build      : 1
Serial Number : 7550330003

Software
Version    : 1.00
Build      : 175
Build Date : 2016 Oct 03 11:56:58
```

There is a 3-pin Run/Upgrade header (J13) about 1.5 inches behind the LED display. Make sure the shunt is placed in the UPGRADE position (on pins 2-3, toward the rear of the card).

Type in the command “reset” and press ENTER. The tally router will reboot. Immediately press CTRL+X several times to stop the unit from booting again. This should break into the “PPCBOOT>” prompt. Type the command “upgrade” and press ENTER. You should see the message “upload product firmware now”. The firmware can now be sent to the tally router using the XMODEM protocol (checksum mode). This should take about 4 minutes to complete.

When the firmware is finished sending, you should see the message “upload okay”. At this point enter the command “boot” and press ENTER. The tally router will boot using the newly upgraded firmware.

```
CLI> reset
Evertz NAND PPCBoot et.836.3
Evertz PPCBoot 2.3 et.836.3
8313e rev. 2.2, e300c3 rev. 1.0, 167 MHz bus, 333 MHz core
PHY 01 REG 00: 1140 ---- 0143 BCB2 01E1 0000 0064 2001 0000 0300 0000 0000 0000 0000 0000 3000
PHY 01 REG 10: 0000 0001 0000 0000 0000 0000 0000 0000 0400 0000 0000 FFFF 0000 0000 0000 0000
PHY register 18 shadow 7 changed from 0x71E7 to 0xF0E7
PHY register 1c shadow 3 changed from 0x0E00 to 0x0E00
user requested abort
PPCBOOT> upgrade
upload product firmware now
upload okay
PPCBOOT> boot
LOADING PROGRAM SECTIONS
LOAD COMPLETE
```

Move the shunt on the Run/Upgrade header (J13) back to the RUN position (pins 1-2).