

# VIA Ethernet Switches

## User Guide and Manual

675X Models running firmware 5.X  
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## About Pathport VIA Ethernet Switches

VIA™ Gigabit Ethernet switches are designed for live entertainment Ethernet systems, including audio and DMX-over-Ethernet networks. This manual covers models **6750** and **6750-P** running firmware of 5.0 or higher.

The VIA Ethernet Switch is intended specifically for signal routing between Pathport® DMX-over-Ethernet nodes, or similar equipment, and Ethernet-aware lighting and audio control products, such as consoles and controllers and end equipment. VIA is a routing device and is not a source of the control protocols or the data being passed. Switches only provide management control over the data path.

Upgrades implementing further Layer 2 and Layer 3 management features will be released on the Pathway Connectivity website from time to time. The VIA is easily upgraded using the freely available configuration tool, **Pathscape**.

**Important:** VIA model **6750** does **not** provide hardware support for IEEE 802.3af Power-over-Ethernet (PoE). It does **not provide a way to connect an external PoE supply**. VIA model **6750-P** features an integrated 100W PoE supply for powering compatible external devices.

**If you connect PoE-enabled devices to a 6750 they will not receive power.**

## Installation Instructions

VIA switches are intended for desktop use, or to be mounted in a standard 19" equipment rack, using the included rack ear accessories.

Truss-mount adaptors (#9003) and wall-mount kits (#9002) are available as accessories.

All VIA switches are intended for installation in a dry, indoor location. Operating conditions are -10°C - 40°C; 5-95% relative humidity, non-condensing.

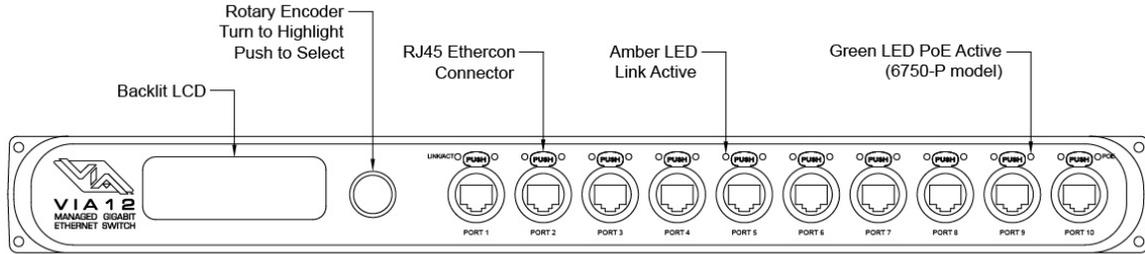
**Warning:** The AC socket outlet shall be installed near the equipment and shall be easily accessible.

**Warning:** This equipment relies on building installation primary overcurrent protection.

**Warning:** Except for the chassis plug marked for AC input, all ports on the VIA12 are intended for low voltage and/or data lines only. Attaching anything other than low voltage sources to the data ports may result in severe equipment damage, and personal injury or death.

# Panel Layouts

## Front Panel – model 6750/6750-P



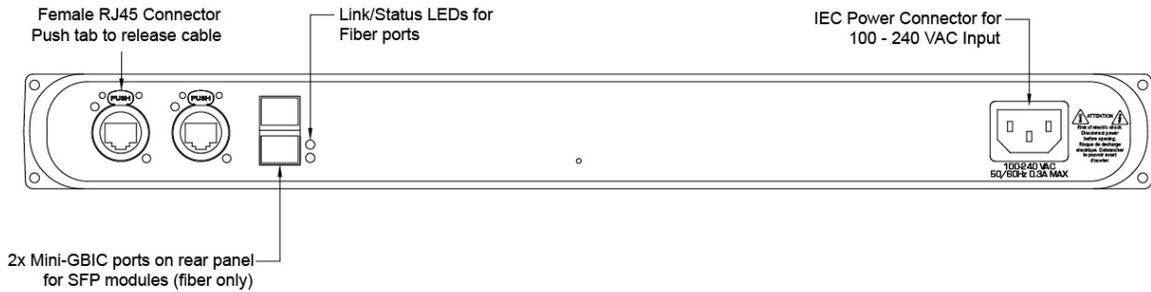
## Main Display Messages

Along with its soft label and IP address, the VIA may display optional messages. At present, the messages only report status of the Ring Protection feature, when enabled.

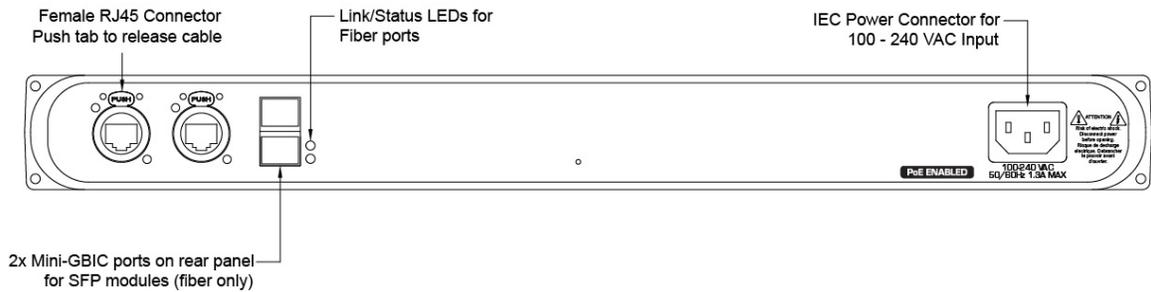
Message	Explanation
Ring Protect Master: Init	Switch configured as Master. Ring is initializing
Ring Protect Transit: Init	Switch configured as Transit. Ring is initializing
Ring Protect Master: OK	Switch configured as Master. Ring is intact
Ring Protect Transit: OK	Switch configured as Transit. Ring is intact
Ring Protect Master: Failed	Switch is configured as Master. Link between two ports has failed. Communication now relies on secondary links. Fault should be located and repaired immediately.  To assist in locating the fault the LCD backlight will blink on the two switches adjacent to the failed cable.
Ring Protect Transit: Failed	Switch is configured as Transit. Link between two ports has failed. Communication now relies on secondary links. Fault should be located and repaired immediately.  To assist in locating the fault the LCD backlight will blink on the two switches adjacent to the failed cable.

See below for ring protection set up and activation.

## Rear Panel – model 6750



## Rear Panel – model 6750-P



Models 6750 and 6750-P require the user to provide an SFP (small-form pluggable) fiber adaptor to allow connection of the mini-GBIC ports to fiber optic networks. See Appendix 1 for recommendations on SFP adaptor selection.

The IEC power plug may be connected to an AC power source with a voltage between 100 and 240VAC, either 50 or 60 Hz.

## Base Configuration

With the default screen shown on the LCD, press the encoder knob. The base configuration menu will be shown.

<b><u>Base Configuration</u></b>
Network Status
Device Info/Status

Turn the knob to scroll down the menu. The current menu item is highlighted in reverse video. Push the knob to enter sub-menus. Top-level menu entries are shown in the following table below.

Menu Label
Network Setup
Device Info / Status
Advanced Settings
Utilities
<Back>

For all menus and submenus, the current selection will be highlighted in reverse video. Push the encoder knob to reach further options, or to select the current one. Some menus, such as Network Settings, require the user to scroll down to accept or discard any changes made. The 'Back' option will always move the menu up one level. The current menu will time out after approximately thirty seconds.

Note on LCD Lockout: Software configuration tools (see Software Configuration below) may allow a user to lock out the ability to edit the VIA from the LCD menu. Settings may only be reviewed. This LCD lock out is disabled after a hard reboot of the switch, for a rolling thirty second window after reboot is finished. This time window allows changes to be made when a software connection is not available. It is not possible to completely disable the LCD lockout from the front panel.

## Network Setup

Allows review and changes of the IP address, subnet mask and default gateway. These settings are the default values for the Management VLAN (typically VLAN 1), and will be used if VLANs are disabled. To edit these properties, push the knob again.

Property	Explanation
IP Mode	Determines how IP settings will be obtained <b>Static (default for VLAN#1):</b> IP settings manually set by user. <b>Dynamic:</b> IP settings will be obtained from a DHCP server.
IP Address	Manually sets IP address (IPv4) Turn knob to set each octet. Push to accept. Illegal values are not accepted.
Subnet Mask	Set subnet mask for node. Only valid masks are shown. Turn knob to select from list of valid masks.
Default Gateway	Set default gateway for node. Only valid gateways accepted. Turn knob to set each octet. Push to accept. Illegal values are not shown.

IP Mode must be set to “Static” if the VIA is to act as a DHCP server. Setting the IP Mode to “Dynamic” does NOT enable the DHCP server. DHCP service is enabled under Advanced Settings>VLAN Setup>VLAN Config>VLAN <#>>DHCP Server.

If the IP Mode is set to “Dynamic” on a system with no active DHCP server, the switch will auto-generate IP settings in accordance with zeroconf standards, in the IP range of 169.254.x.x/16. This range may not be suitable for connection to entertainment systems.

When IP Mode is set to “Dynamic”, it is still possible to manually adjust the IP settings. This practice is not recommended as the changes will not stick.

Once the values have been set, acceptance options appear on the bottom line of the screen. Turn knob to choose from following options.

Option	Explanation
Discard Changes	Discards all changes and returns to base menu
Save and Apply	Saves changes and applies them to VLAN 1, and returns to Network Setup menu.

## Device Info/Status

Allows review of the following non-editable properties:

Property	Explanation
Serial Number	Factory-assigned, Pathway serial number
MAC Address	Factory-assigned media access control address
Firmware Version	Current operating firmware version. Firmware may be updated using software configuration tools
Ring Protect State (if enabled)	<b>OK:</b> Ring is intact <b>Init:</b> Ring is initializing <b>Failed:</b> Link between two ports has failed. Communication now relies on secondary links. Fault should be located and repaired immediately
PoE Used	Total Power-over-Ethernet being drawn by all connected devices, in watts
PoE Allocated	Total current Power-over-Ethernet budgeted to all ports, in watts
PoE Remaining	Total unallocated Power-over-Ethernet available from PoE power supply, in watts
Back	Returns to base menu

**IMPORTANT:** VIA model 6750 hardware does not support PoE. Connected PoE-enabled devices will not receive power from the switch.

VIA model 6750-P has 100W of on-board PoE power. The PoE External Supply Power value must be manually configured using Pathscape, or PoE will not function. All PoE values will be reported as 0.0W.

## Advanced Settings

Menu Item	Menu Options				
VLAN Support	Disabled (default) Enabled. Must be enabled to show VLAN Setup and Ring Protect feature				
VLAN Setup	VLAN Range Start: <x>	Specifies lowest VLAN ID# available. Valid range: 1 to 4095. Default is 1.			
	VLAN Range End: <x>	Specifies highest VLAN ID# available. Valid range: 1 to 4095. Default is 10.			
	Management VLAN:<x>	Specifies the VLAN ID# used by the management processor. Default is 1. This value MUST be within the range specified by the range start and end set above, or you will not be able to configure the switch.			
	VLAN Config/Status	VLAN#	Network Settings	See below	
			DHCP Server	Disabled (default) Enabled	
			IGMP Snooping	Disabled (default) Enabled	
IGMP Querier			Disabled (default) Enabled		
Current Multicast Groups			See below		
Ring Protect Setup	Ring Protect Mode	Disabled (default). Ring is turned off. Master: Switch with master responsibility for monitoring ring. Only one Master is allowed Transit: All other switches are set as Transit			
	Primary Port: <x>	Designates which port to use as the active uplink port to other switches. Valid range is port 11 thru 14 only.			
	Secondary Port: <x>	Designates which port to use as the fall back link to other switches. Valid range is port 11 thru 14 only.			
	Control VLAN: <x>	Specifies the VLAN ID# used to determine the integrity of the ring. may not be used for any other traffic. Valid ID# is any ID outside the range set in VLAN setup. Default is VLAN 4095.			
Rapid Spanning Tree	Disabled Enabled (default).				
Alternate Art-Net Mapping	Disabled Enabled (default).				
QoS Settings	Off (default) Standard Dante Strict				

Plan your VLAN layout before attempting configuration. The creation of a map of the network, showing which devices and which ports to associate with a given VLAN, is strongly recommended prior to configuration.

**EXTREMELY IMPORTANT NOTE: When configuring one or multiple VIA switches using Pathway's software-based configuration tools, be certain all switches are set to the same Management VLAN ID#. Be certain that the port connected to your computer is also on the same VLAN ID#. Failure to observe this rule will result in what appears to be a broken network, and embarrassment upon realizing the operator error.**

For more information on VLANs and definition of terms, see the appendix.

## **VLAN Support**

VLAN support must be enabled to allow access to the Ring Protect feature and to the VLAN set up and configuration menus. Once Ring Protection is enabled, VLAN support cannot be disabled.

## **VLAN Setup**

These properties determine the size of the VLAN table, and which VLAN has communication with the switch's management processor. For efficient switch operation, the VLAN range should be kept as small as necessary.

If the Management VLAN is accidentally set to a value outside the VLAN range, it may be necessary to use the Factory Default Including Net Setup from the Utilities menu, to restore communication with the management processor and allow further configuration.

The VLAN range and individual VLAN configuration must be done prior to activating the Ring Protect feature.

## **VLAN Config/Status: VLAN#**

Each VLAN is identified by its VLAN ID#.

Each VLAN ID# must be configured separately, and each VIA switch must be uniquely identified on each VLAN in use on that switch. There is currently no way of copying properties from one VLAN to another.

The VLAN ID# is assigned to individual ports from the Port Configuration Menu.

## VLAN Config/Status: Network Settings

Property	Explanation
IP Mode	Determines how IP settings will be obtained <b>Disabled (default):</b> No IP assigned. <b>Static:</b> IP settings manually set by user. <b>Dynamic:</b> IP settings will be obtained from a DHCP server.
IP Address	Manually sets IP address (IPv4) Turn knob to set each octet. Push to accept. Illegal values are not accepted.
Subnet Mask	Set subnet mask for node. Only valid masks are shown. Turn knob to select from list of valid masks.
Default Gateway	Set default gateway for node. Only valid gateways accepted. Turn knob to set each octet. Push to accept. Illegal values are not shown.

Network Settings must be configured on any VLAN requiring use of multicast filtering (IGMP) or a DHCP server. By default, only the management VLAN (VLAN ID#1 by default) is automatically assigned an IP and subnet mask. All other VLANs default to a null IP address value (0.0.0.0). From the Network Settings for each VLAN, assign a unique IP per switch, a common subnet mask and, where necessary, a default gateway.

Default gateway addresses are not typically required on most entertainment installations, as these systems do not typically connect to the Internet. Any Internet access will be through a proxy or NAT gateway, in which case the default gateway IP should point to this device.

IP Mode must be set to “Static” if the VIA is to act as a DHCP server. Only one DHCP server may be active on any given VLAN. Setting the IP Mode to “Dynamic” does NOT enable the DHCP server – see below.

If the IP Mode is set to “Dynamic” on a system with no active DHCP server, the switch will auto-generate IP settings in accordance with zeroconf standards, in the IP range of 169.254.x.x/16. This range may not be suitable for connection to entertainment systems.

When in doubt, we recommend using a mode of ‘Static’ and configuring each switch and VLAN combination with a unique IP address and appropriate subnet mask.

## VLAN Config/Status: DHCP Server

VIA switches can automatically assign IP addresses to connected devices, using a DHCP (dynamic host configuration protocol) server.

**Important:** Only one DHCP server may be active on any given VLAN at one time. Running multiple DHCP servers will cause network reliability problems.

The DHCP-hosting VIA switch must first be set to a static IP address on the desired VLAN, prior to enabling the DHCP server. The DHCP server should be enabled prior to setting other connected devices to a 'Dynamic IP' mode or being connected to the network VLAN.

In some cases, it may be necessary to reboot connected devices to ensure the DHCP server correctly recognizes them and assigns appropriate network settings.

Property	Explanation
Disabled	DHCP service is turned off. Use this setting for all static (manually-set) IP systems, and for all switches other than the VLAN's designated DHCP server host.
Enabled	Enables DHCP server.  Pool Start: Set the first available IP address. Pool End: Set the last available IP address.  The DHCP pool is partially predefined based on the IP address and subnet mask of the host switch, as the host must have proper communication with the requesting device. Invalid pool ranges are not accepted.
Server Config	Valid: Pool range is valid and can be applied. Invalid: Pool range is invalid. Try again.  This property is not user-editable and acts as a check against accidental surprises.
Enable and Exit	Accept the designated pool and start the DHCP service. Option only available if the Server Config is valid.
Revert and Exit	Abandon configuring the DHCP server
Disable Server and Exit	Turn DHCP server off.  Warning: Devices relying on dynamically obtained IP addresses require an active DHCP server to function.

## VLAN Config/Status: IGMP and Multicast Groups

When using multicast data packets, such as streaming ACN (sACN), bandwidth efficiency may be improved by using IGMP (Internet group management protocol) to enable multicast filtering.

Property	Explanation
IGMP Snooping	Enable/disable IGMP snooping – allows the switch to correctly filter multi-cast traffic
IGMP Querier	Enable/disable the IGMP querier – creates the multicast tables used by snooping
Current Multicast Groups	Shows the table of multi-cast groups in use on the VLAN. Click on a group to see which ports are subscribers to that group.

The IGMP Querier establishes a table of active multicast groups by querying connected devices about which multicast groups each device wishes to join. For example, a gateway will request the multicast groups associated with the sACN universes that the gateway is patched to.

Each switch operating an IGMP Querier on a VLAN must have valid IP settings on that VLAN. The IP settings may be static or dynamically established using the DHCP.

**IMPORTANT:** Two IGMP queriers should be active on each VLAN using multicast filtering. If no querier is active, the groupings table will fail after approximately five minutes and filtering will only work erratically or will fail altogether. IGMP should not be enabled on more than four VLANs per switch.

The IGMP Snooper allows the switch to more efficiently route multicast traffic by applying the multicast groupings as a filter. Multicast traffic is only directed to only those ports, i.e. end devices, that have requested to receive that traffic.

The Current Multicast Groups is a list of the multicast addresses currently maintained in the Querier's table. The list provides a troubleshooting check. Click on a listed group to see what ports are requesting that address. For example, the multicast groups 239.255.237.1, 239.255.237.2 and 239.255.237.255 indicate traffic between Pathport devices, and all ports connected to Pathports (on that VLAN) should be shown.

## Ring Protect Setup

This option will only be shown if VLAN support is enabled.

Property	Explanation
Ring Protect Mode:	Shows the current state of the switch. Press knob to change between: <b>Disabled:</b> Ring Protection feature is turned off <b>Master:</b> Only one switch may be set as the Master. <b>Transit:</b> All other switches must be set as Transit.
Primary Port: <x>	Designates which port to use as the active uplink port to other switches. Valid range is port 11 thru 14 only.
Secondary Port: <x>	Designates which port to use as the fall back link to other switches. Valid range is port 11 thru 14.
Control VLAN: <x>	Specifies the VLAN ID# used to determine the integrity of the ring. This VLAN may not be used for any other traffic. Valid ID# is any ID outside the range set in VLAN setup. Default is VLAN 4095.
Save and Apply	Returns to base menu
Discard Changes	Returns to base menu

**Warning:** Ring Protection should only be configured and enabled after all other VLAN configuration has been completed.

During the set up and configuration of the Ring Protection feature, communication between devices may be erratic or broken. We strongly recommend that all switches be configured with the appropriate Ring Protection settings PRIOR to be connected together. We also strongly recommend that all switches be disconnected from one another PRIOR to disabling the ring feature.

Prior to set up, determine which switch will be the master. Generally, the least busy switch is the best choice. All other switches must be configured as transit switches.

All switches must have both a primary and a secondary ring port set. These ports will be automatically configured as Tagged (uplink) ports, meaning all traffic on all VLANs will be passed through the ports.

If changes are made to the ring configuration while the ring is active, it may be necessary to reboot all switches for the changes to take effect.

## Rapid Spanning Tree

Property	Explanation
Rapid Spanning Tree	Enable / Disable The Rapid Spanning Tree Protocol (RSTP).

**Warning:** Rapid Spanning Tree must be enabled on all switches to detect loops correctly. Network loops created through un-managed switches may not be detected correctly. Pathway's implementation of Rapid Spanning Tree Protocol should be inter-operable with other switch manufacturer's implementations.

The Rapid Spanning Tree algorithm detects and prevents network loops. The interaction between RSTP and the Ring Protect system may cause long network re-configuration times when the ring topology is changed. For this reason, it is recommended that RSTP be used during setup and then disabled after verifying there are no loops present.

For more information, please refer to the Appendix.

## Alternate Art-Net Mapping

This feature is used in conjunction with the 'Broadcast Art-Net Trap-and-Convert to sACN', which is set from the Port Configuration menu. This feature does not affect unicast Art-Net packets.

The Art-Net protocol uses two hexadecimal numbers, a 'subnet' and a 'universe', to define its DMX universe numbering. Numbering is usually shown as # - # and the valid range is from 0 - 0 (zero-zero) to F- F.

However, most other common protocols including sACN do not have a universe 'zero'. The issue is compounded because some Art-Net implementations are shown in a straight decimal representation (1, 2, 3, 4...) without any indication if "1" corresponds to Art-Net universe 0-0 or to 0-1.

By default, Art-Net Universe 0-0 is ignored by the VIA and the packets discarded. When Alternate Art-Net Mapping is enabled, VIA switches will map Art-Net Universe 0-0 to sACN Universe 1. When Alternate Art-Net Mapping is disabled, Art-Net Universe 0-0 will be ignored by the VIA and Art-Net Universe 0-1 will be routed as sACN Universe 1.

## Quality of Service (QoS)

Quality of Service determines the relative priority of different data packets, which in turn determines which packets should receive preferential routing from a VIA switch. QoS is often used for the distribution of video and audio signals, including the Dante® audio standard, to meet the signal's required timing constraints. Please remember that giving all data high priority is the same as treating all traffic equally.

Property	Explanation
Off (default)	Disables QoS-based routing. All traffic is treated equally.
Standard	Traffic priority is observed using a weighted algorithm to ensure timely delivery of high priority traffic and eventual delivery of lower priority packets.
Dante Strict	Traffic priority is strictly observed, using Dante-specified weighting. Lower priority traffic may be dropped or ignored to ensure delivery of Dante's high priority packets.

For more information, please refer to the Appendix.

## Utilities

Allows the switch to be rebooted or factory-defaulted from the front panel. The action must be confirmed before being applied. After confirmation, the rotary knob will be locked out, and about 15 to 20 seconds will pass before the LCD changes.

Factory default disables and defaults all VLANs, but does not change the switch's IP settings. Factory default including Net Setup also defaults the base switch IP settings.

Property	Explanation
Reboot	Restarts the switch with current configuration
Factory Default	Disables all VLANs and returns all properties to their default values, except any changes made to the network settings of VLAN #1 (base switch), which will be retained.
Factory Default Including Net Setup	Disables all VLANs and returns all properties to their default values. The network settings of VLAN #1 (base switch) are also returned to their factory values.

# Port Status and Configuration Menu

Port Status may be reviewed by turning to rotary knob to reach the desired port. The LCD shows the following information.

<p><b>&lt;Port Name&gt;</b>  <b>Port x : &lt;link speed&gt;</b>  <i>VLAN &lt;x&gt;</i></p>
--

The port's soft label is shown on the top line. By default, the label is the port number. Below is shown the port number and the link status or speed. If VLANs are enabled, the bottom line shows the VLAN ID# currently assigned to the port.

From the Port Status screen of the desired port, push the button. The Port Configuration menu will be shown.

<p><b><u>Port x Configuration</u></b>  <b>Link Mode:Auto negotiate</b>  <b>PoE Setup / Status</b></p>
---

The chart below shows all port configuration menu options. The italicized options are only shown if VLANs are enabled.

<b>Label</b>
<i>VLAN: &lt;type&gt;</i>
<i>VLAN ID: &lt;#&gt;</i>
Art-Net to sACN
PoE Enable / Disable
PoE Setup / Status
<i>LLDP Link Partner</i>
Link Mode: <current status>
Bandwidth use: x%
<i>Current Multicast Groups</i>
<Back>

The item available for editing will be highlighted in reverse video. Rotate the knob to scroll through the list of properties. Push the knob to edit. Scroll to the bottom of the list and select "<Back>" to return to the previous menu level.

## VLAN Type

VLANs must be enabled from the Advanced Settings menu for this option to be shown.

Property	Explanation
VLAN	<b>Untagged (Normal):</b> Only data belonging to the port's specified VLAN ID# will be transmitted. Typically connected to end equipment. <b>Tagged (Uplink):</b> All traffic on all VLANs will be transmitted. Typically connected to another switch.

Once VLANs are enabled and the VLAN range is set from the Base Configuration menu, by default a port is set as Untagged (Normal) with a VLAN ID# of 1, or the lowest ID# of the VLAN range.

Ports set as Untagged only transmit data packets in the VLAN specified by the ID# and are typically connected to end equipment.

Ports set as Tagged do not require a VLAN ID#, and this option will not be shown. Tagged ports transmit all data packets regardless of the packet's VLAN ID. Tagged ports are typically connected to other switches.

Generally, a Tagged port on one switch should not be connected to an Untagged port on another switch.

## VLAN ID#

The VLAN ID# option is only shown for ports set as Untagged.

Property	Explanation
VLAN ID#	Sets the VLAN tag used by the port. Only data packets belonging to this VLAN ID will be transmitted by the port. Property is only shown for Untagged ports. Only VLAN ID#s within the range defined in the VLAN Setup will be shown.

Currently it is not possible to set a soft label for VLAN ID#.

## Art-Net to sACN ‘Trap-and-Convert’

This option is only shown for ports set as Untagged (Normal).

When enabled, Art-Net data packets with broadcast address destinations are trapped and converted to E1.31 sACN multicast packets, as the packets enter the port of the switch. The resulting sACN packets may then be filtered using the IGMP settings. All other Art-Net broadcast packets, such as ArtPoll, are discarded. Depending on the amount of Art-Net data traffic, this operation could significantly improve bandwidth usage efficiency and reduce the amount of unnecessary traffic seen by end devices.

The Art-Net packet will be converted to the analogous sACN universe. Due to how Art-Net universes are numbered, there is the possibility of an off-by-one error. Change the ‘Alternate Art-Net Mapping’ option should the universe mapping seem incorrect.

Although performance depends on DMX frame rate, conversion of no more than 48 Art-Net universes by one VIA at one time is recommended.

Currently, there is no method of converting the sACN back to Art-Net. This feature assumes the DMX gateways can receive sACN instead of Art-Net.

When this feature is disabled, Art-Net data will be routed as normal broadcast traffic to all devices on the current VLAN.

## Port Enable/Disable

Enabled by default, this option allows the user to completely disable PoE on a given port. Any PoE allocation set with the following parameter will be ignored.

## Port PoE Setup/Status

Allows review and management of power consumption used by devices running on Power-over-Ethernet (PoE).

Property	Explanation
PoE: Class <x>	The PoE class is reported by device.  PoE: Not Detected – not a PoE device Class 0 - No class reported, 15W draw assumed Class 1 - Uses up to 5W Class 2 - Uses up to 10W Class 3 - Uses up to 15W
PoE used: <x>	Consumption in watts as reported by the PoE controller
PoE Allocated: <x>	Reports the maximum draw allowed by the PoE class, or the limit set by the user, whichever is the lower amount.
Max PoE Allocation: <x>	Sets the PoE allocation for the port. Default is 15.4W, regardless of the size of the power supply  Allocation options range from 0.9W to 15.4W, in 900mW increments.

Except for Maximum Allocation, the PoE settings are not user-editable. The Maximum PoE Allocation allows you to set an upper limit to the power available to a connected device, such as a node. Use Maximum Allocation to ensure critical devices will have power. Also use Maximum Allocation to compensate for Class 0 device power allocation. Many older PoE devices cannot report their class. The switch automatically treats these devices as Class 0 and allocates the full, default 15.4W to their ports.

If Maximum Allocation for every port is left at 15.4W, PoE is allocated by the switch: a) when the switch is powered up, PoE is allocated starting with Port 1, then port-by-port through port 12; or b) PoE is allocated on a first-come, first-serve basis, dependent on the order devices are plugged into the switch.

**Troubleshooting tip:** If the green PoE LED on the front panel is blinking, the maximum allocation is too low for the connected device, the PoE power supply has not been set up (see note below) or all available power is already allocated.

**IMPORTANT NOTE:** Model 6750-P, has hardware support for IEEE 802.3af Power-over-Ethernet standard (PoE) and a 100W built-in PoE supply. In order to make use of this, the PoE External Power Supply field in Pathscape must be manually configured. The front panel does not allow a power supply size to be set at this time.

**The model 6750 does not have hardware to support IEEE 802.3af Power-over-Ethernet.** Any PoE-enabled devices connected to a 6750 switch will not be powered.

## LLDP Link Partner

Link Layer Discovery Protocol (LLDP) is an industry-standard method for device announcement and reporting described in the IEEE 802.1AB standard. Any Ethernet-aware device may announce itself using LLDP, not just switches. Currently, the latest Pathport and VIA firmware enables this protocol. The information shown in the chart may be retrieved and shown on the VIA12's LCD, for each Pathport LLDP-enabled device connected to the switch, on a port-by-port basis. Other LLDP-enabled devices may return different information. This property is only shown when a device is connected to the port in question.

Property	Explanation
Manufacturer	For example, Pathway Connectivity
Product Name	For example: Pathport Octo
Firmware version	Operating code version number
IP Address	
Subnet Mask	
Gateway	
MAC Address	
Serial Number	

## Port Link Mode

Allows review and editing of the port's communication speed.

Auto-negotiation allows the switch and the connected device to determine the fastest mutually supported connection speed. However, there are some situations where, due to poor cabling, interference or traffic congestion, ability to force the connection to a particular speed is desirable.

Range is from 10Mb – Half Duplex (a common value for older nodes) to 1000Mb (Gigabit) – Full Duplex. The port may also be disabled.

NOTE: It is not possible to force a device to connect at a speed faster than the device's network interface hardware will support.

Property	Explanation
Link Mode	Disabled (turns port off) Auto Negotiate (recommended) 10Mbit Half Duplex 10Mbit Full Duplex 100Mbit Half Duplex 100Mbit Full Duplex 1Gbit Full Duplex

## Bandwidth Use

Shows, as a percentage value, the bandwidth used on the selected port. Bandwidth is relative to the port speed as negotiated with the link partner, i.e. if the port is set to 100Mbit, a bandwidth use of 55% is equal to approximately 55Mbit of traffic per second.

## Current Multicast Groups

Displays a list of the multicast addresses used by the end device connected to the selected port.

Currently, it is not possible to block a specific multicast group.

## SFP Module (Fiber Ports Only)

Property	Explanation
Not Detected	No module inserted
Not Support	Module is not compatible/supported
1000Base-SX	Module is recognized as type noted
1000Base-LX	Module is recognized as type noted

## Firmware Upgrades

Firmware upgrades may only be done using the appropriate Pathway Connectivity software configuration tool, **Pathscape**, available from the Pathway Connectivity website: [www.pathwayconnect.com](http://www.pathwayconnect.com).

## Appendix 1: SFP Fiber Adapter Selection

The VIA Gigabit Switch models 6750 and 6750-P allow the end user to provide a fiber adaptor. The adaptors are typically referred to as an SFP (Small Form Pluggable transceiver) or mini-GBIC (gigabit interface converter).

Because of frequent catalog changes in the IT world, it is not possible to recommend part numbers from specific manufacturers. The following are guidelines for selection.

1. The form factor must be stated as SFP (not SFP+, XENpack or others).
2. The fiber connector is LC Duplex.
3. The SFP must support Optical Gigabit Ethernet (typically referred to as 1000BASE-SX or 1000BASE-LX) or (Via12 Only) 100 Mbit Ethernet (100BASE-FX) .
4. The SFP must match the type of fiber installed, either Single Mode or Multi-Mode.
5. The SFP must support the distance required, which in turn determines the optical wavelength. 850nm is typically used for runs up to 550m, while 1310nm is typically used for runs up to 10km.

We strongly recommend each end of the connection use an identical SFP.

When the SFP module is inserted in the switch, the Link/Status LED will light up **green**. If an incompatible module is detected, the Link/Status LED will light up **red**. The Port status on the LCD screen, for Port 13 and/or 14 will indicate 1000BASE-LX or 1000BASE-SX, as well as the link status.

The VIA12 will work with 1000BASE-SX, 1000BASE-LX or 100BASE-FX fiber modules.

When connecting a VIA to another manufacturer's switch using fiber, please bear in mind that some switches check the manufacturer's ID, as announced by the SFP module, and will only connect to a matching brand. VIA switches do not perform a manufacturer's ID check, and should work with any SFP module meeting the criteria above (Cisco, Finisar, Netgear, etc.)

## Appendix 2: Virtual Local Area Network (VLAN)

A VLAN (Virtual Local Area Network) is a group of ports on the switch (or switches) that are configured to pass traffic to one another, but not to ports on any other VLAN. When multiple VLANs are established, some ports on the switch may need to be configured specifically to pass all VLAN traffic, to ensure overall traffic is routed correctly.

This feature allows the user to arrange lighting consoles, nodes and other network gear into groups of equipment. The usual purpose is to minimize unnecessary traffic to the equipment, or to segregate different types of equipment (lighting, audio, video) so that the network does not get flooded with redundant data.

### Definitions

VLAN naming practices are confusing. The following terms are paired interchangeably in this manual: Normal and Untagged; Uplink and Tagged.

**Normal/Untagged** ports belong to a specific VLAN as configured by the user, and will only pass traffic that belongs to that VLAN. Typically connected to end equipment.

**Uplink/Tagged** ports pass all network traffic with VLAN 'tags' within the VLAN range established for that switch (see Range Configuration below). Typically connected to other switches.

**Tag** refers to the marker added to (or removed from) the data packet as the packet enters or exits from a Normal/Untagged port on the switch. The "Tag" determines which VLAN the data packet is assigned to.

**Management VLAN** refers to the VLAN that the switch's management processor is assigned to use. Care must be taken that the Management VLAN is used by at least one Normal/Untagged port on the switch, or the ability to configure the switch may be lost. It is strongly recommended that the Management VLAN be identical to the VLAN Range Start.

**VLAN ID (ID#)** is assigned to Normal/Untagged ports and determines which VLAN that port operates within.

Currently, a Normal/Untagged port may only be associated with one VLAN ID# at a given time.

### Software Configuration of VLANs

VLANs may be configured using Pathscope software. Refer to the Pathscope documentation for configuration instructions.

When using software to configure the switch, make sure your computer is connected to a Normal (Untagged) port set to the same VLAN ID# as used by the management processor. Failure to do so will prevent configuration from being applied.

## VLAN Guidelines

Plan the VLAN layout first. The creation of a map of the network, showing which devices to associate with which VLAN, is strongly recommended prior to configuration.

Generally speaking, ports connected to end devices will be configured as Normal/Untagged and given a VLAN ID#.

Ports connected to other VIA switches will typically be set as Uplink/Tagged, so multiple VLANs may be forwarded between switches, or when a VLAN must be forwarded through an intermediate switch (where that VLAN is not in use) on to a third switch beyond. It is possible to set the ports to Normal/Untagged, and given a VLAN ID#, in cases where it's desirable to pass only one VLAN between switches, but this is not a normal practice.

It is strongly recommended that the ports used to connect separate VIA switches should be set to matching configurations.

When configuring VLANs, remember that each switch must be uniquely identified on each VLAN in use on that switch. By default, only the management VLAN is automatically assigned an IP and subnet mask. All other VLANs default to a null IP address value (0.0.0.0). Use the Network Configuration options available from the VLAN configuration screen to configure the desired IP settings for each VLAN.

VLAN ID#	1	2	3	4
Label				
IP Address				
Subnet Mask				
Default Gateway				
IGMP Snooping				
IGMP Querier				
DHCP Server				
Art-Net Alternate Mapping				
QoS Level				

Switch Label:														
Port	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Connected Device														
Normal/Uplink														
VLAN ID#														
ArtNet to sACN														
PoE Max														
Link Mode														
SFP Type														

## Appendix 3: Ring Protection

Ethernet wiring schemes are based on a 'star'-wiring topology. Ring (or loop) data wiring – where the last device in a chain is wired back to the first device – is forbidden. Only one data path between any two devices is allowed.

But star-wiring layouts are prone to single point failures. Unlike DMX512 transmission, passive data 'thru' connections are not possible with Ethernet, which means there is no redundancy under normal operation. A severed cable or power loss to a switch can mean the loss of some or even all show control.

Ring Protection allows the deliberate – and designed – use of a ring wiring system for Ethernet communications. When in this mode, VIA 12 switches ignore data traffic on one segment of the ring, while monitoring the integrity of the remaining connections. If an interruption is detected, the unused ring segment is activated and full communication is restored. Fail-over time is between 50 and 75 milliseconds, or two to four DMX packets.

### Requirements and Limitations

VLANs must be enabled to use Ring Protection. The mode uses a dedicated VLAN to monitor the integrity of the ring. By default, VLAN 4095 is used.

Only ports 11 through 14 on models 6750 and 6750-P may use this feature.

Ring Protection works with VIA switches only. Switches from other manufacturers can co-exist on the network but should not be placed in-line with the ring.

### Definitions

**Master** switch monitors the integrity of communications. Only one switch on the network may be configured as the master. If choice is available, the least busy switch should be chosen as the master.

**Transit** switches receive and forward the ring monitoring packets. All switches other than the Master must be set as transit switches.

**Primary port** is the main (active) UPLINK connection link on the Master switch, joining to the rest of the network. All transit switches must also have one port configured as the primary. Only ports 11 through 14 are available to be used as the primary port.

**Secondary port** is an UPLINK port 'ignored' (logically blocked) by the Master switch to break the ring topology. All transit switches also must have one port configured as the secondary port. The secondary port is actively used on transit switches. Only ports 11 through 14 are available to be used as the secondary port.

**Control VLAN** is a unique VLAN ID dedicated to monitoring the health of the network. All switches must use the same control VLAN. The default is VLAN ID 4095.

**Ring Protect State: Complete** indicates the ring is complete. Communication is relying on the primary port of the Master switch, and the overall network is secure.

**Ring Protect State: Failed** indicates the ring is broken. Communication is relying on the secondary port of the Master switch, and the overall network is now vulnerable. The fault should be located and corrected. Once the fault is corrected, the ring protect state will automatically revert to “Complete”.

**Note:** Ring Protection wiring topology is not structured. No care need be taken when connecting primary and secondary ports together – any arrangement is acceptable.

**Warning:** During the set up and configuration of the Ring Protection feature, communication between devices may be erratic or broken. We strongly recommend that all switches be configured with the appropriate Ring Protection settings PRIOR to be connected together. We also strongly recommend that all switches be disconnected from one another PRIOR to decommissioning the ring.

## Software Configuration of Ring Protection

**Pathscape** supports configuration of the Ring for models 6750 and 6750-P. Previous version of Pathway configuration software, including VIA Manager and Pathport Manager, do not.

## Appendix 4: Rapid Spanning Tree Protocol

The Rapid Spanning Tree Protocol (RSTP) is another technology to prevent network loops. The algorithm can be described as follows

- One switch is elected as the “root” of the tree.
- The root switch sends out periodic “Hello” packets
- Each switch receives the Hello packets and computes the relative cost of the path back to the root switch.
  - Faster links (i.e. 1 GBit links) have a proportional lower cost than slower links.
  - Tagged VLAN port costs are reduced by a factor of 10.
  - Ring Protect ports are reduced by a factor of 100.
- If a switch detects more than one port that leads back to the root switch all but the lowest cost port are blocked.
  - In the case where both multiple ports have the same cost the lower numbered port is preferred.

## Appendix 5: QoS Settings

Quality of Service priorities are determined by the Differentiated Services Code Point (DSCP) field contained in each data packet header. DSCP values may range from 1 to 64, and are mapped to four egress (output) queues. The egress queues are, in turn, numbered from 1 (Best Effort) to 4 (Highest Priority).

The DSCP mappings and related QoS settings used by VIA switches is shown in the following table:

Property	Explanation
Off (default)	Disables QoS-based routing. All traffic is treated equally.
Standard	Queue 1: DSCP values 1-16 Queue 2: DSCP values 17-32 Queue 3: DSCP values 33-48 Queue 4: DSCP values 49-64  A weighted fair queuing algorithm is used to prevent the starvation of lower queues by higher priority traffic.
Dante Strict	Queue 1: All DSCP values except: Queue 2: DSCP 8 Queue 3: DSCP 46 Queue 4: DSCP 56  Queues 3 and 4 are handled by strict priority, while the two lower queues are handled by the weighted algorithm.

## **Appendix 6: Electrical Information**

### **Model 6750**

- Power input: 100-240VAC, 50/60Hz
- 0.3A Maximum current draw

### **Model 6750-P**

- Power input: 100-240VAC, 50/60Hz
- 1.3A Maximum current draw
- Integrated PoE supply: 100W; Class 3 PoE (15.4W Per Port)