

***thinklogical***

## Router ASCII API V4

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Related documents:

Configuring-the-ASCII-Interface.pdf  
Router\_Interfaces.pdf  
Router\_SNMP\_Traps.pdf

These documents may be found on our ftp site: <ftp://ftp.thinklogical.com/VxRouter/Documentation/> or on our web site: [http://www.thinklogical.com/user\\_manuals](http://www.thinklogical.com/user_manuals).



This symbol is used to mark important information that will be needed to effectively use this API with the VxRouter matrix switch.

This document (Router-ASCII-API.pdf) is valid for XVERSION V4.X.

If XVERSION returns V3.0, V3.1, or V3.2, you need ***DCS-ASCII-API-V3.pdf***.

If XVERSION returns V3.5, you need ***Router-ASCII-API-V3.5.pdf***.

# Overview



Unless stated otherwise, references to a VxRouter also apply to a MxRouter and a HdxRouter.

This document describes the command set used to control Thinklogical's VxRouter series of matrix switches. The commands are all ASCII based and are terminated with either a linefeed character or a carriage-return / linefeed pair. Port numbers are all 4 digits in length and filled with leading zeros (Example: port 12 is encoded as 0012).

The VxRouter commands are based on the command set used by our DCS product line. Some DCS commands were removed because they did not apply to the VxRouter system. New commands were added to accommodate features in the VxRouters that were not in the DCS.

This release of API version 4.x marks a radical departure in the procedure used to make or break connections. Previously, the VxRouter was treated as having 'N' number of bidirectional ports. When a connection command was received, in most cases two connection paths were created. One path allowed information to flow from a transmitter to a receiver, and the second path allowed information to flow from the receiver to the transmitter. The second path was sometimes referred to as the 'low speed channel' or the 'back-channel'.

Automatic path creation required only one connection command to create two connection paths. The software took care of maintaining the second path. The drawback from this feature is that none of the ports used by the second path were available for any other use. This could lead to half or more of the ports on a VxRouter being unusable.

The API commands have been modified in this version of the interface (Version 4.x). These commands give the user complete control over every input and output port of the VxRouter switch matrix. The drawback is the need to issue two commands to connect or disconnect bidirectional data instead of one command. You still need only one command to connect or disconnect video data.



The ability to make any possible connection means that it is now possible to have one keyboard/mouse connected to multiple CPU's. The user can be watching the video from, and interacting with, CPU A while simultaneously sending keystrokes to CPU's A, B, C, D,...

## **HDX switch support.**

The HDX series of switches uses the same API as the VxRouters. Because the HDX implements synchronized switching, a method to cause a sync'd switch event to occur was needed. The HDX API will synchronize switching when it receives a line feed (LF) at the end of a switch command. These switch commands are: Connect, Disconnect, XPUT and Macro.

## **MX switch support.**



The MX series of switches uses the same API as the VxRouters. The one difference is the **XMAXCARDS** command. It returns the actual maximum number of I/O cards allowed, **not** one-half the total. Refer to the **XMAXCARDS** section on page 11.

Unless otherwise indicated, references to VxRouters also apply to the HDX and MX models.

## **XOPTIONS command.**

The new command **XOPTIONS** can be used to determine which command options are available in the api.

# Conventions

## Port numbers

- All port numbers are four places long, start counting at 1 and have leading zeros. For example, port 15 is encoded as 0015.
- A port number of 4 zeros is used in response to a status command to signify that no port is in use. A zero port number is not valid in a command string.
- A port number of four 9s (9999) is used to signify ALL ports. It is not valid in a response. For example, if you wanted to encode all output ports, you would use: O9999
- In the following sections, xxxx is used as a generic input port place holder; yyyy is used as the output port place holder. Do not use xxxx or yyyy in a command, but replace each with the appropriate input or output port number.

## Results

Results from commands are ASCII strings terminated with a newline (linefeed). The first character is an 'R', followed by a 4 digit, zero-filled length. The length includes the trailing newline. Following the length will be either 'OK', or 'ERnnnn'. OK signifies the command was successful, while ERnnnn is an error code. After the OK or ERnnnn, a comment may appear giving more detailed information.

In the case of a status command, the OK is followed by the status response.



**You must wait for a result response before sending another command.**

There are several options to control the output from the API. These options are described in detail in the document [\*Configuring-the-ASCII-Interface.pdf\*](#). Two of the options are:

1. [--CR] Include a carriage return on each line output. (Useful for Windows)
2. [--verbose] Append a comment to each response with more information about an error code, or repeat the successful command. Comments will start with the '#' character.

### Examples of verbose output

```
Command:      CI000400007
normal:      R00030K
verbose:     R00150K#CI000400007
```

```
Command:      CI000400087
normal:      R0007ER0007
verbose:     R0072ER0007#Output port number 87 is out of range (1 thru 80):
              'CI000400087'
```

## **Upper vs. Lower case**

The upper case single letter commands (C,D,S) affect the upper shelf of a Vx320, the upstream to downstream paths of a Vx160, and all the paths on a Vx40, Vx80, Vx320v, Vx640, Hx80, Hx576, Mx48.

The lower case single letter commands (c,d,s) affect the lower shelf of a Vx320, the downstream to upstream paths of a Vx160, and are NOT valid on a Vx40.

All other commands may be in either case.

Vx40	Upper case only
Vx80	Upper case only
Vx160	Upper and Lower case required
Vx320	Upper and Lower case required
Vx320-Video	Upper case only
Hx80	Upper case only
Hx576	Upper case only
Mx48	Upper case only
Vx640	Upper case only

*Table 1: Upper vs. Lower case*

# Commands

## Connection commands

### Connect

Connect one input port to one or more output ports. Connections are additive.

For example, connecting input 5 to output 7 will result in 7 being added to any existing connections to input 5. The 'i' and 'o' may be of either case.

Format: `CixxxxOyyyyO....`  
`cixxxxoyyyo....`

- xxxx of all 9's is illegal.
- yyyy of all 9's will connect xxxx to all outputs.
- Connections will be made in the order specified.

Example Results:

- R00030K or R0007ERnnnn



When switching keyboard/mouse channels it is now possible to connect one keyboard/mouse to multiple computers. *Unless the appropriate video connections are also made, you will be sending commands to computers that you are not currently viewing. This could have disastrous results!*

### Disconnect

Disconnect one or more input or output ports. Disconnecting outputs only affects that port, but disconnecting inputs will affect every output connected to that input. The 'i' and 'o' may be of either case.

Format: `Dixxxx...` or `Doyyyy.....`  
`dixxxx...` or `doyyyy.....`

- This will disconnect all outputs connected to input port xxxx or will disconnect output port yyyy only.
- DI9999 or DO9999 will disconnect all the Upstream/Upper ports.
- di9999 or do9999 will disconnect all the Downstream/Lower ports
- It is not an error to disconnect a port that is not connected.

Example Results:

- R00030K or R0007ERnnnn

Note: If you want to disconnect ALL the ports (Up and Down), you may use the XPUT command without listing any ports.

### Frame Synchronize

On the HDX family of routers, configure the Sync card to use sync format N. N ranges from 0 to 63. Refer to the HDX manuals for the correct usage of the command. This command is not allowed in the Vx family of routers and it will return an error.

Format: `F00nn`

## Status

Return the connection status of an input or output port.

Format: **SiXXXX**  
**siXXXX**

- Return the list of output ports that are connected to input port xxxx.
- If nothing is connected to port xxxx, 0000 will be returned.

Format: **Soyyyy**  
**soyyyy**

- Return the input port number that is connected to output port yyyy.
- If nothing is connected to port xxxx, 0000 will be returned.

Example Results (SI):

- Rnnnn0KIxxxx0yyyy0yyyy0yyyy... or R0007ERnnnn
  - xxxx is connected to output(s) yyyy.
  - 0000 means not connected.

Example Results (S0):

- Rnnnn0KIxxxx0yyyy or R0007ERnnnn
  - xxxx is connected to output yyyy.
  - 0000 means not connected.

## XGET

Return the entire switch connection state. The output from this command is used by the XPUT command.

Format: **XGET**

- This will return a (very) long string listing every connection. The connection list consists of a series of input port numbers, followed by output port numbers.
- The XPUT command requires all the characters in the response that come after the 'OK'.

Example Results:

- R00370KI00010003I00020004i0010001000110012
- R00290KI00010003I0010001000110012
- R00120KI01230145
- R00030K or R0007ERnnnn

## XPUT

Restore the entire switch connection state. The output from XGET is used by this command.

Format: **XPUTstr**

- The XPUT command will turn off all outputs and then make the connections that are listed in 'str'. 'str' is the response that was returned from a XGET command.
- XPUT without any ports is valid and is interpreted as a command to disconnect all ports.
- Example: XPUTI00010003I00020004i0010001000110012

Example Results:

- R00030K or R0007ERnnnn



## Macro

Sends a sequence of connect and disconnect commands as one command line. The syntax of this command is different from the other commands. This command combines connects and disconnects in one string and also combines upper and lower case commands. While the connect and disconnect have upper and lower case versions, there is only an upper case 'M'. The break between the two chassis is done with a semi-colon (;). All commands before the semi-colon affect the Upstream/Upper ports, and the command after the semi-colon affect the Downstream/Lower ports. If a router only has one set of ports (such as the Vx40), then the semi-colon may be omitted.

Format: `Miiii0000iiii0000...[;iiii0000iiii0000...]`

- `iiii` - input port number
- `oooo` - output port number
- an input number of `0000` (all zeros) will disconnect the listed output port (same as the DO command)
- an output number of `0000` (all zeros) will disconnect the listed input port from all connected outputs (same as the DI command)
- an output number of `9999` will broadcast the input port to all outputs
- unlike the XPUT command, the router is not reset before the command is executed
- To turn off all the ports, set the input to all zeros and the output to 9999.
- a 'M' without inputs or outputs is valid. This allows external systems to determine if the API version supports the macro command.
- Example: `M00000001101230000;00230008`
  - disconnect (upper) output 11
  - disconnect (upper) input 123
  - connect (lower) input 23 to output 8
- Example: `M00009999;00009999`
  - disconnect all ports (the semi-colon section is not needed if the router only has one chassis – such as the VX80 or VX320-video)

Example Results:

- `R00030K` or `R0007ERnnnn`

## XSTATUSIO and XSTATUSOI

Similar to the XGET command, these commands return the current switch connection state. The switch state is returned as pairs of ports, input port and output port for the 'IO' command and output port and input port for the 'OI' command. A data pair is returned for each active connection. For bi-directional switches (example: Vx160 and Vx320), the upper chassis pairs are listed first, then a semi-colon (;), then the lower chassis pairs. The semi-colon is always present in an 'OK' response.

The XGET command encodes the port information as hexadecimal values, these commands use four digit, zero filled decimal values. For example: the value 12 is encoded as: 0012. Unlike the XGET, there is only one 'I' or 'O' in the response. It is immediately after the 'OK' and is there to identify which port (input or output) appears first in the data pair.

Format: `XSTATUSIO`

Format: `XSTATUSOI`

- This will return a (very) long string listing every connection. The connection list consists of pairs of port numbers.

Example Results:

- `XSTATUSIO: R00270KI0010012300120015;00030005`
- `XSTATUSOI: R00270K00015001201230010;00050003`
- `XSTATUSOI: R00110K0;00050003`
- `XSTATUSOI: R00190K00015001201230010;`
- `R00050KI; or R00050K0; or R0007ERnnnn`



## **XLASTEVENT**

Returns a time-stamp string that was set the last time a connection was made or broken. This can be used to determine if the switch status has changed since the last XLASTEVENT command was issued.

Format: XLASTEVENT

Example Results:

- R00270KThu Jul 1 11:23:52 2010

## **XPORTCONFIG**

Returns a comma delimited list of three numbers: NU, NB, OFF.

The first number (NU) is the maximum number of uni-directional paths in the system. The second (NB) is the maximum number of bi-directional paths and the third is currently defined as zero.

Format: XPORTCONFIG

Example Results:

- R00170K0080,0000,0000 Vx40
- R00170K0000,0160,0000 Vx160
- R00170K0000,0320,0000 Vx320
- R00170K0576,0000,0000 Hx576

## **XALARM**

Returns the VxRouter hardware alarm status.

The return value is a decimal number that represents a bit-map of the actual alarm bits. For example, if 19 is returned, the binary format will be: 10011. This shows that 3 alarms are active (3 bits are '1'). The leftmost bit in the example is bit 4, followed by bits 3, 2, 1 and 0 (the rightmost bit). Bit 0 corresponds to alarm 1, bit 1 to alarm 2, etc.

The alarm bits are defined in the VxRouter manual and vary depending on the model.

Format: XALARM

Example Results:

- (Vx320) R00070K0522  
Decimal 522 is 1000001010 in binary (bits 9, 3 and 1 are 'on')

## **XRESET**

Resets the internal switch hardware to its power on state.

Format: XRESET

Example Results:

- R00030K or R0007ERnnnn

## XCRON and XCROFF

Enables or disables sending CR's on each line. XCRON is typically used when a (Windows) telnet client connecting to the VxRouter requires each line to end with a CR/LF pair.

Format: XCRON or XCROFF

Example Results:

- R00030K

## XMAXCARDS

Returns the maximum number of either upstream or downstream cards in the switch. The total number of cards in the system is **twice** the value returned. The Vx160 has 8 upstream and 8 downstream cards for a total of 16 cards. To maintain consistency, the VxRouters that are uni-directional (the Vx80 and Vx320-Video) also return half the number of cards.



- The Mx family of Routers are uni-directional. However, the Mx48 only has 3 I/O cards, so it is not possible to return ½ the number of cards. So, the Mx family will return the maximum number of cards.

Bit 3 of XOPTIONS may be used to determine if XMAXCARDS returns ½ the number of cards (default) or the actual number of cards (i.e. for the Mx family).

	UpStream Cards	DownStream Cards	Total cards	Returned value	XOPTIONS bit 3
Vx40	8	8	16	8	0
Vx80	16	0	16	8	0
Vx160	8	8	16	8	0
Vx320	20	20	40	20	0
Vx320-Video	20	0	20	10	0
Hx80	16	0	16	8	0
Hx576	36	0	36	18	0
Mx48	3	0	3	3	1
Vx640	32	0	32	16	0

*Table 2: XMAXCARDS return values*

The Vx160 example shows the message returned when the 'verbose' API command line option is enabled. In this case, the API command is returned at the end of the response message.

Format: XMAXCARDS

Example Results:

- (Vx40) R00070K0008
- (Vx160) R00170K0008#XMAXCARDS
- (Vx320) R00070K0020

## XQUIT

Ends the network connection.

## XOPTIONS

This command returns a numeric response that is a bit map of options available in the version of the api. The value returned is a four digit decimal number of the binary bit map. For example if the value returned was 0015, then bits 0, 1, 2, and 3 would be on (bit 0 is the lsb).

The following bits are defined:

- 0 HDX Sync card may be installed. This is set for the HDXRouters.
- 1 XTEST2 command is allowed. This is set for the Vx320 Router.
- 2 only upper case commands are allowed.
- 3 XMAXCARDS returns the total number of cards allowed in the router, not ½ the number. This is set for the Mx family of routers.
- 4 Router supports point-to-point connection mode.

Format: XOPTIONS

Example Results:

- R00070K0007

## XHELP

Print a list of valid commands.

This is a multi-line response that does NOT start with OK or ER or end with a length. It is intended as a debugging aid and not for use in a production environment. It does not follow the format rules for command responses.

Sample response:

```
C,D,S          - upstream to downstream or upper shelf path
c,d,s         - downstream to upstream or lower shelf path

{C|c}Ixxxx0yyyy0... - Connect Input          09999 broadcasts port xxxx
{D|d}Ixxxx...      - Disconnect Input(s)   I9999 disconnects all
{D|d}0yyyy...      - Disconnect Output(s)  09999 disconnects all
{S|s}Ixxxx         - return list of output ports
{S|s}0yyyy         - return input port
XGET              - return switch status of all the ports
XPUT{I|i}xxxxyyyy... - restore switch status (from XGET)
  I - upstream to downstream or upper shelf path
  i - downstream to upstream or lower shelf path
Miiii0000...[;iiii0000...] - Macro command  ports after the 'M' are the upper ports,
after the ';' are the lower ports
  iiii equal to zero means disconnect the output
  oooo equal to zero means disconnect the input
XVERSION         - return software version
XINSTALLED       - return list of installed cards
XMAXCARDS        - return max. num of cards
XMAXPORTS        - return max. num of ports
XDCSTYPE         - return Vx160Router
XLASTEVENT       - return timestamp of when VxRouter status last changed
XPORTCONFIG      - returns a string with 3 numeric values: NU,NB,OFF
                   NU = number of uni-directional paths
                   NB = number of bi-directional paths
                   OFF = is not used and returns 0
                   A VxRouter contains 1*NU or 2*NB paths
XRESET           - resets the switch hardware to the initial poweron state
XALARM           - returns an alarm bit mask (0 means no alarms), bits are system
dependant
XTEST1           - diagnostic test 1 - connect 1 to 1, 2 to 2, ... n to n
XCRON            - turn on CR's
XCROFF           - turn off CR's
```

```

XSTATUSIO      - return switch status as pairs of ports, input first
                 upper chassis ports listed first, then a ';', then lower
                 chassis ports
                 Iiiiiioooooiiiiioooo...;iiiiioooooiiiiioooo...
XSTATUSOI      - return switch status as pairs of ports, output first
                 upper chassis ports listed first, then a ';', then lower
                 chassis ports
                 Oooooiiiiioooooiiii...;ooooiiiiioooooiiii...
XOPTIONS       - returns a bit mask of installed options
                 bit 0   HDX Sync card  compatable (lsb)
                 bit 1   XTEST2 allowed
                 bit 2   upper case commands only
                 bit 3   XMAXCARDS returns the total number of cards allowed,
                         not one-half the number
                 bit 4   Router supports point-to-point connection mode
XQUIT          - end this session
XHELP          - this text

```

## XSYNCSTATUS

Valid in the HDX family of routers, it returns the status of the sync card. This command is not allowed in the Vx family of routers and it will return an error.

Format: XSYNCSTATUS

Example Results:

- R0007ERnnnn
- R00320Ki,r,l,a,format,reference (Ex: R00200K1,0,0,0,0063,0003)
  - i = 1: sync card is installed
  - r = 1: reference detected
  - l = 1: locked
  - a = 1: auto, = 0: manual
  - format = output sync format index
  - reference = input reference format index

# VxRouter Port Numbering

When making or breaking connections, it is important to identify the 'direction' of the connection. In this context, connection direction refers to data flow from the extender transmitter to the extender receiver, or receiver to transmitter. Transmitter to receiver data flow is called an 'upstream to downstream' connection and a receiver to transmitter data flow is a 'downstream to upstream' connection.

The Vx40 is actually an 80 port switch. It can be thought of as having 80 upstream ports (similar in design to the upper half of the Vx320).

The Vx160 has I/O cards labeled Upstream and Downstream. The Vx320 has two cards shelves. The upper shelf holds the upstream ports and the lower holds the downstream ports.

The Vx160 only allows connections between upstream and downstream ports. You may not connect an upstream port to an upstream port or a downstream port to a downstream port.

The Vx320 only allows connections within a card shelf. You may not connect an upper shelf port to a lower shelf port.

The illustrations below show the port number assignments.

## **Vx40 / Vx80**

Connections may be made between any port on any card. The labels of 'upstream' or 'downstream' are not relevant. Vx40 ports are numbered from 1 to 80, the same as the .

## **Vx160**

Connections may only be made between upstream input ports and downstream output ports, or downstream input ports and upstream output ports.

## **Vx320**

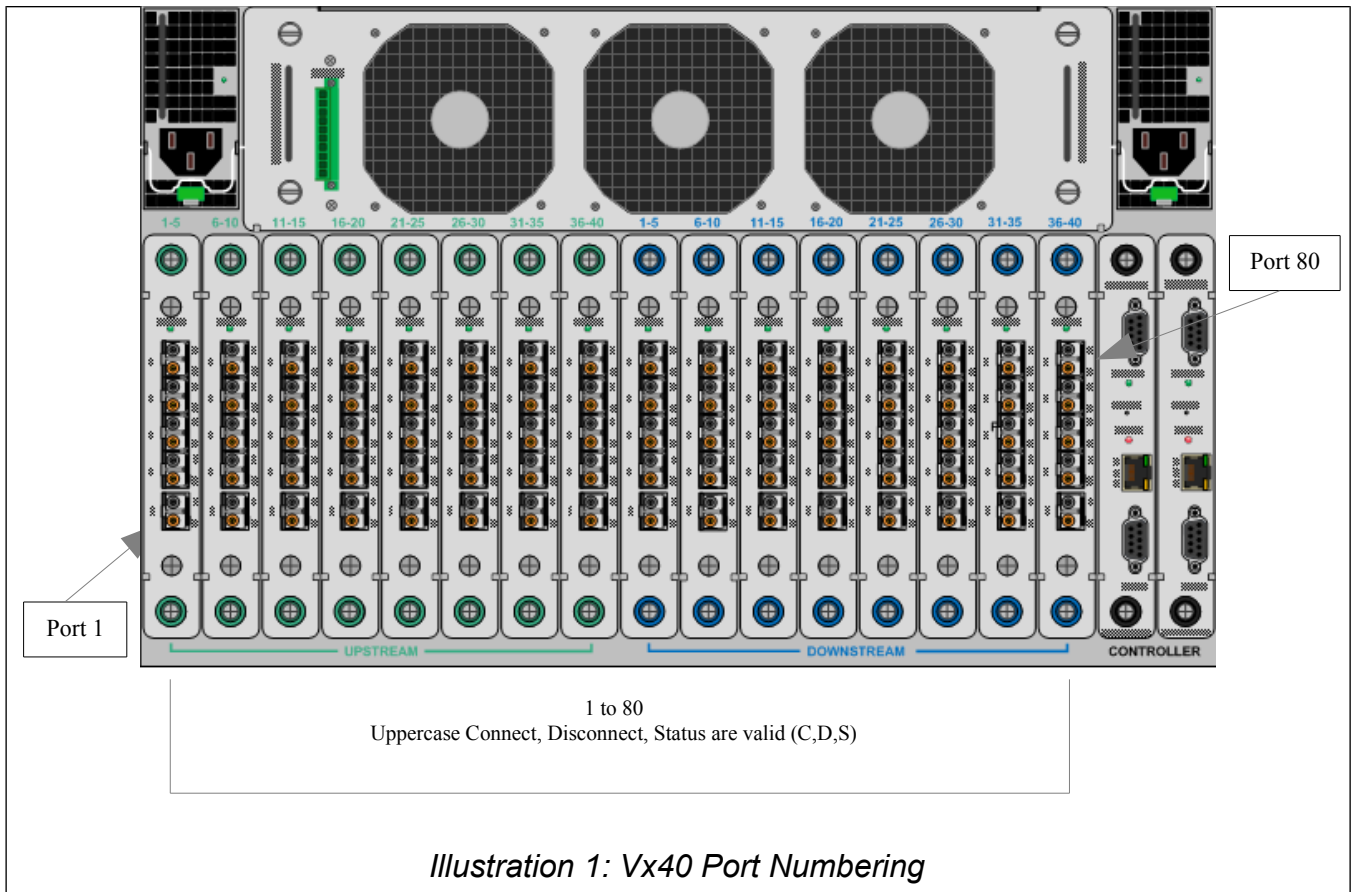
Connections may only be made between input ports and output ports on either shelf. You may not make connections between shelves.

## **Vx320 Video / Hx80 / MX48 / Vx640**

Connections may be made between any port on any card.

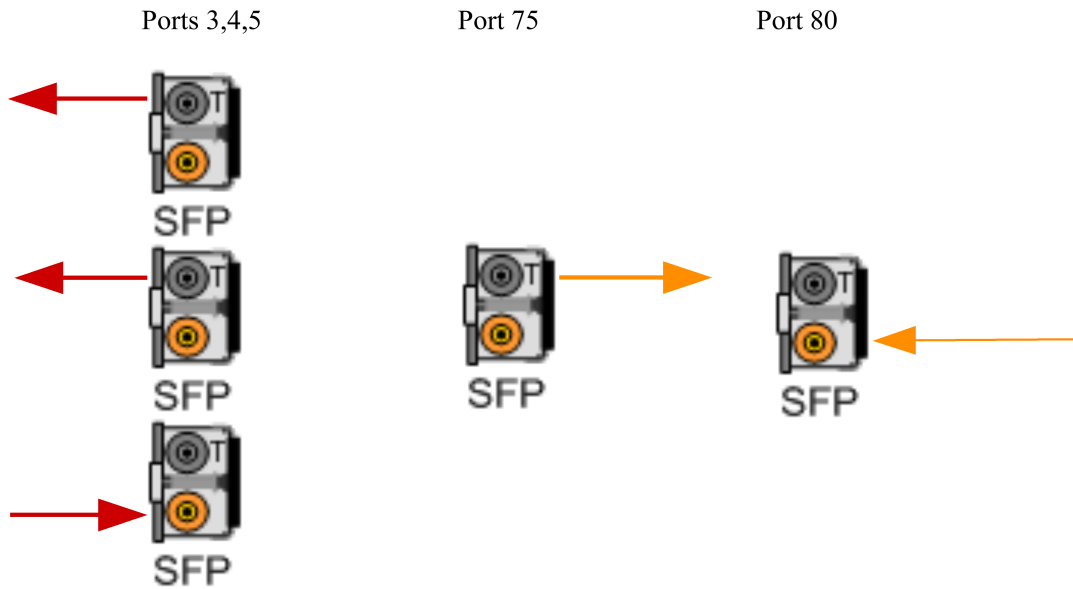
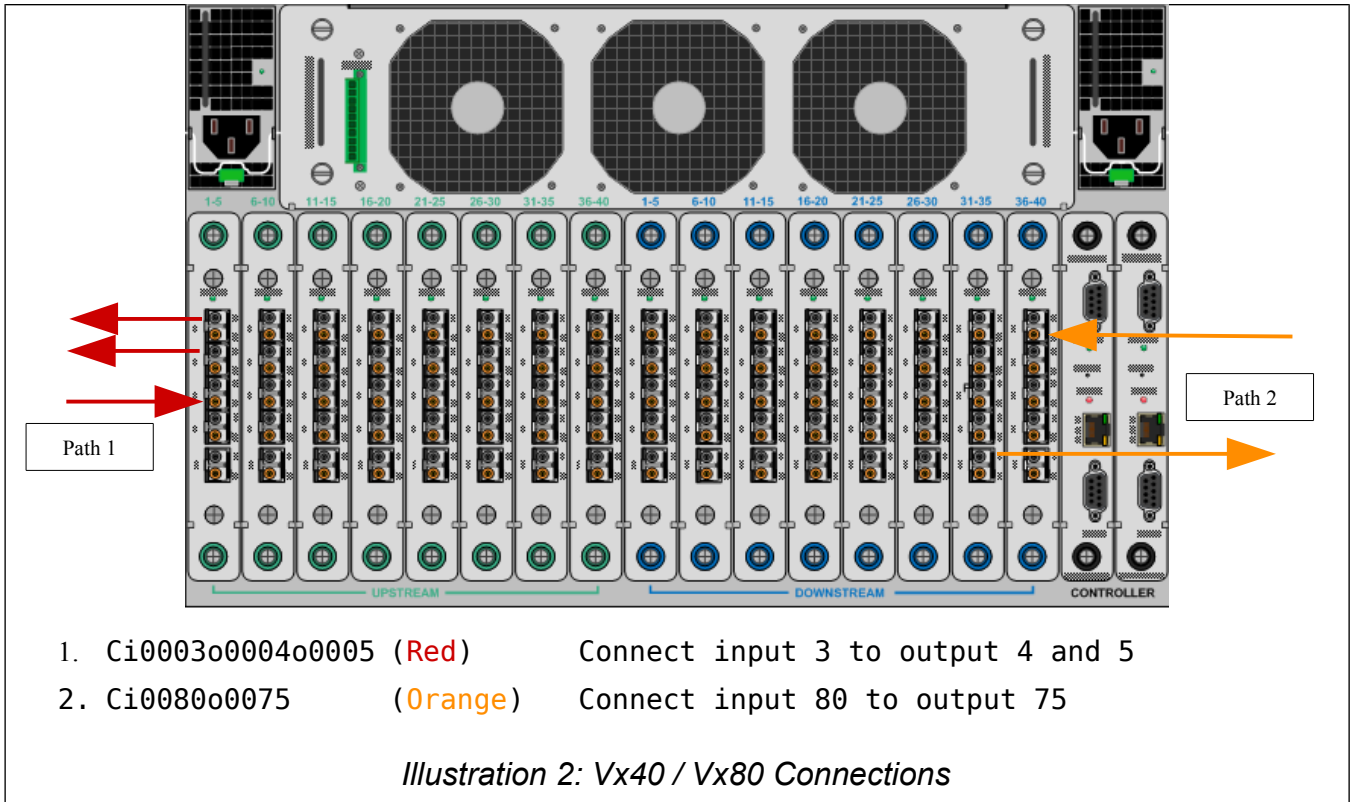
## **Hx576**

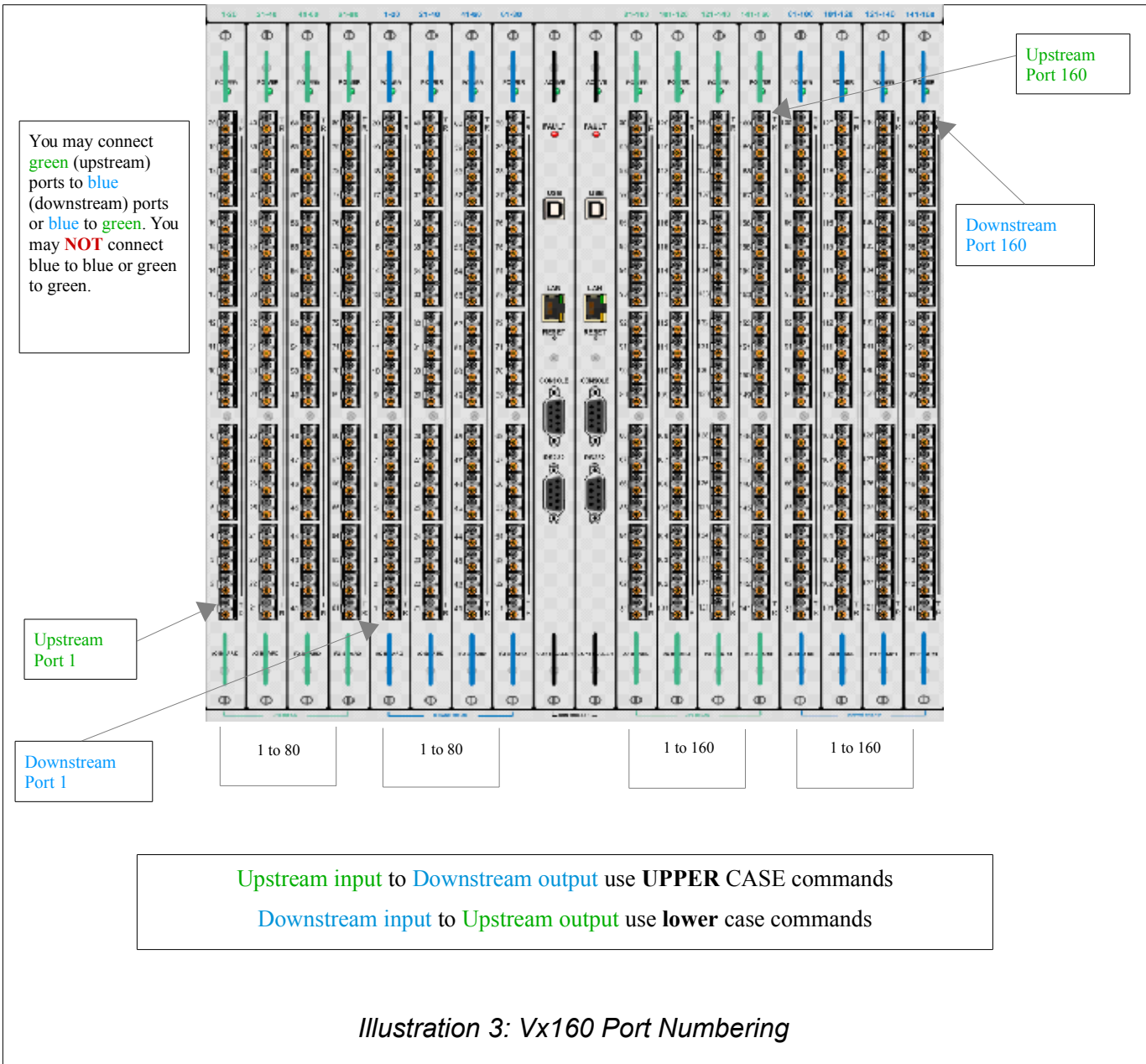
- With one Switch card installed: connections may be made between port 1 and 288.
- With two Switch cards installed: connections may be made between ports 1 and 288 (the left side of the switch) or ports 289 and 576 (the right side of the switch). It is not possible to connect between ports  $\leq 288$  and ports  $>288$ .
- With four Switch cards installed: connections may be made any port on any card.

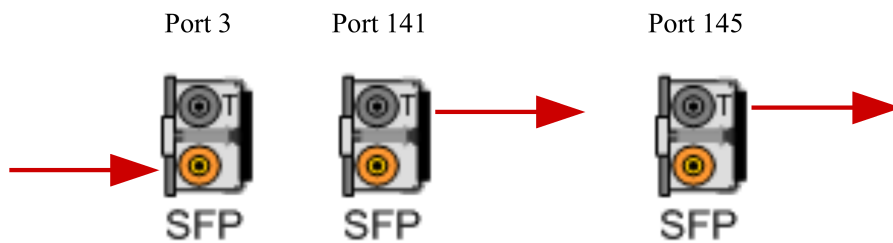
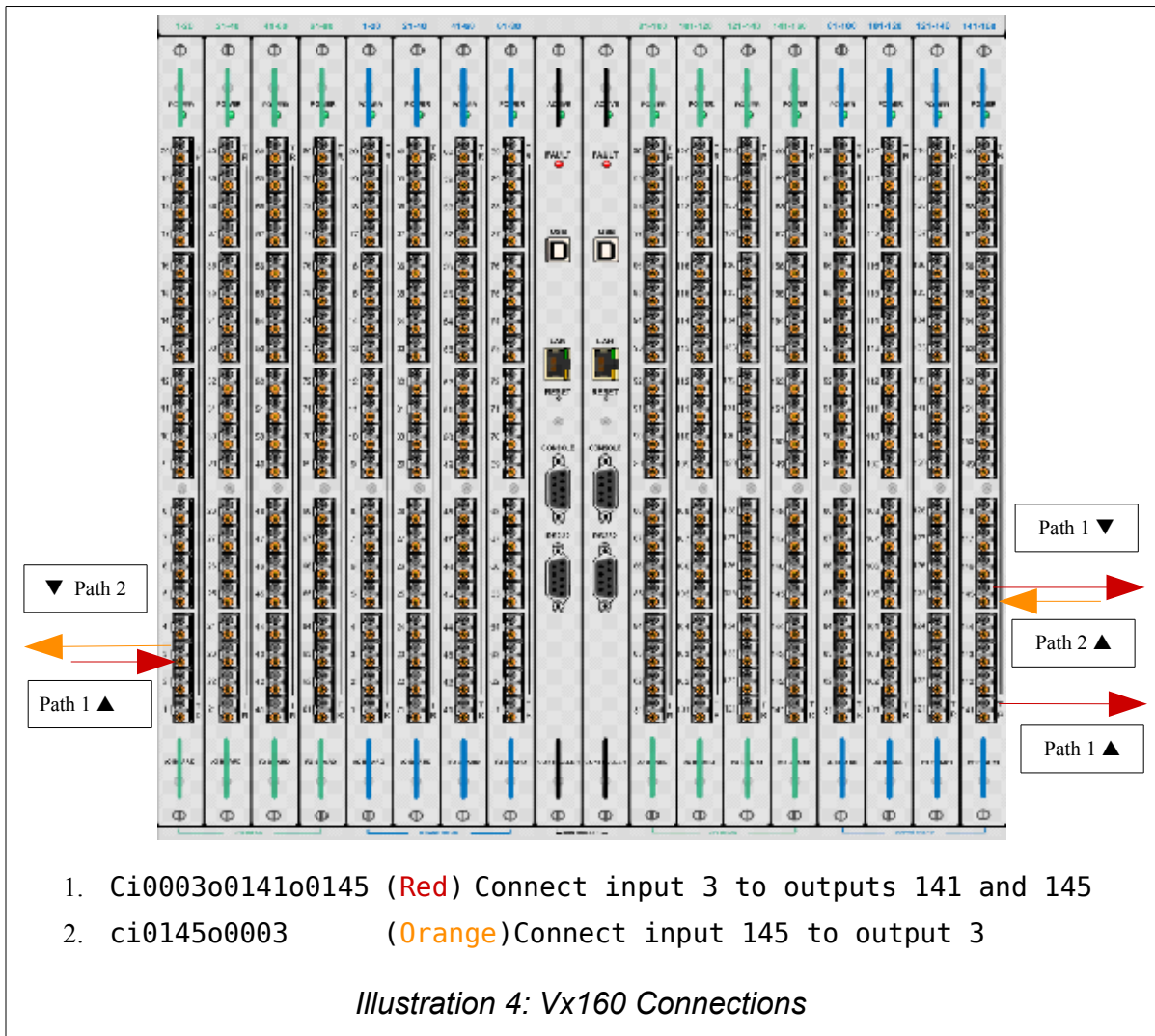


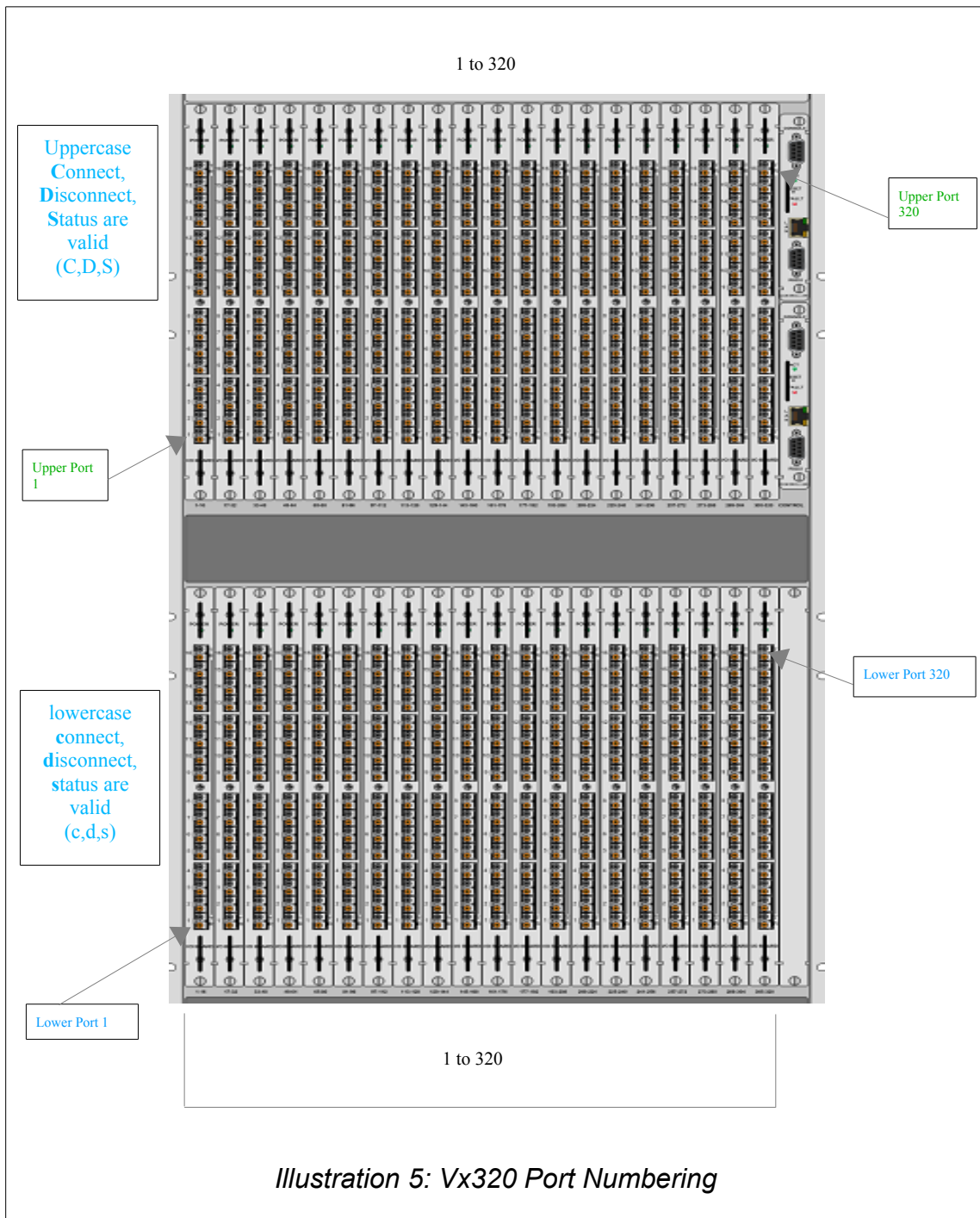
Early models of the Vx40 have 1 - 40 silk screened in blue and green on the back of the unit (see illustration above). Later models have 1 - 80 silk screened in black. The black 1 – 80 is the accurate port numbering. Refer to *Illustration 8: Hx80 / Vx80 Port Numbering* to see a picture of the back of the unit.



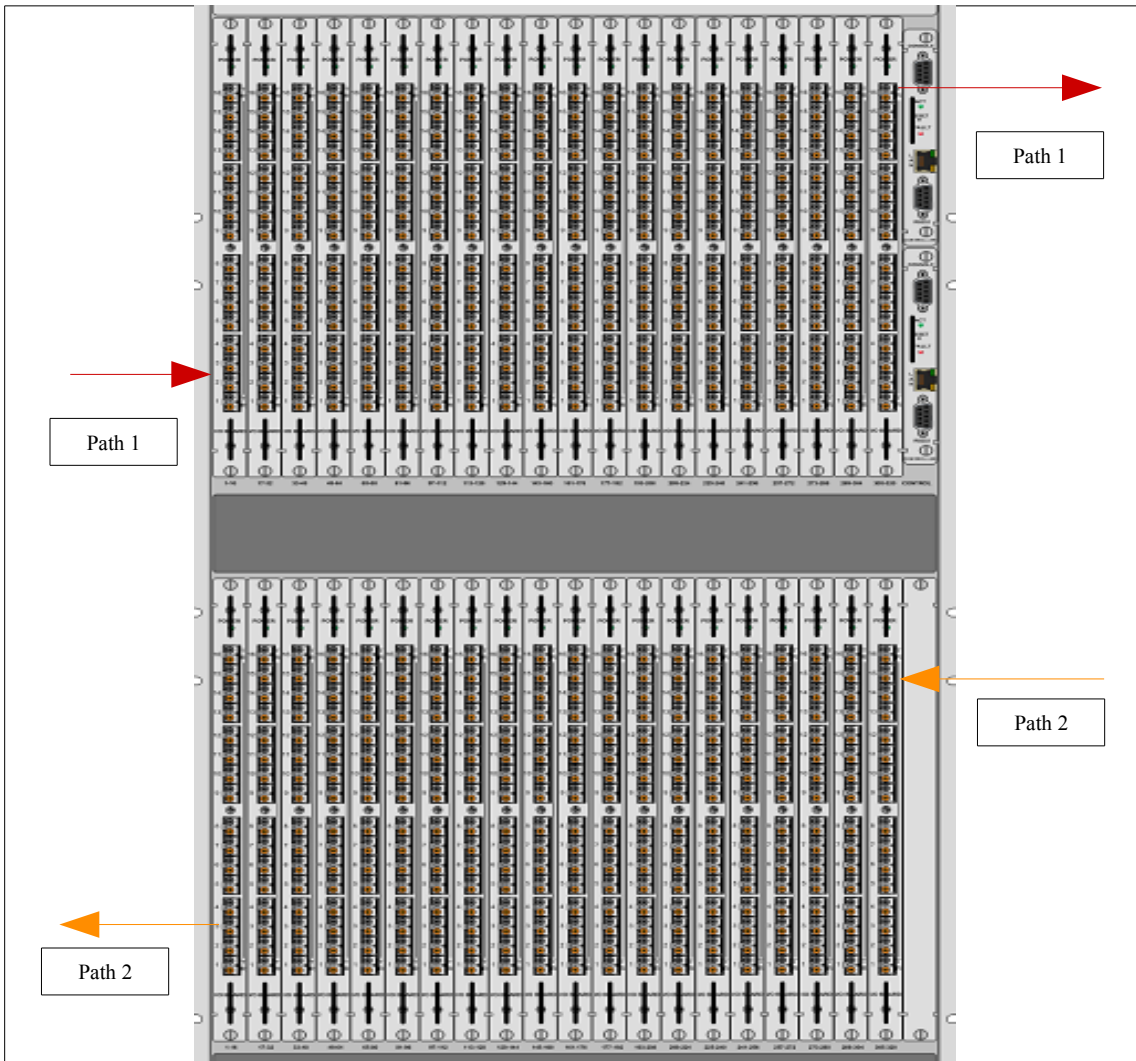






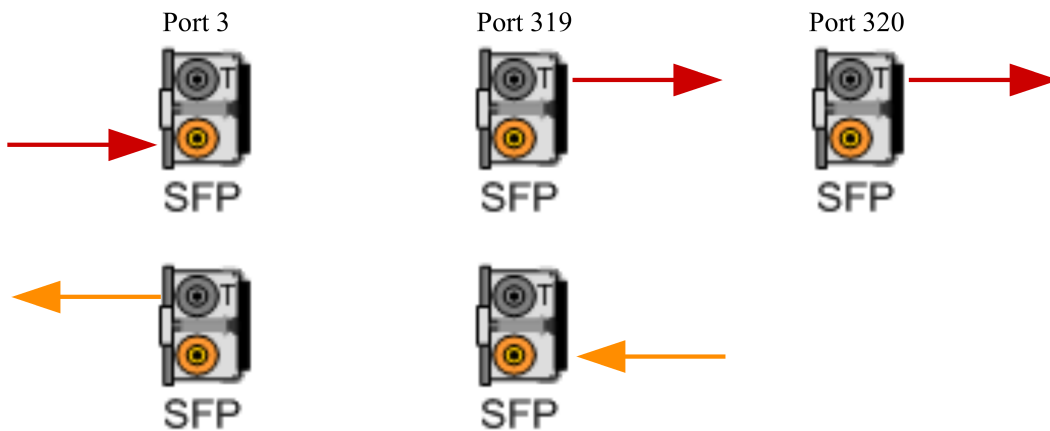


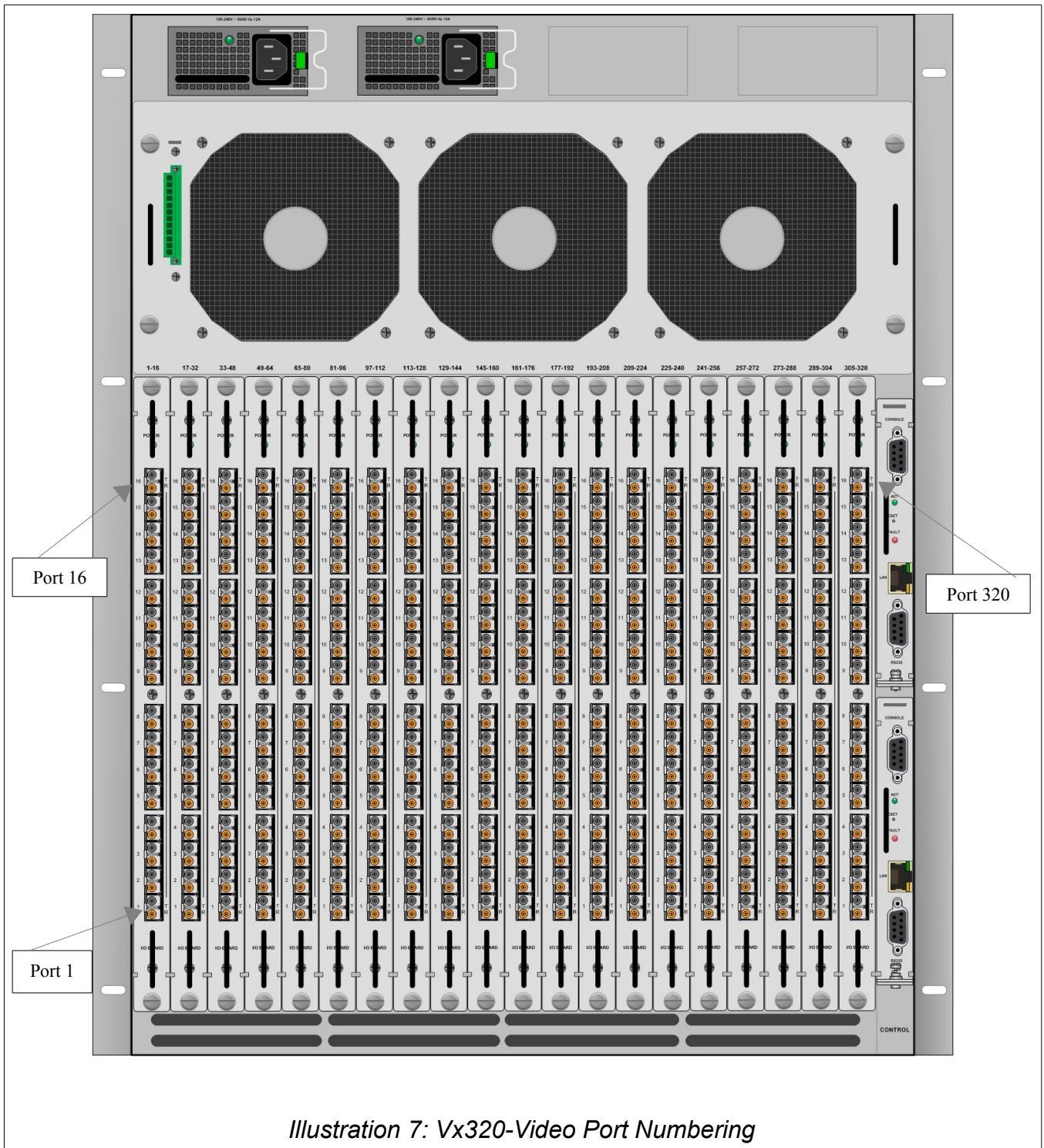




1. Ci0003o0320o0319 (Red) Connect input 3 to outputs 320 and 319
2. ci0319o0003 (Orange) Connect input 319 to output 3

*Illustration 6: Vx320 Port Connections*





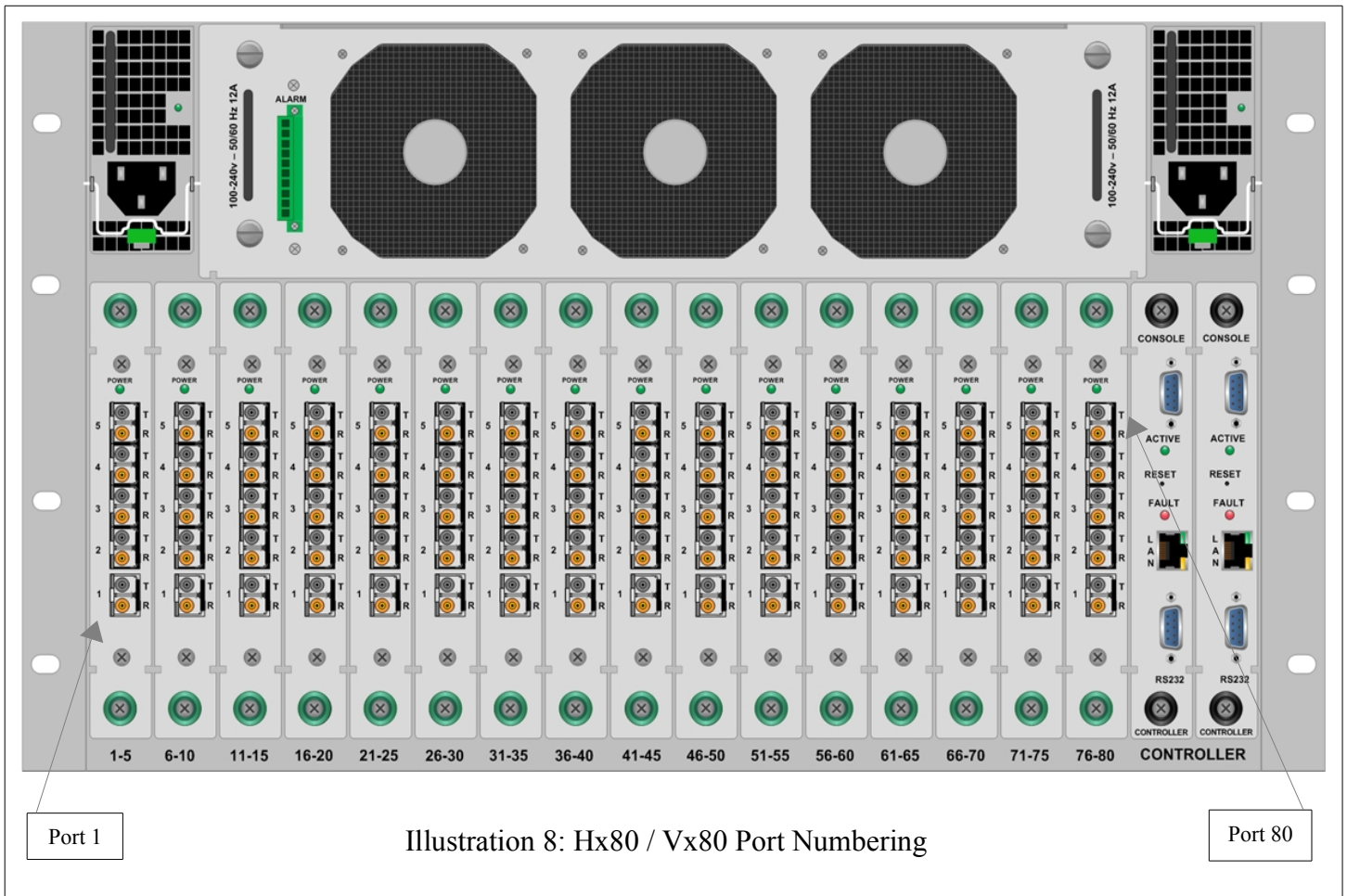


Illustration 8: Hx80 / Vx80 Port Numbering



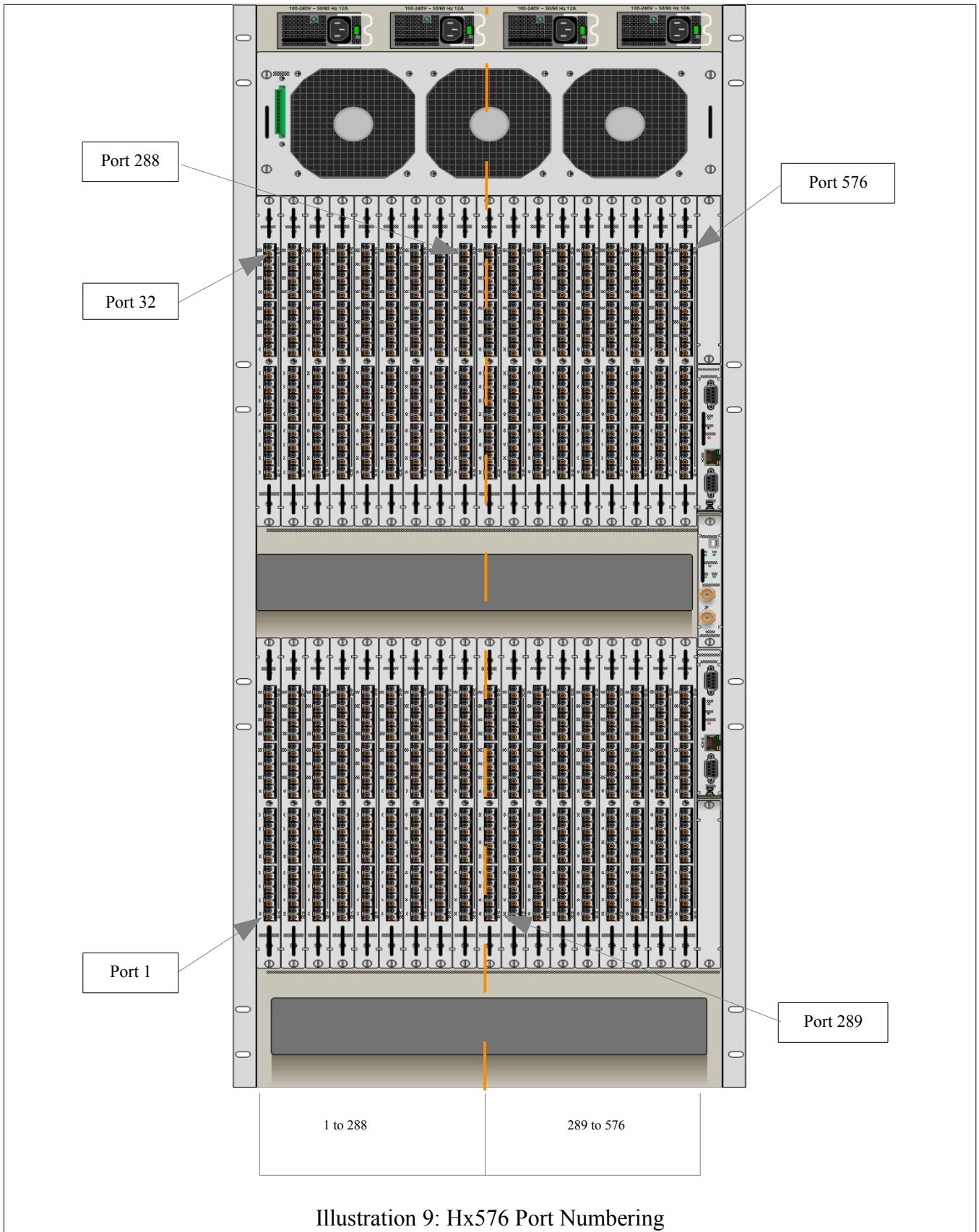


Illustration 9: Hx576 Port Numbering



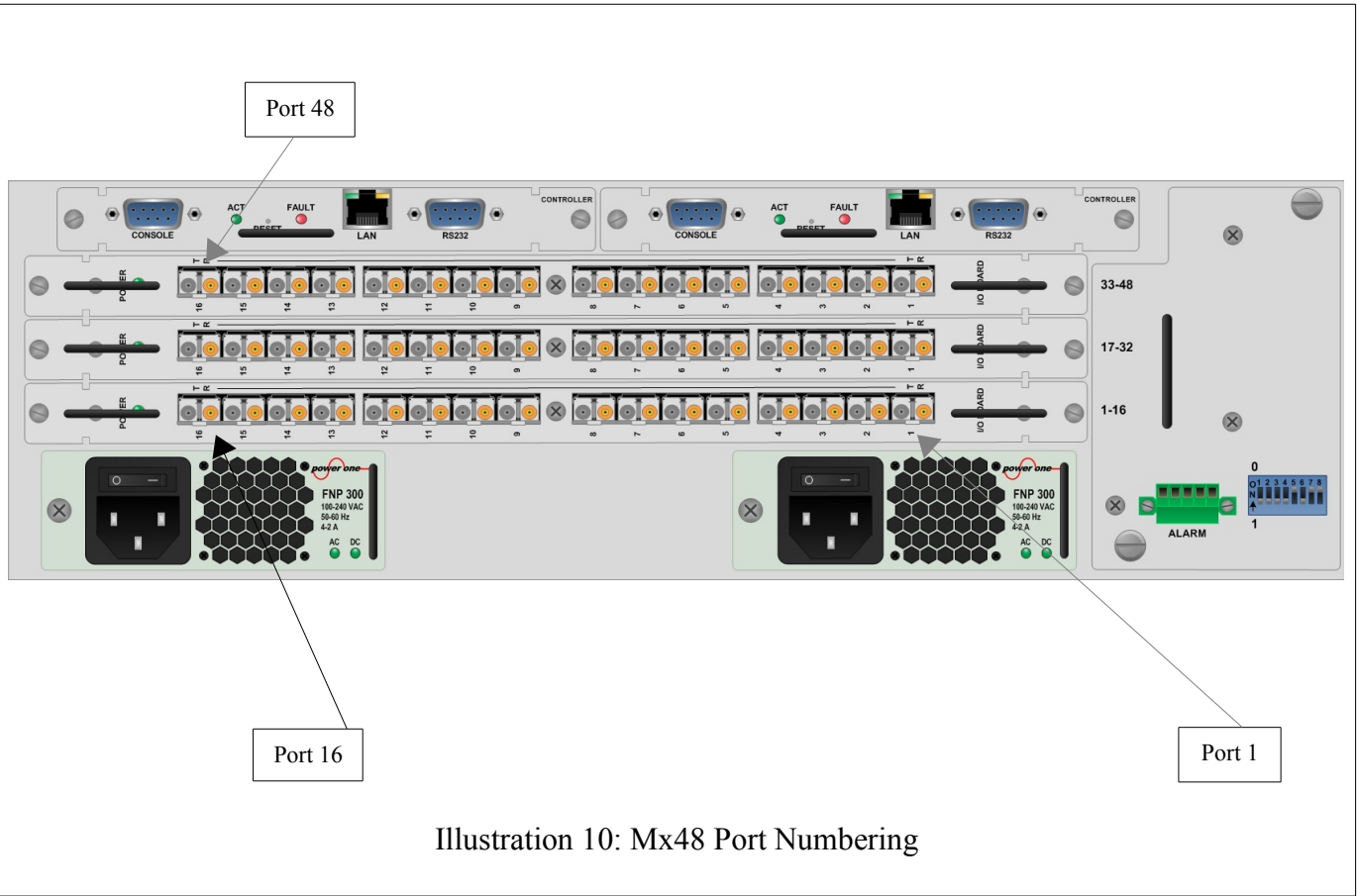
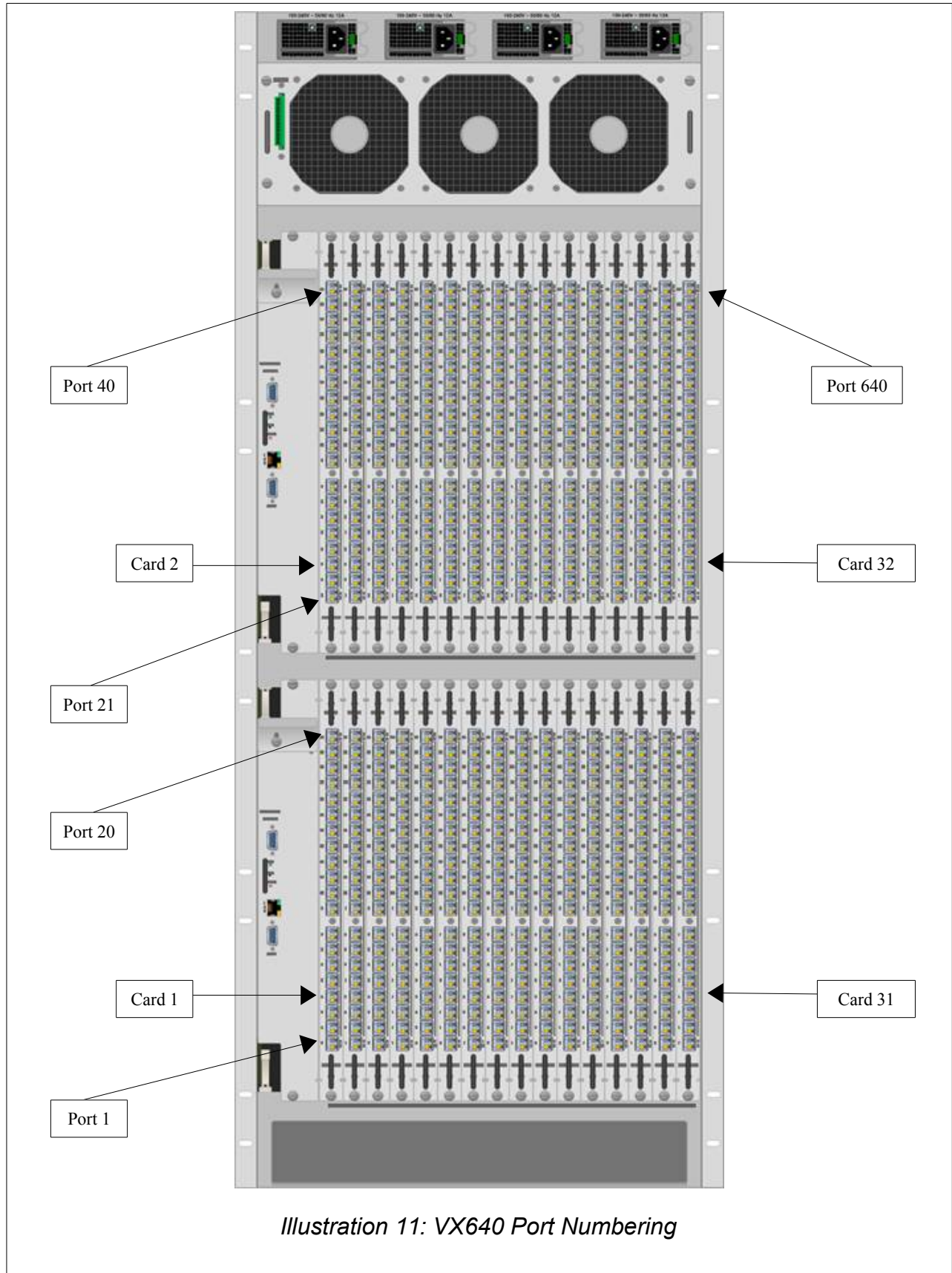


Illustration 10: Mx48 Port Numbering



# Error and Status Codes

- 1.1 **0001** – Syntax error.
- 1.2 **0002** – The command is missing an input port field.
- 1.3 **0003** – The command is missing an output port field.
- 1.4 **0004** – The command has multiple input fields, but only 1 is allowed.
- 1.5 **0005** – The command has multiple output fields, but only 1 is allowed.
- 1.6 **0006** – The input port value is out of range.
- 1.7 **0007** – The output port value is out of range.
- 1.8 **0008** – The command contains an invalid character.
- 1.9 **0009** – A port value of 9999 is not allowed in this command.
- 1.10 **0010** – A SNMP error occurred (only a DCS switch will generate this error).
- 1.11 **0011** – An error occurred while attempting an internal fork command.
- 1.12 **0012** – API received a command that is not allowed.
- 1.13 **0013** – Not enough memory to process the command
- 1.14 **0014** – File I/O error; an error occurred while reading or writing a file.
- 1.15 **0015** – The VxRouter control process is not responding.
- 1.16 **0016** – The command references multiple chassis, but the router only has one.
- 1.17 **0017** – A macro was sent with a semi-colon ';', but the router is uni-directional. Uni-directional routers do not allow port numbers after a semi-colon.
- 1.18 **0018** – Partition or Restrictive port failure.
- 1.19 **0019** – The connection can not be made because of a blocking condition in the internal switch matrix.

Error 10: This is only generated by a DCS switch.

Error 11, 13, 14, 15: An internal program error: Contact Thinklogical™ if you get this message.

Error 12: API V4 does not use this error code.

## API V3 Commands Removed from Version 4

The following commands were useful in the DCS switch, but are not appropriate for the VxRouter switches and have been eliminated in Version 4.

- XGOTOBLACK
- XFROMBLACK
- XFILESAVE
- XFILELOAD
- XFILEDIR
- XFILEDEL
- XPOWEROFF
- XSAVE (replaced with XGET)
- XLOAD (replaced with XPUT)
- XMKYBD

## Changing from V3 to V4 API commands

The basic V3 commands (connect, disconnect, status) still exist in V4 of the API. The V3 connect command automatically creates an active keyboard (backchannel) connection. This no longer happens in V4. The user must send the second connect command to create this connection. Because the user must explicitly create the active keyboard connection, the *XMVKYBD* command is no longer necessary. In its place, use the 'c' connect command.

The port numbers used below are for these examples only and they may not be valid for all VxRouter models. In the V4 API, the 'I' and 'O' in the commands may be either upper or lower case, **except** in the XPUT command. In XPUT, the case of the letter 'I' determines the direction of the connection. A lower case 'i' would correspond to a lower case 'c', and an upper case 'I' to an upper case 'C'.

Command(s)	V3	V4
connect video input 7 to output 12	Ci0007o0012	Ci0007o0012
connect data input 9 to output 15 and the active keyboard is on port 15	Ci0009o0015	Ci0009o0015 ci0015o0009
broadcast video input 66	Bi0066	Ci0066o9999
broadcast data input 66 and have the active keyboard on port 13	Bi0066o0013	Ci0066o9999 ci0013o0066
disconnect output 54	Do0054	Do0054
disconnect input 18	Di0018	Di0018
save switch settings	XSAVE	xget
load switch settings	XLOAD.....	xput.....
connect data input 3 to data outputs 4 & 5 (active keyboard is at output 4)	Ci0003o0004o0005	CI0003o0004o0005 ci0004o0003
then move the keyboard to output 5 (from the example on page 6) *	XMVKYBDI000500003	di0004 di0005 ci0005o0003
connect input 54 to outputs 1,2,3,4	Ci0054o0001o0002o0003o0004	Ci0054o0001o0002o0003o0004
disconnect all outputs	Do9999	do9999 ( <i>breaks lower paths</i> ) Do9999 ( <i>breaks upper paths</i> ) or you may use xput

Table 3: V3 vs. V4 commands

\* the 'di' commands will break any back-channel connections that might be in place from the keyboards at 0004 and 0005. This is done to prevent the accidental connection of a keyboard to more than one CPU.

## Appendix A: Switch Status Broadcast

The API program will periodically broadcast over the network the current switch connection map. This data may be used to keep external systems in sync with the switch. Previously, either the XGET or XSAVE command was needed to obtain the connection map. In systems with many external controls trying to stay synchronized to the router, the router would spend a lot of its resources trying to answer these status requests.

It is now possible to replace the use of broadcast with the use of multicast. The advantage of using multicast over broadcast is that multicast packets will be routed past the local subnet, whereas broadcast packets are not routed.

You may configure the frequency of these messages or disable them altogether.

More information about this feature can be found in the manuals [\*Router Interfaces.pdf\*](#) and [\*Configuring-the-ASCII-Interface.pdf\*](#).

## Appendix B: Sample Commands

Ci0005o0010	Connect Input 5 to Output 10
ci0005o0010	Connect Input 5 to Output 10
Si0004	Get the connection status of Input 4
xputi00010003i00020004	Turn off all outputs, connect Input 1 to Output 3, Input 2 to Output 4

# Appendix C: Connecting Extenders

The following are sample commands needed to connect selected transmitters and receivers through a VxRouter. These examples will reference the appropriate Quick Start Guide.

## A) VEL-24DH through a VX80

Quick Start Guide: [VX80\\_VEL-24DH\\_Quick\\_Start\\_Rev\\_B.pdf](#)

Number of fibers: 4, L1, L3, K1, K2

Backchannel fiber: K2 (data flows from receiver to transmitter)

Tx fiber connections

- L1 -> 5R
- L3 -> 4R
- K1 -> 3R
- K2 -> 3T

Rx fiber connections

- L1 -> 70T
- L3 -> 69T
- K1 -> 68T
- K2 -> 68R

Commands: (all upper case)

CI000500070	connects L1 video to RX
CI000400069	connects L3 video to RX
CI000300068	connects K1 TX data to RX
CI006800003	connects K2 RX data to TX (backchannel)

Now, let's assume a second receiver connected as follows:

- L1 -> 40T
- L3 -> 39T
- K1 -> 38T
- K2 -> 38R

The commands to connect this receiver to the transmitter are:

CI000500070	connects L1 video to RX
CI000400039	connects L3 video tx RX
CI000300038	connects K1 TX data to RX

Note: receiver 2 K2 data is **NOT** connected (backchannel).

Receiver 1 has full keyboard/mouse/USB/speaker access.

Receiver 2 has sound (speakers) but no keyboard/mouse/USB.

To move the keyboard/mouse/USB from receiver 1 to receiver 2, issue the following commands:

DI0068	disconnects RX 1 K2 (backchannel)
DI0038	disconnects RX 2 K2 (backchannel)
CI003800003	connects RX 2 K2 data to TX 1 (backchannel)

or

M006800000038000000380003 Macro command that combines all three commands



The two 'DI' commands are sent to insure that the keyboard/mouse data only goes to a single transmitter. If you are certain that there are no other K2 connections in place, you may eliminate them. Eliminating them will open the possibility of sending keystrokes and/or mouse commands to multiple servers at the same time – a situation that will lead to disaster.

## B) VEL-4 and VEL-24 through a VX160

Quick Start Guide: [VX160\\_VEL-4\\_VEL-24\\_Quick\\_Start\\_Rev\\_D.pdf](#)

Number of fibers: TX24 - 3, L1, L2, L3                      RX24 - 3, L1, L2, L3  
                         TX4 - 2, L1, L2                                      RX4 - 2, L1, L2

Backchannel fiber: L2 (data flows from receiver to transmitter)

Tx24 fiber connections (green)    Rx24 fiber connections (blue)

- L1 -> 20R                                      L1 -> 20T
- L2 -> 20T                                      L2 -> 20R
- L3 -> 19R                                      L3 -> 19T

Tx4 fiber connections (green)    Rx4 fiber connections (blue)

- L1 -> 4R                                      L1 -> 1T
- L2 -> 4T                                      L2 -> 1R

Commands (24 to 24, 4 to 4): (upper and lower case)

```
CI002000020                      connects L1 video & data to RX24 (green to blue)
CI001900019                      connects L3 video to RX24 (green to blue)
cI002000020                      connects L2 data to TX24 (blue to green -
backchannel)
```

```
CI000400001                      connects L1 video & data to RX4 (green to blue)
cI000100004                      connects L2 RX4 data to TX4 (blue to green)
```

Now, let's connect the TX24 to the RX4:

```
dI0001                              disconnects RX4 L2 (blue - backchannel)
CI002000001                      connects TX24 L1 video & data to RX4 (green to
blue)
```

Note: RX4 L2 video is **NOT** connected. (blue - backchannel)

RX24 has full keyboard/mouse/USB/speaker access.

RX4 has sound (speakers) but no keyboard/mouse/USB.

To move the keyboard/mouse/USB from receiver 24 to receiver 4, issue the following commands:

```
dI0020                              disconnects RX24 L2 data to TX (blue - backchannel)
dI0001                              disconnects RX4 L2 data to TX (blue - backchannel)
cI000100020                      connects RX4 L2 data to TX24 (blue to green -
backchannel) or
M;002000000000100000010020    Macro command that combines all three commands
```



The two 'dI' commands are sent to insure that the keyboard/mouse data only goes to a single transmitter. If you are certain that there are no other K2 connections in place, you may eliminate them. Eliminating them will open the possibility of sending keystrokes and/or mouse commands to multiple servers at the same time – a situation that will lead to disaster.



## Appendix D: Point-to-Point Connection mode

Version 4.4 of the API will allow input ports to be restricted to just one output port at a time. If input X is routed to output A and then connected to output B, X will be disconnected from A and then moved to B. This mode is referred to as Point-to-Point mode, or P2P for short.

The P2P definition files are stored on the Controller Card in the following files:

- **[/var/local/router/restrict/upstream.csv](#)**
- **[/var/local/router/restrict/downstream.csv](#)**

P2P mode is disabled when the definition files do not exist. By default, when there are no files, input ports may connect simultaneously to any number of output ports. All VX Routers are shipped without any P2P files stored on the Controller card.

These files are in the form of a comma separated value (csv) file. Each entry in the file is the input port that you want to restrict to P2P mode. You may have one or more entries per line in the file. The only characters allowed in the file are the digits 0 thru 9, commas, and spaces. Blank lines are allowed.

An example that set ports 1,2,3,4,9,11,15 to P2P mode is:

```
1, 2, 3, 4
9
11, 15
```

As a shortcut, you may use the value 9999 to indicate ALL input ports.

The [upstream.csv](#) file is read by all router models. The [downstream.csv](#) file is only read by the VX160 and VX320 models. Downstream on the VX160 controls connections between the Blue card inputs and Green card outputs; on the VX320 it controls the cards on the lower shelf.

If you make changes to either of these files, you may force the API to reread them by issuing the command:

```
killall -HUP vxrapi
```

If P2P files are found at startup, the API will log this to the file: [/var/log/api](#). An example is shown below.

```
Mar 11 17:51:59 vxrouter vxrapi[508]: starting Vx80Router ASCII API Version: V4.4-0 (build: 20)
Mar 11 17:51:59 vxrouter vxrapi[508]: parsing P2P csv file /var/local/router/p2p/upstream.csv
Mar 11 17:51:59 vxrouter vxrapi[508]: parse_api_csv_file.c@133: line 1 of csv file
/var/local/router/p2p/upstream.csv '1,2,3,4 '
Mar 11 17:51:59 vxrouter vxrapi[508]: point-to-point mode enabled
```

# API Manual Revision History

- 4.0-0 Initial release
- 4.0-1 added the XCRON and XCROFF commands
- 4.0-2 added examples of verbose responses to commands
- 4.0-3 modified the disconnect all description
- 4.1-0 added the macro command 'M'  
added the XSTATUSIO and XSTATUSOI commands  
added Hx80 and Hx576 routers  
added Appendix A – Switch Status Broadcast
- 4.1-2 added the 'F' and 'XSYNCSTATUS' commands for the Hx routers
- 4.1-3 added the Mx family of routers (Mx48)  
changed the picture of the VX80, the port numbers are on the bottom  
added the XOPTIONS command  
added Appendix C
- 4.1-4 The XQUIT description had text from another section of the manual. This text has been removed.
- 4.1-5 (Rev C3) added Vx640 support  
error codes 17, 18 and 19 were added to page 26
- 4.4-0 (Rev D) added port point-to-point mode section: Appendix D
- 4.5-1 (Rev E) updated Appendix A to include multicast as an option to replace broadcast.