

## LSI DCS/VxRouter ASCII Interface

### Differences Between Version 2 and Version 3 of the API.

- V3 allows commands to be in lower case.
- V3 can be configured to output a CRLF (Carriage Return, Line Feed) instead of just a LF. Refer to the **Using-the-ASCII-Interface** document for more details.
- These commands were added in V3:
  - XALARM
  - XRESET
- These commands were removed from V3:
  - XGOTOBLACK
  - XFROMBLACK
  - XFILESAVE
  - XFILELOAD
  - XFILEDIR
  - XFILEDEL
  - XPOWEROFF

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1 **Commands** – All commands are in ASCII, and are terminated with a newline (linefeed). A carriage return, if present, will be ignored. A '#' denotes a comment: Everything from the '#' to the newline will be ignored.

- 1.1 **Connect**            Connections are additive. Example: connecting input 5 to output 7 will result in 7 being added to any existing connections to input 5.
- 1.2 **Broadcast**        Select an input to go to all outputs.
- 1.3 **Disconnect**      You may disconnect inputs and/or outputs. Disconnecting outputs only affects that port, but disconnecting inputs will affect every output connected to that input.
- 1.4 **Status**
  - 1.4.1            Input port status        Returns a list of output ports connected to an input port.
  - 1.4.2            Output port status      Returns the input port connected to an output port.
  - 1.4.3            Active keyboard        A KMASS command, returns the output port of the active keyboard.
- 1.5 **Extended commands**
  - 1.5.1            Save Connections       Returns a stream used by XLOAD.
  - 1.5.2            Load connections       Using the stream returned by XSAVE, restores connections. Note: All connections in place before the Load Command is executed will be cleared.
  - 1.5.3            Power Off<sup>1</sup>            Turn off the DCS CPU (this command is normally NOT enabled).
  - 1.5.4            Version                Return the software's version string.
  - 1.5.5            Installed              Returns a list of installed/missing I/O cards.
  - 1.5.6            DCS Type              Returns VIDEO or KMASS.
  - 1.5.7            Max Ports             Returns the maximum number of ports in the DCS.
  - 1.5.8            Max Cards             Returns the maximum number of Input cards in the DCS. (This is the same as the maximum number of Output cards)
  - 1.5.9            Go To Black<sup>1</sup>        Turn off ALL outputs, can be restored by From Black.
  - 1.5.10          From Black<sup>1</sup>        Restores outputs after a Go To Black command.
  - 1.5.11          Last Event            Returns a timestamp of when the DCS status last changed. (A connection was made or broken.)
  - 1.5.12          Save File<sup>1</sup>         Saves the current connection settings to a file. This is similar to the Save & Load commands, but the data is kept on the DCS. The file contains an XLOAD command, so this allows the user a means to completely reconfigure the DCS with one command (XFILELOAD). (This implements SALVO compatibility.)
  - 1.5.13          Load File<sup>1</sup>         Executes commands read from a file. Multiple commands may be stored in this file. (This implements MACRO's.)
  - 1.5.14          Delete File<sup>1</sup>        This will delete the saved configuration from the DCS.

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1.5.15	List Files <sup>1</sup>	Creates a comma-separated list of file names that can be used with the Load File command.
1.5.16	Move Keyboard	This command will move the active keyboard from one destination to another. You must supply the input port number and the number of the output port to gain the keyboard. The output to gain control of the keyboard must already be connected to the input port or it must be disconnected. You cannot use this command to move a keyboard connected to input X to input Y. If sent to a Video DCS, the 'OK' response will be returned.
1.5.17	Chassis Configuration	<p>This returns three numbers that describe the port configuration of the DCS chassis. Chassis are built in one of three configurations: video only, data only, and video/data combined. The data returned allows the user to determine the type of chassis and the number of ports of each type in a chassis. The numbers returned are: number of video ports supported, number of data ports supported, and an offset that is currently not supported so is set to 0.</p> <p>The result is a string containing three comma separated values: video,data,offset.</p> <p>Examples: "72,0,0"                      72 port VIDEO           "0,144,0"                     144 port KMASS/DATA           "16,32,0"                    StudioPro with 16 Video and 32 data ports</p>
1.5.18	Help	List available commands.
1.5.19	Quit	End the session.
1.5.20	Alarm <sup>2</sup>	Returns a number which is a bit-map representation of the alarm status. A zero means there are no alarms. The bits are hardware dependant; please refer to the switch reference manual.
1.5.21	Reset <sup>2</sup>	Resets the internal switch hardware to its poweron state.

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## 2 Results

2.1 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.

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

## 3 Conventions

### 3.1 Port numbers

- All port numbers start counting at 1 and have leading zeros. They are four places long. For example, port 15 would be 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.
- StudioPRO32 Port Numbers
  - Video ports are numbered from 1 to 32.
  - Data ports are numbered from 33 to 64.
  - The software will not allow video and data ports to be connected to each other.

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## 4 Command details

### 4.1 Connect – 1 input port to 1 or more output ports

CIxxxxOyyyy.....

- xxxx or yyyy of all 9's is illegal.
- Connections will be made in the order specified.
- To connect an input port to ALL outputs, use the Broadcast command.

Results:

- R0003OK
- R0007ERnnnn

### 4.2 Broadcast – connect 1 input to all outputs

BIxxxxOyyyy or BIxxxx

- This will connect input xxxx to all outputs, with output yyyy having the active keyboard/mouse. The Oyyyy will be ignored in a Video DCS, but yyyy must be a valid port number. The KMASS DCS will make output port 1 the active keyboard/mouse port if Oyyyy is missing.

Results:

- R0003OK
- R0007ERnnnn

### 4.3 Disconnect – 1 or more input or output ports

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 ports.
- Multiple inputs and outputs may be combined into a single command. The order in which the ports are processed is unspecified.

It is not an error to disconnect a port that is not connected: An OK will be returned.

Example: DO0001I0003I0006O0012

Results:

- R0003OK
- R0007ERnnnn

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## 4.4 Status Requests

4.4.1 **SIxxxx** Return a list of output port(s) connected to input port xxxx.

Results:

- RnnnnOKIxxxxOyyyyOyyyyOyyyy....
  - nnnn is the number of bytes to follow.
  - xxxx is connected to output yyyy. 0000 means not connected.
  - If nothing is connected, R0008OKO0000 will be returned.
- R0007ERnnnn

4.4.2 **SOyyyy** Return the input port number connected to output port yyyy

Results:

- R0013OKIxxxxOyyyy
  - yyyy is connected to input xxxx, 0000 means not connected.
- R0007ERnnnn

4.4.3 **SAxxxx** Return the output port that has the active back channel; this is only valid for the KMASS DCS: The DCS Video chassis will return 0000.

Results:

- R0013OKInnnnOyyyy
  - Output port yyyy has the active keyboard/mouse or 0000. NOTE: A return value of 0000 does not mean there are NO connections to port xxxx, just that there is no back channel connection. You would need to do an SI request to determine if there are any connections.
- R0007ERnnnn

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## 4.5 Extended Commands

4.5.1 XSAVE Returns a string used by XLOAD to restore the switch connections.

**Example result:** R0030OKI001003I002004I00a00a00b00c

XLOAD requires all the characters after the 'OK'. Note: Input and output ports are represented in hex, not decimal.

The following applies ONLY to the KMASS/Data ports:

Those ports have bidirectional data channels, but only one channel may be active from an output port to an input port at a time. An input port may be connected to multiple output ports. The output port that has this active back channel is flagged by ORing a 0x400 to the list of output ports. Also, this port will be the first one listed in the list of output ports. For example, R0030OKI001003I002004I00a40a00b00c, inputs 1 and 2 have no back channel enabled, input 10 (00a) has 3 ports connected (10, 11, and 12) with output 10 (40a) having the active back channel.

What is the back channel and why do I need it? The 'forward' channel has the data from the TX (computer) to the RX (user) devices. One such data stream is the from the CPU sound card to the speakers. The back channel has the data going to the CPU. This could be the mouse, keyboard or microphone (in keeping with the speaker example). Only one back channel to an input is allowed at a time because we don't want to have two or more input devices (keyboard) connected to a CPU simultaneously.

4.5.2 XLOADstr Using the result from XSAVE, restore the switch.

**Example result:** XLOADI001003I002004I00a40a00b00c

4.5.3 XPOWEROFF<sup>1</sup> Turn off the DCS CPU.

(This command is disabled by default; to enable it, the application "dcsapi" must be started with the -poweroff option. Refer to the dcsapi man page for more details)

4.5.4 XVERSION Returns the software version.

4.5.5 XINSTALLED Returns a list of installed cards.

**Example result:** OK110011111000001111

4.5.6 XDCSTYPE Returns the DCS chassis type.

**Example result:** OKKMASS, OKVideo, OKVx40Router

4.5.7 XMAXPORTS Returns the maximum number of ports in the switch.

**Example result:** OK0072

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4.5.8 XMAXCARDS Returns the maximum number of cards (input or output) in the switch.

**Example result:** OK0009

4.5.9 XGOTOBLACK<sup>1</sup> Turn off all (active) outputs.

4.5.10 XFROMBLACK<sup>1</sup> Restore all (active) outputs.

4.5.11 XLASTEVENT Returns a timestamp that was set the last time a connection was made or broken.

**Example result:** OKMon Aug 14 17:09:13 2006

4.5.12 XFILESAVEname<sup>1</sup> Save the current set of connections to a file called 'name'. This can later be restored with the XFILELOAD command.

4.5.13 XFILELOADname<sup>1</sup> Using a file created by the XFILESAVE command, the DCS is restored to these connection settings.

4.5.14 XFILEDELname<sup>1</sup> Returns OK.

4.5.15 XFILEDIR<sup>1</sup> Returns a comma delimited list of filenames.

**Example:**

```
echo XFILEDIR | nc localhost 18000
R0066OKfile1,anotherfile,autoload.dcs
```

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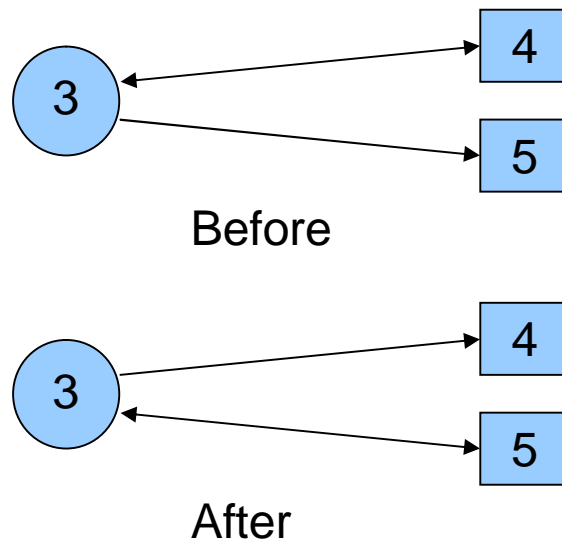
4.5.16 `XMVKYBDIyyyyOxxxx` Makes output yyyy the active keyboard for input xxxx.

Special care must be taken as to which is the input port and which is the output port. A quick glance might cause the user to reverse the two port numbers. Input and output refer to the real-world connections and data flow direction. In effect, for this command inputs become outputs and outputs become inputs. For my example I will use the word 'source' for the CPU side and 'destination' for the end-user station.

**An example:** `CI0003O0004O0005`

Source 3 is connected to destinations 4 and 5 with the active keyboard at destination 4 (because it is the first destination port listed). To move the active keyboard to destination 5 the move command is: `XMVKYBDI0005O0003`.

The data will now flow from the keyboard at destination 5 to the CPU at source 3.





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### 5 Error / Status codes

- 5.1       **0001** – Syntax error, usually using lower case instead of upper case
- 5.2       **0002** – The command is missing an input port field
- 5.3       **0003** – The command is missing an output port field
- 5.4       **0004** – The command has multiple input fields, but only 1 is allowed
- 5.5       **0005** – The command has multiple output fields, but only 1 is allowed
- 5.6       **0006** – The input port value is out of range
- 5.7       **0007** – The output port value is out of range
- 5.8       **0008** – The command contains an invalid character
- 5.9       **0009** – A port value of 9999 is not allowed in this command
- 5.10      **0010** – A SNMP error occurred

The most common SNMP error occurs when an attempt is made to connect to a port that is not present because the I/O card it belongs to is not installed. The error message is:

**SNMP error: resourceUnavailable (This is likely an out-of-memory failure within the agent.)**

The out-of-memory text is a standard SNMP guess, and in this case not accurate – resourceUnavailable is the meaningful part of the message.

- 5.11      **0011** – An error occurred while attempting an internal fork
- 5.12      **0012** – XPOWEROFF command is not allowed  
(refer to the man page for dcsapi for more information on enabling this command)
- 5.13      **0013** – Not enough memory to process the command
- 5.14      **0014** – File I/O error; an error occurred while reading or writing a file.

Errors 10, 11 and 13 are internal errors and are not related to command syntax. If they occur, please contact Logical Solutions.

Error 10 will also occur if the SNMP daemon is not running. The daemon may be restarted by running the following command (as root) at a shell prompt:

```
service snmpd restart ; service dcsSnmpAgent restart
```

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## 6 Examples:

CI0005O0010	Connect input 5 to output 10.
SI0004	Get the status of input port 4.
BI0007O0015	Broadcast input 7 to all outputs if the DCS is a KMASS, then output 15 will have the active keyboard/mouse.

## 7 Changes to Revision 3:

- Page 9 had XMVKYBD spelled wrong in the example.

## 8 Changes to Revision 2:

The response to the three status commands (SI, SA, and SO) was changed to include the input port number (SI and SA commands) or the output port number (SO command). With this change, the response text has the data needed to match the input and output ports.

## 9 Revision History

### 2.41a:

- Added an explanation of the port numbering scheme for the StudioPRO32

### 2.41:

- Changed the document version to be the same as the software's.
- Added an explanation for the SNMP error: resourceUnavailable

### 2.30:

- Added the XFILExxxx commands.
- Added the XMVKYBD command.
- (9/13/07) Expanded the description of the XSAVE command to include the back channel flag.

### 2.05:

- XPOWEROFF description was expanded to explain how to enable the command.
- Added examples to the XSAVE & XLOAD commands.

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<sup>1</sup> These commands are not available in V3 of the API.

<sup>2</sup> These commands are new in V3 of the API.