

Pro4000/9000 command protocols

Revision history

14 February Command 15 now accepts a value of 0x80 for either the audio input or the video input to specify that the input should not be changed

21 December Added Commands 15 16 and 17 only available in PV9000 version 2.01 and later

8 November 2006 Added a sentence stating that Pro4000 units with a firmware version of 1.01 and higher have their outputs numbered from 1

Note: Standard numerical notation is used throughout i.e. hexadecimal numbers are prefixed with '0X'. Numbers without the '0X' prefix are decimal numbers.

The purpose of the protocol is to allow data of any format to be routed to a specified screen connected to the RJ45 outputs of up to 16 Pro4000 units or 32 PV9000 units daisy-chained together, i.e. a maximum of 255 screens.

Commands can also be sent to control functions of the Pro4000/PV9000 units themselves, or request information about the units.

The Pro4000/PV9000 unit is completely transparent as regards commands to and responses from screens. The unit does not need to know the meaning of the data sent to the screens, or to know what if any response to expect.

Commands are prefixed by a header block which specifies whether the command is to be processed internally or passed on to a screen, and specifies which screen to which the command is to be routed.

The format of the command is as follows.

STX ID Type Count Data

Where STX is the header byte 0X02

ID is the output number to which the command is addressed

Type describes the type of command

Count is the number of bytes which follow (maximum 24)

Data is up to 24 bytes required by the command.

The format of the response from the unit is as follows

STX ID Type Count Data

Where STX is the header byte 0X02

ID is the screen number from which the response originated

Type is the command type to which it is responding

Count is the number of bytes which follows

Data is up to 24 bytes returned by the screen

Commands with a Type number of zero are relayed on to the screens, commands with a Type number greater than zero are processed internally within the Pro4000/Pro9000 unit.

The ID has a range of values from 1 to 255. Each unit has 16 outputs. If multiple Pro4000/9000 units are daisy-chained together, the outputs from the first unit are numbered 1 to 16, the outputs from the second unit are numbered 17 to 32 etc. An output number of 0 signifies that the command will be executed by each unit in the chain.

In Pro4000 units with a firmware version of 1.00, the outputs are numbered 0 to 255 with the outputs of the first unit numbered 0 to 15. In Pro4000 units with a firmware version number of 1.01 and higher, the outputs are numbered from 1

Where information is requested about the unit itself rather than a particular output, (i.e. the firmware version number) the ID number may be any value within the range of a particular unit. I.E. requesting the firmware version with an ID between 17 and 32 (16 and 31 in Pro4000 units with a version number of 1.00) would return the version number for the second unit in the chain.

#### Command details

Command: Command to screen

Type: 0

Description: Sends a command to the receiver identified by ID for processing by the receiver or for sending on to the screen

Count: The number of bytes to send to the receiver

Data: The data to send to the receiver

If the data starts with 3 NULL bytes, the following data is processed by the receiver.

Response count: The number of bytes returned by the screen

Response data: The data returned by the screen

Command: Reprogram

Type: 1

Description: Reprograms the CPU or FPGA in the unit. Single or multiple devices may be reprogrammed

Count: 1

Data: nn where nn defines the device and mode of reprogramming

Nn = 00 Reprogram a single CPU

Nn = 01 Reprogram multiple CPUs

Nn = 02 Reprogram a single FPGA

Nn = 03 Reprogram multiple FPGAs

Response: When reprogramming CPUs, ACK (06) is returned after each line of the source file has been sent

When programming FPGAs XON/XOFF handshaking is used, and status messages in plain text preceded with STX ID Type and Count, and terminated with either '.' Or '!' are sent.

Command: Receiver Connected

Type: 2

Description: Returns the state of the DSR signal from a specified user indicating that a receiver module is connected to that output.

Count: 0  
Data: NA  
Response Count: 1  
Response data: non-zero if a receiver is connected, 0 if not connected

Command: Receivers connected  
Type: 3  
Description: Returns a set of flags indicating the states of the 16 DSR signals indicating which outputs have receiver modules connected. Note: ID can be any value within the range of the unit being interrogated.

Count: 0  
Data: NA  
Response Count: 2  
Response Data: FF FF  
Where FF FF is a set of flags indicating which outputs have receivers connected. A logical 1 indicates that a receiver is connected. Bit 7 of the first byte represents output 15, bit 0 of the second byte represents output 0

Command: Get Firmware Version  
Type: 4  
Description: Returns the CPU firmware version number for the specified unit. The ID can be any value within the range of the unit being interrogated.

Count: 0  
Data: NA  
Response count: nn where nn is the number of characters in the version number  
Response data: a text string defining the firmware version number

Command: Get Model Number  
Type: 5  
Description: Returns the model number of the specified unit. The ID can be any value within the range of the unit being interrogated.

Count: 0  
Data: NA  
Response Count: nn where nn is the number of characters in the model number  
Response Data: A text string defining the model number

Command: Get FPGA Version Number  
Type: 6  
Description: Returns the program version number of the FPGA in a specified unit. ID can be any value within the range of the unit being interrogated.

Count: 0  
Data: NA  
Response Count: nn where nn is the number of characters in the version number  
Response Data: A text string defining the FPGA version number

Command: Number of outputs in the unit  
Type: 7  
Description: Returns the number of output connectors on a specified unit. ID can be any value within the range of the unit being interrogated.

Count: 0

Data: NA  
Response count : 1  
Response Data: nn where nn is the number of outputs on the unit

Command: Number of units in the system  
Type: 8  
Description:Returns the ID number of the last output in the whole system. Note: the ID in the command must be 0XFF.  
Count: 0  
Data: NA  
Response count: 0  
Response data: No data is returned, but the ID field will contain the number of the last output in the system i.e. if there are 2 units in the system each with 16 outputs, the ID returned will be 31

Command: Set Baud Rate  
Type: 9  
Description: Sets the baud rate for the specified output. The default baud rate is 9600  
Count: nn where nn is the number of characters in the text defining the baud rate  
Data: A text string defining the baud rate e.g. 9600  
Response count: 1  
Response data: 1 if successful, otherwise 0

Command: Get Baud Rate  
Type: 10  
Description: Returns the current baud rate of the specified output as a text string  
Count: 0  
Data: NA  
Response count: nn where nn is the number of characters in the text string defining the baud rate  
Response data: A text string defining the baud rate e.g. 9600

Command: enable/disable test pattern  
Type: 11  
Description:Enables or disables the generation of a video test pattern to enable the skew and phase compensation to be set up in the reciever  
Count: 1  
Data: 1 = enable, 0 = disable  
Response:

Command: switch specified input to specified output  
Type: 12  
Description:Routes the audio and video signals from the specified input to the specified output  
Count: 1  
Data: NN  
Where NN is the input number  
Response: 1 on success

Command: Select Video mode

Type: 13

Description: Selects the specified video mode for the specified input

Count: 2

Data: nn vv

Where nn is the input number, vv is the video mode to be selected for that input where

Vv = 0 Off

vv = 1 VGA

vv = 2 RGB

vv = 3 S-Video

vv = 4 Composite video

The output number can be any value within the range of the unit being programmed.

For systems employing multiple units, a separate command needs to be sent for each unit in the chain

Response:

Command: Adjust Video

Type: 14

Description: Switches on the test pattern, then sends a command to the receiver to adjust its video compensation, then turns of the test pattern

Count: 0

Data: NA

Response: 1 on success

Command: switch specified video and audio input to specified output

Type: 15

Description: Routes the audio and video signals from the specified inputs to the specified output

Count: 2

Data: VV AA

Where VV is the video input number

AA is the audio input number

A value of 0x80 for AA leaves the audio input unchanged

A value of 0x80 for VV leaves the video input unchanged

Response: 1 on success

Command: Get Switch Status

Type: 16

Description: Returns the video and audio inputs selected by each user

Count: 0

Data: none

Response: VV1 AA1 VV2 AA2 ....

Where VV1 is the video input currently selected by user 1

AA1 is the audio input selected by user 1 etc.

Command: Get video modes

Type: 17

Description: Returns the video input modes for all the inputs of the unit

Count: 0

Data: none

Response: VV1 VV2 VV3 ....

Where VV1 is the video mode for input 1

VV2 is the video mode for input 2 etc