AMX University Programmer Practical Device Specification

Introduction

The following document includes all the control protocols for the system. Please note that the commands listed here are complete and there are no other commands available which means, don't assume there are other commands due to similarities to other existing protocols.

1. ***Matrix Switcher***

   Serial Port Configuration: RS232 – 9600, N, 8, 1 – No hardware handshaking
   Serial Protocol

   ASCII command protocol:
   To execute a switch: #*#S

   The first number is the desired input number, the second number is the desired output number and the letter S is to execute the switch. For example, 3*2Swill switch Input 3 to Output 2. 4*2S will switch Input 4 to Output 2.

   In response to any switch commands, the switcher will respond with OUT#IN#S if it was successful or append X to the original command to report an error. For example, if 7*1S is sent to the switcher, you may receive OUT1IN7S for confirmation. If 31*5S is sent to the switcher, you will receive 31*5X as an error. As another example, if 12*4S is sent to the switcher then you may receive OUT4IN12S for a confirmation.

   Lastly, the switcher will also report any switcher changes initiated by the front panel to the third-party control device (i.e. AMX) if the control device is connected to the RS232 port.

2. *Video Projector*

Serial Port Configuration: RS232 – 38400, N, 8, 1 – No hardware handshaking

Serial Protocol

PC Control Codes - $xx indicates a hexadecimal character

Function	Code Data	Response
POWER ON	$02, $00, $00, $00, $00, CKS	$22, $00, $00, $D0, $00, CKS
POWER OFF	$02, $01, $00, $00, $00, CKS	$22, $01, $00, $D0, $00, CKS
INPUT SELECT HDMI	$02, $03, $00, $00, $02, $01, $01, CKS	$22, $03, $00, $D0, $01, $01, CKS
INPUT SELECT COMPONENT	$02, $03, $00, $00, $02, $01, $11, CKS	$22, $03, $00, $D0, $01, $11, CKS
INPUT SELECT VIDEO	$02, $03, $00, $00, $02, $01, $06, CKS	$22, $03, $00, $D0, $01, $06, CKS
INPUT SELECT S-VIDEO	$02, $03, $00, $00, $02, $01, $0B, CKS	$22, $03, $00, $D0, $01, $0B, CKS
PICTURE MUTE ON	$02, $10, $00, $00, $00, CKS	$22, $10, $00, $D0, $00, CKS
PICTURE MUTE OFF	$02, $11, $00, $00, $00, CKS	$22, $11, $00, $D0, $00, CKS
LAMP INFORMATION*	$03, $8C, $00, $00, $00, CKS	$23, $8C, $00, $04, $XX, $XX, $XX, $XX, CKS
RUNNING STATUS REQUEST**	$00, $85, $00, $D0, $01, $01, CKS	$20, $85, $00, $D0, $01, $SS, $II,CKS

All other commands or incorrectly formatted commands will be ignored by the projector and will not generate any response. The projector has 30 seconds of warm-up time and 75 seconds of cool-down time at which point only the RUNNING STATUS REQUEST command will be accepted.

CKS (Checksum) – The checksum is calculated by adding all the bytes in the command and if the total is greater than a byte then take the lower byte as the checksum.

For example, the checksum for the Power On command ($02, $00, $00, $00, $00, CKS) is calculated by adding all the bytes and taking the sum $02 + $00 + $00 + $00 + $00 = $02.

As for the commands like the RUNNING STATUS REQUEST, the sum of all the bytes total up to $00 + $85 + $00 + $D0 + $01 + $01 = $157 which is greater than a byte so please take the lower byte of $57 as the checksum.

The checksum should be verified when receiving information from the device. If the string received is $20, $85, $00, $D0, $01, $00, $76 then add up all the bytes except for

the last byte, take the lower byte and compare the sum to the last byte. $20 + $85 + $00 + $D0 + $01 + $00 = $176. Therefore, the string in the example has the correct checksum.

**LAMP INFORMATION* – All bytes (hex numbers) are stored in reverse. In order to convert these values into decimal numbers, launch the Windows calculator in the scientific mode and type the bytes in reverse then convert it to a decimal number. For example, $30, $2A, $00, $00 should be typed in as 00 00 2A 30 in Hex and then click on the Dec radio button to convert. The answer should be 10800.

$XX, $XX, $XX, $XX – Stores the current lamp time in seconds. For example, $30, $2A, $00, $00 is equal to 10800 seconds.

***RUNNING STATUS REQUEST* – Returns the projector status in response to the Running Status Request command. The status information is embedded in the sixth byte and it can store one of four values:

$00 – Idling
$03 – Warming Up
$04 – Power On
$05 – Cooling

The seventh byte contains the currently selected input:

$01 – HDMI
$06 – Video
$0B – S-Video
$11 – Component

Lighting Control

TCP/IP Port Configuration: TCP/IP Server – Port 24, Default IP Address – 192.168.1.112

TCP/IP Protocol

Syntax Conventions – The following conventions are used for the API command descriptions in this chapter. All of the commands are case sensitive. All commands must be terminated with a carriage return. Responses are terminated with a carriage return and line feed pair.

FADEDIM

Syntax

FADEDIM, <intensity>,<fade time>,<delay time>,<address>

Parameter	Description	Format
intensity	Target intensity for specified dimmer	0 – 100 (percent)
fade time	Time for dimmers to fade from current intensity to target intensity	If omitted, time defaults to 0 seconds
delay time	Time for dimmers to delay before starting to fade	If omitted, time defaults to 0 seconds
address	System address of dimmer to fade	[unit #:zone #]

Description

Fades one or more system dimmers to a target intensity using a specified fade time and after a specified delay time.

Example

Fade unit 1, zone 2, to 100% with a 3 second fade time and a 4 second delay time

FADEDIM,100,3,4,[1:2]

RAISEDIM

Syntax
RAISEDIM, <address>

Parameter	Description	Format
address	System address of zones to fade	[unit #:zone #]

Description
Starts raising one or more dimmers

Example
Start raising unit 1, zone 3

RAISEDIM,[1:3]

LOWERDIM

Syntax
LOWERDIM, <address>

Parameter	Description	Format
address	System address of zones to fade	[unit #:zone #

Description
Starts lowering one or more dimmers

Example
Start lowering unit 1, zone 3

LOWERDIM,[1:3]

STOPDIM

Syntax
STOPDIM, <address>

Parameter	Description	Format
address	System address zones to fade	[unit #:zone #]

Description
Stops raising/lowering one or more dimmers

Example
Stop raising/lowering unit 1, zone 3

STOPDIM,[1:3]

DL Monitor Output (Dimmer Level Monitor String)

Syntax
DL,<address>,<level>

Parameter	Description	Format
Address	System address of zone that changed	[unit #:zone #]
Level	New level of the zone	0 – 100 (percent)

Description
The DL monitor string is output from a unit when any zone in the system changes level. The lighting system will send out one DL status message for every 1 percent change in level on any load regardless of the ramp rate. In addition, the status messages are sent from the lighting interface regardless of how the change was initiated (whether by a lighting keypad, a lighting controller automated event, or via IP command from a third party control system).

Example
Unit 1, zone 4 changes level to 50%

DL,[1:4],50

3. ***DVD Player***

Serial Port Configuration: RS232 - 9600, N, 8, 1 – No hardware handshaking

Serial Protocol

The protocol is as follows ($xx indicates a hexadecimal character) all commands and responses are terminated by a carriage return:

Stop – $20, $20
Play – $20, $21
Pause – $20, $22
Search Rev – $20, $31
Search Fwd – $20, $32
Skip Rev – $20, $33
Skip Fwd – $20, $34
Menu (DVD only) – $24, $2A
Select (DVD only) – $24, $2B
Arrow up (DVD only) – $24, $2C
Arrow down (DVD only) – $24, $2D
Arrow right (DVD only) – $24, $2E
Arrow left (DVD only) – $24, $2F
Disc Type Inquiry – $21, $11
Transport Status Inquiry – $21, $12
Power Toggle – $22, $00

The Player will respond to the Disc Type Inquiry with the Disc Type
Responses below:
DVD – $11, $01
CD – $11, $02
No Disc – $11, $03

The Player will respond to the Transport Status Inquiry with the Transport Status
Responses below while the power is on:
Play – $12, $01
Stop – $12, $02
Pause – $12, $03
Search Rev – $12, $06
Search Fwd – $12, $07

The player will send the Disc Type responses whenever a disc is changed and when the player is powered on.

The player will respond with a $06 if the command is valid or a $05 if the command is not valid. The inquiry command will only receive the command responses listed above.

If the player is off, a Transport Status Inquiry will be NAK'd ($05 will be sent).

4. ***Integrated Camera with Pan/Tilt***

   Please refer to the Sony EVID100 Duet module documentation for more information.

   In order to obtain the module, launch your web browser and go to http://www.amx.com/techcenter then click on "Search Third Party Devices" on the left side of the page.

5. ***Motorized Projection Screen***

   The circuits for up and down need to be latched for 2.5 seconds to make the screen move. Once this is done, the screen will travel until it reaches its internal limit.

   The circuit for stop will interrupt the screen's motion before the limit is reached. The stop contact is momentary but needs to be engaged for at least ½ second.

   Do not energize two or more of these contacts at the same time. Damage to the screen control will result.

6. ***Power***

   There are two contact-closure controlled devices: an amplifier and a rack mounted power strip.

   To avoid a popping sound coming from the speakers, the amplifier should be turned on at least one second after the rack power strip. When shutting down the system, the amplifier should be turned off at least one second before turning off the rack power.

7. ***Satellite Receiver***

   IR Port Configuration: IR-1 – Carrier On – IR Mode
   Please use the IR file for DirecTV HR20 (DIRECTv8_DISCRETES.IRL).

   In order to obtain the IR file, launch your web browser and go to http://www.amx.com/techcenter then click on "Search Third Party Remotes" then select "IR Files" instead of "Remote Control" in the drop-down menu.