



## INSTRUCTION MANUAL

# UDM-0102 & UDM-RX02

## MULTI-FORMAT DISTRIBUTION HUB AND RECEIVER



## IMPORTANT SAFETY INSTRUCTIONS

1. READ these instructions.
2. KEEP these instructions.
3. HEED all warnings.
4. FOLLOW all instructions.
5. DO NOT use this apparatus near water.
6. CLEAN ONLY with dry cloth.
7. DO NOT block any ventilation openings. Install in accordance with the manufacturer's instructions.
8. DO NOT install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
9. DO NOT defeat the safety purpose of the polarized or grounding type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wider blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
10. PROTECT the power cord from being walked on or pinched, particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
11. ONLY USE attachments/accessories specified by the manufacturer.
12. USE ONLY with a cart, stand, tripod, bracket, or table specified by the manufacturer; or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over:



13. UNPLUG this apparatus during lightning storms or when unused for long periods of time.
14. REFER all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
15. DO NOT expose this apparatus to dripping or splashing and ensure that no objects filled with liquids, such as vases, are placed on the apparatus.
16. To completely disconnect this apparatus from the AC Mains, disconnect the power supply cord plug from the AC receptacle.
17. Where the mains plug or an appliance coupler is used as the disconnect device, the disconnect device shall remain readily operable.
18. DO NOT overload wall outlets or extension cords beyond their rated capacity as this can cause electric shock or fire.



The exclamation point, within an equilateral triangle, is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the product.



The lightning flash with arrowhead symbol within an equilateral triangle is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electrical shock to persons.



ESD Warning: The icon to the left indicates text regarding potential danger associated with the discharge of static electricity from an outside source (such as human hands) into an integrated circuit, often resulting in damage to the circuit.

- WARNING: To reduce the risk of fire or electrical shock, do not expose this apparatus to rain or moisture.
- WARNING: No naked flame sources - such as lighted candles - should be placed on the product.
- WARNING: Equipment shall be connected to a MAINS socket outlet with a protective earthing connection.
- WARNING: To reduce the risk of electric shock, grounding of the center pin of this plug must be maintained.

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# Important Safety Markings

## Markings Used In This Manual

The following symbols are used on the UDM hardware and throughout this Installation Guide to advise you of important instructions. All maintenance must be carried out by an AMX trained and qualified installer.

### Voltage

This symbol (FIG. 1) warns the presence of a voltage of sufficient magnitude to cause a severe or fatal electric shock. Follow the appropriate instructions carefully to avoid the risk of injury.



**FIG. 1** Voltage symbol

There are NO user serviceable parts within the UDM-0102 or UDM-RX02.

## Rating Label

The rating label, containing important safety information, is found on the underside of the UDM-0102 and UDM-RX02. Symbols used on this label are explained below;



The UDM is powered from a suitable 24 VDC supply.



FCC (Federal Communications Commission) Standards;



TESTED TO COMPLY  
WITH FCC STANDARDS  
FOR HOME OR OFFICE USE



This device complies with part 15 of the FCC rules.  
Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference.
- (2) This device must accept any interference received including interference that may cause undesirable operation.



Conforms to particular European Directives.

**FIG. 2** Rating Label

## Important Instructions

This symbol (FIG. 3) used within this manual, indicates an important instruction for the correct and safe installation, operation or maintenance of your UDM-0102 and UDM-RX02. Failure to comply with such instruction may result in injury to person or damage to the UDM hardware.



**FIG. 3** Warning symbol

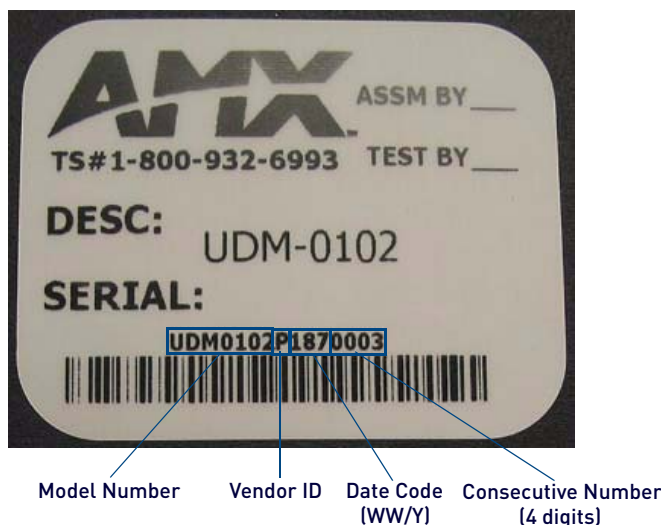
## Compliance

### FCC and IEC

Compliance with FCC and IEC standards are found within the rating label; see above.

### Date of Manufacture

For US customers, the date of manufacture is also found underneath the UDM-0102 and UDM-RX02.



**FIG. 4** Date Of Manufacture Sticker (on bottom panel)

UDM-0102/RX02 Date of Manufacture Sticker	
Model Number	Model number and designation, comprised of up to seven characters.
Vendor ID	One- or two-character ID code.
Date Code	Three-digit date code, comprised of week of year (1-52) and last digit of year.
Consecutive number	Starting at "0001" and continuing to "9999".

## Environmental Conditions

The following criteria on this page must be observed for the installation of the UDM-0102 and UDM-RX02:



Temperature	<b>DO NOT</b> install or operate the UDM-0102 or UDM-RX02 in an area where the ambient temperature exceeds 35°C (95°F) or falls below 5°C (35°F).
Humidity	<b>DO NOT</b> install or operate the UDM-0102 or UDM-RX02 in an area in which the ambient relative humidity exceeds 85% or an area that is prone to condensation.
Water / Liquids	<b>DO NOT</b> install or operate the UDM-0102 or UDM-RX02 near water or in a location which may be prone to water seepage, dripping or splashing. <b>DO NOT</b> place objects containing liquids on the appliance.
External use	<b>DO NOT</b> operate the UDM-0102 or UDM-RX02 outdoors.

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# Table of Contents

<b>Important Safety Markings .....</b>	<b>3</b>
<b>Markings Used In This Manual .....</b>	<b>3</b>
Voltage .....	3
<b>Rating Label .....</b>	<b>3</b>
<b>Important Instructions .....</b>	<b>3</b>
<b>Compliance .....</b>	<b>4</b>
FCC and IEC .....	4
Date of Manufacture .....	4
<b>Environmental Conditions.....</b>	<b>4</b>
<b>UDM-0102 1x2 Multi-Format Distribution Hub .....</b>	<b>10</b>
<b>Overview .....</b>	<b>10</b>
Common Application.....	10
Features .....	10
Compatibility .....	10
Product Specifications .....	10
<b>UDM-0102 Wiring and Connections .....</b>	<b>11</b>
<b>UDM-0102 Front Panel Components .....</b>	<b>12</b>
Power Status LED .....	12
ETHERNET Port (RJ45) .....	12
Pinout Configuration .....	12
Default IP Address.....	12
Serial (RJ12) Port .....	13
Serial Port - Default Communication Settings.....	13
RS01 (DB9F-to-RJ12 Adapter) Cable Pinouts .....	13
Active Input (A /B) LEDs.....	13
Status LED .....	13
SELECT Pushbutton.....	13
PRESETS 1/2 Pushbuttons.....	14
UDM Port (RJ45) .....	14
UDM Port Pinouts .....	14
<b>Connecting the UDM-RX02 Receiver to the UDM-0102 .....</b>	<b>14</b>
UDM HUB Port LEDs .....	15
<b>UDM-0102 Rear Panel Components .....</b>	<b>15</b>
A/V Source Input Connectors.....	15
VIDEO IN Connectors (HD15).....	15
Connecting a VGA Video Input.....	15
Connecting a Component Video Input .....	16
Connecting an S-Video Input.....	16
Connecting a Composite Video Input .....	16
Video Adapter Cables .....	16
Audio & Video Formats/Resolutions/Distance.....	16
IRTX 1 & 2 (IR Transmit) Ports .....	17

Connecting an IR-Controlled Device to an IRTX Port .....	17
IRRX (IR Receiver) Port.....	17
Connecting an External IR Receiver Module .....	17
DC IN Power Input .....	17
<b>UDM-RX02 Multi-Format Receiver .....</b>	<b>18</b>
Overview .....	18
Common Application .....	18
Features.....	18
Compatibility.....	18
Product Specifications .....	18
UDM-RX02 Wiring and Connections .....	19
24 DC Power Input .....	19
Using the UDM-PS External Power Supply .....	19
UDM Hub Port (RJ45) .....	19
Serial (RJ12) Port .....	20
IR Rx (IR Receiver) Port .....	20
Connecting an IR03 External IR Receiver Module to the IR Rx Port .....	20
IR Tx (IR Transmit) Port .....	20
Connecting an IR01 External IR Emitter Module to the IR Tx Port .....	20
AUDIO Outputs .....	21
VIDEO Outputs .....	21
<b>Configuration .....</b>	<b>22</b>
WebConsole Overview .....	22
Connecting to the UDM-0102.....	22
<b>UDM-0102 Configuration - Status Page .....</b>	<b>23</b>
Overview .....	23
Status Page Options .....	23
Port Configuration Options .....	24
Selecting a Remote Control Type .....	24
Renaming the Output Port .....	25
Compensating Video .....	25
Selecting a Control Protocol for the Output Port .....	25
Dual Output Mode .....	25
Input Options .....	26
Selecting an Input Device .....	26
Changing an Input.....	26
Scheduling Input Device Connections.....	26
Defining User Control.....	27
Passthrough Mode.....	29
Using Passthrough Mode.....	29
Control Options.....	30
Executing an IR Command.....	30
Scheduled Control .....	30

**Configuration - Setup Page ..... 32**

- Overview ..... 32
- Setup Page Options ..... 32
  - Network Configuration ..... 33
  - Date and Time Configuration ..... 33
    - Refreshing the Date and Time Display..... 33
  - Restore Options ..... 33
    - Restoring Configuration and Connections ..... 33
    - Restoring Connections On Power Up ..... 33
    - Resetting the UDM-0102..... 33

**Configuration - Inputs Page ..... 34**

- Overview ..... 34
- Inputs Page Options ..... 34
  - Inputs (A-B) Configuration..... 34

**Configuration - Devices Page ..... 36**

- Overview ..... 36
- Devices Page Options ..... 36
  - Configuring IR-Controlled Devices 1 and 2..... 37
- Devices Page - Control Bar Options ..... 37
  - Scheduling an Event for IR-Controlled Devices ..... 37
  - Sending a Command to IR-Controlled Devices ..... 39

**Configuration - Schedule Page ..... 40**

- Overview ..... 40
- Schedule Page Options ..... 40
  - Creating a Preset Schedule ..... 40
  - Executing Presets..... 42
  - Configuring the UDM-RC02 Remote Control for Scheduling..... 42

**Configuration - Protocols Page ..... 44**

- Overview ..... 44
- Protocols Page Options ..... 44
  - Creating a New Serial Protocol ..... 44
  - Testing Serial Commands..... 46
  - Examples of Serial Controls ..... 47
  - Sample Serial Protocol..... 47
  - Third party control (Ports)..... 48
  - Third party control (Local)..... 48
  - Updating the UDM-RX02 Receiver With the Serial Protocol ..... 49
  - Creating and Learning an IR Protocol..... 50
    - Creating an IR Protocol ..... 50
    - IR Learning With a Device?s Remote Control ..... 51
  - Updating the UDM-RX02 With the IR Protocol..... 52
  - Deleting Protocols..... 52

Endeleo IR Codes .....	52
<b>Upgrading Firmware .....</b>	<b>53</b>
Overview .....	53
Determining the Current Firmware Versions .....	53
Downloading New Firmware from <a href="http://www.amx.com">www.amx.com</a> .....	53
Establishing a TFTP Session with the Hub and/or Receiver .....	54
Upgrading Firmware and Web Pages On a UDM-0102.....	55
Upgrading Port Controllers .....	55
<b>Advanced Administration .....</b>	<b>57</b>
Overview .....	57
Establishing a TFTP Session with the Hub and/or Receiver .....	57
Copying the Hub Configuration File.....	57
Restoring the Configuration file .....	57
Loading the Hub Configuration File .....	58
Copying Protocols Between UDMs .....	58
Retrieving IR Files From the UDM Ports.....	58
Backing up the Hub Configuration File .....	59
Restoring the Hub Configuration File .....	59
Upgrading Input Controllers .....	59
Backend Commands.....	59
Changing the Login Password .....	59
Obtaining the Hub's IP Address Via the Command Line .....	60
Setting the Hub's IP Address Via the Command Line .....	60
Multi Format Inputs .....	60
User Outputs.....	60
Copying IR/Serial Tables .....	61
Backend Commands - UDM-RX02 .....	61
Viewing the Video Compensation Settings.....	61
Resetting Video Compensation Settings .....	61
<b>UDM-RC10 Remote Control .....</b>	<b>62</b>
Compensating Video Via the UDM-RC10 Remote.....	62
<b>Video Compensation .....</b>	<b>63</b>
Overview .....	63
Default Video Compensation Settings .....	63
Video Compensation Guidelines.....	63
Advanced Video Compensation .....	64
Compensating Video Via the UDM-RC10 Remote Controller .....	65
<b>UDM-0102 Control Protocol .....</b>	<b>66</b>
Overview .....	66
Command Format .....	66



---

Command and Reply Example - Port Connection .....	66
Command and Reply Example - Authentication (Login).....	66
UDP Over Network (10BaseT) Encapsulation.....	67
UDM Over Serial Port (SLIP) Encapsulation.....	67
SLIP Serial Communication Example .....	67
Handshaking .....	68
Command set .....	68
Authentication.....	68
Authenticate (Login) .....	68
Logout .....	69
Command Summary .....	69
Basic Commands.....	69
Input Numbering .....	69
Port Numbering.....	69
Connect Video and Audio to Port.....	70
Disconnect Port .....	70
Connect Video Input Only to Port .....	70
Disconnect Video Input Only to Port.....	70
Connect Audio Input to Port .....	70
Disconnect Audio from Port.....	71
Query Port .....	71
Get Port or Input Name.....	71
Get Receiver Info .....	71
Send Remote Command .....	72
Set Remote Control Receiver Protocol .....	72
Send Control Operation To Connected Device .....	73
Send Non-Specific Serial Command .....	73
Set Serial Parameters .....	73
Get Remote Serial Buffer .....	74
Enable/Disable Remote Key Messages.....	74
Set Hub Identification .....	75
Get Hub or Port Identification and System Information .....	75
Reset Controller .....	75
Status Values .....	76
ASCII / Hex Conversion .....	77
Overview .....	77

# UDM-0102 1x2 Multi-Format Distribution Hub

## Overview

The UDM-0102 1x2 Multi-Format Distribution Hub (FG-UDM-0102) is designed for smaller installations with long video/audio cable runs. It supports two high-resolution input ports and one UDM output port, making it an ideal solution for distributing audio/video content to a classroom, conference room or other presentation room.



**FIG. 5** UDM-0102 (front view)

The UDM-0102 delivers media over easily-installed, dedicated Cat5/5e/6, which de-couples distribution of the media from the corporate backbone. Users can quickly switch and transmit any video source to any display device, power on/off display devices, and permission user control to select and play video sources and media servers on demand.

The UDM-0102 supports any combination of the following: two RGBHV sources, two Component video sources, two S-Video sources or six Composite video sources. Supported source inputs to the UDM include standard VGA, Composite, Component or S-Video feed, and output is presented as an RJ45 port for connection to Cat5/5e/6 twisted-pair Ethernet cable. Video inputs are connected via the HD15 VIDEO IN Input connectors on the rear of the UDM. Adapters are used to bring the different types of video source into the UDM.

- To use Component or Composite input, you will need the *UDM-HD15RCA3F* HD-15 to 3x RCA Breakout Cable (**FG-HD15RCA3F**, not included).
- To use SVideo input, you will need the *UDM-SVID01* HD-15 to S-Video Cable Breakout Cable (**FG-UDM-SVID01**, not included).

Each UDM has an Ethernet network port to provide connectivity to a central management system, or can be controlled by the onboard configuration pages. A Serial connection is also provided for CLI administration and diagnostic purposes. The UDM-0102 can deliver all content and control up to 2,300 feet. See the *Audio & Video Formats/Resolutions/Distance* section on page 8 for tested and confirmed distances.

## Common Application

Ideal for distributing audio/video content to classrooms, conference rooms or other presentation rooms.

## Features

- 2 multi-format inputs x 1 RJ-45 output
- Digital audio support
- Central device control
- Switched manually, centrally (browser) and/or via remote control

## Compatibility

The UDM-0102 is compatible for use with UDM-RX02 (FG-UDM-RX02) Multi-Format Receivers. See the *UDM-RX02 Multi-Format Receiver* section on page 18 for details.

## Product Specifications

UDM-0102 Specifications	
Power Requirements:	24VDC @ 1.25A
Front Panel Components	
Ethernet (RJ-45) port:	Provides 10 BaseT network connectivity
Serial (RJ-12) port (labeled "10101"):	Enables an administrator to control the UDM-0102 from a command line prompt and terminal connection. Requires a DB9-to-RJ12 adapter cable (FG-RS01) to connect to a PC.

UDM-0102 Specifications (Cont.)	
LEDs:	The front LEDs are grouped by control type and are labeled according to their corresponding port (connector) numbers on the rear of the unit. <ul style="list-style-type: none"> <li>Power - device is receiving power</li> <li>A - Source A is currently selected</li> <li>B - Source B is currently selected</li> <li>Status - changes from red to green when it receives a valid UDP command, and returns to red after 30 seconds if it has not received anything.</li> </ul>
SELECT (A/B) Pushbutton:	Pushbutton switches between Source A / Source B.
PRESETS (1/2) Pushbuttons:	Two pushbuttons execute user-defined presets.
UDM (RJ-45) port:	Provides audio/video transport as well as control via Cat5/5e/6 to a UDM-RX02 Receiver.
<b>Rear Panel Connectors:</b>	
Source Inputs (A, B):	Two sets of input connectors for A/V source devices (labelled A and B): <ul style="list-style-type: none"> <li>VIDEO IN: HD-15 input connector (female) - supports VGA, Component, S-Video and Composite formats.</li> <li>Analog Audio: Left (white) and Right (red) stereo RCA input connectors (female).</li> <li>Digital Audio: SPDIF (female) input connector.</li> </ul>
IRTX Ports:	Two 3.5mm stereo IR Transmitter output ports allow up to two IR-controlled devices (such as a DVD or VCR player) to be controlled via optional wired IR emitters.
IRRX Port:	3.5mm stereo input port, allows connecting an IR receiver to allow learning IR commands.
Power Socket:	2.1mm barrel-style DC power socket (female)
Operating Environment:	<ul style="list-style-type: none"> <li>35°F - 95°F (5°C - 35°C)</li> <li>Max. relative humidity - 85% (non-condensing)</li> </ul>
Dimensions (HWD):	1.61" x 8.63" x 3.66" (40.89 mm x 219.08 mm x 93.04 mm)
Weight:	1.60 lb. (730 g)
Certifications:	<ul style="list-style-type: none"> <li>CE</li> <li>FCC part 15 Class A</li> </ul>
Included Accessories:	<ul style="list-style-type: none"> <li>UDM-PS Power Supply with cable - 24VDC, 1.25A (FG-UDM-PS)</li> <li>RS01, RS232 Serial Transmit Cable, DB9-to-RJ12 (FG-RS01)</li> <li>UDM-HD15RCA3F HD-15 to 3x RCA Breakout Cable (FG-HD15RCA3F)</li> <li>Ethernet Crossover Cable, 3' (0.9144 m)</li> </ul>
Other AMX Equipment:	<ul style="list-style-type: none"> <li>UDM-SVID01 HD-15 to S-Video Cable (FG-UDM-SVID01)</li> <li>UDM-RX02 Multi-Format Receiver (FG-UDM-RX02)</li> <li>UDM-RC10 Multi-Format IR Engineering Remote Control (FG-UDM-RC10)</li> <li>UDM-RC02 Multi-Format IR Remote Control (FG-UDM-RC02)</li> <li>IR01 IR Emitter Module (FG-IR01)</li> <li>IR03 External IR Receiver Module (FG-IR03)</li> </ul>

## UDM-0102 Wiring and Connections

The system diagram in FIG. 6 illustrates a basic installation using the UDM-0102 Hub, UDM-RX02 receivers, and attached display and audio playback devices:

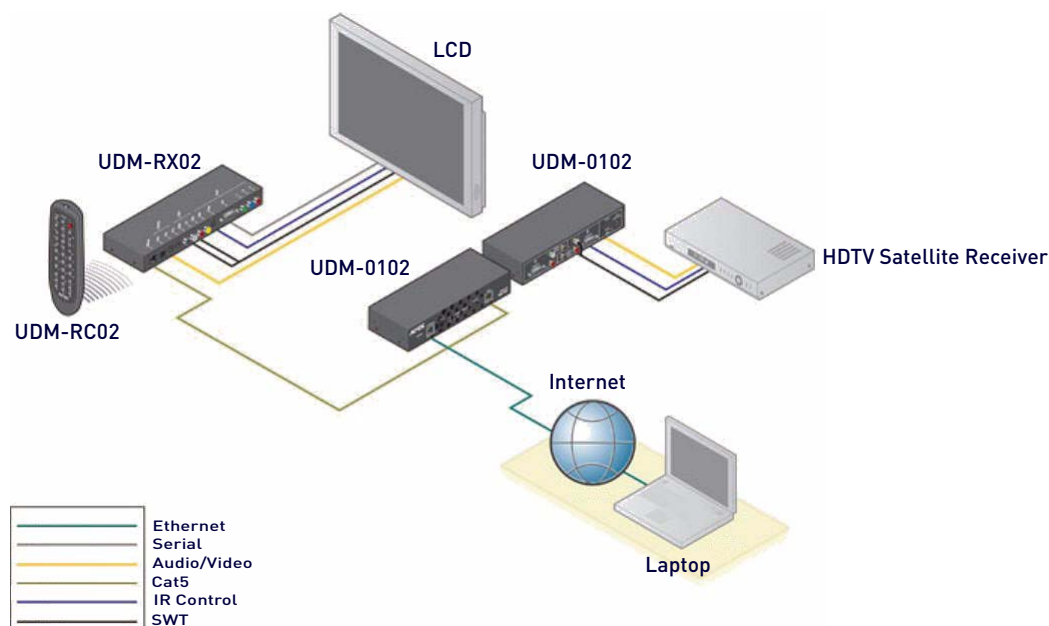
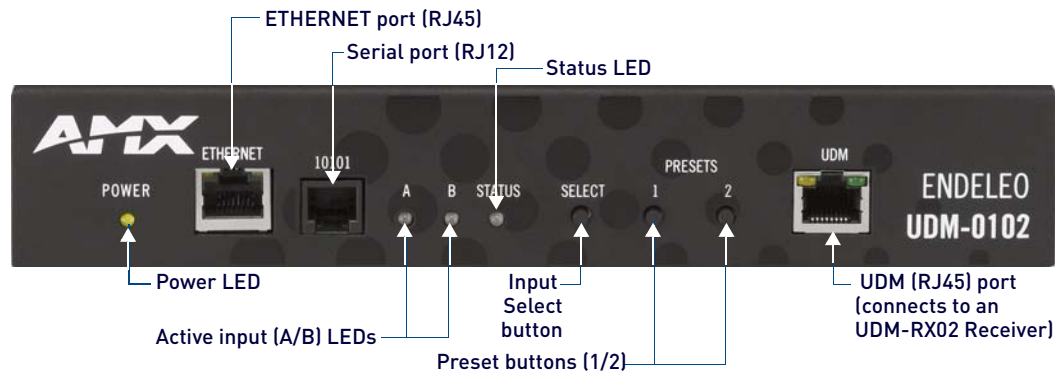


FIG. 6 UDM-0102 System Diagram

## UDM-0102 Front Panel Components

FIG. 7 shows the components on the front panel of the UDM-0102:



**FIG. 7** UDM-0102 - front panel components

### Power Status LED

The yellow LED on front panel labeled "POWER" lights to indicate that UDM-0102 is powered.

### ETHERNET Port (RJ45)

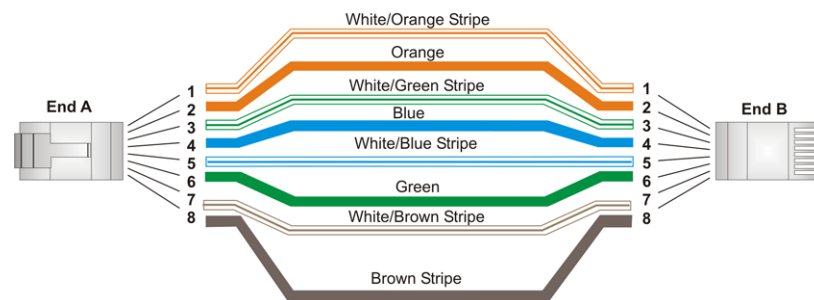
The RJ45 port on the front panel (labeled "ETHERNET") provides 10 BaseT network connectivity.

### Pinout Configuration

The following table lists the pinouts, signals, and pairing for the Ethernet port.

RJ45 Ethernet Port Pinouts and Signals				
Pin	Signals	Connections	Pairing	Color
1	TX +	1 ----- 1	1 ----- 2	Orange-White
2	TX -	2 ----- 2		Orange
3	RX +	3 ----- 3	3 ----- 6	Green-White
4	no connection	4 ----- 4		Blue
5	no connection	5 ----- 5		Blue-White
6	RX -	6 ----- 6		Green
7	no connection	7 ----- 7		Brown-White
8	no connection	8 ----- 8		Brown

**FIG. 8** diagrams the pinouts and signals for the Ethernet RJ45 connector and cable.



**FIG. 8** RJ45 wiring diagram

**NOTE:** Consult the Network Administrator for correct cabling from the UDM-0102 onto the network. The Firewall may have to be configured to open port 2008 for remote connectivity over UDP

### Default IP Address

The default IP address of the UDM-0102 is **192.168.0.96**.

- Once the UDM-0102 is switched on, use the *Setup* option in the UDM WebConsole to configure the Hub's correct IP address (see the *Network Configuration* section on page 33).
- The IP address may also be configured via the serial port (refer to the *Backend Commands* section on page 59).

## Serial (RJ12) Port

The SERIAL (RJ12) port on the front panel (labeled "10101") is available for diagnostic and troubleshooting purposes. The Serial port on the UDM-0102 requires a DB9-to-RJ12 adapter cable (FG-RS01 included) to connect to a PC for Terminal control.

**NOTE:** Connecting the Serial port on the UDM-0102 is not an essential step in the installation process.

### Serial Port - Default Communication Settings

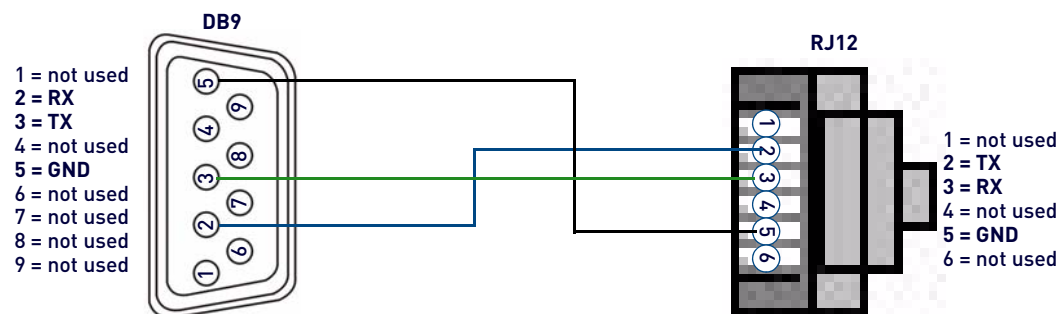
Use hyper terminal with default serial settings to communicate with the UDM-0102 (and UDM-RX02):

Default Serial Settings	
Baud Rate:	9600
Data Bits:	8
Parity:	None
Stop Bits:	1
Flow Control:	None

### RS01 (DB9F-to-RJ12 Adapter) Cable Pinouts

The following table provides the pinout configuration for the RS01 DB9F-to-RJ12 adapter cable:

DB9F connector		RJ12 connector	
Pin #	Function	Pin #	Function
1	not used	1	not used
2	RX - Receive Data	2	TX - Transmit Data
3	TX - Transmit Data	3	RX - Receive Data
4	not used	4	not used
5	GND - Signal Ground	5	GND - Signal Ground
6	not used	6	not used
7	not used		
8	not used		
9	not used		



**FIG. 9** RS01 (DB9F-to-RJ12) Cable Pinouts

### Active Input (A /B) LEDs

The LEDs labeled "A" and "B" indicate the currently active input device.

- **A** - Input device A is currently selected
- **B** - Input device B is currently selected

### Status LED

The STATUS LED changes from red to green when it receives a valid UDP command, and returns to red after 30 seconds if it has not received anything.

### SELECT Pushbutton

Press the SELECT pushbutton to manually switch the currently active input (A / B).

## PRESETS 1/2 Pushbuttons

The UDM-0102 supports up to two *Presets*. Presets are scheduled events that have been combined into a single schedule. Presets are created via options in the Schedule configuration page (see the *Configuration - Schedule Page* section on page 40 for details). These Presets can be executed directly via the PRESETS (1 and 2) pushbuttons:

1. Select an input device (1 or 2), via the **SELECT** pushbutton. Note that the LEDs labeled "A" and "B" indicate the currently active input device.
2. Select either **PRESET 1** or **PRESET 2** to execute.

## UDM Port (RJ45)

The RJ45 port on the front panel of the UDM-0102 (labeled "UDM") provides connectivity to a UDM-RX02 Multi-Format Receiver.

### UDM Port Pinouts

The following table provides detailed pinout information for the UDM port:

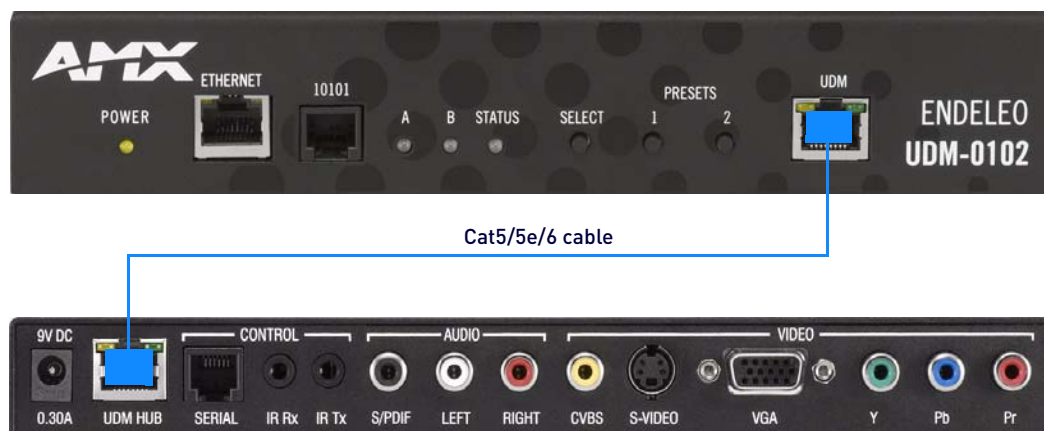
RJ45 Pin #	568A Termination		A/V Signals				568B Termination	
	Color	Pair #	RGB	YPbPr	CVBS	S-Video	Color	Pair #
1		3	Red +	Y +	CVBS S1 +	Y +		2
2	Green	3	Red -	Y -	CVBS S1 -	Y -	Orange	2
3		2	Blue +	Pr +	CVBS S3 +	C +		3
4	Blue	1	Green +	Pb +	CVBS S2 +		Blue	1
5		1	Green -	Pb -	CVBS S2 -			1
6	Orange	2	Blue -	Pr -	CVBS S3 -	C -	Green	3
7		4	Audio, Data, Power +	Audio, Data, Power +	Audio, Data, Power +	Audio, Data, Power +		4
8	Brown	4	Audio, Data, Power -	Audio, Data, Power -	Audio, Data, Power -	Audio, Data, Power -	Brown	4

An incorrectly terminated cable will result in the following scenarios:

Incorrectly Terminated Cable Results					
RJ45 Pin #	RGBHV Video	Component Video	Composite Video	SVideo	UDM Audio & Data RX Green LED
1-2	No RED	No Y	No Video 1	No Y	On With Audio & Data RX
3-6	No BLUE	No Pr	No Video 2	No C	On With Audio & Data RX
4-5	No GREEN	No Pb	No Video 3	NONE	On With Audio & Data RX
7-8	NONE	NONE	NONE	NONE	Always OFF

## Connecting the UDM-RX02 Receiver to the UDM-0102

The RJ45 port on the front panel of the UDM-0102 Hub labeled "UDM" supports one UDM-RX02 Receiver. The UDM-RX02 is then be connected to a display device (FIG. 7).



**FIG. 10** Connecting the UDM-RX02 Receiver to the UDM-0102

1. Connect a standard Cat5/5e/6 Ethernet cable to the RJ45 port labeled **UDM** on the front panel of the UDM Hub.
2. Connect the other end of the cable to the RJ45 port labeled **UDM Hub** on the rear panel of the UDM-RX02.

**NOTE:** Ensure the port the UDM-RX02 is attached to is configured correctly within the Status option of the WebConsole (for example, if a UDM-RX02 is connected to the Hub, ensure the port in the Status option is configured likewise).

### UDM HUB Port LEDs

2 LEDs are visible at the **UDM Hub** port (on the UDM-RX02) when the UDM-0102 is switched on:

- **Green** – Connection to UDM-0102 (if Cat 5 removed, LED switches off)
- **Amber** – Power (as well as comms if uploading protocols etc. the Amber LED may flicker)

Refer to the *UDM-RX02 Wiring and Connections* section on page 2 for details on installing the UDM-RX02.

## UDM-0102 Rear Panel Components

FIG. 11 shows the components on the rear panel of the UDM-0102:

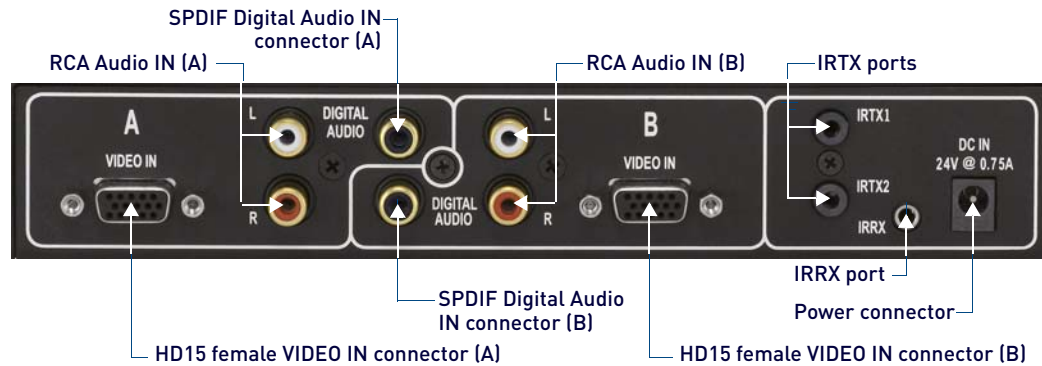


FIG. 11 UDM-0102 - rear panel components

### A/V Source Input Connectors

#### VIDEO IN Connectors (HD15)

FIG. 12 provides the pin layout for the VIDEO IN HD15 Connectors:

HD15 Pinouts				
Input Pin	VGA	Component	S-Video	Composite
1	Red	Y	Luminance	CVBS1
2	Green	Pb	n/c	CVBS2
3	Blue	Pr	Chrominance	CVBS3
4	n/c	n/c	n/c	n/c
5	n/c	n/c	n/c	n/c
6	Red - Ground	Y - Ground	Luminance - Ground	CVBS1 - Ground
7	Green - Ground	Pb - Ground	n/c	CVBS2 - Ground
8	Blue - Ground	Pr - Ground	Chrominance - Ground	CVBS3 - Ground
9	n/c	n/c	n/c	n/c
10	n/c	n/c	n/c	n/c
11	n/c	n/c	n/c	n/c
12	n/c	n/c	n/c	n/c
13	Horz. Sync	n/c	n/c	n/c
14	Vert. Sync	n/c	n/c	n/c
15	n/c	n/c	n/c	n/c

FIG. 12 VIDEO IN HD15 Connector

**NOTE:** The UDM-HD15RCA3F HD15 to 3x RCA Breakout Cable (FG-HD15RCA3F) referenced in the table above is different from a standard RCA cable, and an RCA cable cannot be used in its place (the Y, Pb, and Pr connections are shifted from the VESA standard). If a standard cable is to be used, you will have to swap the connectors. Contact AMX Technical Support for details.

### Connecting a VGA Video Input

Ensure that Input A is configured appropriately in the *Inputs* page of the UDM-0102's WebConsole (FIG. 13):

Input	Type	Name	Audio
A	Component	DVD	Analog L/R
B	VGA	VCR-1	Analog L/R

FIG. 13 WebConsole - Inputs page - Input Type and Audio drop-down menus

- *Type* should be set to **VGA**, and *Audio* should be set to the audio type (Analog L/R or S/PDIF) used by this device.
- See the *Inputs (A-B) Configuration* section on page 34 for details.

1. Connect one end of a VGA cable to the source device's VGA output port.
2. Attach the other end of the cable to the appropriate VIDEO IN connection (A or B) on the UDM-0102.



3. Connect any audio to the appropriate analog (RCA) audio connectors or digital (SPDIF) connector (A or B).

### Connecting a Component Video Input

Ensure that Input A is configured appropriately in the *Inputs* page of the UDM-0102's WebConsole (see FIG. 13):

- *Type* should be set to **Component**, and *Audio* should be set to the audio type (Analog L/R or S/PDIF) used by this device.
  - See the *Inputs (A-B) Configuration* section on page 34 for details.
1. Connect the UDM-HD15RCA3F Breakout Cable (FG-HD15RCA3F, not included) to the video source device's Component video output connectors (Red, Green and Blue).
  2. Attach the other end of the cable to the appropriate VIDEO IN connection (A or B) on the UDM-0102.
  3. Connect any audio to the appropriate analog (RCA) audio connectors or digital (SPDIF) connector (A or B).

### Connecting an S-Video Input

Ensure that Input A is configured appropriately in the *Inputs* page of the UDM-0102's WebConsole (see FIG. 13):

- *Type* should be set to **S-Video**, and *Audio* should be set to the audio type (Analog L/R or S/PDIF) used by this device.
  - See the *Inputs (A-B) Configuration* section on page 34 for details.
1. Connect the UDM-SVID01 HD15 to SVideo cable (FG-UDM-SVID01, not included) to the video source's S-Video output connector.
  2. Attach the other end of the cable to the appropriate VIDEO IN connection (A or B) on the UDM-0102.
  3. Connect any audio to the appropriate analog (RCA) audio connectors or digital (SPDIF) connector (A or B).

### Connecting a Composite Video Input

Ensure that Input A is configured appropriately in the *Inputs* page of the UDM-0102's WebConsole (see FIG. 13):

- *Type* should be set to **Composite**, and *Audio* should be set to the audio type (Analog L/R or S/PDIF) used by this device.
  - See the *Inputs (A-B) Configuration* section on page 34 for details.
1. Connect the UDM-HD15RCA3F Breakout Cable (FG-HD15RCA3F, not included) to the source device's Composite output ports:
    - A1 = red RCA
    - A2 = green RCA
    - A3 = blue RCA
  2. Attach the other end of the cable to the appropriate VIDEO IN connection (A or B) on the UDM-0102.
  3. Connect any audio to the appropriate analog (RCA) audio connectors or digital (SPDIF) connector (A or B).

### Video Adapter Cables

The following adapter cables are available from AMX, to allow connecting various video input types to the UDM-0102:

Video Adapter Cables		
Name	FG #	Description
UDM-HD15RCA3	FG-HD15RCA3	HD-15 to 3x RCA Breakout Cable
UDM-SVID01	FG-UDM-SVID01	HD-15 to S-Video Cable Breakout Cable

### Audio & Video Formats/Resolutions/Distance

The following table provides allowed distances for video cable runs of various classes and formats: I

Audio & Video Formats/Resolutions/Distance			
Class	Format	Name	Max Distance
Composite	720x480	NTSC	2300' (700m)
	720x756	PAL	2300' (700m)
Component	720x480	480p	2300' (700m)
	720x756	576p	2300' (700m)
	1280x720	720p	650' (200m)
	1920x1080	1080i	500' (150m)
	1920x1080	1080p	400' (120m)
VGA	640x480	VGA	650' (200m)
	800x600	SVGA	650' (200m)
	1024x768	XGA	650' (200m)
	1280x1024	SXGA	500' (150m)
	1600x1200	UXGA	400' (120m)



It is important to note that the maximum distances indicated above are not absolute, but are recommended distances that have been tested to deliver video at the specified resolutions, without significant signal degradation. In particular, lower resolutions (640 x 480, 720 x 480 and 800 x 600) can often be delivered significantly further than what is indicated in the table. Several factors affect the overall quality of the displayed video, including the quality of the twisted pair cable and connectors used, the nature of the video image itself, as well as the particulars of the installation and how the video is displayed and viewed. Two major factors affect the quality of signal transmission include:

- **Cable Distance:** Naturally, long distance cable runs (in excess of 300 meters/1000 feet) are always subject to resistance and capacitance losses which can negatively impact the quality of the image.
- **Skew:** "Skew" represents the slight delay that results from the variation in wiring lengths for each of the twisted pairs. The effects of skew on A/V signals increases with cable length. Excessive skew can adversely affect video image quality, especially at long cable lengths and high signal resolutions.

### IRTX 1 & 2 (IR Transmit) Ports

Two IR-controlled devices (such as DVD players or VCRs) can be connected to the UDM-0102 via the 3.5mm stereo IRTX ports on the rear panel (see FIG. 11 on page 15). This allows device control via the WebConsole or remote control.

**NOTE:** *IR commands for each device on the system have to be learned by the UDM-0102 in order to function properly. Refer to the [Creating and Learning an IR Protocol](#) section on page 50 on how to learn a device's IR commands.*

Use two **IR01** IR Emitter Modules (FG-IR01 - not included) to connect the IRTX 1 & 2 ports on the UDM-0102 to the IR receivers on the devices, to allow them to receive IR control signals directly from the UDM-0102.

- The device connected to IRTX1 = Device "1" on the *Devices* page. IRTX1 transmits IR commands to Device 1.
- The device connected to IRTX2 = Device "2" on the *Devices* page. IRTX2 transmits IR commands to Device 2.

**NOTE:** *IR devices controlled via the IRTX ports are typically installed within the same equipment rack as the UDM-0102.*

### Connecting an IR-Controlled Device to an IRTX Port

To issue IR commands to the devices connected to IRTX 1/2 ports, an IR01 IR Emitter Module (FG-IR01) is required:



**FIG. 14** IR01 IR Emitter Module (FG-IR01)

1. Connect an IR01 cable to the appropriate **IRTX** port on the UDM-0102.
    - Ensure that the device connected to IRTX1 is configured as **Device 1** in the *Devices* page.
    - Ensure that the device connected to IRTX2 is configured as **Device 2** in the *Devices* page.

Refer to the *Configuring IR-Controlled Devices 1 and 2* section on page 37 for details.
  2. Run the other end of the cable to the display device, and attach the IR Emitter over the device's IR sensor.
- Once connected, the UDM-0102 can issue IR commands directly to the device(s) via the IR01 IR emitter(s).

### IRRX (IR Receiver) Port

The IRRX port is a 3.5mm stereo input port, which allows you to connect an (optional) IR03 External IR Receiver Module (FG-IR03). The IRRX port has two purposes: to learn and create new IR protocols (refer to the *Creating and Learning an IR Protocol* section on page 50 for details), and to control an IR-controlled device via *Passthrough* mode (refer to the *Passthrough Mode* section on page 29 for information).

### Connecting an External IR Receiver Module

If pass-through mode (where a device such as a DVD or VCR can be controlled via an RC-02 remote control) is required then an IR03 External IR Receiver Module will be needed to pick up IR controls from the remote control (FIG. 15):



**FIG. 15** IR03 External IR Receiver Module

An IR03 External IR Receiver Module is also needed if the UDM-RX02's video compensation is to be done via a remote control.

**NOTE:** *The IR03 IR receiver supports transmitters that produce a Carrier Center Frequency of 38KHz.*

### DC IN Power Input

**NOTE:** *As a Class 1 appliance, ensure the device is connected to a main socket outlet with a protective grounding connection.*

The DC IN power input is a 2.1mm barrel-style DC power socket, for use with the included (24VDC, 1.25A) UDM-PS power supply.

# UDM-RX02 Multi-Format Receiver

## Overview

Installed at the display device, the UDM-RX02 converts the signal received from the UDM-1604 or UDM-0102 Multi-Format Distribution Hub to standard audio/video signals. With intelligent receiver technology, each UDM-RX02 is powered remotely from the Multi-Format Distribution Hub via Cat 5/5e/6 cable. The receiver supports an embedded control function to allow detection of a change in signal from the hub and automatic switch of the Plasma or LCD screen to its new video format. The UDM-RX02 also allows an optional local power supply to be added for long cable runs.



FIG. 16 UDM-RX02

## Common Application

Perfect for the receiving end of sources to be displayed in classrooms, conference rooms or other presentation rooms.

## Features

- Video Support for 1600 x 1200 (UXGA), 1920 x 1080 (HDTV), Component YPbPr, S-Video, Composite PAL/NTSC
- S/PDIF, Digital and analog stereo audio support
- IR blaster and receiver ports

## Compatibility

The UDM-RX02 is compatible for use with the following UDM Hubs:

- UDM-0102 (FG-UDM-0102) - supports Common Synch Mode.
- UDM-0404 (FG-UDM-0404) - supports Common Synch Mode.
- UDM-1604 (FG-UDM-1604C) - supports Common Synch Mode.
- UDM-1604 (FG-UDM-1604) - does not support Common Synch Mode. In this case, the UDM-RX02 will function, but without Common Synch Mode.

## Product Specifications

UDM-RX02 Specifications	
Power Requirements:	24VDC @ .75A <i>Note: In most cases the UDM-RX02 is remotely powered by the UDM Multi-Format Distribution Hub (see Powering on the UDM-RX02).</i>
<b>Rear Panel Connectors:</b>	
Power Socket:	2.1mm barrel-style DC power socket (female)
UDM Hub (RJ45) Port:	Provides audio/video transport as well as control via Cat5, Cat5e or Cat6 to an UDM Hub.
Serial (RJ12) port:	Provides serial RS232 control of remote devices. It also allows administrators to control the various functions to the UDM-RX02 from a command line prompt and terminal connection. <ul style="list-style-type: none"> <li>• See the <i>Serial Port (RJ12)</i> section for more details.</li> <li>• Requires a DB9-to-RJ12 adapter cable (FG-RS01) to connect to a PC.</li> </ul>
IR Rx Port:	3.5mm stereo input port, for connection of an IR receiver to allow setup of the UDM-RX02, local compensation controls, and remote control of centrally located IR devices.
IR Tx Port:	3.5mm stereo IR Transmitter output port allows one IR-controlled device (such as a DVD or VCR player) to be controlled via optional wired IR emitter.
Audio Connectors:	<ul style="list-style-type: none"> <li>• Black RCA connector - Digital audio</li> <li>• White / Red RCA connectors - Analog audio L/R</li> </ul>
Video Connectors:	<ul style="list-style-type: none"> <li>• Yellow RCA female connector - CVBS (supports composite video)</li> <li>• S-Video - S-video female connector</li> <li>• VGA - HD15 female connector (supports VGA video)</li> <li>• Green RCA female connector - Component output: Y</li> <li>• Blue RCA female connector - Component output: Pb</li> <li>• Red RCA female connector - Component output: Pr</li> </ul>

UDM-RX02 Specifications (Cont.)	
Operating Environment:	<ul style="list-style-type: none"> <li>35°F - 95°F (5°C - 35°C)</li> <li>Max. relative humidity - 85% (non-condensing)</li> <li>Heat Dissipation (Typical): 30.7 BTU/hr</li> </ul>
Dimensions (HWD):	1" x 8 15/16" x 3 3/8" (25 mm x 227 mm x 85 mm)
Weight:	1.45 lb. (658 g)
Certifications:	<ul style="list-style-type: none"> <li>CE</li> <li>FCC part 15 Class A</li> </ul>
Included Accessories:	UDM-PS 24VDC, 30W Power Supply (57-0102-01)
Other AMX Equipment:	<ul style="list-style-type: none"> <li>RS232 DB9/RJ12 Connection Cable (FG-RS01)</li> <li>UDM-RC02 Multi-Format IR Remote Control (FG-UDM-RC02)</li> <li>UDM-RC05 Multi-Format IR Remote Control (FG1402-70)</li> <li>IR01 IR Emitter Module (FG-IR01)</li> <li>IR03 External IR Receiver Module (FG-IR03)</li> </ul>

## UDM-RX02 Wiring and Connections

There are no components on the front panel of the UDM-RX02. All of the connectors and ports are located on the rear panel of the UDM-RX02 (FIG. 17):

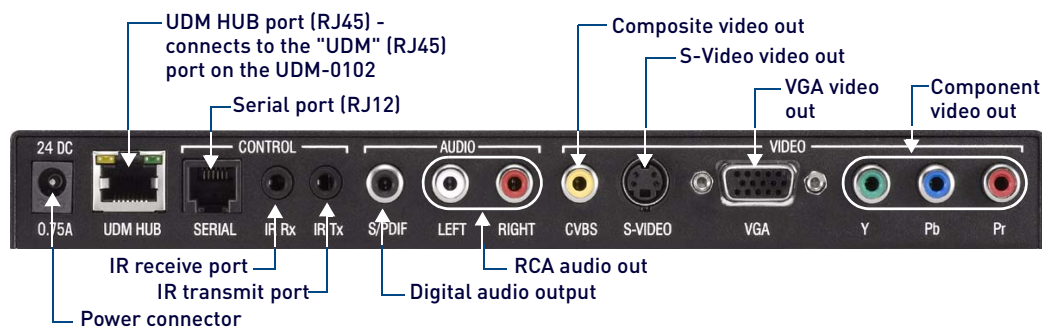


FIG. 17 UDM-RX02 - rear panel components

### 24 DC Power Input

**NOTE:** As a Class 1 appliance, ensure the device is connected to a main socket outlet with a protective grounding connection.

The DC IN power input is a 2.1mm barrel-style DC power socket, for use with the included (24VDC, 1.25A) UDM-PS power supply.

### Using the UDM-PS External Power Supply

Normally, the UDM-RX02 is powered remotely by the UDM-0102 Hub. However, in cases involving long cable runs, it may be necessary to power the UDM-RX02 locally, via the included UDM-PS power supply.

Typically, the external power supply is not needed for cable runs of 650' (200m) or less, but at greater distances it may improve image quality. The best way to determine whether the external power supply is needed is to observe the quality of the image received. If there is noticeable distortion, then connecting the UDM-PS power supply may provide a visible improvement.

- To connect the UDM-PS power supply to the UDM-RX02, insert the barrel connector into the 24 DC connector on the UDM-RX02.
- To power down the UDM-RX02, remove the barrel connector of the power supply from the power connector and then remove the Ethernet cable from the UDM Hub connector.

**NOTE:** Disconnecting the UDM-PS power supply will not power down the UDM-RX02 if the Ethernet connection to the UDM-0102 is intact.

To connect the UDM-PS power supply to an UDM-RX02N that is currently connected to a UDM-0102 (via the UDM port):

- Disconnect the CAT5/5e/6 cable from the UDM HUB port to power the unit down
- Connect the UDM-PS power supply and reconnect the CAT5/5e/6 cable to the UDM HUB port.

### UDM Hub Port (RJ45)

The UDM-RX02 connects to the UDM-0102 Hub via the UDM HUB connector. This is a standard RJ45 connector, and the UDM-RX02 can be connected via standard Cat5/5e/6 cabling.

- Refer to the *UDM Port (RJ45)* section on page 4 for pinout details.
- Refer to the *UDM-0102 Wiring and Connections* section on page 2 for information on connecting the UDM-0102 to the network.

## Serial (RJ12) Port

The SERIAL (RJ12) port allows administrators to control the various functions to the UDM-RX02 from a command line prompt and terminal connection.

- Requires a DB9-to-RJ12 adapter cable (FG-RS01) to connect to a PC.
- Default settings = 9600, 8 bit, No Parity, 1 Stop Bit.

The Serial port can also be used as a control port for sending serial data to a connected device. In this mode the UDM-RX02N supports baud rates from 1200 - 115200. If a display device is controlled using a serial connection instead of IR, then a serial cable is connected from the UDM-RX02N to the serial port on the display device.

**NOTE:** *The baud rate on the UDM-RX02N must match the baud rate as the receiver is set up for. For example, if the baud rate has been changed to 115200 for a certain display, then you'll need to change your terminal to the same 115200 baud rate.*

Depending on the screen manufacturer, it may be necessary to introduce a cross into this connection by instead using the FG-RS02 cable, or a null modem DB9-DB9 adapter with the FG-RS01. In some cases the null modem adapter may need a link between RTS/CTS at the DB9 end.

For example, NEC LCD panels act as DTE equipment and work with standard serial cable, while Fujitsu and Panasonic Plasma screens act as DCE equipment and therefore require cross connections.

**NOTE:** *Refer to the UDM-0808-SIG / UDM-RX02N Operation/Reference Guide for pinout details on the SERIAL (RJ12) connector.*

To connect to a display device using a serial cable:

1. Connect a serial cable to the UDM-RX02N's SERIAL port.
2. Run the serial cable (observing distance limitations) to the display device's serial port and connect.

**NOTE:** *The serial cable must be pinned out according to the Manufacturer's instructions. Failure to do so will result in serial commands failing.*

Refer to the *Serial (RJ12) Port* section on page 3 for default communication settings and RS01 (DB9-to-RJ12 Adapter) Cable Pinouts.

## IR Rx (IR Receiver) Port

The IR Rx port is a 3.5mm stereo input port, which allows you to connect an (optional) IR03 External IR Receiver Module (FG-IR03). The IR Rx port has two purposes: to learn and create new IR protocols (refer to the *Creating and Learning an IR Protocol* section on page 50), and to control an IR-controlled device via *Passthrough* mode (refer to the *Passthrough Mode* section on page 29 for information).

### Connecting an IR03 External IR Receiver Module to the IR Rx Port

If pass-through mode (where a device such as a DVD or VCR can be controlled via an RC-02 remote control) is required then an IR03 External IR Receiver Module will be needed to receive IR commands from the remote control (FIG. 18):



**FIG. 18** IR03 External IR Receiver Module

An IR03 External IR Receiver Module is also needed if the UDM-RX02's video compensation is to be done via a remote control (see the *Compensating Video Via the UDM-RC10 Remote Controller* section on page 65 for details).

**NOTE:** *The IR03 IR receiver supports transmitters that produce a Carrier Center Frequency of 38KHz.*

## IR Tx (IR Transmit) Port

The IR Tx port issues IR commands from the UDM-RX02 to a controlled device. One IR device (such as DVD player or VCR) can be connected to the UDM-RX02 via the IR Tx port, and controlled via the UDM-0102's WebConsole or via remote control.

**NOTE:** *IR devices controlled via the IRTX ports are typically installed within the same equipment rack as the UDM-RX02.*

### Connecting an IR01 External IR Emitter Module to the IR Tx Port

To issue IR commands to the display device such as power on or power off, an IR01 IR Emitter Module (FG-IR01) is needed.

**NOTE:** *Ensure the position of the device corresponds to the position assigned in the Devices option of the UDM-0102's WebConsole.*

1. Connect the IR Emitter Module cable to the **IR Tx** connector on the UDM-RX02.
2. Run the other end of the cable to the display device, and attach the IR Emitter over the device's IR sensor by removing the cover on the reverse side of the IR Emitter.
3. The UDM-RX02 is now capable of issuing IR commands to the display device.

IR commands for each device on the system have to be learned by the UDM-0102 in order to function properly. Refer to the *Creating and Learning an IR Protocol* section on page 50 for instructions on learning a device's IR commands.

## AUDIO Outputs

The UDM-RX02 provides standard RCA (L/R) output connectors for analog audio output and S/PDIF for digital audio output. Use the audio output appropriate for the display device to be used with each UDM-RX02.

## VIDEO Outputs

The UDM-RX02 provides several video output connectors to accommodate various connection types on display devices. The UDM-RX02 can output CVBS (Composite), VGA, S-Video or Component video. Use the video output appropriate for the display device to be used with each UDM-RX02:

1. Attach an appropriate video cable to the respective video output connector (either CVBS (Composite), VGA, S-Video or Component) on the UDM-RX02.
2. Run the other end of the cable to a video input connector on the display device; connect firmly.
3. Connect any audio to the appropriate analog (RCA) audio connectors or digital (SPDIF) connector.

# Configuration

## WebConsole Overview

Each UDM-0102 Hub can be configured for the correct network environment. Configuration options are available via the UDM's built-in WebConsole, as described in this section. The UDM-RX02 Receiver connected to the UDM-0102 is also configured via the UDM-0102's WebConsole.

This section describes the pages that comprise the UDM-0102's WebConsole interface in the order that they are presented ("Status", "Setup", "Inputs", "Devices", "Schedule" and "Protocols"). However, on initial connection, you'll probably need to visit the Setup page first, to specify network configuration and other basic device setup options for the Hub. See the *Configuration - Setup Page* section on page 32 for details.

## Connecting to the UDM-0102

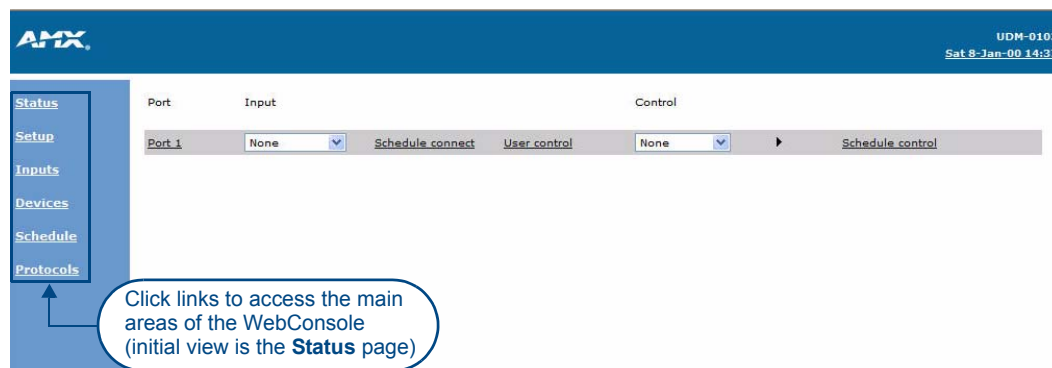
**NOTE:** Use the included Ethernet Crossover cable for initial setup.

1. The default IP address of the UDM-0102 is **192.168.0.96**.
2. Enter the IP address into the address field within a browser window.
3. To connect to the UDM-0102, a password is required.



**FIG. 19** Authentication dialog

- The *username* should be left blank.
  - The *password* is **admin** (case-sensitive).
4. On initial connection, the *Status* page is displayed (FIG. 20).



**FIG. 20** UDM-0102 WebConsole - Initial View (Status page)

After setup you can change TCP/IP address and connect the UDM-0102 to your network equipment (switch, Hub, or serial port). Use the links in the left-pane of the page to access each of the main Configuration pages, as described in the following sections.

For the initial setup, you will probably need to visit the Setup page first, to establish network settings for the UDM-0102 (see the *Configuration - Setup Page* section on page 32).

# UDM-0102 Configuration - Status Page

## Overview

The options on the *Status* page allow you to access the Port Configuration options, select an Input Device, schedule connections, define user control and schedule commands (FIG. 21).

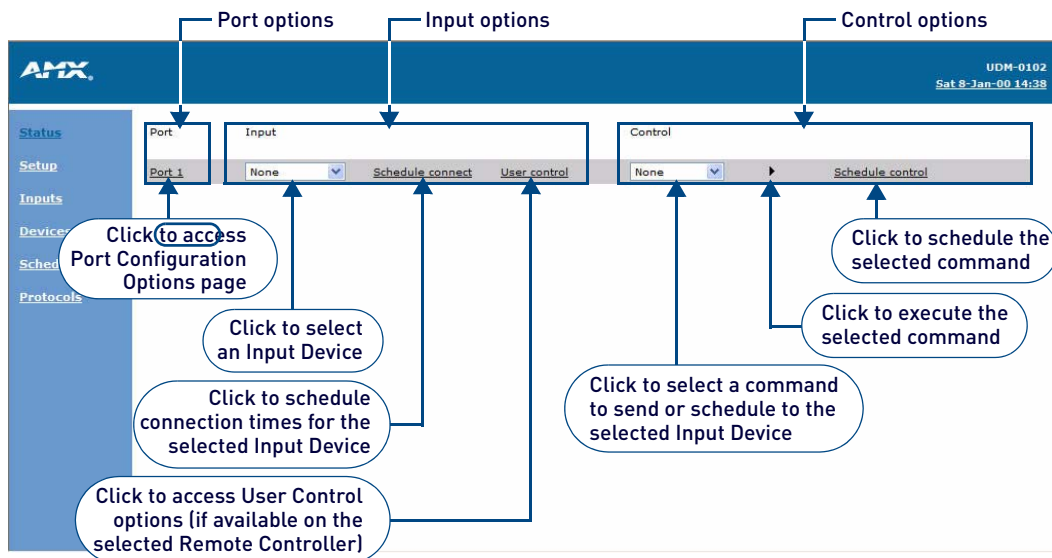


FIG. 21 Status page

- The *Status* page is the initial view when the UDM-0102's WebConsole is accessed.
- To access the Status page from any other Configuration page in the WebConsole, click on the *Status* link in the navigation pane

## Status Page Options

Status Page Options	
<b>Port</b>	
• Port 1:	Click this link to access the Port Configuration options for the UDM-0102's input port. See the <i>Port Configuration Options</i> section on page 24 for information.
<b>Input</b>	
• Input (Device) drop-down menu:	"Input" refers to devices connected directly to the UDM Hub (Inputs A-B). Select an input device to display from this drop-down menu. The two devices available for selection are configured in the <i>Inputs</i> page. See the <i>Selecting an Input Device</i> section on page 26 for details.
• Schedule connect:	Click this link to schedule the selected Input Device to connect at specific times. See the <i>Scheduling Input Device Connections</i> section on page 26 for information.
• User Control:	Click this link to access the User Control page. The User Control page lists all commands available to the Input Device, based on the Remote Controller currently selected. Note that the <i>User Control</i> options are not available at all for some Remote Controllers (i.e. the Sky+ Remote), based on the inherent functionality of the selected Remote Controller. <b>Note:</b> The Remote Controller type is selected in the Port Configuration Options page (see the <i>Port Configuration Options</i> section on page 24 for information). See the <i>Defining User Control</i> section on page 27 for information.
<b>Control</b>	
• Control drop-down menu:	The <i>Control</i> options allow Administrators to issue commands to the selected Input Device, directly from the UDM WebConsole. Select a command to be issued from the drop-down menu; press the Execute icon (⏏) to issue the command. See the <i>Executing an IR Command</i> section on page 30 for details.
• Schedule Control:	The Schedule Control options allow you to schedule commands to be issued to the selected Input Device at a specified time. See the <i>Scheduled Control</i> section on page 30 for details.



Port Configuration Options

Click on **Port 1** link on the *Status* page (FIG. 22) to access the *Port Configuration* page.

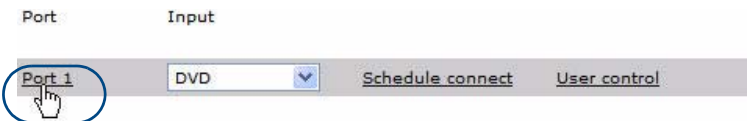


FIG. 22 Port 1 Link on the Status Page

The options on the *Port Configuration* page (FIG. 23) allow you to configure various options for the UDM-0102's output port.

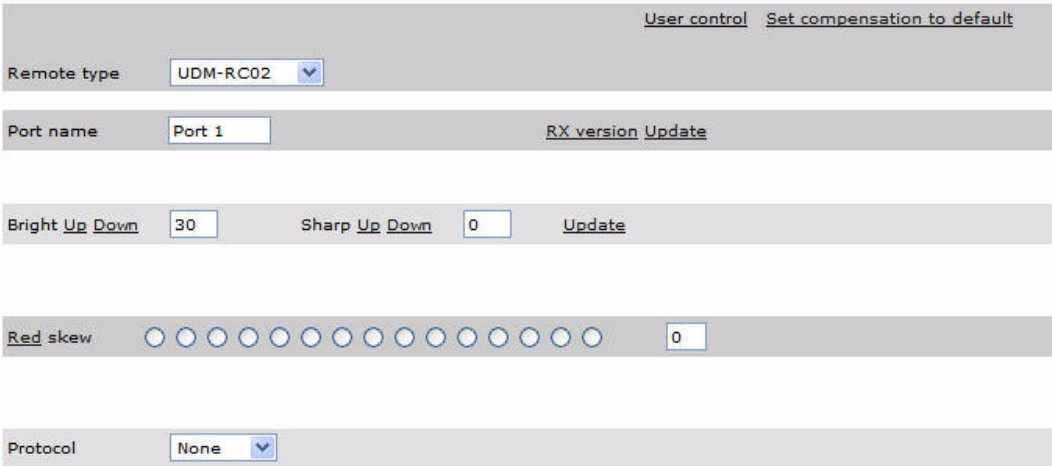


FIG. 23 Port Configuration page

The options on the *Port Configuration* page are described below:

Port Configuration page	
User control:	Click to access the User Control options for this Port, to allow Administrators to issue commands from the UDM WebConsole. See the <i>Defining User Control</i> section on page 27 for details.
Set compensation to default:	Click to return all video compensation settings options to their default values. See the <i>Default Video Compensation Settings</i> section on page 63 for details.
Remote type:	Click to select the type of remote controller to be used for Passthrough control. See the <i>Passthrough Mode</i> section on page 29 for details.
Port name:	The current name for this (output) Port (default = "Port 1").
RX version:	Click to retrieve the current settings of the UDM Receiver connected to this Port
Update:	Click to send the current settings to the UDM Receiver connected to this Port.
Bright Up/Down:	Once any skew has been eliminated the video should be adjusted for brightness using a grey scale or equivalent test card. Click <i>Update</i> to apply changes.
Sharp Up/Down:	The sharpness of the video should be adjusted last, to eliminate any over or under shoot of the video. Horizontal black and white bars are one useful method of tuning sharpness. Click <i>Update</i> to apply changes.
Red/Green/Blue skew:	Use this set of radio buttons to manually adjust the skew (delay) for any of the video colors. Initially, the skew control is for <i>Red</i> . Once the skew for Red is set, click the <b>Red</b> link to cycle to <i>Blue</i> ; once the skew for Blue is set, click the <b>Blue</b> link to cycle to <i>Green</i> , etc. See the <i>Video Compensation</i> section on page 63 for details.
Protocol:	Select a control protocol to be used for this Port ( <i>IR</i> or <i>Serial</i> ). Note that the Protocol setting can also be specified in the <i>Protocols</i> page. See the <i>Configuration - Protocols Page</i> section on page 44 for details.

Selecting a Remote Control Type

The **Remote type** option in the *Port Configuration* page (FIG. 24) allows you to select a specific type of remote controller to be used for Passthrough control of the Output device.

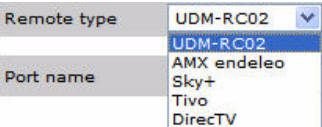


FIG. 24 Remote Type drop-down menu



The remote control types available for selection include:

- UDM-RC02
- AMX Endeleo
- Sky+
- Tivo
- DirecTV

### Renaming the Output Port

By default, (output) Port 1 is named "Port 1". To rename the output Port:

1. Click the **Port 1** hyperlink on the *Status* page to access the *Port Configuration* page.
2. Type directly into the **Port name** text field.
3. Click **Update** to rename the Port.

### Compensating Video

Options within the *Port Configuration* page allow you to compensate (tune) outgoing video signals, for optimum picture quality.

**NOTE:** LCD screens will attempt to automatically optimize the video, which can present issues when adjusting for skew. For best results, use a CRT monitor to compensate video.

1. On the *Status* page, click on a *Port* hyperlink to access the Port Configuration options (see FIG. 23 on page 24).
2. Adjust *Brightness* and *Sharpness* via the **Up** and **Down** links.
3. To add skew delay into any of the video colors, click on the appropriate **color** hyperlink (FIG. 25).

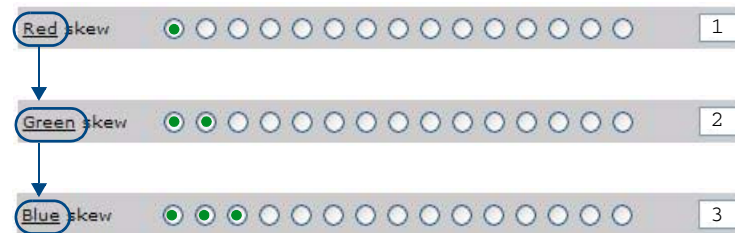


FIG. 25 Skew controls

**NOTE:** Each radio button represents a 2ns delay.

Video compensation settings can also be configured at the UDM-RX02 Receivers via two methods;

- Via the UDM-RC10 Remote Control (see the *Compensating Video Via the UDM-RC10 Remote* section on page 62).
- Via hyper terminal session via the serial connector on the UDM-RX02 (especially effective when using long runs). See the *Advanced Administration* section on page 57 for details.

### Selecting a Control Protocol for the Output Port

Protocols for Serial and IR devices used in the system can be created via options in the Protocols page (see the *Configuration - Protocols Page* section on page 44). These protocols allow the UDM-0102 to control connected serial and IR devices.

Once one or more protocols have been defined in the Protocols page, these protocols are available for selection in the **Protocol** drop-down menu in the Port Configuration page (FIG. 26):

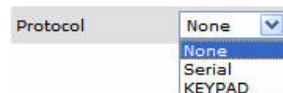


FIG. 26 Protocol drop-down menu

### Dual Output Mode

*Dual Output mode* permits a single output to be viewed as two separate output types. For example a port could be configured for the dual output of VGA and Component video. This means at the UDM-RX02 end the video could be delivered to two separate display devices over the relevant connections at the UDM-RX02. However, the output via the component connectors can only be RGBs; separate syncs are not available on this connection.

To place a port into Dual Output mode:

1. Click on the **Port** hyperlink on the *Status* page to invoke the *Port Configuration* page
2. Click on the **Dual Output** checkbox to permit the port to display the single input as 2 separate types at the UDM-RX02 (FIG. 27).

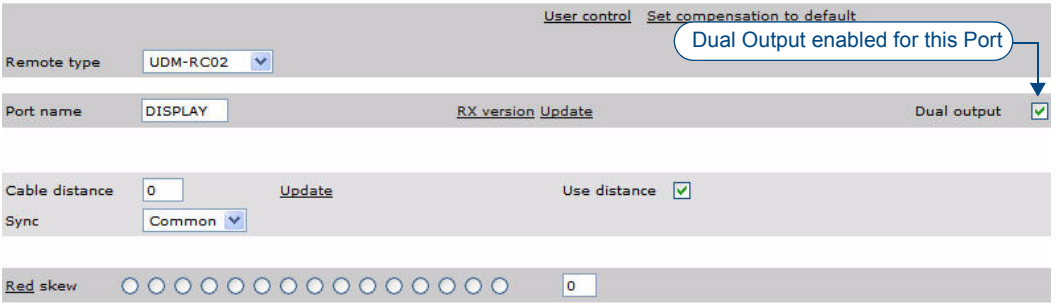


FIG. 27 Port Configuration Options page - Dual Output enabled for a selected port

**NOTE:** Ensure the correct cabling is in place at the UDM-RX02 to accommodate the 2 separate signals.

Input Options

“Input” refers to the Input Devices connected to the UDM Hub (Inputs A-B). The Input options on the *Status* page include *Input selection*, *Schedule connect* and *User control*.

Selecting an Input Device

Select an input device to configure from the **Input** drop-down menu (FIG. 28).

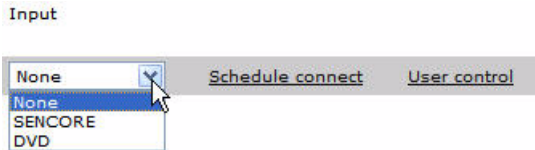


FIG. 28 Status Page - Selecting an Input Device

The devices available for selection in this menu are configured in the *Inputs* page (see the *Configuration - Inputs Page* section on page 34 for information).

Changing an Input

The input being displayed can be changed at any time. Simply select the new input to be displayed via the **Input** drop-down.

Scheduling Input Device Connections

The **Schedule Connect** link at the top of the *Status* page allows you to schedule a connect time for the selected Input Device. Once a Scheduled Connect is defined for an Input Device, that device will automatically connect to the UDM-0102 at the specific time:

- 1. Click on the **Schedule Connect** link at the top of the *Status* Page (FIG. 29).

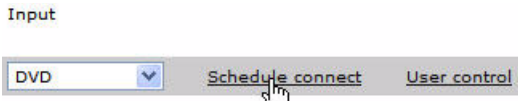


FIG. 29 Status Page - Selecting Schedule connect

This link opens the *Schedule* page (FIG. 30).

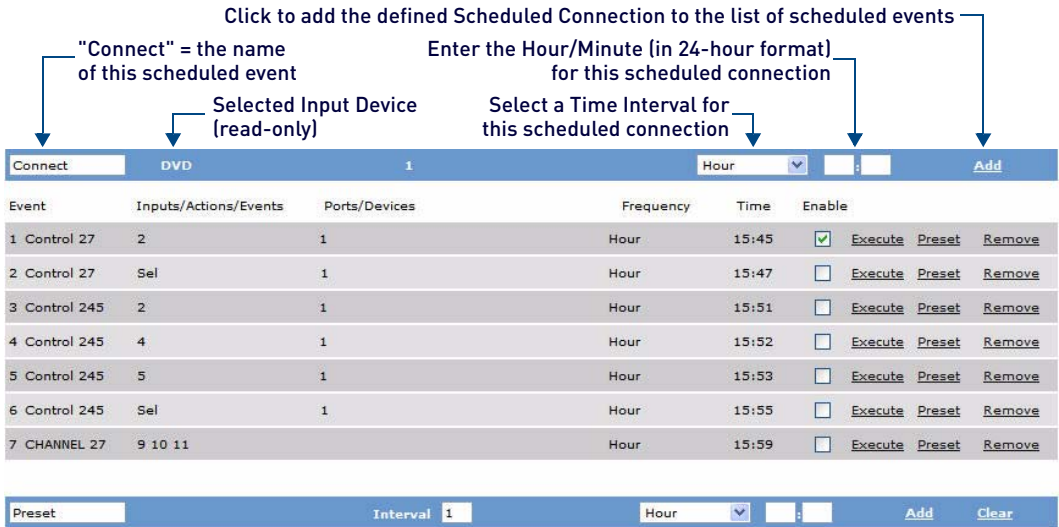


FIG. 30 Schedule Page for Scheduled Connect

The blue row at the top of the *Schedule* page represents the new scheduled event - in this case, a scheduled *Connect*. The options in this row (from left to right) are:

- **Scheduled Event name text box** - this editable field indicates the default name for the new scheduled event, in this case "Connect".
  - **Selected Input Device** - this read-only field indicates the currently selected Input Device. This is the Input Device to which the Scheduled Connect will apply.
  - **Time Interval drop-down menu** - this drop-down menu lists the various time intervals that can be applied to this Scheduled Connect (*Hour, Day, Weekday, Sunday - Saturday*).
  - **Hour/Minute text boxes** - these text fields allow you to specify the Hour and Minute (in 24-hour format) at which this Scheduled Connect should occur.
  - **Add** - this link adds the Scheduled Connect to the list of scheduled events.
2. Select a time interval from the *Time Interval* drop-down menu.
  3. Enter the hour and minute (in 24-hour format) at which this Scheduled Connect should occur, in the *Hour/Minute* text fields.
  4. Click **Add** to add the new Scheduled Connect to the list of scheduled events, in the *Schedule* page (FIG. 31):

Event	Inputs/Actions/Events	Ports/Devices	Frequency	Time	Enable			
1 Control 27	2	1	Hour	15:45	<input checked="" type="checkbox"/>	<a href="#">Execute</a>	<a href="#">Preset</a>	<a href="#">Remove</a>
2 Control 27	Sel	1	Hour	15:47	<input type="checkbox"/>	<a href="#">Execute</a>	<a href="#">Preset</a>	<a href="#">Remove</a>
3 Control 245	2	1	Hour	15:51	<input type="checkbox"/>	<a href="#">Execute</a>	<a href="#">Preset</a>	<a href="#">Remove</a>
4 Control 245	4	1	Hour	15:52	<input type="checkbox"/>	<a href="#">Execute</a>	<a href="#">Preset</a>	<a href="#">Remove</a>
5 Control 245	5	1	Hour	15:53	<input type="checkbox"/>	<a href="#">Execute</a>	<a href="#">Preset</a>	<a href="#">Remove</a>
6 Control 245	Sel	1	Hour	15:55	<input type="checkbox"/>	<a href="#">Execute</a>	<a href="#">Preset</a>	<a href="#">Remove</a>
7 CHANNEL 27	9 10 11		Hour	15:59	<input type="checkbox"/>	<a href="#">Execute</a>	<a href="#">Preset</a>	<a href="#">Remove</a>
8 Connect	2	1	Hour	16:30	<input type="checkbox"/>	<a href="#">Execute</a>	<a href="#">Preset</a>	<a href="#">Remove</a>

Scheduled Connect  
 Click here (check) to enable this Scheduled Connect  
 Click to execute the Connect event  
 Click to add this Scheduled Connect to a Preset Schedule  
 Click to remove this Scheduled Connect from the list of scheduled events

**FIG. 31** Schedule Page - showing a new Scheduled Connect

5. Click in the **Enabled** checkbox to enable this Scheduled Connect.

**NOTE:** *Scheduled Events will only be executed if they have been Enabled via this checkbox.*

- Click the **Execute** link to execute the associated event immediately.
- Click the **Preset** link to add this Scheduled Connect to a Preset Schedule. Multiple scheduled events can be combined into a single Preset Schedule. For example, you could create a Preset Schedule that powers up devices 1-2 (connected to the IRTX Ports on the rear panel), then powers up display devices 1-4 (connected to the RJ-45 Output ports on the front panel), and displays Inputs 1-2 on Ports 1-4. See the *Creating a Preset Schedule* section on page 40 for details.
- Click the **Remove** link to remove the associated event from the scheduled events list.

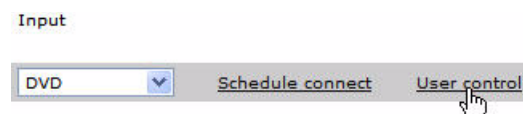
## Defining User Control

The *User Control* feature allows you to assign IR commands to the selected Input Device and associated remote controller.

- The remote controller is selected via the **Remote Type** option in the *Port Configuration* page (see the *Selecting a Remote Control Type* section on page 24).
- The IR command which the selected remote controller will issue must first be been learned by the Hub (refer to the *Creating and Learning an IR Protocol* section on page 50 for information).
- The availability of the User Control feature depends on the functionality of the remote controller currently selected. For example, User Control is not available for Sky+, Tivo or DirecTV remotes. If any of these are selected as the *Remote type*, the User Control option is not displayed on the Status page.

To assign IR User controls to an input device:

1. Select the input device for which you will assign a control from the *Input* drop-down menu.
2. Click on the **User control** link at the top of the *Status* page (FIG. 32):



**FIG. 32** Status Page - Selecting User control

This link opens the *User Control* page (FIG. 33).

Each Key represents a button on the selected Remote Controller

Select an Input (Input Device) from the drop-down menu for each Key

Select a Control (IR command) from the drop-down menu for each Key

Click to issue the last command defined

Click to reset the Remote Controller to it's default key assignments

Click to assign this key as a pass-through command

Select Port or Device as the recipient of the Control for each Key

Select a defined Schedule to which each Control will be added

**FIG. 33** User Control page [with UDM-RC02 Remote Controller selected]

This page consists of several columns:

- **Key** - This column represents the keys on the UDM-RC02 Remote Control. The following table provides the key layout for the RC02:

UDM-RC02 Keys	Description
1, 2	Select UDM-0102 Inputs 1 and 2
0, 3-9	Pass-through
C0-C8	Programmed as needed to control the display or the input source
pause, play, stop, rwd and fwd	Pass-through

- **Input** - This column indicates the Input Device to which each Key/Control is associated. Select an Input Device from the drop-down menu. The devices available for selection are defined in the *Configuration - Devices Page* section on page 36 for details). "Input" refers to devices connected directly to the UDM Hub (Inputs A-B).
  - **Control** - IR Commands are selected from the *Control* drop-down menu (provided for each Key).
  - **Port / Device** - The radio buttons in this column allow you to specify either the Port or the Device as the recipient of each defined command.
  - **Schedule** - These drop-down menus allow you to add each defined User Control to a user-defined Schedule. The schedules that are available for selection here are defined in the *Schedule Page* section on page 40 for details.
  - **Passthrough** - These checkboxes allow you to specify each User Control as a *passthrough* command. Passthrough allows an UDM-RC02 remote control (or SKY or SKY+ remotes) to be used to control devices connected to the UDM-0102 (see the *Passthrough Mode* section on page 29 for details).
3. Open the **Control** drop-down menu for any Key, and select the command which this key on the UDM-RC02 Remote Control will issue (FIG. 34).

**NOTE:** Ensure the key on the Remote Controller corresponds with the correct command.

4. Select either the **Port** or **Device** radio button to specify whether this button on the remote should be associated with the Port (display device) or an actual Device (e.g. a DVD player added to the system as a device) when it is pushed.
5. Click the **Schedule** drop-down menu to add each Control to a user-defined schedule if desired. The schedules that are available for selection here are defined in the *Schedule Page* (see the *Configuration - Schedule Page* section on page 40).
6. The UDM Receiver will now accept the relevant command from the remote controller (i.e. Key 1 on the UDM-RC02 will "Play" the DVD, as indicated in FIG. 35. .

Key	Input	Control	Schedule	Passthrough
1	SENCORE	None	Port <input checked="" type="radio"/> Device <input type="radio"/> None	<input checked="" type="checkbox"/>
2	DVD	Pwr Off	Port <input checked="" type="radio"/> Device <input type="radio"/> None	<input checked="" type="checkbox"/>
C0	None	Red	Port <input checked="" type="radio"/> Device <input type="radio"/> None	
C1	None	Grn	Port <input checked="" type="radio"/> Device <input type="radio"/> None	
C2	None	Yellow	Port <input checked="" type="radio"/> Device <input type="radio"/> None	
C3	None	Blue	Port <input checked="" type="radio"/> Device <input type="radio"/> None	
C4	None	Menu	Port <input checked="" type="radio"/> Device <input type="radio"/> None	
C5	None	Exit	Port <input checked="" type="radio"/> Device <input type="radio"/> None	
C6	None	Up	Port <input checked="" type="radio"/> Device <input type="radio"/> None	
C7	None	Dn	Port <input checked="" type="radio"/> Device <input type="radio"/> None	
A	None	Lft	Port <input checked="" type="radio"/> Device <input type="radio"/> None	
B	None	Rt	Port <input checked="" type="radio"/> Device <input type="radio"/> None	
C	None	Sel	Port <input checked="" type="radio"/> Device <input type="radio"/> None	
D	None	Guide	Port <input checked="" type="radio"/> Device <input type="radio"/> None	
E	None	Ch+	Port <input checked="" type="radio"/> Device <input type="radio"/> None	
F	None	Ch-	Port <input checked="" type="radio"/> Device <input type="radio"/> None	
		Vol+	Port <input checked="" type="radio"/> Device <input type="radio"/> None	
		Vol-	Port <input checked="" type="radio"/> Device <input type="radio"/> None	
		Stop	Port <input checked="" type="radio"/> Device <input type="radio"/> None	
		Play	Port <input checked="" type="radio"/> Device <input type="radio"/> None	
		Pse	Port <input checked="" type="radio"/> Device <input type="radio"/> None	
		Rew	Port <input checked="" type="radio"/> Device <input type="radio"/> None	
		Rec	Port <input checked="" type="radio"/> Device <input type="radio"/> None	
		FF	Port <input checked="" type="radio"/> Device <input type="radio"/> None	
		Prev	Port <input checked="" type="radio"/> Device <input type="radio"/> None	
		Golive	Port <input checked="" type="radio"/> Device <input type="radio"/> None	
		Box	Port <input checked="" type="radio"/> Device <input type="radio"/> None	
		Act	Port <input checked="" type="radio"/> Device <input type="radio"/> None	
		Info	Port <input checked="" type="radio"/> Device <input type="radio"/> None	
		Txt	Port <input checked="" type="radio"/> Device <input type="radio"/> None	
		Help	Port <input checked="" type="radio"/> Device <input type="radio"/> None	

FIG. 34 User Control page - Control menu for Key 1

Key	Input	Control	Schedule	Passthrough	Default
1	DVD	Play	Port <input checked="" type="radio"/> Device <input type="radio"/> None	<input checked="" type="checkbox"/>	

FIG. 35 Example - Key 1 set to send the "Play" command

### Passthrough Mode

Input devices can also be placed into *Passthrough mode*. Passthrough Mode allows an UDM-RC02 Remote Control (or SKY or SKY+ remotes) to be used to control Input Devices connected to the UDM-0102.

The following steps must be taken in order for Passthrough Mode to function correctly:

1. Use an IR01 IR Emitter Module connected to connect an IRTX port on the UDM-0102 to the IR Receiver on the Input Device - see the *Connecting an IR-Controlled Device to an IRTX Port* section on page 8.  
**NOTE:** Ensure the relevant IR blaster port is cabled up to the device: If the device is connected to Input A, connect the device to IR port 1. If the device is connected to Input B, connect the device to IR port 2.
2. The Input Device must be added to the system as an **Input** - see the *Configuration - Inputs Page* section on page 34.
3. The Input Device must also be added to the system as a **Device** - see the *Configuring IR-Controlled Devices 1 and 2* section on page 37.
4. The device must be assigned an IR protocol see the *Creating and Learning an IR Protocol* section on page 50.
5. The port must be configured for Passthrough Mode: In the *User Control* page, select the **Passthrough** option for each Key/Command for which you want to use passthrough mode to control the selected Input device (FIG. 36).

Key	Input	Control	Schedule	Passthrough
1	DVD	Play	Port <input checked="" type="radio"/> Device <input type="radio"/> None	<input checked="" type="checkbox"/>
2	VCR-1	Pwr Off	Port <input checked="" type="radio"/> Device <input type="radio"/> None	<input type="checkbox"/>

Passthrough enabled for this key

FIG. 36 Passthrough option selected for Key 1

The example in FIG. 36 indicates that Key 1 on the UDM-RC02 remote control will put device "DVD" into Passthrough mode. Alternatively, selecting Input A on the UDM-RC02 will also enable passthrough control of the source.

### Using Passthrough Mode

Once a device has been configured for Passthrough Mode, the relevant remote control is used to control the device. Press the previously configured key on the relevant remote control to enter Passthrough mode.

- If accessing a Sky Box through Passthrough Mode, click on the "Sky" button on the Sky remote control. Now use the Sky Remote control as normal. Press "TV" on the Sky remote to exit Passthrough Mode.
- If accessing a DVD player through Passthrough, click on the relevant button on the UDM-RC02 remote control to play, pause, stop, eject, etc.

**NOTE:** To exit Passthrough mode click on any key on the remote control (which accessed Passthrough mode) which is not configured as a control enabled key. If accessing a Sky box press "TV" on the Sky remote to exit Passthrough mode.



## Control Options

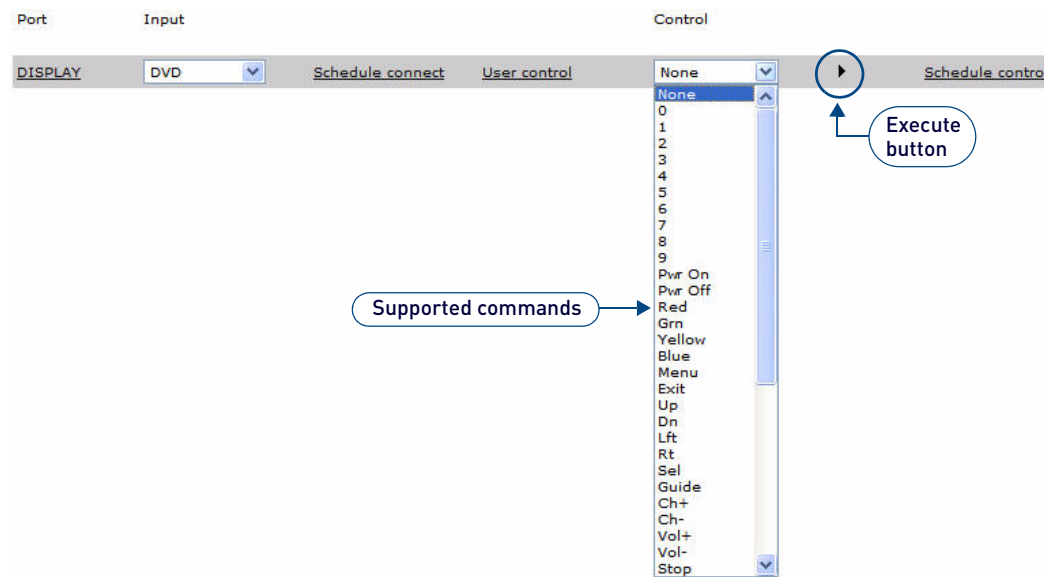
Administrators can issue IR commands directly from the UDM WebConsole, via the *Control* options on the Status page.

**NOTE:** Ensure the device's IR commands have been learned by the Hub first. Refer to the *Creating and Learning an IR Protocol* section on page 50 for details.

**NOTE:** Ensure that an IR01 IR Emitter Module is connected to the UDM-RX02's IRTX port. Attach it to the device's IR sensor before issuing a command. This IR Emitter Module is used to transmit the command from the UDM-RX02 to the device's IR sensor

## Executing an IR Command

1. Select the Input Device that will receive the command from the *Input* drop-down menu.
2. Click the down arrow on the *Control* drop-down menu to access a listing of supported commands (FIG. 37), and select the desired command.



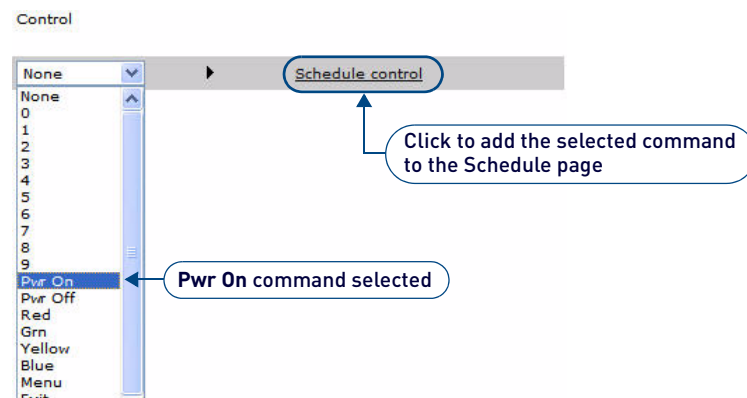
**FIG. 37** Status Page - Control drop-down menu

3. Click the **Execute** button to send the selected command to the Input Device.
  - If a custom control is required, type in the IR code for the command. Refer to the *Endeleo IR Codes* section on page 52 for information.
  - It is also possible to control centrally located hardware such as DVD players, via options on the Devices page. Refer to the *Sending a Command to IR-Controlled Devices* section on page 39.

## Scheduled Control

The **Schedule control** link on the *Status* page allows you to schedule a command to occur automatically at a specified time or time interval. To schedule a command:

1. In the *Status* page, select a command from the *Control* drop-down menu (FIG. 38).



**FIG. 38** Status Page - Control drop-down menu and Schedule control link

2. Click the **Schedule control** link to open the *Schedule* page, with the command selected in Step 1 added (FIG. 39).

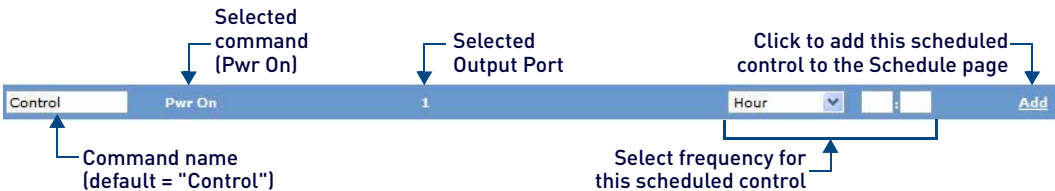
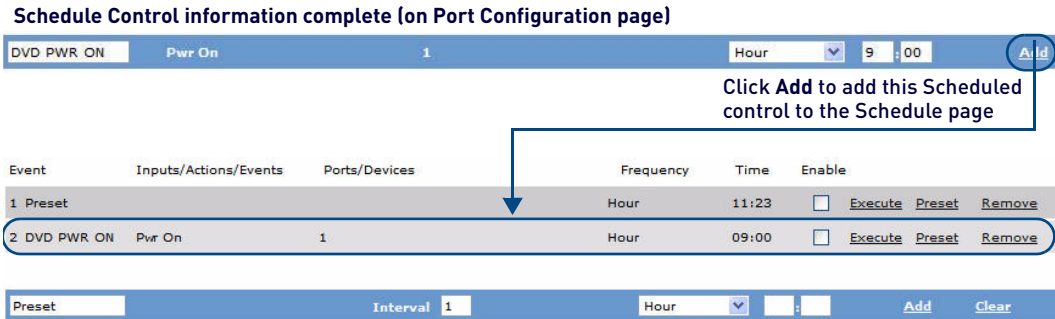


FIG. 39 Schedule Page - command added from Status page (via Schedule control)

3. The default name for the schedule is "Control", but it can be edited in the text field.
4. To set the frequency details, select one of the following from the *Frequency* drop-down menu:
- Hour Event happens at a specified time and then every 60 minutes.
  - Day Event happens at a specified time and then every 24 hours.
  - Weekday Event happens at a specified time and then every 24 hours (Mon. - Fri.).
  - Sunday Event happens every Sunday at the specified time.
  - Monday Event happens every Monday at the specified time.
  - Tuesday Event happens every Tuesday at the specified time.
  - Wednesday Event happens every Wednesday at the specified time.
  - Thursday Event happens every Thursday at the specified time.
  - Friday Event happens every Friday at the specified time.
5. Enter the *Hour* and *Minute* for this event in the text fields to the right of the *Frequency* drop-down menu.
6. Click **Add** to save this scheduled event to the Hub. This action opens the *Schedule* page, with the newly added command listed (FIG. 40):



Schedule Control information added to Schedule page

FIG. 40 Schedule page - showing newly added Scheduled control

7. Click on the **Enable** checkbox (FIG. 41) to enable this scheduled control for use. Each scheduled event must be enabled before it can be used.

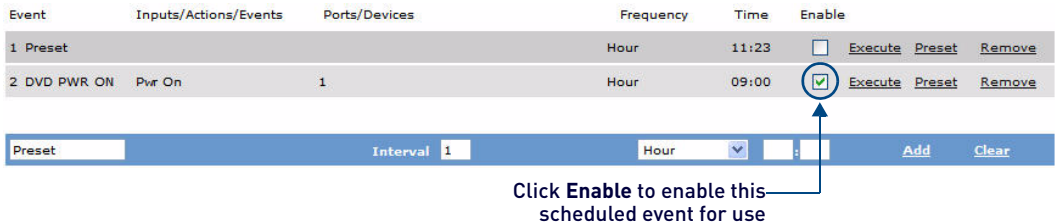


FIG. 41 Scheduled control Enabled

**NOTE:** Refer to the *Configuration - Schedule Page* section on page 40 for additional information on scheduling commands.

# Configuration - Setup Page

## Overview

The options on the *Setup* page allow you to view device information, configure network settings, set the date and time, and specify restore options (FIG. 42):

FIG. 42 Setup Page

## Setup Page Options

Setup Page Options	
<b>Device Information</b>	
• Controller firmware:	This display-only field indicates the current controller firmware version.
• Serial number:	This display-only field indicates the unique serial number for this UDM Hub.
• Authenticate SLIP:	By default, SLIP authentication is enabled. De-select this option to disable SLIP authentication.
• Enable advanced options:	Enable this option to access the advanced video compensation settings (in the Port Configuration options page - see the <i>Audio &amp; Video Formats/Resolutions/Distance</i> section on page 8).
<b>Network Configuration</b>	
• IP Address:	Enter/edit the IP address for this UDM-0102 in this set of text fields. <ul style="list-style-type: none"> <li>The default IP address is: <b>192.168.0.96</b></li> <li>The UDM-0102 does not support DHCP - please configure a static IP Address.</li> </ul>
• UDP Port:	Enter/edit the UDP Port used by this UDM-0102 in this text field. <ul style="list-style-type: none"> <li>The default UDP Port is: <b>2008</b></li> </ul>
• Gateway:	Enter/edit the Gateway address for this UDM-0102 in this set of text fields.
• Subnet Mask:	Enter/edit the Subnet Mask address for this UDM-0102 in this set of text fields.
• Hub Name:	Enter/edit a name for this UDM-0102 (maximum of 30 characters).
<b>Date / Time Settings</b>	
• Date:	Enter the current date in this set of text fields, in the format <b>dd-mm-yy</b> . Click the <b>Set Time</b> link to update the date setting.
• Time:	Enter the current time in this set of text fields, in 24-hour format. Click the <b>Set Time</b> link to update the time setting.
<b>Restore Options</b>	
• Restore configuration on power up:	Select this option to restore network configuration and port configuration settings on when the UDM-0102 is powered-up. Default = <i>enabled</i> .
• Restore connections on power up:	Select this option to ensure that inputs are transmitted to the outputs (or ports) on boot up. Default = <i>enabled</i> .
• Reset Hub:	Click this option to reset the UDM-0102 from the Browser interface. A power down of the Hub must be performed to complete the reset procedure.



## Network Configuration

**NOTE:** The UDM-0102 does not support DHCP - configure a static IP Address.

- The default IP address is: **192.168.0.96**
- The default UDP Port is: **2008**

1. The following Network Configuration options must be configured (FIG. 43):

The form displays the following configuration options:

- IP address:** 192, 168, 244, 176
- Gateway:** 192, 168, 244, 2
- Subnet mask:** 255, 255, 252, 0
- UDP Port:** 2008
- Hub name:** ATL-0102#1
- Update button:** A button labeled 'Update' is located to the right of the Hub name field.

**FIG. 43** Network Configuration options

- Hub IP Address, Subnet Mask and Default Gateway
  - UDP Port
  - Hub name (maximum of 30 characters).
2. Once the network environment has been configured, click on **Update**.

**NOTE:** All changes are immediate - once the IP address of the Hub has been changed redirect the web browser to the changed address.

## Date and Time Configuration

The Setup page is also used to set up the Hub *date* and *time*, which is used for scheduling (FIG. 44).

The form displays the following configuration options:

- Date - dd-mm-yy:** 9, 9, 9
- Time:** 10, 20
- Set time button:** A button labeled 'Set time' is located to the right of the Time field.

**FIG. 44** Date and Time Settings

- Enter the desired values for the current **Time** and **Date**.
- Click **Set Time** to apply changes.

## Refreshing the Date and Time Display

Clicking on the date and time displayed at the top of the screen refreshes the clock to the current time. This can be useful before creating a scheduled event (FIG. 45).

The display shows the following information:

- UDM-0102 ATL-0102#1**
- Wed 9-Sep-09 10:20**
- Click to refresh:** A blue arrow points to the date and time display.

**FIG. 45** Hub Date and Time display

## Restore Options

To ensure the configuration settings for the Hub are retained each time the Hub boots, ensure the **Restore configuration on power up** and **Restore connections on power up** options (at the bottom of the Setup page) have been enabled (FIG. 46).

The form displays the following configuration options:

- Restore configuration on power up:** ☒
- Restore connections on power up:** ☒

**FIG. 46** Restore options

## Restoring Configuration and Connections

To ensure network configuration and port configuration are restored on boot up select **Restore configuration on power up** option (see FIG. 46).

## Restoring Connections On Power Up

To ensure inputs are transmitted to the outputs (or ports) on boot up select the **Restore connections on power up** option (see FIG. 46).

**NOTE:** If the Restore Options are disabled, the Hub configuration and connections will need to be re-configured if the UDM-0102 is reset or rebooted.

## Resetting the UDM-0102

Where appropriate the Hub can be reset from the Browser interface:

- In the *Setup* page, click the **Reset Hub** button (FIG. 47).

The form displays the following configuration options:

- Reset hub button:** A button labeled 'Reset hub' is located to the right of the Restore connections on power up checkbox.

**FIG. 47** Reset Hub button

- The network connection will be lost temporarily, and video displays will switch off then on again very quickly.
- Restart the Hub.

# Configuration - Inputs Page

## Overview

Use the options in the *Inputs* page to specify the video and audio sources being presented to each input port (FIG. 48).

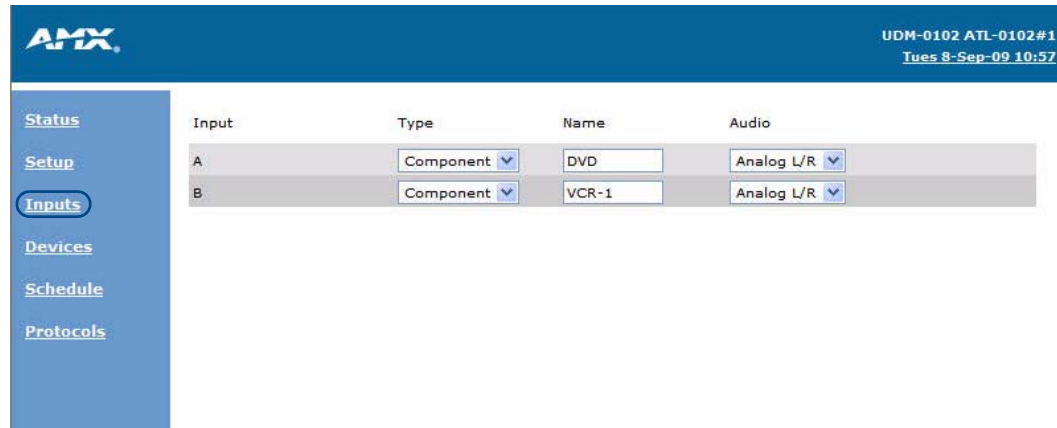


FIG. 48 Inputs Page

## Inputs Page Options

Inputs Page Options	
• Input:	Inputs "A" and "B" listed here correspond to the physical connectors on the rear panel of the UDM-0102 (see FIG. 49): <ul style="list-style-type: none"> <li>The device connected to the Input A connectors should be represented as Input "A" on the Inputs page.</li> <li>The device connected to the Input B connectors should be represented as Input "B" on the Inputs page.</li> </ul>
• Type:	These drop-down menus allow you to specify the video type provided by each Input Device. The options are <i>VGA</i> , <i>Composite</i> , <i>S-Video</i> and <i>Component</i> .
• Name:	These text fields display the name currently assigned to each of the Input Devices. <ul style="list-style-type: none"> <li>The names assigned here manifest in the <i>Status</i> page (<i>Input</i> drop-down menu).</li> <li>The input names can be edited directly in these fields.</li> </ul>
• Audio	These drop-down menus allow you to specify the audio type provided by each Input Device. The options are <i>Analog L/R</i> , <i>S/PDIF</i> and <i>None</i> .

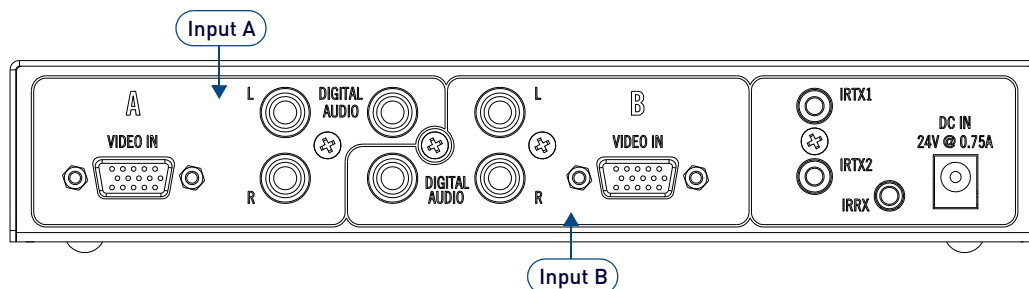


FIG. 49 UDM-0102 (rear panel) - Input Connectors "A" and "B"

## Inputs (A-B) Configuration

- For each Input port (A & B), select the appropriate **video** input type from the *Type* drop-down menu provided for each input (FIG. 50).

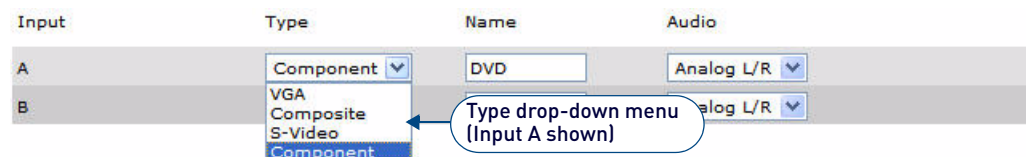


FIG. 50 Inputs page - Input Type drop-down menu

- The options are *VGA*, *Composite*, *S-Video* and *Component*.
- Enter a name for each Input directly into the *Name* fields (FIG. 51).

Input	Type	Name	Audio
A	Component	DVD	Analog L/R
B	Composite	VCR-1	Analog L/R
		VCR-2	
		VCR-3	

Note that since Input B is set to Composite, there is separate Name field for each composite input

**FIG. 51** Inputs page - Name text fields

For RGB, VGA, Component or SVideo inputs, only one connection is possible per input port. However, if the Input *Type* is set to **Composite**, additional *Name* fields are provided to name each of the three composite sources separately (as shown in FIG. 51).

3. In the *Audio* column, select the type of audio provided by each input device from the drop-down menus provided (FIG. 52).

Input	Type	Name	Audio
A	Component	DVD	Analog L/R
B	Composite	VCR-1	Analog L/R
		VCR-2	Analog L/R S/PDIF None
		VCR-3	

**FIG. 52** Inputs page - Audio drop-down menu

The options are *Analog L/R*, *S/PDIF*, and *None*.

# Configuration - Devices Page

## Overview

The options in the *Devices* page (FIG. 53) allow you to configure up to 2 "centrally located" IR-controlled devices (e.g. VCR, DVD, DVR or Satellite Decoders) connected to the IR output ports ("IRTX1" & "IRTX2") on the rear panel of the UDM-0102 (see FIG. 54).

The options in the Control Bar at the bottom of this page allow you to schedule IR commands and send IR commands directly to these devices. Use IR01IR Emitter Modules (FG-IR01 - not included) to transmit IR signals directly from the UDM-0102 to each centrally located device.

The screenshot shows the AMX UDM-0102 configuration interface. The top header displays the AMX logo and the device identifier 'UDM-0102 ATL-0102#1' with a timestamp 'Thurs 10-Sep-09 11:57'. A left sidebar contains navigation links: Status, Setup, Inputs, **Devices** (highlighted), Schedule, and Protocols. The main content area features a table with two columns: 'Device' and 'Name'. The table lists two devices: Device 1 with name 'tv' and Device 2 with name 'TUNER'. Both devices have a 'Protocol' dropdown menu set to 'tv'. To the right of each device name is an 'Include' checkbox, which is currently unchecked for both. Below the table is a 'Control Bar' section. It includes a 'Control' dropdown menu set to 'None', and two buttons: 'Schedule' and 'Send to included'. A callout arrow points to the 'Control Bar' label.

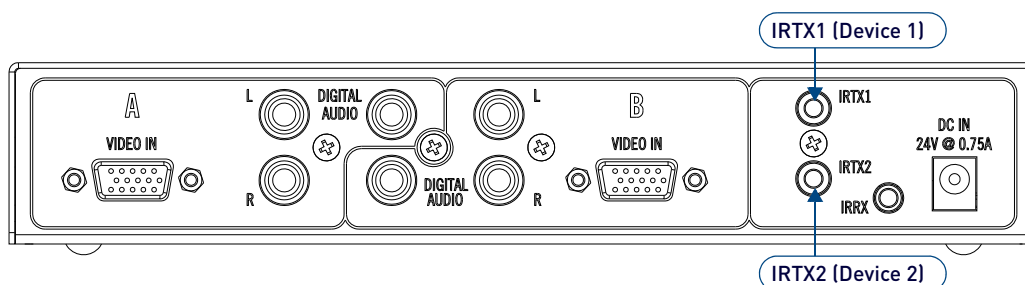
FIG. 53 Devices page

## Devices Page Options

Devices Page Options	
• Device:	Devices "1" and "2" listed here correspond to devices connected to the IRTX1 and IRTX2 connectors on the rear panel of the UDM-0102 (see FIG. 54): <ul style="list-style-type: none"> <li>The device connected to the IRTX1 connector is represented as Device "1" on the Devices page.</li> <li>The device connected to the IRTX2 connector is represented as Device "2" on the Devices page.</li> </ul>
• Name:	These text fields display the name currently assigned to each of the centrally located devices. The device names can be entered/edited directly in these fields.
• Protocol:	These drop-down menus allow you to specify the IR protocol to be used to control each centrally located device. The Device's commands must have been learned by the UDM-0102 in order to function. IR Protocols are defined in the Protocols page - see the <i>Configuration - Protocols Page</i> section on page 44 for information.
• Include:	Select this checkbox for each devices that you want to include in the <i>Schedule</i> and/or <i>Send to Included</i> options in the Control Bar (see below).
Control Bar:	The options in the Control Bar allow you to schedule commands to these devices, or send commands directly to any or all of these devices. See the <i>Devices Page - Control Bar Options</i> (below).
• Control drop-down menu:	Select a control (command) to schedule and/or send to the included devices. Included devices are all devices that have the <i>Include</i> option selected.
• Schedule:	Click to open the Schedule page, to schedule the selected command.
• Send to Included:	Click to send the selected command to all devices that have the <i>Include</i> option selected.

## Configuring IR-Controlled Devices 1 and 2

Devices "1" and "2" correspond to the devices connected to the IRTX1 and IRTX2 (IR output) connectors on the rear panel of the UDM-0102 (see FIG. 2):



**FIG. 54** UDM-0102 (rear panel) - IRTX (IR output) Connectors "IRTX1" and "IRTX2"

Use an **IR01** IR Emitter Module (FG-IR01 - not included) to connect each device to the UDM-0102. The IR01 modules connect the IRTX1/2 ports to the IR receivers on the devices, to allow them to receive IR control signals directly from the UDM-0102.

- The device connected to IRTX1 represents Device "1" on the *Devices* page.
  - The device connected to IRTX2 represents Device "2" on the *Devices* page.
1. Enter a name for each device in the *Name* text fields.
  2. Select the appropriate IR protocol from the *Protocol* drop-down menu. The protocols available for selection here are defined in the *Protocols* page (see the *Configuration - Protocols Page* section on page 44).

## Devices Page - Control Bar Options

The options in the Control Bar (FIG. 55) allow you to schedule commands to these devices, or send commands directly to any or all of these devices.

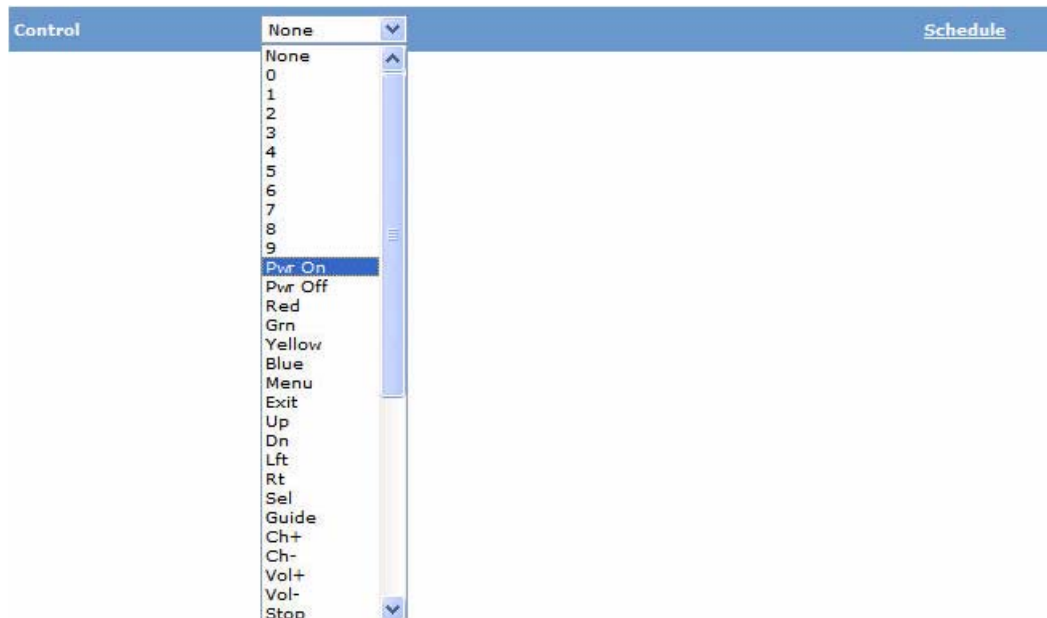


**FIG. 55** Devices page - Control Bar

### Scheduling an Event for IR-Controlled Devices

Use the **Schedule** link on the Control Bar to schedule an event (based on an IR command) for one or more IR-Controlled Device:

1. Select the command that you want to schedule from the *Control* drop-down menu (FIG. 56).



**FIG. 56** Devices page - Control drop-down menu

2. Select an IR protocol for each device from the *Protocol* drop-down menu (FIG. 57).

Device	Name	Protocol	Include
1	tv	tv	<input type="checkbox"/>
2	TUNER	None	<input type="checkbox"/>
		tv	
		IR2	

**FIG. 57** Devices page - Protocol drop-down menu

**NOTE:** The IR protocols available for selection here are defined in the *Protocols* page (see the *Configuration - Protocols* Page section on page 44).

3. Select the *Include* checkbox for each device that you want to include in this scheduled event (FIG. 58).

Device	Name	Protocol	Include
1	tv	tv	<input checked="" type="checkbox"/>
2	TUNER	tv	<input checked="" type="checkbox"/>

Both devices will be included in this scheduled event

**FIG. 58** Devices page - Include checkboxes

4. Click the **Schedule** link in the Control Bar to open the *Schedule* page, with this (new) scheduled event indicated at the top of the page (FIG. 59).

Scheduled event name (default = "Device", editable field)

Command (selected in the Devices page - Control Bar)

Devices included in this scheduled event (Include checkboxes selected in the Devices page)

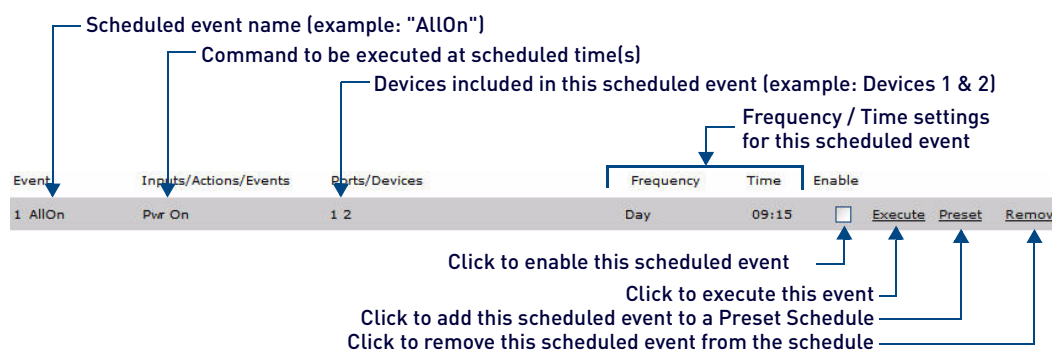
Frequency / Time settings for this scheduled event

Click to add this scheduled event to the schedule

Device Pwr On 1 2 Hour : Add

**FIG. 59** Schedule page - new scheduled event entry (top of page)

- Enter a descriptive name in the text field (by default, all new scheduled events are named "Device").
- Set the frequency details - select one of the following from the Frequency drop-down menu:
  - Hour: Event happens at a specified time and then every 60 minutes.
  - Day: Event happens at a specified time and then every 24 hours.
  - Weekday: Event happens at a specified time and then every 24 hours (Mon. through Fri.).
  - Sunday: Event happens every Sunday at the specified time.
  - Monday: Event happens every Monday at the specified time.
  - Tuesday: Event happens every Tuesday at the specified time.
  - Wednesday: Event happens every Wednesday at the specified time.
  - Thursday: Event happens every Thursday at the specified time.
  - Friday: Event happens every Friday at the specified time.
- Enter the Hour and Minute (in 24-hour format) at which you want this event to occur in the text fields to the right of the Frequency drop-down menu. For example, enter "9" : "15" to indicate 9:15AM.
- Click Add to add this scheduled event to the schedule (FIG. 60).
  - The scheduled event is added to the schedule list (top of the *Schedule* page).
  - The entry for this scheduled event in the schedule list provides a summary of info on this scheduled event (*Name*, *Command*, *Included Devices*, and *Frequency & Time* settings):



**FIG. 60** Schedule page - scheduled event entry

5. Select the **Enable** checkbox to enable this scheduled event. Scheduled events must be enabled before they will occur.

Note that on the Schedule page, there are three additional options for each scheduled event:

- **Execute** - click to test (execute) the scheduled event.
- **Preset** - click to add this scheduled event to a (new) *Preset* schedule. Presets are created by combining two or more pre-defined Scheduled events (see the *Creating a Preset Schedule* section on page 40 for details).
- **Remove** - click to delete this scheduled event.

### Sending a Command to IR-Controlled Devices

Use the **Send to included** link on the Control Bar of the Devices page (see FIG. 53 on page 36) to send an IR command to one or more IR-Controlled Devices:

1. Select the command that you want to schedule from the *Control* drop-down menu (see FIG. 56 on page 37).
2. Select an IR protocol for each device from the *Protocol* drop-down menu (see FIG. 57 on page 38).

**NOTE:** The IR protocols available for selection here are defined in the *Protocols* page (see the *Configuration - Protocols* Page section on page 44).

3. Select the *Include* checkbox for each device that you want to include in this scheduled event (FIG. 58).

Device	Name	Protocol	Include
1	tv	tv	<input checked="" type="checkbox"/>
2	TUNER	tv	<input checked="" type="checkbox"/>

Both devices are included to receive the selected command

**FIG. 61** Devices page (Control Bar) - Include checkboxes

4. Click the **Send to included** link on the Control Bar to send the selected command (to the Included devices only).

# Configuration - Schedule Page

## Overview

Scheduled events (including *Scheduled Events* and *Preset* schedules) are listed on the Schedule page (FIG. 62), but are created using options in both the *Status* and *Devices* pages, as described in this section.

FIG. 62 Schedule page (initial view)

There are main types of schedules that can be created:

- **Scheduled Events** - Scheduled events consist of individual device commands that are scheduled to execute at specified intervals. Scheduled events are created in the *Devices* page, and are limited to IR-controlled devices. Refer to the *Scheduling an Event for IR-Controlled Devices* section on page 37 for information on creating a scheduled event.
- **Presets** - Multiple scheduled events can be combined into a Preset schedule (or "Preset"). In order to create a Preset, you must first have created two or more Scheduled Events. The process of creating a Preset entails selecting two or more existing Scheduled Events and saving them as a Preset (see below).

**NOTE:** You can create and store up to 16 scheduled events (including Presets).

## Schedule Page Options

Schedule Page Options	
• Event:	Select an event (command) to schedule and/or send to the included devices. Included devices are all devices that have the <i>Include</i> option selected.
• Inputs/Actions/Events:	<ul style="list-style-type: none"> <li>• For listed Scheduled Events, this column displays the name assigned to each event.</li> <li>• For Presets, this column displays the Events (by Event number) included in each Preset.</li> </ul>
• Ports/Devices:	For listed Scheduled Events, this column displays the Devices (by Device number) included in this scheduled event.
• Frequency:	This column displays the frequency setting for each Scheduled Event and Preset.
• Time:	This column displays the time setting for each Scheduled Event and Preset.
• Enable:	Click this checkbox to enable each Scheduled Event and Preset that you want to execute at the scheduled time(s). Only Scheduled Events and Presets that are enabled will be executed.
• Add:	Click this checkbox to add a new Preset to the schedule list.
• Clear:	Click this checkbox to remove a Preset from the schedule list.

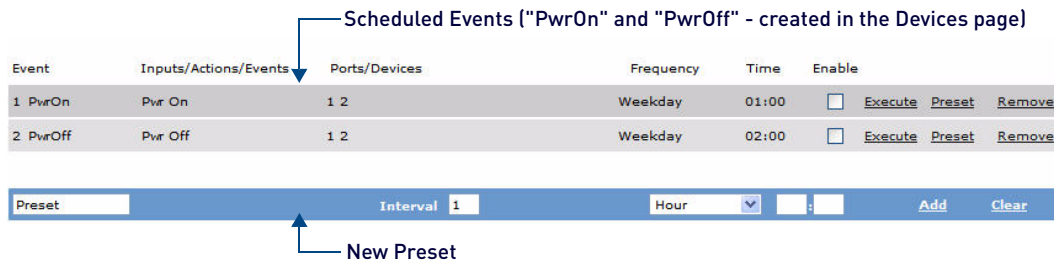
## Creating a Preset Schedule

Since the process of creating a Preset entails combining two or more existing Scheduled Events, in order to create a Preset, you must first have created two or more Scheduled Events. To create a Preset schedule:

1. In the *Devices* page, create at least two Scheduled Events (see the *Scheduling an Event for IR-Controlled Devices* section on page 37 for details). In this example, the Scheduled Events are **PwrOn** (scheduled for Weekdays at 1:00 for devices 1 and 2), and **PwrOff** (scheduled for Weekdays at 2:00 for devices 1 and 2).

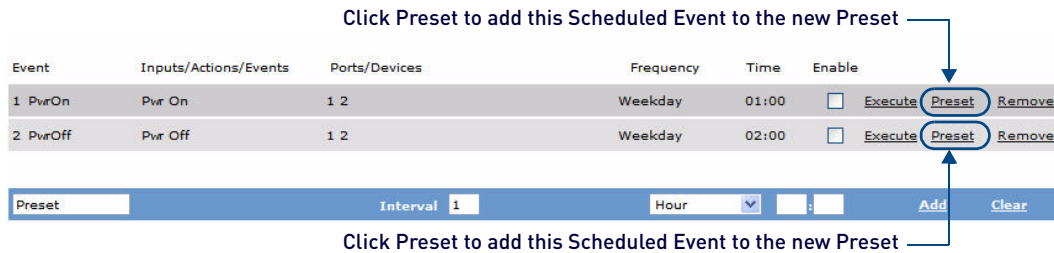
FIG. 63 shows the *Schedule* page with these two Scheduled Events listed:





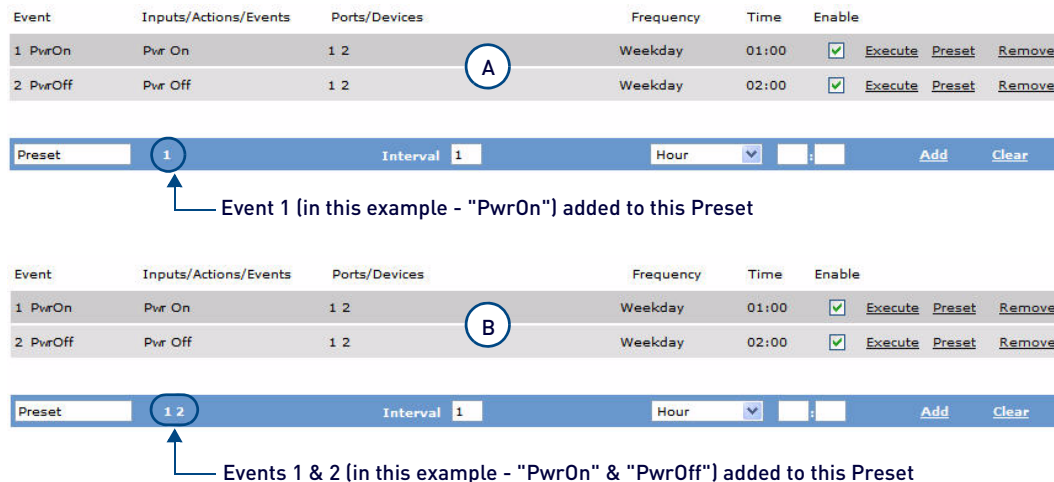
**FIG. 63** Schedule page - two example Scheduled Events ("PwrOn" and "PwrOff")

- In the *Schedule* page, click the **Preset** link for each Scheduled Event that you want to add to the new Preset (FIG. 64):



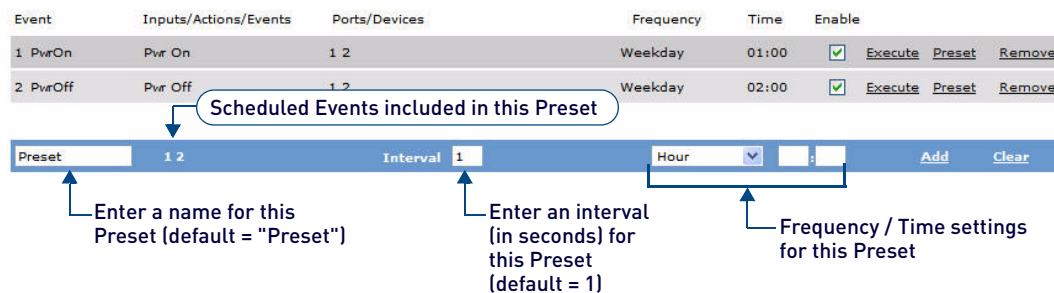
**FIG. 64** Schedule page - click Preset to add each Scheduled Event to the new Preset

- As each Scheduled Event is added to the new Preset, it is indicated in the Preset bar, by their respective Event numbers (FIG. 65):



**FIG. 65** Schedule page - each Scheduled Event added to the new Preset

- At this point, assign a *Name*, *Interval* and *Frequency* to the new Preset (FIG. 66):



**FIG. 66** Schedule page - assign a Name, Interval and Frequency to this Preset

- Enter a descriptive name for this Preset in the text field. By default, all new Presets are named "Preset".
- If an interval is required between each individual schedule within this Preset schedule, specify a time interval (in seconds) in the Interval field.

- c. Enter the time and frequency for this Preset.
- Hour: Event happens at a specified time and then every 60 minutes.
  - Day: Event happens at a specified time and then every 24 hours.
  - Weekday: Event happens at a specified time and then every 24 hours (Mon. through Fri.).
  - Sunday: Event happens every Sunday at the specified time.
  - Monday: Event happens every Monday at the specified time.
  - Tuesday: Event happens every Tuesday at the specified time.
  - Wednesday: Event happens every Wednesday at the specified time.
  - Thursday: Event happens every Thursday at the specified time.
  - Friday: Event happens every Friday at the specified time.

**NOTE:** The Frequency and Time specified here overrides any previously created frequency / times used in the Scheduled Events contained within the Preset schedule.

- Click **Add** to add this Preset to the schedule list (FIG. 67):

Event	Inputs/Actions/Events	Ports/Devices	Frequency	Time	Enable			
1 PwrOn	Pwr On	1 2	Weekday	01:00	<input checked="" type="checkbox"/>	Execute	Preset	Remove
2 PwrOff	Pwr Off	1 2	Weekday	02:00	<input checked="" type="checkbox"/>	Execute	Preset	Remove
3 Preset	1 2		Weekday	12:30	<input checked="" type="checkbox"/>	Execute	Preset	Remove

new Preset added to schedule list

Preset
Hour
:
Add
Clear

**FIG. 67** Schedule page - new Preset added to schedule list

6. **Enable** the Preset by clicking on the Enable checkbox.

## Executing Presets

Presets can be executed directly via the PRESETS ("1" and "2") pushbuttons on the front panel (see FIG. 2 on page 2).

To execute Presets:

1. Select the AV input source (1 or 2), via the **SELECT** pushbutton.
2. Select either **PRESET 1** or **PRESET 2** to execute.

## Configuring the UDM-RC02 Remote Control for Scheduling

The (optional) UDM-RC02 Multi-Format IR Remote Control can be used to create scheduled events on the UDM-0102, as described below

**NOTE:** *The relevant schedules must be defined before assigning schedules to the UDM-RC02 Remote Control.*

1. In the *Status* page, click the appropriate **Port** name hyperlink to access the Port Configuration options shown in FIG. 68:

Port 1 version

01.18

User controlSend settings to RXDefault

Remote type

UDM-RC02 ▼

Port name

Port 1

Dual output

☐

Cable distance

250

Advanced

☐

Sync

Auto ▼

Red skew

☒ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

0

Protocol

None ▼

**FIG. 68** Port Configuration options

2. Click on the **User Control** link at the top right of the page (see FIG. 68). This invokes the *Control Options* page for the selected Port (FIG. 69).

Port 1 version 01.18 Last command 0 (0) on port 0

Remote type UDM-RC02

Key	Input	Control	Schedule	Passthrough	Copy to all	Default
0	None	None	Port <input checked="" type="radio"/> Device <input type="radio"/>	None		
1	A1	None	Port <input checked="" type="radio"/> Device <input type="radio"/>	None	<input type="checkbox"/>	
2	B1	None	Port <input checked="" type="radio"/> Device <input type="radio"/>	None	<input type="checkbox"/>	
3	C1	None	Port <input checked="" type="radio"/> Device <input type="radio"/>	None	<input type="checkbox"/>	
4	D1	None	Port <input checked="" type="radio"/> Device <input type="radio"/>	None	<input type="checkbox"/>	
5	None	None	Port <input checked="" type="radio"/> Device <input type="radio"/>	None		
6	None	None	Port <input checked="" type="radio"/> Device <input type="radio"/>	None		
7	None	None	Port <input checked="" type="radio"/> Device <input type="radio"/>	None		
8	None	None	Port <input checked="" type="radio"/> Device <input type="radio"/>	None		
9	None	None	Port <input checked="" type="radio"/> Device <input type="radio"/>	None		
A	None	None	Port <input checked="" type="radio"/> Device <input type="radio"/>	None		
B	None	None	Port <input checked="" type="radio"/> Device <input type="radio"/>	None		
C	None	None	Port <input checked="" type="radio"/> Device <input type="radio"/>	None		
D	None	None	Port <input checked="" type="radio"/> Device <input type="radio"/>	None		
E	None	None	Port <input checked="" type="radio"/> Device <input type="radio"/>	None		
F	None	None	Port <input checked="" type="radio"/> Device <input type="radio"/>	None		

FIG. 69 Control Options page

3. Keys 0 to F represent the keys on the UDM-RC02 Remote Control. For each Key, select the schedule (from the *Schedule* drop-down menu) to be issued by the selected Key on the UDM-RC02 Remote Control (FIG. 70).

Key	Input	Control	Schedule	Passthrough	Copy to all	Default
0	None	None	Port <input type="radio"/> Device <input checked="" type="radio"/>	None		
1	A1	None	Port <input type="radio"/> Device <input checked="" type="radio"/>	None	<input type="checkbox"/>	
2	B1	None	Port <input type="radio"/> Device <input checked="" type="radio"/>	None	<input type="checkbox"/>	

For each Device selected, you must specify a Protocol from the Protocol drop-down menu (Protocols are not used for Ports)

FIG. 70 Control Options page - Schedule drop-down menu

**NOTE:** Ensure the correct key on the UDM-RC02 Remote Control corresponds with the correct schedule.

4. The Receiver will now accept the relevant command from the UDM-RC02 Remote Control.

# Configuration - Protocols Page

## Overview

The options in the *Protocols* page (FIG. 71) allow you to create Serial and IR control protocols for devices connected directly to the UDM-0102 (via the IRTX1/2 ports), as well as for devices connected to the UDM-RX02 Receivers in the system.

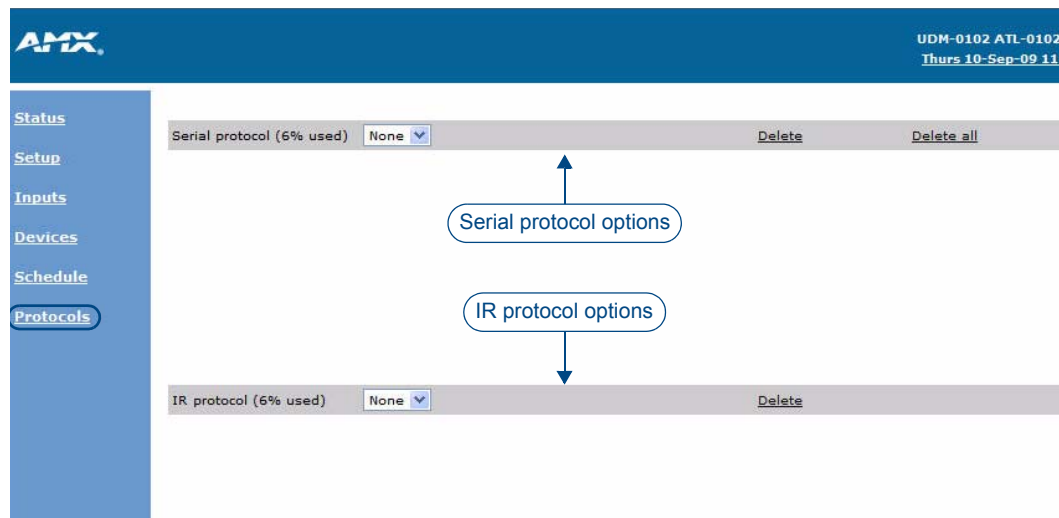


FIG. 71 Protocols Page

## Protocols Page Options

Protocols Page Options	
<b>Serial Protocol</b>	
• % used:	This read-only field indicates the amount of available commands currently used for Serial protocol.
• Command drop-down menu:	This menu provides a list of all commands available to add to a Serial protocol.
• Delete:	Click to delete the current Serial protocol.
• Delete All:	Click to delete all saved Serial protocols.
<b>IR Protocol</b>	
• % used:	This read-only field indicates the amount of available commands currently used for IR protocol.
• Command drop-down menu:	This menu provides a list of all commands available to add to an IR protocol.
• Delete:	Click to delete the current IR protocol.
• Delete All:	Click to delete all saved IR protocols.

For **Serial** devices the following information is key to the successful function of the serial device;

- Serial cable and pinouts
- Serial settings for correct communication with the device
- Manufacturer's command strings are equivalent to the command to be executed from the UDM-0102.

For **IR** devices, the device's IR controls (remote control key presses) will have to be learned by the UDM-0102.

### Creating a New Serial Protocol

The UDM-RX02 Receiver issues serial commands via the serial cable connected between the Receiver and the device. It is presumed that the serial device connected to the UDM-RX02 has the appropriate serial settings as described and the correct serial cable/pinouts configured in order to function correctly with the UDM-RX02.

1. In the *Protocols* page, open the *Serial Protocol* drop-down menu, and select **New** (FIG. 72).

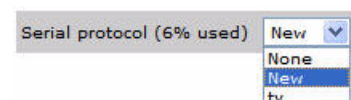
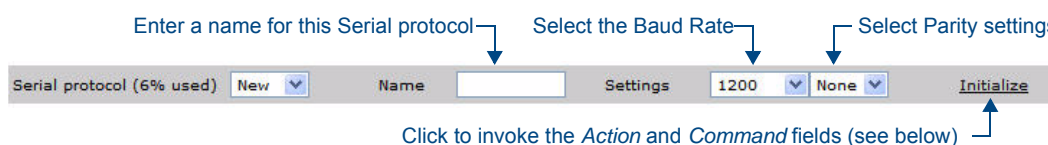


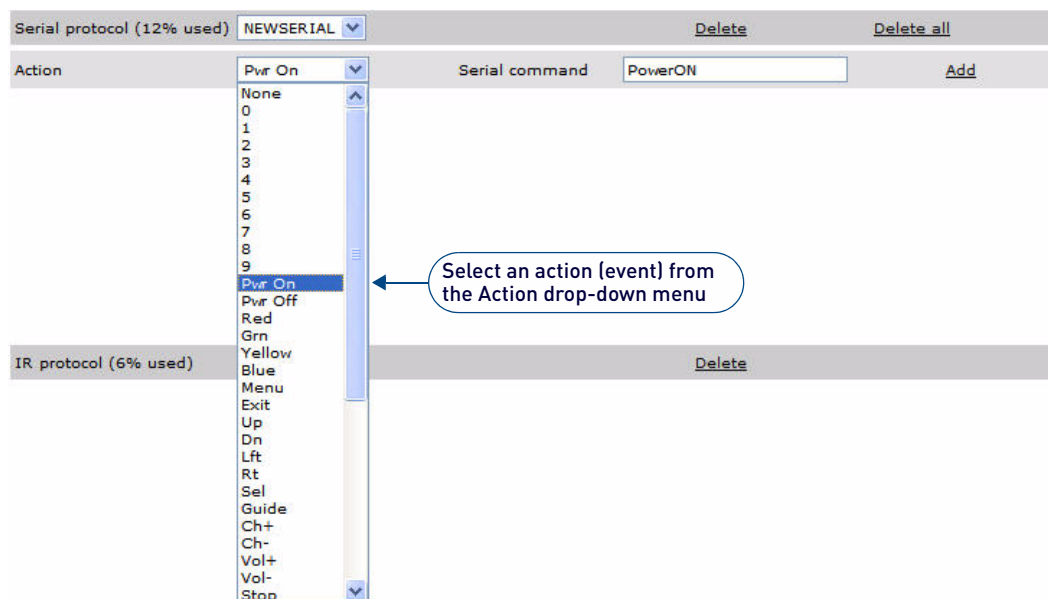
FIG. 72 Serial Protocol drop-down menu

This action invokes several additional fields: *Name*, *Settings* and *Initialize* (FIG. 73):



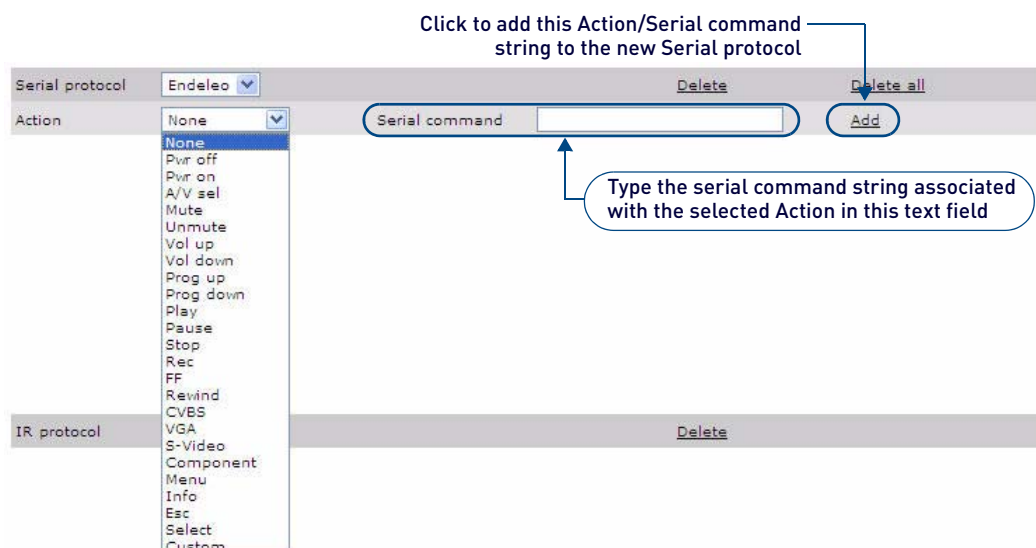
**FIG. 73** New serial protocol options

- **Name:** Enter a name for this Serial protocol.
  - **Settings** Use these drop-down menus to specify the Baud Rate and Parity settings for this Serial protocol.
  - **Initialize:** Click to clear the UDM Receiver of any pre-loaded serial commands, and invoke the Action and Command fields (see FIG. 74).
2. **Name** the new protocol appropriately, and select the protocol **Settings** (*baud rate* and *parity*) from the *Settings* drop-down menus.
    - The baud rate options are: 1200, 2400, 4800, 9600, 19200, 38400, 57600, and 115200.
    - The parity options are: None, Odd and Even.
  3. Click on **Initialize** to clear the UDM Receiver of any pre-loaded serial commands, and invoke the additional options (*Action* and *Serial Command*) shown in FIG. 74.



**FIG. 74** Creating a serial command for the action

- **Action:** Select the action to be performed by this command from this drop-down menu.
  - **Serial Command:** Enter the serial string associated with the selected action. The serial string must be accurate for the serial command to work. Consult the Manufacturer's documentation to ascertain the correct string for each serial device.
  - **Add:** Once an action has been selected and the command has been defined, click *Add* to add the Action/Command to this Serial protocol.
4. Select an action to be performed from the *Action* drop-down menu (FIG. 75).



**FIG. 75** Creating a serial command for the action

5. Enter the serial command (serial string) equivalent for this action in the **Serial command** text field.
6. Click **Add** to create the new protocol.
7. Repeat as necessary for other serial commands to be stored under this protocol name.

**NOTE:** The UDM-RX02 can store approximately eight serial commands per device, depending on the length of the serial string.

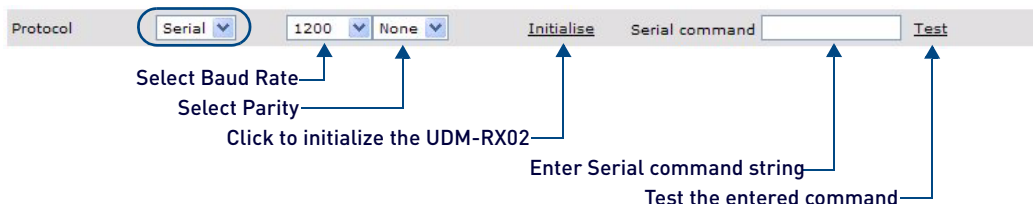
Once complete, the protocol can be assigned to relevant devices, via the *Protocol* drop-down menu in the *Devices* page (see *Configuration - Devices Page* section on page 36).

### Testing Serial Commands

Serial commands can be tested via options in the *Status* page, before they are added to the protocol library.

**NOTE:** The UDM-RX02 Receiver will issue the serial command over the serial cable connected between the Receiver and the device.

1. On the *Status* page, click on a Port hyperlink to access the Port Configuration options.
2. In the *Protocol* drop-down menu, select **Serial** to enable the Serial-specific configuration options shown in FIG. 76.



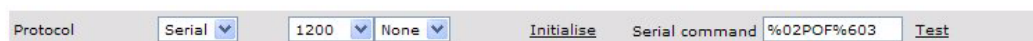
**FIG. 76** Serial configuration options

**NOTE:** Any serial protocols that have been created previously are also available via this drop-down menu. Refer to the *Creating and Learning an IR Protocol* section on page 50 for details.

3. Select the appropriate *Baud Rate* and *Parity* settings from the drop-down menus.
4. Click on **Initialize** to initialize the UDM-RX02.
5. Enter the serial string equivalent to perform the desired control function in the *Serial Command* text field (see FIG. 76). The UDM-0102 supports a predetermined set of actions (commands), against which you can associate serial strings. For a listing of supported commands, check the *Control* drop-down menu.

- Either enter ASCII text directly into the serial command box or where a HEX code is required.
- Precede the double-digit HEX code with a "%" symbol.

The example below (FIG. 77) is from a Panasonic screen where the actual command string requires a "Start of Text" header (**stx**), the character command *POF* (Power Off) and a "End of Text" header (**etx**). Both the headers have therefore been added in HEX and the character string uses ASCII.



**FIG. 77** Panasonic screen - command screen

6. Once you have finished entering the string, click the **Test** hyperlink to send the string to the device connected.

Repeat the process as many times as required to test a complete set of controls before saving them to the protocol library.

### Examples of Serial Controls

Screen Type	Command	Ascii code	Hex code
NEC 30/40" LCD	Power Off	00!%0D	%00%00%21%0D
	Power On	00"%0D	%00%00%22%0D
	CVBS Input Select	00_v1%0D	%00%00%5f%76%31%0D
	DSR		Data Set Ready
Panasonic	Power Off	%02POF%03	%02%50%4F%46%03

The video mode select commands (**VGA select** etc.) are extremely useful commands and enable a serial string to be associated with a change of input type, allowing a display automatically switched to the appropriate input port on a change of the video type from the UDM-0102.

See the *Appendix A: Ascii / Hex Conversion* section on page 85 for details.

### Sample Serial Protocol

**Example:** Simple Switching // 232 Control remove leading and trailing \$CO and waits for IP control:

```

Connect Input A (component video) to Port 1
SEND_STRING UDM, "$C0"
    WAIT 2
        SEND_STRING UDM, "$01,$00,$01,$01,$01,$03 "
            WAIT 4
                SEND_STRING UDM, "$C0"
Connect Input B (composite sub-input 1) to Port 2
SEND_STRING UDM, "$C0"
    WAIT 2
        SEND_STRING UDM, "$01,$00,$02,$02,$01,$01 "
            WAIT 4
                SEND_STRING UDM, "$C0"
Connect Input C (s-video) to Port 3
SEND_STRING UDM, "$C0"
    WAIT 2
        SEND_STRING UDM, "$01,$00,$03,$03,$01,$02 "
            WAIT 4
                SEND_STRING UDM, "$C0"
Connect Input D (VGA) to Port 4
SEND_STRING UDM, "$C0"
    WAIT 2
        SEND_STRING UDM, "$01,$00,$04,$042,$01,$00 "
            WAIT 4
                SEND_STRING UDM, "$C0"

```

Byte Numbers and Values						
Byte #	0	1	2	3	4	5
Byte Value	1	User Defined	Port	Input	SubInput	Input Type

Input Type	
Value	Input Type
0	VGA
1	Composite (SVBS)
2	S-Video
3	Component Analog (YPhPr)
4	TV (from TVM)

Byte Number and Value		
Byte #	Value	Description
0	1	Command value for Connect Input to Port
1	0	User defined - can be any value - this first byte is normally replaced in the reply with a Status value. Other User-defined values are just returned unaltered in the reply from the Hub and can be used for checking, etc.
2	6	Port number 1-16
3	3	Input number 1-4
4	1	Sub input number (for a component input all sub inputs are used in the connection, so this value is not used - it is only important when specifying connections for composite input types)
5	3	Component Video



### Third party control (Ports)

```

Send Power On to Screen connected to Port 1
SEND_STRING UDM,"$C0"
WAIT 2
SEND_STRING UDM,"87,$01,$01,$01,$02,21"
WAIT 4
SEND_STRING UDM, "$C0"
Send Power Off to Screen connected to Port 16
SEND_STRING UDM,"$C0"
WAIT 2
SEND_STRING UDM,"87,$01,$10,$01,$02,12"
WAIT 4
SEND_STRING UDM, "$C0"
Send Input-1 to Screen connected to Port 4
SEND_STRING UDM,"$C0"
WAIT 2
SEND_STRING UDM,"87,$01,$04,$01,$02,30"
WAIT 4
SEND_STRING UDM, "$C0"
Send Volume up to Screen connected to Port 2
SEND_STRING UDM,"$C0"
WAIT 2
SEND_STRING UDM,"87,$01,$02,$01,$02,14"
WAIT 4
SEND_STRING UDM, "$C0"

```

### Third party control (Local)

```

Send Play to DVD connected to TX 1
SEND_STRING UDM,"$C0"
WAIT 2
SEND_STRING UDM,"87,$01,$02,$01,$02,70"
WAIT 4
SEND_STRING UDM, "$C0"
Send Stop to DVD connected to TX 2
SEND_STRING UDM,"$C0"
WAIT 2
SEND_STRING UDM,"87,$01,$03,$01,$02,72"
WAIT 4
SEND_STRING UDM, "$C0"
Send Channel up to DSS connected to TX 3
SEND_STRING UDM,"$C0"
WAIT 2
SEND_STRING UDM,"87,$01,$04,$01,$02,10"
WAIT 4
SEND_STRING UDM, "$C0"
Send Record to DVR connected to TX 4
SEND_STRING UDM,"$C0"
WAIT 2
SEND_STRING UDM,"87,$01,$05,$01,$02,73"
WAIT 4
SEND_STRING UDM, "$C0"

```

#### Byte Numbers and Values

Byte #	0	1	2	3	4	5...n
Byte Value	87	User Defined	Port	User Defined	Remote command	Remote parameters

#### Byte Number and Value

Byte #	Value	Description
0	87	Command value for sending remote command
1	0	User defined - can be any value - this first byte is normally replaced in the reply with a Status value. Other User-defined values are just returned unaltered in the reply from the Hub and can be used for checking, etc.
2	2	Port number 1-16
3	0	User Defined
4	1	Remote Device Command - Power Off. These commands are found below.

IR Codes			
IR Code	Description	IR Code	Description
0-9	Keys 0 to 9	56	Esc
10	Channel up	57	Info
11	Channel down	58	Help
12	Power off	59	Teletext
13	Mute	60	Services
14	Volume up	61	Box office
15	Volume down	62	Interactive
16	Program up	63	TV guide
17	Program down	64	Red
18	10+ key (for two digit channel entry)	65	Green
20	Channel restore (back)	66	Blue
21	Power up	67	Yellow
22	Unmute	70	Play
30	A/V select 1	71	Pause
31	A/V select 2	72	Stop
32	A/V select 3	73	Record
40	Device select (DVD/VCR)	74	Fast forward
50	Menu	75	Rewind
51	Select Function	90	Custom 1 through to...
52	Cursor up	99	...Custom 10
53	Cursor down	128	Select composite input
54	Cursor left	136	Select VGA input
55	Cursor right	144	Select S-Video input
		152	Select Component (YPbPr) input

### Updating the UDM-RX02 Receiver With the Serial Protocol

The UDM-RX02 Receiver which will issue serial commands to a controlled device must be connected to the UDM port on the UDM-0102 (rear panel). See the *UDM Port (RJ45)* section on page 4 for details.

Once the Serial commands have been defined, follow these steps to update the UDM-RX02 Receiver with the new protocol:

1. On the *Status* page (see FIG. 19 on page 27), click on the port number to which the serial device is attached. This invokes the Port Configuration options for the selected Port.
2. Click on the *Protocol* drop-down menu (FIG. 78).

The screenshot shows the 'Port Configuration' interface. At the top, there's a 'Port 1 version' field set to '01.15' and three links: 'User control', 'Send settings to RX', and 'Default'. Below this is a 'Remote type' dropdown menu set to 'UDM-RC02'. The 'Port name' is 'Port 1' and 'Dual output' is unchecked. The 'Cable distance' is '0' and 'Advanced' is unchecked. The 'Sync' dropdown is set to 'Common'. There's a 'Red skew' section with a row of 16 colored circles and a value of '1'. At the bottom, the 'Protocol' dropdown menu is open, showing options: 'None', 'Serial', and 'Endaleo'. A blue callout bubble points to the 'Serial' option with the text: 'Select the Serial protocol to download to the UDM Receiver connected to this Port'.

**FIG. 78** Port Configuration options - Protocol drop-down menu

3. Select the Serial protocol which this UDM Receiver will download.
4. Click **Send Settings to RX** to send the Serial protocol to the RX02 connected to this port. This may take a few minutes depending on how many commands are contained in the protocol.

5. A message will appear saying *“Loading Protocol – Please wait”*. Once this has disappeared the Serial protocol has been downloaded to the UDM Receiver. Commands can now be sent from the Hub WebConsole to the serial device.

A new table for this device's Serial control is what is actually being created. When the administrator decides to create further commands particular to this serial device they will be stored within this table.

- If new commands are to be created in the future, ensure the correct Serial protocol has been selected before defining new commands to ensure commands are stored in the correct table.
- There is one protocol/table per UDM-RX02.

**NOTE:** *Serial commands are stored in the UDM-RX02 - be sure to keep any serially programmed UDM-RX02 units associated with the correct display device type.*

## Creating and Learning an IR Protocol

**NOTE:** *The UDM-0102 can learn approximately 128 IR commands depending on the actual command length and protocol used.*

### Creating an IR Protocol

1. Connect the 3.5mm jack of the IR03 External IR Receiver Module to the **IR Rx** connection on the rear panel (see FIG. 6 on page 6).
2. Run the cable and attach the IR Receiver Module within IR range of any remote control devices to be used.
3. In the *Protocols* page, click on the *IR Protocol* drop-down menu and select **New**. This invokes the *Name* text field (FIG. 79).

**FIG. 79** Naming the new IR Protocol

4. Enter a name for the IR protocol in the *Name* text field.
5. Click **Initialize**. This invokes the *Action* drop-down menu (FIG. 80).

**FIG. 80** Creating an IR command for the action

6. Select an action to be performed from the *Action* drop-down menu. This invokes the **Step 1** option (FIG. 81).

Click here to prepare the device to receive the IR code

**FIG. 81** Creating an IR command for the action

7. Click **Step 1** to ready the device to receive the IR code (the system prompts you to press the desired key on the remote control).
8. Press the corresponding button on the remote.
9. Click **Step 2** on the page to begin the IR code confirmation.
10. Press the corresponding button on the remote again. The IR code has now been added and assigned an action.

**NOTE:** The UDM-0102 can learn approximately 128 IR commands, depending on the actual command length and protocol used.

### IR Learning With a Device's Remote Control

IR protocols can be learned by the UDM-0102 by using the device's remote control to program its commands into the UDM-0102.

**NOTE:** The device's own remote control can still be used locally at the device to control the device.

1. Connect the 3.5mm jack of the IR03 External IR Receiver Module to the **IR Rx** connection on the Hub (see FIG. 6 on page 6).
2. Run the cable and attach the IR Receiver Module within IR range of any remote control devices to be used.
3. In the *Protocols* page, click on the *IR Protocol* drop-down menu and select **New** (FIG. 82). This invokes the *Name* text field.



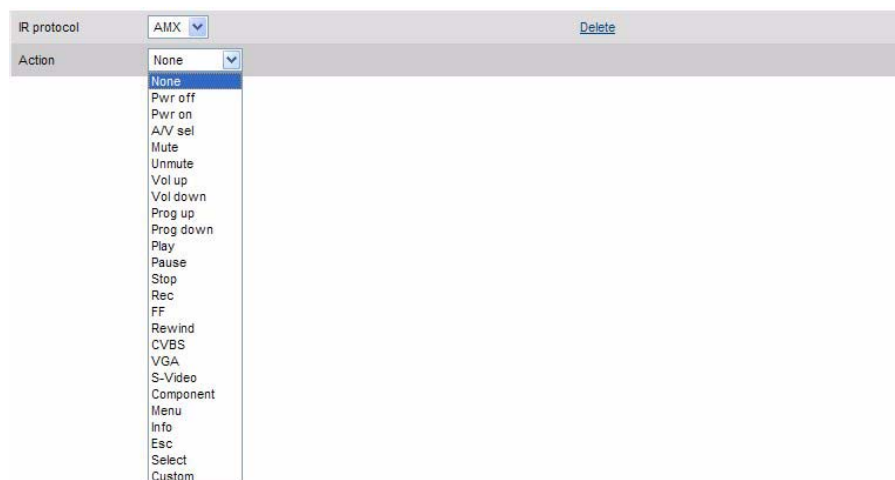
**FIG. 82** IR Protocol drop-down menu

4. Enter a name for the IR protocol in the *Name* text field (FIG. 79).



**FIG. 83** Naming the new IR Protocol

5. Click **Initialize**. This invokes the *Action* drop-down menu (FIG. 80).



**FIG. 84** Creating an IR command for the action

6. Select an action to be performed from the *Action* drop-down menu. This invokes the **Step 1** option (FIG. 81).



**FIG. 85** Creating an IR command for the action

7. Click **Step 1** to ready the device to receive the IR code (the system prompts you to press the desired key on the remote control).

**NOTE:** Ensure the device's remote control is pointing to the IR sensor located at the front of the UDM-0102 when performing key presses. If not the key presses may not be stored in the UDM-0102.

8. Press the corresponding button on the remote.
9. Click **Step 2** on the page to begin the IR code confirmation.
10. Press the corresponding button on the remote again. The IR code has now been added and assigned an action.

**NOTE:** The IR learning process requires that the command on the device's remote is learned twice - i.e the same remote control command needs to be repeated at step 2.

A new table for this device's remote control is what is actually being created. When the administrator decides to create further commands e.g power off, power on particular to this remote control they will be stored within this table. If new commands are to be created in future ensure the correct IR Protocol has been selected before recording new commands to ensure commands are stored in the correct table. There is one protocol/table per UDM-RX02.

## Updating the UDM-RX02 With the IR Protocol

**NOTE:** A UDM-RX02, which will issue the relevant IR commands to the device, must be connected to the relevant port via a Cat5/e/6 cable. Remember the IR commands are stored within the UDM-RX02.

1. Ensure the IR protocol has been created previously.
2. In the *Status* page, click on the **port number** hyperlink which the device is attached to. It is the UDM-RX02 which will transmit the IR command to the device's IR interface.
3. Once the Port properties become visible, select the IR protocol which this UDM-RX02 will download from the *Protocol* drop-down menu. This may take a few minutes depending on how many commands are within the table.
4. A message will appear saying "Loading Protocol - Please wait" once this has disappeared the IR protocol has been downloaded to the UDM-RX02. IR commands can now be sent from the UDM-0102 to the device.

## Deleting Protocols

The last created or currently highlighted protocol (Serial or IR) will be deleted when using the *Delete* hyperlink.

- To delete a Serial protocol: Click the **Delete** hyperlink in the *Serial* section.
- To delete an IR protocol: Click the **Delete** hyperlink in the *IR* section.
- To delete all (Serial and IR) protocols: Click **Delete all**

## Endeleo IR Codes

The following is a list of IR Codes used by Endeleo in learning Serial or IR controls for display devices.

Note that several of the items in the following table are not represented in the *Action* drop-down menus for IR and Serial protocols (in the Web Configuration Interface).

For example, "AV SELECT 1" is available in the Action drop-down menu (see "A/V Sel"), and needs no custom code reference. However, a custom command like "AV SELECT 2" would be only be accessed by Custom 31, since this command is not represented in the *Action* drop-down menu options.

IR code	Description	IR code	Description
0-9	Keys 0 to 9	52	Cursor up *
10	Channel up *	53	Cursor down *
11	Channel down *	54	Cursor left *
12	Power Off	55	Cursor right *
13	Mute	56	Esc
14	Volume up	57	Info
15	Volume down	58	Help *
16	Program up	59	Teletext *
17	Program down	60	Services *
18	10+ key (for two digit channel entry)	61	Box office *
20	Channel restore (back) *	62	Interactive *
21	Power On	63	TV guide *
30	A/V select 1	64	Red *
31	A/V select 2 *	65	Green *
32	A/V select 3 *	66	Blue *
40	Device select (DVD/VCR) *	67	Yellow *
41	Enter *	70	Play
42	Clear *	71	Pause
44	TV Input *	72	Stop
45	TV Power *	73	Record
46	Live TV *	74	Fast forward
47	Thumbs up *	75	Rewind
48	Thumbs down *	76	Slow *
50	Menu	80	Select pass through *
51	Select Function	81	Cancel pass through *
		90 -99	Custom 1... through to Custom 10

**NOTE:** An asterisk in the Description column for any IR Code in this table indicates that the command will require custom code (since the command is not represented in the Actions list).

# Upgrading Firmware

## Overview

System upgrades of the UDM-0102 can be performed following consultation with AMX support. Upgrade files can be downloaded from the AMX web site.

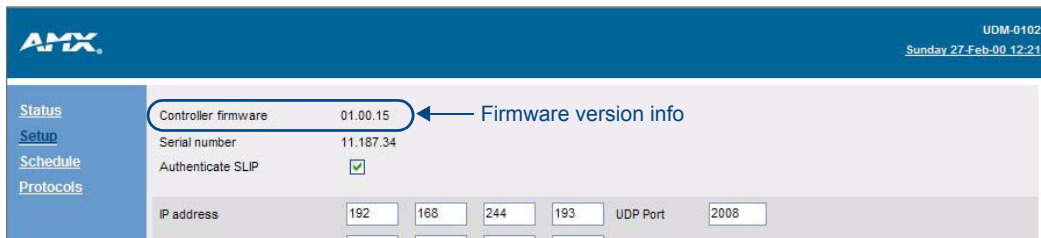
Tools required to perform system upgrades include:

- TFTP client
- Necessary files. Files that represent possible firmware updates include:
  - UDM-0102 Firmware (file format = c<id>.rom)
  - Web Firmware (file format = f<id>.rom or f<id>.dat)
  - Port Firmware (for output ports, not input ports - file format = p<id><3 digit port #>.rom)
  - Bootloader Firmware (file format = b<id>.rom)
  - UDM-RX02 Firmware (file format = c<id>.rom)
- Working knowledge of UDM-0102 and UDM-RX02.

**NOTE:** *The Controller Firmware and the Web Firmware must always be the same version. Never upgrade one without also upgrading the other to the same version number.*

## Determining the Current Firmware Versions

Before upgrading firmware, be sure to determine which firmware version is currently loaded on the UDM Hub and receiver. Open the UDM-0102's WebConsole, and click on the **Setup** link to invoke the main *Setup* page. The firmware version currently loaded on the UDM-0102 is indicated at the top of the page (FIG. 86).



**FIG. 86** Firmware Version Information (Setup page)

Alternatively, you can retrieve firmware version information in a Command Line session:

- Establish a Command Line session with either the UDM-0102 or UDM-RX02 and type a period ("."). This will return the current firmware version.
- Alternatively, type ?<port#> from the UDM-0102 Command Line interface to return the Port Firmware version and UDM-RX02 Firmware version (if one is attached).

**NOTE:** *Since the UDM-RX02 does not have its own WebConsole, a Command Line session is the only way to view current firmware version information for the receiver.*

- You can also type **Setup** at the UDM-0102 Command Line prompt to enter Setup mode to view firmware information.

## Downloading New Firmware from www.amx.com

Firmware updates are available for download via the relevant product page in the online catalog:

1. Go to [www.amx.com](http://www.amx.com), and log in as a Dealer.
2. Open the UDM-0102 Product Page. The link to the latest firmware version for this product is included in the right-hand pane, under "Firmware Files" (FIG. 87):

**UDM-0102**  
2x1 Multi-Format Distribution Hub

Description: 2x1 Multi-Format Distribution Hub  
Part #: FG-UDM-0102  
Status: Available to Order  
Your Price: \$497.50

**OVERVIEW**  
The UDM-0102 is designed for smaller installations with long video/audio cable runs. It supports two high-resolution input ports and one UDM output port, making it an ideal solution for distributing audio/video content to a classroom, conference room or other presentation room. Advanced, yet cost-effective, the UDM-0102 delivers media over easily-installed, dedicated Cat5/5e/6, which decouples distribution of the media from the corporate backbone. Users can quickly switch and transmit any video source to any display device, power on/off display devices, and permission user control to select and play video sources and media servers on demand.

**COMMON APPLICATION**  
Ideal for distributing audio/video content to classrooms, conference rooms or other presentation rooms.

**FEATURES**

- 2 multi-format inputs x 1 RJ-45 output
- Supports Composite, S-Video, Component, RGBHV, RGB
- Digital
- Central
- Switch
- Trans

**Firmware Files**  
UDM-0102 Firmware  
ZIP | 68 KB | v 1.00.20

**Manuals**  
[Operation/Reference Guide - UDM-0102 and UDM-RX02 Multi-Format Distribution Hub and Receiver](#)  
PDF | 2.41 MB  
[Quick Start Guide - UDM-0102 Multi-Format Distribution Hub](#)  
PDF | 236 KB

**Literature**  
[2009 Fall Pocket Guide](#)  
PDF | 16.50 MB  
[Endeoleo UDM Series Distributed Media](#)  
PDF | 5.76 MB

**AMX Device Modules**  
[UDM Distribution Hubs Device Module](#)

FIG. 87 UDM-0102 Product Page (www.amx.com)

3. Click the link under **Firmware Files** ("UDM-0102 Firmware") to download the Firmware (ZIP) file.
4. The *AMX License Agreement* is displayed. Read this agreement, and click **I Accept** to proceed with the download, or **Back** to return to the previous page.
5. Open the ZIP file, and open the "README.TXT" file for instructions on using the included BAT file to load the new Firmware (\*.ROM) Files on the UDM-0102 (FIG. 88).

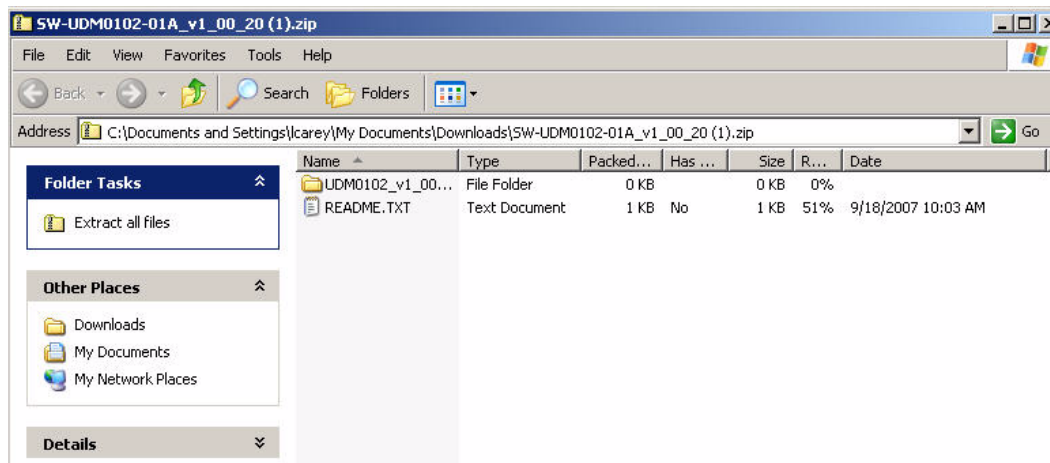


FIG. 88 UDM-0102 Firmware ZIP File

The BAT file is included for your convenience. You can also transfer the ROM files manually, following the instructions in the following sub-sections.

## Establishing a TFTP Session with the Hub and/or Receiver

The Serial port on the UDM-0102 and UDM-RX02 is an RJ12 connector, and requires a RS01 DB9-to-RJ12 adapter cable (FG-RS01) to connect to a PC for Terminal control.

- On the UDM-0102, the Serial port is located on the front panel, and is labelled "10101".
  - On the UDM-RX02, the Serial port is located on the rear panel, and is labelled "SERIAL".
1. Use the RS01 cable to connect an available DB9 Serial port on the PC to the RJ12 Serial port on either the UDM-0102 or the UDM-RX02.
  2. Ensure the TFTP client software has been installed on the PC, and is configured to use default Serial communication settings:



Default Serial Settings	
Baud Rate:	9600
Data Bits:	8
Parity:	None
Stop Bits:	1
Flow Control:	None

3. Start a Command Line session on the PC and run the TFTP client.

## Upgrading Firmware and Web Pages On a UDM-0102

**NOTE:** The following procedures can also be used to upgrade the Web Page archive on the UDM-0102. Replace filenames appropriately.

1. Ensure the TFTP client has been installed on the PC which will be used to send files to the Hub. Install TFTP client if necessary, consulting with AMX support as to the appropriate client.
2. Run the TFTP client.
3. Start a command session on the PC. Change to the directory where the .ROM files are stored on the PC e.g. **cd\Hub**.
4. Type in the following command at the prompt observing the parameters below;  
**TFTP -i [ip address of UDM-0102] PUT [filename.ROM]** (FIG. 89)  
For example, typing in TFTP -i 192.168.0.96 PUT FUDM129.ROM will upload the file FUDM129.ROM to the UDM Hub with IP address 192.168.0.96.
5. Once the command has been typed in, push **Enter** to execute the command.

```

C:\hub>ls
'ls' is not recognized as an internal or external command,
operable program or batch file.

C:\hub>dir
Volume in drive C has no label.
Volume Serial Number is 9C64-6ABF

Directory of C:\hub

31/03/2006  14:06    <DIR>          .
31/03/2006  14:06    <DIR>          ..
31/03/2006  09:03             120,818  C03121612900.ROM
31/03/2006  09:03             48,745  FUDM129.ROM
                2 File(s)              169,563 bytes
                2 Dir(s)  30,274,510,848 bytes free

C:\hub>tftp -i 192.168.0.96 PUT C03121612900.ROM
Transfer successful: 120818 bytes in 56 seconds, 2157 bytes/s

C:\hub>tftp -i 192.168.0.96 PUT FUDM129.ROM
Transfer successful: 48745 bytes in 9 seconds, 5416 bytes/s

C:\hub>

```

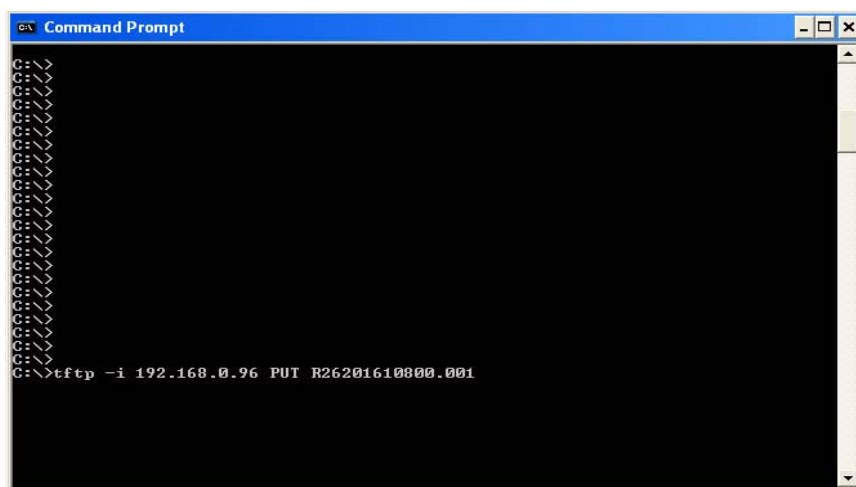
FIG. 89 Issuing TFTP commands to the Hub

6. A *successful transfer* message should be returned. This may appear after a minute or so depending on network environment and size of file.  
**NOTE:** If you experience problems with TFTP, try opening a hyperterminal session to the UDM at the same time, so that you can see the bytes loading.
7. The command window can be closed.
8. The network connection to the Hub will be broken as the Hub will reset. It is recommended that the Hub is **powered off** then powered on at this point.

## Upgrading Port Controllers

Ensure the TFTP client has been installed on the PC which will be used to send files to the Hub. Install TFTP client: if necessary, consult with AMX support as to the appropriate client.

1. Run the client.
2. Start a command session on the PC. Change to the directory where the .ROM files are stored on the PC e.g. **cd\Hub**.
3. Type in the following command at the prompt observing the parameters below;  
**TFTP -i [IP address] PUT [filename].[portnumber]**  
For example, typing in TFTP -i 192.168.0.96 PUT R26201610800.001 will upload the file *R26201610800* to the UDM Hub with IP address *192.168.0.96* (FIG. 90).



**FIG. 90** Issuing TFTP commands to the UDM-RX02 via the Hub

5. Push **Enter** to execute the command.
6. The command window can be closed.

# Advanced Administration

## Overview

System upgrades of the UDM-0102 can be performed following consultation with AMX support. Upgrade files can be downloaded from the AMX web site.

Tools required to perform system upgrades include:

- TFTP client
- Necessary files. Files that represent possible firmware updates include:
  - UDM-0102 Firmware (file format = c<id>.rom)
  - Web Firmware (file format = f<id>.rom or f<id>.dat)
  - Port Firmware (for output ports, not input ports - file format = p<id><3 digit port #>.rom)
  - Bootloader Firmware (file format = b<id>.rom)
  - UDM-RX02 Firmware (file format = c<id>.rom)
- Working knowledge of UDM-0102 and UDM-RX02.

**NOTE:** *The Controller Firmware and the Web Firmware must always be the same version. Never upgrade one without also upgrading the other to the same version number.*

## Establishing a TFTP Session with the Hub and/or Receiver

The Serial port on the UDM-0102 and UDM-RX02 is an RJ12 connector, and requires a RS01 DB9-to-RJ12 adapter cable (FG-RS01) to connect to a PC for Terminal control.

- On the UDM-0102, the Serial port is located on the front panel, and is labelled "10101".
  - On the UDM-RX02, the Serial port is located on the rear panel, and is labelled "SERIAL".
1. Use the RS01 DB9-to-RJ12 adapter cable to connect an available DB9 Serial port on the PC to the RJ12 Serial port on either the UDM-0102 or the UDM-RX02.
  2. Ensure the TFTP client software has been installed on the PC, and is configured to use default Serial communication settings:

Default Serial Settings	
Baud Rate:	9600
Data Bits:	8
Parity:	None
Stop Bits:	1
Flow Control:	None

3. Start a Command Line session on the PC and run the TFTP client.

## Copying the Hub Configuration File

Copying the Hub Configuration file permits the Administrator to backup key data entered by Administrators such as Input names, Port names, Devices and the Hub setup.

To backup the Hub Configuration file:

**NOTE:** *Ensure the TFTP client has been installed on the PC which will be used to send files to the Hub. Install TFTP client if necessary, consult with AMX support as to the appropriate client.*

1. Run the TFTP client.
2. Start a command session on the PC. Change to the directory where the Hub Configuration file is to be stored on the PC e.g. **cd\Hub**.
3. Type in the following command at the prompt observing the parameters below:  
 TFTP -i [IP address] get hxxxxx.hub  
 Where *hxxxxx.hub* is the name of the Hub configuration file.  
 If the name of the Hub Configuration file is not known, typing in **h** followed by **xxx** will find the file, as there is only one file beginning with "h" in the UDM-0102.

## Restoring the Configuration file

1. Run your TFTP client. If using the Windows client, move to step 2.
2. Start a command session on the PC. Change to the directory where the Hub Configuration file is to be stored on the PC. For example:  
 cd\udm and cd\config
3. Type in the following command at the prompt, observing the parameters below:  
 TFTP -i [IP address] put hxxxxx.hub  
 Where **hxxxxxx.hub** is the name of the Hub configuration file.

Hub configuration file names start with an **h**.

**NOTE:** Restoring the Hub configuration file can cause the UDM Hub web pages to be damaged. Follow the direction for loading the web pages to restore the damaged file.

4. When complete, close the command window.

### Loading the Hub Configuration File

1. Run your TFTP client. If using the Windows client, move to step 2.
2. Start a command session on the PC. Change to the directory where the .ROM files are stored on the PC:  
e.g. **cd\Hub**.
3. Type in the following command at the prompt, observing the parameters below;;  
TFTP -i [ip address of UDM Hub] PUT [filename.ROM].  
For example, typing in TFTP -i 192.168.0.96 PUT FUDM129.ROM  
will upload the file **FUDM129.ROM** to the UDM Hub with IP address **192.168.0.96**.
4. Once the command has been typed in, push **Enter** to execute the command.
5. Upload the file to any other ports requiring this upgrade by changing the last 3 digits of the command to the relevant port number.  
For example, type TFTP -i 192.168.0.96 PUT R26201610800.002 to upload the file to port 2 on the UDM Hub with IP address 192.168.0.96.
6. The command window can be closed.

## Copying Protocols Between UDMs

**NOTE:** Once protocols have been learned by the Hub through the Web Browser, they will remain on the Hub. AMX recommends the Web Browser be used at all times to allocate protocols to UDM-0102s.

1. Once an IR protocol has been learned for a specific port it can simply be copied across to other ports using the TFTP application and the network port.
2. First, you must retrieve the IR file from the UDM-0102. IR files all start with an **I** and use a file extension to indicate number. These could therefore take the form isonymode1.001, IRtable.001 etc.
3. At the command prompt use the following command.  
TFTP -I [IP address of Hub] GET irtable.001  
Where *irtable* is the user defined name given to the IR code on port 1 and where the .001 file extension relates to the port number.

**NOTE:** The same command structure and method is used to copy and paste serial commands between ports. In this instance the filename will begin with the letter **S**.

The IR protocol can be loaded to an UDM-RX02 by using the following command at the Hub:

```
TFTP -I [IP address of Hub] GET irtable.hub
```

and the following command at the receiver:

```
TFTP -I [IP address of Hub] PUT irtable.hub
```

### Retrieving IR Files From the UDM Ports

1. Run your TFTP client. If using the Windows client, move to step 2.
2. Create a folder on the **C:** drive named **RX**.
3. Browse the new RX folder with your TFTP client.
4. At the command prompt, type the following command to retrieve an IR/Serial file from the UDM Receiver connected to port 1:  
C:\RX\ TFTP -i <ip address of Hub> get iname.001 <enter>  
Example:  
C:\RX\ TFTP -i 192.168.0.96 get isony.001 <enter>
5. To get a file off the RX connected to port 16 use this command:  
C:\RX\ TFTP -i 192.168.0.96 get isony.016 <enter>  
The file name you create must start with an **"i"** and end in an extension from **.001** to **.016**.
6. To put the file onto another RX unit on the same Hub you must first copy the newly created file to all extensions (.001 - .016), or at least the extension of the port to which the RX is connected.  
C:\RX\ copy isony.001 isony.002 <enter>
7. Repeat for other extensions:  
C:\RX\ copy isony.001 isony.003 <enter>  
C:\RX\ copy isony.001 isony.004 <enter>
8. Use the put command to send to the RX units on the other Hub ports that need the IR/Serial file.  
C:\RX\ TFTP -i 192.168.0.96 put isony.002 <enter>  
Once an IR protocol has been learned for a specific port, it can simply be copied across to other ports using the TFTP application and the network port. To copy an IR protocol to another port:
9. Create a directory or folder on the PC to store the protocol file. For example, create:

C:\UDM\Protocol

10. You must GET the IR file from the Receiver via the Hub. IR files all start with an **I** and use a file extension to indicate number. These could therefore take the form isonymode1.001, IRtable.001 etc.

11. At the command prompt use the following command:

```
TFTP -I [IP address of Hub] GET irtable.hub
```

**NOTE:** Entering the extension ".hub" will download the Hub configuration file, which will capture such data as the input configuration, setup information, input and port names, and the protocol files. The same file is used for serial (s) or IR (i) protocols.

### Backing up the Hub Configuration File

1. Run your TFTP client. If using the Windows client, move to step 2.
2. Start a command session on the PC.
3. Change to the directory where the Hub Protocol file is to be stored on the PC.

For example:

**cd\udm** and **cd\protocol**.

4. Type in the following command at the prompt, observing the parameters below:

```
TFTP -i [IP address] get ixxxxx.hub
```

-Or-

```
TFTP -i [IP address] get sxxxxx.hub
```

Where **ixxxxx.hub** is the name of the Hub configuration file.

The file name must start with an **i** or an **s**.

If the name of the Hub Protocol file is not known typing in **i** or **s** followed by any logical characters will find the file, as there is only one protocol file in the UDM Hub.

A file name starting with either **i** or **s** will retrieve that file. Use a name that will identify the protocol file for the project.

For example: **imyprotocol.hub** is an acceptable name.

5. When complete, close the command window.

### Restoring the Hub Configuration File

1. Run your TFTP client. If using the Windows client, move to step 2.
2. Start a command session on the PC. Change to the directory where the Hub Configuration file is to be stored on the PC.

For example:

**cd\udm** and **cd\protocol**.

3. Type in the following command at the prompt, observing the parameters below:

```
TFTP -i [IP address] put ixxxxx.hub
```

-Or-

```
TFTP -i [IP address] put sxxxxx.hub
```

Where **ixxxxx.hub** is the name of the Hub protocol file.

All Hub protocol file names start with an **i** or **s**.

4. When complete, close the command window.

When the protocol file is restored, it will usually automatically associate correctly with the configuration file when it is restored. However, it is wise to check each UDM port using the Web interface to verify the correct protocol is assigned.

## Upgrading Input Controllers

1. Run the TFTP client.
2. Start a command session on the PC. Change to the directory where the .ROM files are stored on the PC. For example:  
**cd\Hub**
3. Type in the following command at the prompt observing the parameters below:

```
TFTP -i [IP address] PUT uXXXXXXXX.022
```

## Backend Commands

In case of human error the Command Line can be used to perform several Administrative tasks on the UDM-0102.

### Changing the Login Password

1. Create a hyperterminal session with the UDM Hub using default serial connections.
2. To change the password enter the original password and new password separated by a full colon at the login prompt.  
For example type in **admin:password** at the login prompt, to change the password from "admin" to "password".
3. **Reset** the Hub. A power off then on is now required.

## Obtaining the Hub's IP Address Via the Command Line

1. Type **i** at the command prompt (FIG. 91).
2. Push **Enter**.

```
*
password: *****
- i
IP 192.168.0.96 port 2008
subnet mask 255.255.255.0
IP gateway 0.0.0.0
-
```

**FIG. 91** Issuing the **i** command

## Setting the Hub's IP Address Via the Command Line

1. Type **i <ip address>** at the command prompt.
2. Push **Enter**.

## Multi Format Inputs

The multi format inputs located at the rear of the Hub are numbered **129** & **132** for administrative purposes.

Multi format inputs	
Input	Input Number
A	129
B	130

1. To check the input port configuration, type in the following – a question mark followed by the Input Number (129, 130, 131 or 132). For example:  
 ? 129
2. Push **Enter**.
3. The following information will be displayed (FIG. 92):

```
- ? 129
port 129 00.06.00
XGA (1024x768)
799 H+ V+
```

**FIG. 92** Querying a multi format input port

The table below describes typical values returned when using the **?** command on an input port.

Multi-Format Input Configuration	
Value	Description
129	Input A
00.06.00	Input Controller Version
XGA	Extended Graphics Array
1024x768	Screen Resolution
799	Vertical lines on screen
H+	Horizontal polarity (+/-)
V+	Vertical polarity (+/-)

## User Outputs

1. To view a port's properties, type a question mark before the port number.  
 Ensure there is a space between the question mark and the number. (FIG. 93)  
 For example **? 1** will display Port 1 properties.

```
- ? 1
port 1 01.11.00
clock master 8406 (E2)
disconnected
port power ON
port number checksum is 1
```

**FIG. 93** Querying a port

2. Push **Enter** once the command has been entered.

3. The table below describes typical values returned when using the ? command on a Hub port.

Value	Description
Port 1	Port number on UDM Hub
01.11.00	Port Controller version
Clock Master 8406	Master (version)
Disconnected / Connected	Connected to RX
Port Power	On or Off
Port Number Checksum	Port in Master or Target Hub

### Copying IR/Serial Tables

To copy the IR/Serial tables from a UDM Hub:

**NOTE:** Windows XP Pro has a built in TFTP client program. If you are using another operating system, or have an alternate TFTP client, follow the directions of your OS and install TFTP client if necessary. Consult with AMX Technical Support as to the appropriate client for your OS.

1. Run your TFTP client. If using the Windows client, move to step 2.
2. Create a folder on the **C:** drive named **Endeleo**.
3. Open a command prompt (Start, Run, type "cmd" <enter>) and change it to the **C:\Endeleo** directory.
4. Connect the serial cable (RJ12 to DB9) that is supplied with the UDM Hub.
5. Open a Hyperterminal session and connect to the UDM Hub (**9600, 8, None, 1, None**)
6. Type the following command at the prompt:

```
TFTP -i <ip address of the udm Hub> get ixxxx.hub <enter>
```

Example:

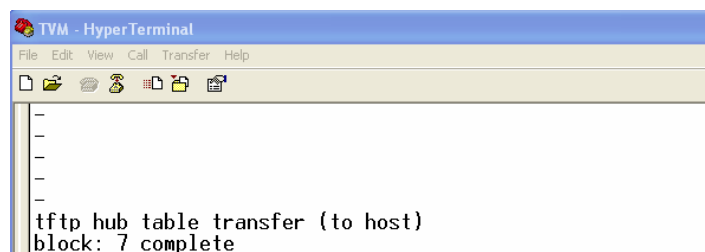
```
C:\AMX\TFTP -i 192.168.1.201 get iudm.hub <enter>
```

```
C:\>cd endeleo
```

```
C:\Endeleo>tftp -i 192.168.1.201 get iudm.hub_
```

**FIG. 94** GET iudm.hub prompt

7. After hitting **Enter**, watch the Hyperterminal session window to see the file download from the Hub.



**FIG. 95** File download from the UDM Hub

The transfer is complete.

## Backend Commands - UDM-RX02

Several UDM-RX02 commands can be used for information purposes.

### Viewing the Video Compensation Settings

The **z** command will report the current compensation settings configured within the UDM-RX02.

1. Use hyper terminal to connect to the UDM-RX02 via its serial port.
2. At the command prompt type in **setup**. Once in setup mode to view the compensation settings, type in **z**. (FIG. 96)

```
- z
gain 34 sharpness 24 red 1 green 1 blue 1
H+ V+ enabled
-
```

**FIG. 96** Video Compensation Settings

**NOTE:** When in Setup mode, the UDM's current firmware version is displayed.

### Resetting Video Compensation Settings

The **x** command resets all compensation settings at the UDM-RX02 back to default.

1. Use hyper terminal to connect to the UDM-RX02 via its serial port.
2. At the command prompt type in **setup**. Once in setup mode type in **x** to reset the compensation settings if required.



# UDM-RC10 Remote Control

## Compensating Video Via the UDM-RC10 Remote

Video can also be compensated using the UDM-RC10 IR Engineering Remote Control (FIG. 97).



**FIG. 97** UDM-RX02 with IR03 IR Receiver Module

1. Ensure the IR03 External IR Receiver Module (FG-IR03) is attached to the UDM-RX02 at the IRRX port (FIG. 97).  
**NOTE:** The IR03 IR receiver supports transmitters that produce a Carrier Center Frequency of 38KHz.
2. To enter compensation mode, push the **ESC** and **B** buttons on the remote control.
3. The amber LED at the Cat5 port on the UDM-RX02 will start to flash, indicating the UDM-RX02 is in compensation mode.
4. Use the buttons on the remote control to adjust appropriately the following up or down;
  - Sharpness
  - Gain
  - Red, Green and Blue.
5. Once the image displayed is of an acceptable quality, push the **A** button on the remote control to exit compensation mode.

**NOTE:** The compensation settings will be specific to this UDM-RX02 and stored internally (for example, if this UDM-RX02 is replaced or swapped out the compensation settings will travel with the UDM-RX02). It may therefore be necessary to re-compensate the UDM-RX02 / replacement UDM-RX02 if this UDM-RX02 is to be used elsewhere or is being replaced.

# Video Compensation

## Overview

Video Compensation settings such as brightness, sharpness and color skew can be adjusted on each port, via options in the *Port Configuration Options* page of the UDM-0102 WebConsole (FIG. 98).

The screenshot shows the 'Port Configuration Options' page. At the top right are links for 'User control' and 'Set compensation to default'. Below these are three main sections: 1. Remote type: A dropdown menu set to 'UDM-RC02'. 2. Port name: A text box containing 'Port 1', with links for 'RX version' and 'Update' to its right. 3. Compensation settings: Three sliders for 'Bright', 'Sharp', and 'Red skew'. 'Bright' is set to 30, 'Sharp' to 0, and 'Red skew' to 0. Each slider has 'Up' and 'Down' arrows and an 'Update' button. At the bottom is a 'Protocol' dropdown menu set to 'None'.

**FIG. 98** UDM-0102 WebConsole - Port Configuration page

**NOTE:** See the *Port Configuration Options* section on page 24 for details.

Use these options to compensate (tune) outgoing video signals for optimum picture quality. Video compensation settings can also be configured at the UDM-RX02 Receivers via the UDM-RC10 Remote Control (see the *Compensating Video Via the UDM-RC10 Remote* section on page 62).

## Default Video Compensation Settings

The default video compensation settings are listed below:

Default Video Compensation Settings	
• Bright:	default setting = 30
• Sharp:	default setting = 0
• Skew:	default setting = 0 (all colors)

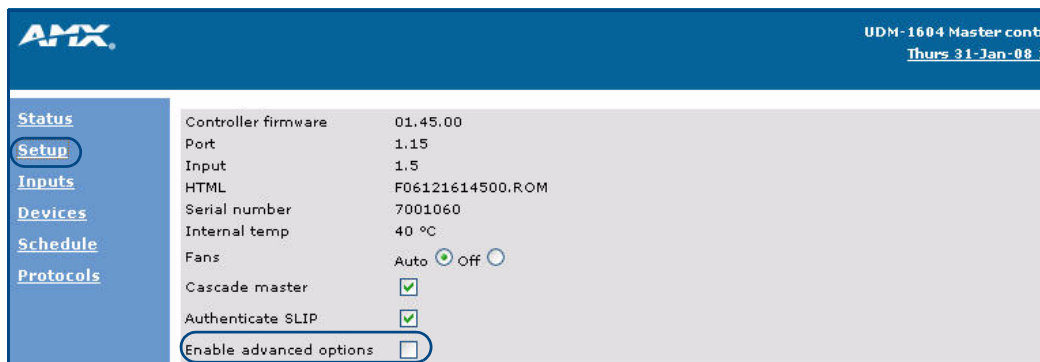
## Video Compensation Guidelines

1. **Skew:** AMX recommends that the video compensation is first adjusted to eliminate any skew, using vertical red / green / blue lines.
2. **Brightness:** Once any skew has been eliminated the video should be adjusted for brightness using a grey scale or equivalent test card.
3. **Sharpness:** Finally the sharpness of the video should be adjusted eliminating any over or under shoot of the video. Horizontal black and white bars are one useful method of tuning sharpness.

**NOTE:** LCD screens have a tendency to automatically try and compensate the video, presenting issues when adjusting for skew. Using a CRT monitor to adjust video quality is often the best way around this.

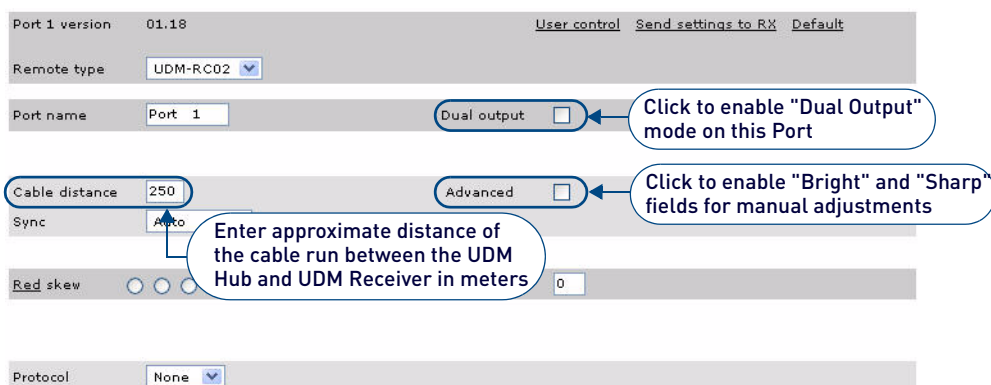
## Advanced Video Compensation

To enable advanced video compensation options, click on the *Enable advanced options* checkbox, in the *Setup* page (FIG. 99).



**FIG. 99** Setup Page - Enable advanced options checkbox

1. In the *Status* page, click on a Port link to access the Port Configuration options for the selected Port.
2. With the *Enable advanced options* checkbox selected in the *Setup* page, the Port Configuration options include the additional *Cable Distance* field (FIG. 100):

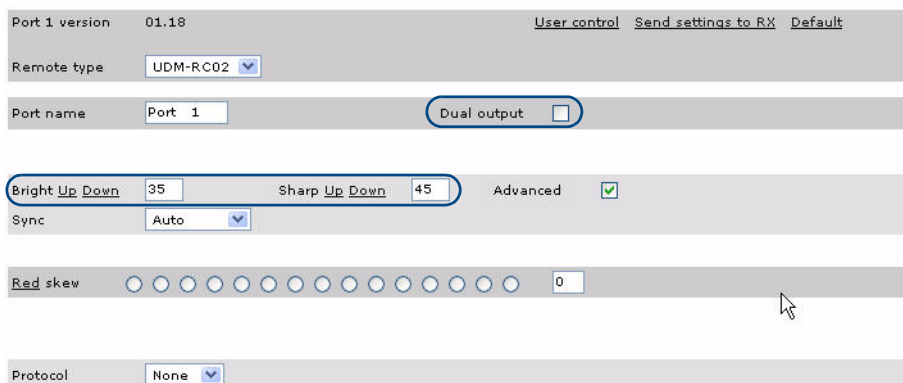


**FIG. 100** Port Configuration options - with "Enable advanced options" selected in the *Setup* page

3. In the *Cable Distance* field, enter the approximate distance of the cable run from the UDM-0102 to the UDM-RX02 (in meters). This value is used to automatically adjust the brightness and sharpness of the image.

**NOTE:** The *Cable Distance* field is intended primarily for use with VGA cabling in excess of 200 meters (see the *Audio & Video Formats/Resolutions/Distance* section on page 8).

4. To make manual adjustments to Brightness and Sharpness, click on the *Advanced* checkbox (see FIG. 100) to enable the *Bright* and *Sharp* fields (FIG. 101):



**FIG. 101** Port Configuration options - "Enable advanced options" selected in the *Setup* page and "Advanced" selected

## Compensating Video Via the UDM-RC10 Remote Controller

Video can also be compensated at the UDM-RX02 Receivers, using an IR03 External IR Receiver Module (FG-IR03, not included), and the UDM-RC10 Multi-Format IR Engineering Remote Control (FIG. 102).



**FIG. 102** UDM-RX02 with IR03 IR Receiver Module

1. Connect an IR03 External IR Receiver Module (FG-IR03, not included) to the UDM-RX02 at the IRRX port (FIG. 102).

**NOTE:** The IR03 IR receiver supports transmitters that produce a Carrier Center Frequency of 38KHz.

2. To enter compensation mode, push the **ESC** and **B** buttons on the remote control.
3. The amber LED at the Cat5 port on the UDM-RX02 will start to flash, indicating the UDM-RX02 is in compensation mode.
4. Use the buttons on the remote control to adjust appropriately the following up or down;
  - Sharpness
  - Gain
  - Red, Green and Blue.
5. Once the image displayed is of an acceptable quality, push the **A** button on the remote control to exit compensation mode.

**NOTE:** The compensation settings will be specific to this UDM-RX02 and stored internally (for example, if this UDM-RX02 is replaced or swapped out the compensation settings will travel with the UDM-RX02). It may therefore be necessary to re-compensate the UDM-RX02 / replacement UDM-RX02 if this UDM-RX02 is to be used elsewhere or is being replaced.

# UDM-0102 Control Protocol

## Overview

The Universal Distribution Matrix (UDM) Hub often forms part of a larger system where control of switching and management functions is provided by an external system (i.e. a NetLinx Controller).

This document describes the protocol for communications between an external controller and the hubs using either a 10BaseT network connection or a SLIP encapsulated serial stream to the RS232 port.

**NOTE:** Unless otherwise specified, all data and command values are shown in decimal (base 10).

The UDM Hub communicates over a 10BaseT connection using UDP packets or over a serial link using UDP packets encapsulated using SLIP. In both these cases, the UDM Hub accepts a set of command and data values to carry out various actions, which are detailed in this document. These command and data values are encapsulated in a frame for transmission from the host to the Hub. In most cases this encapsulation will be provided by the host software, but in the case of simple SLIP commands, it might have to be supplied by the customer software or driver.

## Command Format

UDM commands consist of a command value, together with a number of relevant parameters (normally 6 bytes in total) which are transmitted to the Hub, generally described as follows:

Byte #	0	1	2	3	4	5	6...n
Byte value	Command value	User defined	Data value 1	Data value 2	Data value 3	Data value 4	Other data for some commands

The data packet returned by any command may be longer than described – any additional data in a packet may be ignored.

## Command and Reply Example - Port Connection

Command values differ for each command as do the values and length of the accompanying data.

For example, to connect port 1 to VGA input 2 on the UDM the command format is as follows

Byte #	0	1	2	3	4	5
Byte value	1	User defined	Port	Input	Sub input	Input type

So the data values which must be sent to the Hub would be:

Byte #	Value	Description
0	1	Command value for Connect Input to Port
1	0	User defined - can be any value - this first byte is normally replaced in the reply with a Status value, other User defined values are just returned unaltered in the reply from the Hub and can be used for checking etc
2	1	Port number
3	2	Input number
4	1	Sub input number (for a VGA input all sub inputs are used in the connection so this value is not used - it is only important when specifying connections for composite input types)
5	0	VGA type (other types are listed in the command description later in the document)

The Hub replies to all commands, and the reply format are also detailed in this document. For the switching command described above, the reply would be:

Byte #	0	1	2	3	4	5
Byte value	1	Status	Port	Input selected	Sub input	Input type

The reply packet starts with the command value, then a Status value (1 for success, other values are listed in section 6.0). The remainder of the reply varies by command, in this case the original parameters are returned, but these may normally be ignored.

## Command and Reply Example - Authentication (Login)

Since the host has to login to the Hub before any commands can be executed, this serves as another example

To login, the command format is as follows

Byte #	0	1	2	3...n
Byte value	98	User defined	Password length	Password string

So, assuming a password of 'admin', the data values which must be sent to the Hub would be:

Byte #	Value	Description
0	98	Command value for login
1	0	User defined - can be any value - this first byte is normally replaced in the reply with a Status value, other User defined values are just returned unaltered in the reply from the Hub and can be used for checking etc
2	5	Length of password string
3	97	First character in password ('a' has an ASCII value of 97 decimal)
4	100	Second character in password ('d' has an ASCII value of 100)
5	109	Third character in password ('m' is ASCII 109)
6	105	Fourth character in password ('i' is ASCII 105)
7	110	Fifth character in password ('n' is ASCII 110)

The Hub replies to all commands, and the reply format are also detailed in this document. For the login command described above, the reply would be:

Byte #	0	1	2	3	4	5
Byte value	98	Status	Undefined	Undefined	Undefined	Undefined

The reply packet starts with the command value, then a Status value (1 for success, 70 for incorrect password). The remainder of the reply varies by command, in this case the original parameters are returned, but these may normally be ignored.

### UDP Over Network (10BaseT) Encapsulation

If the UDM Hub is connected using the 10BaseT network connection, then the commands must be sent over that network. For the network to operate correctly, these commands must be encapsulated in a network packet. This is normally done transparently by the host software.

The Hub communicates over a 10BaseT network over UDP port **2008**.

### UDM Over Serial Port (SLIP) Encapsulation

The UDP packets may also be transported over a serial connection to the serial port on the Hub. The UDP data is transferred using SLIP (Serial line internet protocol) encapsulation. This scheme is defined in RFC1055, and involves framing the UDP data using special characters and substitution of special sequences when data may include the framing characters.

A brief description follows

- Begin and end the data by adding a character with value 192
- If the data contains 192 as a valid data value, substitute with the sequence 219, 220
- If the data contains the value 219, substitute with sequence 219, 221

The following example shows SLIP encoding for a UDP packet, showing the start and end characters (192) and substitution of special sequences when the data includes the start and end characters.

UDP data		17	03	192		69	219		25	
SLIP data	192	17	03	219	220	69	219	221	25	192

Responses which are SLIP framed will require decoding at the host.

### SLIP Serial Communication Example

Typically, host systems may not provide support for SLIP encapsulation, so the host must use the normal mechanism for sending serial characters, and add the encapsulation. For most commands, this just consists of adding a 192 character to the beginning of the serial command and one at the end. For example, assuming that the host has a function call to send a serial character of SendChar() (this will vary from system to system), then the switching example in 1.2 above would become:

```
SendChar(192); // send begin character
SendChar(1);  // send command value
SendChar(0);  // send first parameter (user defined)
SendChar(1);  // send second parameter (port number)
SendChar(2);  // send third parameter (input number)
SendChar(1);  // send fourth parameter (sub input number)
SendChar(0);  // send fifth parameter (input type)
SendChar(192); // send end character
```

The Hub would reply with eight serial characters, six for the reply described in this document, together with the SLIP encapsulation characters of 192 at the beginning and 192 at the end i.e the Hub reply string would look like:

Byte #	Value	Description
0	192 (equivalent C0 hex)	SLIP begin character
1	1	Returned command value
2	1	Status (success)
3	1	Returned port number
4	2	Returned input number
5	1	Returned sub input number
6	0	Returned input type
7	192	SLIP end character

Similarly, the login example in 1.3 above would result in the following. In this example, we have assumed that the SendChar() command in the host can accept an ASCII value in quotes as well as a decimal number:

```
SendChar(192); // send begin character
SendChar(98); // send command value
SendChar(0); // send first parameter (user defined)
SendChar(5); // send second parameter (password length)
SendChar('a'); // send third parameter (first character in password)
SendChar('d'); // send fourth parameter (second password character)
SendChar('m'); // send fifth parameter (third password character)
SendChar('i'); // send sixth parameter (fourth password character)
SendChar('n'); // send seventh parameter (fifth password character)
SendChar(192); // send end character
```

## Handshaking

Although UDP is not deterministic (there is no guarantee that a UDP packet will be delivered), using UDP greatly simplifies the stack processing in the hubs. To accommodate UDP, this protocol requires that the hubs send a completion reply on receipt (and completion) of any command. This is not a great restriction since some commands may not complete (selection of a disabled input for example) and status must be returned and decoded anyway.

To facilitate decoding, returned status messages duplicate the command and add a status return value. Returned status replies can therefore be matched with commands, even if delivered out of order. If a reply is not received, the sender must retry. Since all commands are stateless, such a simple scheme is adequate. The command format allows for a number of user-defined bytes to be sent with the command, which will be returned in the status. These may be used, for example, for sequence numbering or decoding.

## Command set

In each of the following descriptions, only the contents of the UDP data packet are specified:

## Authentication

Before any SLIP (ethernet UDP commands do not require authentication) commands can be executed the user must be authenticated - this uses the same password mechanism as authentication from the console command line or from a web browser.

**NOTE:** This authentication process may be disabled using a Setup web page option.

### Authenticate (Login)

Provides authentication information for this UDP session - the password is the same as for web browser and console sessions (default is admin). If the password is correct, further UDP commands will be accepted. Currently, the password is un-encrypted.

Byte #	0	1	2	3...n
Byte value	98	User defined	Password length	Password string

Return status

Byte #	0	1	2	3	4	5
Byte value	98	Status	Undefined	Undefined	Undefined	Undefined

The status value returned is as follows

Status value	Description
1	Command completed successfully
70	Unable to authenticate (password incorrect)

If the session is not logged (hasn't been correctly authenticated) then any command will return a status value of 70.



## Logout

Logs the UDP session out - further communications will require a login command to be sent.

Byte #	0	1	2	3	4	5
Byte value	97	User defined	User defined	User defined	User defined	User defined

Return status

Byte #	0	1	2	3	4	5
Byte value	97	Status	Undefined	Undefined	Undefined	Undefined

The status value returned is as follows:

Status value	Description
1	Command completed successfully
70	System is already logged out

## Command Summary

UDP							
Command	0	1	2	3	4	5	6
Connect	1	X	Port	Input	Sub input	Video input type	
Disconnect	6	X	Port				
Connect video	11	X	Port	Input	Sub input	Video input type	
Disconnect video	16	X	Port				
Connect audio	21	X	Port	Input	Audio input type		
Disconnect audio	26	X	Port				
Query port	12	X	Port				
Get port or input name	79	X	Port	Sub port	Type		
Get receiver info	88	X	Port				
Send remote command	87	X	Port		Remote command	Remote parameters	
Get remote serial buffer	89	X	Port	Terminator			
Enable/disable UDP key messages	93	X	Port	Enable/disable			
Set Hub ID	67	X	Length of ID string	Start of string (data)			
Get Hub or port ID	78	X	Port				
Reset	99	X	156				

## Basic Commands

### Input Numbering

The UDM has a flexible architecture to maximize use of the available matrix. The UDM1604 is a 16 output port Hub, with four analog input ports and four TVM input ports. Each analog input port can be used for a variety of input types, VGA, S-Video, component and composite, and input ports are specified by a main number, together with a sub input number if the input can be split

The Input number is specified as follows

Value	Description
1	Input A
2	Input B

If the Input is of type 1 (composite) then the Sub input field (with values 1,2,3) can further specify which of the three composite inputs on an Input to use for this connection. Input A would come from the 'A' labeled VGA connector.

### Port Numbering

There is a single output port, numbered 1.

## Connect Video and Audio to Port

Selects the input on the port (only one port is available in the UDM 0102).

Byte #	0	1	2	3	4	5
Byte value	1	User defined	Port	Input	Sub input	Input type

*Input Type* can have the following values:

Value	Description
0	VGA
1	Composite (CVBS)
2	S-Video
3	Component analog (YPbPr)

Return status:

Byte #	0	1	2	3	4	5
Byte value	1	Status	Port	Input selected	Sub input	Input type

## Disconnect Port

Disconnects the current input from the port specified in the command.

Byte #	0	1	2	3	4	5
Byte value	6	User defined	Port	User defined	User defined	User defined

Return status:

Byte #	0	1	2	3	4	5
Byte value	6	Status	Port	User defined	User defined	User defined

## Connect Video Input Only to Port

Selects the input on the port (only one port is available in the UDM 0102).

Byte #	0	1	2	3	4	5
Byte value	11	User defined	Port	Input	Sub input	Input type

*Input Type* can have the following values:

Value	Description
0	VGA
1	Composite (CVBS)
2	S-Video
3	Component analog (YPbPr)

Return status:

Byte #	0	1	2	3	4	5
Byte value	11	Status	Port	Input selected	Sub input	Input type

## Disconnect Video Input Only to Port

Disconnects the current input from the port specified in the command.

Byte #	0	1	2	3	4	5
Byte value	16	User defined	Port	Input	Sub input	Input type

Return status:

Byte #	0	1	2	3	4	5
Byte value	16	Status	Port	Input selected	Sub input	Input type

## Connect Audio Input to Port

Selects the audio input on the ports specified by the Port property, or if non zero, the port specified in the command.

Byte #	0	1	2	3	4	5
Byte value	11	User defined	Port	Input	Sub input	Input type

Audio Input Type can have the following values:

Value	Description
0	Analog
1	S/PDIF (digital audio)

Return status:

Byte #	0	1	2	3	4	5
Byte value	21	Status	Port	Input selected	Sub input	Input type

### Disconnect Audio from Port

Disconnects the current audio input from the Port specified by the Port property, or if non-zero, from the port specified in the command.

Byte #	0	1	2	3	4	5
Byte value	26	User defined	Port	Input	Sub input	Input type

Return status:

Byte #	0	1	2	3	4	5
Byte value	26	Status	Port	Input selected	Sub input	Input type

### Query Port

Queries the port for connection and status information. The command returns the currently connected input, and information in the flags byte about current connection status.

Byte #	0	1	2	3	4	5
Byte value	12	User defined	Port	User defined	User defined	User defined

Return status:

Byte #	0	1	2	3	4	5
Byte value	12	Status	Port	Input	User defined	Flags

The *Flags* byte contains additional information about the input selected, defined as follows:

Flag bit	Description if set	Description if clear
2	Port link disconnected	Port link connected

### Get Port or Input Name

Retrieves a string identifier from the port specified. Sub port should be specified if the port type is an Input port as input sub ports may have different names.

Byte #	0	1	2	3	4	5
Byte value	79	User defined	Port	Sub port	Port type	User defined

The *Port Type* parameter can take the following values:

Value	Description
1	Output port
2	Video input port
3	Audio input port
4	Device

Return status:

Byte #	0	1	2	3	4	5	6	7...7+length
Byte value	79	Status	Port	Sub port	Port type	User defined	Name length	Name string

### Get Receiver Info

Retrieves information about the connected receiver on a port.

Byte #	0	1	2	3	4	5
Byte value	88	User defined	Port	User defined	User defined	User defined

Return status:

Byte #	0	1	2	3	4...n
Byte value	88	Status	Port	User defined	Parameter block

The *Parameter Block* contains at least the following - it may contain extra information, but if not defined here it can be ignored:

Byte offset (from 4)	Receiver information
0	Receiver type
1	Flags
2	Receiver version number - major
3	Receiver version number - minor

### Send Remote Command

Sends a command to the Rx (which is normally sent on to the screen or other device connected to the Rx). *Remote command* specifies the type of action taken, with optional parameters.

Byte #	0	1	2	3	4	5...n
Byte value	87	User defined	Port	User defined	Remote command	Remote parameters

Return status:

Byte #	0	1	2	3	4	5
Byte value	87	Status	Port	User defined	Remote device command	Remote device parameter

All these commands start with the header above (bytes 0-3), but use the remote device command value to perform separate functions as described below:

### Set Remote Control Receiver Protocol

Sets the control protocol being used by the remote control handset.

Byte #	4	5	6
Byte value	1	Remote control protocol	Device address for remote

The following table provides a list of supported handset protocols and their default addresses:

IR protocol	Description	Default handset address
3	UDM-RC02	110
4	Sky	1
5	Sky+	1
6	Tivo	5
7	DirectTV	1
8	AMX Endeleo RC03	58

## Send Control Operation To Connected Device

Sends a control command out through the IR blaster or serial port connected to the remote receiver. This is translated in the receiver to the appropriate control protocol previously selected. The receiver must already be loaded with the right driver for the codes used, and the device being controlled must allow the necessary actions.

Byte #	4	5
Byte value	2	IR code

Device control codes are defined as follows:

IR code	Description	IR code	Description
0-9	Keys 0 to 9	57	Info
10	Channel up	58	Help
11	Channel down	59	Teletext
12	Power off	60	Services
13	Mute	61	Box office
14	Volume up	62	Interactive
15	Volume down	63	TV guide
16	Program up	64	Red
17	Program down	65	Green
18	10+ key (for two digit channel entry)	66	Blue
20	Channel restore (back)	67	Yellow
21	Power up	70	Play
22	Unmute	71	Pause
30	A/V select 1	72	Stop
31	A/V select 2	73	Record
32	A/V select 3	74	Fast forward
40	Device select (DVD/VCR)	75	Rewind
50	Menu	90	Custom 1... through to
51	Select Function	99	Custom 10
52	Cursor up	128	Select composite input
53	Cursor down	136	Select VGA input
54	Cursor left	144	Select S-Video input
55	Cursor right	152	Select Component (YPbPr) input
56	Esc		

## Send Non-Specific Serial Command

Sends a serial string to the serial output (if present) on the remote receiver. This allows direct control of the serial output (independent of the device protocol loaded in the receiver).

Byte #	4	5...n
Byte value	3	Serial string for onward transmission

It is preferred that serial control be accomplished by loading the appropriate driver file into a receiver and using the generic control commands (this allows the same command to be issued to a variety of different devices, for example), but this command can be used for more direct control if required.

## Set Serial Parameters

Sets serial port parameters for use with direct serial string transmission.

Byte #	4	5	6	7
Byte value	10	Serial parameter code	User defined	User defined

The serial parameter code is defined as follows:

Serial parameter code	Description
112	1200 baud
113	2400 baud
114	4800 baud
115	9600 baud
116	1200 baud odd parity
117	2400 baud odd parity
118	4800 baud odd parity
119	9600 baud odd parity
120	1200 baud even parity
121	2400 baud even parity
122	4800 baud even parity
123	9600 baud even parity
128	19200 baud
129	38400 baud
130	57600 baud
131	115200 baud
132	19200 baud odd parity
133	38400 baud odd parity
134	57600 baud odd parity
135	115200 baud odd parity
136	19200 baud even parity
137	38400 baud even parity
138	57600 baud even parity
139	115200 baud even parity

### Get Remote Serial Buffer

Returns the contents of the remote serial buffer. On receiving this command, the remote serial buffer is flushed and characters are acquired until the termination character is received. Once received a reply is sent as below. As a general case, this command would normally be issued before sending a remote serial command to retrieve information from the device connected to the receiver.

Byte #	0	1	2	3	4	5
Byte value	89	User defined	Port	Terminator	User defined	User defined

A typical example would be a lamp life query or similar. The command times out after 30 seconds of inactivity on the remote serial port if the terminator is not received. The Serial buffer returned in the reply includes the termination character.

**NOTE:** The communications channel between remote device and host is limited in speed - approximately 10 characters per second, so care must be taken using this command as large serial responses will take some considerable time to be retrieved.

Return status:

Byte #	0	1	2	3	4...n
Byte value	89	Status	Port	No of characters in buffer	Serial buffer

### Enable/Disable Remote Key Messages

Enables and disables remote key messages to the host. If enabled, remote control key presses entered at the RX are passed back to the host as UDP message packets for further processing if necessary.

Byte #	0	1	2	3	4	5
Byte value	93	User defined	Port	0 - disable 1 - enable	User defined	User defined

The format of the key message is as follows:

Byte #	0	1	2	3	4	5
Byte value	94	User defined	Port	Key Value	User defined	User defined

Key values are the same values as listed in section 5.12.2 (IR control codes). The UDM automatically times out this facility to reduce the possibility of sending UDP messages to a non-existent host, so this command must be renewed on a regular basis to continue to process keystrokes. The timeout is currently set to 15 minutes.

**Return status:**

Byte #	0	1	2	3
Byte value	93	Status	Port	0 - disable 1 - enable

### Set Hub Identification

Stores a string identifier in the Hub. This may be used to subsequently identify the Hub or for storage of user-defined values and information. The identification string can have a maximum length of 125 characters. Length is the length of the ID string.

Byte #	0	1	2	3...127
Byte value	67	User defined	Length	Identification string

**Return status:**

Byte #	0	1	2	3	4	5
Byte value	67	Status	0	0	0	0

### Get Hub or Port Identification and System Information

Retrieves a string identifier from the Hub, together with some predefined information. The string identifier is the same as that set in the command above, the first 128 bytes are used for predefined system information (defined below). Length is the length of the ID string if present. If port is specified (non zero), then only port information is returned (no ID string).

Byte #	0	1	2	3	4	5
Byte value	78	User defined	Port	User defined	User defined	User defined

**Return status:**

Byte #	0	1	2	3	4...127	128...Length+128
Byte value	78	Status	Port	Length	Predefined values	Identification string

**Predefined system information values:**

Byte offset (from 4)	Hub information	Port information
0	Chassis type	Port version number - major
1	Number of ports	Port version number - minor
2	Controller version number - major	Port version - revision
3	Controller version number - minor	
4	Controller version number - revision	

### Reset Controller

Resets the controller - reboots as though powered on - the second 156 (inverted 99) in packet is to guard against accidental resets.

Byte #	0	1	2	3	4	5
Byte value	99	User defined	156	User defined	User defined	User defined

**Return status:**

Byte #	0	1	2	3	4	5
Byte value	99	Status	156	User defined	User defined	User defined

## Status Values

Status replies can be either general or specific to certain commands. Status values are always returned in the byte after the returned command in the returned status packet. In general, success is indicated by a single value, failure is indicated by as specific a return value as possible:

Status value	Description
1	Command completed successfully
64	Command fail
65	Incorrect parameters
66	Incorrect port parameter
67	Incorrect input parameter
70	Session not authenticated
80	Input is disabled
81	Port is locked
82	Port is disconnected
90	Command has timed out (no response from port)



# ASCII / Hex Conversion

## Overview

Devices are typically controlled either using ascii text strings or using the HEX equivalent.

Control codes can be entered into the UDM-0102 using ASCII, HEX or a combination of both. (Where certain ASCII codes are difficult to enter (e.g. carriage return).

Char	Hex	Char	Hex	Char	Hex	Char	Hex
(nul)	00	(sp)	20	@	40	`	60
(soh)	01	!	21	A	41	a	61
(stx)	02	"	22	B	42	b	62
(etx)	03	#	23	C	43	c	63
(eot)	04	\$	24	D	44	d	64
(enq)	05	%	25	E	45	e	65
(ack)	06	&	26	F	46	f	66
(bel)	07	'	27	G	47	g	67
(bs)	08	(	28	H	48	h	68
(ht)	09	)	29	I	49	i	69
(nl)	0a	*	2a	J	4a	j	6a
(vt)	0b	+	2b	K	4b	k	6b
(np)	0c	,	2c	L	4c	l	6c
(cr)	0d	-	2d	M	4d	m	6d
(so)	0e	.	2e	N	4e	n	6e
(si)	0f	/	2f	O	4f	o	6f
(dle)	10	0	30	P	50	p	70
(dc1)	11	1	31	Q	51	q	71
(dc2)	12	2	32	R	52	r	72
(dc3)	13	3	33	S	53	s	73
(dc4)	14	4	34	T	54	t	74
(nak)	15	5	35	U	55	u	75
(syn)	16	6	36	V	56	v	76
(etb)	17	7	37	W	57	w	77
(can)	18	8	38	X	58	x	78
(em)	19	9	39	Y	59	y	79
(sub)	1a	:	3a	Z	5a	z	7a
(esc)	1b	;	3b	[	5b	{	7b
(fs)	1c	<	3c	\	5c		7c
(gs)	1d	=	3d	]	5d	}	7d
(rs)	1e	>	3e	^	5e	~	7e
(us)	1f	?	3f	_	5f	(del)	7f



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