Operation/Reference Guide

UDM-1604C

4x16 Multi-Format Distribution Hub

Universal Distribution Matrix

Last Updated: 7/15/2010

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Table of Contents

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 () 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 Hub.

Rating Label

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

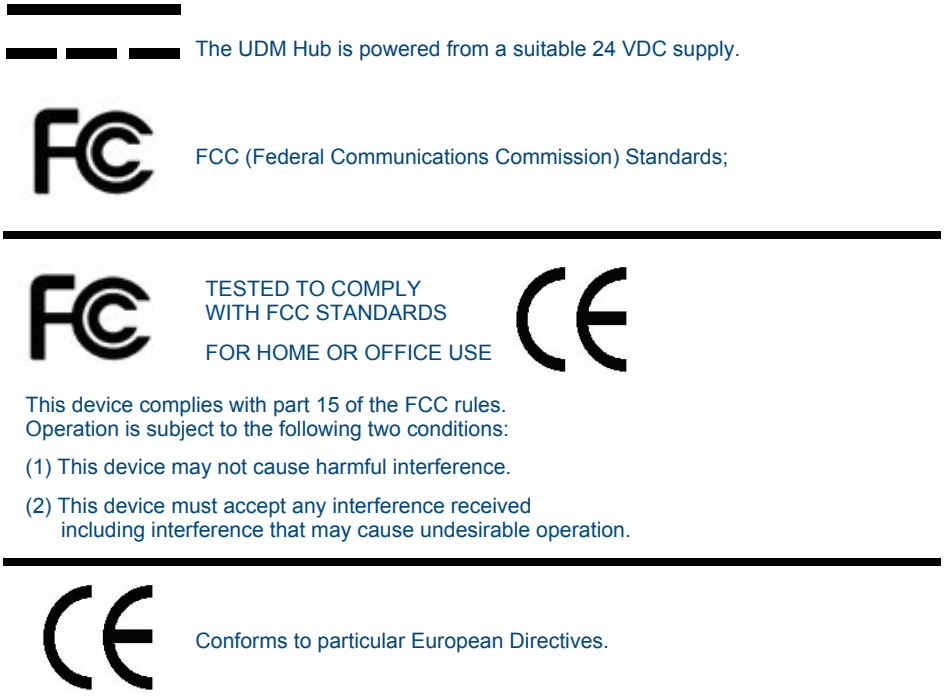


FIG. 2 Rating Label

Important Instructions

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

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 Hub.

UDM-1604C 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 criteria on this page must be observed for the installation of the UDM-1604C.

Temperature

DO NOT install or operate the UDM Hub in an area where the ambient temperature exceeds 35ºC (95ºF) or falls below 5ºC (35ºF).

Ventilation

DO NOT obstruct the rear or side ventilation grilles during operation as this will restrict the airflow and may cause the main board to overheat.

The UDM Hub is fitted with two cooling fans. These draw cool air through the right side ventilation grille and expel warm air through the grilles on the left side ventilation grilles.

Humidity

DO NOT install or operate the UDM Hub in an area in which the ambient relative humidity exceeds 85% or an area that is prone to condensation.

Water / Liquids

DO NOT install or operate the UDM Hub near water or in a location which may be prone to water **seepage**, **dripping** or **splashing**.

DO NOT place objects containing liquids on the appliance.

The hub is not waterproof.

External use

DO NOT operate the UDM Hub externally.

UDM-1604C Multi-Format Distribution Hub

Overview

The UDM-1604C 4x16 Multi-format Distribution Hub (FG-UDM-1604C) delivers any video source, including Component, RGB, VGA and S-Video to a virtually unlimited number of display devices (FIG. 3).

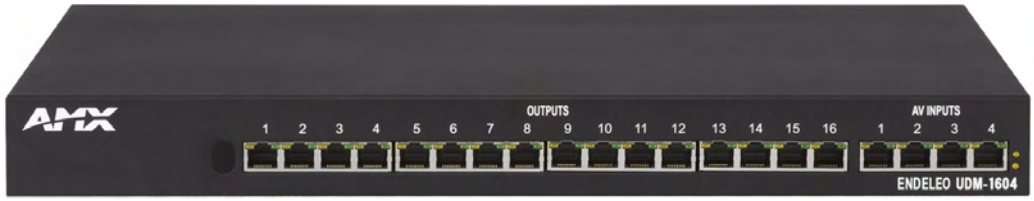


FIG. 3 UDM-1604C

The UDM-1604C supports four high-resolution input ports and 16 UDM output ports, and supports multiple methods of delivering sync information between the UDM Hub and the display device, including common mode.

The UDM-1604C 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 the display device, power on/off display devices, and permission user control to select and play video sources and media servers on demand.

The UDM-1604C offers four high-resolution input ports on the back of each unit. Additional Composite video inputs (RJ-45 located on the front) enable the connection of four interconnects from a TVM-1600 Managed TV Distribution Hub or four Composite video sources using approved Video over UTP extenders.

In total, the UDM-1604C system can distribute any combination of the following: four RGBHV sources, four Component video sources, four S-Video sources or 12 Composite video sources.

Source inputs to the UDM are industry standard VGA, Composite, Component or S-Video feed, and output is presented as an RJ45 port for connection to Cat5, 5e or 6 twisted-pair Ethernet cable.

Video inputs are connected via the HD15 Input connector on the rear of the UDM. Adapters are used to bring the different types of video source into the UDM. See the *Audio & Video Formats/Resolutions/ Distance* section on page 14 for tested and confirmed distances.

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.

Features

- 4 multi-format inputs (plus 4 CVBS inputs) x 16 outputs
- Supports multiple methods of delivering sync, including Common Mode Sync delivery
- Digital audio support
- Central device control
- Compatible with TVM-1600
- 1U rack-mounting
- Multiple Hubs can be cascaded to support higher number of outputs

Compatibility

The UDM-1604C is compatible for use with UDM-RX01 (FG-UDM-RX01) and UDM-RX02 (FG-UDM-RX02) Receivers.

Common Mode Sync delivery is supported only on the UDM-RX02.

Product Specifications

UDM-1604C Specifications	
Power Requirements:	• 90-264V AC, 50/60Hz • Max power consumption: 130W
Front Panel Components	
IR Sensor:	Infrared receive port (IRRX) for learning IR remote control functions from IR controlled devices.
Outputs:	16 RJ-45 ports for connection to Endeleo TVM hubs (via Cat5, Cat5e or Cat6).
A/V Inputs:	4 RJ-45 ports for connection from Endeleo TVM hubs (via Cat5, Cat5e or Cat6).
Rear Panel Components	
Network Port:	RJ-12 10 BaseT network port is provides network connectivity.
Serial Port:	RJ-12 port allows an administrator to control various functions from a command line prompt.
IRTX Ports:	2 Infrared Transmit (IRTX) ports allow the UDM Hub to control IR devices via IR emitters attached to the UDM. The IR cable is attached to the IR panel of the controlled device to receive IR commands issued through the software or remote control.
Input Connectors (A-D):	4 sets of Input connections for up to 4 A/V inputs with the following connectors: • Video • Audio Left • Audio Right • SPDIF
Cascade IN/OUT Ports:	These ports allow UDM Hubs to be cascaded together. • Cascade In Port (from another UDM Hub) • Cascade Out Port (to another UDM Hub)
IEC Power Connector:	Universal switch-mode power supply. • As a Class 1 appliance the Hub should be connected to a mains supply with a protective earthing connection. • The Power On/Off switch is located beside the IEC power connector. ***Note**: The rating label found to the bottom left of the hub, beneath the IEC connector, contains important information applicable to the Hub's installation environment.*
Network Interface:	10baseT
Serial Interface:	9600, 8, N, 1
Max Video Input:	• 4 x RGBHV (or) • 4 x S-Video (or) • 12 x CVBS (plus) • 4 x Endeleo TVM-1600 or CVBS

UDM-1604C Specifications	
Operating Environment:	• 35°F - 95°F (5°C - 35°C) • Max. relative humidity - 85% (non-condensing)
Dimensions (HWD):	1 3/4" x 19" x 12 1/2" (45 mm x 440 mm x 320 mm)
Weight:	8.8 lb. (4 Kg)
Certifications:	• CE/UL/FCC part 15 Class A
Included Accessories:	• IEC power cord • 19" mounting brackets • RS-232 DB-9/RJ-12 connection cable ***Note**: No A/V interface cables supplied*
Other AMX Equipment:	• HD15 to S-Video Cable (FG-UDM-SVID01) • HD15 to 3x RCA Breakout Cable (FG-HD15RCA3) • RS232 DB9/RJ12 Connection Cable (FG-RS01) • UDM-RX02 Multi-Format Receiver (FG-UDM-RX02) • UDM-RC10 IR Engineering Remote Control (FG-UDM-RC10) • IR01 IR Emitter Module (FG-IR01) • IR03 External IR Receiver Module (FG-IR03) • Solecis Distribution Amplifiers (see the Solecis Distribution Amplifiers table on page 79 for listing od compatible DAs)

Installation

Overview

The UDM-1604C occupies a single rack space in a standard 19" equipment rack. Rack mounting brackets and screws are located in the accessories box supplied with the UDM-1604C.

Exercise extreme care when lifting or moving the hub within the rack to avoid injury. It is recommended that you seek the assistance of another person when rack mounting the UDM-1604C.

Rack mounting brackets and screws are located in the accessories box supplied with the UDM-1604C.

1. Attach the rack mounting brackets to each side of the UDM-1604C using four M4 screws for each bracket (FIG. 4).

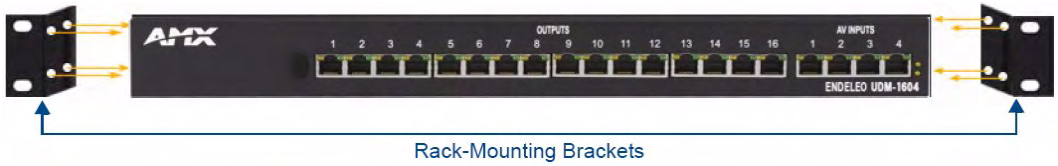


FIG. 4 Attach the mounting brackets to each side of the Hub

To prevent injury the Hub must be securely attached to the rack in accordance with the installation instructions.
ALWAYS use the special rack mount brackets supplied and high quality fixing screws to ensure the hub is installed in the rack correctly.

2. Place the UDM-1604C in the Rack and hold steady.
3. Two fixing holes are supplied on each side of the UDM-1604C. Screw the hub into the rack using the fixing holes (FIG. 5).

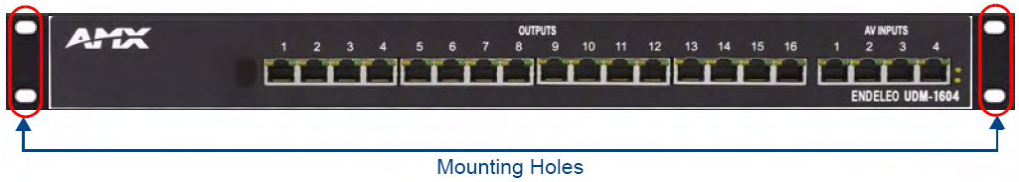


FIG. 5 Screw the hub into the rack using the fixing holes

DO NOT stand other units directly on top of the hub when it is rack mounted, as this will place excessive strain on the mounting brackets.

Ventilation

ALWAYS ensure that the rack enclosure is adequately ventilated.

Sufficient airflow must be achieved (by convection or forced-air cooling) to satisfy the ventilation requirements of all the items of equipment installed within the rack.

Wiring and Connections

UDM-1604C Front Panel Components

The components on the front panel of the UDM-1604C are described below (FIG. 6).

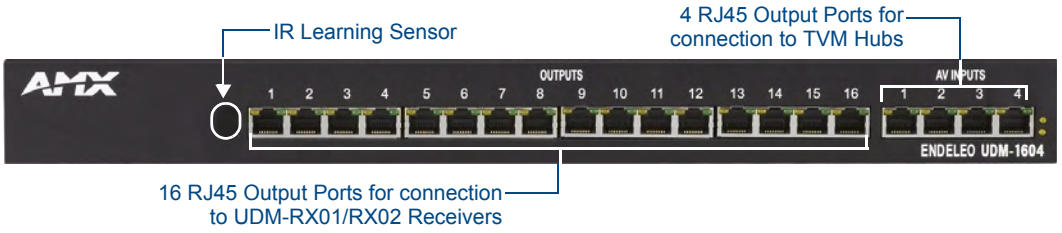


FIG. 6 UDM-1604C - Front Panel Components

IR Learning Sensor

An IR receive port is found at the front of the UDM Hub to the right hand side. This is used to learn device IR remote control functions from devices such as DVD players, VCRs etc. Common functions learned include Power on, Power off, Play, Pause, Stop, etc.

Refer to the *Configuration - Protocols Page* section on page 71 for details.

OUTPUT Ports (RJ-45)

The 16 RJ-45 ports on the front panel of the UDM (labelled "OUTPUTS") provide connectivity to UDM-RX01 or UDM-RX02 Multi-Format Receivers. This is a standard RJ-45 connector, and UDM Receivers can be connected via either Cat5, Cat5e or Cat6 cabling (FIG. 7).

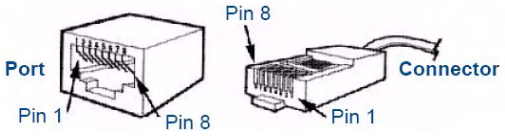


FIG. 7 RJ-45 Pinouts

UDM Port Pinouts

The following table describes the pinout configuration of the UDM port:

UDM Port Pinouts				
Pair	**Color**	**RJ45 Pin**	**Polarity**	**Endeleo Function**
1	White / Blue	5	-	Green
	Blue	4	+	
2	White / Orange	1	+	Red
	Orange	2	-	
3	White / Green	3	+	Blue
	Green	6	-	
4	White / Brown	7	+	Bi-Directional Control, Digital Audio, Phantom Power
	Brown	8	-, Gnd	

UDM Port Transmission Details

The following table provides transmission details for the UDM port:

Transmission on UDM Port					
Pair	**Pin**	**UDM (CVBS)**	**UDM (SVideo)**	**UDM (YPbPr)**	**UDM (RGB)**
Pair	**Pin**	CVBS +	Luma +	Y+	Red +
2	1	CVBS -	Luma -	Y-	Red -
2	2		Chroma +	Pr+	Blue+
3	3			Pb+	Green +
1	4			Pb-	Green -
1	5		Chroma -	Pr-	Blue -
3	6	Power, Data, Audio	Power, Data, Audio	Power, Data, Audio	Power, Data, Audio
4	7	Power, Data, Audio	Power, Data, Audio	Power, Data, Audio	Power, Data, Audio

An incorrectly terminated cable will result in the following scenarios:

Incorrectly terminated cable results					
Pair	**Composite Video**	**SVideo**	**Component Video**	**RGBHV Video**	**User Port LINK LED**
2	No Video 1	No Luma	No Y	No RED	LIT
3	No Video 3	No Chroma	No Pr	No BLUE	LIT
1	No Video 2	NONE	No Pb NONE	No GREEN NONE	LIT NONE
4					

UDM-1604C Rear Panel Components

FIG. 8 shows the components on the rear panel of the UDM-1604C:

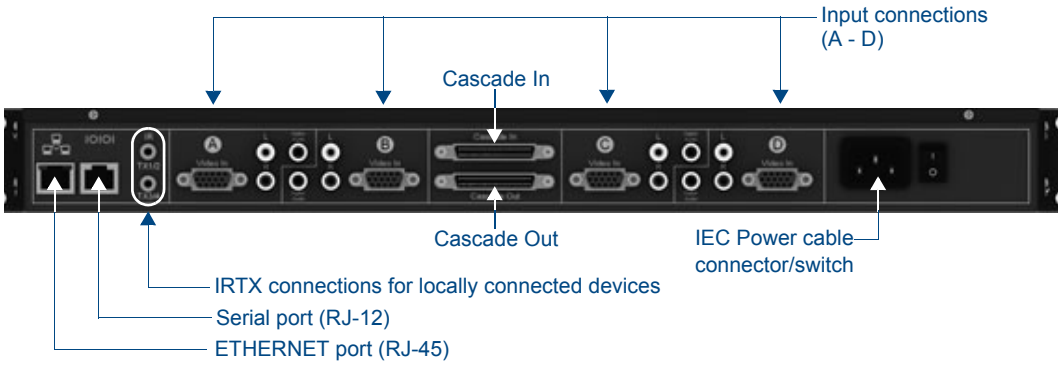


FIG. 8 UDM-1604C - rear panel components

Network Port (RJ45)

The RJ45 Network port on the rear panel of the UDM-1604C provides 10 BaseT network connectivity.

Pinout Configuration

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

RJ45 Network 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. 9 diagrams the pinouts and signals for the Network RJ45 connector and cable.

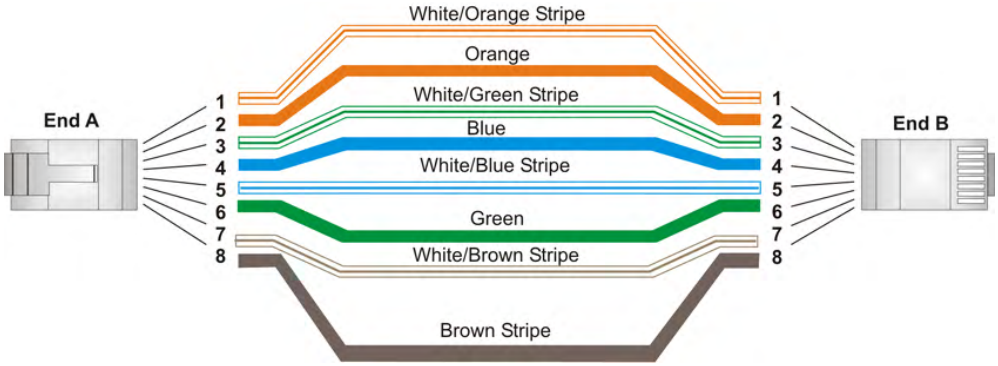


FIG. 9 RJ45 wiring diagram

NOTE

*Consult the Network Administrator for correct cabling from the UDM-1604C onto the network. For remote connectivity, 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-1604C is **192.168.0.96**.

Once the UDM-1604C is switched on, use the *Setup* option in the UDM WebConsole to configure the Hub's correct IP address (see the *Configuration - Setup Page* section on page 45).

The IP address may also be configured via the serial port (refer to the *Backend Commands* section on page 99).

Serial Port

The Serial port on the rear panel (labelled "**10101**") is available for diagnostic and troubleshooting purposes.

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

The Serial port on the UDM-1604is an RJ12 connector, and requires a DB9-to-RJ12 adapter cable (FG-RS01) to connect to a PC for Terminal control.

Serial Port - Default Communication Settings

Use hyper terminal with default serial settings to communicate with the UDM-1604C (and UDM-RX01):

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

DB9-to-RJ12 Adapter Cable Pinouts

The following table provides the pinout configuration for the DB9-to-RJ12 adapter cable:

DB9-to-RJ12 Adapter Cable Pinouts			
DB9 connector	**Function**	**Abbreviation**	**RJ12 connector**
Pin 1	Not used	NC	
Pin 2	Transmit Data	TD or TX or TXD	Pin 2
Pin 3	Receive Data	RD or RX or RXD	Pin 3
Pin 4	Data Set Ready	DSR	Pin 1
Pin 5	Signal Ground	GND	Pin 4, 5
Pin 6	Data Terminal Ready	DTR	Pin 6
Pin 7	Not Used	NC	
Pin 8	Not Used	NC	
Pin 9	Not Used	NC	

IRTX (IR Transmit) Ports

Two 3.5mm stereo IRTX connections issue IR commands from the UDM Hub to the controlled device(s):

- TX1 – Transmits IR commands to Device 1
- TX2 – Transmits IR commands to Device 2

A maximum of two IR devices (such as DVD players or VCRs) can be connected to the UDM via the IRTX ports on the rear panel (FIG. 10), and controlled via the WebConsole or remote control.

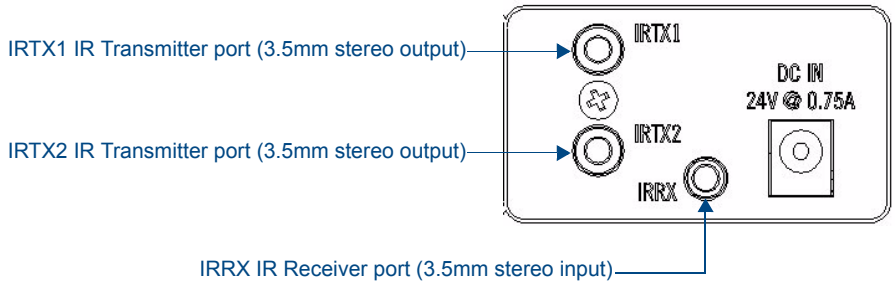


FIG. 10 IR Transmit/Receive Ports

NOTE

IR devices controlled via the IRTX ports are typically installed within the same equipment rack as the UDM.

Connecting an IR Device to an IRTX Port

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

FIG. 11 IR01 Endeleo IR Emitter Module

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 appropriate **IRTX** port on the UDM-0102.
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-0102 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 74 on how to learn a device's IR commands.

A/V Source Input Connectors

There are four sets of input connectors to the rear panel of the UDM-1604C, labelled A, B, C and D (FIG. 12).

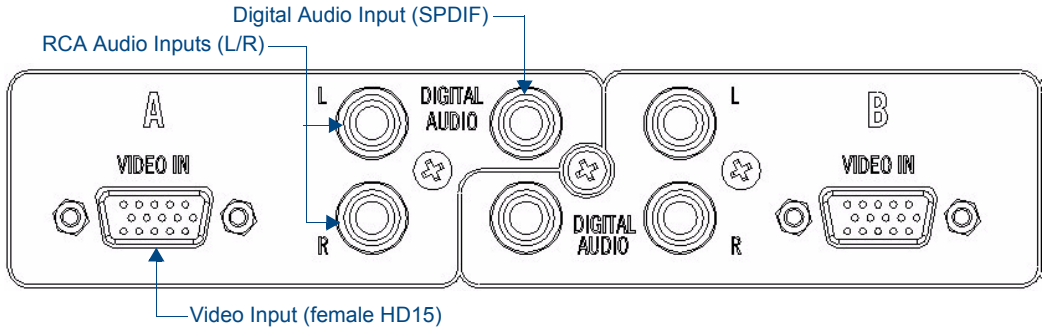


FIG. 12 A/V Source Input connectors (A and B shown)

Audio & Video Formats/Resolutions/Distance

The following table provides recommended maximum distances for cable runs, based on video class type at various resolutions:

Audio & Video Formats/Resolutions/Distance				
Class	**Format**	**Name**	**UDM-RX01**	**UDM-RX02**
Composite	720x480	NTSC	300 m / 1000’	300 m / 1000’
	720x576	PAL	300 m / 1000’	300 m / 1000’
Component	720x480	480p	300 m / 1000’	300 m / 1000’
	720x576	576p	300 m / 1000’	300 m / 1000’
	1280x720	720p	200 m / 650’	300 m / 1000’
	1920x1080	1080i	150 m / 500’	300 m / 1000’
	1920x1080	1080p	120 m / 400’	300 m / 1000’
VGA	640x480	VGA	200 m / 650’	300 m / 1000’ *
	800x600	SVGA	200 m / 650’	300 m / 1000’ *
	1024x768	XGA	200 m / 650’	300 m / 1000’ *
	1280x1024	SXGA	150 m / 500’	300 m / 1000’ *
	1600x1200	UXGA	120 m / 400’	300 m / 1000’ *
	** When using VGA modes **with audio enabled**, the maximum cable distance is approximately 200 m / 650’ (UDM-RX02).*			

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:

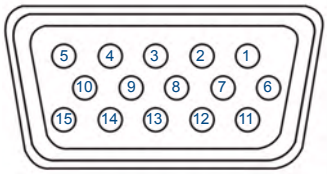
- **Cable Distance**: Naturally, long distances cable runs (in excess of 300 meters/1000 feet) are always subject to resistance and capacitance losses which can negatively impact the quality of the image.
- **Skew**: "Skew" represents the slight delay that results from the variation in wiring lengths 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.

UDM Hubs allow you to compensate brightness, sharpness and skew delay via options in the *Status* page of the UDM's built-in WebConsole (see the *Video Compensation* section on page 29).

VIDEO IN Connectors (HD15)

FIG. 13 provides the pin layout for the VIDEO IN HD15 Connectors:



HD15 Pinouts

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

FIG. 13 VIDEO IN HD15 Connector

Connecting a VGA Video Input

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. For example, connect to the Video In connection on Input A of the Hub.
3. Connect any audio to the analog (RCA) audio connectors or digital (SPDIF) connector.

NOTE

Ensure the UDM Hub port the RX01/RX02 is attached to is configured correctly within the Hub's configuration software. Also ensure the correct Audio Type (Analog L/R, S/PDIF, or None) is selected for the relevant input. Refer to the Configuration - Inputs Page section on page 49 *for details.*

Connecting a Composite Video Input

1. Connect the UDM-HD15RCA3 Breakout Cable (FG-HD15RCA3, 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.
3. Connect any audio to the analog (RCA) audio connectors or digital (SPDIF) connector.

Connecting a Component Video Input

1. Connect the UDM-HD15RCA3 Breakout Cable (FG-HD15RCA3, 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.
3. Connect any audio to the analog (RCA) audio connectors or digital (SPDIF) connector.

Connecting an S-Video Input

1. Connect the UDM-SVID01 HD15 to SVideo cable (FG-UDM-SVID01, not included) to the video source's S-Video connection.
2. Attach the other end of the cable to the appropriate VIDEO IN connection (A or B) on the UDM.
3. Connect any audio to the analog (RCA) audio connectors or digital (SPDIF) connector.

Cascade IN/OUT Ports

The Cascade IN and Cascade Out ports allow UDM Hubs to be chained together to increase the number of inputs which can be delivered to the end points (FIG. 14). This is known as "cascading" the hubs.

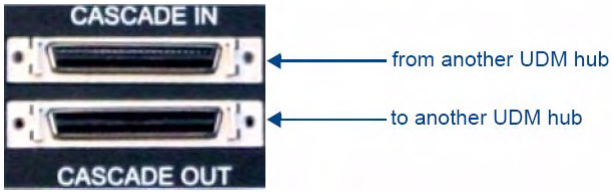


FIG. 14 Cascade IN/OUT Ports

- The Cascade In and Cascade Out ports are used to cascade two UDM hubs.
- A UDM-EXP-01 cascade cable (optional) is required to connect the UDM hubs together.

Refer to the *Cascading Hubs* section on page 79 for details on configuring cascaded Hubs.

IEC Power Connector

The UDM-1604C uses a universal switch-mode power supply, which operates from 90-264V AC, 50/60Hz, with a power consumption of 130W fully loaded.

- The rating label found to the bottom left of the hub, beneath the IEC connector, contains important information applicable to the Hub's installation environment.
- The Power On/Off switch is located beside the IEC power connector.

As a Class 1 appliance the UDM-1604C should be connected to a mains supply with a protective earthing connection.

Powering the UDM-1604C Hub On

1. Ensure a standard PC mains lead has been connected to the 3-pin power connection, and then connected to a mains power source.
2. Flip the power switch down to its On (|) position.

Powering the UDM-1604C Hub Off

Where a mains plug (or appliance coupler) is used in the event of a fault, the hub can be disconnected from the mains by removing the lead from the IEC inlet or from the mains socket.
It is important that the hub is installed in such a way that this method remains readily operable.
The user should have easy access to either the IEC inlet or the mains socket in the event of a fault.

To turn the UDM-1604C off, flip the Power switch to it's Off (0) position.

Wiring and Connections - UDM Receivers

Overview

UDM Receivers include the UDM-RX01 and UDM-RX02. Each Receiver is described in the following sections.

UDM-RX01

Installed at the display device, the UDM-RX01 (FG-UDM-RX01) converts the signal received from a UDM Multi-Format Distribution Hub to standard A/V signals (FIG. 15).

FIG. 15 UDM-RX01

With intelligent receiver technology, each UDM-RX01 is powered directly from the UDM Multi-Format Distribution Hub. As the hub is switched from one video/audio source to another, the receiver detects a change in signal and automatically switches the output device to its new video format.

UDM Hub Compatibility

The UDM-RX01 is compatible for use with the following UDM Hubs:

- UDM-0102 (FG-UDM-0102)
- UDM-0404 (FG-UDM-0404)
- UDM-1604C (FG-UDM-1604C)
- UDM-1604 (FG-UDM-1604)

UDM-RX01 Product Specifications

UDM-RX01 Specifications	
Power Requirements:	24VDC @ .75A ***Note**: The UDM-RX01 is remotely powered by the UDM Multi-Format Distribution Hub (see Powering on the UDM-RX02).*
Rear Panel Connectors:	
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:	Enables an administrator to control the various functions to the UDM-RX01 from a command line prompt and terminal connection. • Requires a DB9-to-RJ12 adapter cable (FG-RS01) to connect to a PC. • 9600, 8 bit, No Parity, 1 Stop Bit
IR Rx Port:	3.5mm stereo input port, for connection of an IR receiver to allow setup of the UDM-RX01, local compensation controls, and remote control of centrally located IR devices.

UDM-RX01 Specifications (Cont.)	
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:	• Black RCA female connector - Digital audio • White RCA female connector - Analog audio Left • Red RCA female connector - Analog audio Right
Video Connectors:	• Yellow RCA female connector - CVBS (supports composite video) • S-Video - S-video female connector • VGA - HD15 female connector (supports VGA video) • Green RCA female connector - Component output: Y • Blue RCA female connector - Component output: Pb • Red RCA female connector - Component output: Pr
Operating Environment:	• 35°F - 95°F (5°C - 35°C) • Max. relative humidity - 85% (non-condensing)
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:	• CE • FCC part 15 Class A
Other AMX Equipment:	• RS232 DB9/RJ12 Connection Cable (FG-RS01) • UDM-RC02 Multi-Format IR Remote Control (FG-UDM-RC02) • IR01 IR Emitter Module (FG-IR01) • IR03 External IR Receiver Module (FG-IR03) • UDM-PS 24VDC, 750mA Power Supply (FG-UDM-PS)

UDM-RX02

With all the same features of the UDM-RX01, the UDM-RX02 adds support for “Common” mode sync, as well as remote power for long cable distance runs. (FIG. 16).

FIG. 16 UDM-RX02

UDM-RX02 - UDM Hub Compatibility

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

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

UDM-RX02 Product Specifications

UDM-RX02 Specifications	
Power Requirements:	24VDC @ .75A ***Note**: In most cases the UDM-RX02 is remotely powered by the UDM Multi-Format Distribution Hub (see Powering on the UDM-RX02).*
Rear Panel Connectors:	
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:	Enables an administrator 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. • 9600, 8 bit, No Parity, 1 Stop Bit
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:	• Black RCA female connector - Digital audio • White RCA female connector - Analog audio Left • Red RCA female connector - Analog audio Right
Video Connectors:	• Yellow RCA female connector - CVBS (supports composite video) • S-Video - S-video female connector • VGA - HD15 female connector (supports VGA video) • Green RCA female connector - Component output: Y • Blue RCA female connector - Component output: Pb • Red RCA female connector - Component output: Pr
Operating Environment:	• 35°F - 95°F (5°C - 35°C) • Max. relative humidity - 85% (non-condensing)
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:	• CE • FCC part 15 Class A
Other AMX Equipment:	• RS232 DB9/RJ12 Connection Cable (FG-RS01) • UDM-RC02 Multi-Format IR Remote Control (FG-UDM-RC02) • IR01 IR Emitter Module (FG-IR01) • IR03 External IR Receiver Module (FG-IR03) • UDM-PS 24VDC, 750mA Power Supply (FG-UDM-PS)

UDM Receivers - Configuration

UDM Receivers are configured via the UDM Hub's WebConsole. Refer to the *Configuration* section on page 25 for details.

UDM Receivers - Rear Panel Components

All of the connectors and ports are located on the rear panel (FIG. 17):

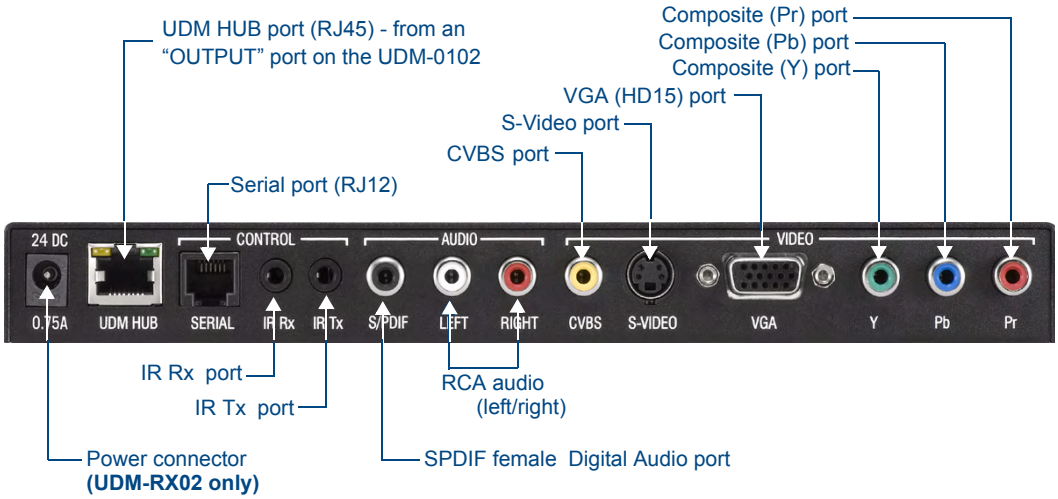


FIG. 17 UDM Receivers - rear panel components (UDM-RX02 shown)

UDM Hub Port (RJ45)

The UDM-RX01/RX02 connects to the network through a connection to a UDM Hub.

Serial Port

The Serial port is available for diagnostic and troubleshooting purposes.

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

IR Receiver (IR Rx) Port

The **IR Rx** port is used to enable user control and the remote compensation of the video link to the UDM Receiver, using the FG-UDM-RC10 and the FG-IR03.

Refer to the *Creating and Learning an IR Protocol* section on page 74 for information on learning a device's IR commands.

IR Transmit (IR Tx) Port

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

IR devices controlled via the IRTX ports are typically installed within the same equipment rack as the UDM Hub and Receiver.

Connecting an IR Device to the IR Tx Port

1. Connect an IR01 Endeleo IR Emitter Module (FG-IR01) to the IR Tx port on the UDM Receiver.

Ensure the position of the device corresponds to the position assigned in the Devices option of the UDM- Hub's WebConsole.

2. Run the other end of the IR Emitter cable to the device's IR sensor, and attach the IR Emitter to the device's sensor by removing the cover on the reverse side of the IR Emitter.

IR commands for each device on the system have to be learned by the UDM Hub in order to function properly. Refer to the *Creating and Learning an IR Protocol* section on page 74 for information on learning a device's IR commands.

AUDIO Connectors

UDM Receivers provide standard Audio RCA output connectors for S/PDIF for digital audio, and LEFT/RIGHT for analog audio output (see FIG. 17 on page 20).

VIDEO Connectors

VGA Input at Display Device

1. Attach one end of the Endeleo VGA to VGA cable to the **VGA** connector on the UDM Receiver.
2. Run the other end to the VGA connector on the display device. Connect firmly.
3. If appropriate connect audio to the audio connectors on the UDM Receiver.

Ensure Input A is configured as a "VGA Input" and named appropriately within the "Inputs" section of the Hub's Configuration software. Also ensure the correct Audio Type (Analog L/R or S/PDIF) is selected for the relevant input.

Composite Input at Display Device

1. Attach the composite cable (normally yellow) to the **CVBS** connector on the UDM Receiver.
2. Run the other end of the composite cable to the Composite connector (normally yellow) on the display device. Connect firmly.
3. If appropriate connect audio to the audio connectors on the UDM Receiver.

SVideo Input at Display Device

1. Attach the SVideo cable to the 4-pin **S Video** connector on the UDM Receiver.
2. Run the other end of the SVideo cable to the SVideo connector on the display device. Connect firmly.
3. If appropriate connect audio to the audio connectors on the UDM Receiver.

Component Input at Display Device

1. Attach the Component cables (normally green, blue and red) to the **Y** (green), **Pb** (blue) and **Pr** (red) connectors on the UDM Receiver.
2. Run the other end of the Component cable to the Component connectors (normally green, blue and red) on the display device. Connect firmly.
3. If appropriate connect audio to the audio connectors on the UDM Receiver.

Audio & Video Formats/Resolutions/Distance

Refer to the *Audio & Video Formats/Resolutions/Distance* section on page 14.

Video Compensation

Video at the Receive end can be compensated using three main methods;

- Using the UDM Hub's WebConsole.
- Using the UDM-RC02 Multi-Format IR Remote Control.
- Using a hyper terminal session via the serial connector on the UDM Receiver (especially effective setup method when using long runs).

Connecting an External IR Receiver Module

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

Additionally, if the UDM Receiver is to be compensated via a remote control, then an IR Receiver Module is also needed.

Connecting the UDM Receiver to the UDM Hub

The RJ45 port on the front panel of the UDM Hub labelled "UDM" supports one UDM Receiver. The UDM Receiver is then be connected to a display device.

1. Connect a standard Cat5/6 Ethernet cable to the RJ45 port labelled **UDM** on the front panel of the UDM Hub.
2. Connect the other end of the Ethernet cable to the RJ45 port labelled **UDM Hub** on the rear panel of the UDM Receiver.

Ensure the port the UDM-RX01/RX02 is attached to is configured correctly within the Status option of the WebConsole (for example, if a UDM Receiver 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-RX01/RX02) when the UDM Hub is switched on:

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

While connected receivers may be powered through the UDM Hub, using separate power sources for each receiver is highly recommended, especially with receivers connected to the 15th and 16th ports.

Powering on the UDM-RX02

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

The UDM-RX02 may be powered by its hub device through a standard CAT5 cable, but it may also be powered through an optional 24 VDC power supply (FG-UDM-PS) intended to augment power for very long cable runs.

To connect the UDM Receiver to the optional power supply, insert the barrel connector of the power supply into the power connector on the UDM Receiver (see FIG. 17 on page 20).

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 optional power supply will not power down the UDM-RX02 if its Ethernet connection to the UDM Hub is intact.

System Overview

FIG. 18 provides a basic system diagram representing a UDM Hub, UDM Receiver, and connected devices:

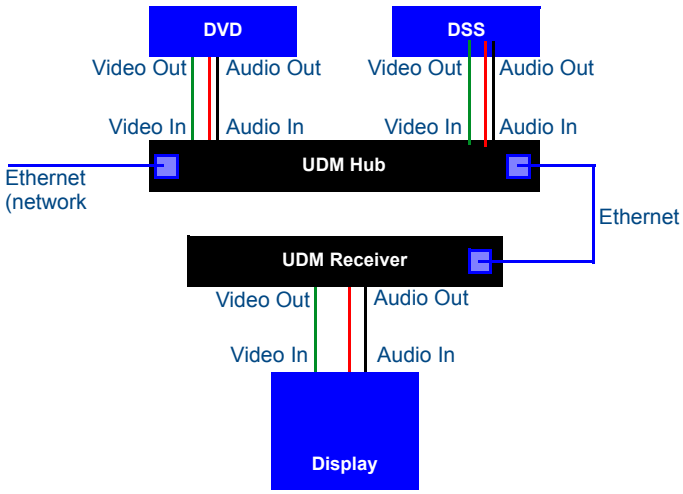


FIG. 18 UDM System Diagram

Configuration

WebConsole Overview

Each UDM-1604C Hub can be configured for the correct network environment. It is also possible to configure each Hub for the correct date and time. Configuration options are available via the UDM's built-in WebConsole, as described in this section.

The UDM-RX02 Receiver connected to the UDM-1604C is also configured via the 1604's WebConsole.

NOTE

This section describes the pages that comprise the UDM-1604C'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 45 *for details.*

Connecting to the UDM-1604C

NOTE

Use the included Ethernet Crossover cable for initial setup.

1. The default IP address of the UDM-1604C is **192.168.0.96**.
2. Enter the IP address into the address field within a browser window.
3. To connect to the UDM-1604C, a password is required.
   - The *username* should be left blank.
   - The *password* is **admin** (case-sensitive).
4. On initial connection, the *Status* page is displayed (FIG. 19) .

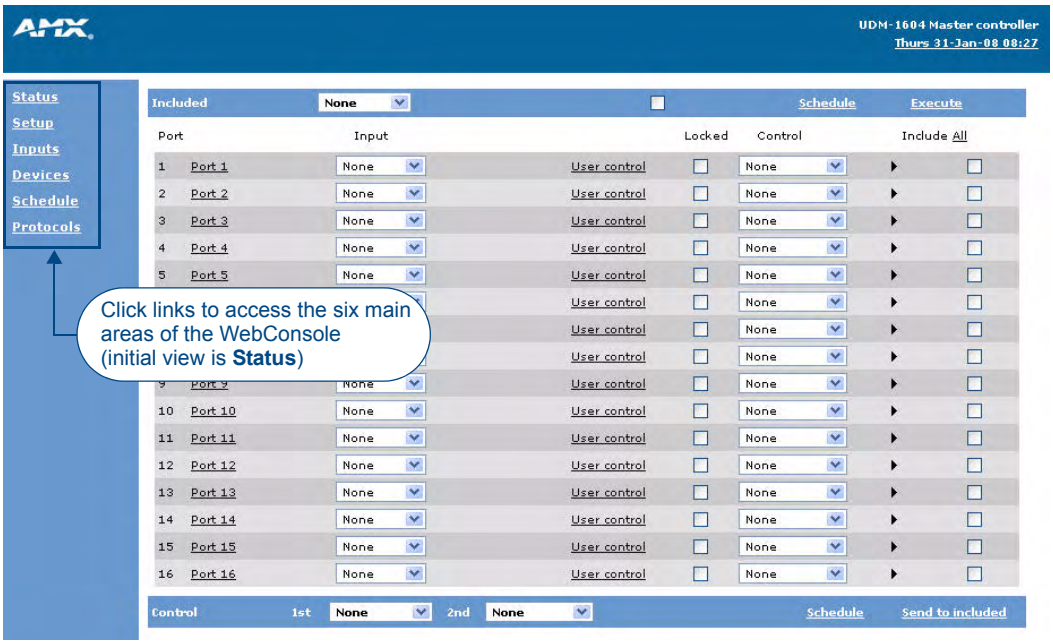


FIG. 19 Status page (Initial View)

After setup you can change TCP/IP address and connect the UDM-1604C 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.

Configuration - Status Page

Overview

The *Status* page is the initial view when the UDM-1604C'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 (FIG. 20).

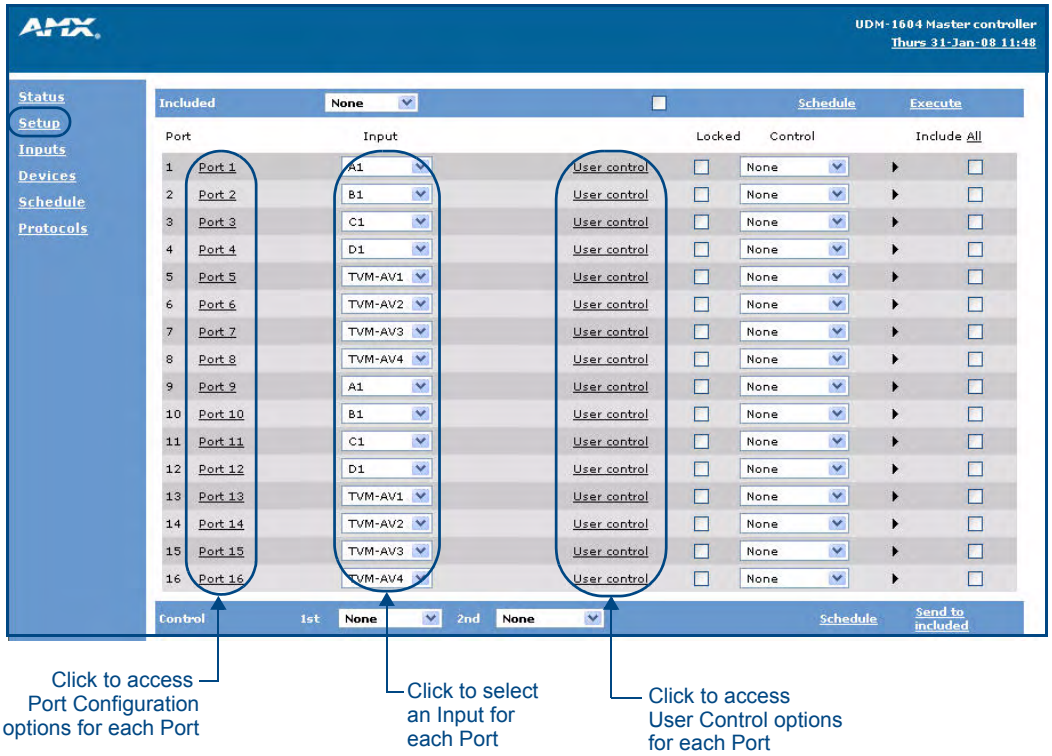


FIG. 20 Main Status page

All of the system control is handled via options in the Status page. From this page it is possible to configure each Port:

- Specify which Input is displayed on each output Port
- Adjust video settings to compensate for cable distance
- Send device control messages to display devices
- Schedule events

Port Configuration Options

Click on any of the Port (1-16) links on the *Status* page (see FIG. 20) to access the Port Configuration options for the selected Port (FIG. 21):

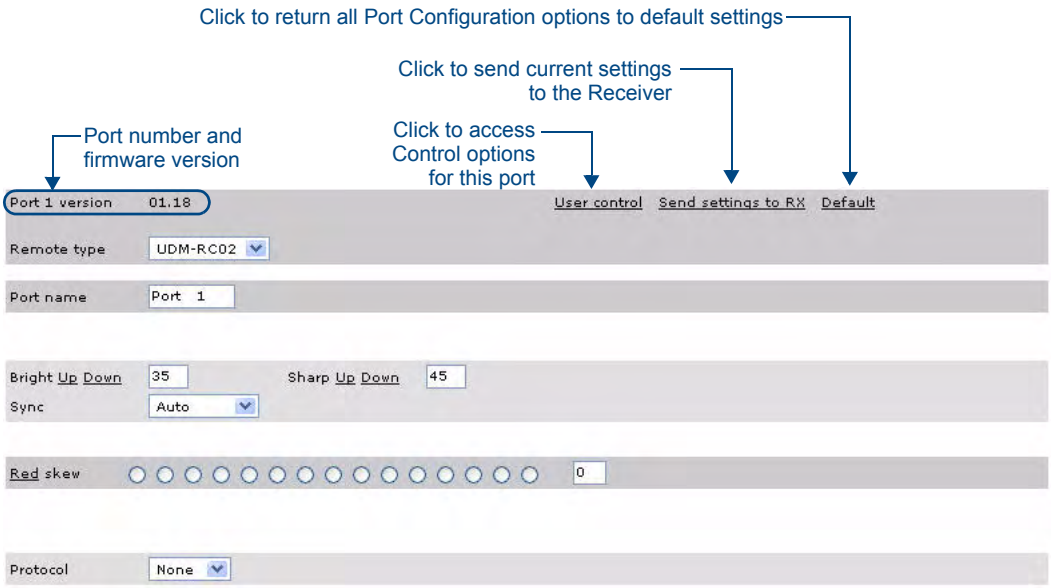


FIG. 21 Port Configuration Options

NOTE

The video compensation options shown in FIG. 21 are only presented when a Receiver is connected to the selected port.

The Port Configuration Options include:

Port Configuration Options	
Port Number and Firmware version:	Displays the currently selected Port (1-16), and the current firmware version.
User Control:	Click to access the User Control options for this Port, to allow Administrators to issue commands from the UDM WebConsole. See the *User Control* section on page 36 for details.
Send Settings To RX:	Click to send the current settings to the UDM Receiver connected to this Port.
Default:	Click to return all Port Configuration options for this Port to their default settings.
Remote Type:	Click to select the type of remote controller to be used for Passthrough control for this Port (if applicable). See the *Passthrough Mode (Inputs A-D, TVM Inputs 1-4)* section on page 40 for details.
Port Name:	The current name for this Port. Click and type in this text field to rename this Port. See the *Renaming Output Ports* section on page 29 for details.
Bright Up/Down	Once any skew has been eliminated the video should be adjusted for brightness using a grey scale or equivalent test card.
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.
Sync:	Click to select a sync mode for this port. Options include: *Common*, *Auto*, *On Green*, *Negative and Positive*). By default "Common" sync is selected - in most situations the sync mode should not be changed unless there are sync issue with a particular display device.

Port Configuration Options (Cont.)	
Red/Green/Blue skew:	Use this set of radio buttons to manually add skew delay to any of the video colors. See the *Basic Video Compensation* section on page 29 for details.
Protocol:	Select a control protocol to be used for this Port. See the *Configuration - Protocols Page* section on page 71 for details.

Renaming Output Ports

1. Click on the relevant Port hyperlink on the *Status* page (see FIG. 20 on page 27) to invoke the *Port Configuration* options for the selected Port (see FIG. 21 on page 28).
2. Type directly into the **Name** text field to rename the port.

Video Compensation

Options within the Port Configuration page (see FIG. 21 on page 28) allow you to compensate (tune) outgoing video signals for optimum picture quality.

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.

Basic Video Compensation

1. On the *Status* page. click on a *Port* hyperlink to access the Port Configuration options (see FIG. 21 on page 28).
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. 22).

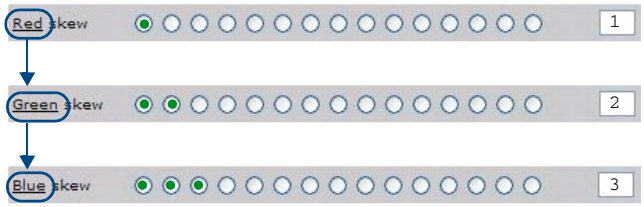


FIG. 22 Skew controls

- The skew delay cycles through red, green and blue.
- Each radio button is equivalent to **2ns** delay.

Advanced Video Compensation

To enable advanced video compensation options, click on the *Enable advanced options* checkbox, in the *Setup* page (FIG. 23).

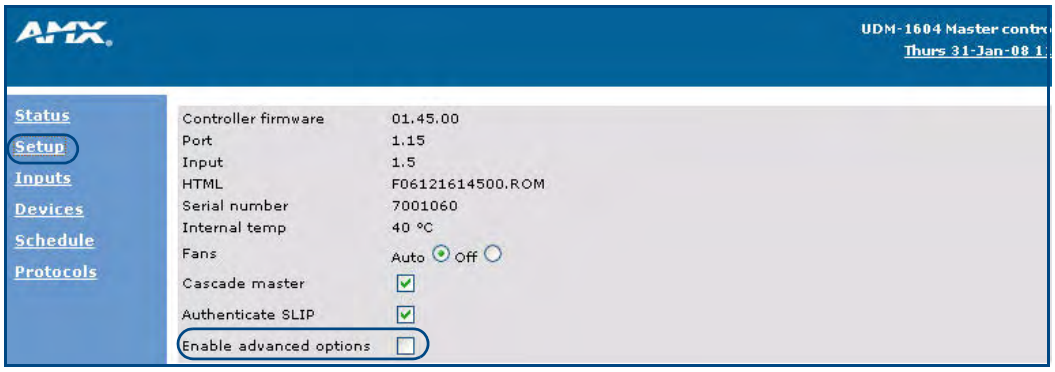


FIG. 23 Setup Page - Enable advanced options checkbox

1. In the *Status* page, click on a Port link to access the Port Configuration options for the selected Port (see FIG. 21 on page 28).
2. With the *Enable advanced options* checkbox selected in the *Setup* page, the Port Configuration options include the additional *Cable Distance* field (FIG. 24):

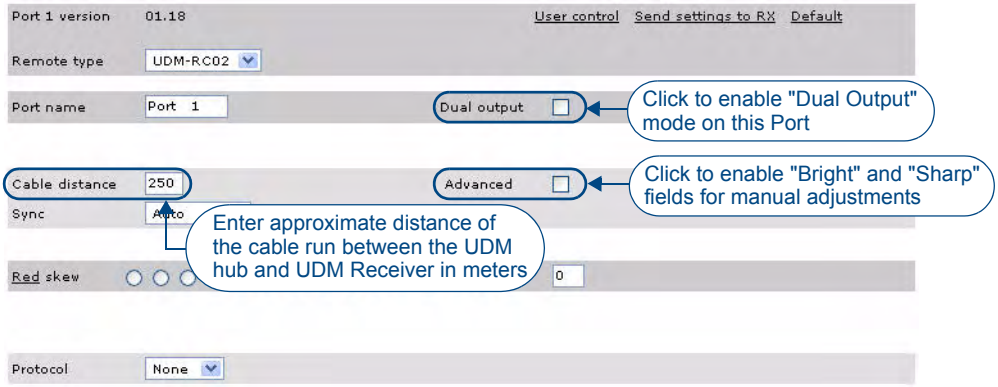


FIG. 24 Port Configuration options - with "Enable advanced options" selected in the *Setup* page

3. In the *Cable Distance* field, enter the approximate distance of the cable run from the UDM-1604C to the UDM Receiver (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 14*).*

4. To make manual adjustments to Brightness and Sharpness, click on the *Advanced* checkbox (see FIG. 24) to enable the *Bright* and *Sharp* fields (FIG. 25):

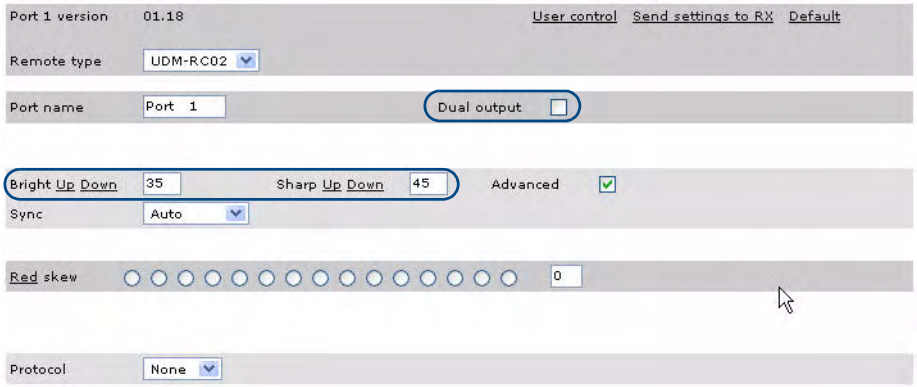


FIG. 25 Port Configuration options - "Enable advanced options" selected in the *Setup* page and "Advanced" selected

NOTE

Video compensation settings can also be configured via hyper terminal session. See the Advanced Administration section on page 93 *for details.*

Video Compensation (UDM-RX01/RX02)

Video at the Receive end can be compensated using three main methods;

- Using the WebConsole to compensate each port individually in the Status option (see the *Video Compensation* section on page 29).
- Using the Endeleo Remote Control to compensate video (see the *Compensating Video Via the UDM-RC10 Remote Control* section on page 31).
- Using a hyper terminal session via the serial connector on the UDM-RX02 (especially effective when using long runs). See the *Advanced Administration* section on page 93 for details.

Compensating Video Via the UDM-RC10 Remote Control

Video can also be compensated using the Endeleo UDM-RC10 IR Engineering Remote Control (FIG. 26).

FIG. 26 UDM-RX02 with IR03 IR Receiver Module

1. Ensure the IR03 Endeleo External IR Receiver Module (FG-IR03) is attached to the UDM-RX02 at the IRRX port (FIG. 26).
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.

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.

Dual Output Mode

With the *Enable advanced options* checkbox selected in the *Setup* page (see FIG. 23 on page 30), the Port Configuration options include the *Dual Output* checkbox (FIG. 25).

Dual Output mode permits a single input 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 Receiver, the input could be delivered to two separate display devices.

.

Ensure the correct cabling is in place at the RX to accommodate the 2 separate signals.

Selecting Inputs For Display

1. Each port on the hub has a drop down box, in which will be displayed all of the inputs (as configured in the *Inputs* page) available to this particular Port (FIG. 27).

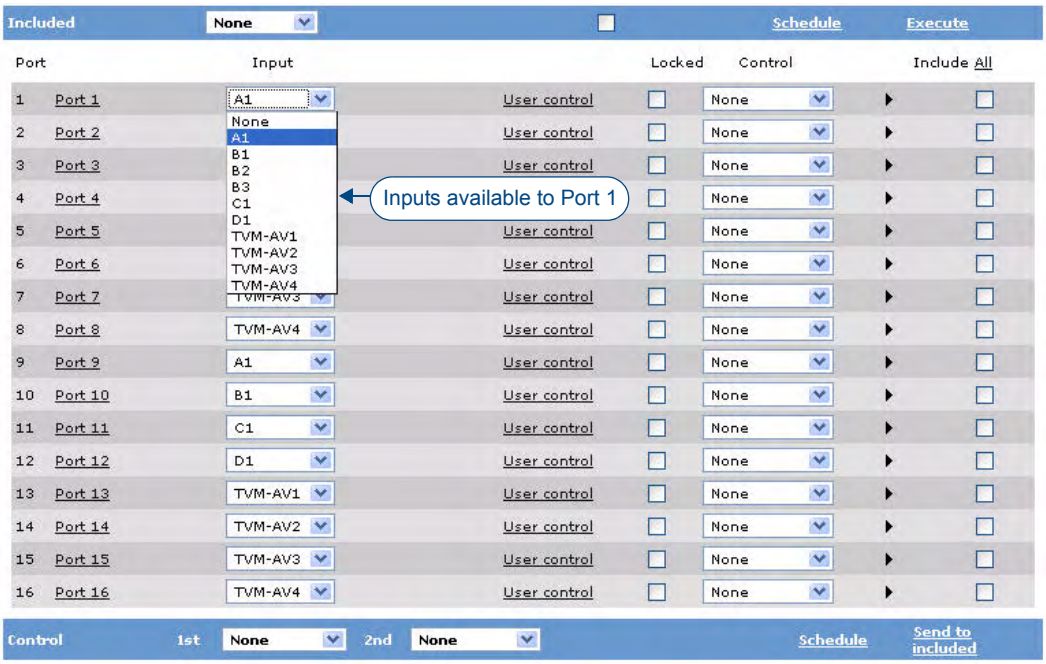


FIG. 27 Inputs available for a Port

"Inputs" mean inputs directly connected to the rear of the UDM-1604C (e.g. Inputs A-D, or devices connected to IRTx ports 1 – 4.

2. Select the appropriate **Input** which this port will display.

Selecting Multiple Inputs For Display

An input can be assigned to multiple ports to save administration time.

1. To change more than one port to display a particular input, select the desired input from the drop down list beside the *Included* option (FIG. 28).

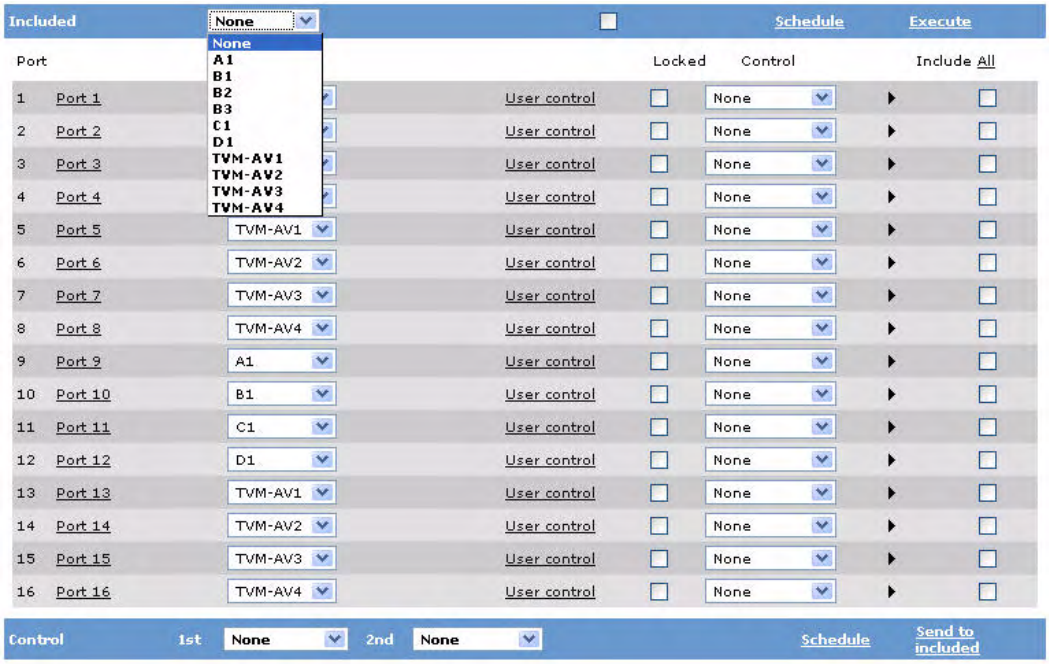


FIG. 28 Included drop-down menu

2. Select the checkboxes beneath the *Include* column beside the relevant ports which are to display the input selected in the *Included* drop-down menu. The selected ports are highlighted in blue (FIG. 29).

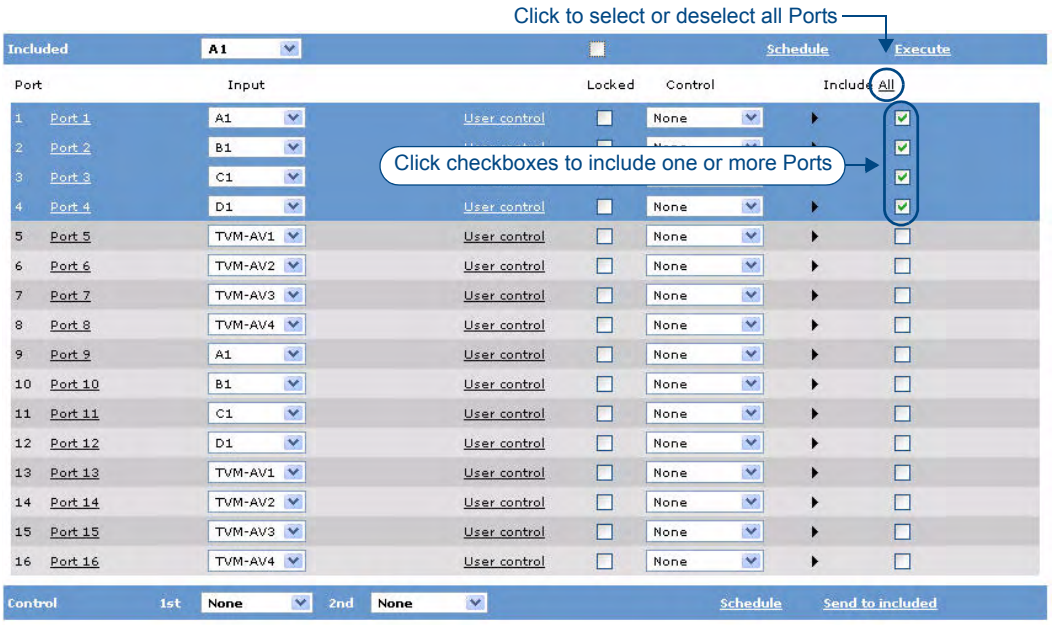


FIG. 29 Include checkboxes selected for Ports 1-4 (to include Input "A1")

NOTE

*The **Include All** link toggles all the Ports to be included on or off.*

3. Click on **Execute** to configure the ports to display the *Included* input (FIG. 30).

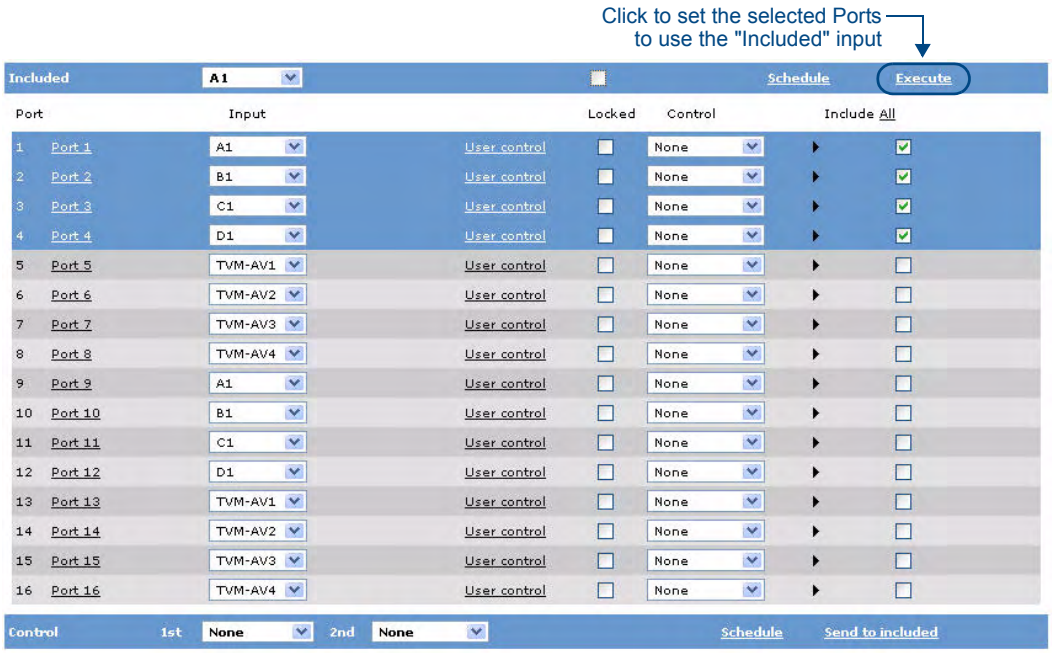


FIG. 30 Execute button

4. Once the configuration changes are complete, de-select the relevant ports by clicking their corresponding checkbox in the *Include* column. The blue highlight disappears, and the specified Ports are configured to use the Included input - see FIG. 31).

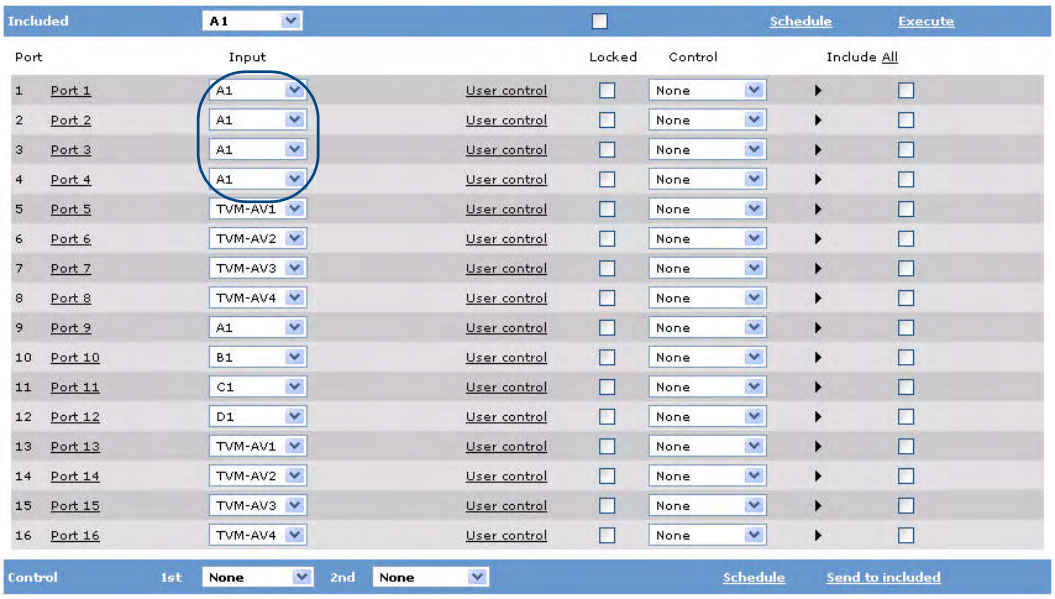


FIG. 31 Ports re-configured to use the "Included" input ("A1")

Changing an Input

The input being displayed at a Port can be changed at any time via the *Input* drop-down menu. To change multiple ports select/include those ports appropriately.

User Control

Administrators can issue commands directly from the UDM WebConsole, via the User Control options in the *Status* page (FIG. 32).

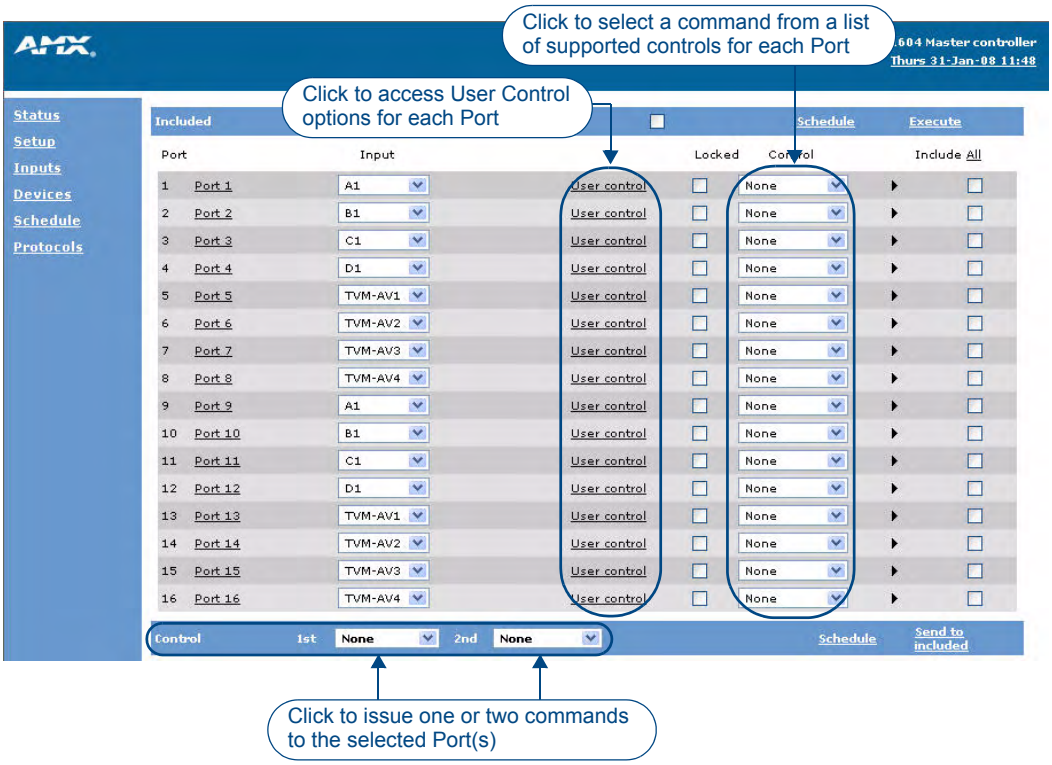


FIG. 32 User Control options

Commands can be issued in multiple ways:

- The *Control* toolbar located at the bottom of the Status page for the selected port(s).
- The *Control* drop-down options for the relevant port
- The User Control options for a selected port (click the relevant Port's link to access User Control options).

NOTE

Schedules are also used to issue commands at a pre-determined time to inputs and devices. Refer to the Configuration - Schedule Page section on page 57 *for details.*

Issuing Commands To a Selected Port

NOTE

Ensure the device's IR commands have been learned by the Hub first. Refer to the Configuration - Protocols Page section on page 71.

Control of the input is performed in a similar way to changing the input to be displayed. Commands can either be issued per Input or issued across all or groups of ports.

1. For the Port that you want to issue a command, open the *Control* drop-down menu, as shown in FIG. 33.

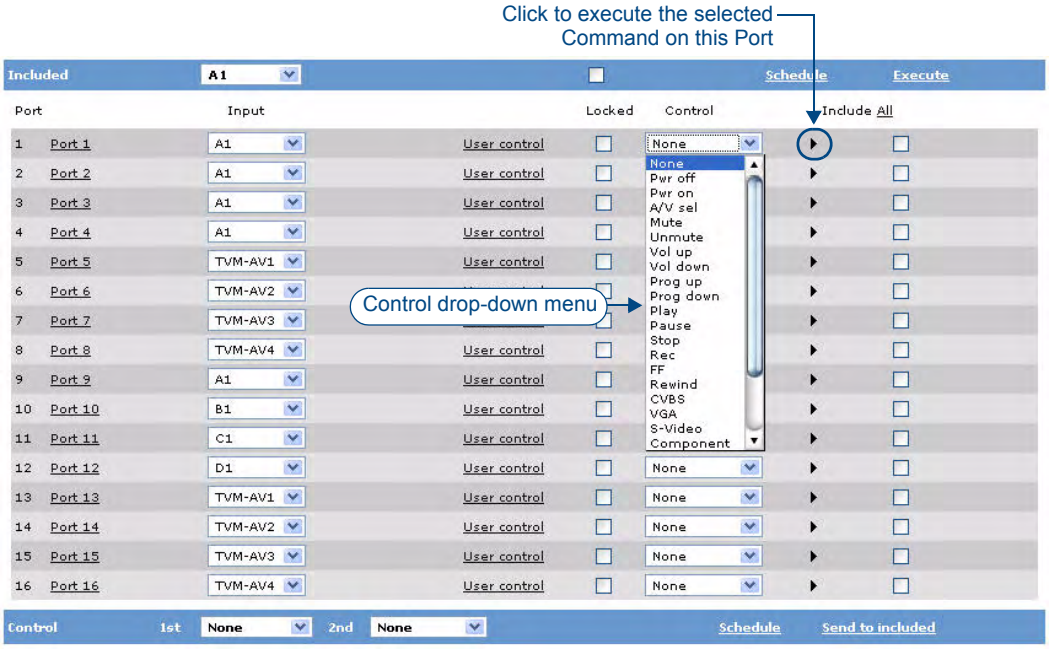


FIG. 33 Control drop-down menu

2. Select the required command from the *Control* drop-down menu.

NOTE

Where a custom control is required, type in the IR code for the command. Refer to the Creating and Learning an IR Protocol section on page 74.

3. Once selected, click on **Execute** (see FIG. 33) to execute the selected command for the relevant port.

NOTE

Ensure that an (optional) IR01 Endeleo IR Emitter Module (FG-IR01) is connected to the Receiver's IRTX port. Attach it to the Device's IR sensor before issuing a command. The IR Emitter transmits the command from the Receiver directly to the device's IR sensor.

Issuing Commands To Multiple Ports

As with the input selection it is also possible to send multiple control commands to all or selected ports. Because the control strings are stored in the UDM Receivers, a global command across multiple ports will allow any range of display devices to be controlled simultaneously.

1. Select the *Include* checkboxes for the Ports to be changed (use the *Include All* link to toggle all Ports to be included on or off). The ports are highlighted in blue.
2. Open the *Control* drop-down menu for one of the selected Ports, and select the control to be executed.
3. Click on **Execute** button (see FIG. 33 on page 37).

NOTE

It is also possible to control centrally located hardware such as DVD players, using the "Devices" page. See the Issuing Commands to Centrally Located Devices section on page 56 *for details.*

Assigning a Command to an Endeleo UDM-RC02 Remote Control

NOTE

Ensure the IR command which the UDM-RC02 Remote control will issue has been learned by the Hub first. Refer to the Protocols and IR learning section of this manual.

1. Click on a Port name to access the Port Configuration options for the selected Port.
2. Click the **User Control** link (FIG. 34). .

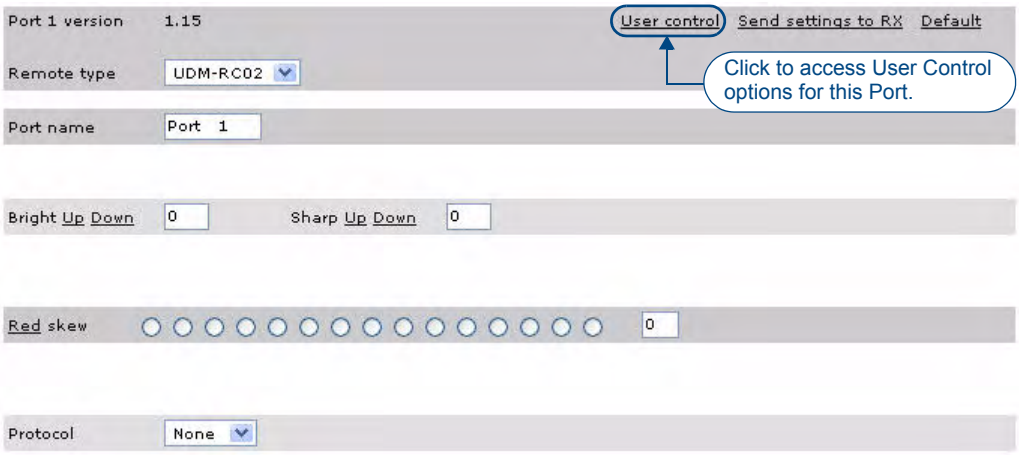


FIG. 34 Port Configuration options for Port 1 - User Control link

NOTE

Alternatively, click on the "User Control" link for the relevant Port on the main Status Page (see FIG. 33 on page 37).

- This action invokes the User Control options for the selected Port (FIG. 35).
- Keys 0 to F represent the keys on the UDM-RC02 Remote Control.
- Commands for each Key are selected from the Control drop-down menu (provided for each Key).

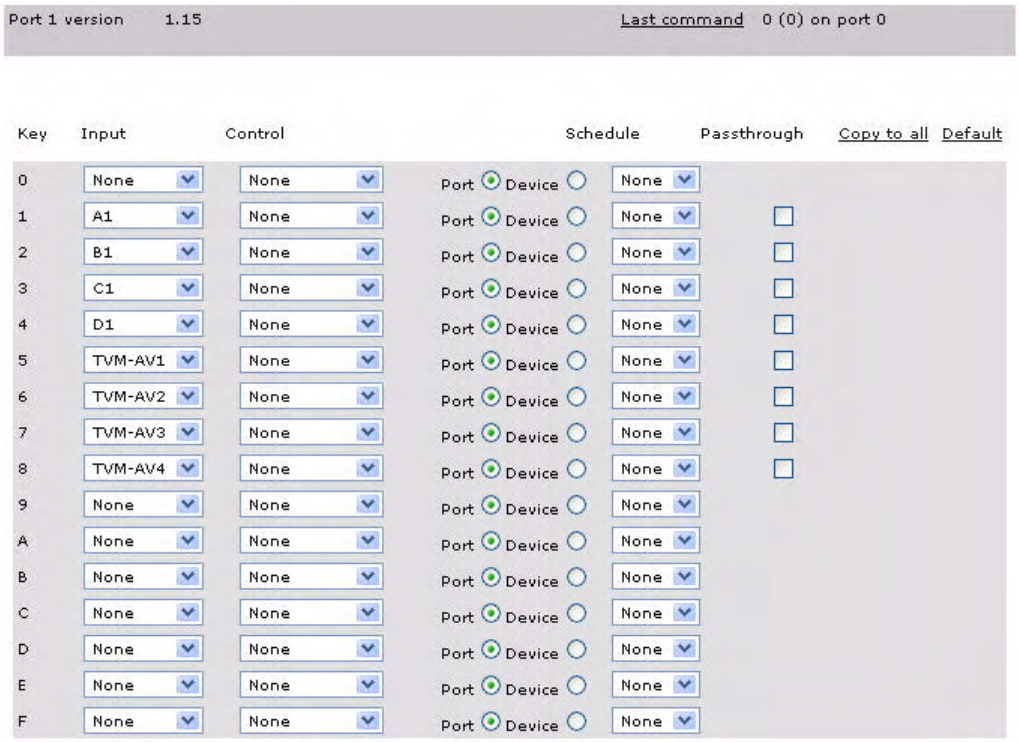


FIG. 35 User Control options for Port 1

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. 36).

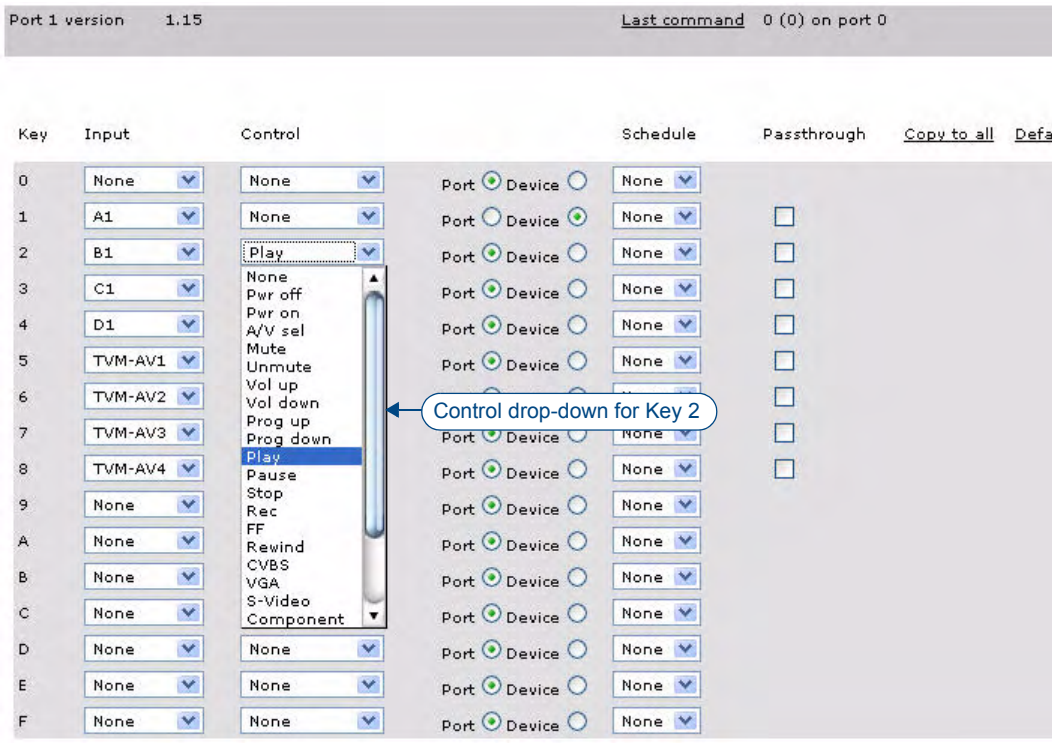


FIG. 36 Control drop-down menu for Key 2

NOTE

Ensure the correct key on the Endeleo Remote 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. The Endeleo Receiver will now accept the relevant command from the RC02 remote (i.e. Key **2** on the remote will "**Play**" the Device (FIG. 37). .

FIG. 37 Port Configuration options for Port 1 (Key 2 set to "Play")

Passthrough Mode (Inputs A-D, TVM Inputs 1-4)

Devices can also be placed into Passthrough Mode. Passthrough Mode allows an Endeleo TVM remote control to be used to control TV channels being viewed through the UDM-1604C, or devices connected to the UDM-1604C (e.g. a DVD player). Passthrough Mode is available for Inputs A-D and for TVM inputs 1-4, as shown in FIG. 38:.

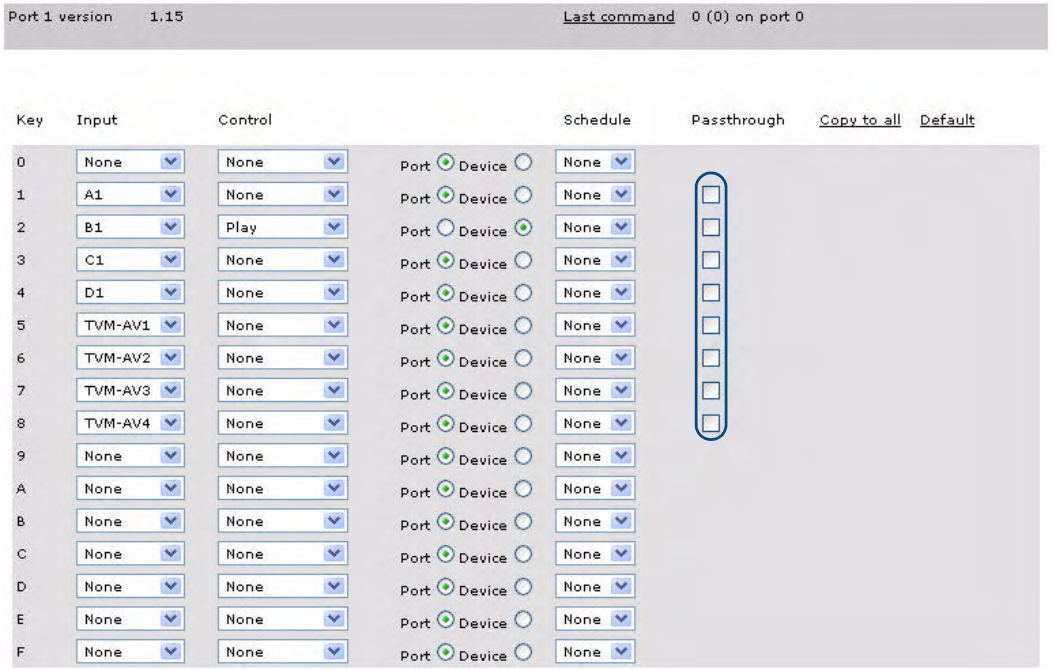


FIG. 38 User Control options (for Port 1) - Passthrough Mode options

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

1. The Device must be added to the system as an Input.
2. IR emitter (on the correct IR port) at the rear of the UDM-1604C must be connected to the device.
3. The Device must be added to the system as a Device and be assigned its learned protocol.
4. The Device's Port must be configured for Passthrough Mode.

Configuring a Device for Passthrough Mode

The device must to be added to the system as both an *Input* and as a *Device*:

1. Cable the device as an input coming into the rear of the chassis (e.g. into Input A as for a normal input).
2. Add the device as an input in the Inputs option. See the *Configuration - Inputs Page* section on page 49 for details.
3. Learn the device's protocol using IR Learning – refer to the *Configuration - Protocols Page* section on page 71 and *Advanced Administration* section on page 93.
4. Add the device into the **Devices** option as normal and assign it its IR protocol. See the *Configuration - Devices Page* section on page 53 for details.

NOTE

Ensure the relevant IR emitter port is cabled up to the device also e.g. if the device is connected to Input A cable IR port 1 to the device, if Input B cable IR port 2 to the device etc.

Configuring a Port for Passthrough Mode

1. Click on a **Port** link (in the *Status* page) to access the Port Configuration options (see FIG. 38 on page 40).
2. Select the Remote Control that will be used to put the device into passthrough mode from the *Remote type* drop-down menu (FIG. 39).

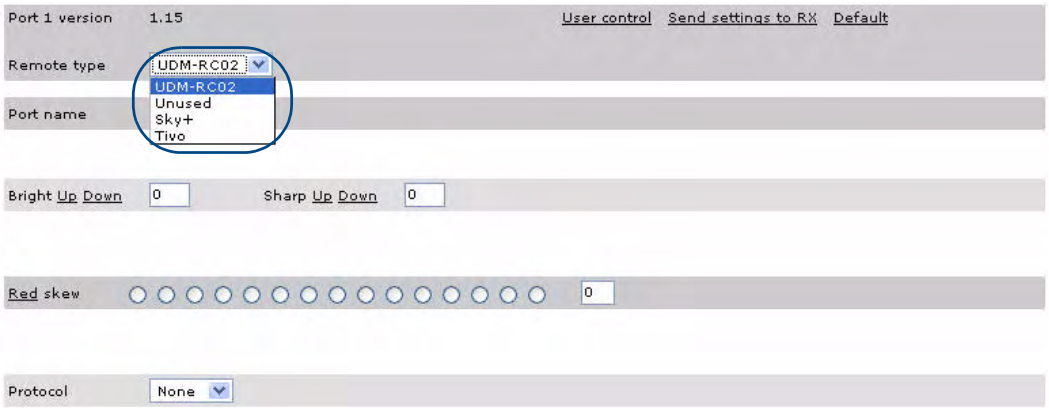


FIG. 39 Remote type drop-down menu

3. Click on the Port's **User Control** link in the Status page to access the User Control options for the selected port, and click on the *Passthrough* checkbox for the key dedicated to putting the Receiver into Passthrough Mode (FIG. 40).
4. The device can now be controlled directly at the Receiver end.

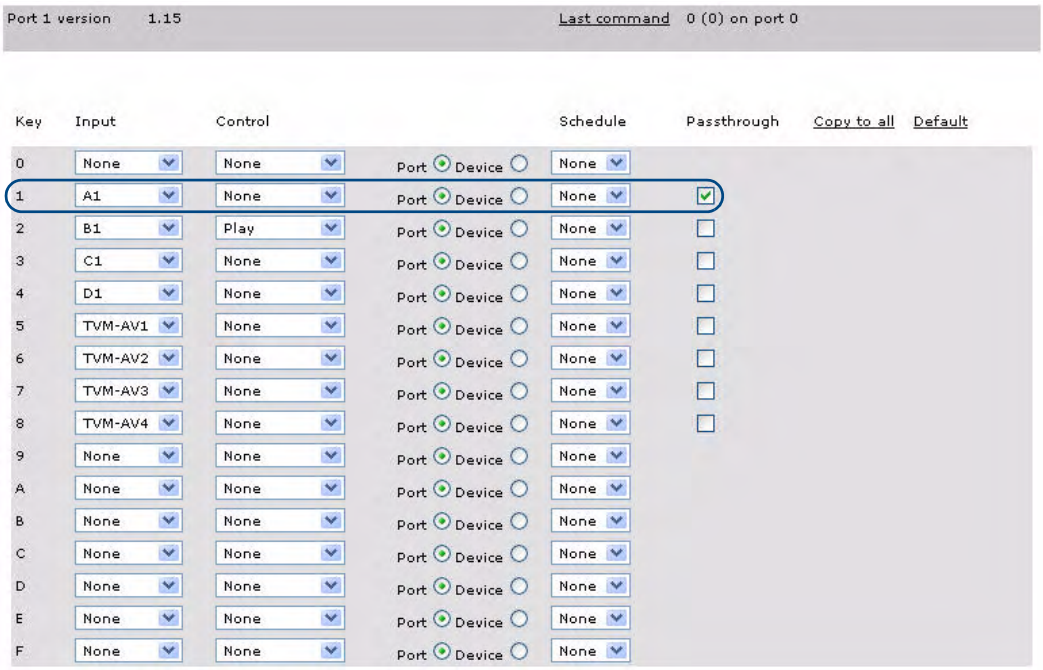


FIG. 40 Passthrough enabled on Key 1 for Port 1

Passthrough Mode (Inputs TVM-AV1 – TVM-AV4)

Similarly a TVM Input (TVM-AV1 – TVM-AV4) can be configured for Passthrough Mode.

Observe the following guidelines;

- Ensure the IR Blaster is connected to the correct IR port at the rear of the UDM Hub. For example IR Port 1 – which will be associated with Device 1 and input TVM-AV1.
- The relevant Device Number is selected to reflect the relevant IR Port (same Device number as IR port on the rear of the UDM Hub).
- Ensure the Device number is associated with the relevant TVM-AV port. For example Device 1 is associated with TVM-AV1.
- The protocol for the Device (for example a Sky box) has been learned. Refer to Advanced Administration in this guide.
- Relevant key has been assigned in User Control to enter Passthrough Mode for the TVM-AV input.
- The TVM-AV Input has been enabled for Passthrough Mode.

NOTE

If a TVM Hub is directly connected to port TVM-AV1 on the UDM Hub and an IR Blaster connected to IR Port 1 (at the rear of the UDM Hub) is associated with Input A, then only channel changes will be permitted on the TVM Hub – i.e. NON Passthrough Mode.

\

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 (UDM-RX01 or Sky remote control) to enter passthrough mode.

- If accessing a Sky Box through passthrough, 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 DVD remote control to play, pause, stop eject etc. Use the DVD Remote control as normal.
- If accessing an Endeleo TVM Hub through passthrough, click on the Up or Down channel on the TVM remote control, to toggle between channels.

Exiting Passthrough Mode

Press any key on the UDM-RC02 remote which is not configured as a control enabled key.

If accessing a Tivo or Sky set-top box press **TV** on the Tivo or Sky remote.

Locking One or More Ports

Locking an output port to a specific source prevents any user control at that port.

1. On the *Status* page, select the **Locked** checkbox beside the relevant port or ports (FIG. 41).

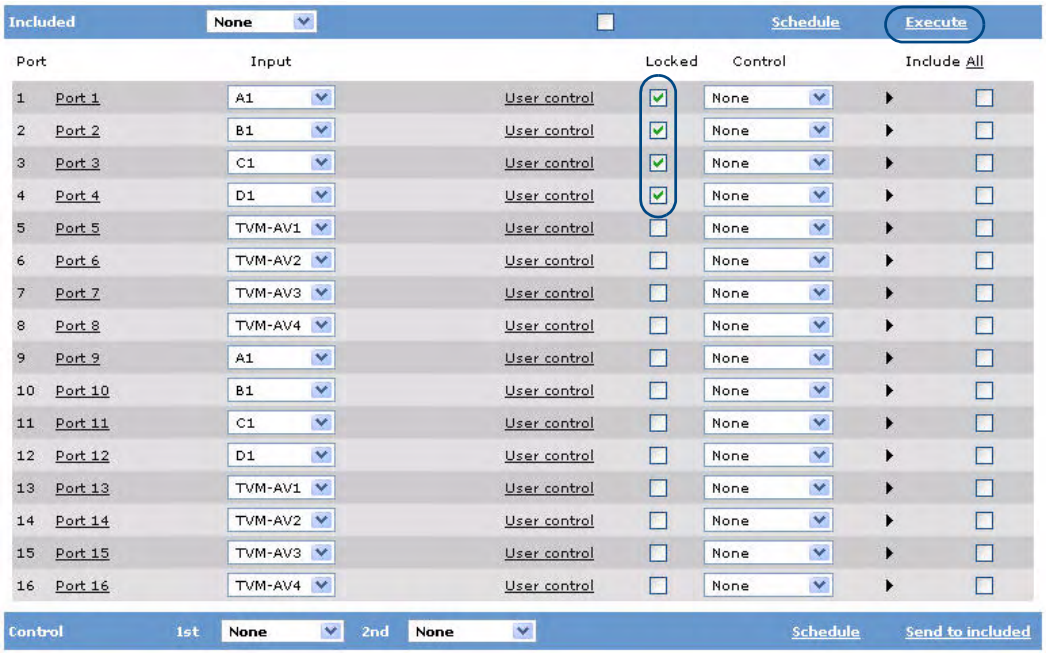


FIG. 41 Locking a port

2. Click on **Execute**. The port is now locked to that display.

NOTE

*Multiple ports can be locked by clicking on the **Include** checkbox relevant to the port, then clicking on **Execute** to lock the ports.*

Configuration - Setup Page

Overview

Each Hub must be configured for the correct network environment. It is also possible to view device information, set this UDM-1604C as the Master Hub in a cascaded system, configure the Hub for the correct date and time and specify Restore options, via options in the *Setup* page (FIG. 42):

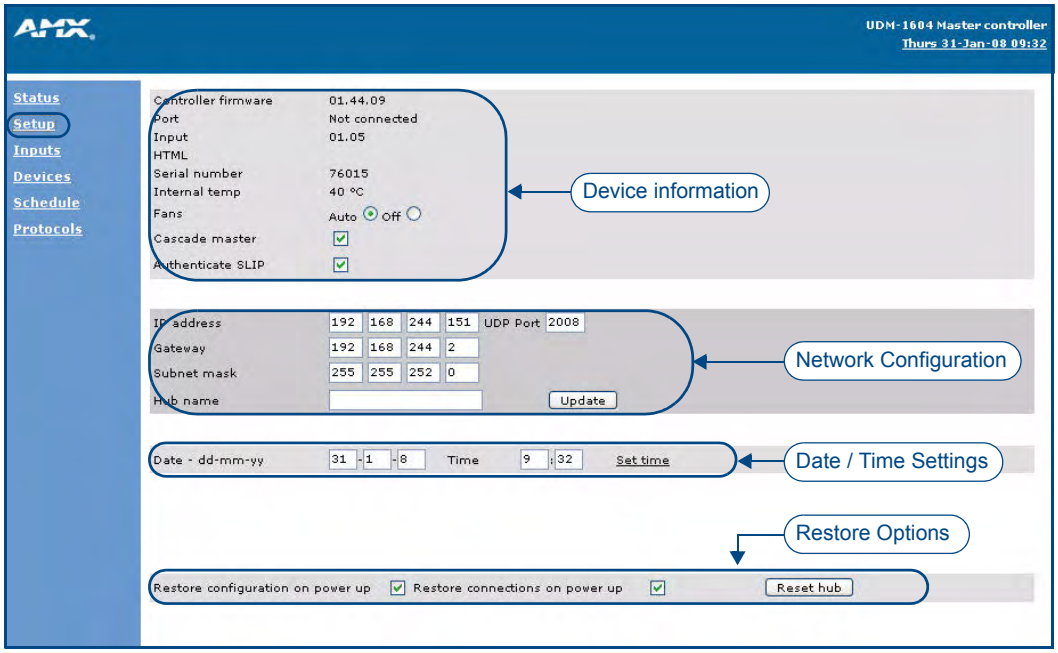


FIG. 42 Setup Page

Device Information

The top portion of the Setup page provides several Device Information items as well as Fan control, SLIP authentication and an option to enable advanced video compensation controls:

Setup Page - Device Information	
Controller firmware:	This display-only field indicates the current controller firmware version.
Port:	This display-only field indicates the current port (UDM) firmware version.
Input:	This display-only field indicates the current input firmware version.
HTML	This display-only field indicates the current HTML (WebConsole) version.
Serial number:	This display-only field indicates the unique serial number for this UDM Hub.
Internal temp:	This display-only field indicates the current internal temperature of the unit.
Fans:	These radio buttons allow you to turn off the internal fans. The default setting is "Auto" (fans will automatically turn on and off based on the internal temperature reading). ***Caution**: by turning off the fans, the unit may be susceptible to overheating.*
Cascade Master:	Click to enable Cascading for this UDM-1604C. Refer to the *Cascading Hubs* section on page 79 for details.
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 - see the *Advanced Video Compensation* section on page 30).

Network Configuration

NOTE

The UDM-1604C does not support DHCP. Please 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):

FIG. 43 Network Configuration options

   a. Hub IP Address, Subnet Mask and Default Gateway
   b. UDP Port
   c. 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).

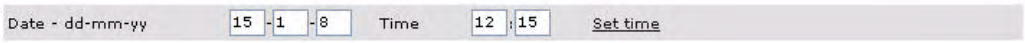


FIG. 44 Date and Time Settings

1. Enter the desired values for the current **Time** and **Date**.
2. Click on **Update** when all configuration changes have been completed.

Restoring Hub Configuration and Connections

To ensure the configuration settings for the Hub are retained each time the hub boots it is advisable to ensure the Restore options at the bottom of the *Setup* page have been enabled (FIG. 45).

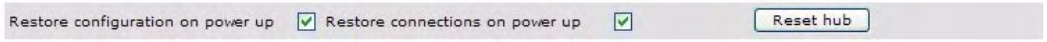


FIG. 45 Restore options

WARNING

Failure to select the Restore Configuration and Connection options will mean if the Hub is reset the Hub configuration and connections will need to be re-configured.

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. 45).

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. 45).

Resetting the UDM-1604C

Where appropriate the Hub can be reset from the Browser interface. Use the *Setup* option to reset the Hub.

1. Click the **Reset Hub** button (see FIG. 45).

   The UDM-1604C's network connection will be lost temporarily and video displays will switch off then on again very quickly.

2. Restart the Hub.

WARNING

A power down of the Hub must be performed to complete the reset procedure.

Configuration - Inputs Page

Overview

Use the options in the *Inputs* page (FIG. 46) to set up the video types and audio sources being presented to each input port and where appropriate renaming these.

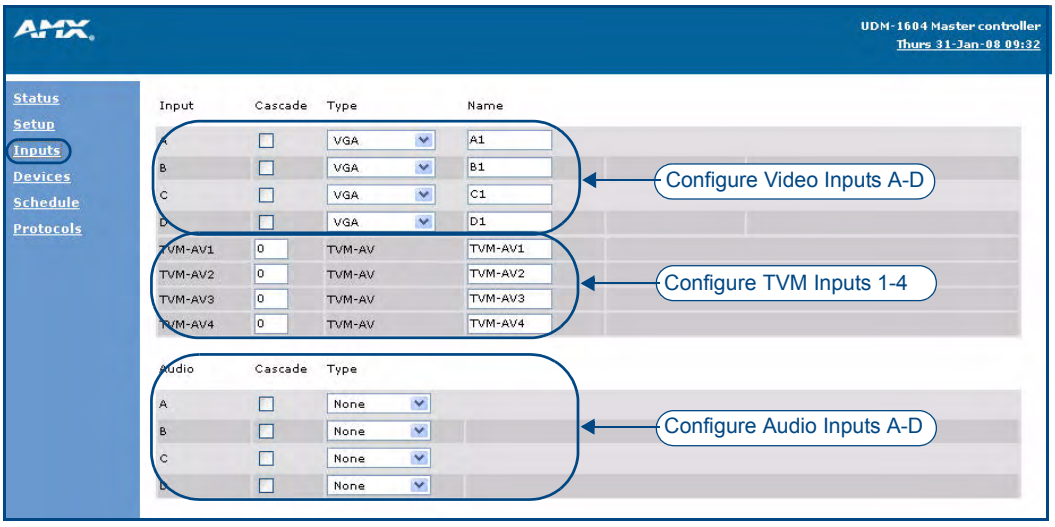


FIG. 46 Inputs Page

Configuring Inputs A-D

1. For each Input port (A-D), select the Cascade checkbox, if that input will be cascaded from an upstream UDM-1604C Hub (see the *Cascading Hubs* section on page 79 for details).
2. For each Input port, select the appropriate input type from the *Type* drop-down menu provided for each Input (FIG. 47).

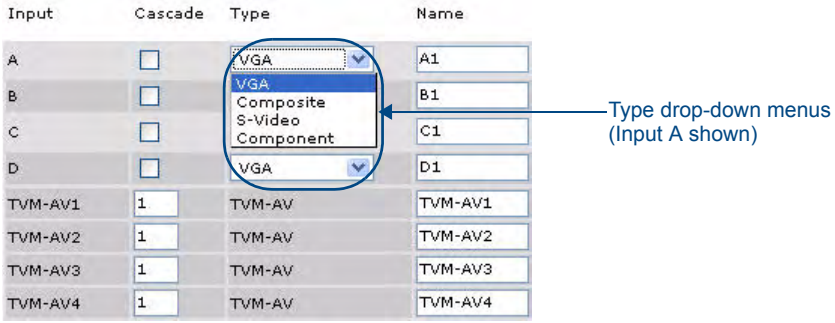


FIG. 47 Inputs page - Input Type drop-down menu

NOTE

For RGB, VGA, Component or SVideo inputs, only one connection is possible per input port.

3. To name the Input Type, type directly into the *Name* field for each Input (FIG. 48).

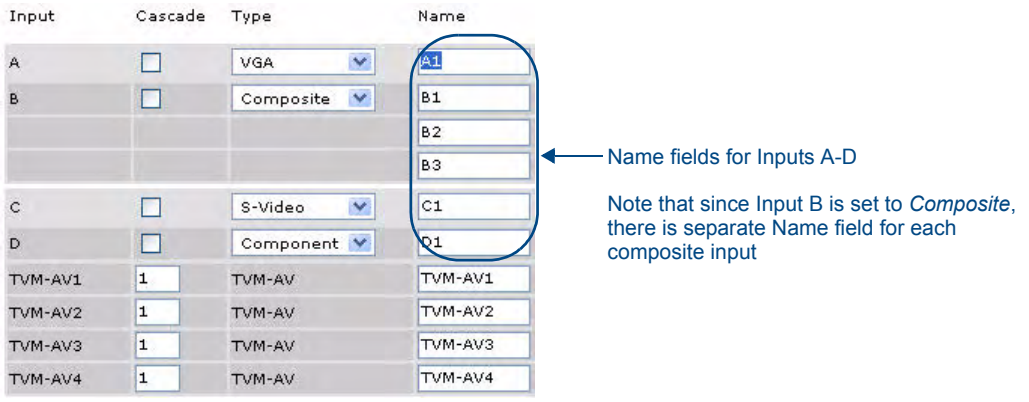


FIG. 48 Inputs page - Naming the Input Type

- If the Input *Type* is **Composite**, additional *Name* fields are provided to name each of the 3 composite sources separately (as shown in FIG. 48). Name each Composite video source appropriately.

Configuring TVM (AV) Inputs

TV Inputs from an Endeleo TVM hub can also be fed into the UDM-1604C for display at screens throughout the location.

NOTE

*The power at the relevant TVM port will have to be disabled using the **<k> <port no>** command or through the TVM's WebConsole before being connected to a UDM Hub.*

Configuring TVM inputs for a UDM Hub

1. Ensure the port on the TVM is configured to display the correct channel (refer to the TVM documentation).
2. Ensure the power on the TVM port which will transmit the TV feed has been switched off using the **[k] [port no]** command (or using the TVM's WebConsole).
3. Connect a Cat5 cable from the TVM port on the front panel of the UDM-1604C (FIG. 49) to the relevant TVM port on the front of the UDM Hub.

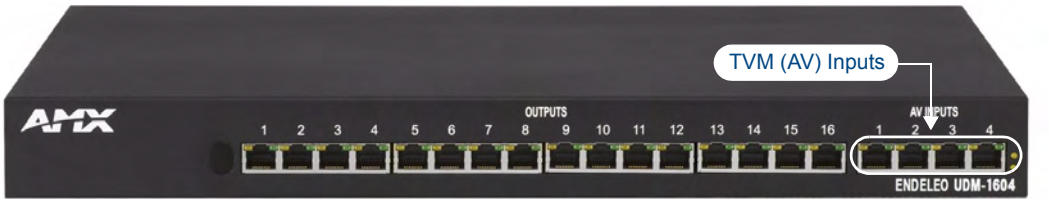


FIG. 49 TVM (AV) inputs

4. **Name** each TVM input accordingly (FIG. 50).

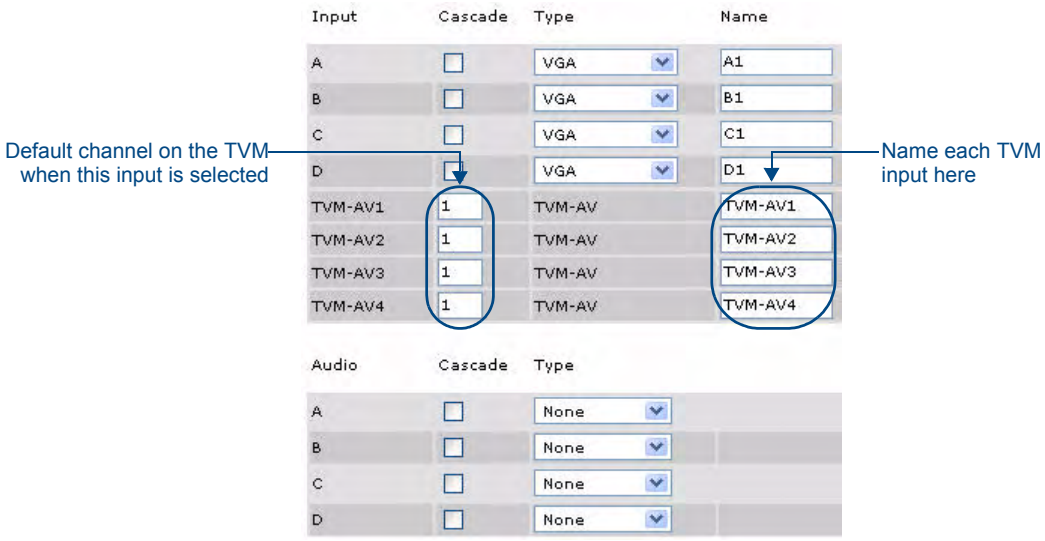


FIG. 50 Configuring TVM inputs for a UDM-1604C

5. Configure the default channels for each TVM input. For example if you enter "1" in the text field for TVM-AV1 (as shown in FIG. 50), then every time a UDM user selected TVM-AV1 then they would be initially switched through to TV channel 1.
Channel names are manually entered to help the user recognize each input from the input selection drop down box on the *Status* page.

NOTE

If through the user selection page you have enabled pass through (i.e. the ability for the user to send commands through to the TVM hub to change the channel), then you may find that the text no longer reflects channel being viewed. If this feature is to be used, try using a generic channel name such as "TVM port X".

Configuring Audio Types For Inputs

Audio types (Analog L/R or S/PDIF) can be configured for each Input. In the audio section, under the *Type* column, select the **type** of audio (*Analog L/R*, *S/PDIF* or *none*) for each input (FIG. 51).

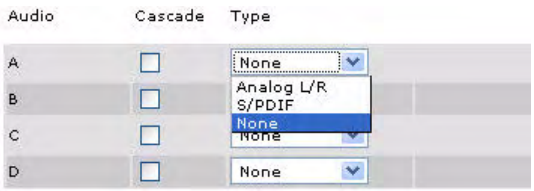


FIG. 51 Configuring audio types for inputs

NOTE

Ensure audio has been connected from the Input to the rear of the hub. Ensure the connections are sound and fixed correctly.

Configuration - Devices Page

Overview

The system allows "centrally located" devices connected to the rear of the UDM-1604C (e.g. VCR, DVD, DVR or Satellite Decoders) to be managed from the user port. Centrally located devices are connected directly to the rear of the UDM-1604C via the UDM IR ports (Tx1 – Tx4) using an Endeleo IR Tx bud.

The IR Tx bud will then transmit the IR signal from the UDM-1604C to the device.This is performed through the *Devices* page (FIG. 52).

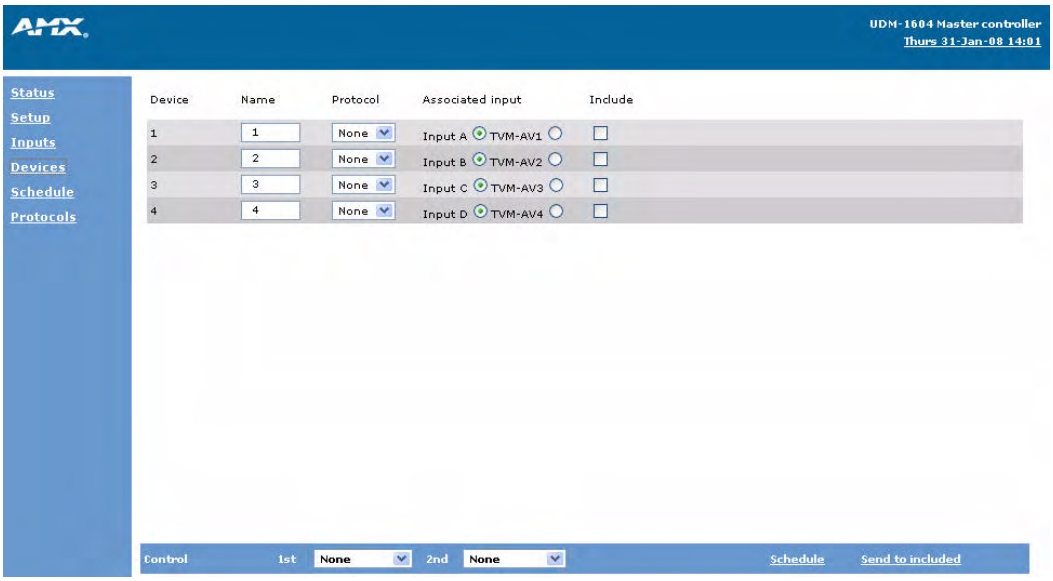


FIG. 52 Devices page

An IR02 Endeleo IR Splitter Cable (FG-IR02) will be needed for each of the IR ports if using 2 devices per IR port.

- If only one device connected to IR TX port 1/2 it will by default be *Device 1*.
- If only one device connected to IR TX port 3/4 it will by default be *Device 3*.

FIG. 53 IR TX ports for locally connected devices

Adding Centrally Located Devices

1. Name each device accordingly by typing in the *Name* text fields.

NOTE

Ensure the correct port is selected.

2. Configure the device with the relevant IR protocol if appropriate.

   Refer to the *Creating and Learning an IR Protocol* section on page 74 for details.

Issuing Commands To a Centrally Located IR Device

NOTE

The UDM-1604C needs to learn the device's IR protocol (which button on its remote performs which function). Refer to the Configuration - Protocols Page section on page 71.

1. The *Control* toolbar at the bottom of the screen enables specific commands to be executed via the browser connection (FIG. 54).

FIG. 54 Control Bar

2. Select the command(s) to be performed for this device from the *1st* and *2nd* (*Command*) drop-down menus (FIG. 55). Two commands can be issued to a device (1st and 2nd).

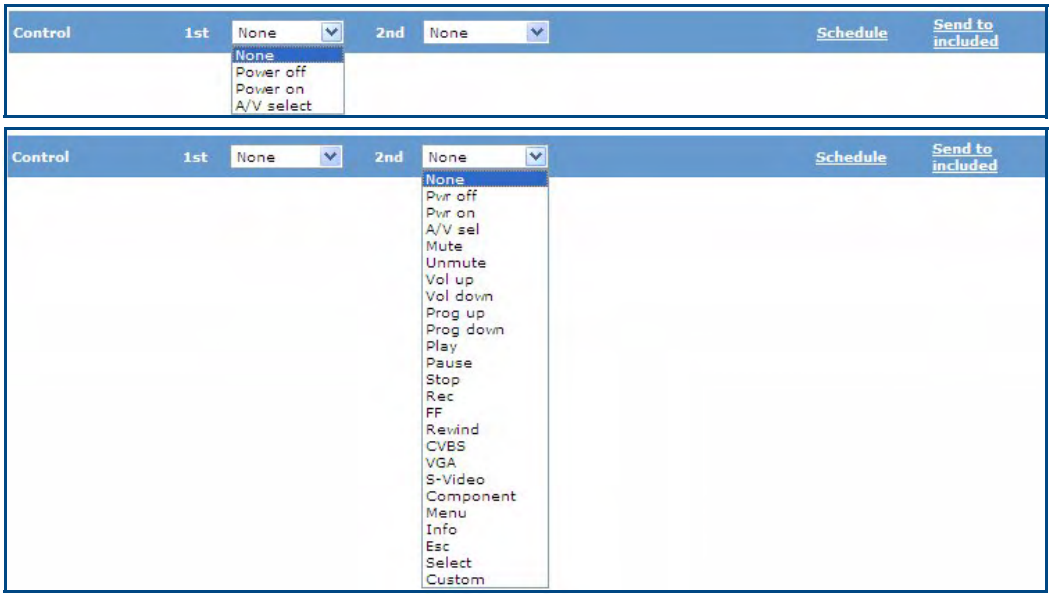


FIG. 55 Optional controls for a device

NOTE

The first command is limited to Power On, Off and A/V Select.

3. Click the *Include* checkbox to select the device(s) to be sent a command.

4. Click the *Send to Included* link to send the selected command to the Included device(s).

Alternatively such commands can be scheduled to occur later. Refer to the Configuration - Schedule Page section on page 57 *for details.*

Custom Commands

Custom Commands permits the Administrator to specify custom IR commands which can sent to the device or display. A list of custom commands and their IR value can be found in the *Endeleo IR Codes* section on page 103).

To issue a custom command;

1. Select the **custom** option within the 2nd list of commands.
2. Type in the **value** of the IR code which is to be sent in the relevant box.
3. Execute the custom command or schedule it to occur later.

Issuing Commands to Centrally Located Devices

It is also possible to control centrally located hardware such as DVD players, via options in the *Devices* page. Remember an IR-TX bud coming from the rear of the UDM-1604C will sit over the Device's IR sensor.

1. Select the device(s) you wish to control by clicking on the appropriate *Include* checkboxes (FIG. 56).

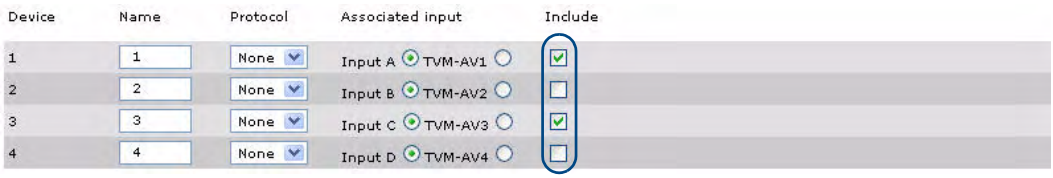


FIG. 56 Selected devices

2. In the *Control* toolbar at the bottom of the page, select the command(s) to be performed for the selected device(s) from the *1st* and *2nd* (*Command*) drop-down menus (FIG. 55). Two commands can be issued to a device (1st and 2nd).

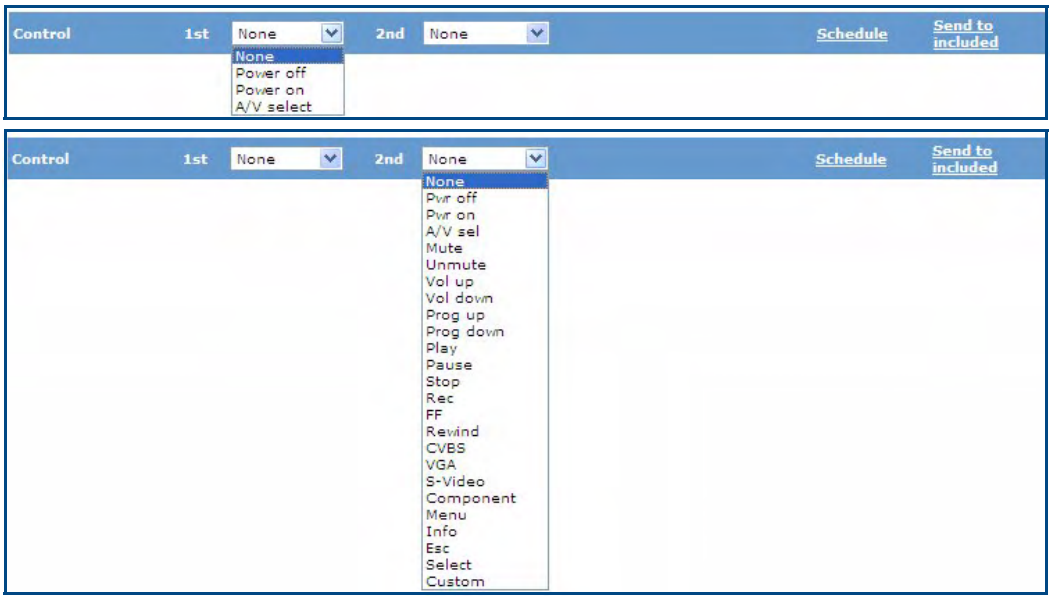


FIG. 57 Optional controls for a device

NOTE

The first command is limited to Power On, Off and A/V Select.

3. Click the **Send to included** link to issue the commands (see FIG. 57).

NOTE

The Device's commands must have been learned by the UDM-1604C in order to function. Refer to the Configuration - Protocols Page section on page 71.

Configuration - Schedule Page

Overview

The UDM-1604C features an on-board clock that allows you to create scheduled events to be executed at a predetermined time in the future. Scheduled events are listed on the Schedule page (FIG. 58), but are created using options in both the *Status* and *Devices* pages, as described in this section.

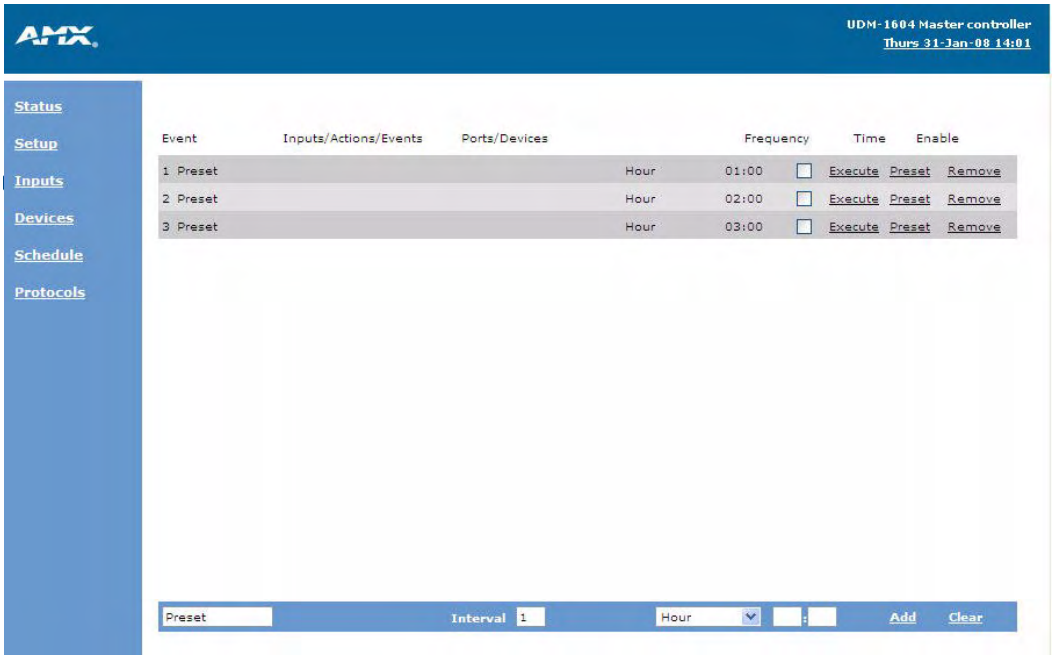


FIG. 58 Schedule page

NOTE

You can create and store up to 16 scheduled events.

There are several basic types of scheduled events:

- **Scheduled IR Device Control**s - Use the Schedule options in the *Devices* page to schedule events to be executed at specified times on IR-controlled devices connected to the IRTX (IR Transmit) Ports on the rear panel (see the *IRTX (IR Transmit) Ports* section on page 13). For example, you could create a scheduled device event that causes the devices connected to TX Ports 1-4 to power-up and/or power-down at scheduled times each day.
  See the *Scheduling IR Device Control Events* section on page 58 for details.
- **Scheduled Output Device Control** - Use the Schedule options in the **bottom** toolbar of the *Status* page to schedule events to be executed at specified times on display devices connected to the RJ-45 Output ports on the front panel (see the *OUTPUT Ports (RJ-45)* section on page 9). For example, you could create a scheduled port control event that causes the display devices connected to Outputs 1-4 to power-up and/or power-down at scheduled times each day.
  See the *Scheduling Output Device Control Events* section on page 61 for details.

- **Scheduled Input Controls** - Use the Schedule options in the **top** toolbar of the *Status* page to schedule inputs (devices connected to the Input connectors on the rear panel of the UDM) to be displayed on specific Ports (via the UDM receivers connected to the Output ports on the front of the UDM) at specified times. For example, you could create a scheduled input event that causes the device connected to Input A to automatically display on Port 1 every day at 9:00am.
  See the *Scheduling Inputs* section on page 64 for details.
- **Preset Scheduling** - Multiple scheduled events can be combined into a single Preset Schedule. For example, you could create a Preset Schedule that powers up devices 1-4 (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 1-4 on Ports 1-4.
  See the *Preset Scheduling* section on page 67 for details.

Checking the Hub Time

Click on the date and time at the top-right of the *Status* page to refresh the UDM's internal clock to the current time (FIG. 59). This can be useful before creating a scheduled event.

FIG. 59 Hub Date and Time

Scheduling IR Device Control Events

Use the Schedule options in the *Devices* page (bottom toolbar) to create a scheduled IR Device Control Event (FIG. 60):

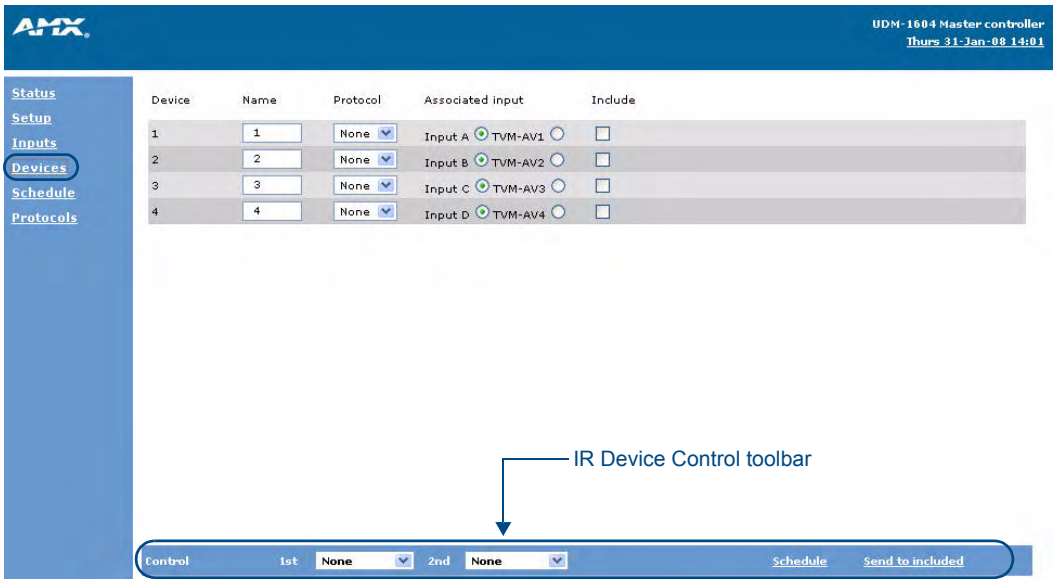


FIG. 60 Devices page

1. Select up to two commands to be executed from the **1st** and **2nd** *Control* drop-down menus at the bottom of the *Devices* page (FIG. 61).

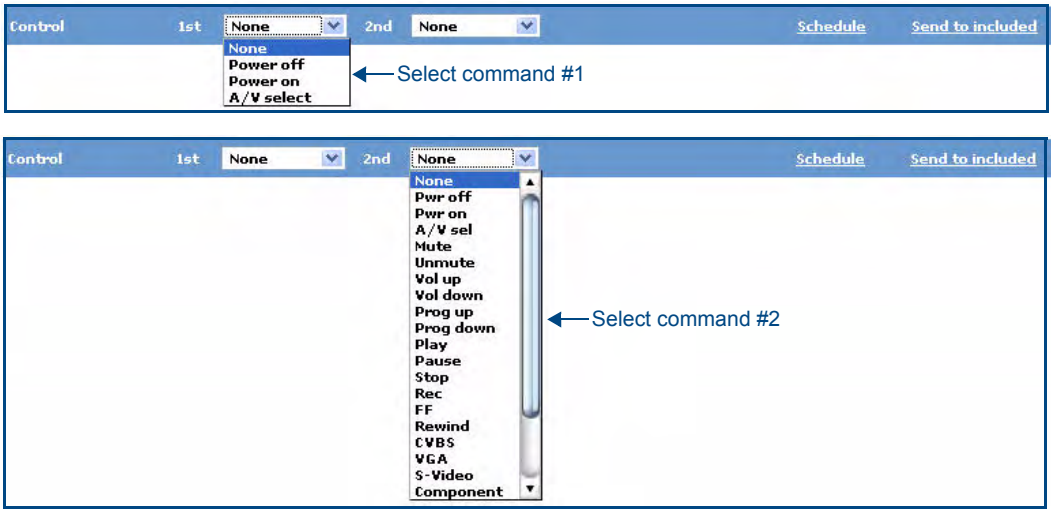


FIG. 61 Commands to be executed

2. Select the device(s) to which the command should be sent by clicking on the relevant *Include* checkboxes (FIG. 62).

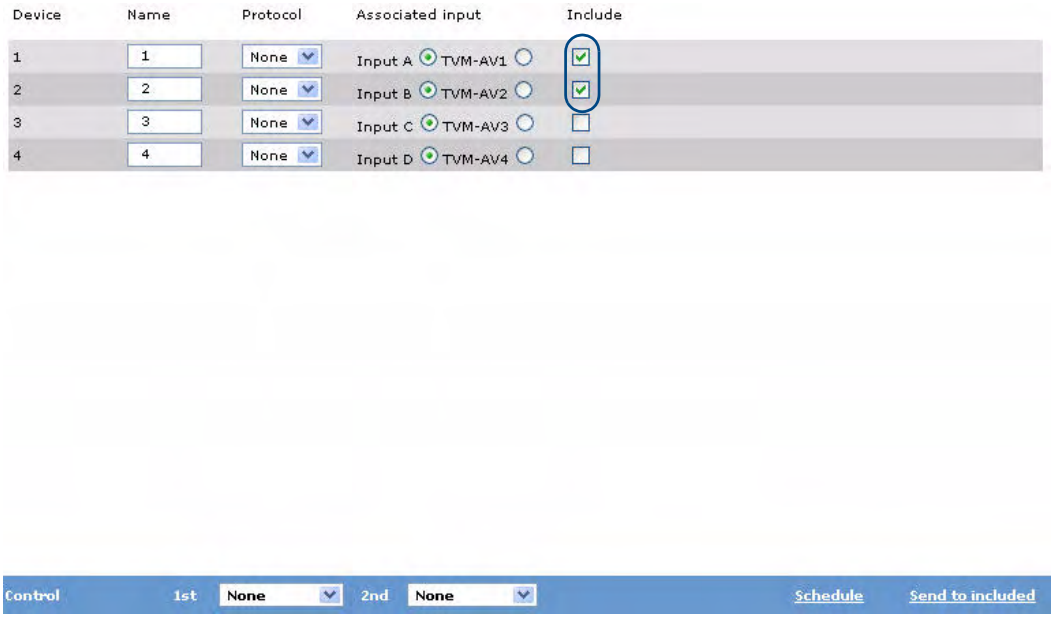


FIG. 62 Devices 1 and 2 selected to receive the specified controls

To test the selected commands with the selected Ports, click on the **Send To Included** link at the bottom of the *Devices* page (FIG. 63). Note that clicking here sends the commands to the selected Ports, but does not schedule the commands,

FIG. 63 Send To Included link

3. Click the **Schedule** link at the bottom of the *Devices* page to schedule the specified commands for the selected Devices (FIG. 64).

FIG. 64 Schedule link

4. This invokes the *Schedule* page. The command(s) and Port(s) selected in the Status page will automatically appear in the scheduled event (FIG. 65).

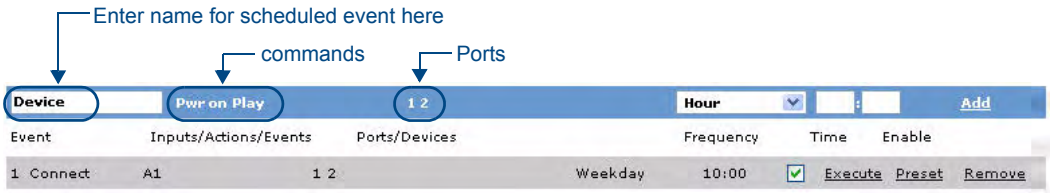


FIG. 65 Schedule page (indicating "Pwr On" and "Play" commands, and Ports 1 and 2

5. **Name** the scheduled event in the text field provided.
6. In the *Frequency* drop-down menu, select a frequency for the scheduled event, and enter the time for the event to occur in the text fields provided (FIG. 66).

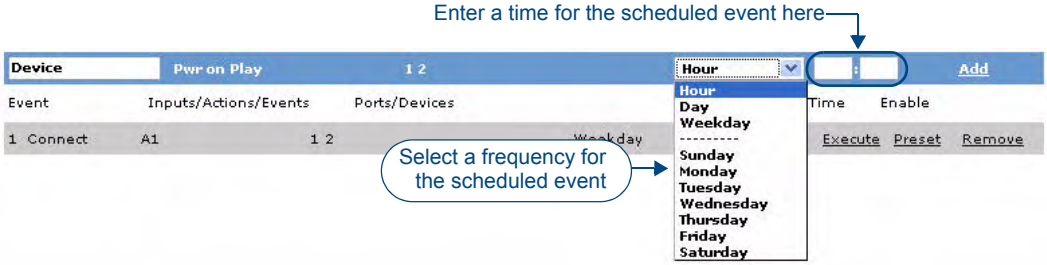


FIG. 66 Selecting the event frequency and time

NOTE

Refer to the Scheduling Events - Frequency Options section on page 68 *for a description of each frequency option.*

7. Click the **Add** link (see FIG. 66) to add the schedule to the list of scheduled events (FIG. 67).

FIG. 67 Scheduled event added

8. Click the event's *Enabled* checkbox (FIG. 68).

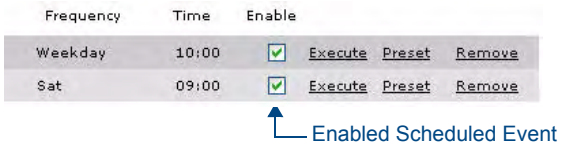


FIG. 68 An enabled schedule

Once enabled, the scheduled event will execute at the specified time/frequency.

Scheduling Output Device Control Events

Use the Schedule options in the **bottom** toolbar of the *Status* page to schedule events to be executed at specified times on display devices connected to the RJ-45 Output ports on the front panel (FIG. 69).

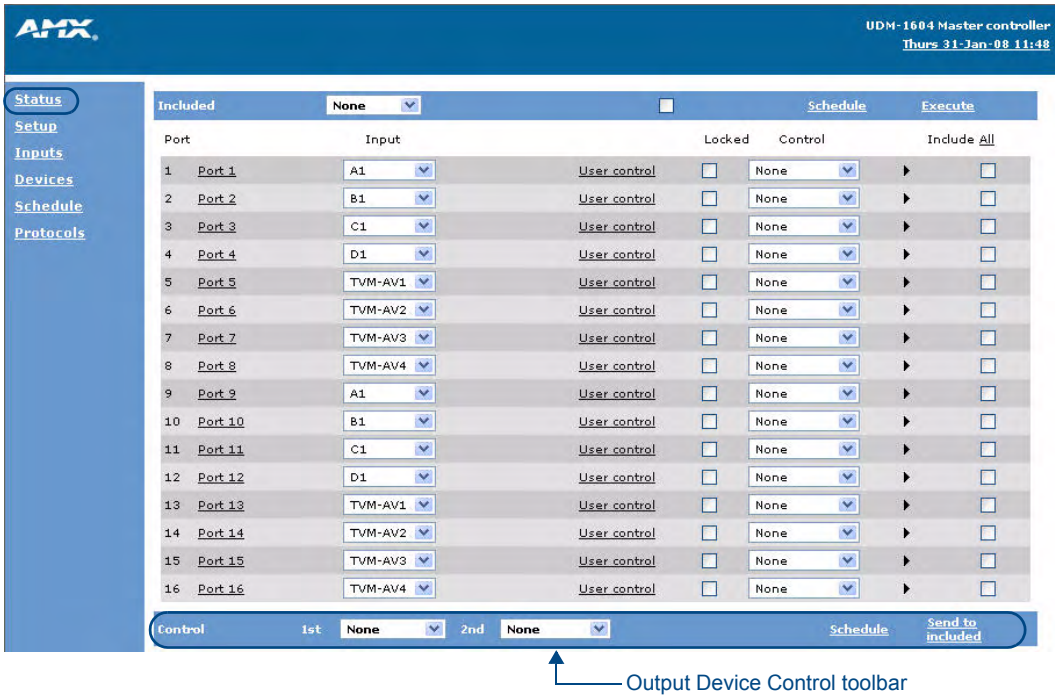


FIG. 69 Status page

1. Select up to two commands to be executed from the **1st** and **2nd** *Control* drop-down menus at the bottom of the *Status* page (FIG. 70).

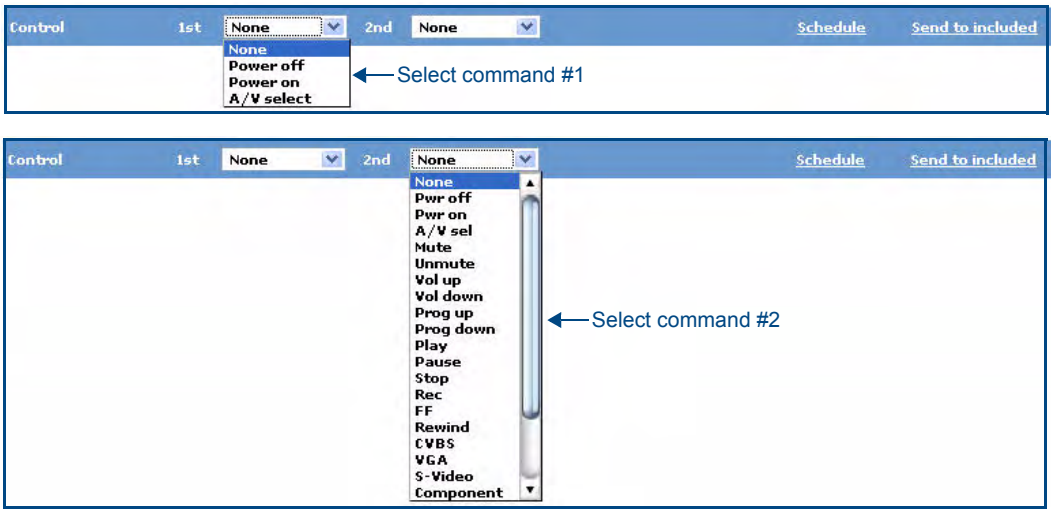


FIG. 70 Commands to be executed

2. Select the Port(s) to which the command should be sent by clicking on the relevant *Include* checkboxes (FIG. 71).

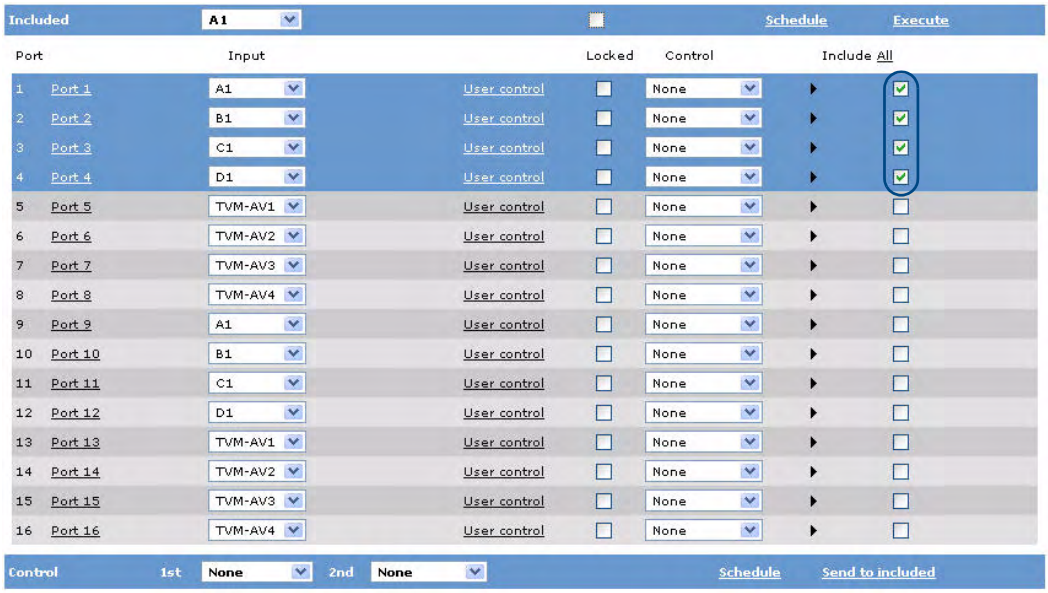


FIG. 71 Devices 1 - 4 selected to receive the specified controls

3. Click the **Schedule** link at the bottom of the *Status* page to schedule the specified commands for the selected Devices (FIG. 72).

FIG. 72 Schedule link

4. This invokes the *Schedule* page. The commands(s) and Port(s) selected in the Status page will automatically appear in the scheduled event (FIG. 73).

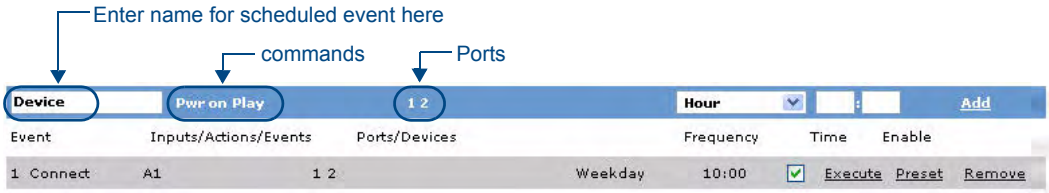


FIG. 73 Schedule page (indicating "Pwr On" and "Play" commands, and Ports 1 and 2

5. **Name** the scheduled event in the text field provided.
6. In the *Frequency* drop-down menu, select a frequency for the scheduled event, and enter the time for the event to occur in the text fields provided (FIG. 74).

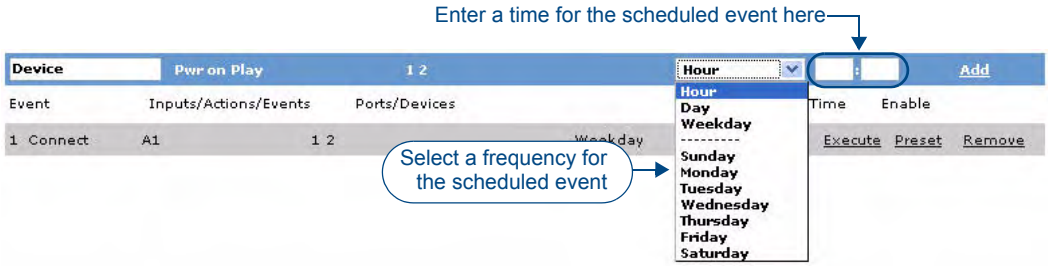


FIG. 74 Selecting the event frequency and time

NOTE

Refer to the Scheduling Events - Frequency Options section on page 68 *for a description of each frequency option.*

7. Click the **Add** link (see FIG. 74) to add the schedule to the list of scheduled events (FIG. 75).

FIG. 75 Scheduled event added

8. Click the event's *Enabled* checkbox (FIG. 76).

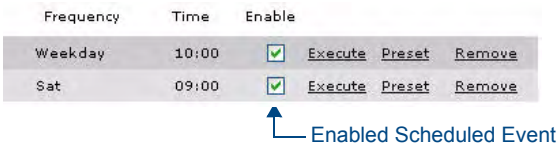


FIG. 76 An enabled schedule

Once enabled, the scheduled event will execute at the specified time/frequency.

Scheduling Inputs

Use the Schedule link in the **top** toolbar of the *Status* page to schedule Inputs to be displayed on specific Ports at specified times (FIG. 77).

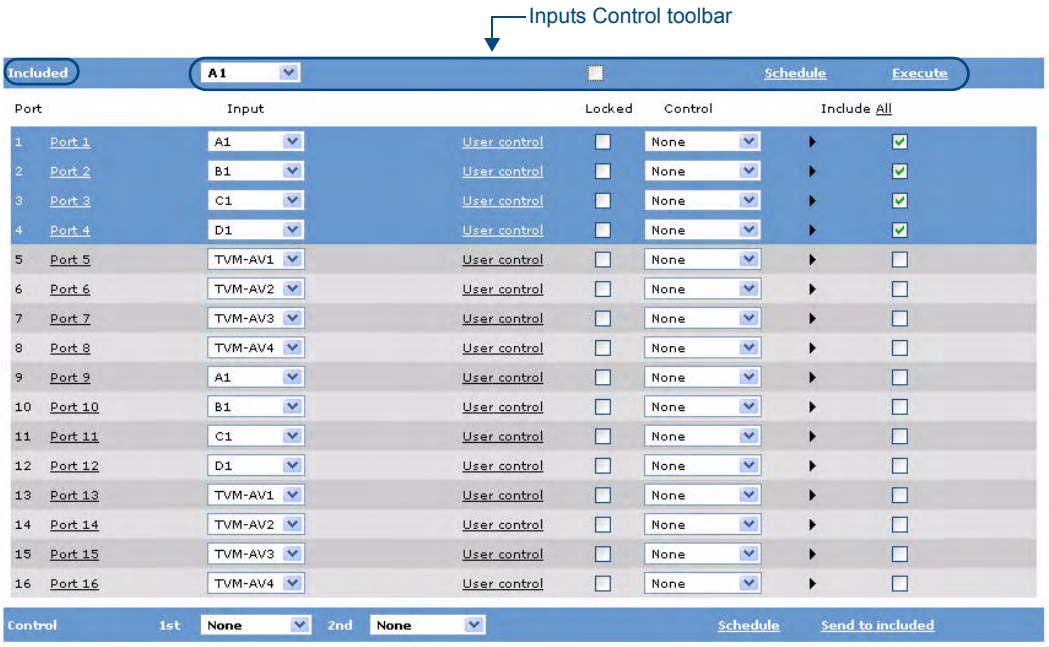


FIG. 77 Status page

1. In the *Status* page, select the **Inputs** to which the schedule will be applied from the *Included* drop-down menu (FIG. 78).

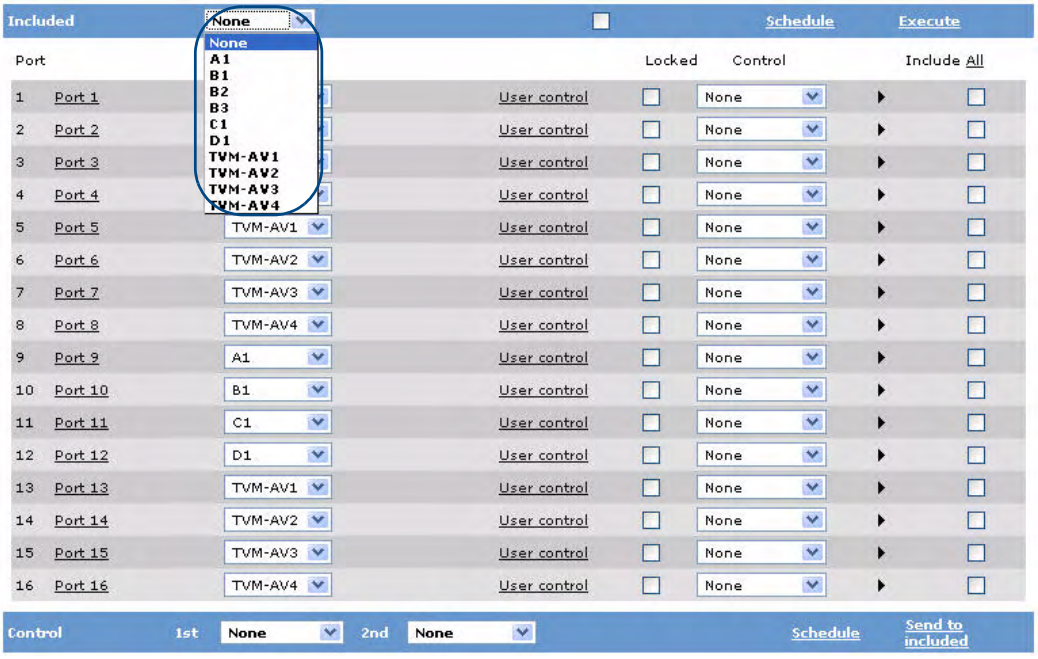


FIG. 78 Included drop-down menu (Status page)

2. Select the **Ports** on which the input will be displayed by clicking on the *Include* checkbox at the relevant ports. The selected ports are highlighted in blue (FIG. 79).

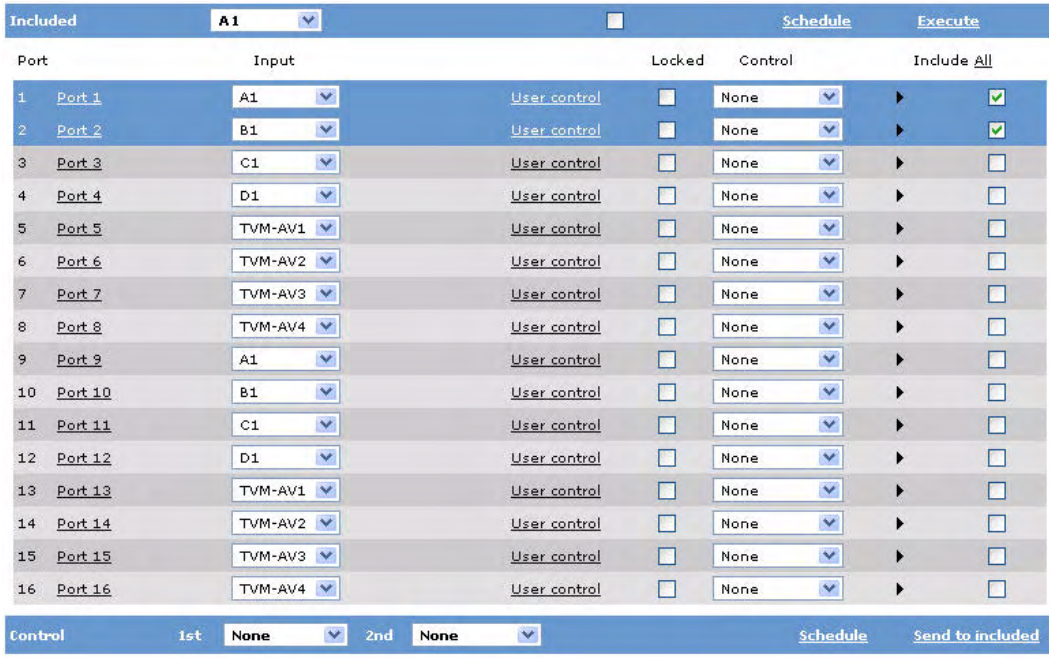


FIG. 79 Selecting the ports on which the input will be displayed

3. Click on the **Schedule** link at the top of the page (FIG. 80).

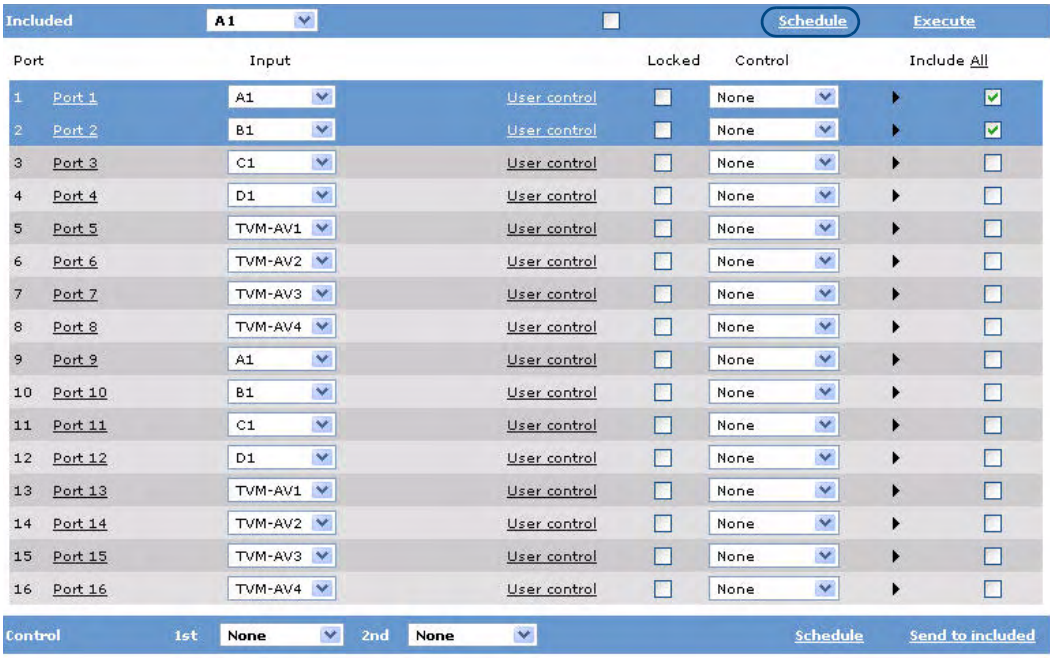


FIG. 80 Click the top Schedule link to access the Schedule page

4. This invokes the *Schedule* page. The Input(s) and port(s) selected in the Status page will automatically appear in the scheduled event (FIG. 81).

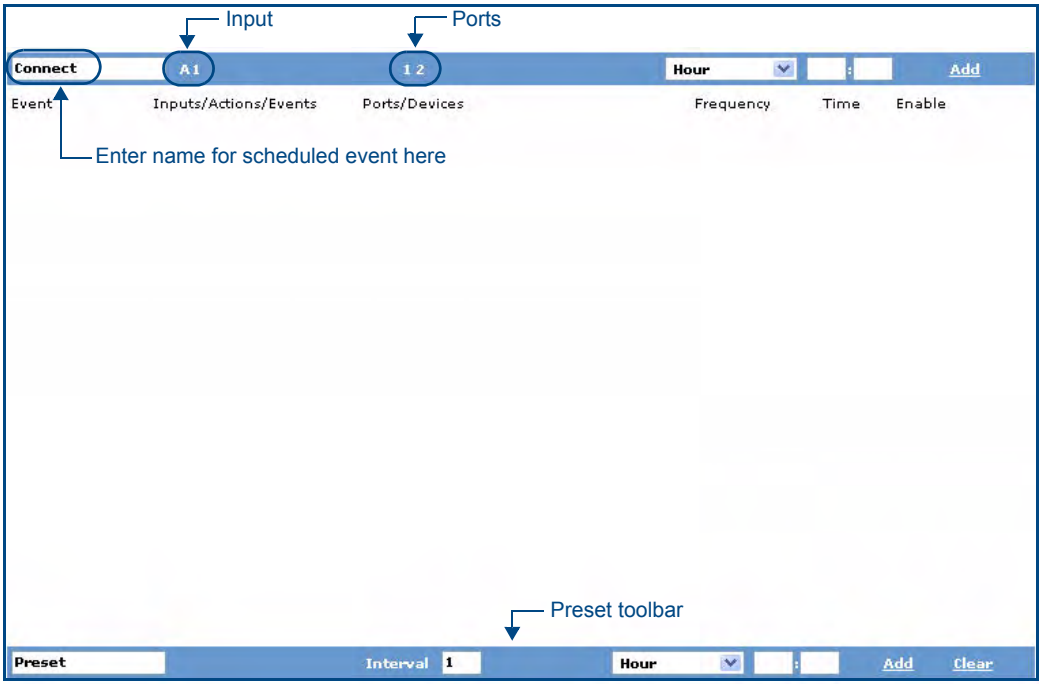


FIG. 81 Schedule page (indicating Input "A1" and Ports 1 and 2

5. **Name** the scheduled event in the text field provided.
6. In the *Frequency* drop-down menu, select a frequency for the scheduled event, and enter the time for the event to occur in the text fields provided (FIG. 82).

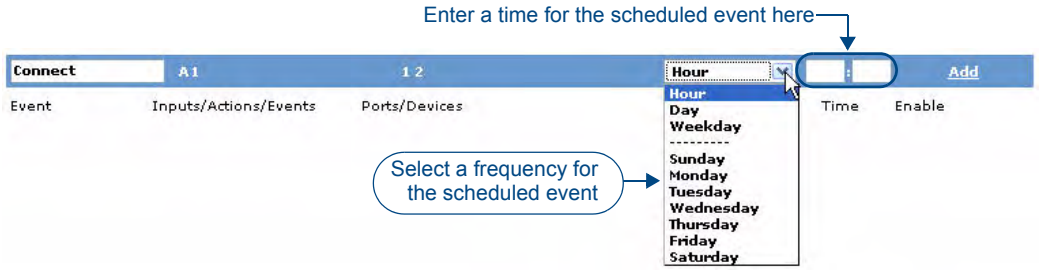


FIG. 82 Selecting the event frequency and time

NOTE

Refer to the Scheduling Events - Frequency Options section on page 68 *for a description of each frequency option.*

7. Click the **Add** link (see FIG. 82) to add the schedule to the list of scheduled events (FIG. 83).

FIG. 83 Scheduled event added

8. Click the event's *Enabled* checkbox (FIG. 84).

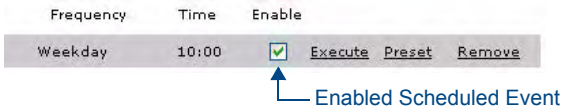


FIG. 84 An enabled schedule

- Once enabled, the scheduled event will execute at the specified time/frequency.
- Each new scheduled event is displayed on the *Schedule* page.

Preset Scheduling

It is possible to create a scheduled Preset (or Combination) event - events based on schedules already created (such as combining two or more existing events), via options in the *Schedule* page.

1. In the *Schedule* page (which displays a listing of all currently scheduled events), click each schedule's **Preset** link (FIG. 85).

FIG. 85 Schedule page - Preset links

2. The individual scheduled event numbers appear in the Preset toolbar at the bottom of the page (FIG. 86).
3. Specify a frequency for the Preset event by selecting from the *Frequency* drop-down menu (FIG. 86).
4. Enter a *Time* for the Preset event by typing directly into the text fields provided (FIG. 86).

FIG. 86 Schedule page - Preset toolbar

The Frequency and Time specified here overrides any previously created frequency / times used in the Preset schedule.

5. If an interval is required between each individual schedule within the Preset schedule, specify a time interval (in seconds) in the *Interval* field (FIG. 86).
6. Assign the Preset schedule a unique **name** by replacing the default text (FIG. 86).
7. Finally click the **Add** hyperlink button. The Preset event should now appear in the event list.

8. **Enable** the event also by clicking on the tick box beneath the *Enable* column beside the combination event (FIG. 87).

FIG. 87 Enabling a Preset schedule

NOTE

No tick box appears to the left of the combined event as several combined events can not be added together.

Scheduling Events - Frequency Options

A scheduled event can execute in a number of ways, according to the frequency option selected in the Frequency drop-down menu:

Scheduled Events - Frequency Options	
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 (Monday through Friday).
Sunday	Event happens every Sunday at specified time.
Monday-Saturday	As with Sunday.

Configuring the UDM-RC02 Remote Control for Scheduling

NOTE

Ensure the relevant schedules have been 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. 88:

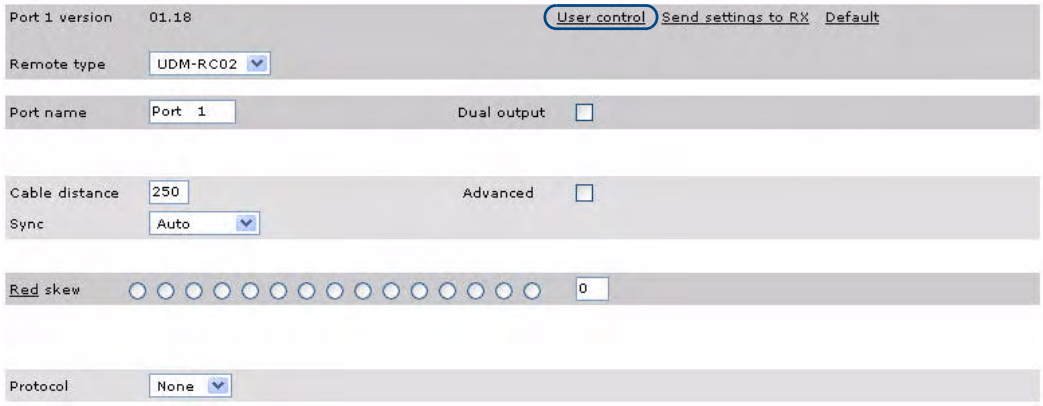


FIG. 88 Port Configuration options

2. Click on the **User Control** link at the top right of the page (see FIG. 88). This invokes the *Control Options* page for the selected Port (FIG. 89).

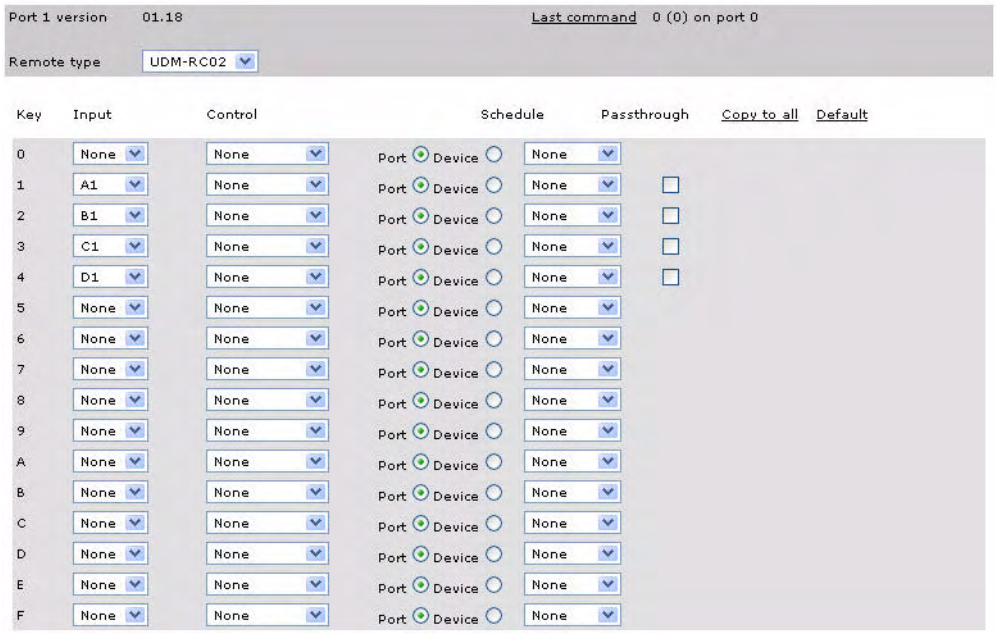


FIG. 89 Control Options page

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. 90).

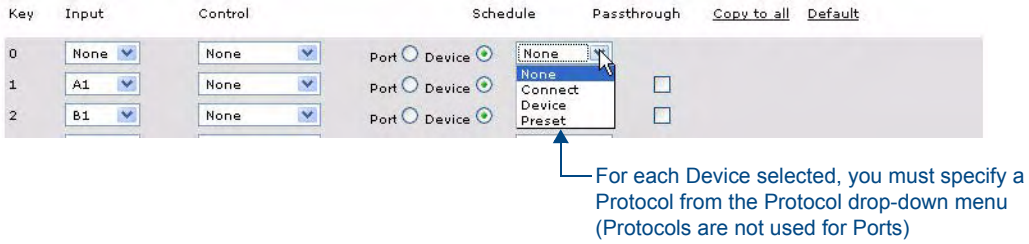


FIG. 90 Control Options page - Schedule drop-down menu

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

Protocols for serial and infrared devices used in the system can be created via options in the *Protocols* page. These protocols allow the UDM-1604C to control serial and infrared devices connected via the Hub. To access the Protocols page from any other Configuration page in the WebConsole, click on the *Protocols* link in the navigation pane (FIG. 91).

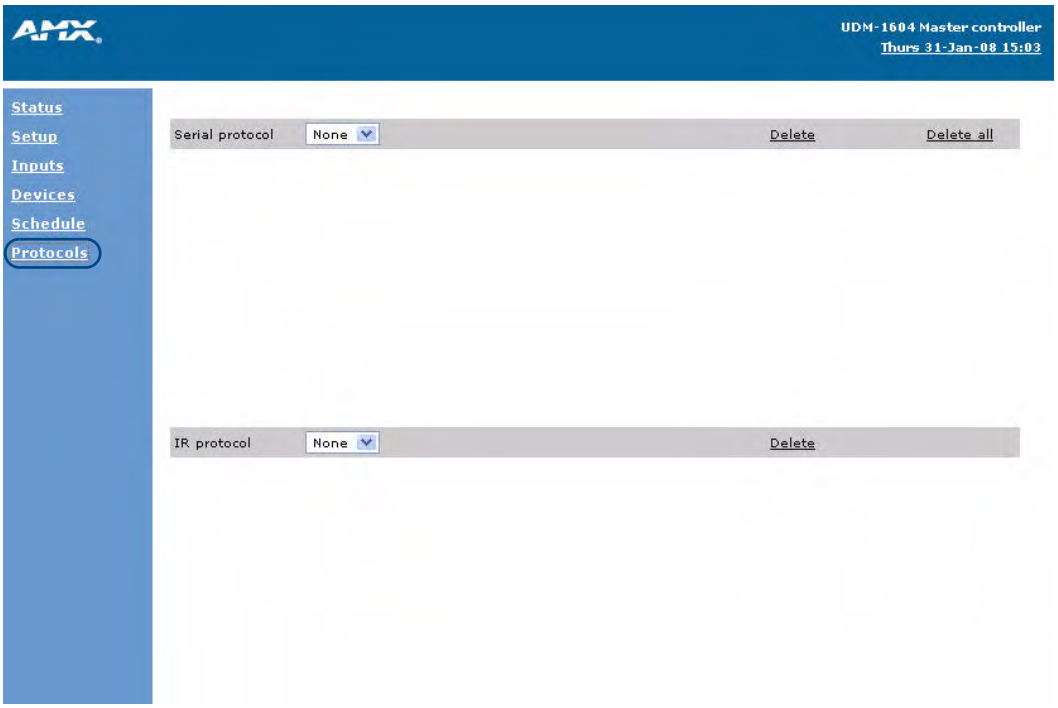


FIG. 91 Protocols Page

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 and
- Manufacturer's command strings equivalent to the command to be executed from the UDM-1604C.

For IR devices the device's IR controls (remote control key presses) will have to be learned by the UDM-1604C.

Creating a Serial Protocol

1. Open the *Serial Protocol* drop-down menu, and select **New** (FIG. 92).

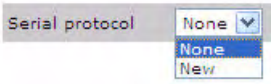


FIG. 92 Serial Protocol drop-down menu

This action invokes several additional fields: *Name*, *Settings* and *Initialise* (FIG. 93):

FIG. 93 Creating a new serial protocol

2. **Name** the serial protocol appropriately and assign the protocol **Settings** (baud rate and parity).

NOTE

When configuring the serial settings "OP" means Odd, Parity and "EP" means Even, Parity.

3. Click on **Initialise** to clear the UDM Receiver of any pre-loaded serial commands, and invoke the *Action* options shown in FIG. 94.

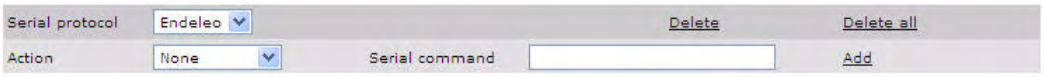


FIG. 94 Creating a serial command for the action

4. Select an Action to be performed from the *Action* drop-down menu (FIG. 95).

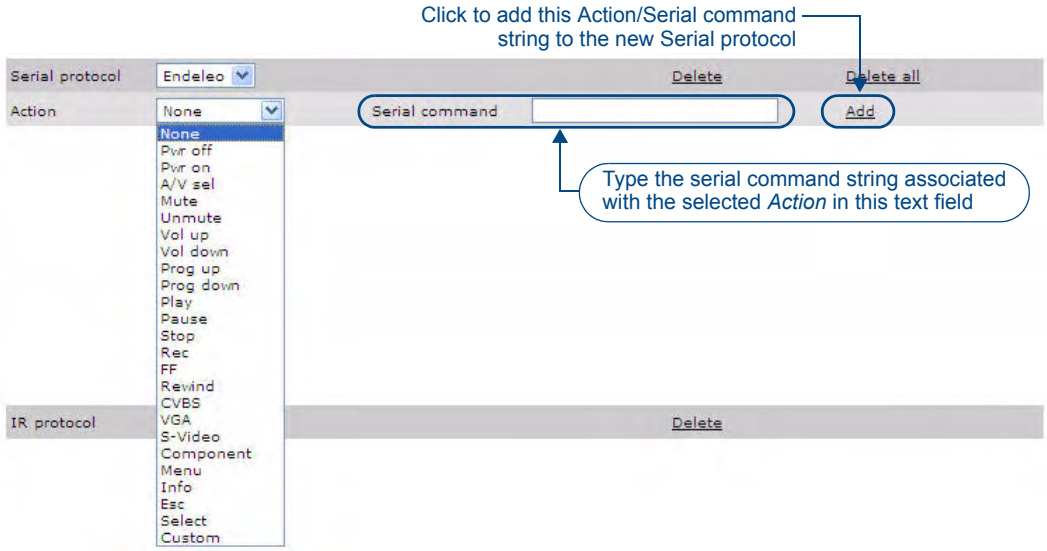


FIG. 95 Creating a serial command for the action

5. Enter the serial command (serial string) equivalent for this action in the **Serial command** text field.

NOTE

The serial string which reflects the action has to be accurate for the serial command to work. Consult the Manufacturer's web site or documentation to ascertain the correct string for this serial device.

6. Click **Add** to create the new protocol.
7. Repeat if necessary for other serial commands which are to be stored under this protocol name.

Once complete, the protocol can be assigned to relevant devices.

NOTE

It is presumed that the serial device connected to the Endeleo RX has the appropriate serial settings as described and the correct serial cable/pinouts configured in order to function correctly with the Receiver.

Updating the UDM Receiver With the Serial Protocol

The UDM-RX02 Receiver which will issue the relevant serial commands to the device must be connected to the UDM-1604C's relevant port (via Cat5/e/6 cable). Once the Serial Protocol and commands have been created, follow these steps to update the connected UDM Receiver with the new protocol:

WARNING

Remember the serial commands are stored within the UDM Receiver.

1. On the *Status* page (see FIG. 20 on page 27), click on the port number (hyperlink) to which the serial device is attached. This invokes the Port Configuration options for the selected Port.

NOTE

It is the Endeleo Receiver which will issue the serial command over the serial cable connected between the Receiver and the device.

2. Click on the *Protocol* drop-down menu (FIG. 96).

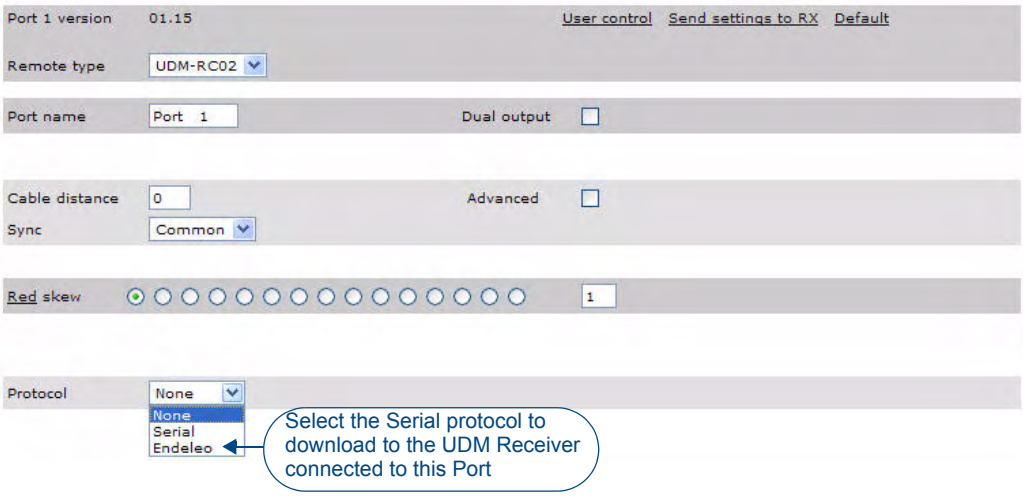


FIG. 96 Port Configuration options - Protocol drop-down menu

3. Select the Serial protocol which this UDM Receiver will download. This may take a few minutes depending on how many commands are within the protocol.
4. 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.

NOTE

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 e.g power off, power on. If new commands are to be created in 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 Receiver.

Creating and Learning an IR Protocol

IR protocols can be learned by the UDM-1604C by using the device's remote control to program its commands into the UDM-1604C. This is performed via options in the *Protocols* page.

NOTE

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

The UDM-1604C can learn between 8 and 25 IR commands, depending on the command length and protocol used.

IR Learning with a Device's Remote Control

1. In the *Protocol* page, open the *IR protocol* drop-down menu, and select **New** (FIG. 97).

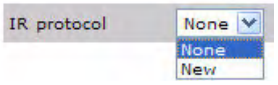


FIG. 97 IR Protocol drop-down menu

This action invokes two additional fields: *Name* and *Initialise* (FIG. 98):

FIG. 98 Creating a new IR protocol

2. Name the IR protocol appropriately, and click on **Initialise**.
3. Select the action which is to be performed from the *Action* drop down menu (e.g. *vol up* - FIG. 99).

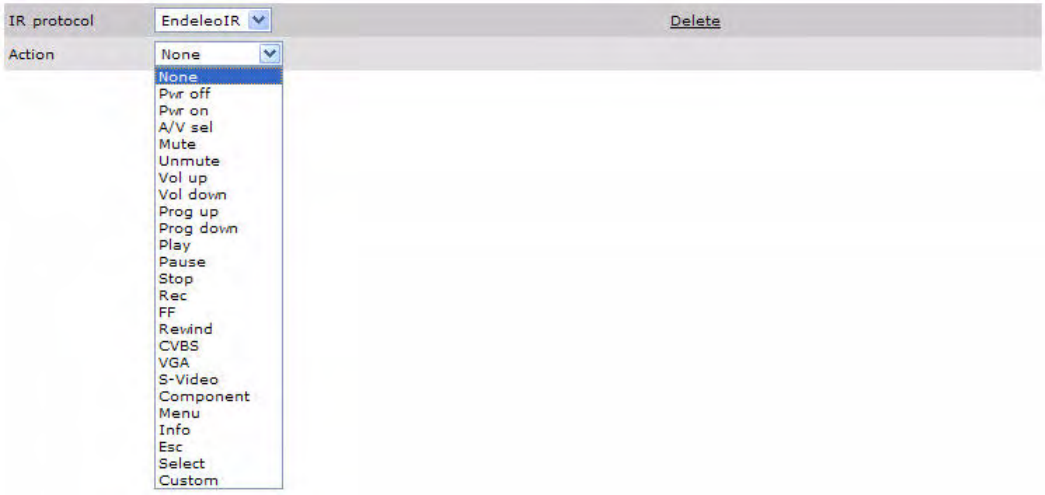


FIG. 99 IR protocol - Action drop-down menu

WARNING

Ensure the device's remote control is pointing to the IR sensor located at the front of the UDM-1604C when performing key presses. If not the key presses may not be stored in the UDM-1604C.

4. Click on **Step 1** (FIG. 100).

FIG. 100 Capturing IR Protocol - Step 1

5. A message saying *Press key on remote* will appear (FIG. 101).

FIG. 101 Capturing IR Protocol - "Press key on remote"

6. Click the key on the device's remote control which will manage the action *Power On*.
7. Click on **Step 2** to repeat the process for this command.
8. A message saying *Press key on remote* will appear. Click the key on the device's remote control which will manage the action *Power On*.

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).

Updating the UDM Receiver With the IR Protocol

WARNING

A UDM-RX01/02 Receiver, 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 Receiver.

1. Ensure the Infrared Protocol has been created previously.
2. Click on the **Status** page.
3. Click on the **port number** hyperlink which the device is attached to. It is the Receiver which will transmit the IR command to the devices IR interface.
4. Once the port properties become visible click on the arrow to the right of the **Protocol** field.
5. Select the IR protocol which this Receiver will download. This may take a few minutes depending on how many commands are within the table.
6. A message will appear saying *"Loading Protocol – Please wait"* once this has disappeared the IR protocol has been downloaded to the RX device. IR commands can now be sent from the Hub Web pages to the device.

Testing Serial Control Commands

Device serial codes can be tested via options in the *Status* page, before they are added to the protocol library.

NOTE

Serial commands are stored in the UDM-RX02, and care should be taken to keep any serially programmed units associated with the correct display device type.

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

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. 102.

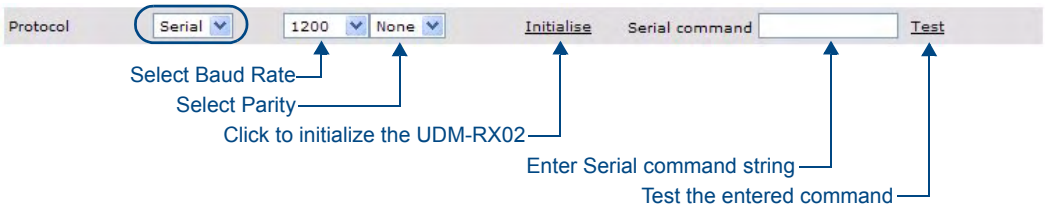


FIG. 102 Serial configuration options

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 74 *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. 102).

   The UDM-1604C 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. 103) 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. 103 Panasonic screen - command screen

6. Once you have finished entering the string you can test that it operates as expected, via the **Test** hyperlink. This sends the string typed into the *Serial Command* text box 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-1604C.

See the *Ascii / Hex Conversion* section on page 117 for details.

Deleting Protocols

Protocols can be deleted individually by type (Delete) or all protocols can be removed from the UDM-1604C (Delete all) i.e. all serial and all Infrared protocols can be deleted using Delete All.

1. Click on the **Protocols** option.
2. To delete a protocol click the **Delete** hyperlink in the serial section to delete a serial protocol or click the **Delete** hyperlink in the Infrared section to delete an infrared protocol.

The last created or currently highlighted serial or infrared protocol will be deleted when using the Delete hyperlink.

Deleting All Protocols (Serial and IR)

All protocols can be deleted from the UDM-1604C.

1. Click on the **Protocols** option.
2. To delete all protocols click the **Delete all** hyperlink in the Serial section i.e. the top half of the screen. This deletes **all Serial** and **all Infrared** protocols.

Cascading Hubs

Distributing Video - Using Cascade Kits

To ensure that customers are satisfied with the operation of the UDM-1604C even as video resolutions increase, *AMX recommends that ALL new installations of the UDM-1604C requiring cascade capability use kit **FG1402-61K** or kit **FG1402-62K** as an alternative to the cascade ports built into the UDM-1604C. These Cascade kits use Solecis Distribution Amplifiers (rather than the Cascade ports) to distribute Video.*

This will offer the best video performance without compromising any flexibility, and should be used for all video types (Composite, S-Video, Component, RGBHV).

NOTE

For all new installations, the CASCADE connectors should only be used to cascade audio. See the Cascading Audio section on page 88 *for details.*

Each Solecis Distribution Amplifier distributes one video source to up to six target devices (in this case, UDM-1604C Hubs).

Compatible Solecis Distribution Amplifiers include:

Solecis Distribution Amplifiers		
Product Name	**Description**	**FG#**
AVB-DA-RGBHV-0102	1x2 RGBHV HD-15 Distribution Amplifier	FG1340-1200-01
AVB-DA-RGBHV-ST-0102	1x2 RGBHV HD-15 Stereo Distribution Amplifier	FG1340-1101-02
AVB-DA-RGBHV-0103	1x3 RGBHV BNC Distribution Amplifier ***Note**: This DA requires a BNC-to-HD-15 adapter cable to connect to the UDM-1604C.*	FG1340-3403-01
AVB-DA-RGBHV-0104	1x4 RGBHV HD-15 Distribution Amplifier	FG1340-3404-01
AVB-DA-RGBHV-0106	1x6 RGBHV BNC Distribution Amplifier ***Note**: This DA requires a BNC-to-HD-15 adapter cable to connect to the UDM-1604C.*	FG1340-4516-01
AVB-DA-RGBHV-HD15-0106	1x6 RGBHV HD-15 Distribution Amplifier	FG1340-4616-01

NOTE

Refer to each Solecis Distribution Amplifier Installation Guide for detailed product specifications and installation instructions.

The examples and figures in this section use the Solecis AVB-DA-RGBHV-0104 1x4 RGBHV HD-15 Distribution Amplifier (FG1340-3404-01).

Using Solecis Distribution Amplifiers to Distribute Video

1. Connect the video output from each source A/V device to the VIDEO INPUT connector on the Solecis Distribution Amplifier (DA). Each source A/V device should be connected to a Solecis (DA).
2. Connect the VIDEO OUTPUT connectors on the Solecis DA to the VIDEO IN connectors on each UDM-1604C.

The illustration in FIG. 104 shows all four video outputs on the Solecis DA connecting to Video Input A, on four UDM-1604C Hubs.

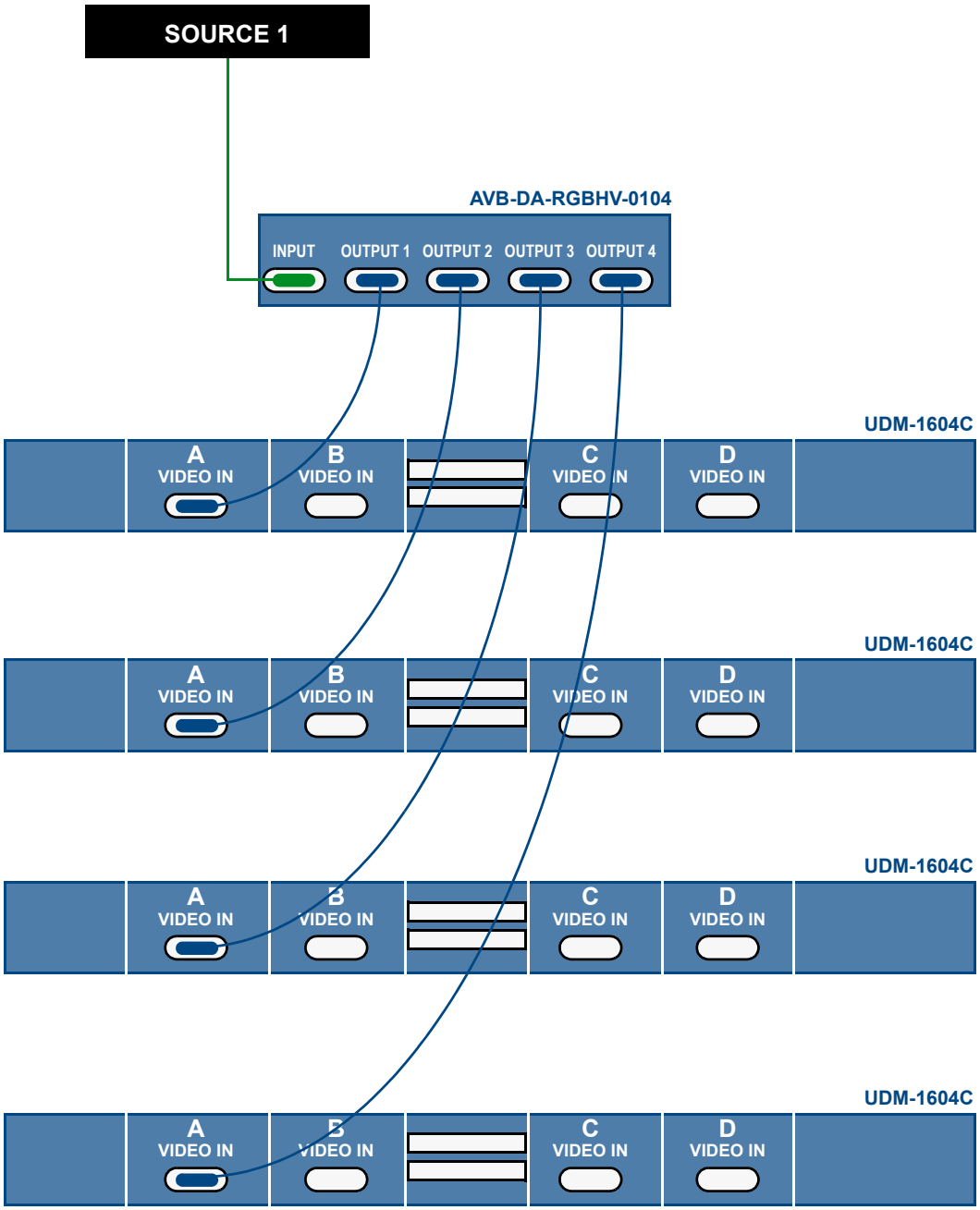


FIG. 104 Using Solecis Distribution Amplifiers to Distribute Video

FIG. 105 illustrates the video connection layout for a system using four source A/V devices, four Solecis DAs, and four UDM-1604C Hubs (Master Hub plus three Target Hubs):

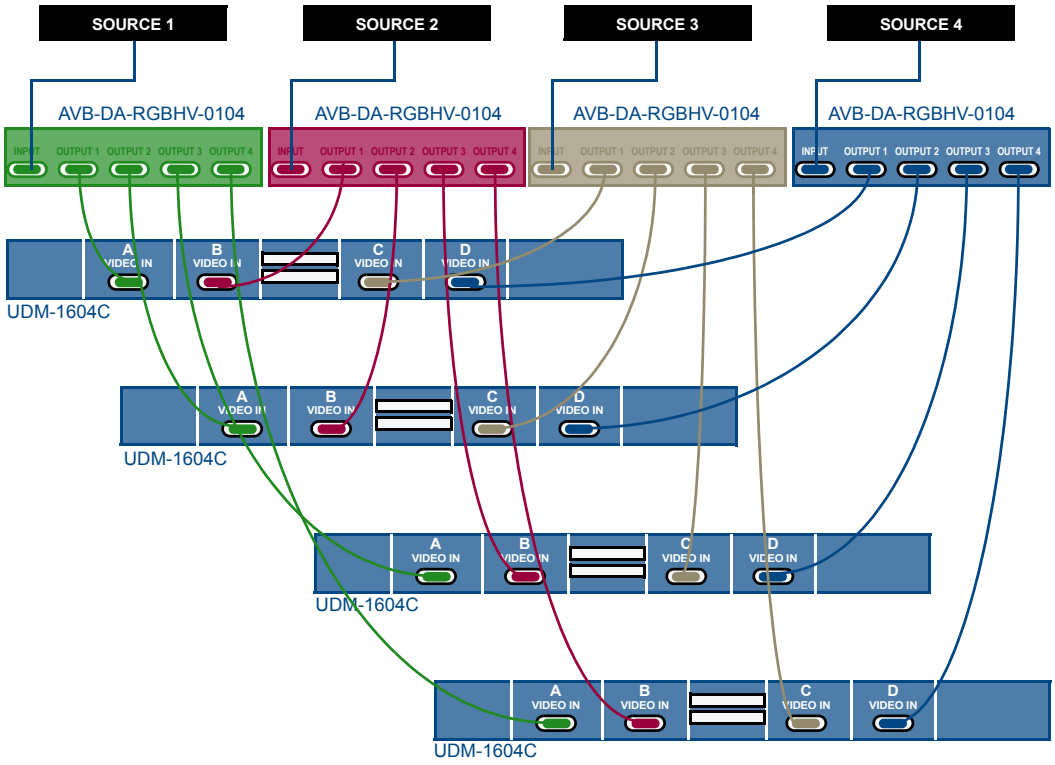


FIG. 105 Video Distribution System

Distributing Video - Cascading One UDM-1604C Hub

FIG. 106 illustrates an A/V distribution system using two Solecis DAs to distribute video, and one target UDM-1604C Hub to cascade audio to (up to) 32 display devices (16 outputs per UDM-1604C Hub):

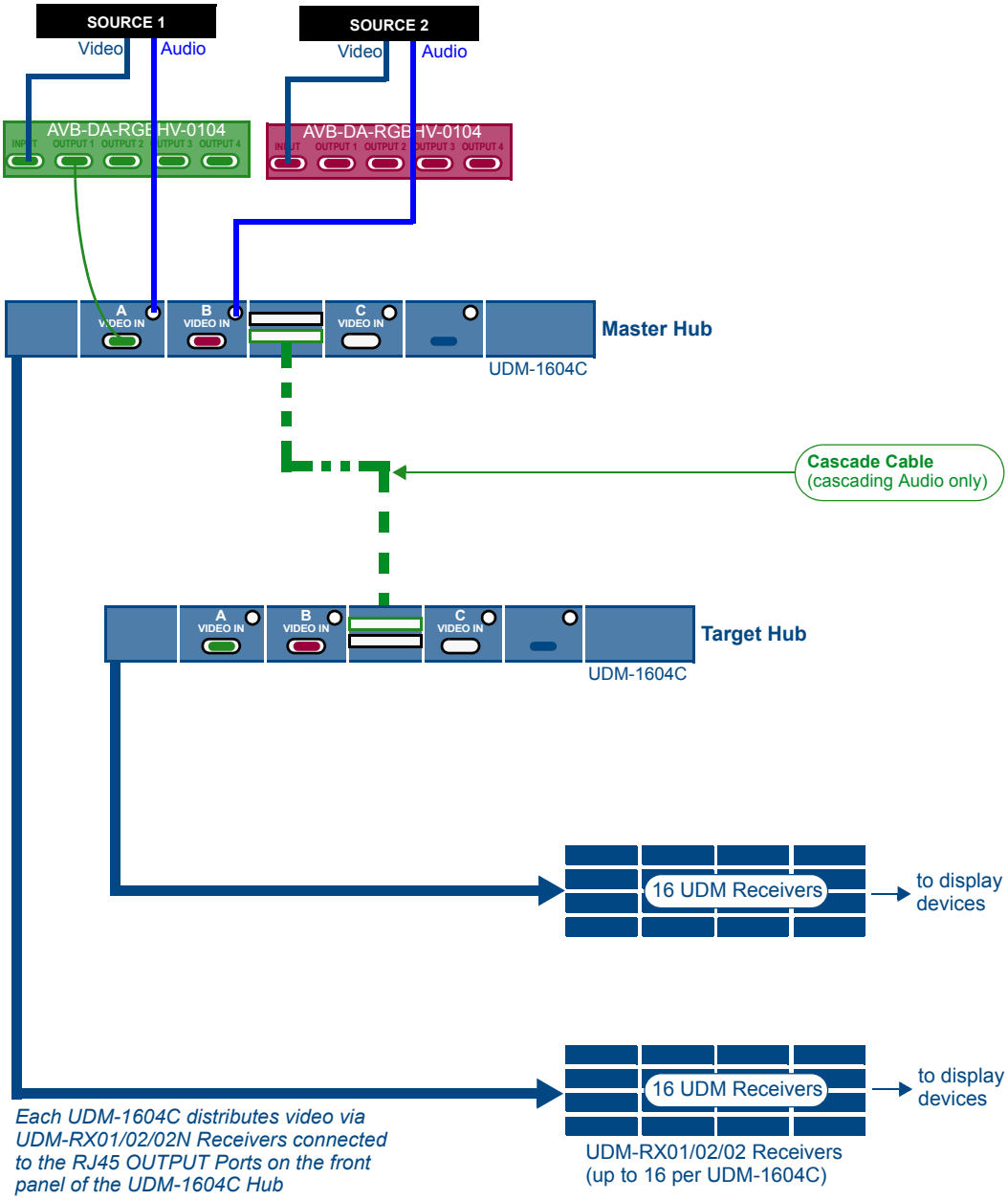


FIG. 106 Cascading One UDM-1604C Hub (using Video Distribution)

Distributing Video - Cascading Two UDM-1604C Hubs

FIG. 107 illustrates an A/V distribution system using three Solecis DAs to distribute video, and two target UDM-1604C Hubs to cascade audio to (up to) 48 display devices (16 outputs per UDM-1604C Hub):

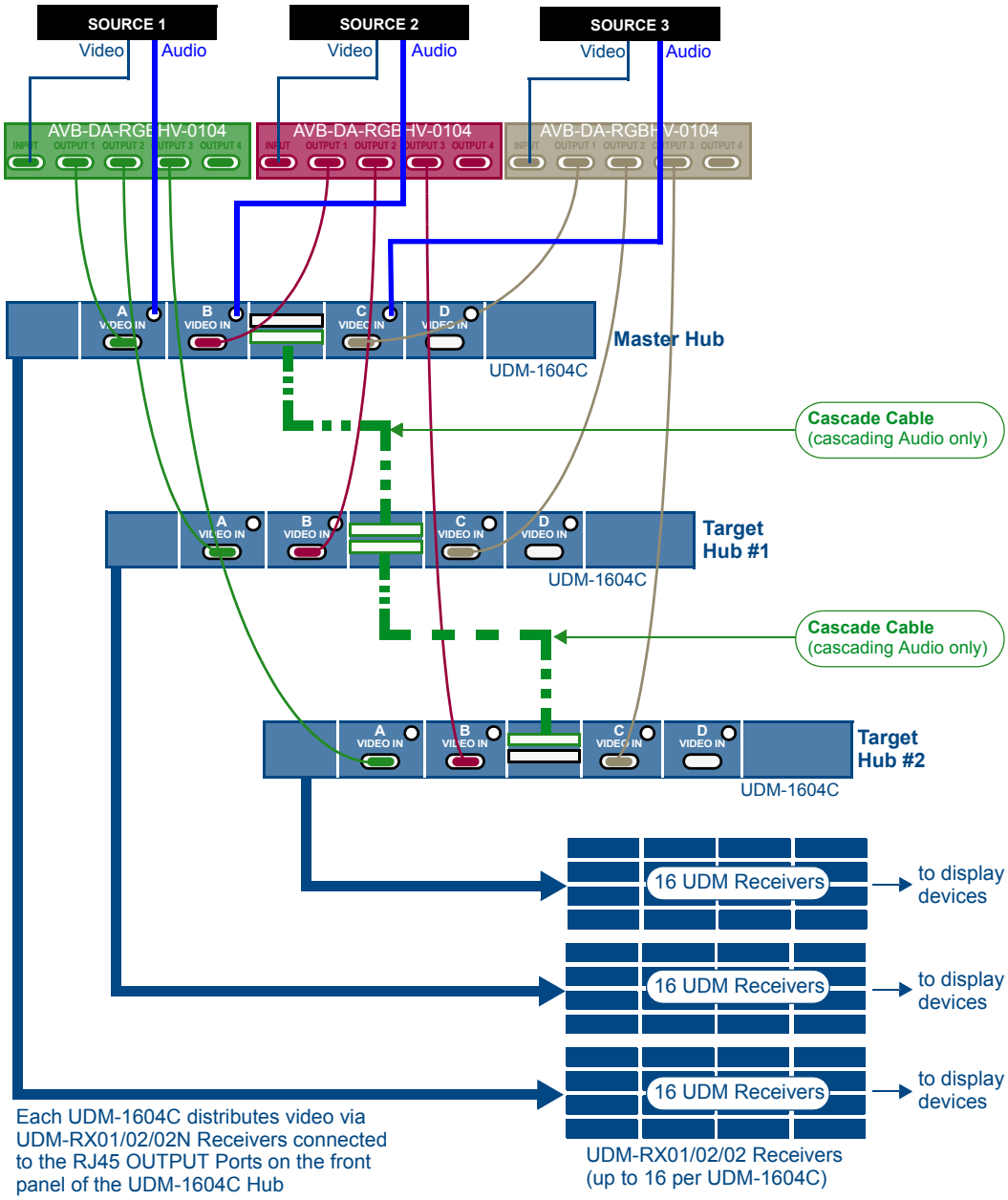


FIG. 107 Cascading Two UDM-1604C Hubs (using Video Distribution)

CASCADE IN/OUT Connectors

The CASCADE IN and OUT connectors on the UDM-1604C require a UDM-EXP-01 50-Pin Hub Expansion Cable (**FG-UDM-EXP01** - not included). The CASCADE IN and OUT connectors on the UDM-1604C are intended to be used for cascading audio only.

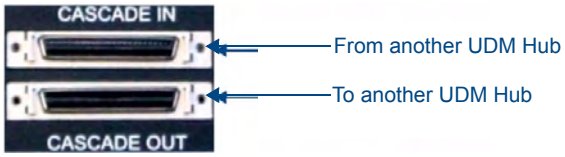


FIG. 108 Cascade In/Out Ports

NOTE

For all new installations, the recommended method for video distribution uses Solecis Distribution Amplifiers, rather than the CASCADE IN/OUT Ports (see the Distributing Video - Using Cascade Kits section on page 79*).*

Cascaded Hub Connection Diagrams

FIG. 109 illustrates a cascaded UDM system with a Master Hub and one target Hub to cascade audio/video to (up to) 32 display devices (16 outputs per UDM-1604C Hub):

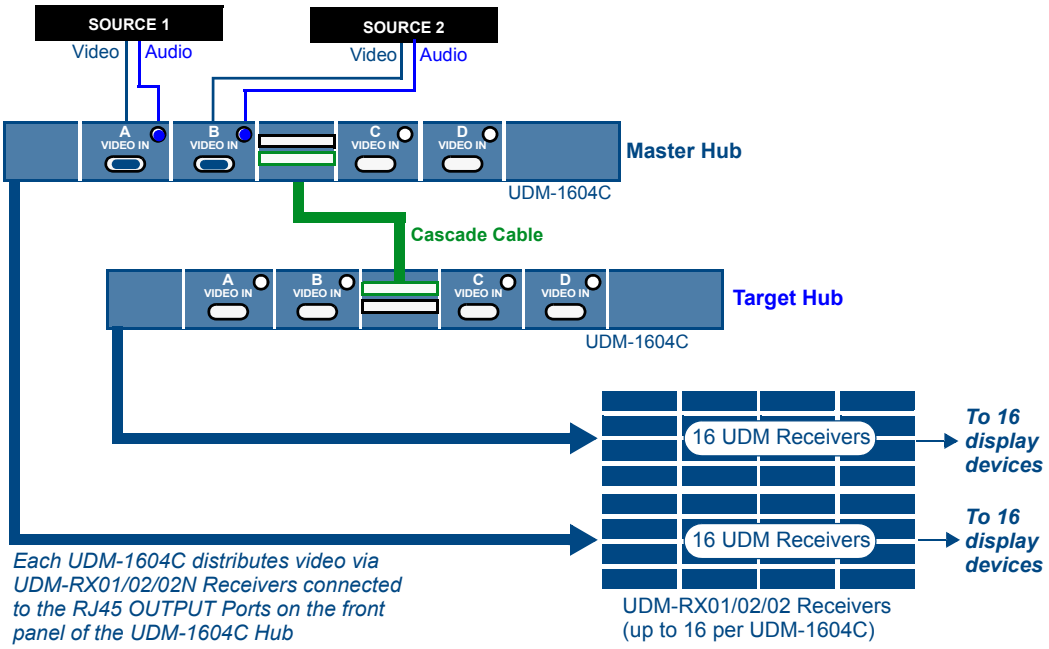


FIG. 109 Cascading One UDM-1604C Hub

FIG. 109 illustrates an cascaded UDM system with a Master Hub and one target Hub to cascade audio/ video to (up to) 32 display devices (16 outputs per UDM-1604C Hub):

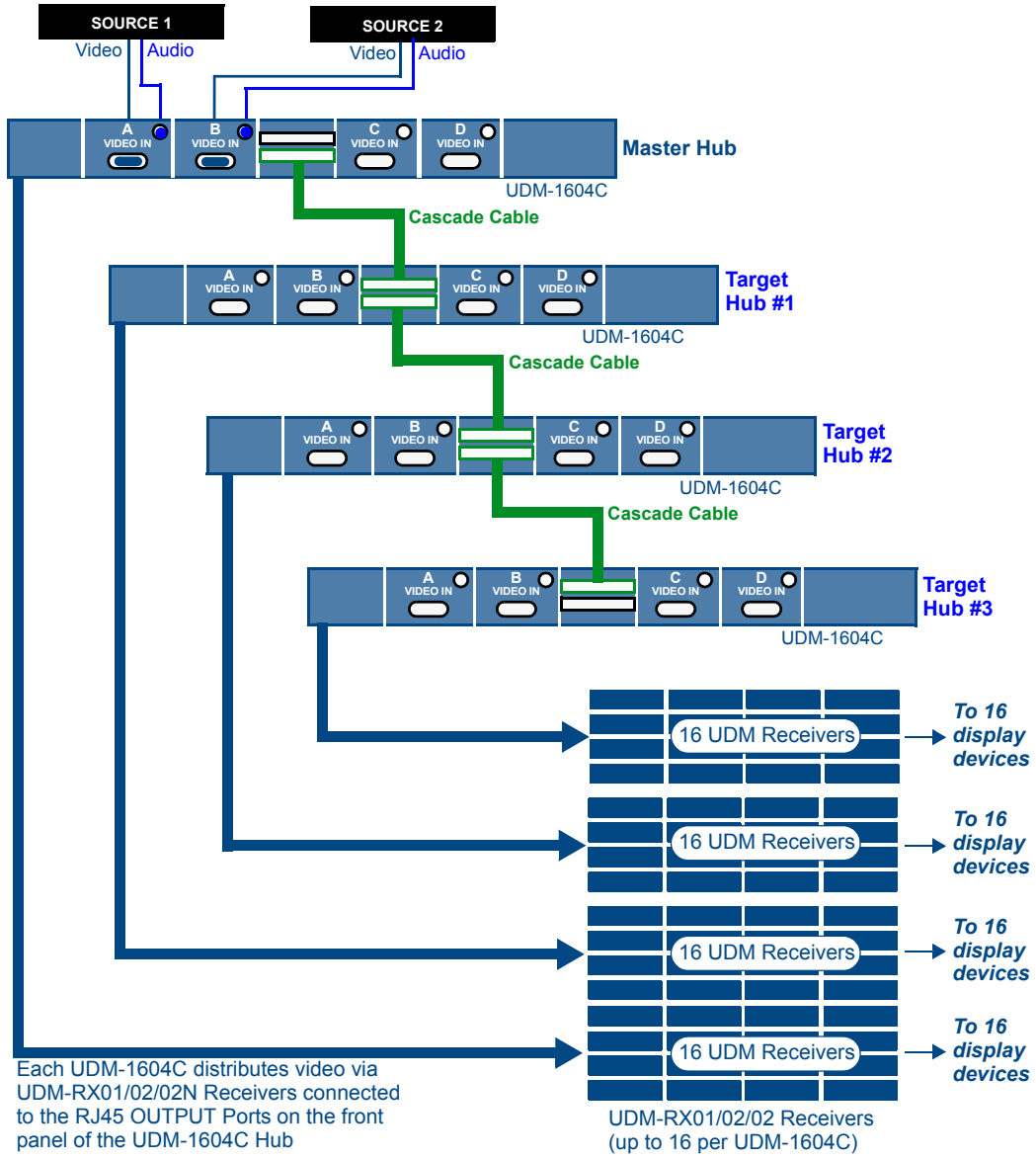


FIG. 110 Cascading 3 UDM-1604C Hubs

Configuring the Master Hub

NOTE

The "Master" Hub refers to the first Hub in a cascaded chain. All other (downstream) hubs are considered to be "Target" (or "slave") Hubs.

In a multi-Hub installation, the first UDM Hub in the chain must be configured through the Hub's built-in WebConsole as a *Master* Hub. Subsequent Hubs in the chain should be configured as *Target* (or "slave") Hubs. Each system can have only one Master Hub, and in theory there is no limit to the amount of cascaded (Target) Hubs allowed.

NOTE

For all new installations, the recommended method for video distribution uses Solecis Distribution Amplifiers, rather than the CASCADE IN/OUT Ports (see the Distributing Video - Using Cascade Kits section on page 79*).*

To configure a Hub as the Master Hub in a Cascaded system;

1. In the WebConsole, click on the **Setup** option.

NOTE

See the Configuration section on page 25 *for details on the WebConsole.*

2. Click on the **Cascade master** option (FIG. 111).

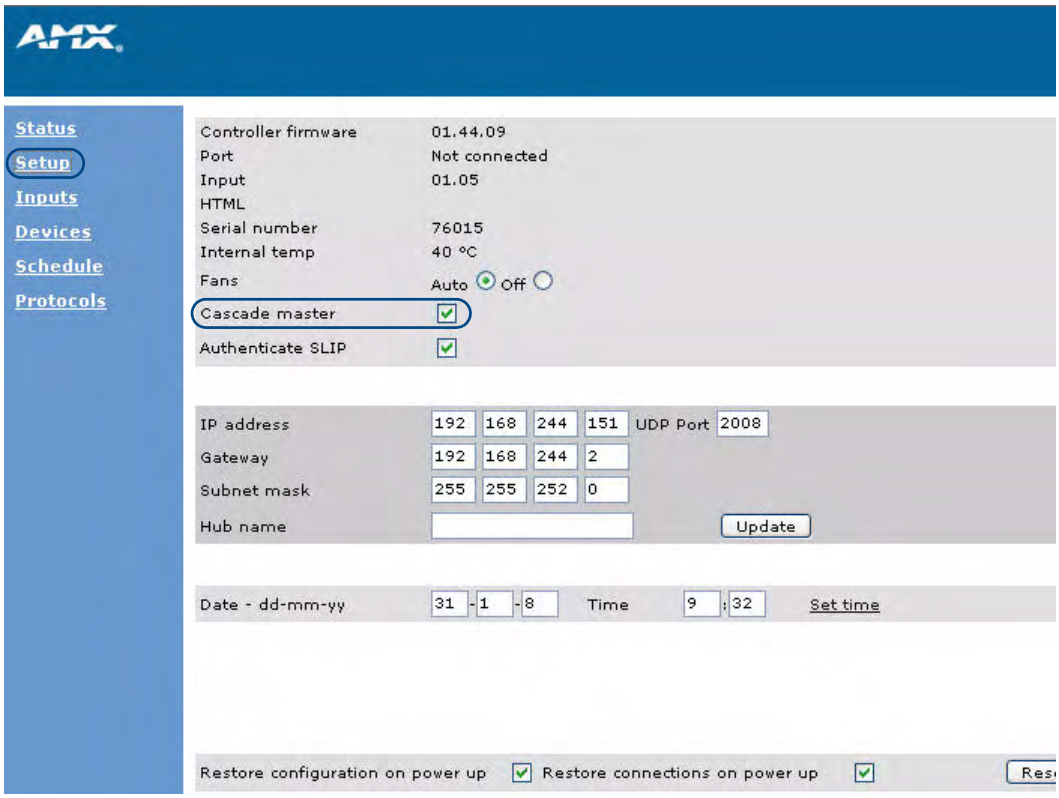


FIG. 111 Setup page - Cascade Master option

Configuring Cascaded Video

Cascaded video sources are connected to the Master Hub and passed down to Target (or "slave") Hubs via the CASCADE OUT port (using the optional 50-pin CASCADE cable - FG-UDM-EXP01).

Any video inputs that are checked as *Cascade* in the Inputs page will replace the available video inputs on the Target Hub.

This allows you to create a matrixed 4x32 (or larger, 4x48, 4x64 etc) system, or create zones of users pulling from different sets of sources with certain sources from the Master UDM made available to all users.

NOTE

For all new installations, the recommended method for video distribution uses Solecis Distribution Amplifiers, rather than the CASCADE IN/OUT Ports (see the Distributing Video - Using Cascade Kits section on page 79*).*

Options in the Hub's WebConsole (*Inputs* page), allow you to define which Video and Audio inputs on each UDM Hub are *Local* (connected directly to the Hub) and which are *Cascaded* from another Hub (FIG. 112).

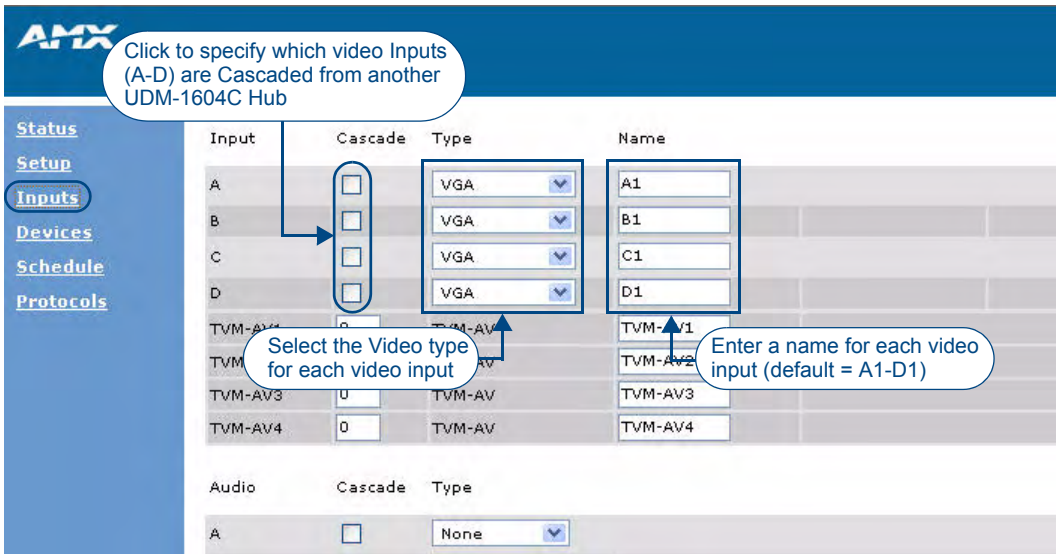


FIG. 112 Inputs Page - Cascade Input options

The method described here for cascading video via the CASCADE OUT port (using the optional FG-UDM-EXP01 CASCADE cable) is recommended only for systems with up to three cascaded Hubs.

For optimal performance, Video Distribution (using Solecis Distribution Amplifiers) is recommended - see the *Distributing Video - Using Cascade Kits* section on page 79 for details.

To configure one or more video inputs as cascaded inputs;

1. In the WebConsole, click on the **Inputs** option.
2. Under **Input** at the top of the *Inputs* page, click the **Cascade** checkbox for each cascaded video input that this Hub will receive via the CASCADE IN port (FIG. 112*)*.
3. For each video input (including cascaded video inputs), select the type of video being received in each Input port from the **Type** drop-down menus.
4. For each video input (including cascaded video inputs), enter a name in the **Name** text fields. Renaming the video inputs will make it easier to track which Video Inputs are on each Hub in a cascaded system.

Cascading Audio

Audio is cascaded via the CASCADE ports on the rear panel. To cascade audio, the audio from each source should be connected to the audio inputs on the rear panel of the Master Hub. All downstream UDM Hubs receive audio via the CASCADE Connectors (using the optional 50-pin CASCADE cable - FG-UDM-EXP01).

FIG. 113 illustrates connecting audio from 4 source devices to the UDM-1604C:

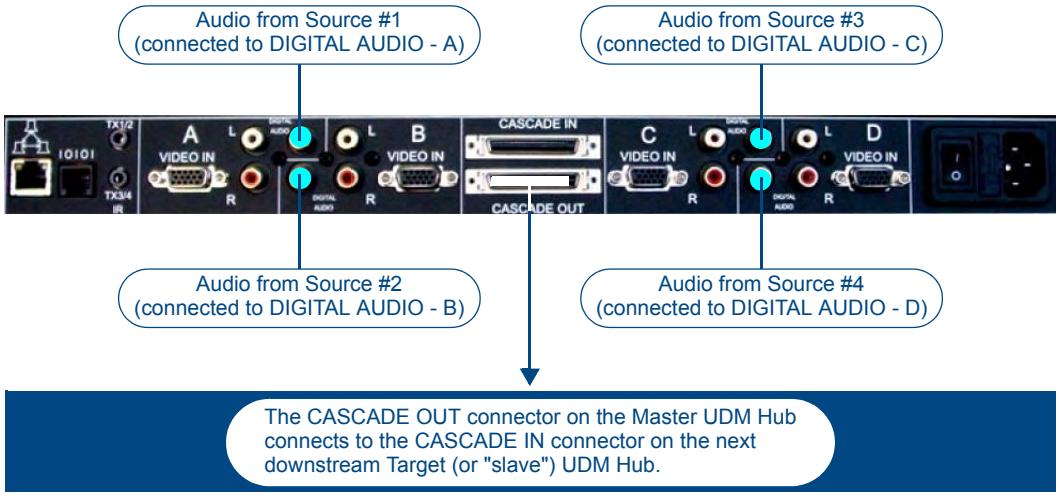


FIG. 113 Cascading Audio

NOTE

In this example, all four source A/V devices are utilizing the Digital Audio inputs on the UDM-1604C. For analog stereo input, use the R/L inputs instead.

Configuring Cascaded Audio

Any audio inputs that are checked as *Cascade* in the Inputs page will replace the available audio inputs on the Target Hub.

Options in the Hub's WebConsole (*Inputs* page), allow you to define which Video and Audio inputs on each UDM Hub are *Local* (connected directly to the Hub) and which are *Cascaded* from another Hub (FIG. 114).

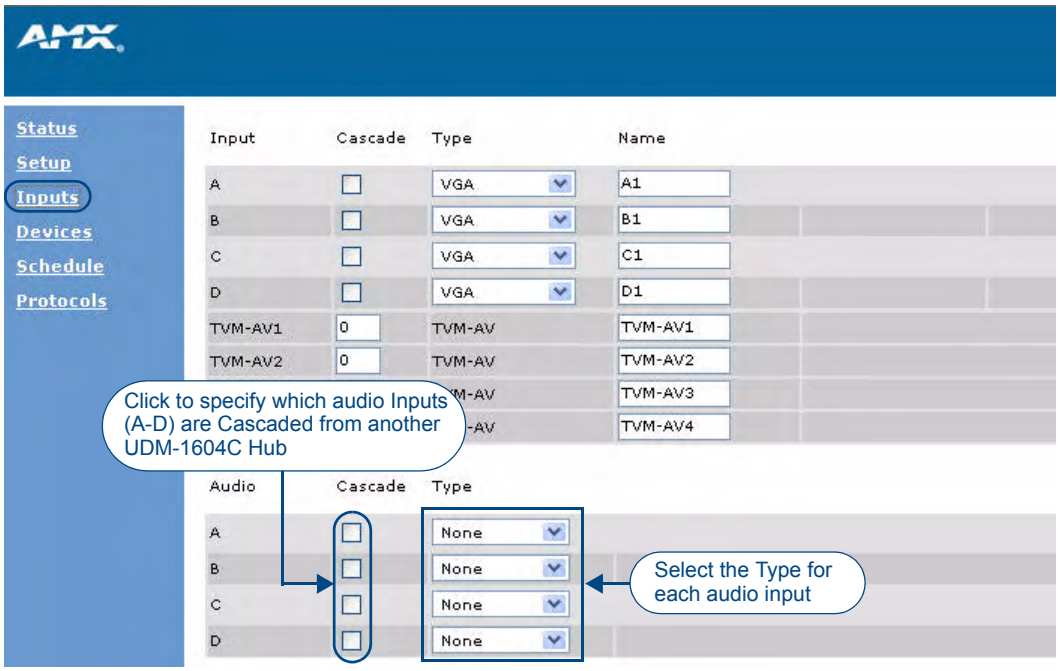


FIG. 114 Inputs Page - Cascade Input options

To configure one or more audio inputs as cascaded inputs;

1. In the WebConsole, click on the **Inputs** option.
2. Under **Audio**, click the **Cascade** checkbox for each cascaded audio input that this Hub will receive via the CASCADE IN port (FIG. 114).
3. For each audio input (including cascaded audio inputs), select the type of audio (*analog* or *digital*) being received in each Input port from the **Type** drop-down menus.

Example 1 - Cascading One Hub

In this system there is a Master Hub, and one Target (or "slave") Hub.

While the Inputs for UDM-1604C Hubs are physically labelled A, B, C and D on the rear panel, they can be renamed via the **Name** field in the *Inputs* page. It is recommended that you rename the ports on the Master and Target Hubs to make it easy to tell which between the ports are on the Master and which the ports are on the Target Hub.

For this example:

- The inputs on the Master Hub have been named "**A**", "**B**", "**C**" and "**D**".
- The inputs on the Target Hub have been named "**E**", "**F**", "**G**" and "**H**" (FIG. 115).

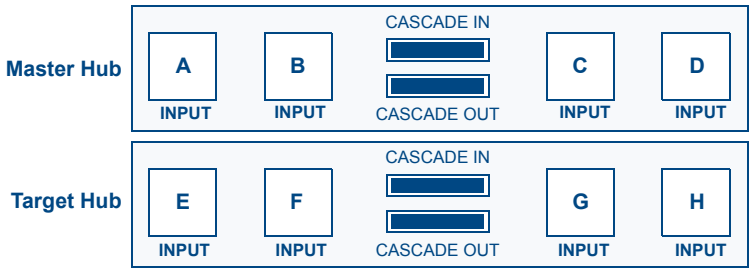


FIG. 115 Example - Port naming on a Cascaded 2-Hub system

The Master Hub can distribute Inputs "**A**", "**B**", "**C**", and "**D**".

On the Master Hub, video Inputs "**A**" and "**C**" are selected to Cascade, via the **Cascade** options at the top of the *Inputs* page (FIG. 116):

MASTER Hub (Inputs page)

Input	Cascade	Type	Name
A	☑	VGA	A
B	☐	VGA	B
C	☑	VGA	C
D	☐	VGA	D

FIG. 116 Master Hub - Inputs A and C selected to Cascade

NOTE

*The **Cascade** option on the corresponding Input which is actually being cascaded does not need to be checked in its Hub. Only the Inputs through which the signal will cascade need to be configured as Cascade.*

As a result, inputs "**E**" and "**G**" on the Target Hub will present the *Cascaded* inputs "**A**" and "**C**" from the Master Hub (as opposed to the *Local* Inputs "E" and "G"), as indicated in FIG. 117:

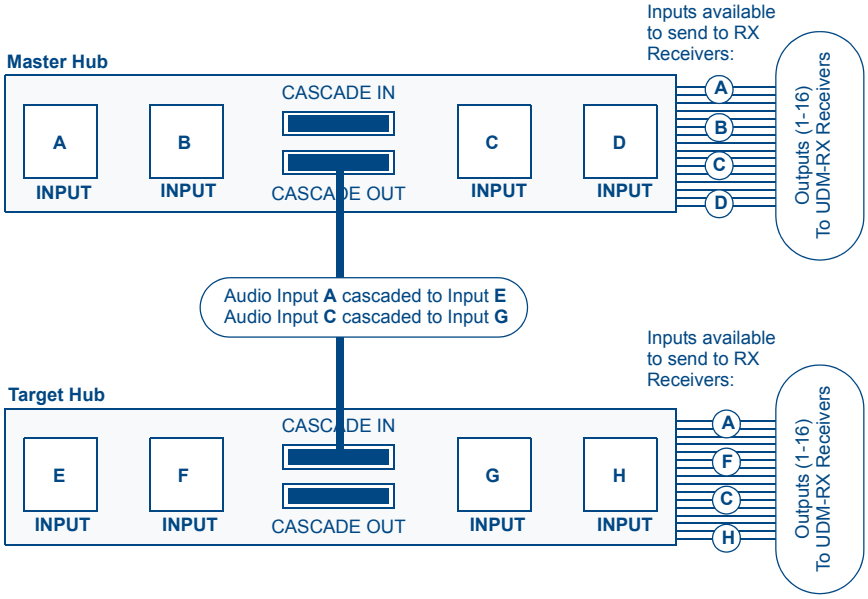


FIG. 117 Two Cascaded Hubs

Example 2 - Cascading Two Hubs

In a cascaded two Hub system, there is a Master Hub, and two Target Hubs.

Again, in this example assume that the Inputs on the Master Hub are named "**A**", "**B**", "**C**" and "**D**", and the inputs on the first Target Hub are named "**E**", "**F**", "**G**" and "**H**".

Further assume that the Inputs on the second Target Hub have been named "**I**", "**J**", "**K**" and "**L**" (FIG. 118).

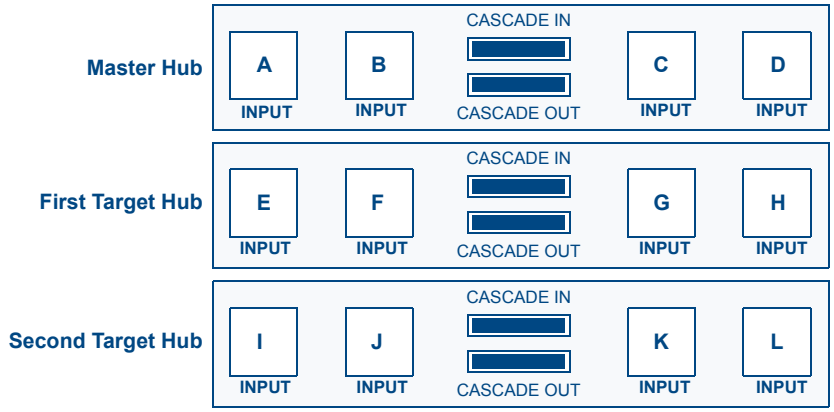
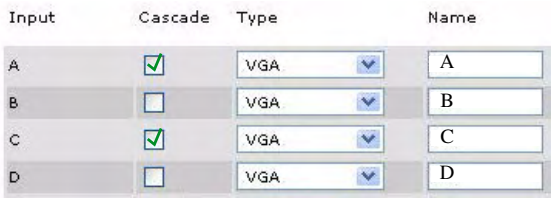


FIG. 118 Example - Port naming on a Cascaded 3-Hub system

Again, the Master Hub can only distribute Inputs "**A**", "**B**", "**C**", and "**D**".

Again, via the *Cascade* options in the Inputs page for the Master Hub, Inputs "**A**" and "**C**" are selected to Cascade (FIG. 116):

Master Hub (Inputs page)



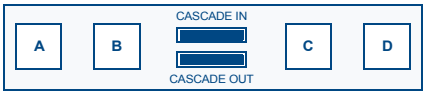


FIG. 119 Master Hub - Inputs A and C selected to Cascade

In this case the *Cascade* options in the Inputs page for the first Target Hub, Inputs "**E**" and "**H**" are selected to Cascade (FIG. 120):

First Target Hub (Inputs page)

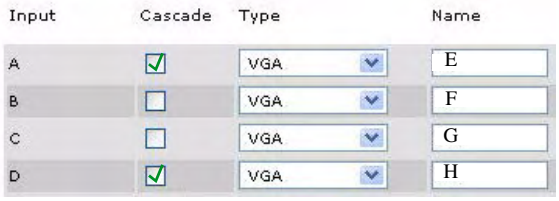


FIG. 120 First Target Hub - Inputs E and H selected to Cascade

NOTE

*The **Cascade** option on the corresponding Input which is actually being cascaded does not need to be checked in its Hub. Only the Inputs through which the signal will cascade need to be configured as Cascade.*

As a result, inputs "**J**" and "**K**" on the second Target Hub will present the *Cascaded* inputs "**F**" and "**C**" from the first Target Hub (as opposed to the *Local* Inputs "**I**" and "**G**"), as indicated in FIG. 121:

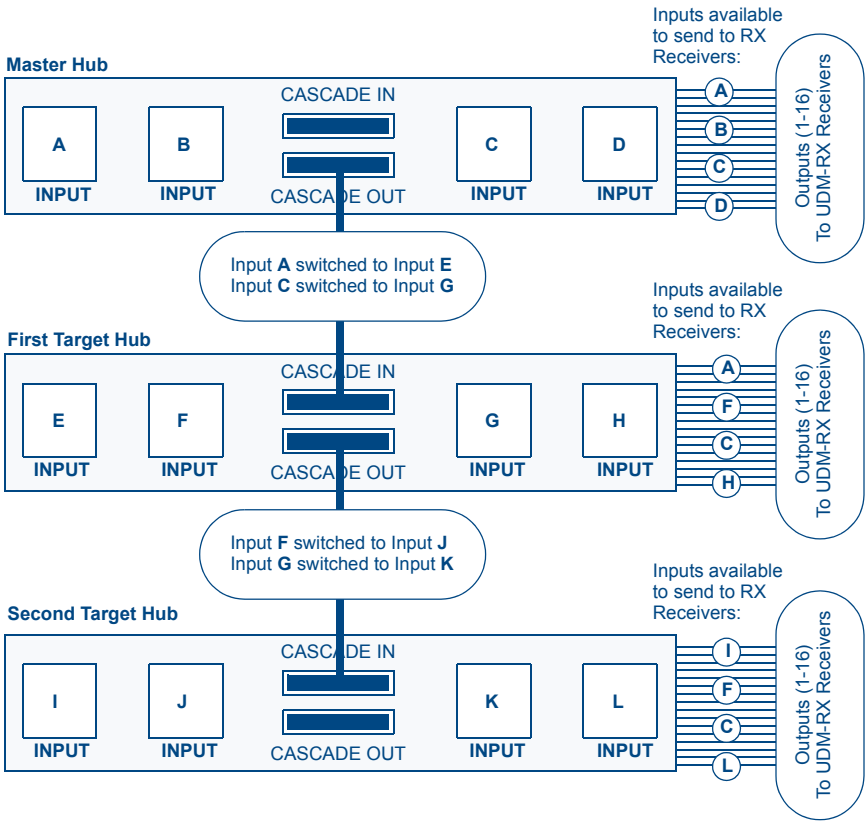


FIG. 121 Three Cascaded Hubs

Since inputs "**A**" and "**C**" on the Master Hub were cascaded to the first Target Hub, and inputs "**E**" and "**H**" were cascaded to the second Target Hub, the second Target Hub can distribute Input "**C**" from the Master Hub.

Advanced Administration

Overview

System upgrades of the UDM Hub can be performed following consultation with Endeleo support. Upgrade files can be downloaded from the Endeleo web site.

Tools required to perform system upgrades include;

- TFTP client;
- Necessary files (e.g. RX firmware, Hub Firmware, Port Controller, Web Pages, Input Ports, EPLDs)
- Working knowledge of UDM Hub.

NOTE

Due to changes in Web page and Hub files since a previous download, loading new web page, configuration, or Hub files may require a complete reinstallation of all pertinent firmware. If the latest Web page or Hub file version number does not match the UDM's firmware version number, reloading the latest firmware file, configuration file, and web page file may be necessary

Upgrading Firmware and Web Pages On a UDM Hub

The following procedures can also be used to upgrade the Web Page archive on the UDM Hub. Replace filenames appropriately.

Firmware Update

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.

Obtain the firmware and Web Pages files and store them in a directory or folder on your PC. For example, create **C:\UDM\Hub**.

1. Run your TFTP client. If using the Windows client, move to step 2.
2. For the Windows TFTP client, start a command session on the PC. Change to the directory where the .ROM files are stored on the PC (e.g. **cd\udm** and **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 F03121614300.ROM** will upload the file F03121614300.ROM to the UDM Hub with IP address 192.168.0.96.

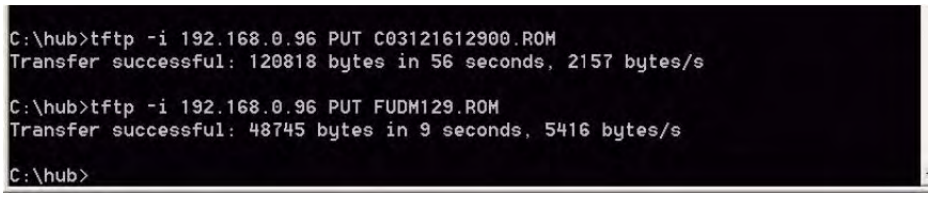


FIG. 122 Issuing TFTP commands to the Hub

4. Press **Enter** to execute the command.
5. A successful transfer message should be returned. This may appear after a minute or so, depending on the network environment and the size of the file.

6. The network connection to the Hub will be broken as the Hub will reset. It is recommended that the Hub is **powered off** and then powered on at this point.
7. The command window can be closed, or you may continue on to the Web Interface file.

Web Interface Update

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.

Obtain the firmware and Web Pages files and store them in a directory or folder on your PC. For example, create **C:\UDM\Hub**.

1. Run your TFTP client. If using the Windows client, move to step 2.
2. For the Windows TFTP client, start a command session on the PC. Change to the directory where the .ROM files are stored on the PC:

   e.g. **cd\udn** and **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 C03121614300.ROM** will upload the file C03121614300.ROM to the UDM Hub with IP address 192.168.0.96.
4. Press **Enter** to execute the command.
5. A successful transfer message should be returned. This may appear after a minute or so, depending on the network environment and the size of the file.
6. The network connection to the Hub will be broken as the Hub will reset. It is recommended that the Hub is **powered off** and then powered on at this point.
7. The command window can be closed, or you may continue on to the Web Interface file.

Upgrading Port Controllers

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. Obtain the Port Controller file and store it in a directory or folder on your PC. For example, create **C:\UDM\Port**.
2. Run your TFTP client. If using the Windows client, move to step 2.
3. Start a command session on the PC. Change to the directory where the .ROM files are stored on the PC:

   e.g. **cd\udm** and **cd\port**
4. 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 port 1 on the UDM Hub with IP address 192.168.0.96.
5. Push **Enter** to execute the command.
6. 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, enter **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.

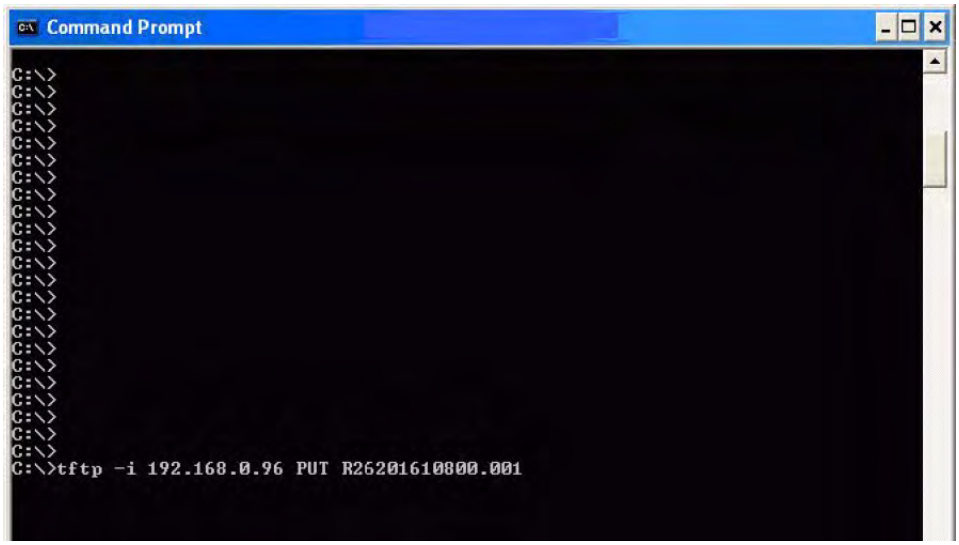


FIG. 123 Issuing TFTP commands to the UDM Receiver via the UDM Hub

7. The command window can be closed.

Copying the Hub Configuration File

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

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.

Create a directory or folder on the PC to store the configuration file. For example, create **C:\UDM\Config**.

To backup 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:

   e.g. **cd\udm** and **cd\config**.
3. Type in the following command at the prompt, observing the parameters below:

   TFTP -i [*IP address*] **get hxxxxx.hub**

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

   The file name must start with an **h**.

   If the name of the Hub Configuration file is not known, typing in **h** followed by any logical characters will find the file, as only one file beginning with **h** is in the UDM Hub.

   Use a name that will identify the Hub configuration file for the project. For example, **hmyproject.hub** is an acceptable name.
4. When complete, close the command window.

Restoring the UDM-1604C 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:

   e.g. **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**.

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 On the UDM-1604C

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 UDM Receivers

Once protocols have been learned by the Hub through the Web browser, they will remain on the Hub. Protocols are assigned to individual UDM Receivers (UDM-RX01) by using the Web interface pages.

- The protocols can be transferred between UDM hubs by using the TFTP file transfer utility.
- All learned protocols are stored in the Hub in a file starting with either an **i** or an **s**.

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.

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

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. Change to the directory where the Hub Protocol file is to be stored on the PC:

   e.g. **cd\udm** and **cd\protocol**.
3. 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 **ixxxxxx.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.

4. 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:

   e.g. **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 **ixxxxxx.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.
5. 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

*Input Controllers are numbered **.001** to **.004** and identified by the letter **u** before the filename.*

1. Run the TFTP client.
2. Start a command session on the PC and 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 u**[*filename*]**.**[*portnumber*]

   For example typing in **TFTP –i 192.168.0.96 PUT ufilename.001** will upload the Input controller file to Input 1 on the UDM Hub with IP address 192.168.0.96.
4. Push **Enter** to execute the command.

Backend Commands

In case of human error the Command Line can be used to perform several Administrative tasks on the multi format video Hub.

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 colon at the login prompt.

   For Example type in **admin:endeleo** at the login prompt, to change the password from *admin* to *endeleo*.
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. 124) Push **enter**.

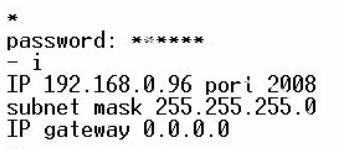


FIG. 124 Issuing the i command

Checking Port Details

Port details (resolution, port firmware) can be checked via the command line also.

Multi Format Inputs

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

Multi format inputs	
Input	**Input Number**
A	129
B	130
C	131
D	132

1. To check the input port configuration, type in the following – a question mark followed by the Input Number (129, 130, 131 or 132):

   Example: **? 129**
2. Push **Enter**.
3. The following information will be displayed (FIG. 125);

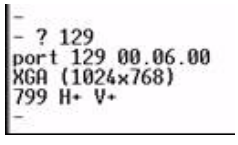


FIG. 125 Querying a multi format input port

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. 126)

   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. 126 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:

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:\Endeleo\TFTP -i 192.168.1.201 get iudm.hub <*enter*>

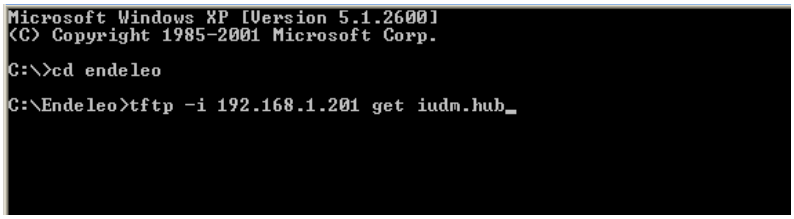


FIG. 127 GET iudm.hub prompt

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

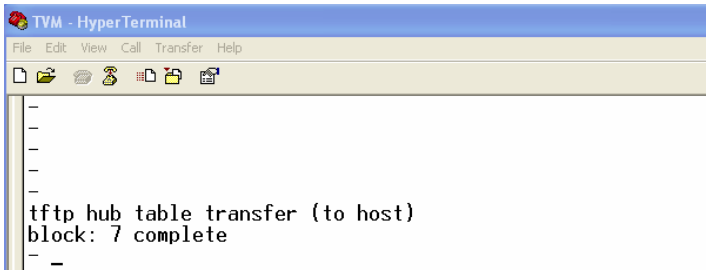


FIG. 128 File download from the UDM Hub

8. The transfer is now complete.

Endeleo UDM Receiver commands

Several Receiver-specific commands can be used for information purposes.

Viewing Video Compensation Settings

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

1. Use Hyperterminal to connect to the Receiver via its serial port.
2. At the command prompt type in **setup**.
3. Once in setup mode to view the compensation settings, type in **z**. (FIG. 129)

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

FIG. 129 Video Compensation Settings

Resetting Video Compensation Settings

The **x** command resets all compensation settings at the Receiver back to default.

1. Use Hyperterminal to connect to the Receiver via its serial port.
2. At the command prompt type in **setup**.
3. Once in setup mode type in **x** to reset the compensation settings if required.

Endeleo IR Codes

Overview

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

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.

UDM Hub Control Protocol

Overview

NOTE

The information in this section applies to UDM-0404, UDM-1604 and UDM-1604C Hubs.

The UDM Hub often forms part of a larger system where control of switching and management functions is provided by an external system (for example, AMX or Crestron controllers).

This section describes the protocol for communications between the management software and the UDM hub using either a 10BaseT network connection or a SLIP encapsulated serial stream to the console port. It also describes (where applicable) the commands usable by a user with a terminal connection to the console port.

NOTE

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

UDP (Ethernet) vs SLIP (RS-232) Communication

The UDM hub communicates over a 10BaseT connection using UDP packets or over a serial link using UDP packets encapsulated using SLIP. In both cases, the UDM hub accepts a set of command and data values to carry out various actions, which are detailed in this section.

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.

- By default, the UDM Hub is configured for UDP (Ethernet) communication.
- To use SLIP (RS-232) communication, the **Authenticate SLIP** option on the Setup web configuration page must be enabled (FIG. 130):

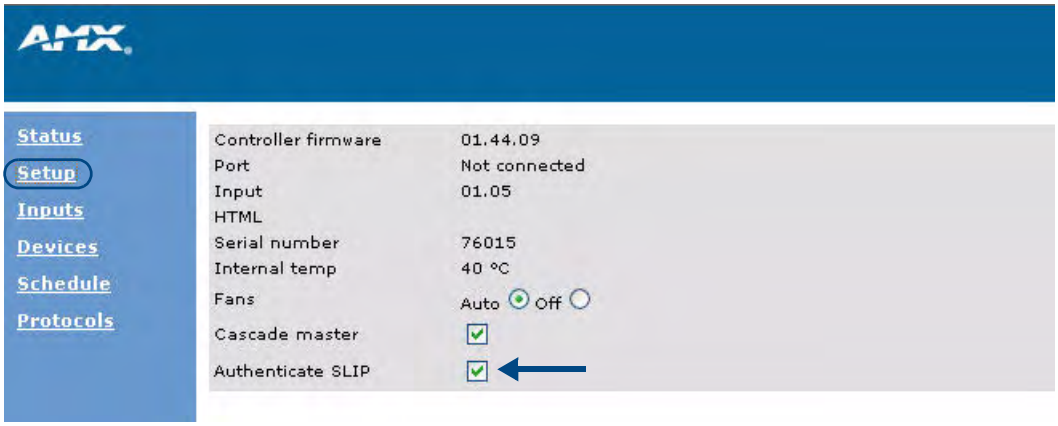


FIG. 130 Setup Page - Authenticate SLIP option enabled

NOTE

*By default, the **Authenticate SLIP** option is disabled, which precludes the use of RS-232 communication on the Hub.*

Beyond enabling the *Authenticate SLIP* option shown in FIG. 130, the crucial difference between UDP and SLIP commands is that SLIP commands must be encapsulated with:

```
SEND_STRING UDM, "$C0"
```

For example:

```
BUTTON_EVENT[dvTP,3] // POWER TV
{
    PUSH:
    {
        SEND_STRING UDM,"$C0"      // SLIP command
        wait 2
        SEND_STRING UDM,"87,$01,$01,$01,$02,21"
        wait 4
        SEND_STRING UDM, "$C0"     // SLIP command
    }
}
```

The waits used in the example above are not required.

By comparison, the equivelant code written for UDP would be:

```
BUTTON_EVENT[dvTP,3] // POWER TV
{
    PUSH:
    {
        SEND_STRING UDM,"87,$01,$01,$01,$02,21"
    }
}
```

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. Some endeleo tools and diagnostics use this extra information, but it is not required for control purposes

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.

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 unencrypted.

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			
Disconnect	6	X	Port				
Cascade input select	9	X	Input	Cascade value			
Lock Port	2	X	Port				
Unlock port	3	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			
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				
Set Protocol	75	X	Protocol				
Set port range	66	X	Min	Max			

Basic Commands

Input Numbering

The UDM has a flexible architecture to maximise 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	Value	Description
1	Input A	**5**	TVM input 1
2	Input B	**6**	TVM input 2
3	Input C	**7**	TVM input 3
4	Input D	**8**	TVM input 4

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' labelled VGA connector or if the cascade input is selected for this input, from the upstream hub.

Port Numbering

There are 16 output ports, numbered 1 to 16.

Connect Input to Port

Selects the 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	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)
4	TV (from TVM)

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 by the Port property, or if non-zero, 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

Input Cascade Selection

Each input in the UDM can either come from the VGA connector on the hub or from the cascade connector of another upstream hub. This command selects this option for each of the four VGA ports.

Byte #	0	1	2	3	4	5
Byte value	9	User Defined	Input	Cascade value	User Defined	User Defined

Cascade value takes the following values:

Value	Description
0	No cascade - VGA input
1	Cascade from upstream hub

Return Status:

Byte #	0	1	2	3	4	5
Byte value	9	Status	Port	User Defined	User Defined	User Defined

Lock Port

Locks the port (or range of ports) specified by the Port property, or if non zero, the port specified in the command, so that the connected input may no longer be changed on that port.

Byte #	0	1	2	3	4	5
Byte value	2	User Defined	Port	User Defined	User Defined	User Defined

Return Status:

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

The status return is a copy of the command with the first user defined byte replaced by a status value - status values are described in a separate section.

Unlock Port

Unlocks the port (or range of ports) specified by the Port property, or if non zero, the port specified in the command, so that selected inputs on that port may be changed.

Byte #	0	1	2	3	4	5
Byte value	3	User Defined	Port	User Defined	User Defined	User Defined

Return Status:

Byte #	0	1	2	3	4	5
Byte value	3	User Defined	Port	User Defined	User Defined	User Defined

Query Port

Queries a particular 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
1	Port input selection is locked	Port input selection is unlocked
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 Device Protocol

Sets the control protocol being used by the remote device. The system treats control codes in a device independent way, and this parameter allows the translation between the device independent value (see below) and the code sent to the device. Device address sets the addressing of the protocol (if allowed). This allows the same protocol to be used for transmit and receive without conflict. If this is zero, then the default (for that protocol) will be used.

Byte #	4	5	6	7	8
Byte value	1	Control protocol for transmit	Device address for transmit	Control protocol for receive	Device address for receive

IR protocol values are defined as follows:

IR protocol	Description	IR protocol	Description
1	Table driven (generic)	**117**	Serial 2400 baud odd parity
2	Sony	**118**	Serial 4800 baud odd parity
3	NEC (endeleo remote)	**119**	Serial 9600 baud odd parity
4	Sky	**120**	Serial 1200 baud even parity
112	Serial 1200 baud	**121**	Serial 2400 baud even parity
113	Serial 2400 baud	**122**	Serial 4800 baud even parity
114	Serial 4800 baud	**123**	Serial 9600 baud even parity
115	Serial 9600 baud	**124**	Serial 19200 baud
116	Serial 1200 baud odd parity	**125**	Serial 38400 baud

The table driven protocol output requires that the relevant driver file has been loaded or learnt in the receiver. Similarly the serial protocol selection requires that a relevant serial protocol driver has been uploaded or learnt. The protocol selection connects this driver file to the output and sets the baud rate. A serial device driver may have a variable or fixed baud rate. If it is fixed then all the serial protocol values above are equivalent, if the driver has a variable rate then the baud rate is set appropriately from the value above.

The default protocol values are 3 (endeleo remote) for reception and 1 (table driven) for transmission.

Send IR Command 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).

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.

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

Set Serial Parameters

Sets serial port parameters for the serial interface (if present) on the Rx. DTR may be controlled by the value in offset 7 - a non zero value will assert it.

Baud rate values are split into most significant byte (MSB) and least significant byte (LSB), so for example:

9600 baud has MSB = 37 and LSB= 128 since 9600 = 37x256 + 128

If the baud rate in this command is zero (both MSB and LSB), then the baud rate of the remote device will remain unchanged.

Byte #	4	5	6	7
Byte value	4	Baud rate MSB	Baud rate LSB	DTR (0 for off)

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.

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

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 - 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

Set Protocol

Determines protocol settings for communications and operations.

Byte #	0	1	2	3	4	5
Byte value	75	User Defined	Response protocol	Reserved	Reserved	User Defined

Various values and descriptions are shown below:

Response Protocol:

Value	Description
1	Provide response packets for all operations in a range - each command in the range has a separate response.
3	Aggregates all responses - a command set based on a range will only supply one response, unless some commands result in errors.

Return status:

Byte #	0	1	2	3	4	5
Byte value	75	Status	Response protocol	Reserved	Reserved	Reserved

Set Port Range

Sets the Port property for the hub. This property value may be used in subsequent action commands. A range may be specified using the min and max values, if max is equal to the min then a single value will be used.

Byte #	0	1	2	3	4	5
Byte value	66	User Defined	Min Port	Max Port	User Defined	User Defined

Return status:

Byte #	0	1	2	3	4	5
Byte value	66	Status	Min Port	Max Port	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 Endeleo hardware 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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