



UHD-160R & UHD-288 12G System Setup and Operation Guide



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FCC Compliance (USA) and Digital Equipment Compliance (Canada)

This equipment has been tested and found to comply with the limits for a Class A, digital device, pursuant to Part 15, Subpart B of the FCC Rules and the Canadian EMC Requirement (ICES-003). These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

Operation of this equipment in a residential area is likely to cause harmful interference, in which case, the user will be required to correct the interference at their own expense. Shielded cables must be used to ensure compliance with the FCC Class A limits.

Declaration of Conformity

Utah Scientific, Inc.

4750 Wiley Post Way, Suite 200

Salt Lake City, Utah 84116-2878 U.S.A.

We declare our sole responsibility that the UTAH-100/UHD 12G Digital Routing Switcher is in conformance with the following standards:

Emission

- EN55022:1994+A1&A2

Immunity

- EN55024:1998
- EN61000-3-2
- EN61000-3-3

Safety

- IEC 60950-1:2001 /EN 60950-1:2001

Following the provisions of the Directive(s) of the Council of the European Union:

- EMC Directive 89/336/EED
- Low Voltage Electrical Directive 72/23/EEC



Utah Scientific, Inc. hereby declares that the product specified above conforms to the above Directive(s) and Standard

Important Safeguards and Notices

This section provides important safety guidelines for the Operator and Service Personnel. Specific warnings and cautions are found throughout the guide where they apply, but may not appear here. Please read and follow the important safety information, specifically those instructions related to risk of fire, electric shock, or injury to persons.

Safety Symbols

- Hazardous Voltage symbol
- Caution symbol. The product is marked with this symbol when it is necessary to refer to the manual to prevent damage to the product.

Warnings

Please observe the following important warnings:

- Any instructions in this guide that require opening the chassis, changing a power supply, or removing a board, should be performed by qualified personnel only. To reduce the risk of electric shock, do not perform any service unless you are qualified to do so.
- Heed all warnings on the unit and in the operating instructions.
- Do not use this product in or near water. Disconnect AC power before installing any options or servicing the unit unless instructed to do so by this manual.
- This product is grounded through the power cord ground conductor. To avoid electric shock, plug the power cord into a properly wired receptacle before connecting the product inputs or outputs.
- Route power cords and other cables so they won't be damaged.
- The AC receptacle (socket) should be located near the equipment and be easily accessible.
- Disconnect power before cleaning. Do not use any liquid or aerosol cleaner - use only a damp cloth.
- Dangerous voltages exist at several points in this product. To avoid personal injury, do not touch exposed conductors and components while power is on. Do not insert anything into either of the systems two-power supply cavities with power connected.
- Do not wear hand jewelry or watches when troubleshooting high current circuits, such as power supplies. During installation, do not use the door handles or front panels to lift the equipment as they may open abruptly and injure you.
- To avoid fire hazard when replacing fuses, use only the specified correct type, voltage and current rating as referenced in the appropriate parts list for this product. Always refer fuse replacement to qualified service personnel.
- Have qualified personnel perform safety checks after any service.

Cautions

Please observe the following important cautions:

- When installing this equipment do not install power cords to building surfaces. To prevent damage when replacing fuses, locate and correct the problem that caused the fuse to blow, before reconnecting power.
- Use only specified replacement parts

Company Information

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Warranty Policies

Hardware Warranty

Utah Scientific, Inc. warrants to the original purchaser that the Utah Scientific hardware is free from defects in materials and workmanship and will perform substantially in accordance with the accompanying written materials under normal use and service for a period of two (2), five (5), or ten (10) years from the date of shipment. Any implied warranties on hardware are limited to the above three warranty periods (depending on purchase). Some states/jurisdictions do not allow limitations on duration of an implied warranty, so the above limitation may not apply to certain specific purchasers.

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Utah Scientific warrants that the software will perform substantially in accordance with the accompanying written materials for a period of one (1) year from the date of shipment.

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For the first one (1) year after purchase of the software and the first two (2), five (5), or ten (10) years after the date of purchase of the hardware, Utah Scientific's and its suppliers' entire liability and purchaser's exclusive remedy shall be, at Utah Scientific's option, either:

- Return of the price paid, or
- Repair or replacement of the software or hardware that does not meet the above warranties and is returned to Utah Scientific under the returned materials authorization (RMA) process with freight and forwarding charges paid.

After the initial warranty periods, purchaser's exclusive remedy is the repair or replacement of the hardware upon payment of a fixed fee to cover handling and service costs based on Utah Scientific's then-current price schedule. The above warranties are void if failure of the software or hardware has resulted from an accident, abuse, or misapplication.

Any replacement software or hardware will be warranted for the remainder of the original warranty period or thirty (30) days, whichever is longer.

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Section 1: System Setup

The UHD160 & UHD-288 are industry-leading, single-link 12G routing switchers that provides a compact design.

Control System

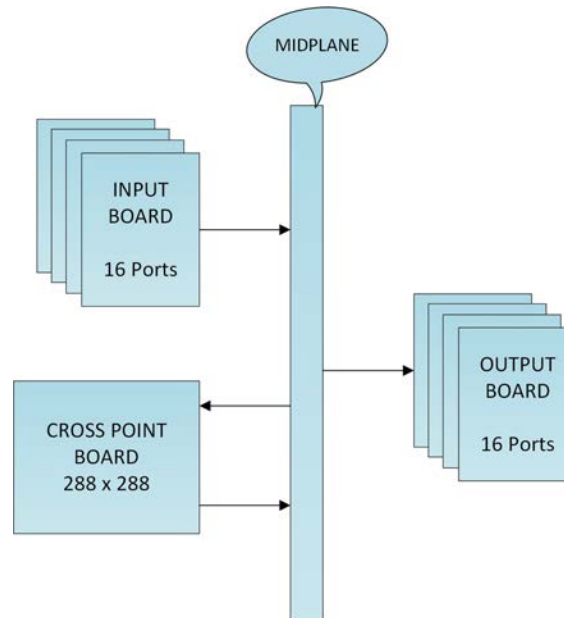
The crosspoint switching and status monitoring of the UHD-160 & UHD-288 routing switchers is performed by the MX-Bus Interface.

The routing switcher under the MX-Bus interface is simply a slave to the Scientific SC-4 / SC-40 / SC-400 system controller. This is useful if a user requires multiple levels or hardware panel options. Information regarding the SC-4 / SC-40 / SC-400 system controller can be found in their respective manuals.

Router Hardware Description

The UHD system is based on a four-board architecture similar to other Utah Scientific routing switchers. These four boards are made up of an Input Board, Output Board, a Crosspoint Board, and Midplane,

Input or Output boards can be removed or added (via the Midplane) in the field to expand systems, or replace modules.



The UHD system is designed to carry SDI signals. The system natively supports and reclocks SMPTE259C, SMPTE292, SMPTE424, ST2081, ST2082, and DVB-ASI signals with a maximum data rate of 11.88 Gb/Sec.

The reclocking mechanism within the UHD automatically bypasses reclocking when a signal that is not one of these standards is presented to it, allowing non-reclocked routing of any signal from 18 Mb/Sec to 11.88 Gb/Sec.

The coaxial version of IO cards uses the HD-BNC connector offered by Amphenol and Samtec. It provides superior performance and density while allowing connection of industry standard Belden 1694 cable or other cable types with standard tools. Visit <http://hdbnc.amphenolrf.com> for more information.

UHD 160/288 routing switchers are powered by one -48V DC connection, and are delivered with 2 internal power supply rectifiers.

The UHD-160/288 power supply: Model RCP-3KIU-V12

Signal Levels

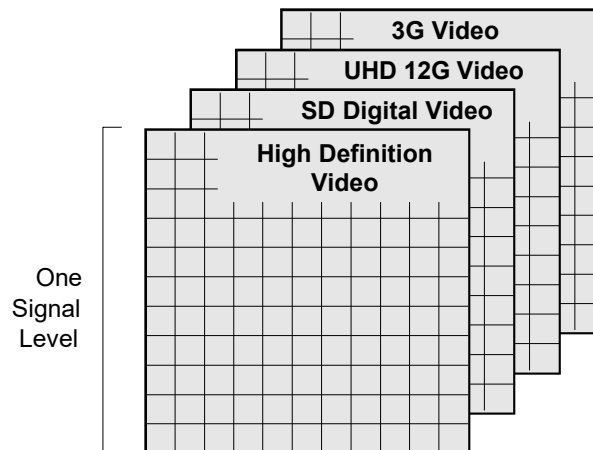
A "signal level" represents one of many specific types of audio or video elements that a routing switcher is capable of handling. The typical signals capable of being switched are:

- 3G Video
- UHD 12G Video
- SD Digital Video
- High Definition Video.

Some systems may be configured with one signal level, while others may be configured with multiple signal levels.

While the diagram in the previous section shows only one signal level, a multi-signal level system is capable of routing any combination up to 32 levels – each with its own matrix and cross-points.

The figure below illustrates **four signal levels** in a 10 X 10 matrix system.



Signal routers are typically much larger than a 10 X 10 matrix, depending on user needs. Each signal level may also have different sizes of matrices and do not all need to be the same size.

Note: The standalone UHD 160/288 Router is only capable of single level control. The multiple level router would require MX control via SC-4/SC-40/SC-400. Refer to section "MX Bus Control Module" for details regarding MX Bus Control.

Hardware Installation

Initial Inspections

Check the contents of the shipment for completeness and possible transport damage. If the contents are incomplete or damaged, contact Utah Scientific Inc immediately for repair or replacement parts of the equipment.

Before Applying Power

NOTE: Verify that the product is configured to match the available main power source per the input power configuration instructions provided in this manual.

Service

Servicing, adjustments, maintenance, or repair of this product may be performed by qualified personnel only. Adjustments described in this manual may be performed with power supplied to the product while protective covers are removed.

CAUTION: Energy available at many points may, if contacted, result in personal injury. Capacitors inside this product may still be charged even when disconnected from their power source.

Initial Setup

1. Unpack the chassis and inspect the unit carefully for damages that may have occurred during transport.
2. Check that the frame is installed so the airflow through the unit is unrestricted. No forced ventilation is required under normal operating conditions.
3. Connect the external power cord to the corresponding power connector on the rear side of the UTAH-100/UHD-288 frame. Check that the Power LED on the front panel is lit.

NOTE: If a failure occurs, potentially related to no power, inoperative fan, or temperature range, a red LED will illuminate on the front panel of the router. Please disconnect power immediately and contact UTSCI support for assistance. See *Company Contact Information* on page 20.

UHD-288 Frame Configuration

Four individually powered fans on the front of the UHD-288 provide cooling capability for the internal crosspoint chip. Air is drawn across these internal components and exhausted out of the back of the unit. Slotted vents, also at the front of the unit, allow for additional cross ventilation and cooling. The UHD-288 is also designed to fit in a standard 19 inch rack for easy access to its components.

- 18 Input card slots.
- 18 Output card slots.
- 2 12-Volt power supplies with chassis shipped standard with the system.
- 8 internal cooling fans using four vents located at the middle front of the chassis and at the top rear of the UHD-288 unit. (Air is drawn from the front and exhausted through the top four fan vents on the back of the chassis.)

This system is being controlled via an MX-Bus, with the use of an external SC-4 / SC- 40 / SC-400 controller.

On the front of the UHD-288 are six LED indicator lights for the following components: *MX BUS*, *POWER*, *CONTROL FAULT*, *ST1*, *ST2*, and *ST3*.

MX BUS – An LED indicator for the MX-Bus cable that plugs into one of two connectors on the back of the unit. The bus cable is used to control multiple routers from an external SC-4 / SC- 40 / SC-400 controller. The bus cable can be plugged into either of the two connector ports.

POWER – Indicator LED is either green (powered) or red (no power).

CONTROL FAULT – A green LED indicates that all units are functioning properly. A red LED indicates that there is a fault somewhere in the system, either with the switcher or the router.



NOTE: In the event that one of the power supplies needs to be replaced, the router will continue to run on the remaining one but there may be some degradation in meeting all of the required specifications. Contact Utah Scientific at 1 800-453-8782 if a replacement power supply is needed.

MX-Bus with UHD288

This is the control bus between the UHD 12G and SC-4 / SC-40 / SC-400 controller. Each UHD-288 chassis contains two MX connectors at the back of the unit. One connects directly to the SC-4 / SC-40 / SC-400 chassis by way of the bus cable. The controller chassis also has two MX-Bus connectors that are used to connect to the UHD-288. The bus cable occupies one connector on each unit. An MX-Bus terminator must be placed on the unused connectors of each unit.

For a UHD-288 unit and an external SC-4 / SC-40 / SC-400 controller, an MX-Terminator is plugged into the bus port of the UHD-288 (top MX port in Figure 1). A second terminator is plugged into the MX-Bus port on the SC-4 / SC-40 / SC-400 controller (top MX port in Figure 2). There *must* be a terminator plugged into an MX port at each end.



Figure 1: Bus port view of SC-4

The MX-terminator and bus cable are interchangeable; each can be plugged into either of the two MX ports on each unit. In addition, up to 16 routers can be daisy-chained together.



Figure 2: MX-Bus port view of UHD-288

NOTE: The total combined length of daisy-chained bus cables cannot exceed 300 ft.

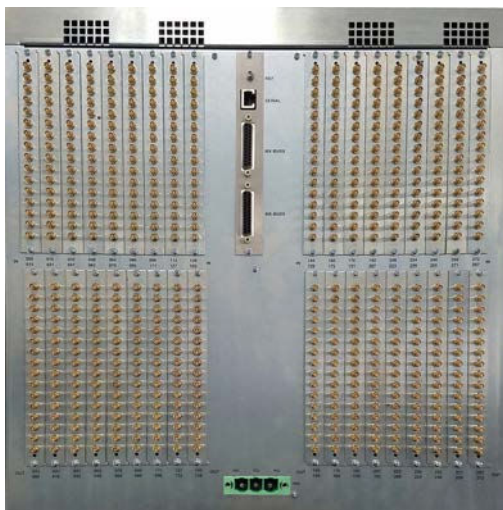
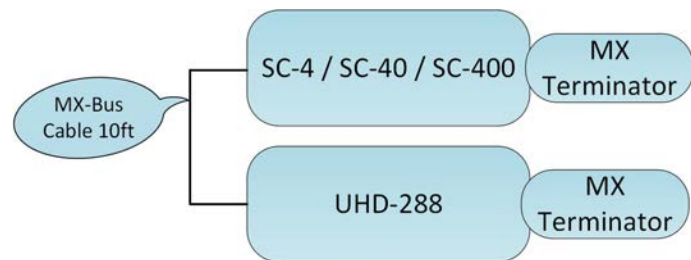


Figure 3: Full rear view of the UHD-288



The above figure is an illustrated representation of the UHD-288 coupled with an SC-4 / SC-40 / SC-400 controller with the required MX-Terminators attached to each unit.

UHD-160 Frame Configuration

Two individually powered fans on the front of the UHD-160 provide cooling capability for the internal crosspoint chip. Air is drawn across these internal components and exhausted out of the back of the unit. Slotted vents, also at the front of the unit, allow for additional cross ventilation and cooling. The UHD-160 is also designed to fit in a standard 19 inch rack for easy access to its components.

- 10 Input card slots.
- 10 Output card slots.
- 2 12-Volt power supplies with chassis shipped standard with the system.
- 2 internal cooling fans using one vent located at the right front of the chassis of the UHD-160 unit. (Air is drawn from the front and exhausted through the right fan vent on the front of the chassis.)

This system is being controlled via an MX-Bus, with the use of an external SC-4 / SC- 40 / SC-400 controller.



On the front of the UHD-160 are six LED indicator lights for the following components: *MX BUS*, *POWER*, *CONTROL FAULT*, *Fans*, *Temp*, and *VREF*.

MX BUS – An LED indicator for the MX-Bus cable that plugs into one of two connectors on the back of the unit. The bus cable is used to control multiple routers from an external SC-4 / SC- 40 / SC-400 controller. The bus cable can be plugged into either of the two connector ports.

POWER – Indicator LED is either green (powered) or red (no power).

CONTROL FAULT – A green LED indicates that all units are functioning properly. A red LED indicates that there is a fault somewhere in the system, either with the switcher or the router.

FANS – A green LED indicates normal function. Red if either fan fails.

TEMP – Green LED indicates normal function. Red indicates either temp error or crosspoint failure.

VREF – Green LED indicates active video. Red when no video signal is present.

NOTE: In the event that one of the power supplies needs to be replaced, the router will continue to run on the remaining one but there may be some degradation in meeting all of the required specifications. Contact Utah Scientific at 1 800-453-8782 if a replacement power supply is needed.

MX-Bus with UHD-160

This is the control bus between the UHD 12G and SC-4 / SC-40 / SC-400 controller. Each UHD-160 chassis contains two MX connectors at the back of the unit. One connects directly to the SC-4 / SC-40 / SC-400 chassis by way of the bus cable. The controller chassis also has two MX-Bus connectors that are used to connect to the UHD-160. The bus cable occupies one connector on each unit. An MX-Bus terminator must be placed on the unused connectors of each unit.

For a UHD-160 unit and an external SC-4 / SC-40 / SC-400 controller, an MX-Terminator is plugged into the bus port of the UHD-160 (top MX port in Figure 1). A second terminator is plugged into the MX-Bus port on the SC-4 / SC-40 / SC-400 controller (top MX port in Figure 2). There *must* be a terminator plugged into an MX port at each end.



Figure 1: Bus port view of SC-4

The MX-terminator and bus cable are interchangeable; each can be plugged into either of the two MX ports on each unit. In addition, up to 16 routers can be daisy-chained together.

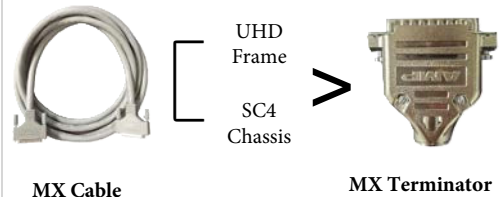
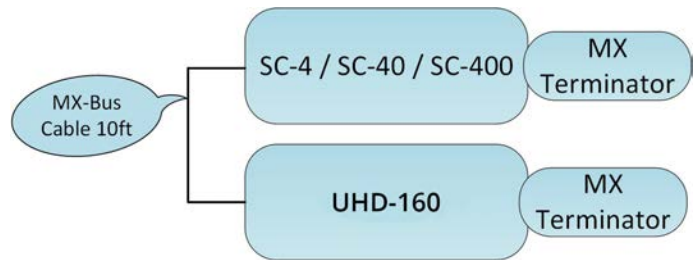


Figure 2: MX-Bus port view of UHD-160

NOTE: The total combined length of daisy-chained bus cables cannot exceed 300 ft.



Figure 3: Full rear view of the UHD-160



The above figure is an illustrated representation of the UHD-160 coupled with an SC-4 / SC-40 / SC-400 controller with the required MX-Terminators attached to each unit.

MX-Bus Level Dip Switches

Switch Settings

Should you ever need to change the signal level of your router, it is necessary to determine:

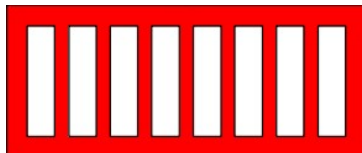
- What new signal level is required?
 - If other signal levels will have to be modified to accommodate the new signal level.
 - Additional encoding requirements necessitated by the change.
1. Locate the dip switch on the control I/O panel at the rear of the chassis.
 2. The four level bits work in a binary addition mode. Possible values range from 0 (all OFF or down) to 15 (all ON or up). Binary value 0 is level 1 in an SC-4 control system, and binary value 15 is level 16.
 3. Set the switches to the level you have chosen according to the following table.

Level Dip-Switch Mapping Table for MX-Bus Control Module

Switch Level	1	2	4	8	Binary Value	SC-4 Level
	OFF	OFF	OFF	OFF	0	1
	ON	OFF	OFF	OFF	1	2
	OFF	ON	OFF	OFF	2	3
	ON	ON	OFF	OFF	3	4
	OFF	OFF	ON	OFF	4	5
	ON	OFF	ON	OFF	5	6
	OFF	ON	ON	OFF	6	7
	ON	ON	ON	OFF	7	8
	OFF	OFF	OFF	ON	8	9
	ON	OFF	OFF	ON	9	10
	OFF	ON	OFF	ON	10	11
	ON	ON	OFF	ON	11	12
	OFF	OFF	ON	ON	12	13
	ON	OFF	ON	ON	13	14
	OFF	ON	ON	ON	14	15
	ON	ON	ON	ON	15	16

LEVEL

1 2 4 8



MX-Bus Control Module

General

The MX-Bus control module controls the switching of the UHD-160/288 router's crosspoints when operating under SC4 / SC40 / SC400 control. It contains power regulation circuitry and an FPGA that receives commands from an SC4 / SC40 / SC400 control and switches the crosspoint with discrete lines accordingly.



The connector panel shown in Figure 2 on page 8, which contains the two MX-Bus ports, can be removed to reveal a set of dip switches for setting the level for the UHD-160/288.

Each unit has its own set of dip switches to set the level, based on the total number of routers. The level set with the dip switches determines the number of MX routers that can be connected together (up to a total of 16). (Refer to the **Dip Switches** section on page 9 for each unique level setting.)

NOTE: When more than one UHD router is to be used, each MX-Bus rear panel must be assigned a unique level. This is done by removing the MX-Bus rear panel and moving the dip switches to the desired levels. (Refer to the **Dip Switches** section on page 9 for each unique level setting.) The dip switch settings inside the connector panel are factory set but can be configured in the field, based on the number of routers that are connected together.

Determining and Setting Router Signal Levels

Signal levels are preset at the factory and tested during manufacturing, determined by requirements and customer input. The installation of your new UHD Router should not require any signal-level changes to operate after installation.

By definition, a signal level represents distinct elements of the broadcast system, which is how the SC Controller identifies each physical router.

Connecting Cables

Video Cables

Use high-quality coaxial cable with HDBNC ends to connect to the UHD 12G system. The input and output numbers are printed on the rear of the chassis.

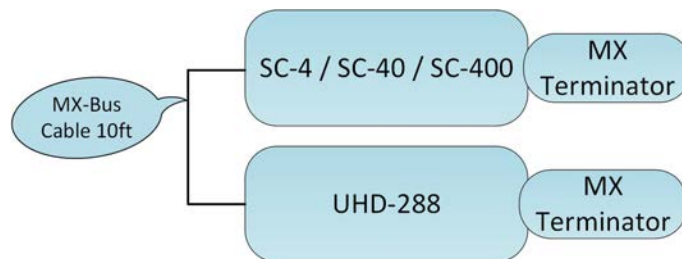
IMPORTANT NOTE: The SC-4 / SC-40 / SC-400 control systems are zero based. Make sure to take that into account when connecting cables.

MX-Bus Cables

The UHD 12G routing system utilizes the external MX-Bus, it must be connected to the SC- 4 / SC-40 / SC-400 control system to switch its inputs and outputs. In addition, the proper levels and offsets must be set on the UHD 12G routing system(s) so they will operate on the proper level.

NOTE: The MX-Bus is a daisy chain configuration and must not exceed 300 feet (91.4 meters) in overall length and must be terminated at the SC-4 / SC-40 / SC-400 side and the UHD-288 side.

The UHD 12G router is shipped standard with one 10 ft. MX-Bus Cable (USI Part Number 80299-10). Other lengths are available and may be ordered through Utah Scientific sales at 1 800-453-8782.

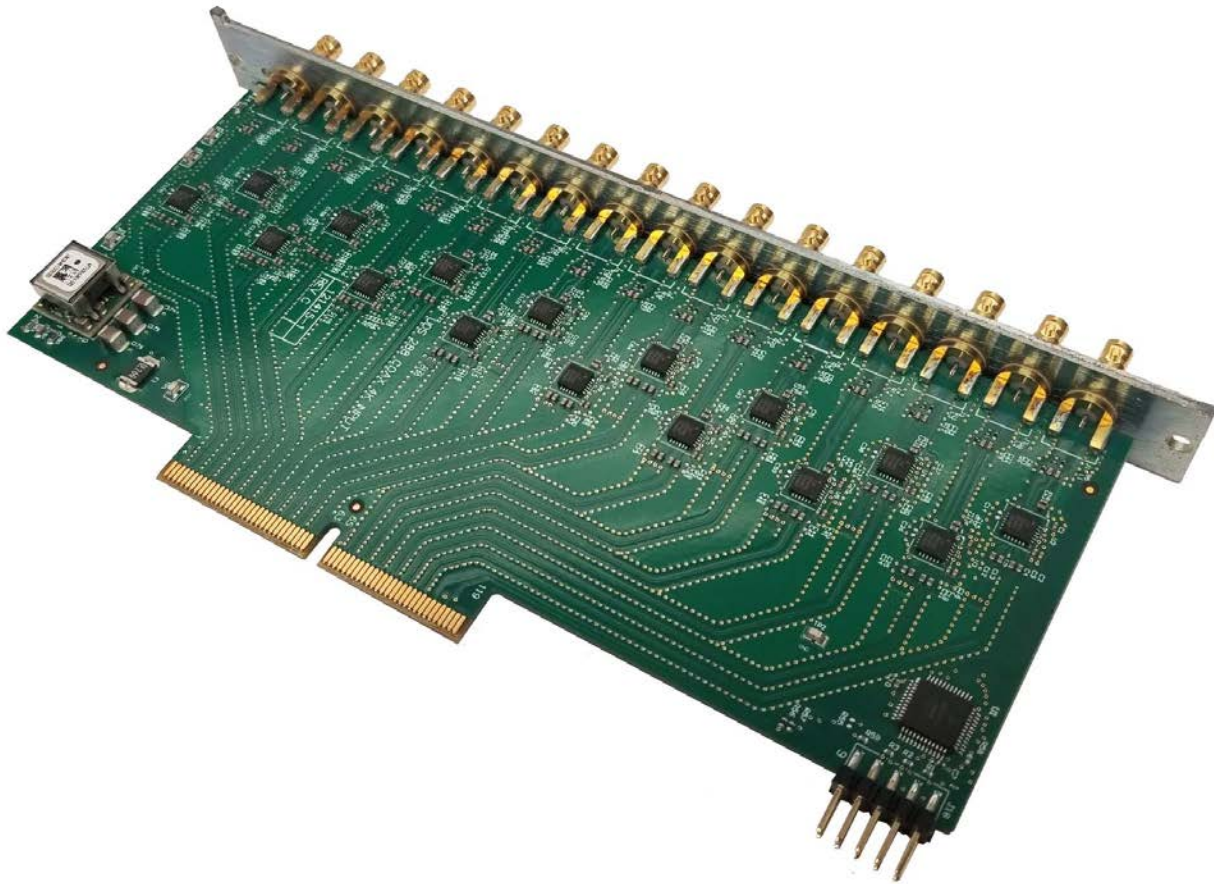


Note the necessary termination on the MX-Bus in the above illustration.

UHD VI/16

General

The SDI Coax input card is responsible for receiving, reclocking, and presenting the input signals to the crosspoint card. It has 16 HDBNC connectors and 16 SDI Cable equalizers with reclockers. The reclocking components automatically detect, lock to, and re-time the incoming SDI signals. If a non-standard signal is presented to the card, the reclocker will automatically bypass and allow the signal through without re-timing it.



Circuit Description

12V is received by this card and regulated down to 2.5V.

SDI cable equalizers are capable of equalizing more than 50 meters of 1694A cable when using 11.88 Gbps signals.

There is an I2C-based IO expander that identifies the card to the control system. This component also allows the system to provide the status of IO card functionality to the user interface.

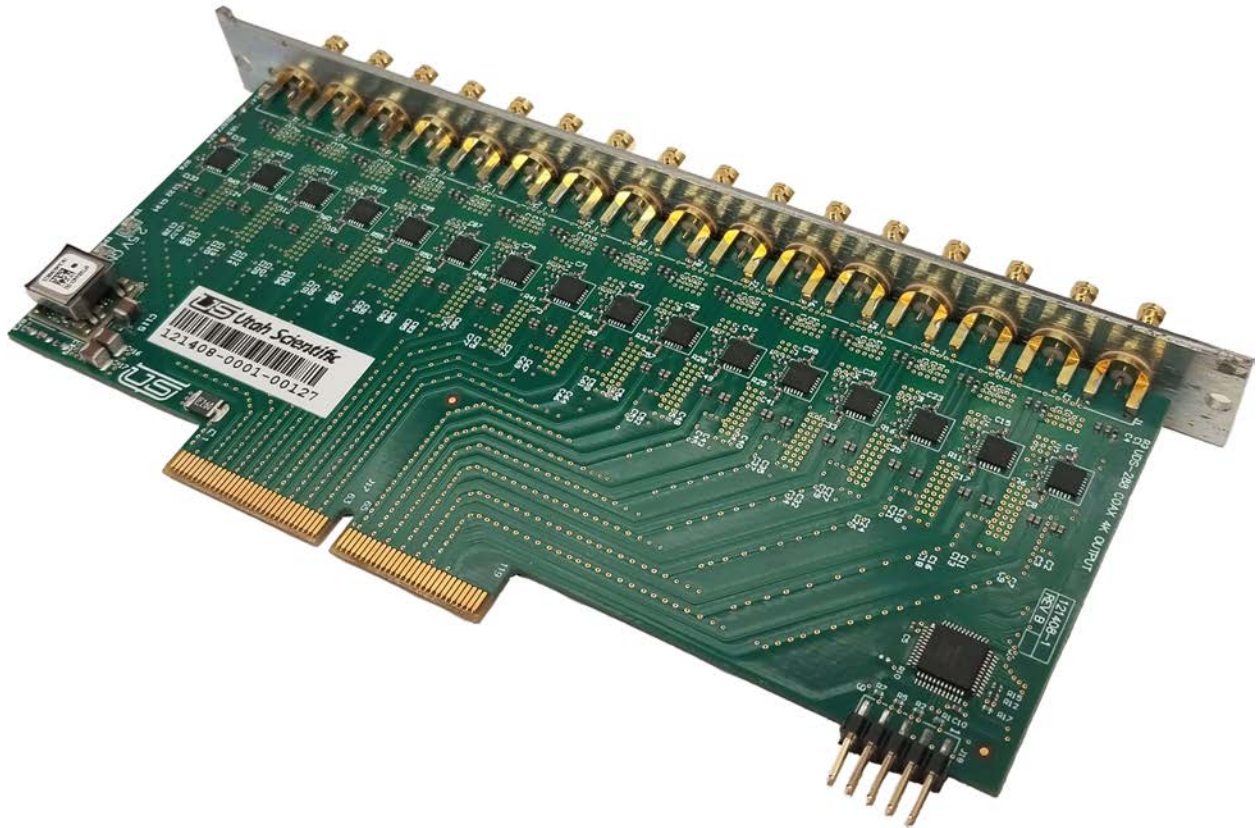
Controls and Indicators

This card has a single Power OK indicator (DS1) which shines through the rear of the chassis to indicate the card has power (3.3V).

UHD VO/16

General

The SDI Coax Output card is responsible for driving the switched video signals down the coaxial cables in an SMPTE-compliant fashion. It has 16 HDBNC connectors and reclockers. The reclocking components automatically detect, lock to, and re-time the SDI signals. If a non-standard signal is presented to the card, the reclocker will automatically bypass and allow the signal through without re-timing it.



Circuit Description

12V is received by this card and regulated down 3.3V and 2.5V. There are eight high-bandwidth switches that route signals from the active crosspoint card to reclockers and cable drivers for a nominal output of 800mV.

Controls and Indicators

This card has a single Power OK indicator (DS1) which is illuminated through the rear of the chassis to indicate the card has power (3.3V).

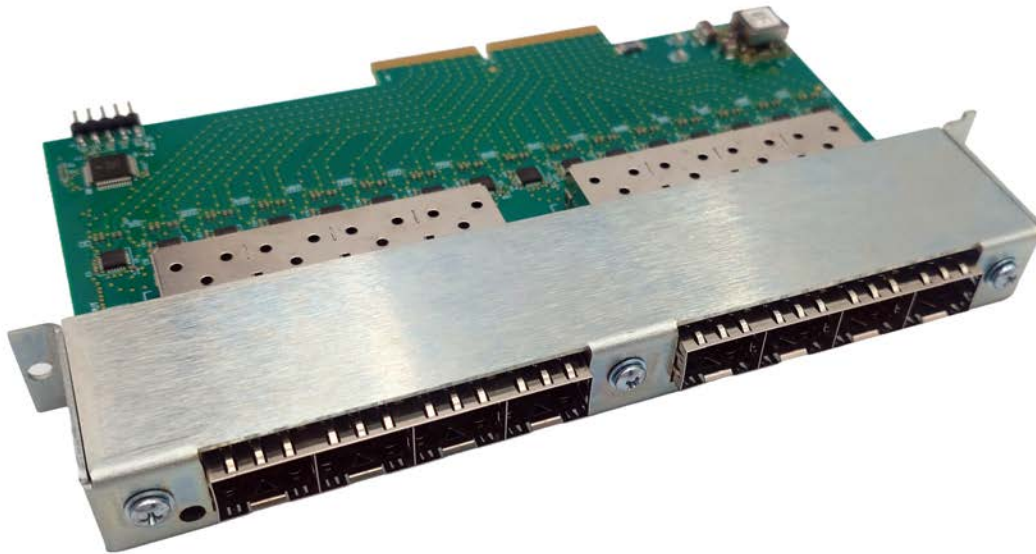
UHD FI/16

General

This card can be populated with a variety of SFP receiver devices to allow for different functionality. It allows for 8 dual SFP connections, allowing 16 total inputs. The list of SFP module types is –

- DUAL 12G SFP Fiber – 94061-41.
- DUAL ST 2110 SFP– 94061-36. (3G Only)
- DUAL 12G HDBNC– 94061-42.

The HDMI Receiver occupies both ports in the SFP cage, making 1 input inaccessible. The receiver uses the upper input. (i.e., if the slot corresponds to inputs 1 and 2, the signal will display on the router input 2).



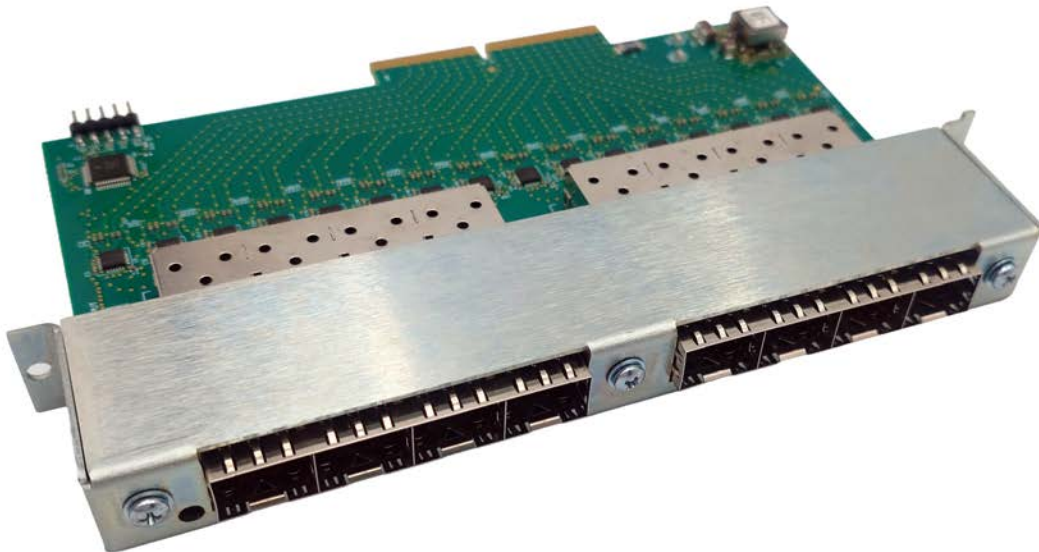
UHD FO/16

General

This card can be populated with a variety of SFP transmitter devices to allow for different functionality. It allows for different functionality. It allows for 8 dual DFP connections, allowing 16 total outputs. The list of SFP module types is -

- DUAL 12G SFP Fiber – 94061-40.
- DUAL ST 2110 SFP– 94061-35. (3G Only)
- DUAL 12G HDBNC– 94061-43.

Note: *The HDMI transmitter occupies both slots in the SFP cage, making 1 output inaccessible. The transmitter uses the lower port. (i.e., if the slot corresponds to router outputs 1 - 2, the SFP will output the signal switched to output 1.*



Section 2: Specifications

Frame Specifications

Width: 19 inch

Rack Mount Depth: 6 inches

Sizes: UHD288 - 10 RU

UHD160 - 5 RU

Connectors: HD-BNC

Capacity: UHD288 - 288 inputs, 288 outputs

UHD160 - 160 inputs, 160 outputs

Power Consumption: <400 Watts

SPECIFICATION - Power Supply System

MODEL		RCP-3K1U□-12		
OUTPUT	RECTIFIER	RCP-1000-12		
	RACK SHELF	RCP-1UI or RCP-1UT		
	OUTPUT VOLTAGE	12V		
	MAX. OUTPUT CURRENT	180A		
	MAX. OUTPUT POWER <small>Note.5</small>	2160W		
INPUT	VOLTAGE RANGE <small>Note.4</small>	90 ~ 264VAC 127 ~ 370VDC		
	FREQUENCY RANGE	47 ~ 63Hz		
	AC CURRENT (Typ.)/PER MODULE	8.5A/115VAC 4.5A/230VAC		
	LEAKAGE CURRENT AUXILIARY	<3.5mA / 230VAC		
	POWER REMOTE ON-OFF	5V @ 0.3A		
FUNCTION	CONTROL	By electrical signal or dry contact ON:short OFF:open		
	REMOTE SENSE	Compensate voltage drop on the load wiring up to 0.5V.		
	OUTPUT VOLTAGE PROGRAMMABLE	Adjustment of output voltage is allowable to 90 ~ 110% of nominal output voltage. Please refer to the Function Manual.		
	DC OK SIGNAL	The isolated TTL signal out, Please refer to the Installation Manual		
	AC OK SIGNAL	The isolated TTL signal out, Please refer to the Installation Manual		
	OVER TEMP WARNING	Logic " High" for over temperature warning, Please refer to the Installation Manual, isolated signal		
ENVIRONMENT	WORKING TEMP.	-20 ~ +60 °C (Refer to "Derating Curve") 20 ~		
	WORKING HUMIDITY	90% RH non-condensing		
	STORAGE TEMP., HUMIDITY	-40 ~ +85 °C, 10 ~ 95% RH non-condensing		
	TEMP. COEFFICIENT	±0.02%/°C (0 ~ 50°C)		
	VIBRATION	10 ~ 500Hz, 2G 10min./1cycle, 60min. each along X, Y, Z axes		
SAFETY & EMC <small>(Note 6)</small>	SAFETY STANDARDS	UL62368-1, CSA C22.2 No. 62368-1, TUV EN62368-1, EAC TP TC 004 approved		
	WITHSTAND VOLTAGE	I/P-O/P:3KVAC I/P-FG:2KVAC O/P-FG:0.7KVDC		
	ISOLATION RESISTANCE	I/P-O/P, I/P-FG, O/P-FG:100M Ohms / 500VDC / 25 °C / 70% RH		
	EMC EMISSION	Parameter	Standard	Test Level / Note
		Conducted	EN55032 (CISPR32)	Class B
		Radiated	EN55032 (CISPR32)	Class B
		Harmonic Current	EN61000-3-2	----
		Voltage Flicker	EN61000-3-3	---
	EMC IMMUNITY	EN55024, EN61000-6-2		
		Parameter	Standard	Test Level / Note
		ESD	EN61000-4-2	Level 3, 8KV air ; Level 2, 4KV contact
		Radiated	EN61000-4-3	Level 3
		EFT / Burst	EN61000-4-4	Level 3
		Surge	EN61000-4-5	Level 4, 4KV/Line-Earth ; Level 3, 2KV/Line-Line
Conducted		EN61000-4-6	Level 3	
Magnetic Field		EN61000-4-8	Level 4	
	Voltage Dips and Interruptions	EN61000-4-11	> 95% dip 0.5 periods, > 95% dip 25 periods, > 95% interruptions 25 periods	
OTHERS	DIMENSION	Rack 350.8*483.6*44(L*W*H)		
	PACKING	13.2Kg; 1pcs/13.2Kg/2.67CUFT		

Digital Video Specifications

Jitter conforms to SMPTE 259, 292, 424, 2081-1, and 2082-1

Reclocked Data Rates: 270 Mbps, 1485 Mbps, 2970 Mbps, 5.94 Gbps, and 11.88 Gbps

Input Return Loss: < -15dB to 1.5 GHz, -10dB to 3 GHz, -7dB to 6 GHz, -5dB to 12 GHz

Output Return Loss: < -15dB to 1.5 GHz, -10dB to 3 GHz, -7dB to 6 GHz, -5dB to 12 GHz

Input EQ level

Belden 4794R cable: > 300 M at 270 Mbps

> 150 M at 1.485 Gbps

> 100 M at 2.970 Gbps

> 80 M at 11.8 Gbps

I/O Module Specifications

Multi-Rate Digital Input Card

Number of ports per card: 16

Formats supported: From 270Mbps up to 12Gbps

Reclocking: All SDI rates up to 12Gbps

Connector Type: HD-BNC

Conforms to SMPTE 259C, 292, 424, ST2081, and ST2082

Multi-Rate Digital Output Card

Number of ports per card: 16

Formats supported: From 270Mbps up to 12Gbps

Reclocking: All SDI rates up to 12Gbps

Connector Type: HD-BNC

Conforms to SMPTE 259C, 292, 424, ST2081, and ST2082

UHD Fiber Input Card

Number of ports per card: 16 (8 dual SFP)

Formats supported: ST 2110 (3G); 3G-12G Fiber

UHD Fiber Output Card

Number of ports per card: 16 (8 dual SFP)

Formats supported: ST 2110 (3G); 3G-12G Fiber