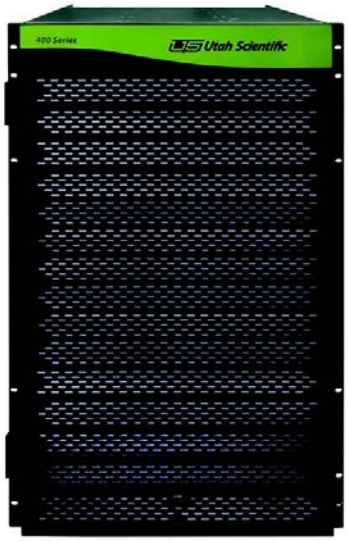
Utah Scientific

National Park Service Photo

UTAH-400 Series 2

Hybrid Enterprise Routers

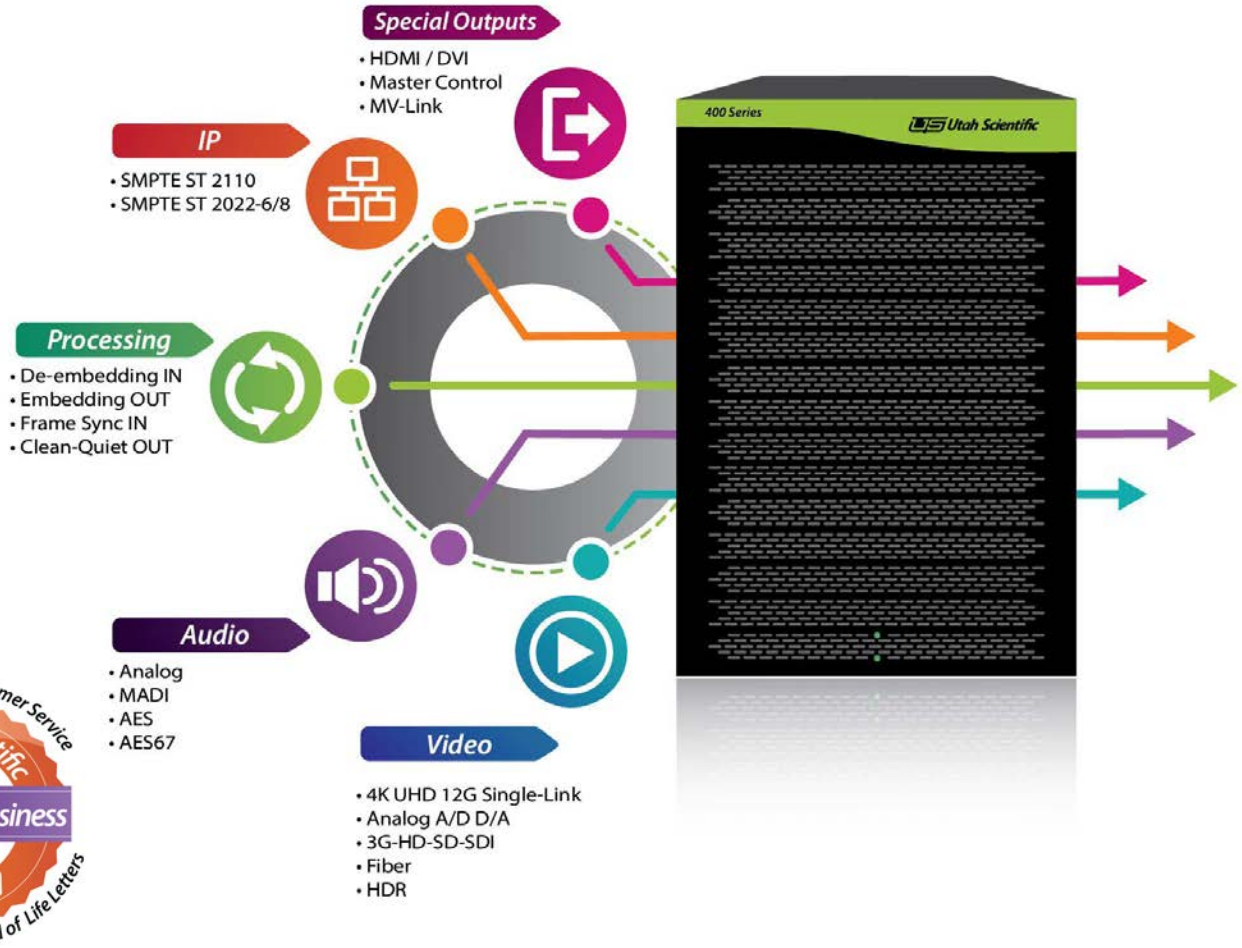


The UTAH-400 Series 2 routers are designed to provide a single platform for all signal formats including those used in IP networks. Each router is based on a unique hybrid architecture, making it ideal for even the most complex signal management environments. Robust tools for switching and processing signals drive a complete, integrated, and flexible system for the facilities of today and the future.

Utah Scientific has introduced a family of advanced modules that greatly simplifies system design, delivering a wide range of router functionality in a single frame that otherwise would require the addition of external equipment. Modules enable SDI management, IP decoding and multiplexing of SMPTE ST-2022-6/8, synchronizing incoming signals to a common reference, clean-quiet switching on specific outputs, audio shuffling, de-embedding and embedding, AES, MADI, and support for fiber and analog formats. In addition to this configuration flexibility, the UTAH-400 Series 2 offers a common set of I/O cards for any frame size.

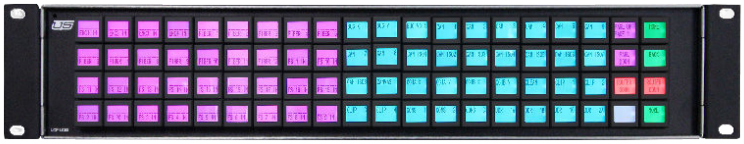
Modular and hot swappable from the front, the cards reduce physical space requirements and power consumption dramatically for increased efficiency and long-term scalability in your operation.

UTAH-400 Series 2 routers are readily scalable from 72 x 72 to 1056 x 1056, offering frame sizes of 72 x 72, 144 x 144, 288 x 288, 528 x 528, and 1056 x 1056.



Control, Configuration, and Monitoring

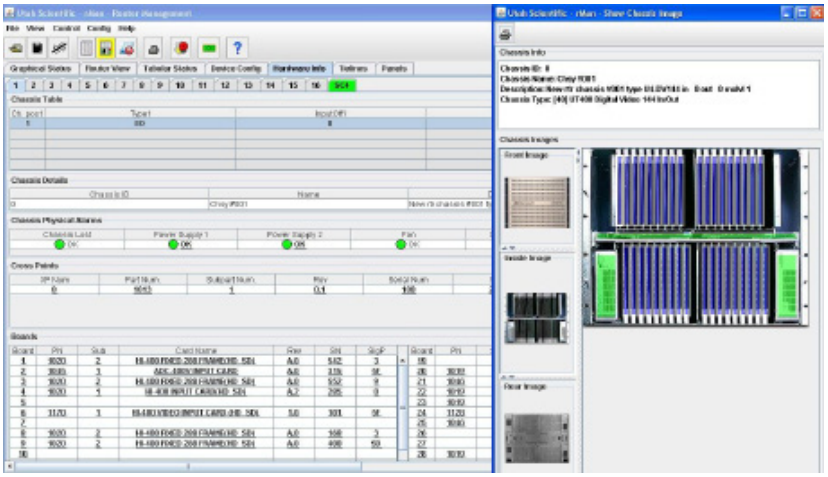
Controlling your UTAH-400 Series 2 routers is easy using our UCP family of hardware control panels. With over 12 models available to suit every operation, from the simplest to the most advanced, panels are easily customized by dragging and dropping buttons in the Ucon software.



Soft-LC is a software-based, virtual control panel for personal computers. Want to add modern, flexible UCP-LC panels to your router control system? Do your conference rooms and newsroom have all the routing control they need? Easily move to the newest control panel designs with 16, 32, or 80 button capabilities!

Our SoftPanel-2 GUI software offers another powerful control option, enabling complete customization of panel design including layout, functions, button sizes, and button colors as required by each location or user.

The SC Controller Series is the heart of control for all Utah Scientific routers, master controls, and panels, with three versions available to suit any budget or need. The Ucon GUI configuration software provides a simple and intuitive method for setting up the router and control panels. rMan software gives you tools for monitoring and managing the system, with status notifications for power supplies, fans, controllers, I/O cards, and crosspoint cards.



System Architecture With Highest Redundancy

Video Crosspoint Cards

Crosspoint cards receive inputs from the input cards and apply these signals to the crosspoint array. Crosspoint cards are controlled by the system controller, and the outputs of the crosspoint array are passed onto output cards by the output bus.

TDM Audio Sub-Router

UTAH-400 Series 2 routers offer a powerful set of tools for switching audio signals when coupled with the optional internal 3K x 3K TDM audio sub-router.

The capability of treating extracted or discrete audio in exactly the same manner as other signals allows for even greater operational flexibility.

Input and Output Cards

The input card carries 12 identical circuits that bring input signals from the rear panel into the matrix and deliver them to the crosspoint board. The output card carries 12 circuits that buffer the signals from the output bus and present them to the connectors at the rear panel of the frame. Each I/O circuit has a signal presence detector for alarm reporting and automated troubleshooting.

Internal Monitor Matrix

Each UTAH-400 Series 2 chassis is equipped with an internal monitor matrix for monitoring any of the output busses carried in that chassis.

Redundant Power Supplies

An external 1-RU power supply frame with dual redundant rectifier units is standard equipment on every UTAH-400 Series 2 chassis. The 72 frame provides dual internal power supplies.

The frame can be fed directly for applications in which 48VDC power is available from an external source, eliminating the need for the 1-RU rectifier frame.

Crosspoint Redundancy

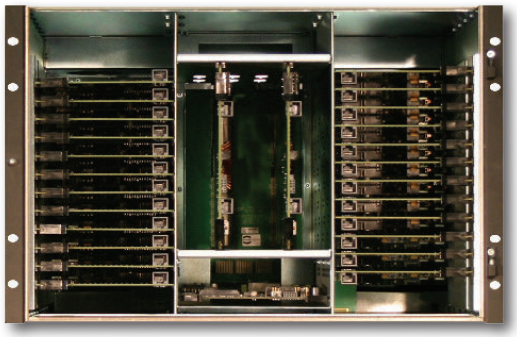
Crosspoint redundancy is enhanced with an optional crosspoint card that provides full backup against an internal path failure in the matrix.

Redundant, Isolated Power Busses

Each UTAH-400 Series 2 router includes two fully isolated and redundant busses to feed each individual module including input, output, and crosspoint cards. With a second power supply rectifier, every module can receive voltage from the A or B bus for an additional level of redundancy inside the router frame.

Frame Controller Redundancy

The frame controller module coordinates all switching and reporting functions from the control system. Redundant frame controllers are installed to ensure the highest level of redundancy.



UTAH-400 Series 2 - 144 Chassis

Features

- Exceptional reliability
- Common I/O modules in all frames
- Signal presence detection on I/O modules
- Internal audio submodule
- Crosspoint redundancy
- Redundant power feeds to all modules
- Standard redundant power supplies
- Standard internal monitor matrix
- Standard redundant frame controllers
- Low power consumption

Available Modules

3G SDI Input / Output Card

This card provides 12 inputs or outputs for SDI formats, supporting signals from 3Mbps all the way up to 3G including SD-SDI, HD-SDI, 3G-SDI, dual- or quad-link 4K, and DVB/ASI. Reclocking is provided as standard for the best possible signal quality on all SMPTE-standard formats.

Features

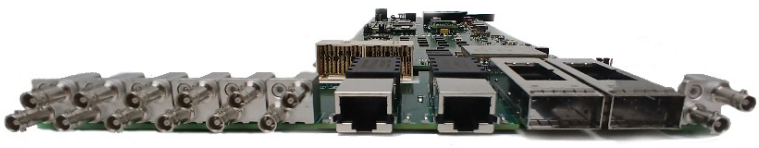
- 12 inputs or outputs per card
- Digital video from 3Mbps to 3Gbps
- Supporting 4K dual or quad links
- Standard reclocking circuitry

PassThrough Card

The Utah Scientific PassThrough card is a revolutionary way of providing signal conversion from SDI to IP, allowing users to migrate at their own pace. The PassThrough card can reside within the input or output card slots of a Utah 400 Series 2 router and can also be deployed outside the router giving the ultimate in flexibility.

Features

- Supports 12 3G/HD/SD-SDI inputs
- All 12 signals are simultaneously copied and encapsulated in uncompressed IP
- Supported IP formats: SMPTE ST 2022-6/8 and SMPTE ST 2110
- Two 40Gb, QSFP+ ports on the card provide the signal output of the copied and converted signals
- Copy up to 12 SDI to 12 uncompressed IP video/audio signals (Input: 12 SDI, Output: 12 uncompressed IP and 12 SDI)



PassThrough Card

Frame Sync and De-embedding Input Card

This card provides 12 SDI inputs with a submodule that handles four independent streams. Up to three submodules can be fitted on a single input card, providing 4, 8, or 12 simple frame syncs with AES audio de-embedders.

Each frame sync input provides delay adjustments and Proc Amp control including Y/Cr/Cb gain, saturation, and hue. The card also provides audio shuffling for 16 audio channels in each signal. The signals align to the chassis reference and feature a normal pass-through signal path if the reference is disrupted.

Each de-embedding input extracts up to 16 audio channels from each of the video signals on the card, creating a combined 192 TDM stream that is fed to the audio subrouter. Once received the AES can be routed as 16 monaural signals providing up to a full 3072 x 3072 AES router. Full audio routing allows channels to be switched to any of the audio functions installed in the router, including embedding, AES, analog audio, and MADI.

Features

- Frame sync, audio shuffling, and de-embedding on a single card
- 12 SDI inputs supporting 3G, HD, or SD
- 4 independent channels per submodule
- 3 submodules per card for 4, 8, or 12 channels
- Simple Proc Amp controls
- Full audio routing after de-embedding

Available Modules

Clean-Quiet and Embedding Output Card

This module provides 12 SDI outputs within a submodule that supports four independent streams. Up to three submodules can be included in a single chassis, providing clean-quiet and embedding outputs for 4, 8, or 12 streams.

Each clean-quiet output is rebuilt on the line on which the switch occurred, performing an audio V-Fade to prevent any disruptions in the audio signal and then to reserialize the resulting signal with correct CRCs. This ensures that downstream equipment does not indicate errors due to the router switch. The module also provides audio shuffling for the 16 audio channels in each signal. The signals align to chassis reference and feature a normal pass-through signal path if the reference is disrupted.

Each embedding output receives up to 16 audio channels for every video signal on the card, fed from a 192 TDM stream that comes from the audio subrouter. Capabilities include embedding from any of the available audio installed in the router, de-embedding, AES, analog audio, and MADI.

Features

- Clean-quiet, audio shuffling, and embedding on a single card
- 12 SDI outputs supporting 3G, HD, or SD
- 4 independent channels per submodule
- 3 submodules per card for 4, 8, or 12 channels
- Video rebuilt on the line on which the switch occurred
- Audio V-Fade to prevent audio pops and clicks
- Full embedding of any audio in the router

Hybrid Card

Fiber, Analog Video, HDMI, and DVI Input/Output Card

Combining Utah Scientific's award-winning flex cards with SFPs, the UTAH-400 Series 2 routers support fiber, A-D analog video, D-A analog video, HDMI, and DVI formats. You can mix and match any of the SFPs to create up to 12 inputs or outputs (in pairs) of mixed formats.

The card's fiber inputs receive optical signals and convert them to SDI; conversely, the outputs take SDI and convert it to optical signals. Both single-mode and multimode fiber is supported, making this capability especially useful on long cable runs.

The card can also convert composite analog video input signals to SDI, and the outputs can convert SDI signals to composite. This is especially valuable when switching a small amount of analog video.

In the same manner, the card converts HDMI and DVI input signals to SDI and the outputs can convert SDI to HDMI or DVI. This is useful for adding monitors to the router.

With these capabilities, together with Utah Scientific's XFD fiber and coax distribution products, the router becomes the hub of a complete optical routing system.

Features

- Award-winning flexible inputs and outputs
- Up to 12 signals on inputs or outputs
- Mix fiber, analog video, HDMI, and DVI
- Small form factor using removable SFPs
- Convenient way to switch multiple formats on a single card

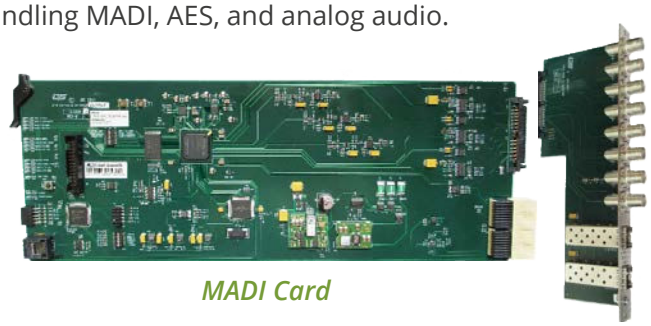
Available Modules

Triple MADI Input/Output Card

This card provides three MADI (multichannel audio digital interface) input or output ports that can carry up to 64 channels of audio on a single cable. With the optional audio submodule installed, each input port can extract 64 mono AES signals for a total of 192 on all ports. Likewise, each output port combines 64 mono AES signals within a single MADI port for a total of 192 mono AES outputs.

MADI enables a greater number of audio channels to be transported on a small amount of cable. Capabilities include full audio routing (with optional subrouter) that allows channels to be switched to any of the available cards including embedding, AES, analog audio, or MADI. Coax and fiber connections are available.

Together with Utah Scientific's MADI Translator companion product, the router can provide a complete set of tools for handling MADI, AES, and analog audio.



MADI Card

Features

- Three MADI input or output ports per card
- 64 mono AES on a single wire for up to 192 AES on just three wires
- Coax BNC or fiber SFP connections
- Convenient way to transport audio to router
- MADI can be decoded to embedded, AES, or analog audio outputs
- MADI Translator companion product enables conversion from AES or analog audio to and from MADI, offering a convenient way to transport audio to the UTAH-400 Series 2 router

AES Input/Output Card

This module provides 12 AES pairs of inputs or outputs for external audio signals that can be used for a small amount of audio routing. When the audio submodule is present, the AES is switched as mono streams for added flexibility for embedding the signal into the video stream or sending it to MADI or analog audio outputs.

Unbalanced and balanced connections are available. Optional balanced breakout panels are available to convert Sub-D connectors to a terminal block.

Features

- Provides mixed signal routing
- 12 AES pairs of inputs or outputs per card
- Unbalanced and balanced connections
- AES can be routed to embedded, MADI, or analog audio outputs

A-D and D-A Analog Audio Input/Output Card

This card provides 12 stereo analog audio inputs or outputs for external audio signals that can be used for a small amount of audio routing. Each stream provides conversion from analog audio to AES or AES to analog audio, making this module perfect for switching mixed audio formats without requiring external conversion. When the audio submodule is present, the analog audio is switched as mono streams for added flexibility for embedding the signal into the video stream or sending it to MADI or AES outputs.

Balanced connections are available. Optional balanced breakout panels are available to convert Sub-D connectors to a terminal block.

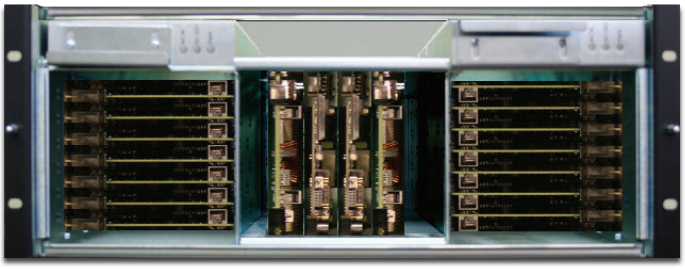
Features

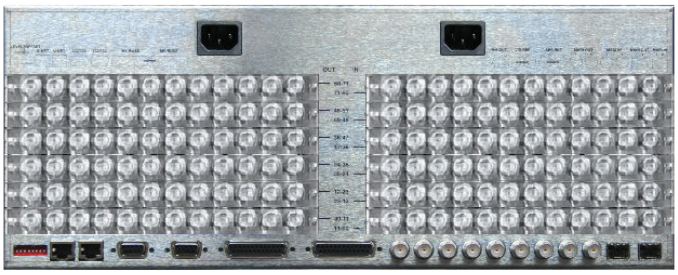
- Provides mixed signal routing
- 12 analog audio inputs or outputs per card
- Analog audio can be routed to embedded, MADI, or AES outputs

UTAH-400 Series 2 Frames

72 Frame

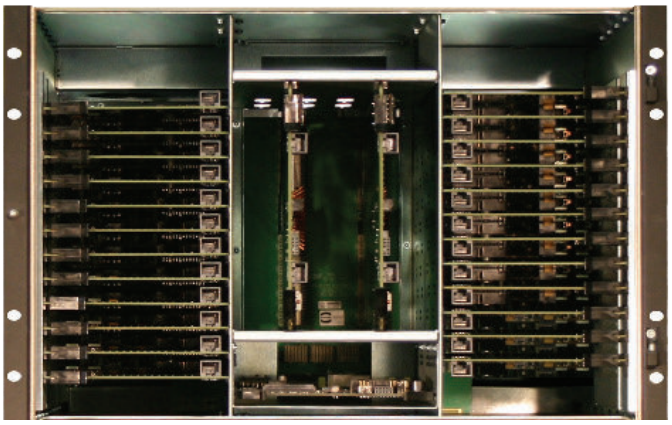
Two models available
72 inputs and 72 outputs fixed
Non-square sizes from 12 x 132 to
132 x 12 with any size in between
Small 4-RU footprint
Low 150-watt power consumption
Handles all I/O module options
Built-in MADI input and output ports
Redundant power feeds to all modules
Standard internal monitor matrix
Internal audio crosspoint available
Crosspoint redundancy available

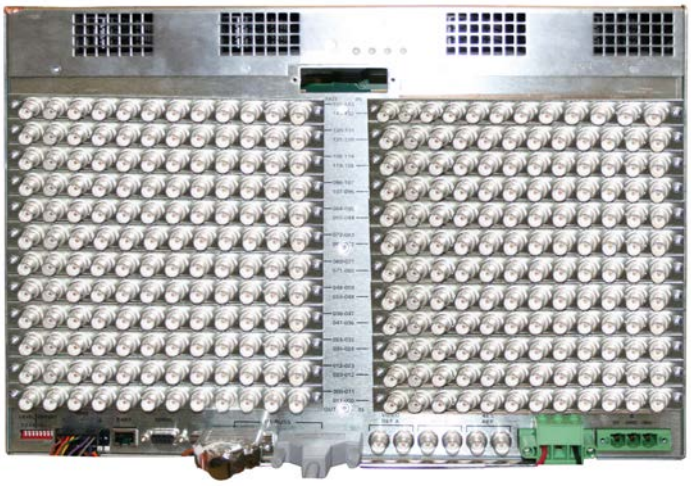




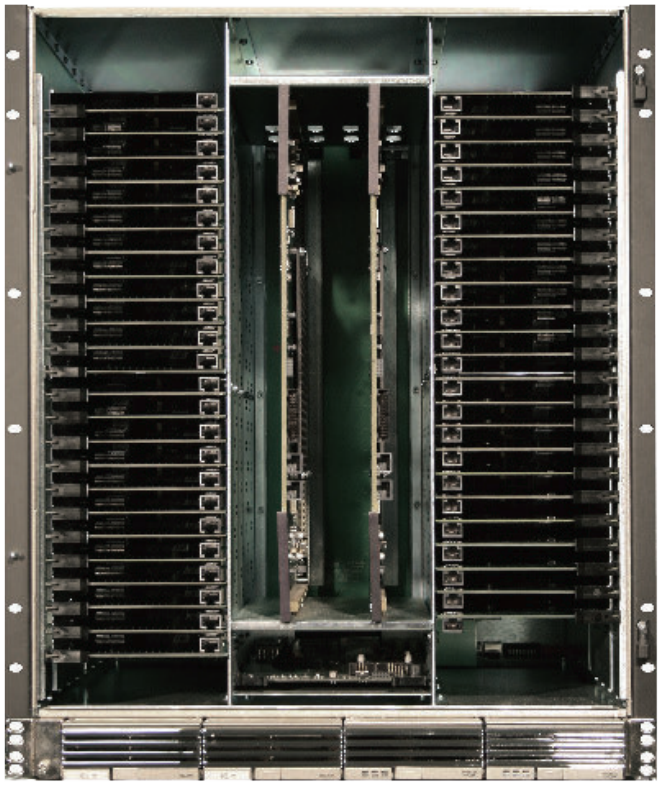
144 Frame

144 inputs and 144 outputs
Small 8-RU footprint (including 1RU PSU)
Low 300-watt power consumption
Handles all I/O module options
Redundant power feeds to all modules
Standard redundant power supply frame
AC and DC options
Standard internal monitor matrix
Internal audio submodule available
Crosspoint redundancy available



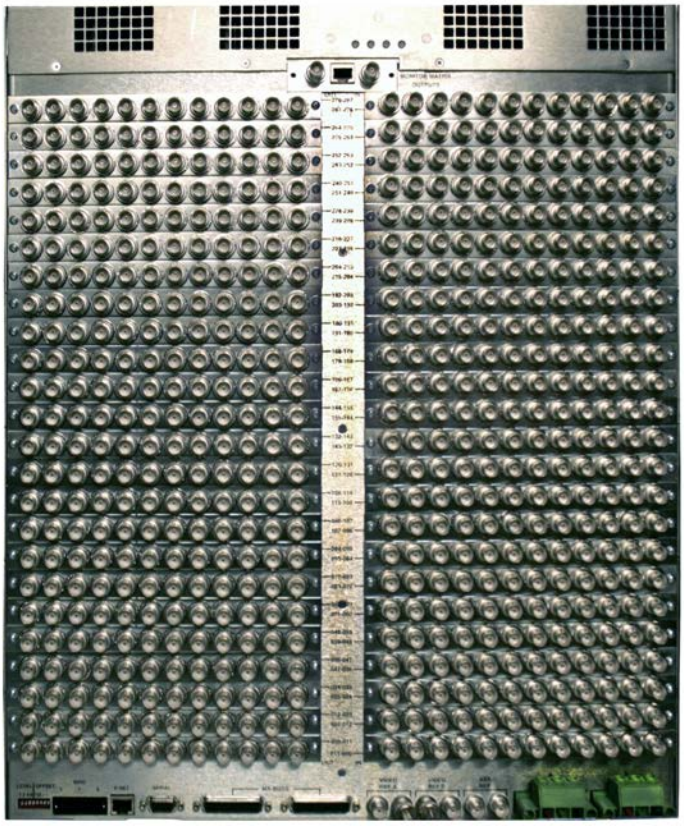


UTAH-400 Series 2 Frames



288 Frame

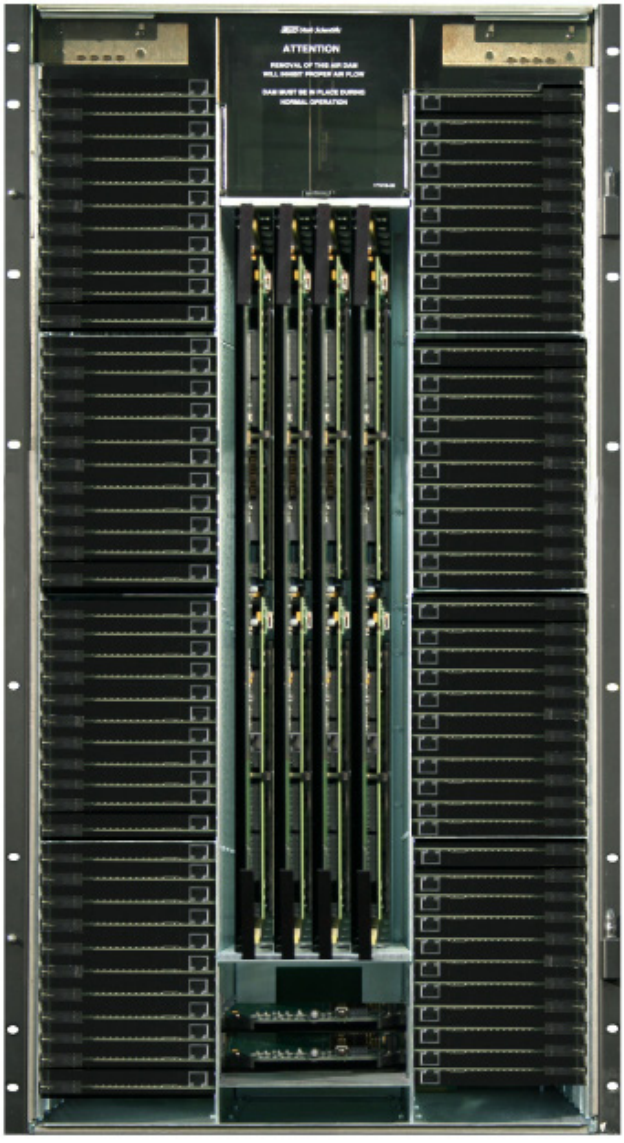
288 inputs and 288 outputs
Small 13-RU footprint (including 1RU PSU)
Low 600-watt power consumption
Handles all I/O module options
Redundant power feeds to all modules
Standard redundant power supply frame
AC and DC options
Standard internal monitor matrix
Internal audio submodule available
Crosspoint redundancy available

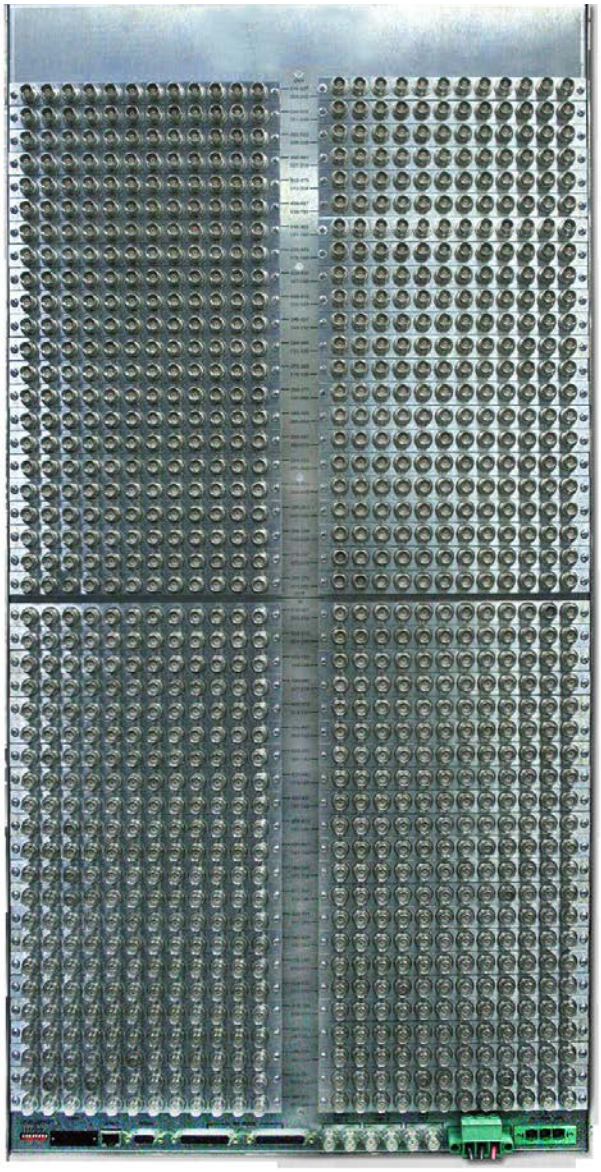


UTAH-400 Series 2 Frames

528 Frame

528 inputs and 528 outputs
Small 21-RU footprint (including 1RU PSU)
Low 1,300-watt power consumption
Handles all I/O module options
Redundant power feeds to all modules
Standard redundant power supply frame
AC and DC options
Standard internal monitor matrix
Internal audio submodule available
Crosspoint redundancy available

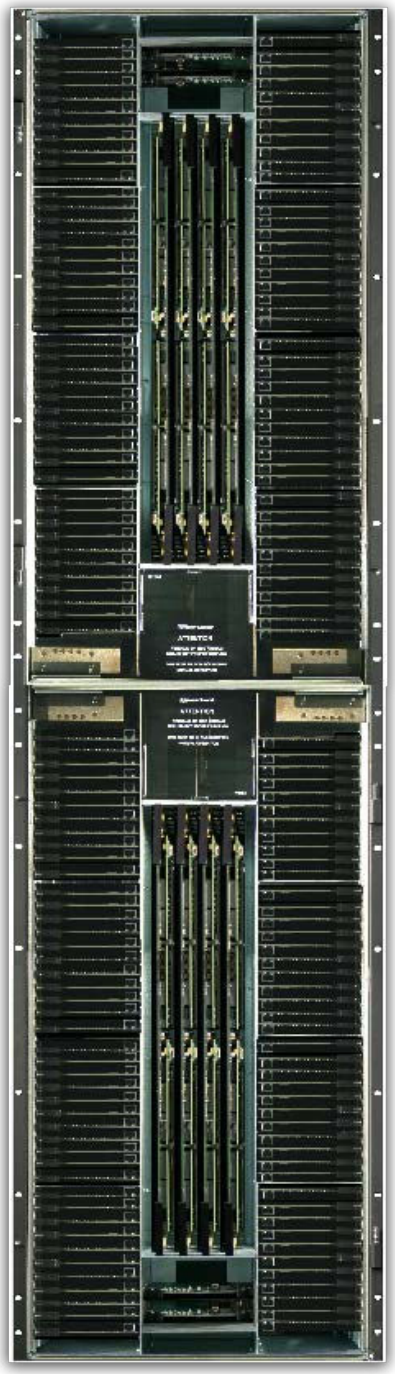


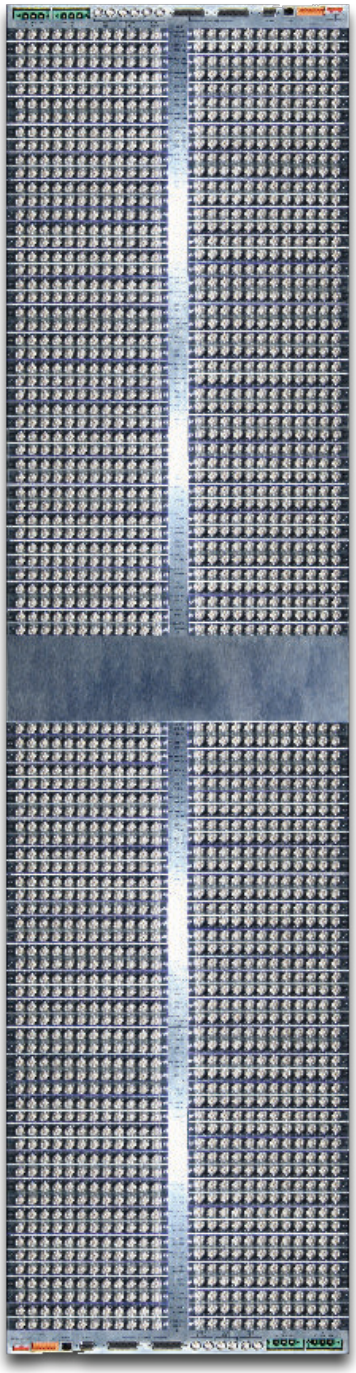


UTAH-400 Series 2 Frames

1056 Frame

1056 inputs and 1056 outputs
Small 42-RU footprint (including 2RU PSU)
Low 2,600-watt power consumption Handles all I/O module options Redundant power feeds to all modules Standard redundant power supply frame AC and DC options
Standard internal monitor matrix Internal audio submodule available





Specifications

Digital Video Standards

Compliant with SMPTE 259M-C, SMPTE 292M, SMPTE 425M-A, SMPTE 425-B, SMPTE 310M, DVB-ASI

Digital Video Inputs and Outputs

Formats:	Auto-select for simultaneous operations of SD, HD, 3G-SDI, 2K, and DVB-ASI
Connector:	Standard card - BNC
	Hybrid card - HD-BNC and Ethernet port
Inputs:	12 per card
Outputs:	12 per card
Reclocking:	Automatic for all standard signal rates including 270Mbps, 1.485Gbps, 2.970Gbps, DVB-ASI.
	Automatic bypass for non-standard signal rates including 3Mbps-2.970Gbps
Equalization:	Automatic 300m at 270Mbps, 150m at 1.485Gbps, 100m at 2.970Gbps with Belden 1694A or equivalent cable
Signal Level:	800mV p-p ±10%
Jitter:	Conforms to SMPTE 259-C, 292M, 425-A, 425-B
Return Loss:	< -15 dB to 1.5 GHz, -10dB to 3 GHz Output Return Loss

PassThrough Card Standards

SMPTE ST 2022-6/8, SMPTE ST 2110
Configured as input or output card

PassThrough Card Inputs and Outputs

Formats:	12 Auto-detect 3G/HD/SD-SDI
Connector:	12 HD-BNC SDI Inputs, Dual 40GigE SFP+ 10GigE SFP, Ethernet for configuration
Inputs:	12 3G/HD/SD-SDI
Outputs:	12 Uncompressed SMPTE ST 2022-6/8 or SMPTE ST 2100. Supports VLAN Tagging, IGMP, AMWA IS-04, IS-05, and IS-06

Flex Input and Output Card

Inputs:	6 dual SFP cages - up to 12 inputs
Outputs:	6 dual SFP cages - up to 12 outputs

Analog Video Standards

NSTC M, NTSC J, NTSC 4.43, PAL B, PAL G, PAL H, PAL I, PAL D, PAL M, PAL N, PAL 6

Analog Video Inputs and Outputs

Formats:	10-bit composite to SD-SDI video
	SD-SDI to composite 10-bit video
Connector:	Dual HD-BNC SFP

Fiber Inputs and Outputs

Connector:	Dual LC SFP

HDMI/DVI Inputs and Outputs

Formats:	HDMI v1.4 and DVI 1.0, up to 1920 x 1080p, 3G-SDI, HD-SDI, SD-SDI
Connector:	Single-latch Type D connector for SFP (uses dual-SFP cage)

Specifications

MADI Standards

MADI/AES10

MADI Inputs and Outputs

Connector:	BNC 75 ohm or optional SFP
Inputs:	3 MADI streams
Outputs:	3 MADI streams
Cable Length:	100m with Belden 1694A or equivalent cable
Output Return Loss:	< -15 dB to 125MHz
Output Amplitude:	800mV +- 10%

AES Audio Standards

AES3id

AES Inputs and Outputs

Formats:	48 kHz 16 - 24 Bit, AES / EBU, AES-3
Modes of Operation:	Synchronous and Asynchronous
Connector:	BNC unbalanced or D-SUB 37 balanced
Inputs:	12 per card
Outputs:	12 per card
Unbalanced Impedance:	75 ohm
Balanced Impedance:	110 ohm
Input Level:	Minimum: 200 mV p-p; maximum: 7 V p-p
Sample Rate:	48 kHz
Common Mode Range:	± 7V (DC + Peak Signal)
Nominal Rise/Fall Times:	25 nanoseconds
Common Mode Rejection:	>30 dB, DC to 6 MHz
Intrinsic Jitter:	< 0.025 UI Peak, w/700 Hz. HPF applies to discrete AES outputs
Output Phasing With Respect to DARS Input:	± 2.5% (± 9º) of frame interval

Analog Audio Inputs and Outputs

Formats:	48 kHz 16 - 24 Bit, AES/EBU, AES-3
Modes of Operation:	A-D and D-A stereo analog audio
Connector:	Dual D-Sub 37 balanced
Inputs:	12 per card
Outputs:	12 per card
Balanced Impedance:	110 ohm
Frequency Response:	20-20kHz ± .05dB
Max Input Level:	24dBu
Input Impedance:	200k ohm, strappable to 600 ohm
THD:	@24dBu, 20-20kHz .05%
IMD:	@24dBu, 20-20kHz .05%
Hum and Noise: 2	0-15kHz -85dBu
Crosstalk:	@20kHz 0dB
Gain Uniformity:	± .05dB
Common Mode Rejection:	@50/60Hz 70 dB

Specifications

Reference Input

(2) Video A BNC Looping:	Analog PAL, NTSC, or tri-level
(2) Video B BNC Looping:	Analog PAL, NTSC, or tri-level
(2) AES BNC Looping:	AES3-id DARS, AES3-id (required for audio submodule)

Power

90-240 VAC, 50/60 Hz

72 frame:	150 watts max
144 frame:	300 watts max
288 frame:	600 watts max
528 frame:	1,300 watts max
1056 frame:	2,600 watts max

All supplies are UL-listed and IEC950-approved

Physical

Width:	19” (48.26cm)
Depth:	18.5” (47cm)
Height:	72 frame – 4-RU, 7” (17.78cm), including internal power supplies
	144 frame – 7-RU, 12.25” (31.11cm)
	288 frame – 12-RU, 21” (53.34cm)
	528 frame – 20-RU, 35” (88.9cm)
	1056 frame – 40-RU, 70” (177.8cm)
	Plus AC power supply rectifier frame – 1-RU, 1.75” (4.45cm)

Environmental

Operating temperature 50-104 degrees F (10-40° C)
Relative humidity range: 0-90%, noncondensing

Warranty

10-year limited warranty, 24/7 service support
Specifications are subject to change without notice.

Ordering Information

Frames

VA-72S2R	72 x 72 frame. Includes single crosspoint and redundant internal power supplies.
VA-72S2RX	Variable input and output frame with up to 144 total I/O. Combinations of 12 inputs or 12 outputs. Includes single crosspoint and redundant internal power supplies.
VA-144S2R	144x144 frame. Includes single crosspoint and redundant power supply frame.
VA-288S2R	288 x 288 frame. Includes single crosspoint and redundant power supply frame.
VA-528R	528 x 528 frame. Includes single crosspoint and redundant power supply frame.
VA-XL	1056 x 1056 frame. Includes single crosspoint and two redundant power supply frames.

Crosspoint Cards

VX-400S2/72RS	Redundant standard crosspoint card for 72R frame
VX-400S2/72XRS	Redundant extended crosspoint card for 72RX frame
VX-400S2/144RS	Redundant crosspoint card for 144R frame
VX-400/528RS	Redundant crosspoint card for the 528R frame
TDM-400/72S	TDM audio crosspoint card for 72R and 72XR frames
TDM-400S	TDM audio submodule for V-144R and larger frames

Input Cards

HI3-400/12S	3G SDI 12 input card
HI3E-400/12S	3G SDI 12 input card with de-embedding
AHI-400/12S	3G SDI advanced input card for adding up to 3 submodules
SDIMOD-400S	3G SDI 4 input submodule for frame sync, audio shuffling, and de-embedding
IPI-400/12S	IP SMPTE 2022 input card
FI-400/12S	3G SDI 12 flex input card for adding SFPs
MI3-400/12S	3-stream MADI input card
AI-400/12S	AES 12 input card
ADC-400A/12S	A-D stereo analog audio input card

Output Cards

HO3-400/12S	3G SDI 12 output card
HO3E-400/12S	3G SDI 12 output card with embedding, audio shuffling
AHO-400/12S	3G SDI advanced output card for adding up to 3 submodules
SDIMOD-400S	3G SDI 4 output submodule for clean-quiet, audio shuffling, and embedding
IPO-400/12S	IP SMPTE 2022 output card
FO-400/12S	3G SDI 12 flex output card for adding SFPs
MO3-400/12S	3-stream MADI output card
AO-400/12S	AES 12 output card
DAC-400A/12S	D-A stereo analog audio output card

Ordering Information

SFPs

FOI-400S	Dual-channel, 1310nm single-mode HD/SD SFP fiber receiver LC
FOI-400MMS	Dual-channel, 850nm multi-mode HD/SD SFP fiber receiver, LC
EB30HD2R-LNRS	Dual-channel, 3G SDI coax SFP receiver, long reach with reclocker, HD-BNC
EB30HD2R-LNS	Dual-channel, 3G SDI coax SFP receiver, long reach, HD-BNC
EB30HD2R-MNS	Dual-channel, 3G SDI coax SFP receiver, medium reach, HD-BNC
EB34TD1R-SN	Single-channel, DVI receiver with 6-foot DVI cable
EB34TD1R-SN	Single-channel, HDMI receiver with 6-foot HDMI (A) cable
EB30HDS2R-ANS	Dual-channel, composite coax NTSC/PAL SFP decoder, HD-BNC
FOO-400S	Dual-channel, 1310nm single-mode HD/SD SFP fiber transmitter, LC
FOO-400MMS	Dual-channel, 850nm multi-mode HD/SD SFP fiber transmitter, LC
EB30HD2T-LNRS	Dual-channel, 3G SDI coax SFP transmitter, long reach with reclocker, HD-BNC
EB30HD2T-LNS	Dual-channel, 3G SDI coax SFP receiver, long reach, HD-BNC
EB34TD1T-SN	Single-channel, DVI transmitter with 6-foot DVI Cable
EB34TD1T-SN	Single-channel, HDMI transmitter with 6-foot HDMI (A) Cable
EB30HD2T-ANS	Dual-channel, composite coax NTSC/PAL SFP encoder, HD-BNC

Breakout Panel

BDA-400S2	Audio breakout panel that converts 72 input and/or output connections from 37 pin “D” to terminal block. Includes three 3’ routing switcher-to-BDA cable assemblies

Since the introduction of our first analog router over three decades ago, Utah Scientific has been an industry leader in the design and manufacture of world-class signal routing and processing solutions.

Our hybrid technologies enable integrated frame sync, clean-quiet outputs, SMPTE ST 2022, A/D and D/A conversions, fiber-optic conversion, audio embedding/ de-embedding, and MADI transport. By design, Utah Scientific products are the most energy-efficient on the market.

Utah Scientific has market-leading experience in the design and manufacture of routing switchers and associated distribution products. We take pride in knowing that the reliability and performance of our products are second to none, backed by industry-leading service and support.

Specifications are subject to change without notice

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