Utah Scientific

TECHNICAL GUIDE

UTAH-100/UDS

Universal Distribution System

A modular, multi-rate signal distribution system that consolidates mixed-format I/O into a single crosspoint fabric — without the cost or power overhead of conventional DA packages.



SIGNAL DISTRIBUTION CHALLENGES

Why Universal Distribution?

In any broadcast facility that handles mixed signal formats, signal distribution quickly becomes a layered engineering problem.

The power and space complexities add up quickly. A facility distributing signals across SD, HD, and 3G formats simultaneously can find itself running three parallel DA infrastructures — each sized for peak capacity, most of it idle at any given moment. The capital cost of this approach is significant; the ongoing power draw is a fixed operational expense regardless of load.

Fixed-format I/O makes the problem worse over time. When a facility adds a new signal type — DVB-ASI ingest, a fiber interconnect, an analog reference feed — the existing DA hardware typically cannot accommodate it. The result is another equipment purchase, another rack slot consumed, and another control interface for operators to manage.



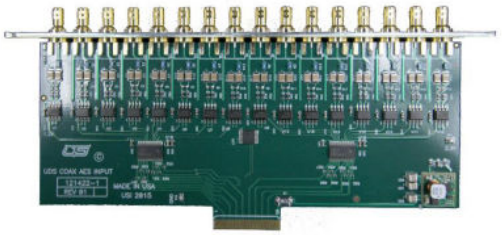
UTAH-100/UDS Compact Series — 1RU and 2RU frame configurations

SECTION 1 — SYSTEM ARCHITECTURE

System Architecture and FLEX-I/O Modularity

Most distribution amplifier packages treat signal format as a fixed property of the frame. That assumption breaks down quickly in facilities running simultaneous SD, HD, and 3G SDI alongside fiber-connected remote sources or IP-encapsulated streams. The UTAH-100/UDS addresses this by placing a crosspoint fabric at the center of the system, with format selection pushed out to the individual I/O port.

The crosspoint fabric interconnects all I/O modules within the frame, so any input signal can feed any number of output ports simultaneously. Standard multi-rate video I/O modules carry 16 ports each, fitted with BNC connectors for density and signal integrity across all supported data rates from 3 Mbps through 3 Gbps. The system auto-selects signal rate per port, handling SD-SDI, HD-SDI, 3G-SDI, and DVB-ASI without manual configuration.



Where standard BNC modules do not meet the interface requirement, those modules can be replaced with FLEX-I/O modules. Each FLEX-I/O module provides 8 dual-port SFP cages, supporting SDI over coax or fiber at any rate up to 3 Gbps, analog composite (PAL/NTSC), DVI/HDMI, and IP-encapsulated DVB-ASI streams. Fiber and coax I/O can be mixed freely across frame slots.



> ARCHITECTURE NOTE
> The crosspoint fabric routes any input to any output within the same frame. It does not provide signal path redundancy for input card hardware failures — a failed I/O module removes its 16 ports from service until the module is replaced.

The built-in web interface goes beyond signal routing. Output ports can be grouped into named output blocks; once a block is defined, any input signal is routed to all ports in that block with a single selection. For dubbing suites or reference signal distribution to edit bays, this eliminates repetitive per-port switching operations. Individual output assignment remains available at all times alongside block-level control.

SECTION 2 — FRAME SIZES

Frame Sizes and Configuration Options

The UTAH-100/UDS ships in three frame sizes, letting facilities match rack space and power budget to actual port requirements rather than over-buying capacity. All three frames share the same module architecture, control interface, and FLEX-I/O compatibility.

Frame	Matrix Size	Rack Units	Max Power	Clean/Quiet
UTAH-100/UDS	32 x 32	1RU	<30W	Not available
UTAH-100/UDS	64 x 64	2RU	<50W	**Optional**
UTAH-100/UDS	144 x 144	4RU	<100W	**Optional**



Every frame includes dual DC input connections, an external power supply (redundant supply optional), and a reference video input for vertical interval switching. The onboard controller module provides RJ-45 Ethernet and serial ports for system integration.

SC-4 SYSTEM INTEGRATION

The standard controller module can be replaced with an optional MX-Bus module. This integrates the UDS frame directly into an SC-4 control system, allowing the distribution matrix to be managed alongside other Utah Scientific routing infrastructure from a single control interface.

Clean/Quiet modules reduce fan noise and electromagnetic emissions for use in noise-sensitive environments such as studio floors or control rooms where equipment cooling fans require attenuation. This option is available on the 64x64 and 144x144 frames only.

CONTROL ARCHITECTURE

Web Interface, Ethernet, and Hardware Panels

Every UTAH-100/UDS frame ships with an embedded web server accessible from any standard browser on the same network. No additional software is required. The web interface covers system configuration, signal status monitoring, and direct control of crosspoint routing. Beyond individual port-by-port assignment, the interface lets operators define output blocks: grouped combinations of output ports that can be switched together with a single input selection. This is particularly useful in dubbing suites or reference distribution scenarios where an entire studio system or edit bay must be switched simultaneously.



For remote and local operator access beyond the browser interface, the UDS supports virtual control via Ethernet using Utah Scientific's RCP-3 protocol over the RJ-45 Ethernet port. A separate RJ-45 diagnostic port is provided for system troubleshooting without interrupting production traffic. Serial control is available through an RS-422/232 DB-9F connection using the RCP-1 protocol, supporting facilities with legacy control infrastructure.



Optional hardware control panels extend operator access to the physical environment without replacing or disabling the web interface. Both the web applet and any connected hardware panel operate concurrently. The controller module can optionally be replaced with an MX-Bus module, allowing the UDS frame to integrate into an SC-4 control system when broader facility-wide routing control is required.





OUTPUT BLOCK GROUPING

Once an output block is defined, any input signal routes to the entire group with a single selection — reducing operator steps in multi-destination switching scenarios such as dubbing or reference distribution.

TECHNICAL SPECIFICATIONS

Full Technical Specifications

The tables below cover system-level and I/O module specifications. Frame size, connector type, and control interface selections should be confirmed against facility requirements prior to ordering.

PARAMETER	SPECIFICATION
Video Standards	SMPTE 259M-C, SMPTE 292M, SMPTE 425M-A, SMPTE 425-B, SMPTE 310M, DVB-ASI
Embedded Audio	20-bit synchronous 48 kHz per SMPTE 272M-C; 24-bit synchronous 48 kHz per SMPTE 299M
I/O Formats	Auto-select: SD, HD, 3G-SDI, 2K, DVB-ASI simultaneous operation
Connector	BNC, 1 per input and output
Reclocking	Automatic: 270 Mbps, 1.485 Gbps, 2.970 Gbps, DVB-ASI · Auto bypass: 18 Mbps–2.970 Gbps non-standard rates
Equalization	Auto: 400 m @ 270 Mbps · 220 m @ 1.485 Gbps · 200 m @ 2.970 Gbps (Belden 1694A or equivalent)
Reference Input	(1) BNC: Analog PAL, NTSC, or HD tri-level sync
Control	(1) RJ-45 10/100 Ethernet — embedded web server, RCP-3 protocol · (1) RJ-45 diagnostic port · (1) RS-422/232 DB-9F — RCP-1 serial protocol
Frame Sizes	1 RU (32×32) <30 W · 2 RU (64×64) <50 W · 4 RU (144×144) <100 W
Power Supply	External DC; redundant supply optional. Dual DC input per frame.
Environmental	Operating temp: 32–104°F (0–40°C) · Humidity: 0–90% non-condensing

I/O MODULE	PORTS	DETAIL
Multi-rate Digital Input	16 (HD-BNC)	3 Mbps–3 Gbps · Input equalization >100 m Belden 1694A · Reclocking all SDI rates to 3 Gbps
Multi-rate Digital Output	16 (HD-BNC)	3 Mbps–3 Gbps
FLEX-I/O Option	16 (8 SFP cages)	Dual-channel SFPs: SDI coax/fiber to 3 Gbps · PAL/NTSC analog composite · DVI/HDMI (single-port SFP) · IP-encapsulated DVB-ASI

Specifications are subject to change without notice. Clean/Quiet modules available on 64×64 and 144×144 frames only. Confirm cable type and length against equalization ratings before installation.

SECTION 7

Deployment Planning and Application Notes

Signal distribution problems rarely announce themselves in advance. They surface mid-production: a misconfigured output port, a frame too small to absorb a last-minute signal addition, a format mismatch that sends the wrong signal level downstream. The planning notes below address the four most common facility contexts where the UTAH-100/UDS is deployed, with the specific failure mode that engineers encounter most often in each.

DUBBING SUITES

The output block grouping feature is well suited here: a single selection routes any ingest source to a predefined set of destination decks simultaneously. The common failure mode is under-population of output ports at initial installation, leaving no headroom when a suite adds a deck. Plan port count at 1.5x current output requirements before ordering.

STUDIO REFERENCE DISTRIBUTION

The reference video input supports analog PAL, NTSC, and HD tri-level sync for vertical interval switching. For facilities distributing reference to multiple studios from a single frame, confirm that the reference source is stable before grouping output blocks. An unstable reference signal propagates glitching to every destination in the block simultaneously.

MULTI-FORMAT INGEST

Auto-select reclocking handles SD, HD, and 3G simultaneously without manual intervention. Where FLEX-I/O ports are used for fiber or IP-encapsulated DVB-ASI feeds alongside coax SDI, verify that each SFP cage is populated with the correct module type before commissioning. A mismatched SFP will pass signal in test conditions but produce intermittent errors under thermal load.

EDIT BAY SIGNAL FEEDS

Web-based control and optional Ethernet virtual panels allow editors to manage their own signal routing without engineering involvement. Assign output blocks per bay to constrain routing permissions. The most common issue in edit bay deployments is selecting the 32x32 frame when the facility scales to more bays; the 64x64 or 144x144 frame should be evaluated from the outset if expansion is anticipated.

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NEXT STEPS

Put the UTAH-100/UDS to Work in Your Facility

The UTAH-100/UDS is available for immediate evaluation. Utah Scientific's engineering team can assist with frame-size selection, FLEX-I/O module configuration, and control panel integration across all three frame sizes. Contact us to request a quotation or a pre-deployment design review.

01

Select Your Frame Size

Identify current and 3-year projected port requirements. Request a frame sizing consultation from Utah Scientific engineering.

02

Configure FLEX-I/O Modules

Confirm SFP module types for each port requiring fiber, HDMI/DVI, or IP-encapsulated DVB-ASI connectivity before placing your order.

03

Request a Quotation

Contact Utah Scientific sales with your frame size, signal mix, and control panel requirements. Delivery lead times available on request.

CONTACT UTAH SCIENTIFIC

+1 (801) 575-8801 info@utahscientific.com utahscientific.com Salt Lake City, Utah USA

WARRANTY DISCLOSURE

The UTAH-100/UDS is covered by Utah Scientific's **no-fee 10-year hardware warranty on routers**.

Specifications subject to change without notice. Confirm warranty terms with Utah Scientific at time of purchase.