BrightEye

NXT 450 Clean Streaming Router

H.264

The Router that Streamlines Live Broadcast

Source: **Camera 1**

Destination: **Encoder Input**

BrightEye NXT 450 Clean Streaming Router

Designed and built in California
5 YEAR WARRANTY

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Purveyors of Fine Video Gear—Loved by Engineers Worldwide

BrightEye NXT 450
Clean Streaming Router

A Set of Signal Processing Resources Tied Together with a Flexible Routing Matrix

Imagine this. You're out in the field. You've just been handed a variety of signals, with no genlock reference, and in different formats. You're expected to input them; perform live switching and dissolves; convert them to a standard format for distribution; and now – the producer wants a live streaming output AND wants to use an incoming MPEG stream. How many different processors are you going to need? How about – just ONE?

High Quality, High Profile MPEG Encoder/Decoder

The BrightEye NXT 450 adds a high quality, high profile H.264 (MPEG-4) Encoder to the already formidable feature set of the BrightEye NXT family of compact routers. Advanced coding techniques give superb performance even at low bit rates. The Encoder produces both a High and Low Resolution output simultaneously. Any SDI input can be fed to the Encoder through the built-in format converting Clean Switch, allowing seamless switching or mixing between all inputs. The independent Decoder operates simultaneously, with baseband output in any desired format. The Decoder output can be switched along with any other source to any destination. An NXT 450 can serve as a full duplex codec, supporting both an outgoing and incoming streaming path. Encoding and Decoding are fully integrated with the full set of resources in the NXT 450.

IP and DVB-ASI Streaming Connections

Encoded streams can be sent or received through IP networking or by direct DVB-ASI connections. The NXT 450 incorporates an RJ-45 Gigabit Ethernet port dedicated to streaming connectivity. The Encoder output can be delivered by either Unicast or Multicast addressing modes over the IP connection. Two Unicast outputs can be independently directed to any desired destination. Assuming the required IP gateway is in place, an NXT 450 can deliver a stream to any place on earth. The Multicast output is limited to the immediate subnet that the NXT 450 is connected to, but can be received by multiple devices. In addition to IP outputs, a DVB-ASI formatted stream can be output through a BNC port, or by fiber with an SFP module. For each of these outputs, IP or ASI, there is independent selection of the High or Low Resolution stream. The NXT 450 can receive an IP stream from the Media port, or ASI from any BNC or Fiber input. This stream will be Decoded to produce a baseband SDI signal with embedded audio.
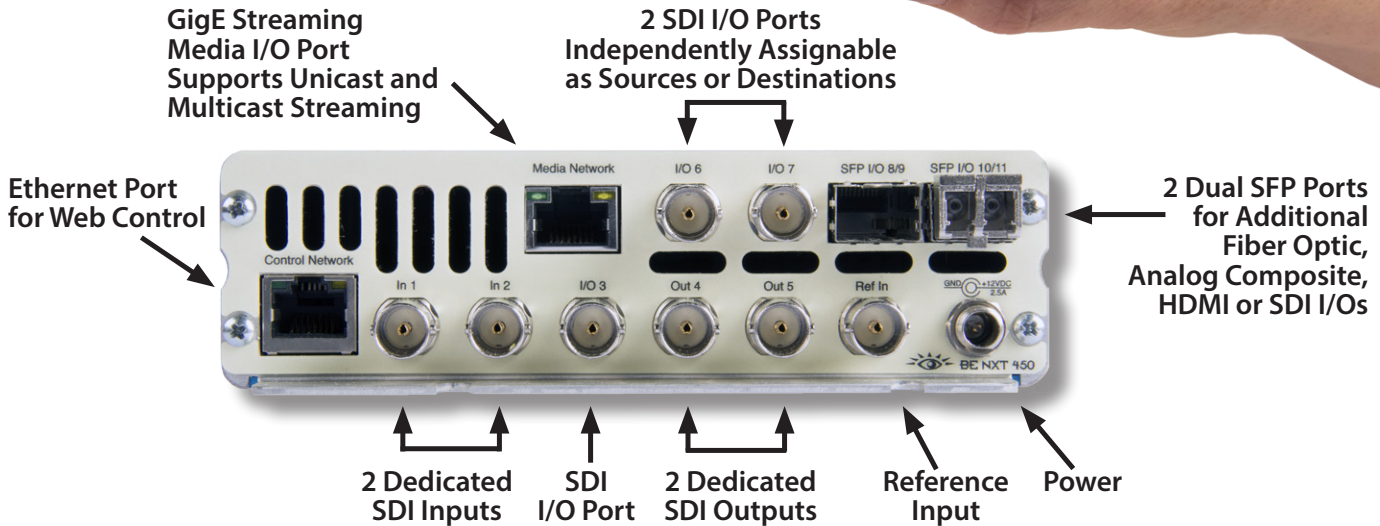
Features

- **Router for 3G, HD, SD SDI, fiber and HDMI video**
- **Simultaneous high quality, high profile MPEG Encoder/Decoder**
- **Advanced H.264 coding techniques give superb performance at low bit rates**
- **Built-in dual Up/Down/Cross converters**
- **Dual assignable clean switches for video and embedded audio for seamless routing**
- **LCD display with realtime full motion video of your sources**
- **Flexible I/O – You configure BNCs and SFPs as inputs or outputs**
- **HDMI, fiber and composite I/O via SFPs**
- **RS-232 and TCP/IP 3rd-party control interfaces**
- **Integrated web server for setup and operation**

- **Dissolve and Cut transitions**
- **Direct Take Mode**
- **Audio breakaway**
- **16 channel audio level adjustments**
- **Mix and shuffle audio**
- **System-wide configuration registers**
- **Programmable Salvo and Action Keys**
- **Front panel and web-based control**
- **Dual built-in test pattern generator with moving element option and slate ID**
- **Genlockable and timeable**
- **PiP-E*fx* – Picture in Picture option**

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BrightEye NXT 450
Clean Streaming Router

GigE Streaming Media I/O Port Supports Unicast and Multicast Streaming

2 SDI I/O Ports Independently Assignable as Sources or Destinations

Ethernet Port for Web Control

2 Dual SFP Ports for Additional Fiber Optic, Analog Composite, HDMI or SDI I/Os

2 Dedicated SDI Inputs

SDI I/O Port

2 Dedicated SDI Outputs

Reference Input

Power

Flexible Architecture

Flexible I/O configuration – a hallmark of all the BrightEye NXT series of routers – allows on-the-fly changes to the number of inputs and router destinations. From 9 inputs and 2 outputs, to 2 inputs and 9 outputs, the NXT 450 adapts to different needs. The two SFP ports allow for fiber optic connections, HDMI I/O, or additional HD-BNC SDI connections. Genlock the Clean Switches and TSGs using the external reference input. Assign a Clean Switch to an output, and now that output can be timed with respect to house reference. The flexibility extends to the integration of the Encoder and Decoder. The Encoder is driven as a destination of the routing matrix, and the output of the Decoder is a source to the matrix. Feed any source to the Encoder, and feed the Decoder to any destination.

Instantaneous Clean Switching and Format Conversion

The NXT 450 contains two Clean Switches. When assigned to an output, they provide clean, quiet switching – even between asynchronous sources. The format conversion feature provides automatic conversion of inputs to the chosen output format. This makes it possible to cut and mix between different input formats. Frame synchronization in the Clean Switch is particularly valuable when assigned to the input of the Encoder. It guarantees that the Encoder receives continuous, uninterrupted synchronization, regardless of the timing or condition of the input signals.

Multiple Intuitive Control Options

Control and configuration of the NXT 450 can be made from a variety of interfaces. The front panel provides a full motion, real time video display of sources and destinations. Route signals and configure resources directly from the front panel. Connect the RJ-45 Control Network port to a LAN for control using the built-in web server. From smartphone, tablet, or laptop, view thumbnails of all the sources and destinations, make routing changes, and configure parameters of all the NXT 450 resources. Control from third-party devices can be accomplished by TCP/IP or RS-232 protocols. Use the 5835 Control Panel to provide a fully customizable operator interface.
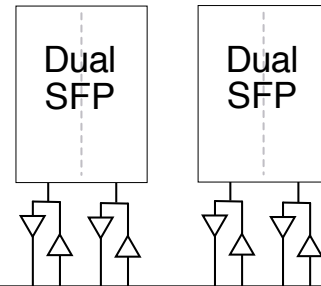
Rich in Resources

The NXT 450 contains a phenomenal number of resources – I/O, Routing, Clean Switches, Format Conversion, TSGs, Encoding, Decoding, IP Streaming, and web based control. Every element on this block diagram is contained in the NXT 450.
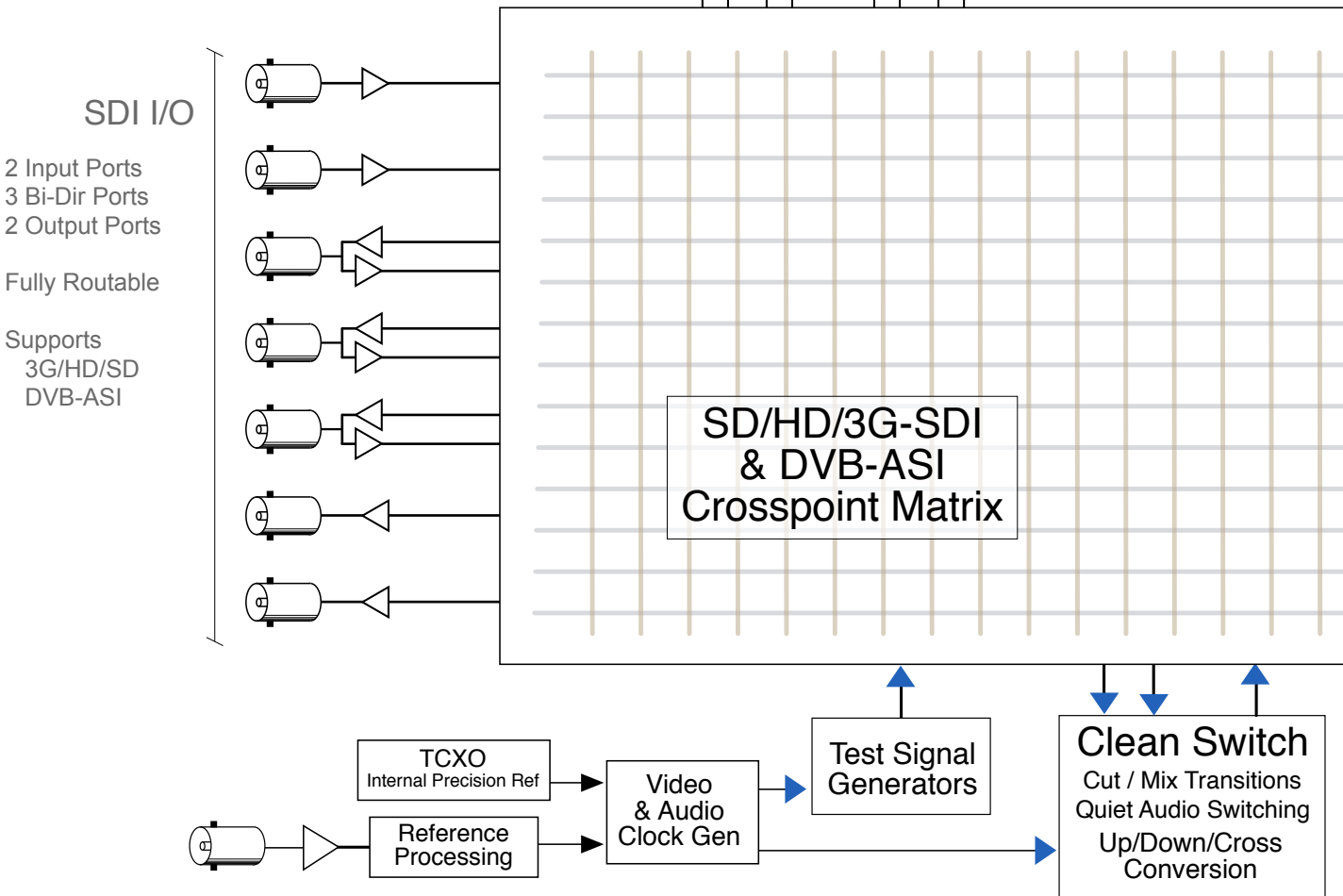
The intuitive control system makes it easy to configure this powerful repertoire of routing and processing resources. Use it to create efficient and compact solutions to a wide variety of requirements.

Flexible Connectivity

Install optional SFP modules to add Fiber, HDMI, Analog Composite, or additional SDI Inputs and Outputs.

Dual SFP

Dual SFP

Each SFP can provide:
Fiber: 2 ports
SDI: 2 ports
HDMI: 1 port
Analog: 1 port

SDI I/O

2 Input Ports
3 Bi-Dir Ports
2 Output Ports

Fully Routable

Supports
  3G/HD/SD
  DVB-ASI

SD/HD/3G-SDI
& DVB-ASI
Crosspoint Matrix

TCXO
Internal Precision Ref

Reference
Processing

Video
& Audio
Clock Gen

Test Signal
Generators

Clean Switch
Cut / Mix Transitions
Quiet Audio Switching

Up/Down/Cross
Conversion

Genlock Input

Accepts analog composite or TLS external reference. Clean Switch outputs and the TSGs can be timed to house reference.
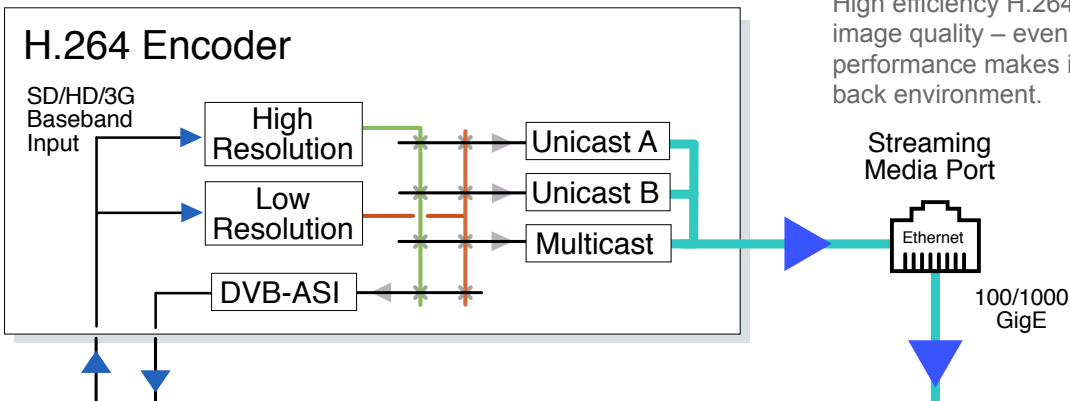
Clean & Quiet Switching

Just assign a Clean Switch to an output, and make cuts and dissolves between sources perfect – clean and quiet. Frame synchronization and format conversion is automatic.

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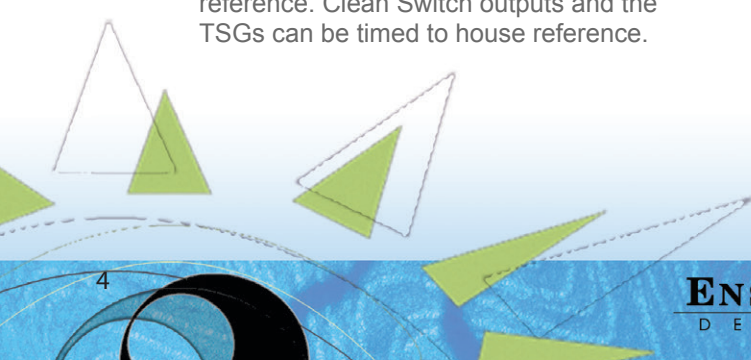
Encoding

High efficiency H.264 Encoding produces superb image quality – even at low bit rates. Low latency performance makes it easy to use in a live, talk-back environment.

H.264 Encoder

SD/HD/3G Baseband Input

High Resolution

Low Resolution

DVB-ASI

Unicast A

Unicast B

Multicast

Streaming Media Port

Ethernet

100/1000 GigE

Stream directly to an IP network, the NXT 450 is the perfect bridge from baseband to IPTV. Simultaneous support for multiple destinations.
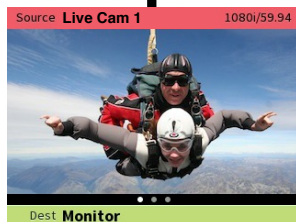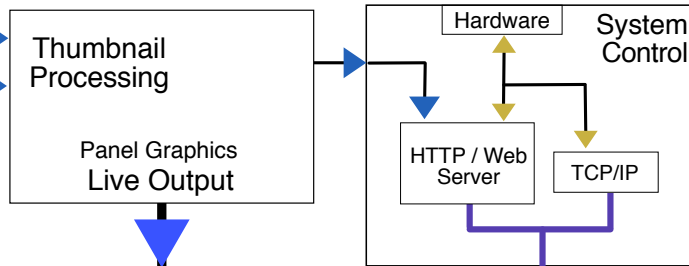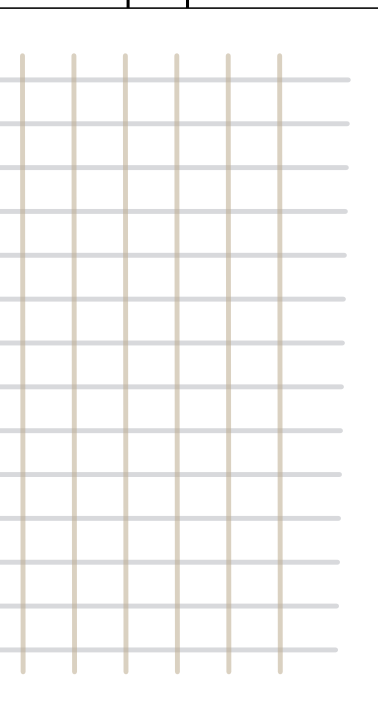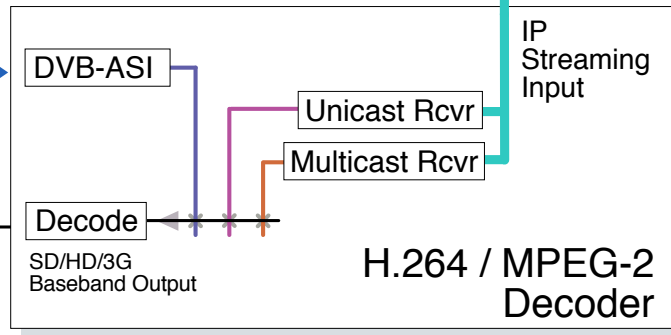
Feed transmission chains with DVB-ASI by coax or fiber.

H.264 / MPEG-2 Decoder

DVB-ASI

Unicast Rcvr

Multicast Rcvr

Decode

SD/HD/3G Baseband Output

IP Streaming Input

Decoding

Receive a stream from IP or DVB-ASI, decode to baseband and deliver to any router output.

Use a Clean Switch to synchronize the Decoder output to house reference.

Decoding & Encoding are independent.

Clean Switch

Cut / Mix Transitions
Quiet Audio Switching
Up/Down/Cross Conversion

Thumbnail Processing

Panel Graphics
Live Output

Source **Live Cam 1**   1080i/59.94

Dest **Monitor**

System Control

Hardware

HTTP / Web Server

TCP/IP

Ethernet   10/100

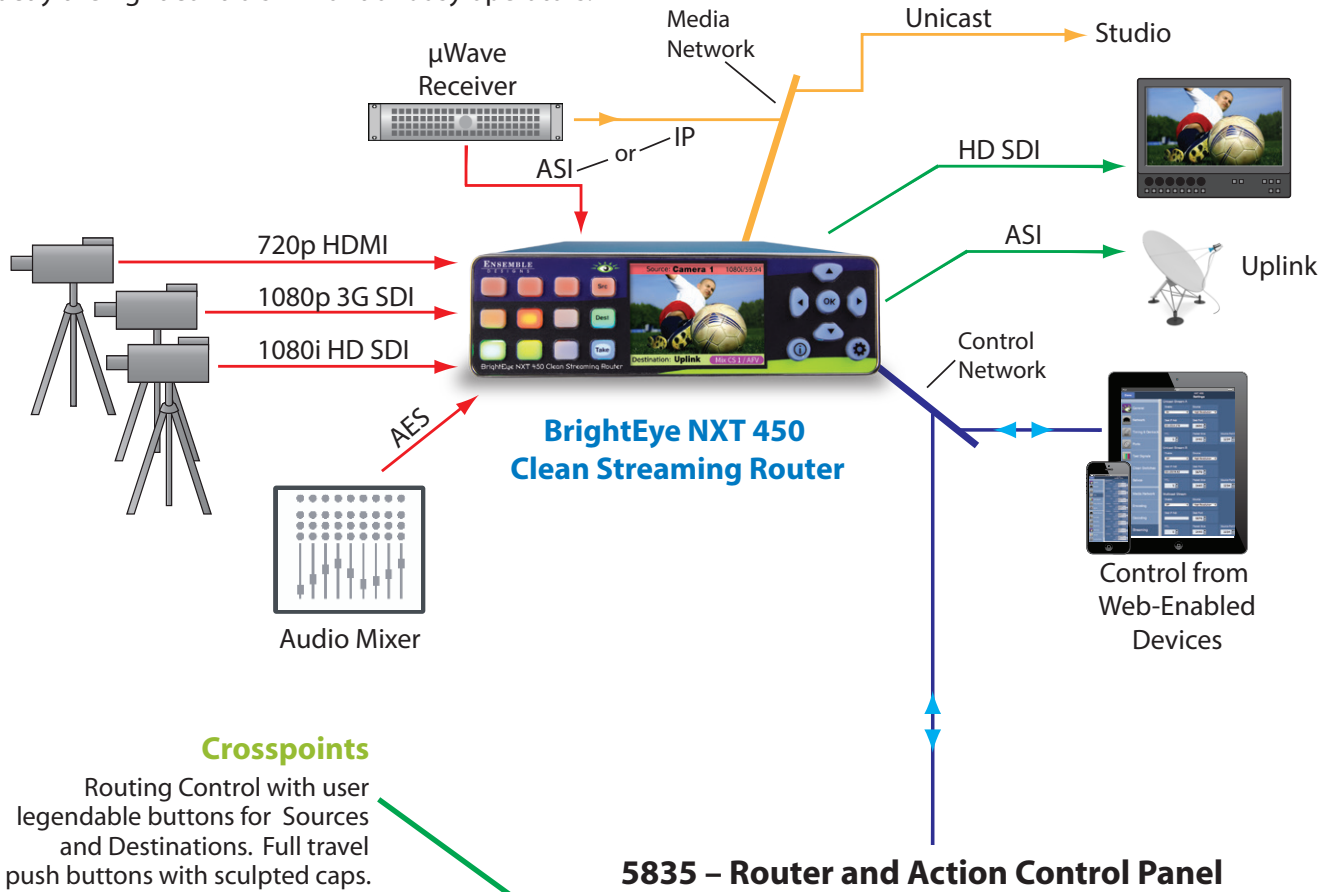Command & Control

Monitor, Switch, and Configure

View live images on the NXT 450 front panel, and thumbnails on the web interface. Switch and configure from front panel or web browser.

BrightEye NXT 450
Clean Streaming Router Applications

Mobile Truck Application

Great for mobile applications, the BrightEye NXT 450 Clean Streaming Router provides signal reception, decoding, clean switching and distribution to multiple destinations using any combination of formats. Seamlessly switch between 1080i, 1080p, 720p, and DVB-ASI sources. Simply set one of the clean switch outputs to your desired format and all of your sources will be automatically converted. Multiple outputs deliver streaming by IP back to the studio, DVB-ASI to your satellite uplink, and HD SDI for local monitoring. Remotely cut and mix sources or use Salvo and Action shortcuts from your tablet or any web-enabled device. The 5835 Router and Action Control Panel is fully customizable to put exactly the right controls in front of busy operators.

**BrightEye NXT 450
Clean Streaming Router**

5835 – Router and Action Control Panel

Crosspoints
Routing Control with user legendable buttons for Sources and Destinations. Full travel push buttons with sculpted caps.

LCD Display
Thumbnail preview of Sources before Take or Mix transition. Displays input status, signal timing, and metadata.

Action Keys
Action Keys are fully programmable. Recall any set of parameters, customize to suit exact application.

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House of Worship Application

Simultaneously send your live Service to an HDMI projector, to the youth room and to storage via Multicast, and to a remote campus via Unicast. Switch seamlessly from the Pastor to a missionary interview coming in on Skype. Use your existing IP network to distribute and control, eliminating the need to lay cable or fiber. And, with the NXT 450's web based control, your director can sit in the back pew with an iPad, switching between hymn lyrics and cameras while participating in the Service.
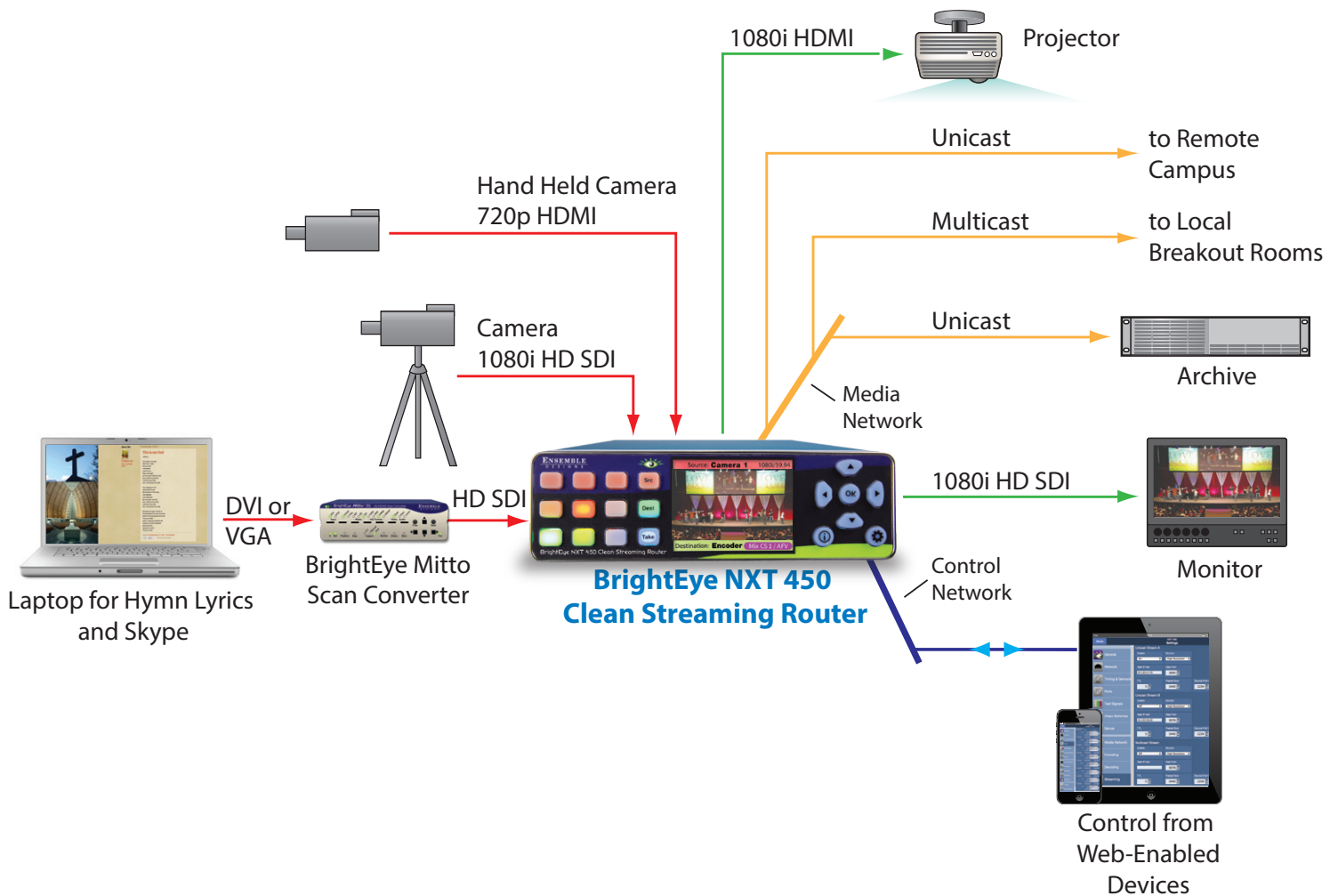
Ideal for the Rental and Staging Market

Save time and money with the amazingly versatile NXT 450 Clean Streaming Router. It's perfect for the rental market, offering flexible assignable I/Os, built-in encoding and decoding, simultaneous Multicast and Unicast outputs, automatic format conversion, clean switching, intuitive web-based control and more. No need for separate fiber or HDMI converters with the NXT 450's optional HDMI and optical I/Os via SFP. Built-in test signal generators, audio mixing and breakaway save router I/O real estate and reduce cabling needs. Plus, easily save default or customer settings for quick recall.

BrightEye NXT 450
Specifications

Serial Digital Input

Number	Two to Nine, configurable, BNC and SFP
Signal Type	See SDI Standards Supported below
Impedance	75 Ω
Return Loss	>15 dB
Max Cable Length	300 meters for 270 Mb/s 100 meters for 1.485 Gb/s (Belden 1694A)

Audio

16 channels of embedded audio. Dolby pass-through in Clean Switches.

Reference Input

Number	One
Type	1 V P-P Composite Video, PAL or NTSC or Tri-Level Sync
Impedance	75 Ω
Return Loss	>40 dB

Serial Digital Output

Number	Two to Nine, configurable, BNC and SFP
Signal Type	See SDI Standards Supported below
Processing	12 and 16 bit
Impedance	75 Ω
Return Loss	>15 dB
Max Cable Length	100 meters for HD 300 meters for SD (Belden 1694A)

HDMI Input

Number	Two possible via SFP

HDMI Output

Number	Two possible via SFP

Fiber Input

Number	Four possible via SFP

Fiber Output

Number	Four possible via SFP

SFPs let you add your favorite connectors to the router including fiber optic, HDMI and HD-BNC

SDI Standards Supported

1080i 50, 59.94 or 60 Hz, 1.485 Gb/s HD, SMPTE 274M -4,5,6

720p 50, 59.94 or 60 Hz, 1.485 Gb/s HD, SMPTE 296M -1,2,3

1080p 23.98, 24 or 25 Hz, 1.485 Gb/s HD, SMPTE 274M -9,10,11

1080p 50, 59.94, 60 Hz, 2.97 Gb/s HD, SMPTE 424M, 425M, Level A

625i 50 , 525i 59.94, 270 Mb/s SD, SMPTE 259M

Dual Rate Encoder

Dual Rate	MPEG-4 Part 10 H.264 (ISO/IEC 14496/10)
High-Resolution	Encoding format matches input source
Low-Resolution	Encoding format 640 x 360P
Data Rate	Adjustable from 1 to 20 Mb/s
Profile (per H.264 standard)	
High-Resolution	Main and High
Low-Resolution	Baseline, Main and High
Level (per H.264 standard)	
High-Resolution	3 to 4.2
Low-Resolution	1.2 to 4.2

Audio Encoding

2 channels	MP3 and AAC Encoding
Data Rate	32 to 384 Kb/s
Downmixing	Up to 16 incoming channels to stereo pair – user selectable

Streaming Outputs

RTP/IP (via GigE port)	2 independent Unicast outputs
	1 Multicast output
DVB-ASI	1 routable to BNC and fiber (SFP) outputs

All four streaming outputs operate simultaneously from either the High or Low-Res Encoder

Decoder

Decode from Unicast, Multicast or DVB-ASI

MPEG-4 part 10 H.264 (ISO/IEC 14496/10)

MPEG-2 (ISO/IEC 13818-2)

Baseband Output	See SDI Standards Supported
	Routable to any destination. Can be processed through clean switch for synchronization to local reference.

Latency

Total end-to-end latency	750 msec (Encode/Decode)

Network Connections

Control Port	RJ-45; 10/100
Media Port	RJ-45; 10/100/1000

General Specifications

Size	5.63"W x 1.65"H x 6.75"D (143 mm x 42 mm x 172 mm) including connectors and flange
Weight	1 lb 12oz
Power	12 volts, 35 watts (100-230 VAC modular power supply)
Temperature Range	0 to 40° C ambient (all specs met)
Relative Humidity	0 to 95%, non-condensing
Altitude	0 to 10,000 ft.