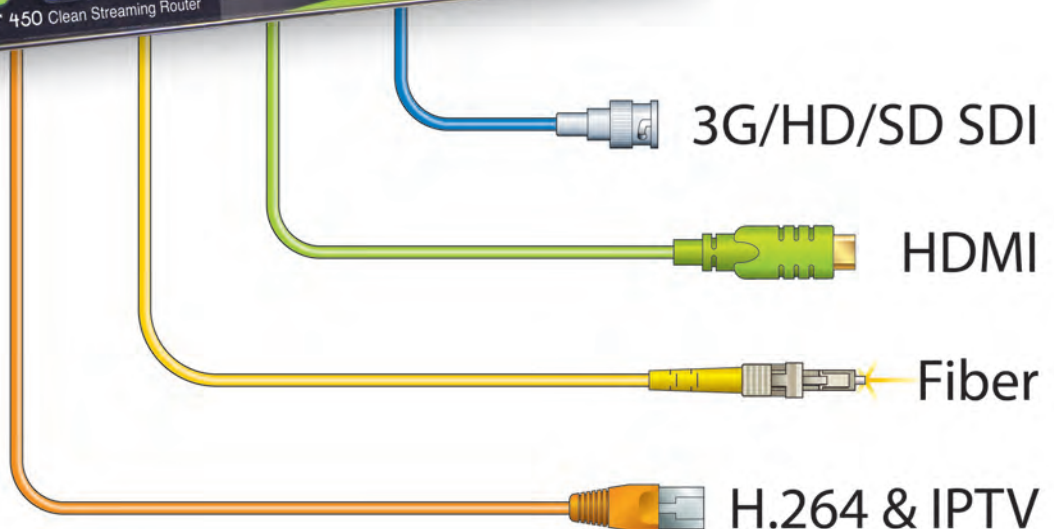# BrightEye™

NXT Compact Routers

Multi Format Video and Audio Routing, Conversion, and Compression

Solutions for

- News Gathering
- Boardroom
- Live Webcasting
- Flypacks
- Field Production

ENSEMBLE
DESIGNS

Source: **Camera 1**

Destination: **Encoder Input**

BrightEye NXT 450 Clean Streaming Router

Src

Dest

Take

3G/HD/SD SDI

HDMI

Fiber

H.264 & IPTV

ENSEMBLE
DESIGNS

BrightEye NXT
Family of Compact Routers

HDMI   HD-SDI   HDMI

HDMI or HD-SDI

RTMP   UniCast   DVB-ASI

HD-SDI

Features

- **Router for 3G, HD, SD SDI, fiber and HDMI video**
- **Flexible I/O – Configure BNCs and SFPs as inputs or outputs**
- **Seamless switching with dual assignable clean switches**
- **Up/Down/Cross conversion**
- **LCD preview monitor with realtime full motion video and meters**
- **SFP ports for HDMI, fiber optic, composite, or additional SDI I/Os**
- **Full control from the web interface or the front panel**
- **Dual built-in test pattern generator with moving element option and slate ID**
- **Audio re-mapping, level control, and breakaway**
- **Genlockable and timeable**
- **System-wide configuration registers**
- **Programmable Salvo and Action Keys**
- **Dissolve and Cut transitions**
- **Direct Take Mode**
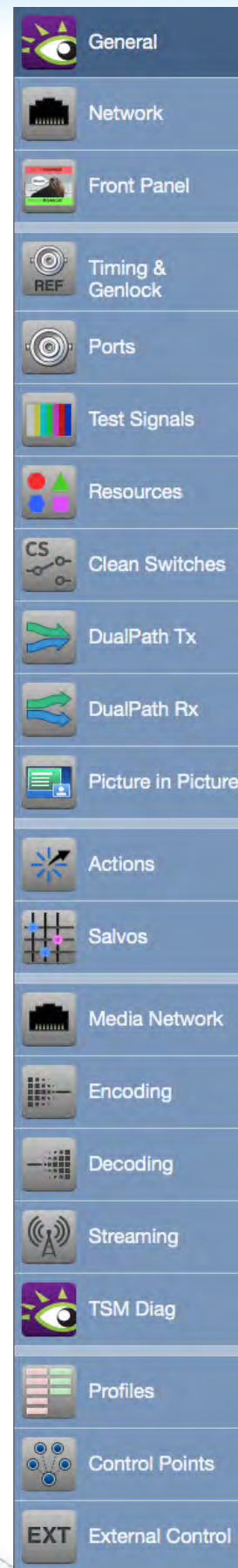- **5-Year warranty and free software upgrades forever**

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DESIGNS

Designed and built in California
5 YEAR WARRANTY

Live Source Thumbnails
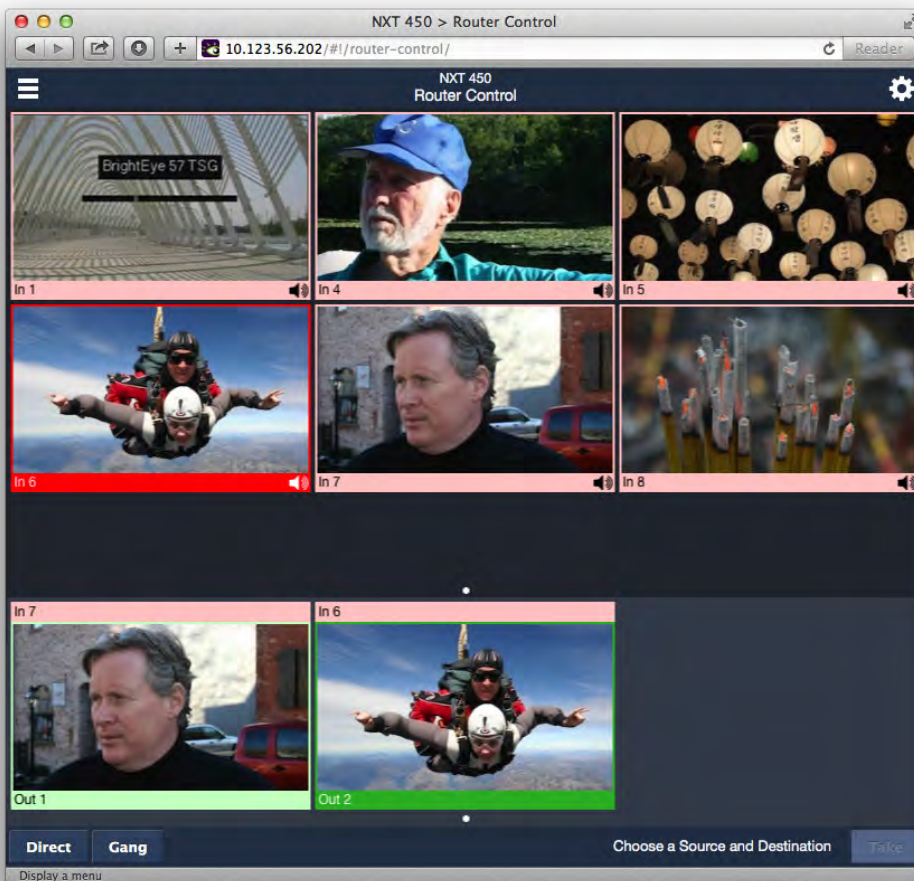
Control the NXT Router directly from the front panel,
live full-motion display is built-in. External control by
TCP/IP and GPI/GPO. Serial RS-232 available on request.

General
Network
Front Panel
Timing & Genlock
Ports
Test Signals
Resources
Clean Switches
DualPath Tx
DualPath Rx
Picture in Picture
Actions
Salvos
Media Network
Encoding
Decoding
Streaming
TSM Diag
Profiles
Control Points
External Control

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's high quality, high profile H.264 (MPEG-4) Encoder uses advanced coding techniques to give superb performance even at low bit rates. It produces a High and Low Resolution output simultaneously. The independent Decoder provides baseband output in any desired format. The NXT 450 serves as a full duplex codec, supporting both an outgoing and incoming streaming path.

IP and DVB-ASI Streaming Connections

The NXT 450 can send or receive encoded streams over IP or by DVB-ASI. The NXT 450 incorporates an RJ-45 Gigabit Ethernet port dedicated to streaming connectivity. You can deliver the Encoder output by Unicast and Multicast over IP. Two Unicast outputs can be directed independently to any destination. You can output a DVB-ASI formatted stream through a BNC port, or by fiber with an SFP module.
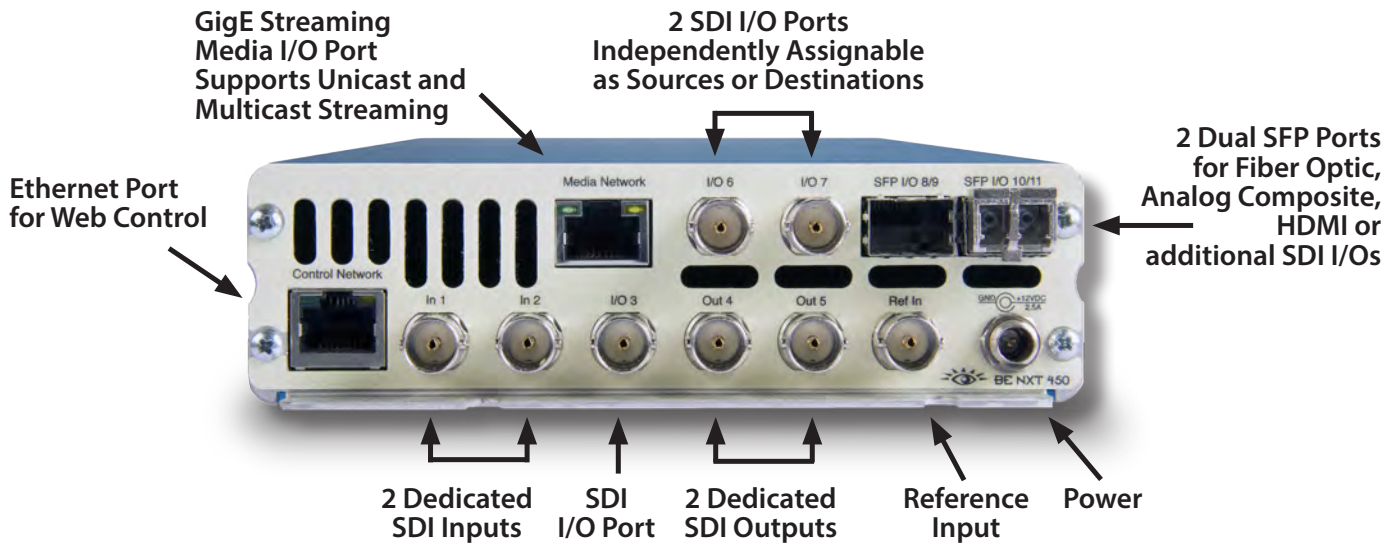
Flexible Architecture

Flexible I/O configuration 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 two SFP ports allow for fiber optic connections, HDMI I/O, or additional HD-BNC SDI connections. The flexibility extends to the integration of the Encoder and Decoder. Feed any source to the Encoder, and feed the Decoder to any destination.

Features

- **Simultaneous high quality, high profile MPEG Encoder/Decoder**
- **Advanced H.264 coding techniques provide superb performance at low bit rates**
- **Encoder outputs by Unicast and Multicast**
- **Encoder produces both a High and Low Resolution output simultaneously**
- **Independent Decoder operates simultaneously, with baseband output in any desired format**
- **Feed any source to the Encoder**
- **Feed the Decoder output to any destination**
- **Multi Image license option for DualPath and PiP-Efx**

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5 YEAR WARRANTY

BrightEye NXT 450 Clean Streaming Router

Source: GoPro 1
Dest: Encoder Input

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

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

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

Ethernet Port
for Web Control

2 Dedicated
SDI Inputs

SDI
I/O Port

2 Dedicated
SDI Outputs

Reference
Input

Power

Assignable I/O and Flexible Architecture

2 dedicated SDI inputs

2 dedicated SDI outputs

3 SDI ports that can be configured individually as inputs or outputs

Media Network Port – supports Unicast and Multicast Streaming

*2 SFP cages for dual fiber, SDI, analog composite, or single HDMI I/Os
    Individually configurable as inputs or outputs*

1 reference input

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 U/D/C feature provides automatic conversion of inputs to the chosen output format, making it possible to cut and mix between different input formats.

Multiple Intuitive Control Options

Control and configuration of the NXT 450 can be made from a variety of interfaces, including directly from the unit's front panel, or from a smartphone, tablet, or laptop. The 5835 Action Control Panel LCD display has thumbnail preview so you can see your Sources before doing a Take or Mix transition. Its Action Keys are fully programmable, so you can have multiple custom presets for different operators. And, you can even control the NXT 450 from a third-party device.
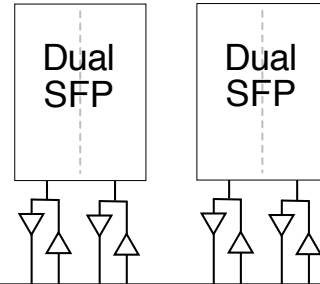
Rich in Resources

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.
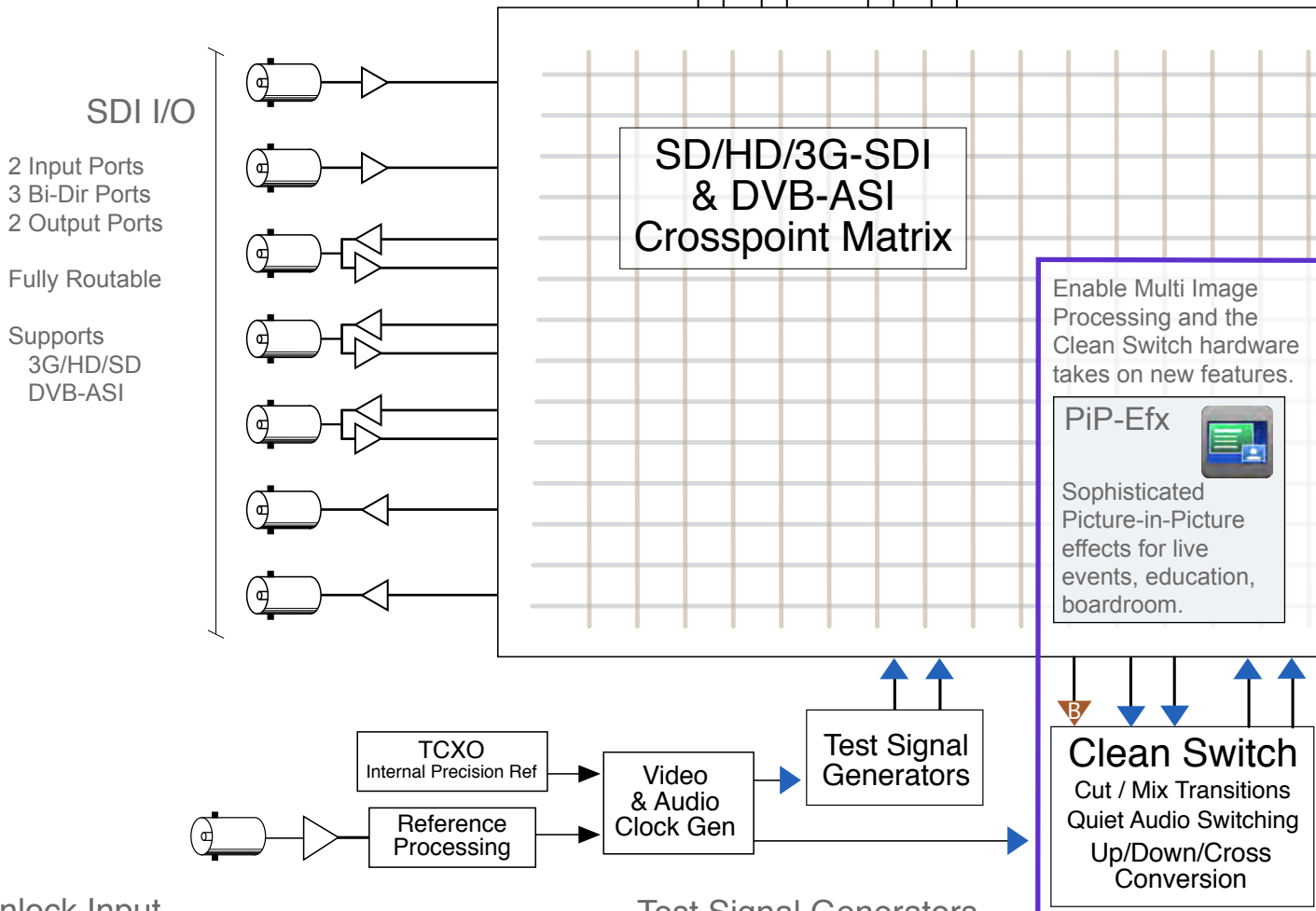
The intuitive control system makes it easy to configure this powerful repertoire of routing and processing resources. Use it to create efficient and compact solutions to a wide variety of requirements.

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

Enable Multi Image Processing and the Clean Switch hardware takes on new features.

PiP-Efx

Sophisticated Picture-in-Picture effects for live events, education, boardroom.

TCXO
Internal Precision Ref

Video & Audio Clock Gen

Reference Processing

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.
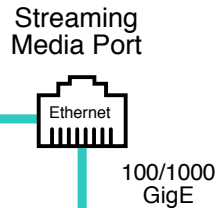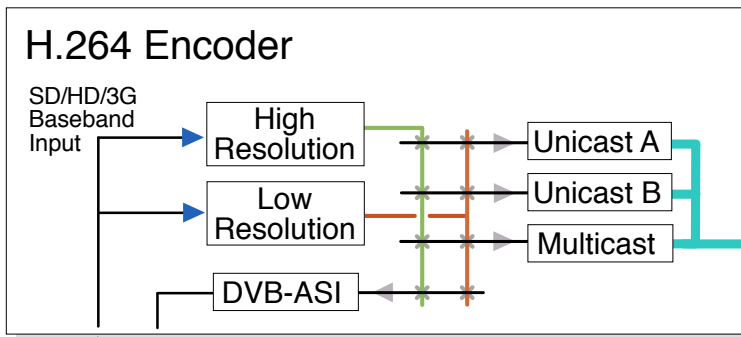
Test Signal Generators

Built-in test signal generators allow test patterns such as black, bars, ID and cyclops to be routed without burning valuable inputs.

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5 YEAR
WARRANTY

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
- Unicast A
- Unicast B
- Multicast
- DVB-ASI

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.

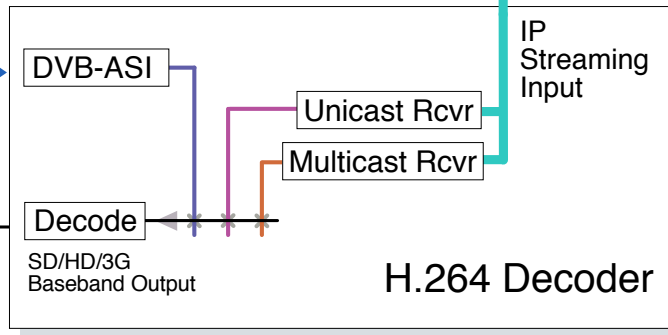Feed transmission chains with DVB-ASI by coax or fiber.

IP
Streaming
Input

H.264 Decoder

- DVB-ASI
- Unicast Rcvr
- Multicast Rcvr
- Decode

SD/HD/3G
Baseband Output

Decoding

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

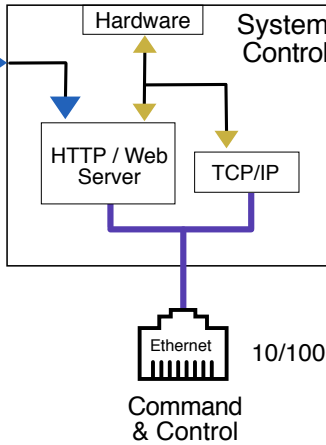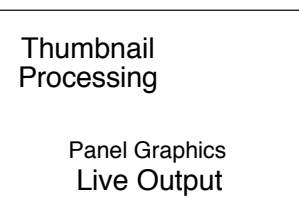Use a Clean Switch to synchronize the Decoder output to house reference.
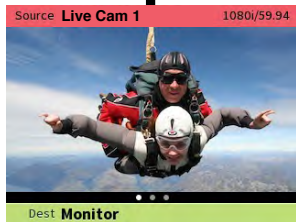
Decoding & Encoding are independent.

Multi Image
Option License

DualPath

Tx   Rx

Carry two live signals, video and audio, in a single path. Use Tx at origin, Rx at destination.

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

Clean Switch

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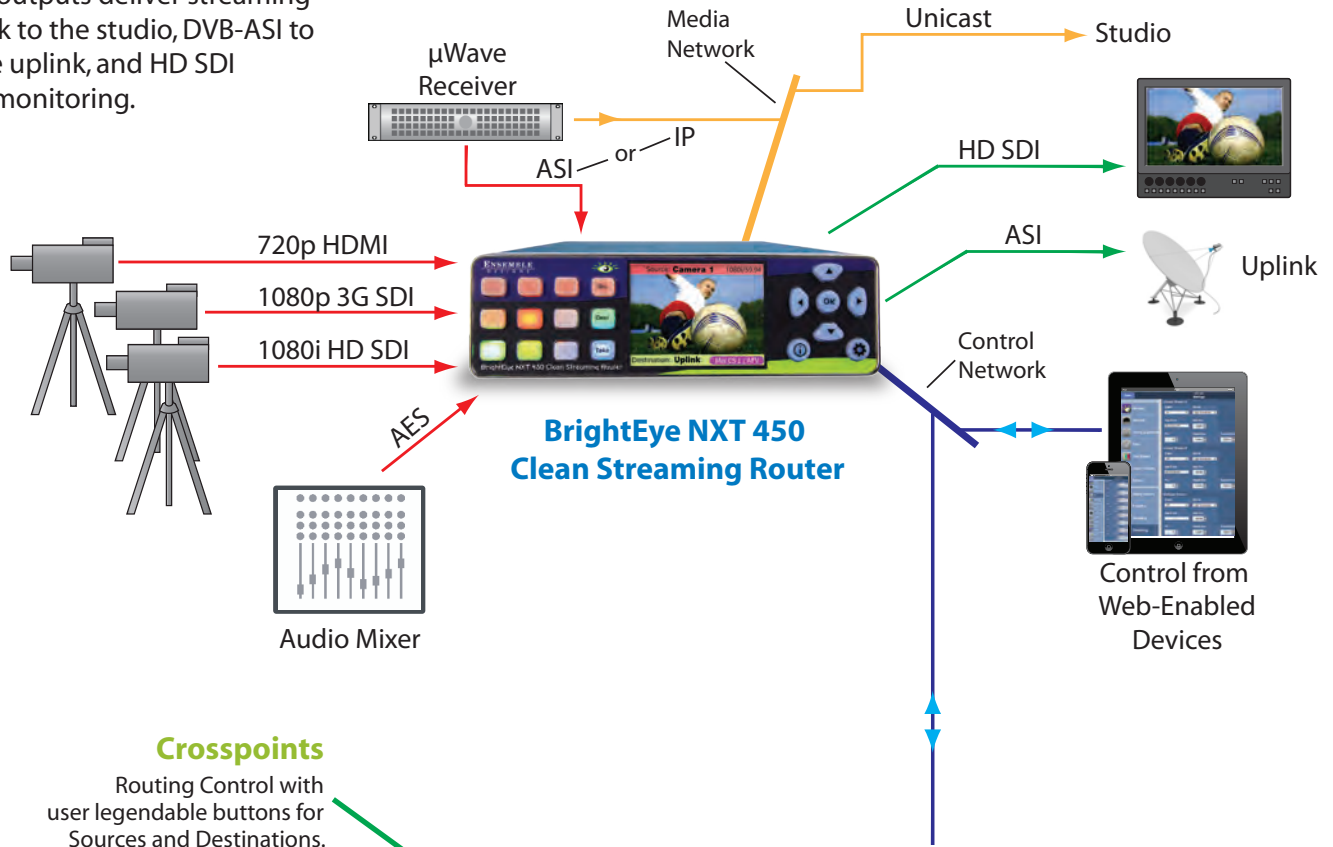Up/Down/Cross
Conversion

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 are automatic.

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. Multiple outputs deliver streaming by IP back to the studio, DVB-ASI to a satellite uplink, and HD SDI for local monitoring.

μWave Receiver

Media Network

Unicast Studio

ASI — or — IP

720p HDMI

1080p 3G SDI

1080i HD SDI

HD SDI

ASI Uplink

AES

BrightEye NXT 450 Clean Streaming Router

Control Network

Audio Mixer

Control from Web-Enabled Devices

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

5835 – Router and Action Control Panel

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.
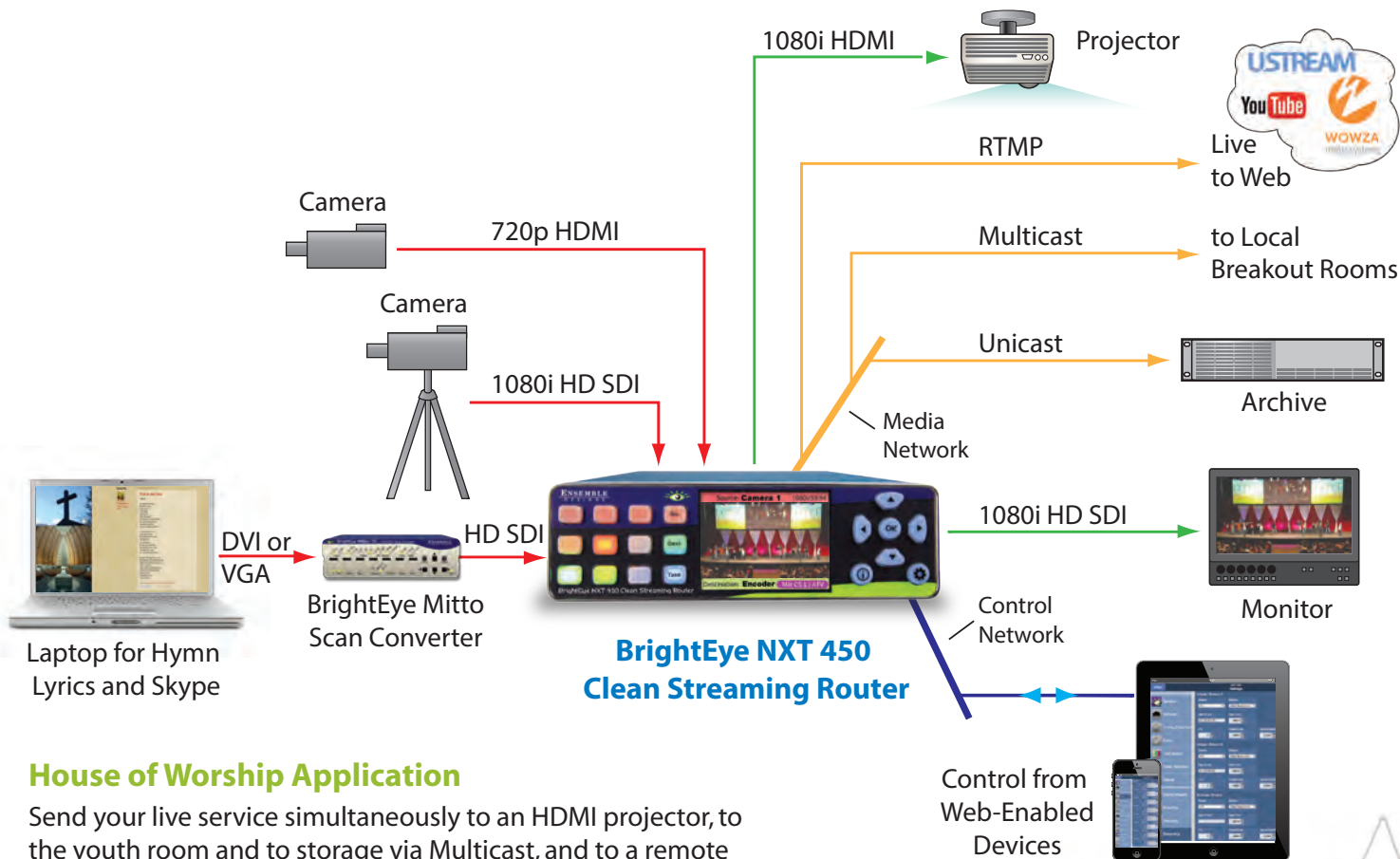
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5 YEAR WARRANTY

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Cut & Mix Sources
Stream Live to Web

StreamWest Conference — Live Feed

RTMP

Connect Directly to your CDN

You Tube

USTREAM

WOWZA media systems

Built-in RTMP Protocol Support

1080i HDMI → Projector

USTREAM / You Tube / WOWZA

RTMP → Live to Web

Multicast → to Local Breakout Rooms

Unicast → Archive

Media Network

Camera — 720p HDMI

Camera — 1080i HD SDI

Laptop for Hymn Lyrics and Skype

DVI or VGA → BrightEye Mitto Scan Converter — HD SDI →

BrightEye NXT 450 Clean Streaming Router

1080i HD SDI → Monitor

Control Network

Control from Web-Enabled Devices

House of Worship Application

Send your live service simultaneously to an HDMI projector, to the youth room and to storage via Multicast, and to a remote campus via Unicast. 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.

BrightEye NXT 445
Streaming Encoder

Start with Encoding

The BrightEye NXT 445 field upgradable flexible option licensing lets you add the functionality you need when you need it.

Add Format Conversion and Clean Switching

Integrate signals from all types of equipment, regardless of the video format with the 445K-X license option. Just select a SMPTE standard for a particular destination, and all sources routed to that destination will be converted automatically.

This license option includes Clean and Quiet Switching to instantly and seamlessly switch or dissolve your sources. Feed the NXT 445 with cameras and other asynchronous sources and take the output to air or to production equipment.

Add Decoding

The 445K-DEC license option adds an MPEG decoder. A MPEG-4 transport stream can be received via Unicast or Multicast on Gigabit Ethernet and decoded to 3G, HD, or SD-SDI with embedded audio. The full duplex codec allows simultaneous use of the encoder and decoder.
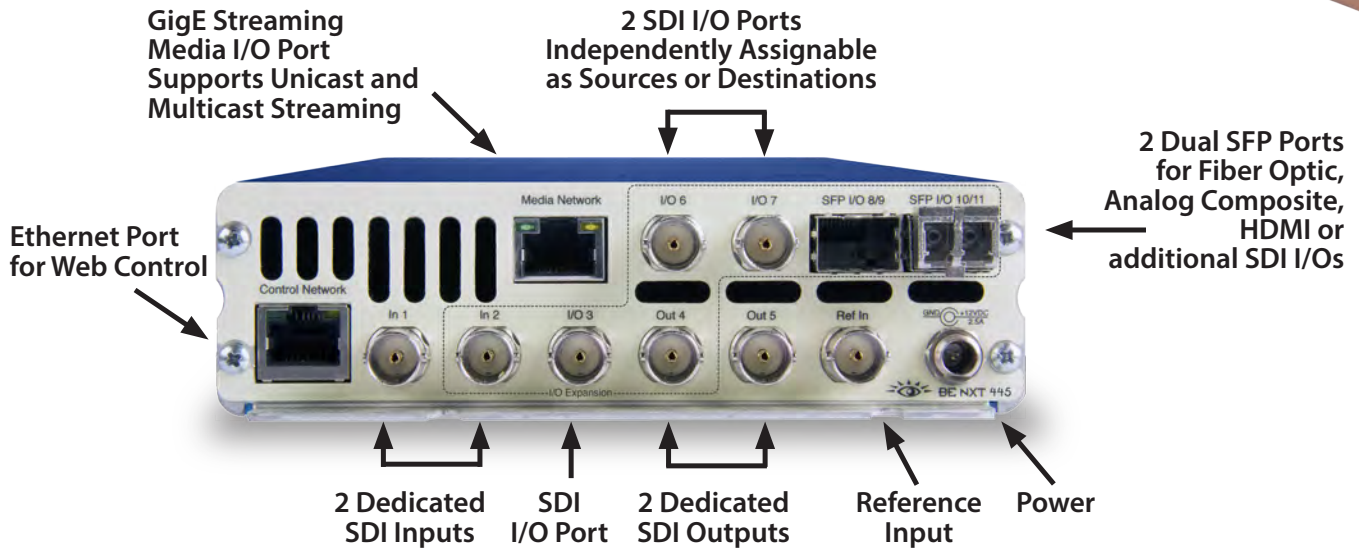
Add Fiber, HDMI, Analog, and SDI I/Os

The SFP (small format pluggable) cages can be populated with dual SFPs that have fiber optic or other connectors, allowing you to determine the best connector for your installation. Adding SFPs gives you true flexibility in combining electrical BNC, HDMI, analog composite and fiber optic inputs and outputs. The 445K-IO license option also activates additional SDI I/Os.

NXT 450 – Complete Streaming Solution

**NXT 445 – Start with Encoding, Add Features as Needed**

Feature Licenses

	NXT 450	NXT 445	445K-DEC	445K-IO	445K-X
High Profile MPEG-4 (H.264) Encoder	✦	✦			
Multiple SDI Inputs and Outputs	✦			✦	
Genlocked, Clean & Quiet Switching	✦				✦
Two SFP Positions – for Fiber, Analog, HDMI	✦			✦	
Up / Down / Cross Format Conversion	✦				✦
Decoder – MPEG-4 and MPEG-2	✦		✦		
IPTV and DVB-ASI Streaming	✦	✦			
Audio Mapping and Level Adjustment	✦				✦
Two Built-In TSGs	✦	✦			
Intuitive Web Interface	✦	✦			
Live View Front Panel	✦	✦			

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5 YEAR
WARRANTY

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

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

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

Ethernet Port for Web Control

2 Dedicated SDI Inputs

SDI I/O Port

2 Dedicated SDI Outputs

Reference Input

Power

Features

- Simultaneous high quality, high profile MPEG Encoder/Decoder
- Advanced H.264 coding techniques provide superb performance at low bit rates
- Encoder simultaneously outputs two Unicast, one Multicast and DVB-ASI
- Encoder produces both a High and Low Resolution output simultaneously
- Independent Decoder operates simultaneously, with baseband output in any desired format
- Feed any source to the Encoder
- Feed the Decoder output to any destination
- Multi Image license option for DualPath and PiP-Efx

HD-SDI

RTMP   UniCast   DVB-ASI

HD-SDI
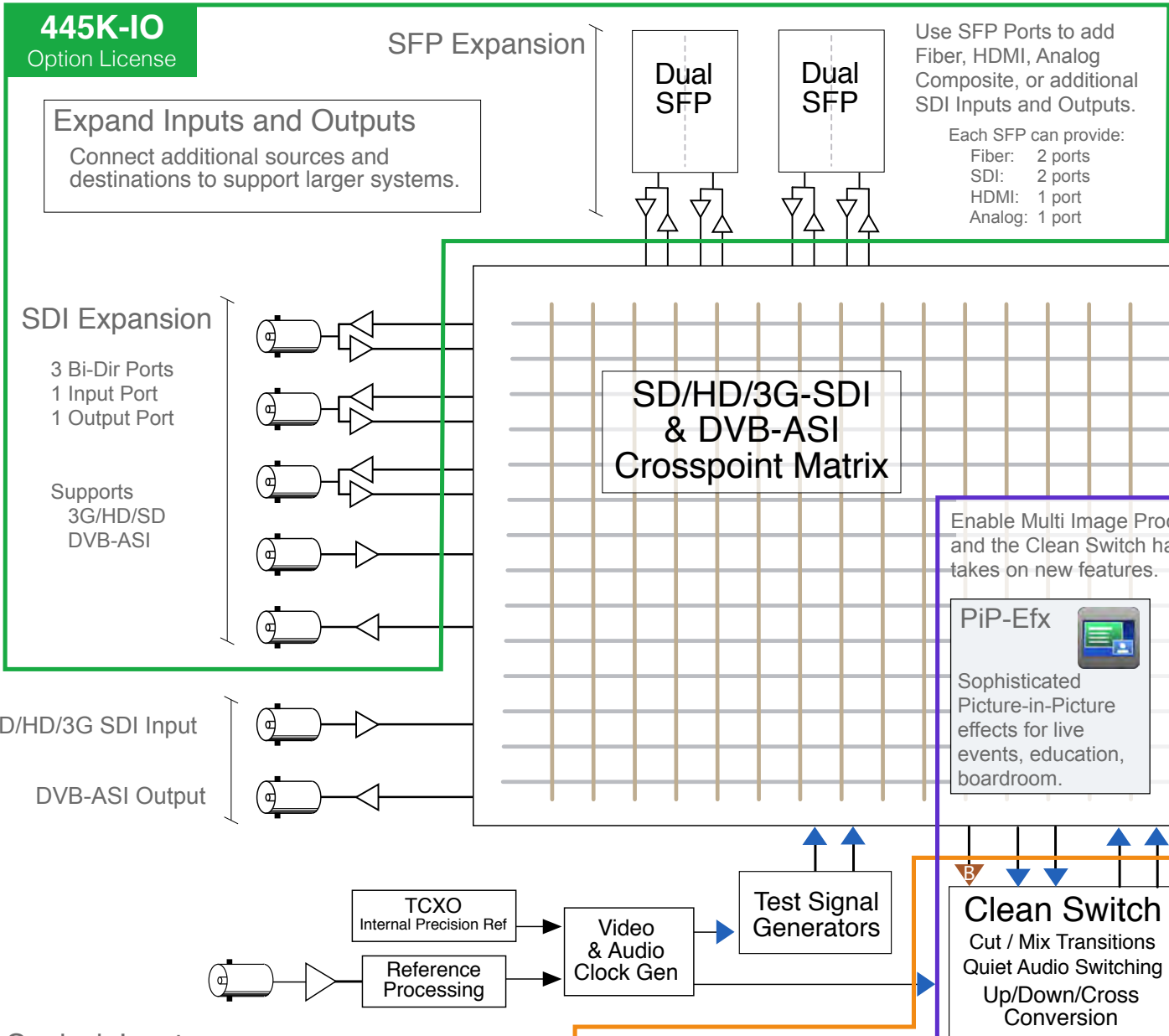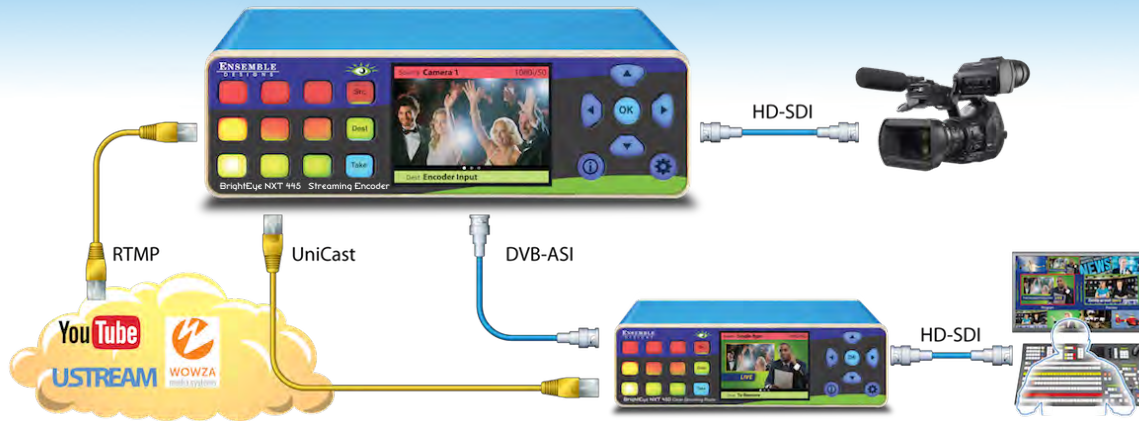
445K-IO
Option License

Expand Inputs and Outputs

Connect additional sources and destinations to support larger systems.

SFP Expansion

Dual SFP   **Dual SFP**

Use SFP Ports to add Fiber, HDMI, Analog Composite, or additional SDI Inputs and Outputs.

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

SDI Expansion

3 Bi-Dir Ports
1 Input Port
1 Output Port

Supports
   3G/HD/SD
   DVB-ASI

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

Enable Multi Image Proce
and the Clean Switch har
takes on new features.

PiP-Efx

Sophisticated Picture-in-Picture effects for live events, education, boardroom.

SD/HD/3G SDI Input

DVB-ASI Output

TCXO
Internal Precision Ref

Video & Audio Clock Gen

Test Signal Generators

Reference Processing

B

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 are automatic.

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BrightEye NXT 445
Streaming Encoder Block Diagram

The NXT 445 puts high performance streaming in a compact package with an intuitive control interface. Deliver content to multiple IP destinations from the GigE media port, or via DVB-ASI from a BNC output. Advanced H.264 encoding produces superb results even at low bit rates.

Add features and functionality with option licenses.

Encoding - Standard Feature

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.
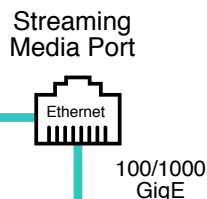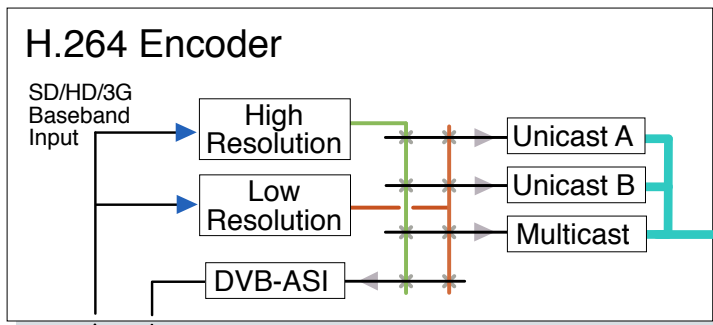
Stream directly to an IP network, the NXT 445 is the perfect bridge from baseband to IPTV. Simultaneous support for multiple destinations.

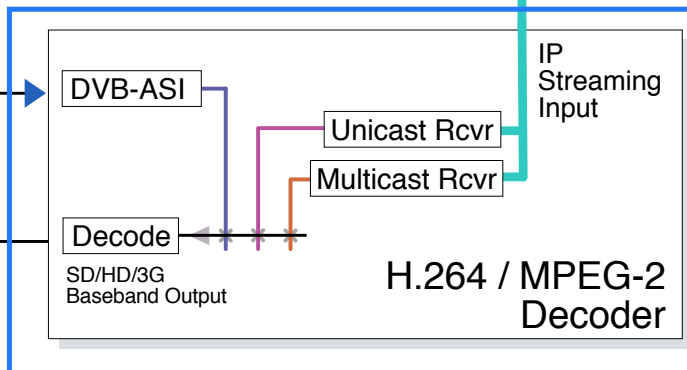Feed transmission chains with DVB-ASI by coax or fiber.

H.264 Encoder

SD/HD/3G Baseband Input

High Resolution
Low Resolution
DVB-ASI

Unicast A
Unicast B
Multicast

Streaming Media Port
Ethernet
100/1000 GigE

445K-DEC
Option License

IP Streaming Input

DVB-ASI
Unicast Rcvr
Multicast Rcvr
Decode

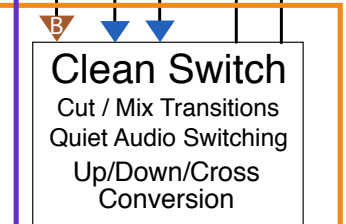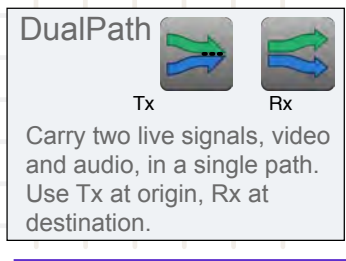SD/HD/3G Baseband Output

H.264 / MPEG-2 Decoder

Decoding

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

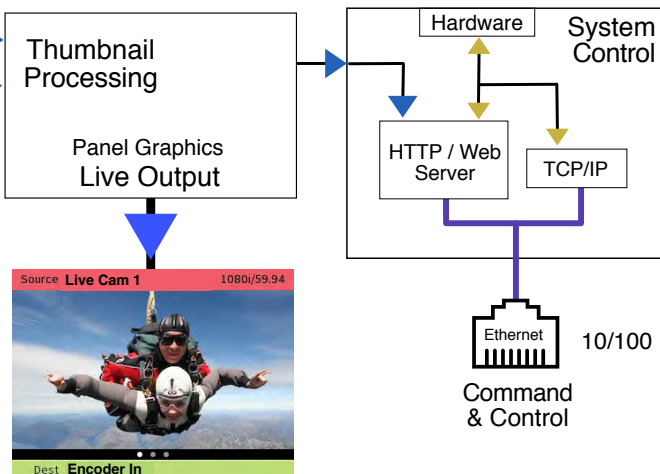Use a Clean Switch to synchronize the Decoder output to house reference.

Decoding & Encoding are independent and can be used simultaneously.

Multi Image
Option License

DualPath
Tx   Rx

Carry two live signals, video and audio, in a single path. Use Tx at origin, Rx at destination.

Thumbnail Processing

Panel Graphics
Live Output

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

Dest **Encoder In**

Hardware   System Control

HTTP / Web Server   TCP/IP

Ethernet   10/100

Command & Control

B

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

445K-X
Option License

Monitor, Switch, and Configure

View live images on the NXT 445 front panel, and thumbnails on the web interface. Switch and configure from front panel or web browser.

www.ensembledesigns.com   tel +1 530.478.1830

13

BrightEye NXT 430-X, 430 and 415
Compact Routers

New Routing Technology

The BrightEye NXT 430 family of compact routers is famous for clean and quiet switching of video and audio sources.

Fully Featured

The BrightEye NXT 430 offers features such as dissolves, audio breakaway mode, direct take for even faster switching in a live environment, programmable router action keys and salvo registers, RS-232 control, and transportable system settings.

Clean Switch – Use Asynchronous Sources

The BrightEye NXT 430 Compact Router gives you two clean switched outputs. The clean switches provide full frame synchronization. If you don't need clean switching, you may prefer the BrightEye NXT 415 Compact Router. It has all the capability of the 430, except for clean switched outputs.

Assignable I/O and Flexible Architecture

You get to configure the number of inputs and outputs; the configuration is changeable on-the-fly. The two SFP (small format plugable) cages can be populated with dual SFPs that have fiber optic or other connectors, allowing you to determine the best connector for your installation.

Convert While You Route

The new BrightEye NXT 430-X Compact Router with U/D/C Conversion and Clean and Quiet Switching allows format conversion to take place while routing signals to destinations.

Control From Third Party Devices

BrightEye NXTs can be controlled from third party devices using serial protocols via TCP/IP, RS-232, and SNMP.
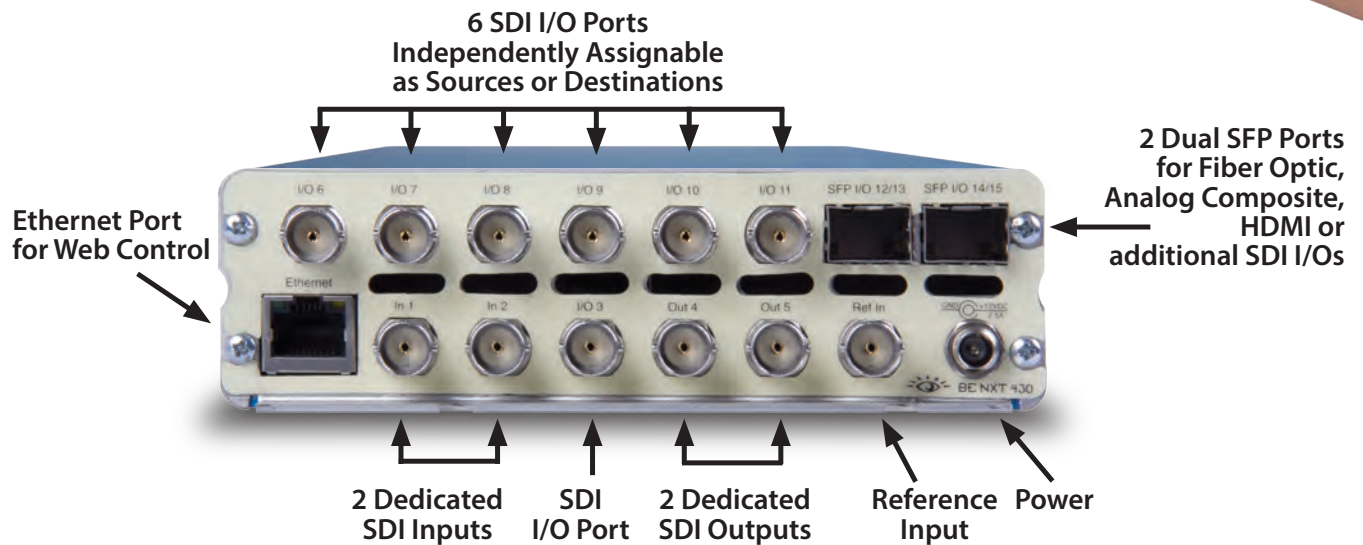
Web-Browser Control

The BrightEye NXT family of compact routers has a web server and Ethernet connector, allowing full control and set up from virtually anywhere with any web browser enabled device.

Features

- **Router for 3G, HD, SD SDI video**
- **Fiber, HDMI and analog composite with SFPs**
- **Flexible I/O – Configure BNCs and SFPs as inputs or outputs**
- **Clean switching of video and embedded audio**
- **Dual Up/Down/Cross conversion (with model 430-X)**
- **Dissolve and Cut transitions**
- **Direct Take mode**
- **Programmable Salvo and Action Keys**
- **Audio level adjustments**
- **System wide configuration registers**
- **RS-232 and TCP/IP 3rd-party control interfaces**
- **Front panel and web-based control**

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5 YEAR WARRANTY

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

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

Ethernet Port for Web Control

2 Dedicated SDI Inputs　**SDI I/O Port**　**2 Dedicated SDI Outputs**　**Reference Input**　**Power**

Assignable I/O and Flexible Architecture

2　dedicated SDI inputs

2　dedicated SDI outputs

7　SDI ports that can be configured individually as inputs or outputs

2　SFP cages for dual fiber, SDI, analog composite, or single HDMI I/Os
　　Individually configurable as inputs or outputs

1　reference input

Order Info – Three great choices

| **BrightEye NXT 430-X** | Clean Compact Router with U/D/C |
| **BrightEye NXT 430** | Clean Compact Router |
| **BrightEye NXT 415** | Compact Router |

Block Diagram

Three Great Options to Fit Your Application and Budget

The NXT 430-X contains a phenomenal number of resources – I/O, Routing, Clean Switches, Format Conversion, TSGs, and web based control. Every element on this block diagram is contained in the 430-X.

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.

For all of this functionality except for Up/Down/ Cross Conversion, choose the NXT 430.

If you don't need U/D/C or clean switching, the NXT 415 Compact Router has all the capability of the 430, except for clean switched outputs.
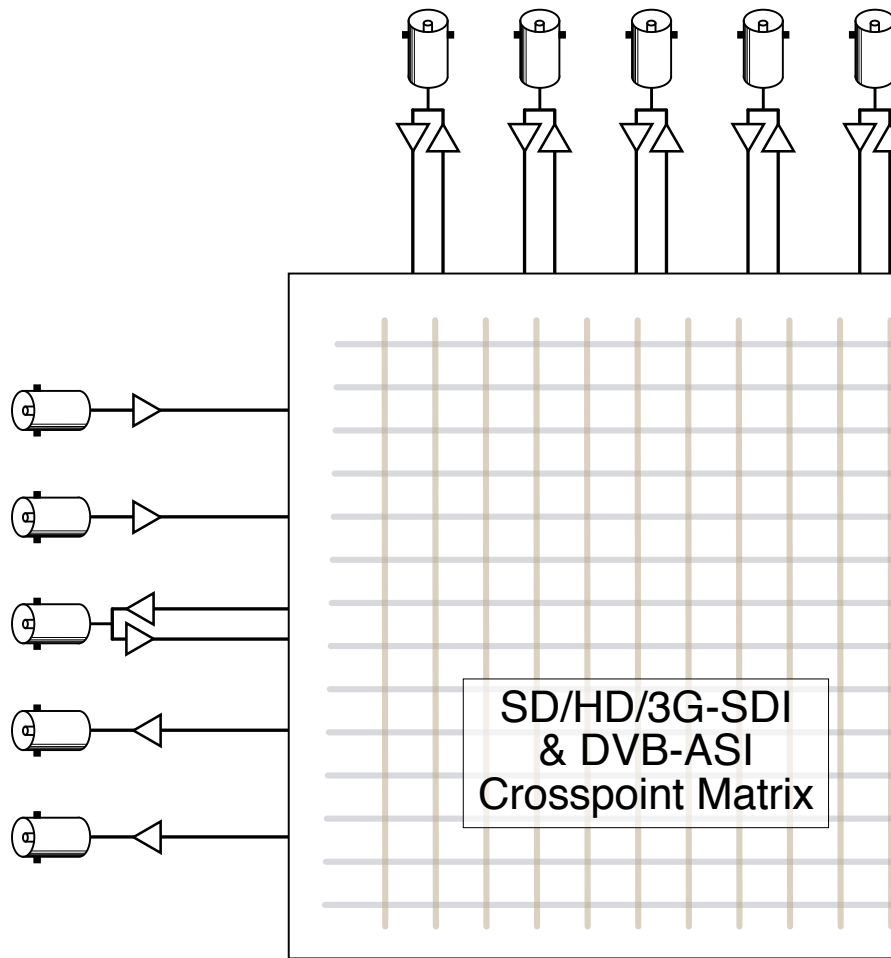
SD/HD/3G-SDI
& DVB-ASI
Crosspoint Matrix

Genlock Input

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

TCXO
Internal Precision Ref

Video
& Audio
Clock Gen

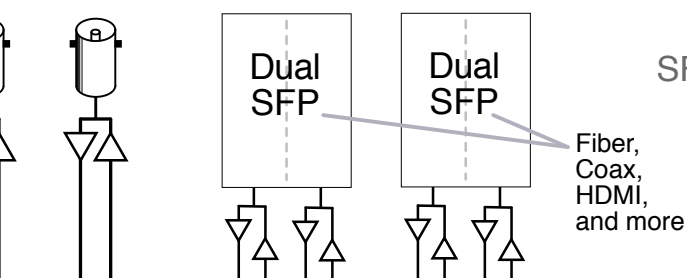Reference
Processing

Test Signal
Generators
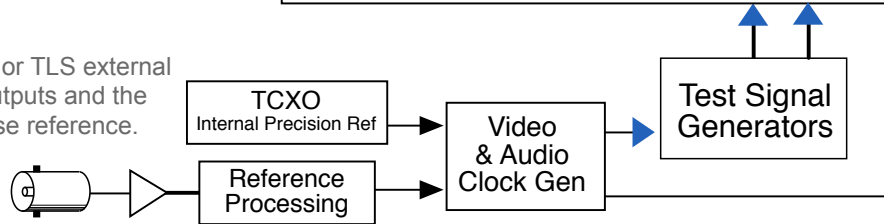
No Clean Switch
on NXT 415

Test Signal Generators

Test signals are built-in. Use Bars, Black, Gray Scale with ID and Cyclops without consuming any input BNCs.

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WARRANTY

Dual SFP

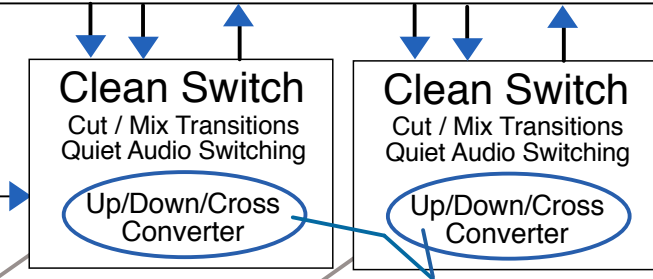**Dual SFP**
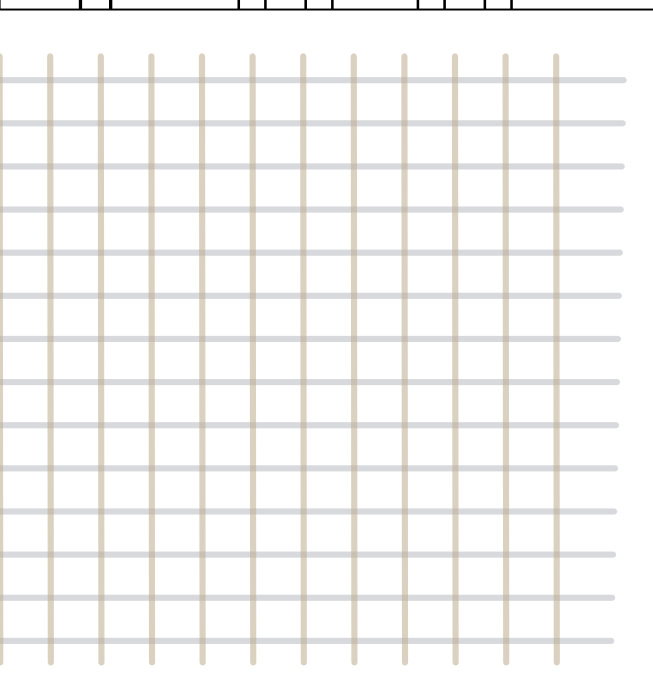
Fiber, Coax, HDMI, and more

SFP Port

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

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

Graphics
Thumbnail Processing

Live Output

System Control

HTTP / Web Server

TCP/IP

Ethernet 10/100

Command & Control

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

Dest **Monitor**

Clean Switch
Cut / Mix Transitions
Quiet Audio Switching

Up/Down/Cross Converter

Clean Switch
Cut / Mix Transitions
Quiet Audio Switching

Up/Down/Cross Converter

NXT 430-X Includes UDC Conversion

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 are automatic.
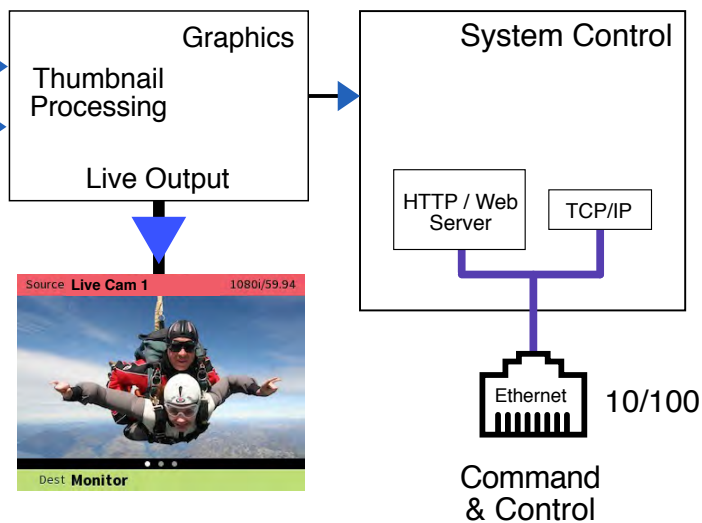
Monitor, Switch, and Configure

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 410-H and 410
HDMI Routers

Instantaneous HDMI Clean Switching

The BrightEye NXT 410 and 410-H Clean HDMI Routers provide seamless switching to your HDMI sources. The HDMI output switches instantaneously, never a glitch or pop. Feed the NXT with cameras and other HDMI and SDI sources and take the output to projectors, flat screens and production equipment. Each of the two clean switches can be assigned to any output, providing synchronized, clean, and quiet switching. When a clean switch is assigned to the HDMI output, the result is perfect and instantaneous switching. No other HDMI router can do that!

Integrate HDMI and SDI I/O

With both HDMI and SDI inputs and outputs, it's easy to integrate and switch signals from all types of equipment, regardless of the video format. Cameras with HDMI outputs can be used directly alongside SDI sources, and seamlessly routed to either HDMI or SDI outputs. The SFP (small format plugable) cage can be populated with dual SFPs. Adding SFPs gives you true flexibility in combining electrical BNC, HDMI and fiber optic inputs and outputs.
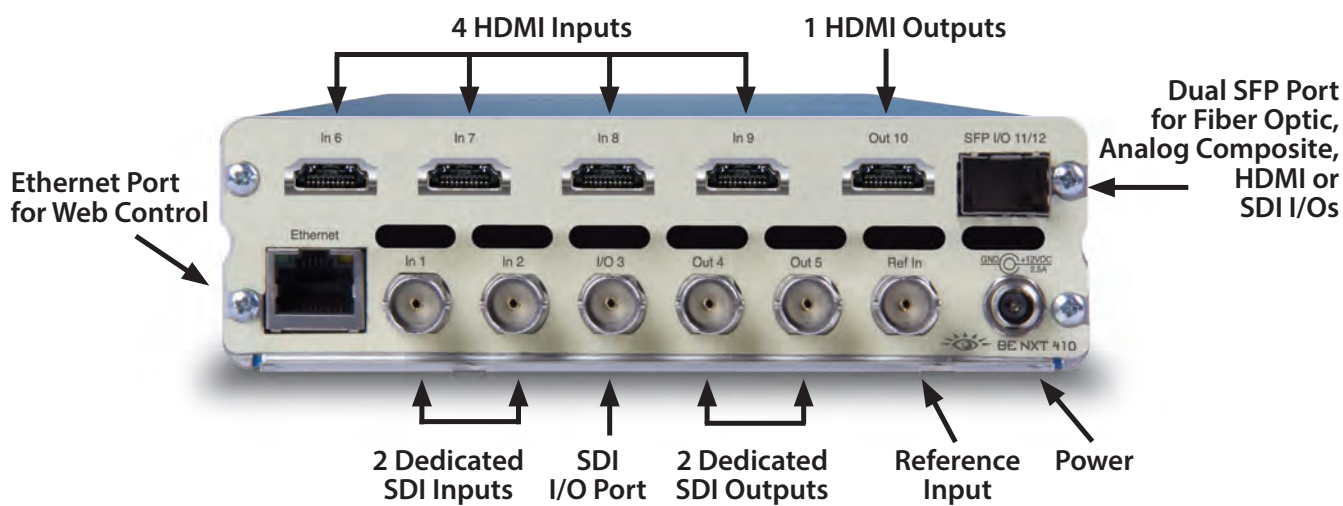
HDCP Solution with Model 410-H

The NXT 410-H is HDCP compliant, accepting encrypted sources and generating an encrypted output. This allows both encrypted and non-encrypted HDMI and SDI sources to be cleanly switched to HDMI destinations.

Features

- **Router for 3G, HD, SD SDI, fiber and HDMI**
- **Seamless switching of video and embedded audio**
- **Cleanly switch HDCP encrypted content with model 410-H**
- **Dual Up/Down/Cross converters with model 410-H**
- **LCD displays realtime full motion video of HDMI and SDI router sources**
- **Two built-in test signal generators**
- **Dissolve and Cut transitions**
- **Direct Take mode**
- **Action Keys and Salvo Registers – Save/Recall from your tablet and computer**
- **RS-232 and TCP/IP interfaces – use with any 3rd party device**
- **System wide configuration registers**

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4 HDMI Inputs

1 HDMI Outputs

Dual SFP Port for Fiber Optic, Analog Composite, HDMI or SDI I/Os

Ethernet Port for Web Control

2 Dedicated SDI Inputs

SDI I/O Port

2 Dedicated SDI Outputs

Reference Input

Power

Order Info – Two great choices

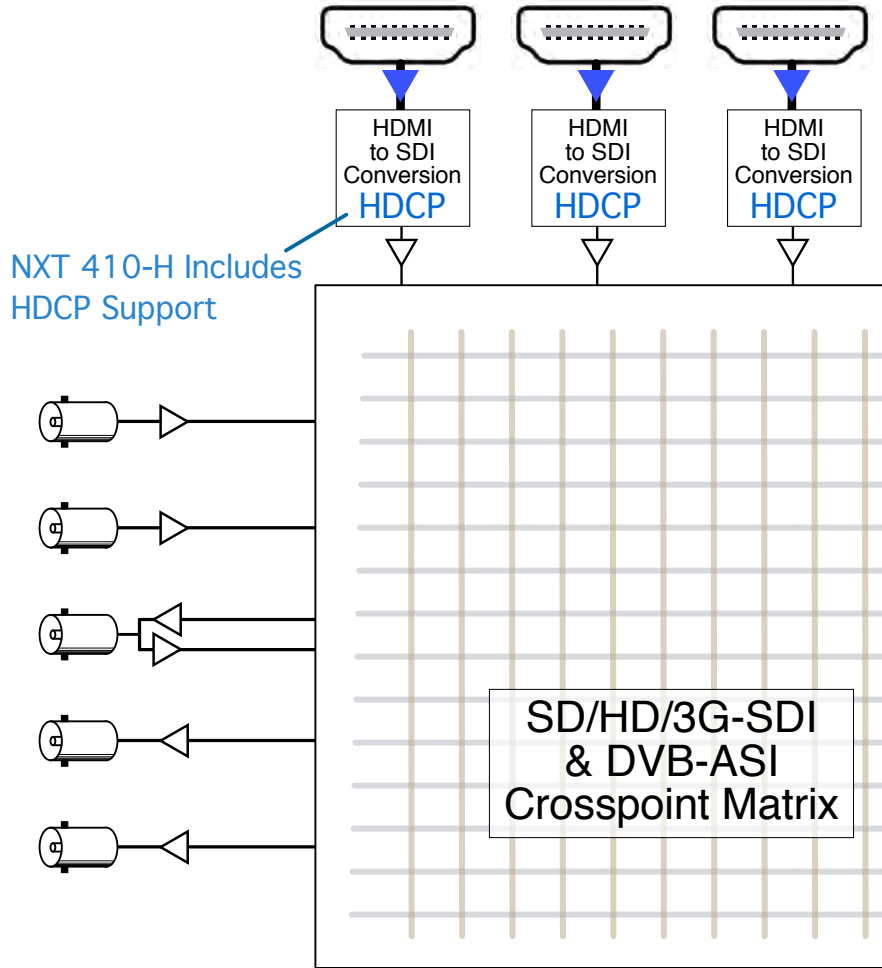|	
BrightEye NXT 410	Clean HDMI Router
BrightEye NXT 410-H	Clean HDMI Router with HDCP and U/D/C

BrightEye NXT 410-H and 410
HDMI Router Block Diagram

Clean Switching HDMI-HDCP-SDI Router with Up/Down/Cross Conversion

The NXT 410-H contains a phenomenal number of resources – I/O, Routing, Clean Switches, Format Conversion, TSGs, web based control, and HDCP support. Every element on this block diagram is contained in the 410-H.
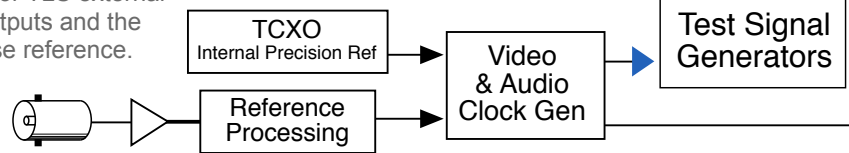
The intuitive control system makes it easy to configure this powerful repertoire of routing and processing resources. Use it to create efficient and compact solutions to a wide variety of requirements.

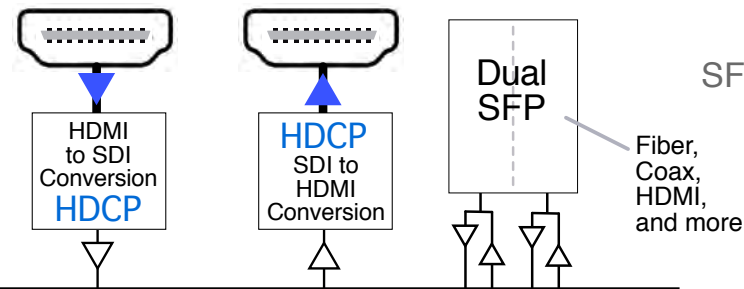If you don't need Up/Down/Cross Conversion or HDCP support, choose the NXT 410 Clean HDMI Router.

NXT 410-H Includes HDCP Support

HDMI to SDI Conversion HDCP

HDMI to SDI Conversion HDCP

HDMI to SDI Conversion HDCP

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

Genlock Input

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

TCXO
Internal Precision Ref

Reference Processing

Video & Audio Clock Gen

Test Signal Generators

Test Signal Generators

Test signals are built-in. Use Bars, Black, Gray Scale with ID and Cyclops without consuming any input BNCs.

ENSEMBLE
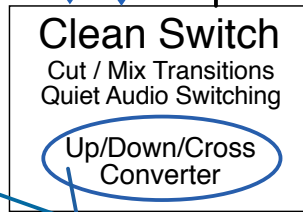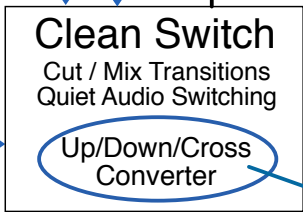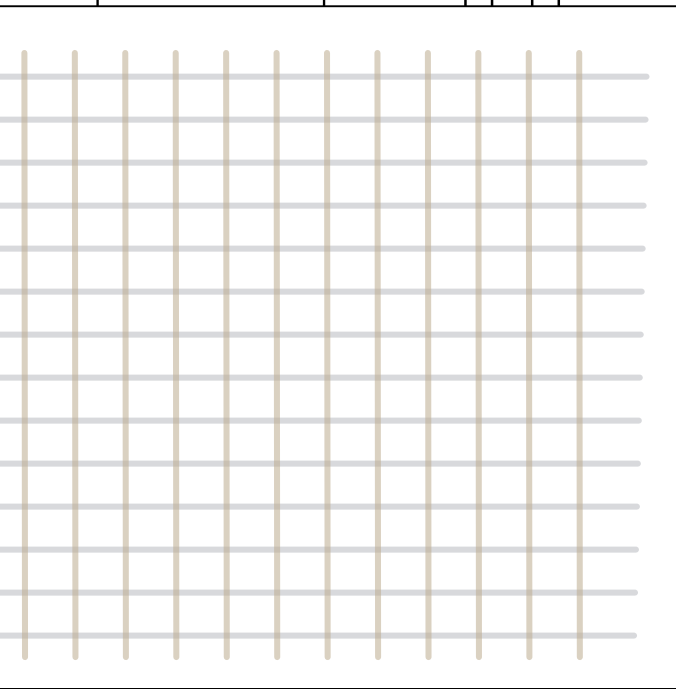D E S I G N S

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HDMI to SDI Conversion
HDCP

HDCP SDI to HDMI Conversion

Dual SFP

Fiber, Coax, HDMI, and more

SFP Port

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

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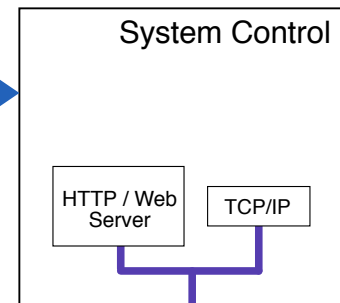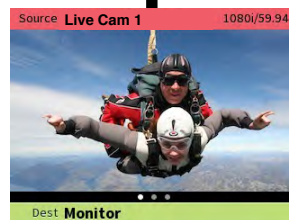- HDMI: 1 port
- Analog: 1 port

Graphics

Thumbnail Processing

Live Output

System Control

HTTP / Web Server

TCP/IP

Ethernet 10/100

Command & Control

Clean Switch
Cut / Mix Transitions
Quiet Audio Switching
Up/Down/Cross Converter

Clean Switch
Cut / Mix Transitions
Quiet Audio Switching
Up/Down/Cross Converter

NXT 410-H Includes UDC Conversion

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

Dest **Monitor**

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.

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 are automatic.

BrightEye NXT Multi Image License
PiP-Efx Picture in Picture

Picture in Picture in a Router?

Perfect for field news reporting, lecture capture, corporate boardroom, and many other applications, the PiP-Efx Multi Image license option for the BrightEye NXT 450, 445, 430-X and 410-H Compact Routers provides a flexible and configurable dual source Picture-In-Picture mode. The PiP-Efx license option, purchased from the factory, can be installed in the field.

PiP-Efx can be a single insert over a full screen video background, or dual PiP inserts over a matte background – each with independent size and position. You have full control of size, position and cropping as well as dissolve and cut transitions to PiP effects.

Up/Down/Cross conversion allows PiP input signals of different formats and frame rates to be combined together into the PiP output. Simply set the PiP output standard and you're done.

Features

- **High Resolution Picture in Picture Effects**
- **Easy to Customize PiP Layouts**
- **Instant Recall of Layouts from User Presets**
- **Full Control of Size, Position and Cropping**
- **Dual PiP Windows Over Matte Background**
- **Fully Routable Output**
- **Dissolve and Cut to PiP Effects**
- **Switch Sources within PiP Effects On The Fly**
- **Mix and Match Video Formats within PiP Effects**
- **Customizable Border Effects**

Easy To Use Controls

Simple, well thought-out user interface controls make creating PiP-Efx layouts a breeze. Full setup, control, and user preset recall can be accessed via any web browser enabled device: laptop, tablet, even a smartphone.
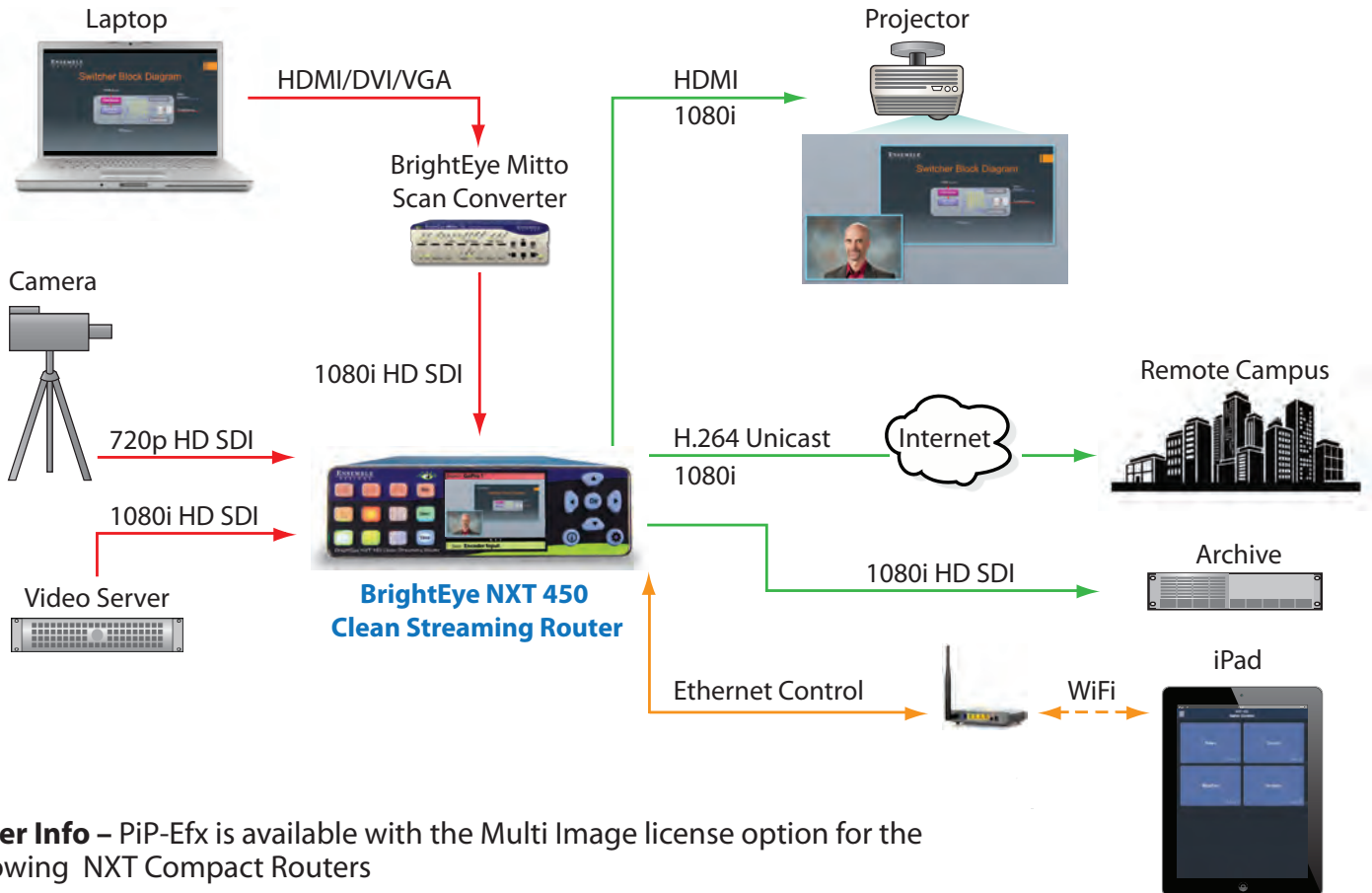
ENSEMBLE DESIGNS
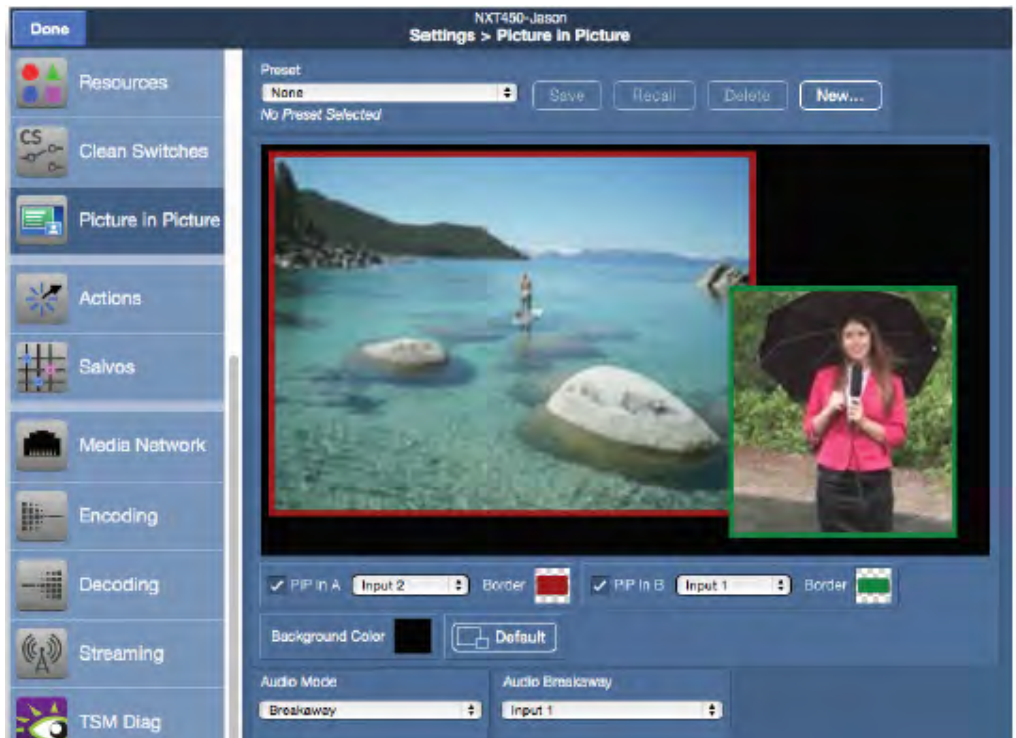
Perfect for Boardroom or Classroom

Cameras, video playback devices, and computers can be brought into the BrightEye NXT 450, 430-X and 410-H Compact Routers and switched or dissolved live to individual or multiple destinations. User-created PiP-Efx layouts become sources in the routing matrix. You can cut or dissolve to them as part of the production. The switched program can be distributed through multiple router outputs, and in multiple formats simultaneously.

Route SD, 720p, 1080i, or 1080p versions by SDI (BNC), HDMI or fiber using optional SFP modules. In the NXT 450 Clean Streaming Router, the PiP-Efx program can be encoded to MPEG-4 (H.264) and delivered by IP Unicast, Multicast, or DVB-ASI to distant locations over public or private networks.

Laptop

HDMI/DVI/VGA

Projector

HDMI
1080i

BrightEye Mitto
Scan Converter

Camera

1080i HD SDI

Remote Campus

720p HD SDI

H.264 Unicast
1080i

Internet

1080i HD SDI

BrightEye NXT 450
Clean Streaming Router

1080i HD SDI

Archive

Video Server

iPad

Ethernet Control

WiFi

Order Info – PiP-Efx is available with the Multi Image license option for the following NXT Compact Routers

BrightEye NXT 450	Compact Router with H.264 Encoder/Decoder and U/D/C
BrightEye NXT 445	Streaming Encoder
BrightEye NXT 430-X	Clean Compact Router with Up/Down/Cross Conversion
BrightEye NXT 410-H	Clean HDMI-HDCP-SDI Router with U/D/C

Video Inputs

Accepts any video compatible input format

Computer graphic input from Scan Converter

Computer direct connection by HDMI, depending upon computer output format

Any video source in the NXT Router can be used in either PiP window. Windows are independently adjustable for crop, size, and position.

Video Output

1080i/50 and 1080i/59
1080p/50 and 1080p/59

Output can be genlocked to external reference

BrightEye NXT Multi Image License
DualPath

DualPath Signal Multiplexing
Carry 2 Video Signals and Associated Audio in a Single Channel

Double Bandwidth Usage and Save Money

DualPath lets you send two video signals in a single channel's bandwidth. Add a second camera feed from your news truck or helicopter without needing another encoder or microwave transmitter.

The DualPath signal, carrying two videos and associated audio, travels as a single feed over an ordinary path. DualPath multiplexing and demultiplexing operates only at the end points, with no changes required to the existing link. Choose the audio transmission mode to suit the production requirements and the capacity of the transmission path.

Select between 1080i, 1080p, or 720p formats to carry the multiplexed signal – independently of the actual end point video formats. The multiplexing process takes place in the baseband, SDI domain. So it's easy to use DualPath with existing infrastructure. SDI, HDMI, Fiber, Microwave, and Streaming connectivity are all compatible with DualPath.

Superb Image Quality

DualPath incorporates Ensemble's proprietary image processing, also used in our award-winning Mitto scan converters, to scale (re-size) each signal horizontally. Sources are upsampled to 8:8:8 resolution and color space, which makes scaling more precise and less destructive. The multiplexed output contains both images, with each resampled to fit side-by-side in a single channel. This is the only change made to the input signals. They retain all of the other characteristics of the HD SDI format – which is the most true and faithful representation of the content. This preserves the 10 bit depth, color space, and structural details of the original signal. No new structure such as MPEG macro-blocks or 4:2:0 data reduction is introduced.

Although the horizontal pixel count is cut in half, the precision scaling will only block the higher frequency components which would produce artifacts. The vast majority of the image data is retained. The result is end-to-end performance with extreme fidelity to the original signal.

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DualPath in the Field

Bring 2 cameras back from a live news event, and put source switching under studio control. Increase the impact and flexibility of even a small field crew. The two signals, locked together, can travel over any existing interfaces. They appear in the final program with perfect timing and lip sync. Use DualPath in the NXT 450 or 445 Encoders to stream by IP or DVB-ASI back to the studio. Or deploy the NXT 430-X with existing transmission paths to double their bandwidth.

DualPath in the Air

The live HD feed from a helicopter represents a huge investment – both in the air and at the receive point. DualPath is the quick and economical solution to doubling that bandwidth. Take two cameras to air, or go live while feeding footage back to the newsroom at the same time.

Perfect Lip-Sync

The two video signals and the chosen audio, are synchronized and joined together in the DualPath Tx process. From this point onward, they travel as a single signal. No delay or latency can be introduced which would affect the lip-sync timing of one signal with respect to the other. When they are delivered back as independent video feeds by the DualPath Rx process, they will still be perfectly matched to one another. This is true regardless of the transmission link.

DualPath Plays Well with Others

Integrating DualPath with your existing gear is a breeze. Update your news truck with a DualPath enabled BrightEye NXT 450 for encoding and use your stations existing decoder. Put an NXT 430-X downstream of that decoder to demultiplex the DualPath signal. The demultiplex process incorporates frame synchronization to local reference, so the output signals are locked, stable, and ready to take to air.

Order Info – DualPath is available with the Multi Image license option for the following NXT Compact Routers

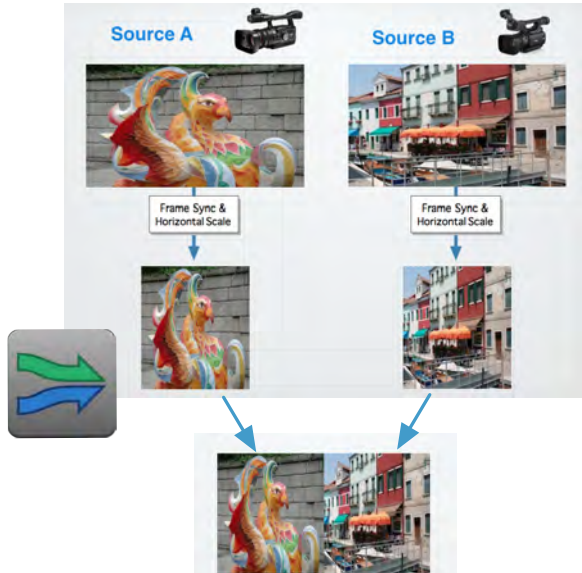|	
BrightEye NXT 450	Compact Router with H.264 Encoder/Decoder and U/D/C
BrightEye NXT 445	Streaming Encoder
BrightEye NXT 430-X	Clean Compact Router with Up/Down/Cross Conversion
BrightEye NXT 410-H	Clean HDMI-HDCP-SDI Router with U/D/C

BrightEye NXT
DualPath Diagram

The DualPath signal, carrying two videos and associated audio, travels as a single feed over an ordinary path. DualPath operates only at the end points, with no changes required to the existing link.
This example shows an IP link utilizing MPEG compresion, but DualPath works equally well with baseband SDI and Fiber connections.

DualPath Tx
Combines Two Signals

Enc

IP Connection
**LAN, VPN,
Public Internet**

Each video input is compressed to 50% width.

Choose the audio transmission mode to suit the production requirements, and the capacity of the transmission path.

The compressed output is still an 'ordinary' baseband video signal.

DualPathTx Out contains both signals.

Route the Tx signal to the transmission path.

Signal Routing at Transmit End

DualPath adds two more destinations for signal routing.

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The left and right halves of the mulitplexed signal
are expanded back to their correct dimensions.

DualPath Input
● 2 Video Signals
● AFV or Breakaway

Frame Sync &
Horizontal Scale

Audio
Embedding

Audio
Dis-Embedder

Audio
Selection

Frame Sync &
Horizontal Scale

Audio
Embedding

Rx Audio Mode
2 Ch: A Mono / B Mono
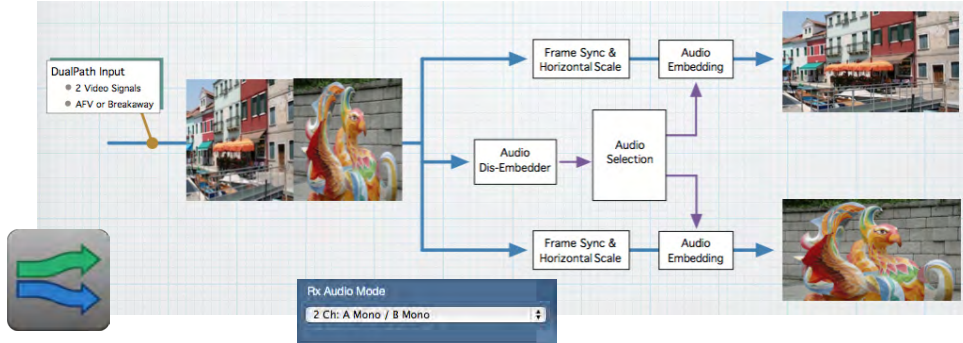
Set the Audio Receive mode
to match transmission.

Dec DualPath Rx

The two sources recovered by
the DualPath Rx process can
be routed to any destination.

The incoming DualPath signal is
fed to Rx In to be demultiplexed.

Receive Point A
Router Control

10.0.1.64/#!/router-control/

Rem 4 - A Path   Rem 4 - B Path   Decoder Out   TSG 1   TSG 2

Rem 4 - A Path   Rem 4 - B Path   Rem 4 - B Path   Decoder Out

Production In 10   Production In 11   News Room In   DualPath Rx In
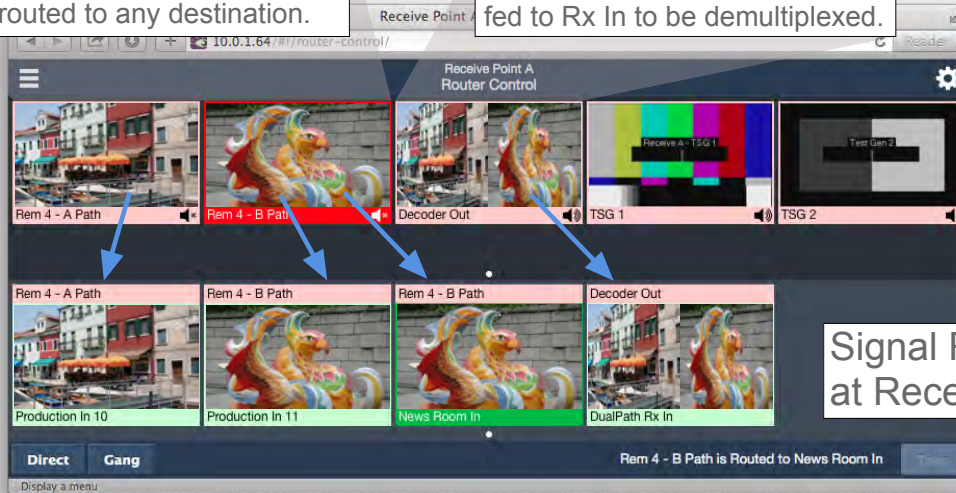
Signal Routing
at Receive End

Direct   Gang   Rem 4 - B Path is Routed to News Room In

Display a menu

BrightEye NXT Accessories
Action Control Panel

Configuration Recall – Instantly!

The 5835 Action Control Panel for the BrightEye NXT Family of Routers is fully customizable to suit your exact application. Source and destination keys are programmable to give operators access to just the signals they need. Thumbnails on the front panel LCD let you preview Sources before Take or Mix transitions. Action Keys give operators single button recall of NXT configurations and signal routing.

With Presets and Actions, control over NXT Routers is easily customized. They put the full power and flexibility of the NXT in a single button.

Presets and Actions are a standard feature of the Web Interface on all NXT Routers. Add the 5835 Action Panel to give operators push button Action recall. It's network connected, so it can operate locally or at a distance.

Presets and Salvos

Control Functions in NXT Compact Routers have user programmable Presets. Presets capture settings and adjustments for different operations and configurations.

Salvos capture presets of all or selected outputs of the routing matrix.

Actions

NXT Actions provide push button recall of selected Presets and Crosspoint Salvos. They can be tailored to change a single, specific parameter, or to recall a complete configuration of the product.

Users can recall an action through the Web interface, or directly from the 5835 Action Keys. Automation and GPI access is also available.

10 Action Keys Access from Web or 5835 Panel

Ethernet

Full Travel, Sculpted Buttons
Legendable
Programmable Color

Source/Destination Preview

Manual Crosspoint Control

Actions give Users fast, single button recall of any set of parameters. Label them to precisely describe their function.

BrightPak and Rack Mount

BrightPak –
Portable, Rugged Field Kit for BrightEyes

Use this sturdy, portable case in the field with the full range of BrightEyes, including BrightEye NXTs. Build up custom systems with Routing, Conversion, SPG/TSGs, Audio Embedding, Fiber interfaces and more.

BrightPak is modular, with built-in AC power distribution, BrightEye mounting hardware, and a variety of signal connector options. Includes support for popular professional battery mounts (battery pack not included). Use BrightPak to put NXT Compact Routers right where they are needed – in the middle of the action.

Rack Mount Your BrightEyes

The BrightEye Rack Mount is 1RU and holds up to 3 BrightEye NXTs, 3 double high BrightEyes, 6 single high BrightEyes, or any combination.

Order Info

5835	BrightEye Router and Action Control Panel
BEPAK	BrightPak
BERKMT-Full	Rackmount Kit for BrightEye products, includes Blank Panel Kit and Retainer Kit
BERKMT-RR	Rackmount Kit for BrightEye products, includes Retainer Kit

BrightEye NXT
Specifications

Common to all NXT Compact Routers

SDI Standards Supported

1080p 50, 59.94, 60 Hz, 2.97 Gb/s HD, SMPTE 424M, 425M, Level A
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
625i 50 , 525i 59.94, 270 Mb/s SD, SMPTE 259M

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

Audio

SDI paths support 16 channels of audio
HDMI supports 8 channels of audio
Clean Switches
    16 channels Sample Rate Conversion (SRC) for PCM sources
    Multi-Channel Surround (Dolby, AC-3) pass-thru

Control

LAN Port	RJ-45; 10/100

Supports Web, TCP/IP, and Telnet
Serial RS-232 available by special order
GPI/GPO using external interface

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	1.7 lbs / 770 grams
Temperature Range	0 to 40° C ambient (all specs met)
Relative Humidity	0 to 95%, non-condensing
Altitude	0 to 10,000 ft.

Encoder and Decoder Specs (450 and 445)

Dual Rate Encoder

Dual Rate	MPEG-4 Part 10 H.264 (ISO/IEC 14496/10)
High-Resolution	Encoding format matches input source up to 1080I/59.94 Hz
Low-Resolution	Encoding format 640 x 360P
Data Rate	Adjustable from 1 to 20 Mb/s
Latency	400 msec
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 3.0

Audio Encoding

2 channels	MP3 and AAC Encoding
Data Rate	32 to 384 Kb/s, 512 Kb/s for AAC
Downmixing	Up to 16 incoming channels to stereo pair – user selectable

Streaming Outputs

IP (via GigE Media port)	
Unicast, 2 independent	Unicast A: RTP, RTMP *
	Unicast B: RTP
Multicast, 1	RTP
DVB-ASI	Routable to BNC and SFP fiber outputs

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

* RTMP configuration includes CDN URL and Key. Supports direct connection to CDN (Wowza, USTREAM, YouTube, etc.), no local server required.

RTMP latency is a function of CDN's behavior. Typical range is 20-30 seconds.

Decoder

Decode from IP Unicast/Multicast or DVB-ASI
MPEG-4 part 10 H.264 (ISO/IEC 14496/10)

Latency	200 msec
Baseband Output	See SDI Standards Supported
	Routable to any destination. Can be processed through Clean Switch for synchronization to local reference.

Network Connection

Media Port	RJ-45; 10/100/1000 (GigE)

BrightEye NXT 445: Specifications applicable when appropriate option licenses are activated.

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Inputs

BNC

Signal Type	See SDI Standards Supported
Impedance	75 Ω
Return Loss	>15 dB
Max Cable Length	300 meters for 270 Mb/s
	100 meters for 1.485 Gb/s

NXT Routers have both fixed and flexible BNC ports, see I/O chart below

SFP

Single Port	HDMI (micro), Analog Composite (BNC)
Dual Port	Fiber (LC), SDI (HD-BNC, DIN 1.0/2.3)

Available as inputs or outputs

HDMI

Type	HDMI 1.3
Format	Supports HDMI signals which map to the SDI standards

Outputs

BNC

Signal Type	See SDI Standards Supported
Impedance	75 Ω
Processing	12 and 16 bit
Return Loss	>15 dB
Max Cable Length	300 meters for 270 Mb/s
	100 meters for 1.485 Gb/s

NXT Routers have both fixed and flexible BNC ports, see I/O chart below

SFP

Single Port	HDMI (micro), Analog Composite (BNC)
Dual Port	Fiber (LC), SDI (HD-BNC, DIN 1.0/2.3)

Available as inputs or outputs

HDMI

Type	HDMI 1.3
Format	Supports HDMI signals which map to the SDI standards

I/O Chart

BNC	410	410-H	415	430	430-X	445	445K-I/O	450
Fixed Inputs	2	2	2	2	2	1	2	2
Fixed Outputs	2	2	2	2	2	1	2	2
Flexible (Bi-Dir)	1	1	7	7	7	0	3	3
In x Out Range *	3x2 to 2x3	3x2 to 2x3	9x2 to 2x9	9x2 to 2x9	9x2 to 2x9	1x1	5x2 to 2x5	5x2 to 2x5
SFP								
Positions	1	1	2	2	2	0	2	2
Max Port Count	2	2	4	4	4	0	4	4
HDMI								
Fixed HDMI Inputs, built-in	4	4	0	0	0	0	0	0
Fixed HDMI Outputs, built-in	1	1	0	0	0	0	0	0
HDMI possible via SFP	1	1	2	2	2	0	2	2
Total In x Out Range *	9x3 to 6x6	9x3 to 6x6	13x2 to 2x13	13x2 to 2x13	13x2 to 2x13	1x1	9x2 to 2x9	9x2 to 2x9

* Input and Output count depends upon configuration of bi-dir BNC ports and choice of SFP modules installed.

Power Chart

	410	410-H	415	430	430-X	445	445K-I/O	450
Power Consumed	30 Watts	30 Watts	20 Watts	30 Watts	30 Watts	35 Watts	35 Watts	35 Watts

Ships with 12 volt modular supply, universal 100-230 VAC input, accepts IEC C13 power cable (included).

BrightEye™ NXT Compact Routers

NXT at the Core of Mobility

Power and Flexibility in a Compact Package – NXT Routers are the go-to choice for mobile systems. Connect SDI, Fiber, HDMI, and IP sources. Built-in format conversion, synchronization, and clean switching deliver a finished program to multiple destinations. Generate baseband and streaming outputs simultaneously. Control it from front panel, Web, and serial interfaces.

NXT Format Conversion

With both SDI and HDMI inputs, the NXT 410 and 410-H can combine SDI, Computer, and GoPro sources. Tell the Weather story with the Images, Maps, and Data that it deserves. NXT Routers are only 1/3 of an RU, so they are always ready for a road trip.

NXT Streams Live to the Web

Put your message on the Web, Live! from your own venue. The NXT 445 Streaming Encoder connects directly to Content Delivery Networks (CDNs) such as YouTube, USTREAM, and Wowza. With RTMP protocol support built-in, it's easy to setup and easy to control. View connection health from the front panel or the Web UI. The NXT 450 and 445 Streaming Routers are comprehensive solutions to Webcasting. Own the Cloud.

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