BrightEye™

Compact Video, Audio and Optical Converters

Designed and built in California
5 YEAR WARRANTY

ENSEMBLE DESIGNS

Purveyors of Fine Video Gear—Loved by Engineers Worldwide

Table of Contents (by function)

Scan Converters

BrightEye Mitto 3G Scan Converter (BEM-1) 30
BrightEye Mitto 3G Fiber Scan Converter (BEM-1F) 30
BrightEye Mitto HD Scan Converter (BEM-2) 30
BrightEye Mitto HD Fiber Scan Converter (BEM-2F) 30
BrightEye Mitto Pro 2 Scan Converter (BEM-4) 30
BrightEye Mitto Pro 2 Scan Converter with HDCP (BEM-4-H) 30

Encoders/Decoders

BrightEye NXT 445 Streaming Encoder 46
BrightEye NXT 450 Clean Streaming Router with Dual Up/Down/Cross Converters 48

Routers

BrightEye NXT 410 Clean HDMI Router 36
BrightEye NXT 410-H Clean HDMI Router with HDCP and Dual Up/Down/Cross Converters ... 36
BrightEye NXT 415 Compact Router 40
BrightEye NXT 430 Clean Compact Router 40
BrightEye NXT 430-X Clean Compact Router with Dual Up/Down/Cross Converters 40
BrightEye NXT 445 Streaming Encoder 46
BrightEye NXT 450 Clean Streaming Router with Dual Up/Down/Cross Converters 48

HDMI

BrightEye Mitto 3G Scan Converter (BEM-1) 30
BrightEye Mitto 3G Fiber Scan Converter (BEM-1F) 30
BrightEye Mitto HD Scan Converter (BEM-2) 30
BrightEye Mitto HD Fiber Scan Converter (BEM-2F) 30
BrightEye Mitto Pro 2 Scan Converter (BEM-4) 30
BrightEye Mitto Pro 2 Scan Converter with HDCP (BEM-4-H) 30
BrightEye NXT 410 Clean HDMI Router 36
BrightEye NXT 410-H Clean HDMI Router with HDCP and Dual Up/Down/Cross Converters ... 36
* BrightEye NXT 415 Compact Router 40
* BrightEye NXT 430 Clean Compact Router 40
* BrightEye NXT 430-X Clean Compact Router with Dual Up/Down/Cross Converters 40
* BrightEye NXT 445 Streaming Encoder 46
* BrightEye NXT 450 Clean Streaming Router with Dual Up/Down/Cross Converters 48
* HDMI I/O with SFP modules

HDMI (continued)

BrightEye 72 SDI to HDMI Converter, Color Corrector and Broadcast Confidence Monitor . . . 132
BrightEye 72-F SDI to HDMI Converter, Color Corrector and Broadcast Confidence Monitor w/ Fiber Input . 132
BrightEye 81 3G/HD/SD SDI to HDMI Converter 144
BrightEye 81-F Optical to HDMI and 3G/HD/SD SDI Electrical Converter 146
BrightEye 83 HDMI to 3G/HD/SD SDI Converter. 148
BrightEye 83-H HDMI to 3G/HD/SD SDI Converter with HDCP 148
BrightEye 83-F HDMI to Optical and Electrical 3G/HD/SD SDI Converter 149
BrightEye 90 HD Up/Down/Cross Converter and ARC with AES Audio 150
BrightEye 90-A HD Up/Down/Cross Converter and ARC with Analog Audio 154
BrightEye 90-F HD Up/Down/Cross Converter and ARC w/ AES Audio and Optical Output . . . 158
BrightEye 90-FA HD Up/Down/Cross Converter and ARC with Analog Audio and Optical Output . 162
BrightEye 91 HD Upconverter with AES Audio 166
BrightEye 91-A HD Upconverter with Analog Audio. 170
BrightEye 92-A HD Downconverter with Analog Audio. 174
BrightEye 92-M HD Downconverter. 178
BrightEye 93 HD Cross Converter 180
BrightEye 94 SD Aspect Ratio Converter. 182

High Definition Video

BrightEye Mitto 3G Scan Converter (BEM-1) 30
BrightEye Mitto 3G Fiber Scan Converter (BEM-1F). 30
BrightEye Mitto HD Scan Converter (BEM-2) 30
BrightEye Mitto HD Fiber Scan Converter (BEM-2F) 30
BrightEye Mitto Pro 2 Scan Converter (BEM-4) 30
BrightEye Mitto Pro 2 Scan Converter with HDCP (BEM-4-H) 30
BrightEye NXT 410 Clean HDMI Router. 36
BrightEye NXT 410-H Clean HDMI Router with HDCP and Dual Up/Down/Cross Converters . . . 36
BrightEye NXT 415 Compact Router 40
BrightEye NXT 430 Clean Compact Router 40
BrightEye NXT 430-X Clean Compact Router with Dual Up/Down/Cross Converters 40
BrightEye NXT 445 Streaming Encoder. 46
BrightEye NXT 450 Clean Streaming Router with Dual Up/Down/Cross Converters. 48
BrightEye 11-HD HD/SD SDI to Analog Converter 70
BrightEye 41 Video/AES/Tri-Level Sync Distribution Amplifier 102
BrightEye 42 HD/SD/ASI Distribution Amplifier 104
BrightEye 43 3G/HD/SD/ASI Distribution Amplifier. 106
BrightEye 46 3G/HD/SD/ASI Electrical to Optical Converter. 108
BrightEye 48 3G/HD/SD/ASI Optical to Electrical Converter. 110
BrightEye 56 HD/SD/Analog Test Signal and Sync Pulse Generator. 116
BrightEye 57 3G/HD/SD/Analog Test Signal and Sync Pulse Generator 120
BrightEye 70 HD/SD AES Embedder/Disembedder. 124
BrightEye 71 HD/SD 8 Channel Analog Audio Embedder/Disembedder. 128
BrightEye 71-F HD/SD 8 Channel Analog Audio Embedder/Disembedder with Optical Out . . . 128
BrightEye 72 SDI to HDMI Converter, Color Corrector and Broadcast Confidence Monitor . . . 132
BrightEye 72-F SDI to HDMI Converter, Color Corrector and Broadcast Confidence Monitor w/ Fiber Input . 132
BrightEye 73 HD/SD AES Embedder with Optical Out 136
BrightEye 74 Optical Disembedder with HD/SD Electrical Out 138
BrightEye 75 HD/SD Analog to Digital Video Converter 140
BrightEye 76 HD/SD Analog to Digital Video Converter with Optical Out. 142
BrightEye 81 3G/HD/SD SDI to HDMI Converter 144
BrightEye 81-F Optical to HDMI and 3G/HD/SD SDI Electrical Converter 146
BrightEye 83 HDMI to 3G/HD/SD SDI Converter. 148
BrightEye 83-F HDMI to Optical and Electrical 3G/HD/SD SDI Converter 149

High Definition Video

BrightEye 83-H HDMI to 3G/HD/SD SDI Converter with HDCP 148
BrightEye 90 HD Up/Down/Cross Converter and ARC with AES Audio 150
BrightEye 90-A HD Up/Down/Cross Converter and ARC with Analog Audio 154
BrightEye 90-F HD Up/Down/Cross Converter and ARC w/ AES Audio and Optical Output . . . 158
BrightEye 90-FA HD Up/Down/Cross Converter and ARC with Analog Audio and Optical Output . 162
BrightEye 91 HD Upconverter with AES Audio 166
BrightEye 91-A HD Upconverter with Analog Audio. 170
BrightEye 92-A HD Downconverter with Analog Audio. 174
BrightEye 92-M HD Downconverter. 178
BrightEye 93 HD Cross Converter 180
BrightEye 94 SD Aspect Ratio Converter. 182

3 Gb/s High Definition Video

BrightEye Mitto 3G Scan Converter (BEM-1) 30
BrightEye Mitto 3G Fiber Scan Converter (BEM-1F). 30
BrightEye NXT 410 Clean HDMI Router. 36

3 Gb/s High Definition Video (continued)

BrightEye NXT 410-H Clean HDMI Router with HDCP and Dual Up/Down/Cross Converters ... 36
BrightEye NXT 415 Compact Router ... 40
BrightEye NXT 430 Clean Compact Router ... 40
BrightEye NXT 430-X Clean Compact Router with Dual Up/Down/Cross Converters ... 40
BrightEye NXT 445 Streaming Encoder ... 46
BrightEye NXT 450 Clean Streaming Router with Dual Up/Down/Cross Converters ... 48
BrightEye 43 3G/HD/SD/ASI Distribution Amplifier ... 106
BrightEye 46 3G/HD/SD/ASI Electrical to Optical Converter ... 108
BrightEye 48 3G/HD/SD/ASI Optical to Electrical Converter ... 110
BrightEye 57 3G/HD/SD/Analog Test Signal and Sync Pulse Generator ... 120
BrightEye 72 SDI to HDMI Converter, Color Corrector and Broadcast Confidence Monitor ... 132
BrightEye 72-F SDI to HDMI Converter, Color Corrector and Broadcast Confidence Monitor w/ Fiber Input ... 132
BrightEye 81 3G/HD/SD SDI to HDMI Converter ... 144
BrightEye 81-F Optical to HDMI and 3G/HD/SD SDI Electrical Converter ... 146
BrightEye 83 HDMI to 3G/HD/SD SDI Converter ... 148
BrightEye 83-F HDMI to Optical and Electrical 3G/HD/SD SDI Converter ... 149
BrightEye 83-H HDMI to 3G/HD/SD SDI Converter with HDCP ... 148

Up/Down/Cross Converters

BrightEye NXT 410-H Clean HDMI Router with HDCP and Dual Up/Down/Cross Converters ... 36
BrightEye NXT 430-X Clean Compact Router with Dual Up/Down/Cross Converters ... 40
BrightEye NXT 445 Streaming Encoder ... 46
BrightEye NXT 450 Clean Streaming Router with Dual Up/Down/Cross Converters ... 48
BrightEye 90 HD Up/Down/Cross Converter and ARC with AES Audio ... 150
BrightEye 90-A HD Up/Down/Cross Converter and ARC with Analog Audio ... 154
BrightEye 90-F HD Up/Down/Cross Converter and ARC w/ AES Audio and Optical Output ... 158
BrightEye 90-FA HD Up/Down/Cross Converter and ARC with Analog Audio and Optical Output ... 162
BrightEye 91 HD Upconverter with AES Audio ... 166
BrightEye 91-A HD Upconverter with Analog Audio ... 170
BrightEye 92-A HD Downconverter with Analog Audio ... 174
BrightEye 92-M HD Downconverter ... 178
BrightEye 93 HD Cross Converter ... 180

Analog to Digital Converters

BrightEye 1 Analog/SD SDI to SD SDI/Optical Converter with TBC and Frame Sync ... 58
BrightEye 2 Analog to SD SDI Converter ... 60
BrightEye 3 Analog to SD SDI Converter with TBC and Frame Sync ... 62
BrightEye 25 Analog Video/Audio to SD SDI Converter with TBC and Embedder ... 88
BrightEye 26 Analog Video/Audio to SD SDI/Optical Converter with TBC and Embedder ... 90
BrightEye 75 HD/SD Analog to Digital Video Converter ... 140
BrightEye 76 HD/SD Analog to Digital Video Converter with Optical Out ... 142

Digital to Analog Converters

BrightEye 11 SD SDI to Analog Converter ... 68
BrightEye 11-HD HD/SD SDI to Analog Converter ... 70
BrightEye 15 SD SDI to Analog Converter with Frame Sync/Genlock ... 72
BrightEye 16 SD SDI to Analog Converter with Frame Sync/Genlock and Audio Disembedder ... 74
BrightEye 72 SDI to HDMI Converter, Color Corrector and Broadcast Confidence Monitor ... 132
BrightEye 72-F SDI to HDMI Converter, Color Corrector and Broadcast Confidence Monitor ... 132

Audio Embedders, Disembedders, and Converters

BrightEye 20 Analog Audio/AES Embedder or Disembedder ... 76
BrightEye 21 AES/SD SDI Embedder ... 80
BrightEye 22 SD SDI/AES Disembedder ... 82
BrightEye 23 Analog Audio/SD SDI Embedder ... 84
BrightEye 24 SD SDI to Analog Converter and Disembedder ... 86
BrightEye 25 Analog Video/Audio to SD SDI Converter with TBC and Embedder ... 88
BrightEye 26 Analog Video/Audio to SD SDI/Optical Converter with TBC and Embedder ... 90
BrightEye 30 Audio ADC and DAC, Bidirectional ... 92
BrightEye 30-D Audio ADC and DAC, Bidirectional Converter with Delay ... 96
BrightEye 70 HD/SD AES Embedder/Disembedder ... 124
BrightEye 71 HD/SD 8 Channel Analog Audio Embedder/Disembedder ... 128
BrightEye 71-F HD/SD 8 Channel Analog Audio Embedder/Disembedder with Optical Out ... 128
BrightEye 72 SDI to HDMI Converter, Color Corrector and Broadcast Confidence Monitor ... 132
BrightEye 72-F SDI to HDMI Converter, Color Corrector and Broadcast Confidence Monitor w/ Fiber Input ... 132
BrightEye 73 HD/SD AES Embedder with Optical Out ... 136
BrightEye 74 Optical Disembedder with HD/SD Electrical Out ... 138
BrightEye 75 HD/SD Analog to Digital Video Converter ... 140
BrightEye 76 HD/SD Analog to Digital Video Converter with Optical Out ... 142

Distribution Amplifiers

BrightEye 33 Analog Audio Distribution Amplifier 98
BrightEye 40 SD SDI Reclocking Distribution Amplifier 100
BrightEye 41 Video/AES/Tri-Level Sync Distribution Amplifier 102
BrightEye 42 HD/SD/ASI Distribution Amplifier 104
BrightEye 43 3G/HD/SD/ASI Distribution Amplifier. 106

ASI

BrightEye NXT 415 Compact Router 40
BrightEye NXT 445 Streaming Encoder. 46
BrightEye NXT 450 Clean Streaming Router with Dual Up/Down/Cross Converters. 48
BrightEye 42 HD/SD/ASI Distribution Amplifier 104
BrightEye 43 3G/HD/SD/ASI Distribution Amplifier. 106
BrightEye 46 3G/HD/SD/ASI Electrical to Optical Converter. 108
BrightEye 48 3G/HD/SD/ASI Optical to Electrical Converter. 110

Fiber Optic

BrightEye Mitto 3G Fiber Scan Converter (BEM-1F) 30
BrightEye Mitto HD Fiber Scan Converter (BEM-2F) 30
* BrightEye NXT 410 Clean HDMI Router 36
* BrightEye NXT 410-H Clean HDMI Router with HDCP and Dual Up/Down/Cross Converters . . . 36
* BrightEye NXT 415 Compact Router 40
* BrightEye NXT 430 Clean Compact Router 40
* BrightEye NXT 430-X Clean Compact Router with Dual Up/Down/Cross Converters 40
* BrightEye NXT 445 Streaming Encoder. 46
* BrightEye NXT 450 Clean Streaming Router with Dual Up/Down/Cross Converters. 48
* Fiber I/O with SFP modules
BrightEye 1 Analog/SD SDI to SD SDI/Optical Converter with TBC and Frame Sync 58
BrightEye 10 Optical/SD SDI to Analog/SDI Converter. 66
BrightEye 26 Analog Video/Audio to SD SDI/Optical Converter with TBC and Embedder 90
BrightEye 46 3G/HD/SD/ASI Electrical to Optical Converter. 108
BrightEye 48 3G/HD/SD/ASI Optical to Electrical Converter. 110
BrightEye 71-F HD/SD 8 Channel Analog Audio Embedder/Disembedder with Optical Out . . . 128
BrightEye 72-F SDI to HDMI Converter, Color Corrector and Broadcast Confidence Monitor w/ Fiber Input. 132
BrightEye 73 HD/SD AES Embedder with Optical Out 136
BrightEye 74 Optical Disembedder with HD/SD Electrical Out 138
BrightEye 76 HD/SD Analog to Digital Video Converter with Optical Out. 142
BrightEye 81-F Optical to HDMI and 3G/HD/SD SDI Electrical Converter 146
BrightEye 83-F HDMI to Optical and Electrical 3G/HD/SD SDI Converter 149
BrightEye 90-F HD Up/Down/Cross Converter and ARC w/ AES Audio and Optical Output . . . 158
BrightEye 90-FA HD Up/Down/Cross Converter and ARC with Analog Audio and Optical Output . 162

Sync Pulse/Test Signal Generators

BrightEye 54 Sync Generator and Test Signal Generator 112
BrightEye 55 Genlockable Sync Generator and Test Signal Generator 114
BrightEye 56 HD/SD/Analog Test Signal and Sync Pulse Generator. 116
BrightEye 57 3G/HD/SD/Analog Test Signal and Sync Pulse Generator 120

Table of Contents (numerical order)

Functional Chart 10
Overview 12
Fiber Optic Interfaces 13
BrightEye Mac and PC Software 13
Power Supplies and Audio Adapters 14
Input and Output Diagrams 20-29
BrightEye Mitto 3G Scan Converter (BEM-1) 30
BrightEye Mitto 3G Fiber Scan Converter (BEM-1F 30
BrightEye Mitto HD Scan Converter (BEM-2) 30
BrightEye Mitto HD Fiber Scan Converter (BEM-2F) 30
BrightEye Mitto Pro 2 Scan Converter (BEM-4) 30
BrightEye Mitto Pro 2 Scan Converter with HDCP (BEM-4-H) 30
BrightEye NXT 410 Clean HDMI Router 36
BrightEye NXT 410-H Clean HDMI Router with HDCP and Dual Up/Down/Cross Converters ... 36
BrightEye NXT 415 Compact Router 40
BrightEye NXT 430 Clean Compact Router 40
BrightEye NXT 430-X Clean Compact Router with Dual Up/Down/Cross Converters 40
BrightEye NXT Application Examples 44
BrightEye NXT 445 Streaming Encoder 46
BrightEye NXT 450 Clean Streaming Router 48
BrightEye NXT 450 Clean Streaming Router Applications 52
BrightEye NXT Multi Image License Option: PiP-Efx Picture in Picture 54
BrightEye NXT Multi Image License Option: DualPath 56
BrightEye 1 Analog/SD SDI to SD SDI/Optical Converter with TBC and Frame Sync 58
BrightEye 2 Analog to SD SDI Converter 60
BrightEye 3 Analog to SD SDI Converter with TBC and Frame Sync 62
BrightEye 5 Analog Composite TBC and Frame Sync 64
BrightEye 10 Optical/SD SDI to Analog/SDI Converter 66
BrightEye 11 SD SDI to Analog Converter 68
BrightEye 11-HD HD/SD SDI to Analog Converter 70
BrightEye 15 SD SDI to Analog Converter with Frame Sync/Genlock 72
BrightEye 16 SD SDI to Analog Video Converter with Frame Sync/Genlock and Audio Disembedder 74
BrightEye 20 Analog Audio/AES Embedder or Disembedder 76
BrightEye 21 AES/SD SDI Embedder 80
BrightEye 22 SD SDI/AES Disembedder 82
BrightEye 23 Analog Audio/SD SDI Embedder 84
BrightEye 24 SD SDI to Analog Converter and Disembedder 86
BrightEye 25 Analog Video/Audio to SD SDI Converter with TBC and Embedder 88
BrightEye 26 Analog Video/Audio to SD SDI/Optical Converter with TBC and Embedder 90
BrightEye 30 Audio ADC and DAC, Bidirectional 92
BrightEye 30-D Audio ADC and DAC, Bidirectional Converter with Delay 96
BrightEye 33 Analog Audio Distribution Amplifier 98
BrightEye 40 SD SDI Reclocking Distribution Amplifier 100
BrightEye 41 Video/AES/Tri-Level Sync Distribution Amplifier 102
BrightEye 42 HD/SD/ASI Distribution Amplifier 104
BrightEye 43 3G/HD/SD/ASI Distribution Amplifier 106
BrightEye 46 3G/HD/SD/ASI Electrical to Optical Converter 108
BrightEye 48 3G/HD/SD/ASI Optical to Electrical Converter 110
BrightEye 54 Sync Generator and Test Signal Generator 112
BrightEye 55 Genlockable Sync Generator and Test Signal Generator 114
BrightEye 56 HD/SD/Analog Test Signal and Sync Pulse Generator 116
BrightEye 56 HD/SD/Analog Test Signal and Sync Pulse Generator 118
BrightEye 57 3G/HD/SD/Analog Test Signal and Sync Pulse Generator 120
BrightEye 70 HD/SD AES Embedder/Disembedder 124
BrightEye 71 HD/SD 8 Channel Analog Audio Embedder/Disembedder 128
BrightEye 71-F SDI to HDMI Converter, Color Corrector and Broadcast Confidence Monitor with Fiber 128
BrightEye 72 SDI to HDMI Converter, Color Corrector and Broadcast Confidence Monitor 132
BrightEye 72-F SDI to HDMI Converter, Color Corrector and Broadcast Confidence Monitor with Fiber 132
BrightEye 73 HD/SD AES Embedder with Optical Out 136
BrightEye 74 Optical Disembedder with HD/SD Electrical Out 138
BrightEye 75 HD/SD Analog to Digital Video Converter 140
BrightEye 76 HD/SD Analog to Digital Video Converter with Optical Out 142
BrightEye 81 3G/HD/SD SDI to HDMI Converter 144
BrightEye 81-F Optical to HDMI and 3G/HD/SD SDI Electrical Converter 146
BrightEye 83 HDMI to 3G/HD/SD SDI Converter 148
BrightEye 83-H HDMI to 3G/HD/SD SDI Converter with HDCP Option 148
BrightEye 90 HD Up/Down/Cross Converter and ARC with AES Audio 150
BrightEye 90-A HD Up/Down/Cross Converter and ARC with Analog Audio 154
BrightEye 90-F HD Up/Down/Cross Converter and ARC with AES Audio and Optical Out 158
BrightEye 90-FA HD Up/Down/Cross Converter and ARC with Analog Audio and Optical Out .. 162
BrightEye 91 HD Upconverter with AES Audio 166
BrightEye 91-A HD Upconverter with Analog Audio 170
BrightEye 92-A HD Downconverter with Analog Audio 174
BrightEye 92-M HD Downconverter 178
BrightEye 93 HD Cross Converter 180
BrightEye 94 SD Aspect Ratio Converter 182
Glossary 184

Functional Chart

	BrightEye Mitto 3G	BrightEye Mitto 3G Fiber	BrightEye Mitto HD	BrightEye Mitto HD Fiber	BrightEye Mitto Pro 2	BrightEye NXT 410	BrightEye NXT 410-H	BrightEye NXT 415	BrightEye NXT 430	BrightEye NXT 430-X	BrightEye NXT 445	BrightEye NXT 450	BrightEye 1	BrightEye 2	BrightEye 3	BrightEye 5	BrightEye 10	BrightEye 11	BrightEye 11-HD	BrightEye 15	BrightEye 16	BrightEye 20	BrightEye 21	BrightEye 22	BrightEye 23	BrightEye 24	BrightEye 25	BrightEye 26	BrightEye 30	BrightEye 30-D	BrightEye 33	BrightEye 40	BrightEye 41	BrightEye 42	BrightEye 43	BrightEye 46	BrightEye 48	BrightEye 54	BrightEye 55	BrightEye 56	BrightEye 57	BrightEye 70	BrightEye 71	BrightEye 71-F	BrightEye 72	BrightEye 72-F	BrightEye 73	BrightEye 74	BrightEye 75	BrightEye 76	BrightEye 81	BrightEye 81-F	BrightEye 83	BrightEye 83-F	BrightEye 83-H	BrightEye 90	BrightEye 90-A	BrightEye 90-F	BrightEye 90-FA	BrightEye 91	BrightEye 91-A	BrightEye 92-A	BrightEye 93	BrightEye 94
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SD Analog Component In													✦	✦	✦																																																				
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HDMI In	✦	✦	✦	✦	✦	✦	✦	✦	✦	✦	✦	✦																																																			
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TBC/Frame sync						✦	✦		✦	✦	✦	✦	✦		✦	✦				✦	✦						✦	✦														✦	✦							✦	✦						✦	✦	✦	✦	✦	✦	✦	✦	✦
Scan Converter	✦	✦	✦	✦	✦							✦	✦																																																					
Streaming											✦	✦																																																					
HDCP					✦		✦																																																										

✦ Product Feature

✦ Optional

ENSEMBLE DESIGNS

Designed and built in California — 5 YEAR WARRANTY

Up to 6 BrightEye Units in 1RU

Compact Video, Audio and Optical Converters

Over 50 Units to Choose From

The BrightEye™ line of compact converters from Ensemble Designs takes advantage of the newest technology to bring you the best video and audio converters. With over 50 different BrightEye units to choose from, you'll find the right unit for your video processing needs. BrightEye units solve your needs for video routing, scan conversion, audio embedding, reference generation, video conversion and more.

These self-contained converters interface to a full range of video formats: high definition and standard definition SDI, 3 Gb/s, analog component, analog composite, and Y/C (S-Video). Analog audio and AES digital audio converters and embedders round out the BrightEye family. HDMI and fiber optic I/O choices let you integrate any type of signal.

Proven and Reliable

Whether you're upconverting analog video to HD for a projection system, converting a camera feed to fiber in an arena, or feeding Tri-Level Sync to a non-linear editor, BrightEye is there to help. With their multi-format inputs and outputs, BrightEye converters are the flexible and cost-effective answer to any conversion requirement. BrightEye's easy configuration interface and signal status indicators make it simple to install and troubleshoot a system.

Mac and PC Control

Adjusting video levels, output timing and mixing audio channels are so easy with BrightEye control software. No DIP switches or button hold-downs are needed. Use BrightEye Mac or PC software to control a single BrightEye unit or any number of units connected to a USB hub. Additionally, you can use it to upgrade BrightEye units as new software versions become available. BrightEye Mac and PC software are included with each unit at no charge. BrightEye NXT units can be controlled from your favorite web browser.

Used Worldwide

Their compact size lets you put conversion right where it's needed: in a mobile production, presentation room, remote truck, helicopter, or TV station. Reliable and easy to install, these units make your transition to HD simple. And they're cost effective too!

Fiber Optic Interfaces

When distances take you beyond the reach of ordinary copper cable, look to BrightEye's fiber optic interfaces. With both laser diode fiber drivers and photo diode receivers, BrightEye can handle both ends of a fiber optic link. Fully compliant with SMPTE 274M, 296M and 297M, BrightEye's optical interfaces operate at a wavelength of 1310 nm. Integral SC type connectors make it easy to connect into fiber infrastructure. BrightEye has been designed without internal fiber pigtails, so all optical converters support both multi and single mode fiber. BrightEye's fiber interconnect carries the same digital bitstream that makes up the electrical SDI interface. Data is carried by pulses of light rather than pulses of electricity. This rugged transmission system can carry serial digital signals with no loss or degradation for twenty kilometers or more on single mode fiber. With the use of a launch attenuator, multi-mode fiber is supported.

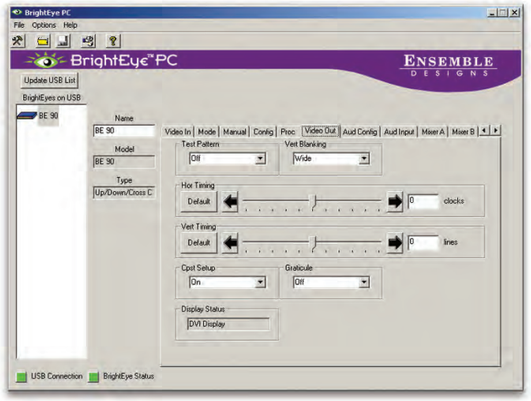
BrightEye makes it easy to take advantage of fiber optic technology. Choose from converters that include analog video I/O or units that interface directly to HD or SD SDI signals. Fiber interfaces are ideal for outdoor events and remote broadcasts. Fiber is not only a great solution for long distances, but since it is electrically non-conductive it also provides complete electrical isolation between the two connection points. Fiber connectivity completely eliminates concern for AC ground loops and hum. Optical transmission over fiber is also immune to radio frequency interference (RFI) and electromagnetic interference. Even nearby lightning strikes will not compromise the signal.

BrightEye Mac and PC Software

Adjusting video levels, output timing and mixing audio channels are so easy with BrightEye control software. No DIP switches or button hold-downs are needed. Use BrightEye Mac or PC software to control a single BrightEye unit or any number of units connected to a USB hub. Additionally, you can use it to upgrade BrightEye units as new software versions become available. BrightEye Mac and PC software are included with each unit at no charge.

Mac Screen Shot

PC Screen Shot



Power Supplies and Audio Adapters

Power Supplies

The BrightEye Individual Power Supply provides power to one BrightEye unit. The BrightEye NXT Individual Power Supply provides power to one BrightEye NXT Series unit.

The Spider Power Supply is a 6-way power supply that provides power for up to 6 BrightEye single high units, 3 double high units, or any combination that fits into a 1RU BrightEye Rack Mount.

The Redundant Power Supply may be used with the BrightEye Individual Power Supply or with the Spider Power Supply. The Redundant Power Supply can be powered off of two separate AC circuits if desired.

.26 kg

BEPS — BrightEye Individual Power Supply

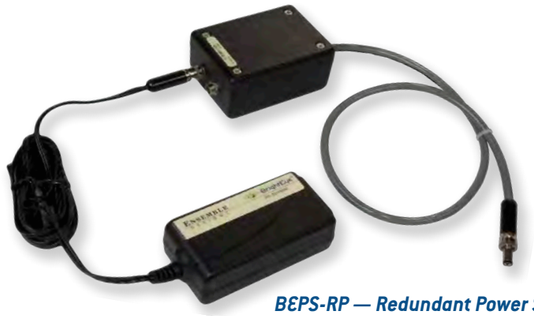
.33 kg

BEPS-NXT — BrightEye NXT Series Individual Power Supply

.37 kg

.34 kg

BEPS6 — Spider Power Supply



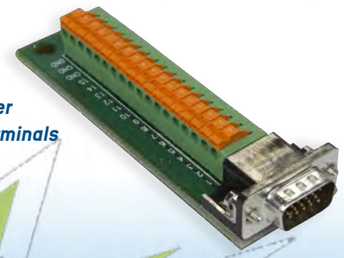
BEPS-RP — Redundant Power Supply

Audio

The Breakout Adapter with Phoenix Terminals mates with BrightEyes that have an HD-15 audio connector. It is compatible with BrightEye 16, 20, 23, 24, 25, 26, 30, 30-D, and 54.

The Analog Audio Breakout Cable connects to BrightEye via an HD-15 connector. The other end is pigtailed to accommodate your choice of connector, such as an XLR.

The 1 Port AES 110 Ohm Adapter is compatible with BrightEye 70, 90, 90-F, and 91.



PHX15 — Breakout Adapter with Phoenix Terminals

BEAC — Analog Audio Breakout Cable with Pigtail End

Rack Mounts

BERKMT-RR — Populated from left to right with one BrightEye NXT series, one BrightEye double high and two BrightEye single highs

Rack Mounts and Blank Panels

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

Blank filler panels are available for unused spaces when a dressed out look is desired. They are not required for structural support.

Order Info

BEPS	BrightEye Individual Power Supply
BEPS-NXT	BrightEye NXT Series Individual Power Supply
BEPS-RP	Redundant Power Supply for Individual and Spider Power Supply (for non-NXT series only)
BEPS6	Spider Power Supply powers 6 single high BrightEyes or 3 double high BrightEyes (for non-NXT series only)
BERKMT-FULL	BrightEye Rack Mount (holds 3 BrightEye NXT series, 3 to 6 BrightEyes, or a combo) Includes blank filler panels. 1RU high, 6 3/16"/157 mm deep, 3 lbs/1.4 kg
BERKMT-RR	BrightEye Rack Mount (holds 3 BrightEye NXT series, 3 to 6 BrightEyes, or a combo) Does NOT Include blank filler panels. 1RU high, 6 3/16"/157 mm deep, 3 lbs/1.4 kg (Note: Blank filler panel kit available separately; BERK-BPKit)
BEBP	BrightEye Blank Panel (single high, for empty slots in Rack Mount)
5082-I	110 Ohm Audio Adapter for BE70 and BE90 series - 1 per AES port
BEAC	Analog Audio Breakout Cable with Pigtail End
PHX15	Breakout Adapter with Phoenix Terminals

BrightPak™ Portable, Rugged Field Kit for BrightEyes

Use this sturdy, portable case with BrightEyes in the field. This rugged case makes it convenient to have compact routers, upconverters, sync pulse generators, fiber transmitters and more wherever you need them.

BrightPak is modular and that means all BrightEyes, from the BrightEye NXT 450 Compact Router with H.264 Encoding/Decoding, BrightEye 90-F HD Up/Down/Cross Converter with Fiber to the BrightEye 55 Sync Pulse Generator, can be housed in BrightPak for easy transport and use. You can optimize BrightPak for your specific application.

BrightPak Integration

BrightPak Basic in Kit Form is intended for end-users, dealers, distributors, and system integrators who wish to configure a BrightPak for a specific use. By selecting the appropriate BrightEye converters, industry standard connectors, and providing internal cabling, a BrightPak can be created that has the exact features and functions needed for a specific application. BrightPak Basic in Kit Form is a starting point for that process – providing the ruggedized field case, mounting for BrightEye converters and connectors, and power system needed. It is a framework for BrightPak integration.

When equipped with Bidirectional fiber, BrightPak supports outbound sound and picture, with return video, sound, and ifb

Features

- **Field acquisition**
- **Field HD source**
- **Telco kit**
- **Field reporting**
- **Mobile applications**

A flexible field case that lets you take video converters, SPGs, and optical transmitters anywhere

On location, it's the interface point for picture, sound, and communication

ENSEMBLE DESIGNS

Designed and built in California 5 YEAR WARRANTY

Easily Configured For Your Needs in the Field

Pelican 1430 Top Loader Case

Modified with side opening for connector bay and Anton/Bauer Battery Gold Mount.

Machined aluminum top plate and framework

Provides mounting for up to 6 single high BrightEyes, or three double high BrightEyes (or combination). Includes one single high and two double high blank plates.

Power and Control System

100-230 VAC 50/60Hz universal power supply suitable for worldwide operation. Automatic detection/selection of AC versus battery power (BrightPak is not a charger for the battery). BrightPak will switch automatically to battery if the AC power is lost – without any on-air glitch or interruption. IEC power connection installed in the connector side bay. Power on/off switch, AC/Battery indication, and Low Battery Indicator on top plate. Internal fan-out connections of 12 volt power for use with BrightEyes and/or other user-supplied devices. Internal USB Hub with Neutrik 'D' type USB connector. USB connector can be installed in connector side bay or on top plate as desired.

Built from a tough Pelican case, it will stand up to a lot of abuse

Connector Support

Connector bay on side of BrightPak provides openings for:

- 1 IEC AC power input connector (internally connected to power system)
- 12 Neutrik/Switchcraft 'D' type connector position (connectors not included)
- 1 Mounting position for Stratos HMA Flange mount expanded beam optical connector (connector not included)

Connection positions on top plate of BrightPak provide:

- 6 Neutrik/Switchcraft 'D' type connector positions (connectors not included)

Battery Mount

Includes an Anton/Bauer Gold Mount Battery connector plate installed on side of case and wired into power system. Suitable for use with all Anton/Bauer batteries. Does not include battery. Mounting systems for alternate batteries available upon request. Typical operating time with a high capacity battery, one BrightEye 90-F, one BrightEye 47, and one BrightEye 24, is three to four hours.

Control Video and Audio Parameters

The BrightPak Basic Kit includes a "D" mount USB connector, an internal USB hub, and all cables needed to support three BrightEye units. The USB connector can be installed in either the side bay or on the top plate. A laptop connected to that connector will have full control over all of the BrightEye units.

Configure the versatile connector bay to provide exactly the inputs and outputs you need

Order Info

BEPAK	BrightPak Basic – Portable, Rugged Field Case for BrightEyes. Comes in Kit Form
BEPAKEXT	BrightPak Basic Extension Kit

BrightPak Basic includes:

- Hardware to install 3 BrightEyes
- Pelican 1430 Top Loader Case
- Machined aluminum top plate, blanks, framework
- Power and Control System
- Anton/Bauer Gold Battery Mount
- Neutrik "D" Mount USB Connector
- 6 Mounting Blocks for BrightEye (2 per BrightEye)
- 4 USB type A-B Cables
- AC Line Cord
- 3 Power Cables for BrightEye

BrightPak Basic Extension Kit includes:

- Hardware to install 3 additional BrightEyes
- 3 USB type A-B Cables
- 6 Mounting Blocks for BrightEye (2 per BrightEye)
- 3 Power Cables for BrightEye

Additional Items:

BrightEye converters, audio/video/fiber connectors, internal cabling, and other non-Ensemble accessories are not part of the BrightPak Basic. They are shown here to demonstrate the full range and capability of the BrightPak system. Additional connectors can be ordered from companies such as Neutrik, Switchcraft, and Stratos.

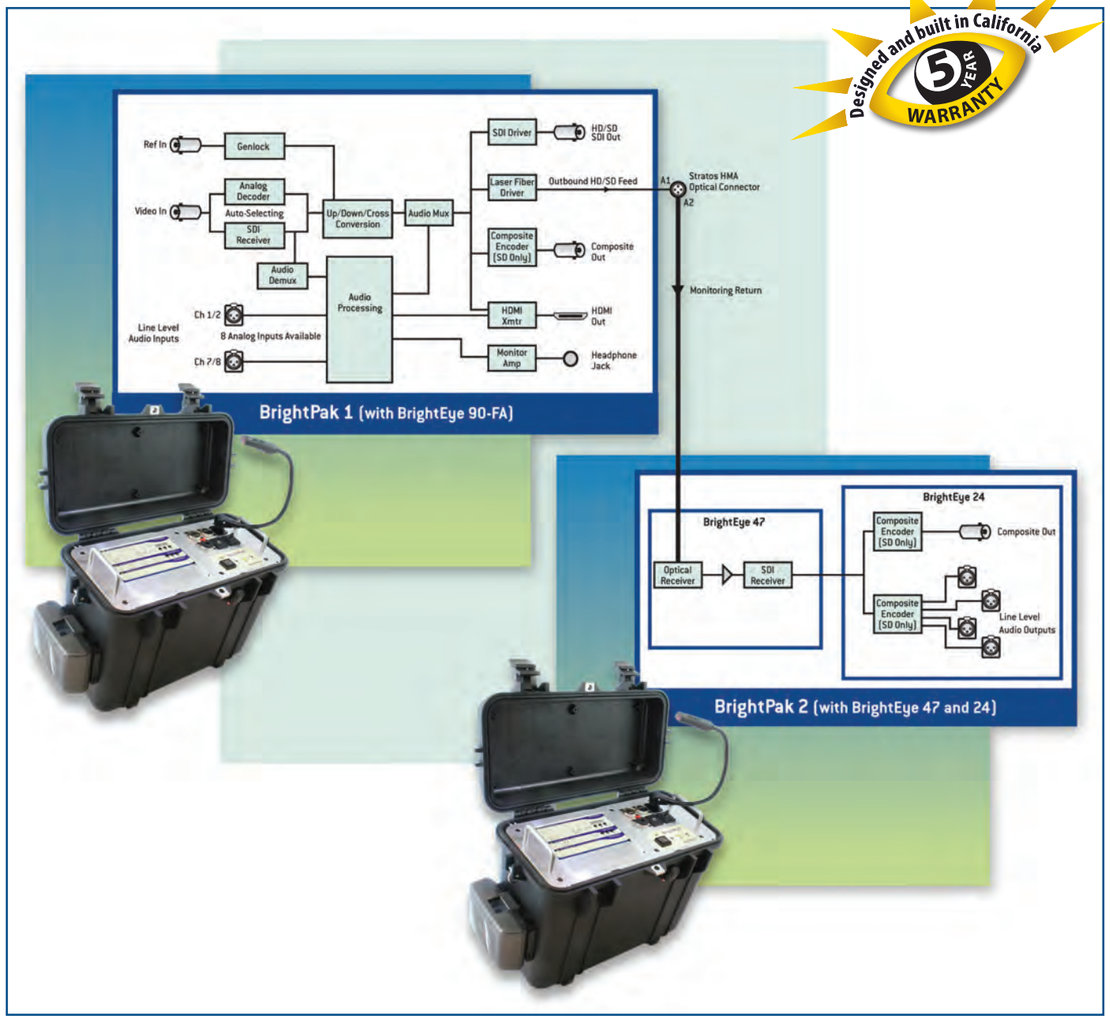
Modular design makes configuration easy. The entire assembly removes from the case for cabling

Up/Down/Cross Conversion, Fiber Tx and Rx, A to D, D to A, Audio Embedding, Bar Generator with Slate – just choose the functions you need

Accepts wide range of industry standard connectors and accessories allowing total customization

Automatically detects and switches seamlessly to AC power when available

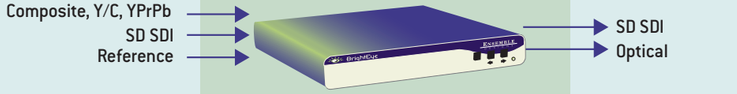
Configuration example



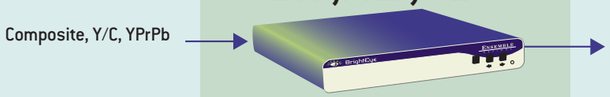
In this example two BrightPaks are used for outdoor field news acquisition. One BrightPak is populated with a BrightEye 90-FA Up/Down/Cross Converter and is processing an HD or SD camera feed. The BrightEye 90-FA upconverts or cross converts the signal as needed to the desired HD format. For example, if the desired output is 720p, any input delivered to the BrightEye 90-FA (SD or HD) would be converted to 720p. Audio levels and video levels can be adjusted.

The BrightEye 90-FA's outbound fiber feed goes to a second BrightPak in another location. This second BrightPak is populated with a BrightEye 47 Optical to Electrical Converter and BrightEye 24 D to A Converter. The incoming optical feed comes into the and is converted to electrical (HD or SD on standard coax) for signal monitoring and distribution. This electrical signal feeds the BrightEye 24, where the signal is into SDI, composite and analog audio for monitoring purposes.

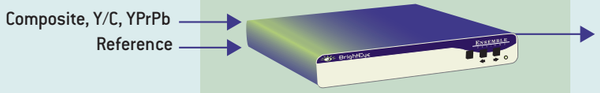
BrightEye 1



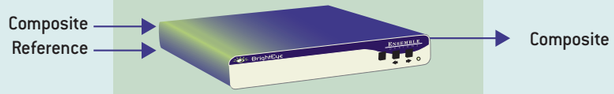
BrightEye 2



BrightEye 3



BrightEye 5

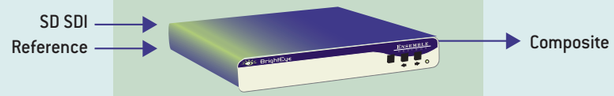


BrightEye 10

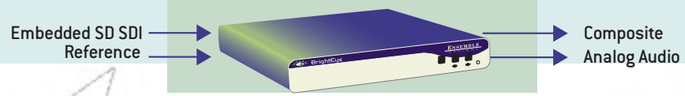
BrightEye 11

BrightEye 11-HD

BrightEye 15

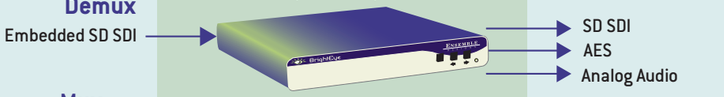


BrightEye 16



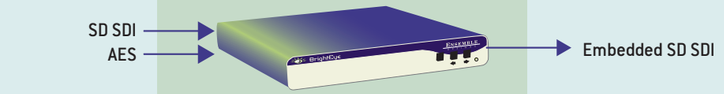
BrightEye 20

Demux

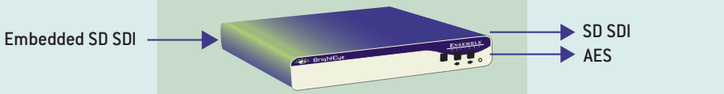


Mux

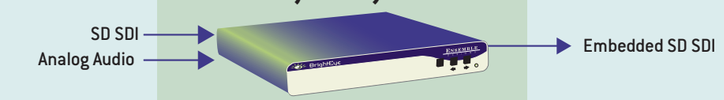
BrightEye 21



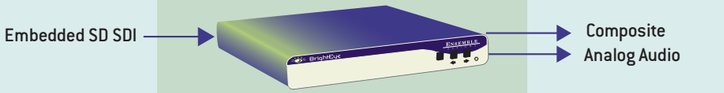
BrightEye 22



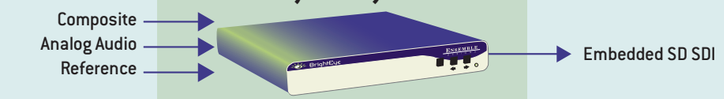
BrightEye 23



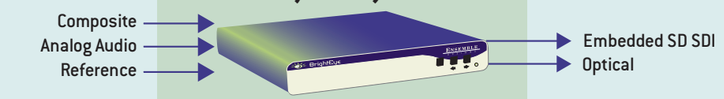
BrightEye 24



BrightEye 25



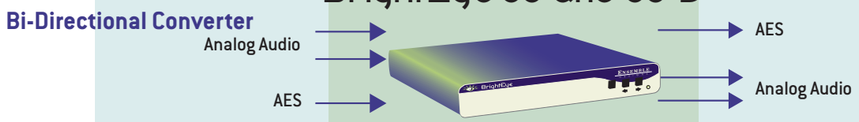
BrightEye 26



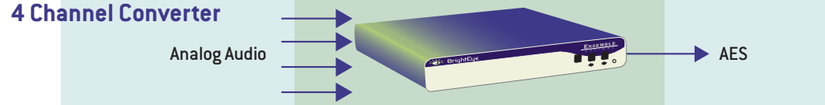
Designed and built in California
5 YEAR WARRANTY

BrightEye 30 and 30-D

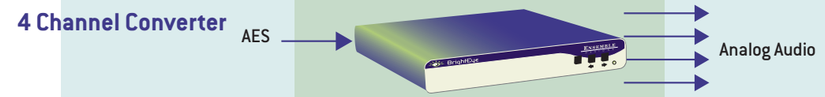
Bi-Directional Converter



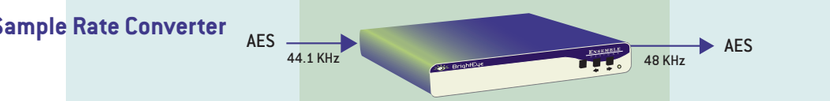
4 Channel Converter



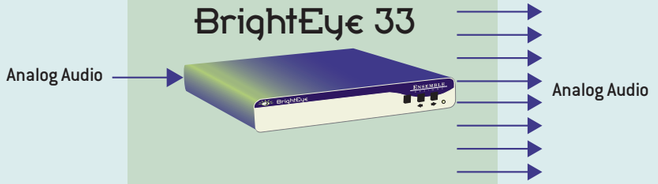
4 Channel Converter



Sample Rate Converter

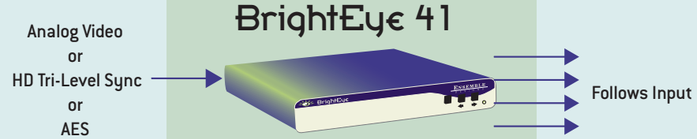


BrightEye 33

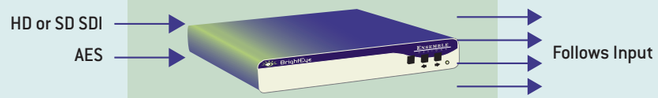


BrightEye 40

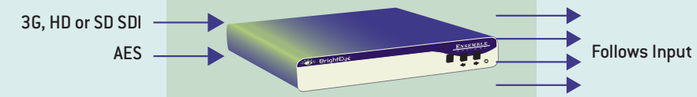
BrightEye 41



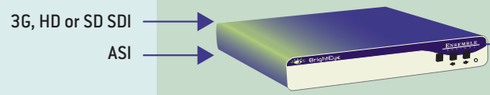
BrightEye 42



BrightEye 43



BrightEye 46



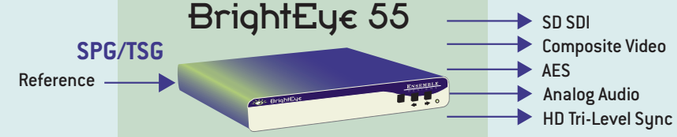
BrightEye 48

BrightEye 54

SPG/TSG

BrightEye 55

SPG/TSG



BrightEye 56

SPG/TSG

BrightEye 57

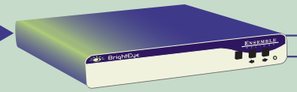
SPG/TSG

Designed and built in California
5 YEAR WARRANTY

BrightEye 70

Demux

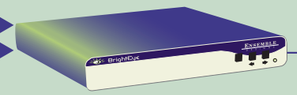
Embedded SDI
HD or SD



SDI
AES

Mux

HD or SD SDI
AES

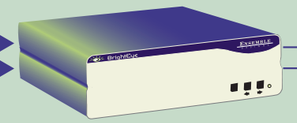


Embedded SDI

BrightEye 71

Demux

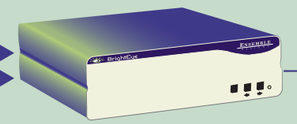
Embedded SDI
HD or SD SDI



SDI
Analog Audio (8 ch)

Mux

HD or SD SDI
Analog Audio (8 ch)

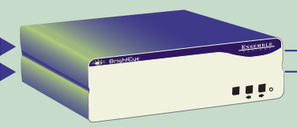


Embedded SDI

BrightEye 71-F

Demux

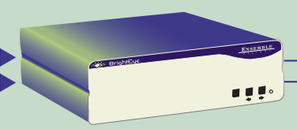
Embedded SDI
HD or SDI



Embedded SDI
Optical

Mux

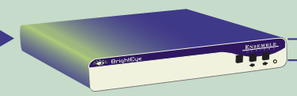
HD or SD SDI
Analog Audio (8 ch)



Embedded SDI
Optical

BrightEye 72

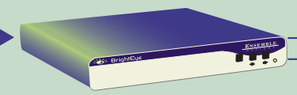
3G, HD or SD SDI



HDMI
Analog Audio

BrightEye 72-F

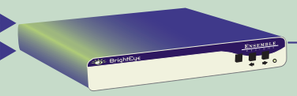
Optical



HDMI
Analog Audio

BrightEye 73

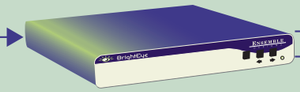
HD or SD SDI
AES



Optical

BrightEye 74

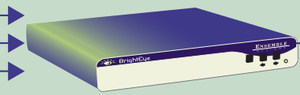
Optical



HD or SD SDI
AES

BrightEye 75

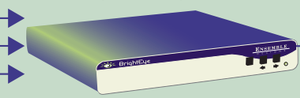
HD YPrPb, HD RGB
SD YPrPb, HD RGB
Composite, Y/C
Analog Audio
Ref



Embedded SDI

BrightEye 76

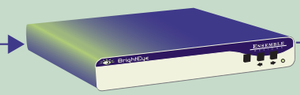
HD YPrPb, HD RGB
SD YPrPb, HD RGB
Composite, Y/C
Analog Audio
Ref



Optical

BrightEye 81

3G, HD or SD SDI



HDMI

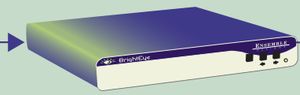
BrightEye 81-F

Optical

HDMI
3G, HD or SD SDI

BrightEye 83

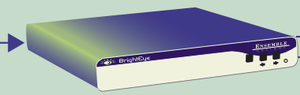
HDMI



3G, HD or SD SDI

BrightEye 83-F

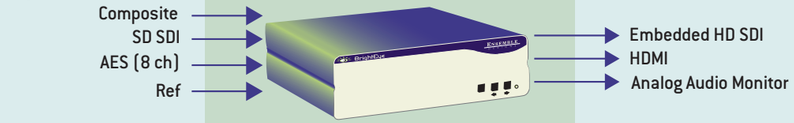
HDMI



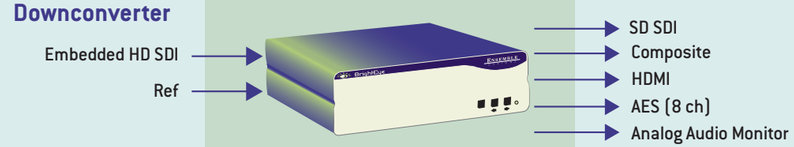
Optical
3G, HD or SD SDI

BrightEye 90

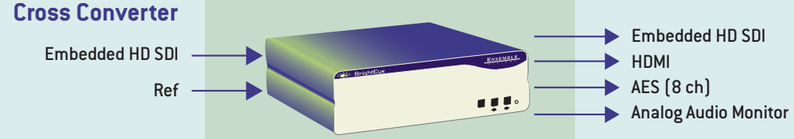
Upconverter



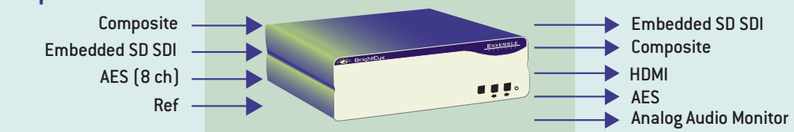
Downconverter



Cross Converter



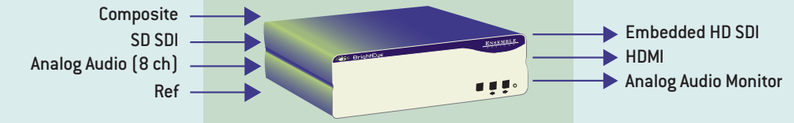
Aspect Ratio Converter



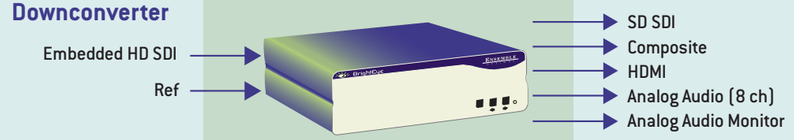
8 channels of audio I/O selectable as 8 in or 8 out or 4 in and 4 out

BrightEye 90-A

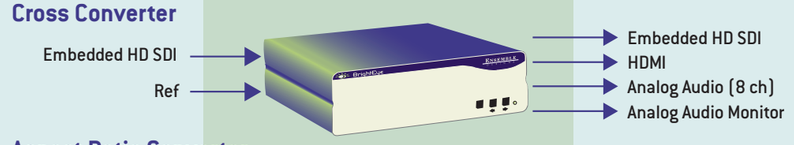
Upconverter



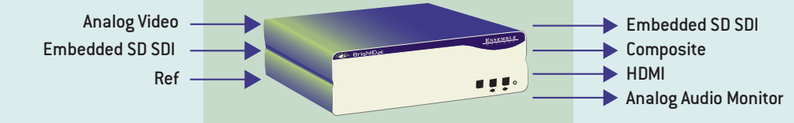
Downconverter



Cross Converter



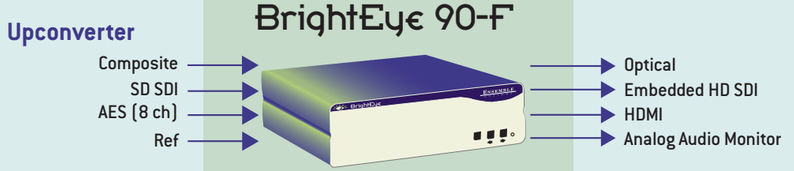
Aspect Ratio Converter



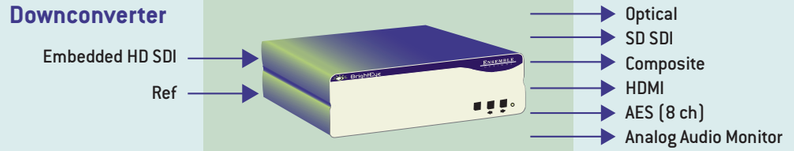
8 channels of audio I/O selectable as 8 in or 8 out or 4 in and 4 out

BrightEye 90-F

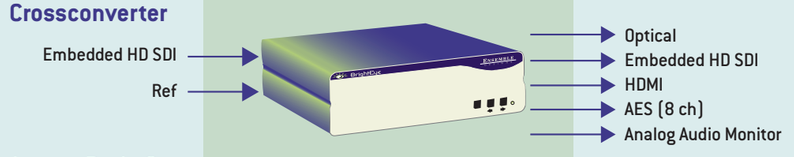
Upconverter



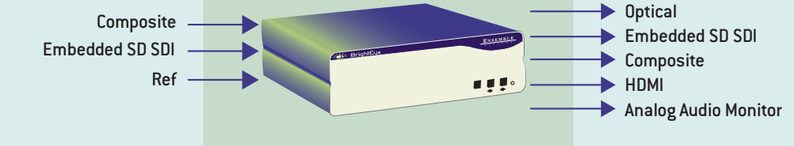
Downconverter



Crossconverter



Aspect Ratio Converter

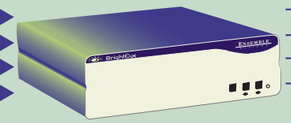


8 channels of audio I/O selectable as 8 in or 8 out or 4 in and 4 out

BrightEye 90-FA

Upconverter

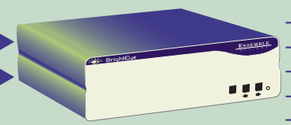
Composite
SD SDI
Analog Audio (8 ch)
Ref



Optical
Embedded HD SDI
HDMI
Analog Audio Monitor

Downconverter

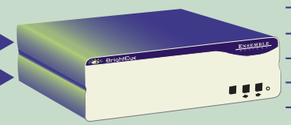
Embedded HD SDI
Ref



Optical
SD SDI
Composite
HDMI
Analog Audio (8 ch)
Analog Audio Monitor

Crossconverter

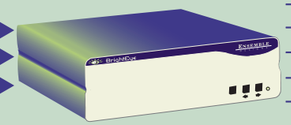
Embedded HD SDI
Ref



Optical
Embedded HD SDI
HDMI
Analog Audio (8 ch)
Analog Audio Monitor

Aspect Ratio Converter

Composite
Embedded SD SDI
Ref



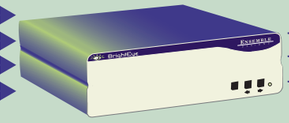
Optical
Embedded SD SDI
Composite
HDMI
Analog Audio Monitor

8 channels of audio I/O selectable as 8 in or 8 out or 4 in and 4 out

BrightEye 91

Upconverter

Composite
SD SDI
AES (8 ch)
Ref



Embedded HD SDI
HDMI
Analog Audio Monitor

BrightEye 91-A

Upconverter

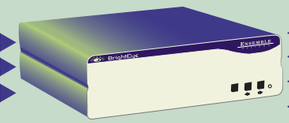
Composite
SD SDI
Analog Audio (8 ch)
Ref

Embedded HD SDI
HDMI
Analog Audio Monitor

BrightEye 92-A

Downconverter

Embedded HD SDI
AES (8 ch)
Ref



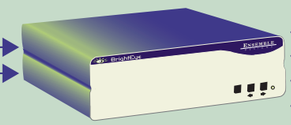
SD SDI
Composite
HDMI
Analog Audio Monitor

8 channels of audio I/O selectable as 8 in or 8 out or 4 in and 4 out

BrightEye 92-M

Downconverter

Embedded HD SDI
Ref

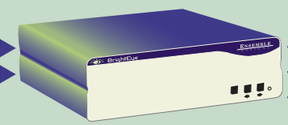


SD SDI
Composite
HDMI
Analog Audio Monitor

BrightEye 93

Crossconverter

Embedded HD SDI
Ref

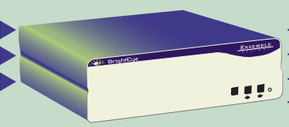


Embedded HD SDI
HDMI
Analog Audio Monitor

BrightEye 94

Aspect Ratio Converter

Composite
Embedded SD SDI
Ref



Embedded SD SDI
Composite
HDMI
Analog Audio Monitor

YouTube and Skype Video Made Easy

The BrightEye Mitto™ family of high performance scan converters provide a new way to take just about any source to 3G, HD or SD SDI video. Computer video can now be used for the most demanding applications including broadcast, high-end military, medical, classroom, church and corporate. All Mitto units accept VGA, DVI and HDMI input signals from PC and Mac computers.

Choose the Functionality You Need

Six different BrightEye Mitto units, each with varying types of outputs and capabilities, allow you to choose the best one for your particular video application. All BrightEye Mitto units convert YouTube, Skype video, weather radar, emails and maps to video. Ensemble uses the latest technology in its proprietary upconversion and filtering and that means you have the best looking video. Compare Mitto to any other scan converter and see the difference!

BrightEye Mac and PC Software

Adjusting video levels, output timing, audio delay, and mixing audio channels is so easy with BrightEye control software. From the software you have complete and intuitive control of timing, video format, and video level adjustments. You can easily time BrightEye Mitto into a video production switcher or router.

Easy To Use

BrightEye PC/Mac software runs overtop of any video, website or software. The Selection Tool shows up as a black box around your selection and shows the portion of the video that will be output from BrightEye Mitto.

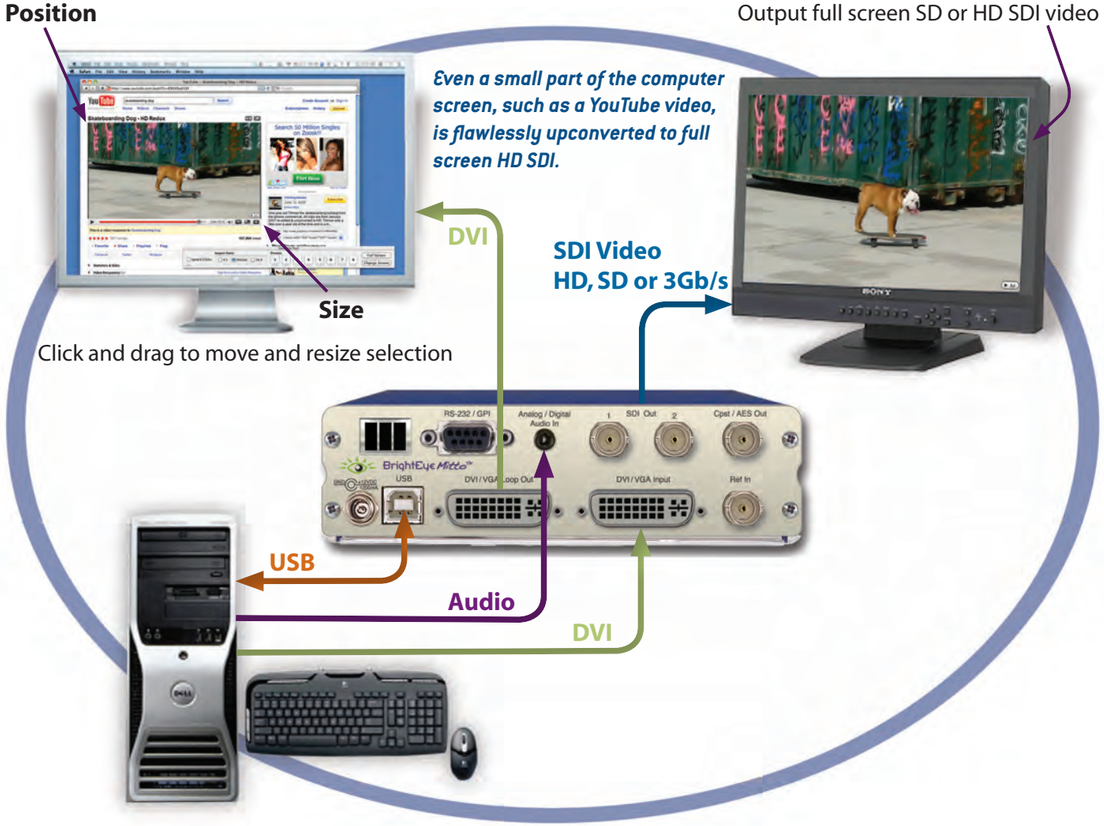
Use a Mouse to Select What's Output to Video

BrightEye™ PC and BrightEye Mac software let you simply use your mouse to click and drag over the specific portion of computer video that you want to output. The perspective of seeing the whole screen gives you the ability to choose exactly which portion of the video you want to output. It's easy to output the entire screen or just a selected portion.

Resize the selection window by clicking and dragging with your mouse. Mitto's video output automatically goes to pillarbox or letterbox as needed. Mitto automatically maintains perfect aspect ratio.

Features

- **High performance scan converter for PC and Mac**
- **Best way to bring YouTube™, Skype™, weather radar, maps and emails to video for production use**
- **Superior video output – flicker-free, fine detail**
- **Use with all types of Macs and PCs including laptops, iPhone® and iPad™**
- **Auto-senses DVI or VGA**
- **Use a mouse to select the part of the video you want to output**
- **Choose a Mitto with adjustable audio delay for Skype and broadcast applications**
- **DVI I/O, VGA and HDMI to SD, HD, 3G, and composite**
- **Easily adjust video parameters and select video output format**
- **Genlock and time to house reference, fully timeable**
- **Rackmountable**
- **Memory presets for your favorite settings**
- **5-Year warranty and free software upgrades forever**



Typical Mitto Connection

BrightEye Mitto
3G/Fiber/HD/SD Scan Converters

"Regardless of how quickly we need to take Mitto to air, it works famously every time. And it looks spectacular. When we covered the blizzards last winter, all of our user-generated content submissions and Skype came through Mitto."

~ John Schilberg, VP of Technology, Griffin Communications KWTV, KOTV and KQCW

Designed and built in California 5 YEAR WARRANTY

TV Technology STAR 2010 · Pick Hit BroadcastEngineering 2009 · TV Technology Europe STAR 2010 · TVBEUROPE Editors' Awards Best of IBC2010

BrightEye Mitto
3G/Fiber/HD/SD Scan Converters

Exclusive Filtering and Scaling Technology

A superior quality scan converter, BrightEye Mitto has the advantage of proprietary scaling technology and exclusive multi-tap filtering. Even a small part of the computer screen, such as a YouTube video, will be upconverted to full screen HD. The region selected for output determines if Mitto acts as an upconverter or downconverter. The filters automatically adjust in accordance with the conversion being performed. The result is that the output looks as good, or better, than the original and passes the most stringent testing.

Digital and Analog Video and Audio

The intuitive front panel interface makes it easy to choose the desired video output format. The genlock reference input allows the video outputs to be timed to house.

The audio input accepts analog audio. AES is optional. Audio is embedded into the SDI outputs which is required for many high end applications. Audio delay controls let you adjust the audio with respect to video for perfect lip sync, which is crucial when using Skype video in a production environment.

Used Worldwide

BrightEye's compact size lets you put conversion right where it's needed: in a remote truck, at a live venue, on a helicopter, in a production, or in a TV station. Reliable and easy to install, BrightEyes make your transition to HD simple. And they're affordable, too!

Free Software Upgrades Forever

Use BrightEye Mac or PC software to control a single BrightEye unit or any number of units connected to a USB hub. BrightEye Mac and PC software are included with each unit at no charge.

BrightEye Mitto's software is easily upgraded through the unit's USB port. Software upgrades are available at no charge for the life of the product and are conveniently downloadable from the Ensemble Designs' web site. Updates are free, forever. Every unit comes with a five-year warranty.

Six BrightEye Mitto Models to Choose From

Select the perfect combination of features and price for your video facility

	BrightEye Mitto 3G BEM-1	BrightEye Mitto 3G Fiber BEM-1F	BrightEye Mitto HD BEM-2	BrightEye Mitto HD Fiber BEM-2F	BrightEye Mitto Pro 2 BEM-4	BrightEye Mitto Pro 2 BEM-4-H, HDCP
DVI, VGA, or HDMI inputs	✦	✦	✦	✦	✦	✦
HD or SD video outputs	✦	✦	✦	✦	✦	✦
3 Gb/s video output	✦	✦				
Optical output		✦		✦		
Analog or embedded audio input	✦	✦	✦	✦	✦	✦
AES audio input and output	✦	✦	✦	✦		
Full control of audio levels, channel mixing	✦	✦	✦	✦		
Adjustable audio delay	✦	✦	✦	✦		
RS-232/GPI control	✦	✦	✦	✦		
HDCP						✦

BrightEye Mitto
3G/Fiber/HD/SD Scan Converters

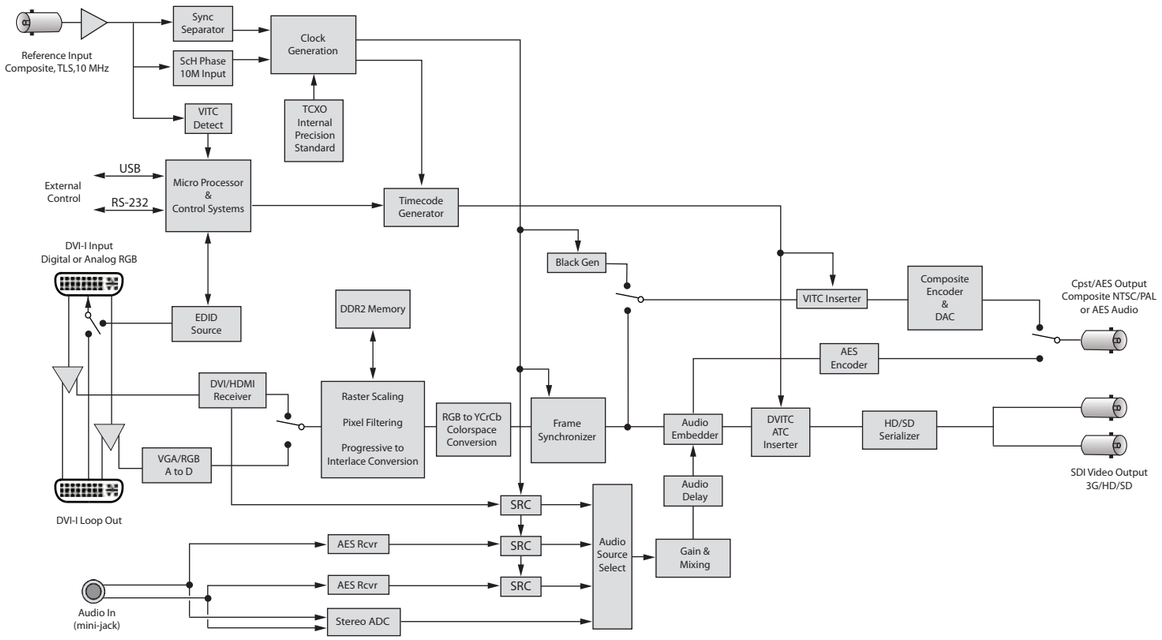
BrightEye Mitto 3G – BEM-1

BrightEye Mitto 3G Fiber – BEM-1F

BrightEye Mitto HD – BEM-2

BrightEye Mitto HD Fiber – BEM-2F

BrightEye Mitto Pro 2 – BEM-4, and BrightEye Mitto Pro 2 with HDCP– BEM-4-H



Block diagram represents BEM-1. See specs for variations on other models.

Order Info

BEM-1	BrightEye Mitto 3G
BEM-1F	BrightEye Mitto 3G Fiber
BEM-2	BrightEye Mitto HD
BEM-2F	BrightEye Mitto HD Fiber
BEM-4	BrightEye Mitto Pro 2
BEM-4-H	BrightEye Mitto Pro 2 with HDCP

Each unit comes with 1 USB cable, 2 VGA to DVI adapters,
1 modular power supply and BrightEye Software for Mac and PC

Mitto Defined:

- **Comes from the Latin root for *transmit* or *send***
- **It's also the root word of *uncompromising***

ENSEMBLE DESIGNS

Designed and built in California 5 YEAR WARRANTY

BrightEye Mitto
3G/Fiber/HD/SD Scan Converters

Computer Input

Number	One
Type	DVI (Supports HDMI or VGA with adapter)
Connector	DVI-I
Resolution	Up to 1920 x 1200

Reference Input

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

Note: When no reference is provided, Mitto runs from an internal "sync gen grade" precision frequency reference.

Analog Audio Inputs

Number	One stereo pair
Connector	1/8" mini jack
Impedance	>15K Ω
Max Input Level	24 dBu
Quantization	24 bits, 128 x oversampled
Sample Rate	48 KHz
Reference Level	-10 dBu or +4 dBu
Frequency Response	±0.1 dB, 20 Hz to 20 KHz
Crosstalk	<106 dB
Dynamic Range	>106 dB

AES/EBU Digital Inputs (BEM-1, 1F, 2, 2F)

Number	Two (four channels)
Type	AES3id, S/PDIF
Connector	1/8" mini jack
Bit Depth	20 and 24 Bit
Sample Rate	30 KHz to 192 KHz (Sample Rate Converted Internally to 48 KHz)

Serial Digital Output

Number	Two, BNC One for BEM-1F and 2F
Signal Type	270 Mb/s SD SDI, SMPTE 259M 1.485 Gb/s HD SDI,SMPTE 274M, 292M, 296M 2.97 Gb/s HD SDI (BEM-1 and BEM-1F only) SMPTE 424M, 425M
Processing	16 bit processing 12 and 14 bit upconversion
Delay	Adjustable from 16 msec to 40 msec

Note: Output is fully timeable with respect to the reference input.

Audio	Embedded
Impedance	75 Ω
Return Loss	>15 dB to 1.485 GHz >10 dB to 2.97 GHz
Output DC	None (AC coupled)

Standards Supported

1080i (SMPTE 274M -4,5,6) 50, 59.94 or 60 Hz
720p (SMPTE 296M -1,2,3) 50, 59.94 or 60 Hz
525i, 625i (SMPTE 259M)
1080p (SMPTE 424M, 425M), 50, 59.94, 60, Level A (BEM-1 and BEM-1F only)

Optical Output (BEM-1F, 2F)

Number	One, LC/UPC
Type	Follows SDI configuration
Wavelength	1310 nm (non-CWDM) Wavelengths 170 nm –1610 nm at 20 nm CWDM spacing available. Call factory for price and details.
Power	-7 dBm
Max Cable Length	20 km (For greater distances, or higher power and larger loss budgets, please contact the factory)
Fiber Type	Single Mode Multi-mode compatible with attenuation at transmit end

Analog Video Output

Number	One, BNC
Type	Composite PAL or NTSC (when SD is selected on the SDI output)
Return Loss	>40 dB
Output DC	<100 mV

Computer Monitor Output

Number	One, looping
Type	DVI (Supports HDMI or VGA with adapter)
Connector	DVI-I
Format	Follows input

Control (BEM-1, 1F, 2, 2F)

Number	One
Connector	9 pin D
Type	RS-232, GPI

General Specifications

Size	5.63"W x 1.65"H x 5.98"D (143 mm x 42 mm x 152 mm) including connectors and flange
Weight	1 lb 6 oz
Power	12 volts, 12 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.

BrightEye NXT 410 and 410-H

Clean 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, the NXT 410 makes it 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

- **Cleanly switch HDCP encrypted content**
- **Router for 3G, HD, SD SDI, fiber and HDMI video**
- **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**
- **Dual built-in test pattern generator with moving element option and slate ID**
- **RS-232 and TCP/IP 3rd-party control interfaces**
- **Integrated web server for setup and operation**
- **5835 Router and Action Control Panel, fully customizable operator interface**
- **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**
- **Genlockable and timeable**
- **PiP-E*fx* – Picture in Picture option (410-H)**
- **DualPath Option (410-H)**

ENSEMBLE DESIGNS

Designed and built in California 5 YEAR WARRANTY

BrightEye NXT 410 and 410-H

Clean HDMI Routers

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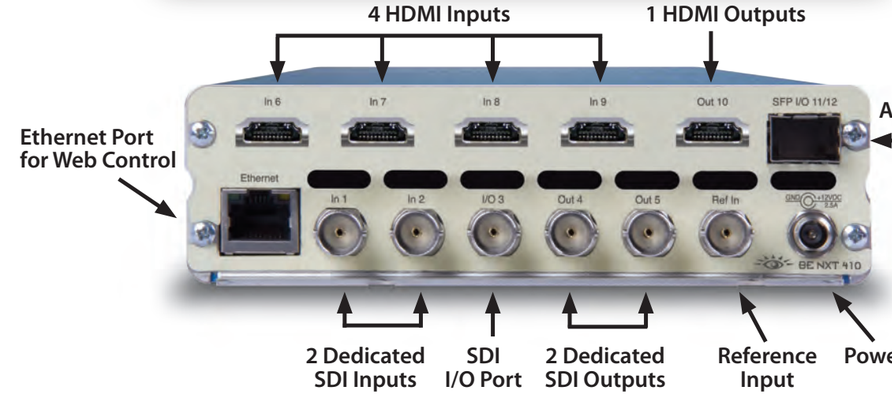


Order Info

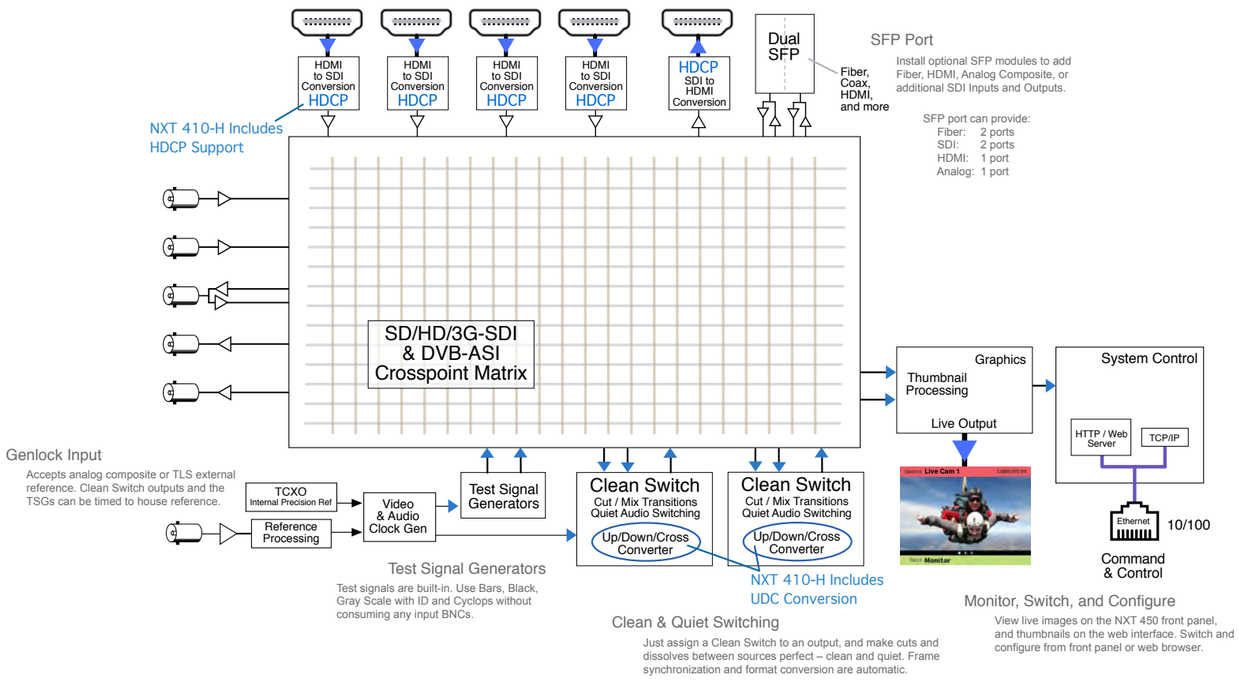
BrightEye NXT 410	**Clean HDMI Router**
BrightEye NXT 410-H	**Clean HDMI Router with HDCP**

Convert While You Route

The BrightEye NXT 410-H Compact Router with U/D/C Conversion and Clean and Quiet Switching allows format conversion to take place while routing signals to destinations. Now, various formats of high definition and standard definition content can be converted to a common format and routed seamlessly to destinations. Standard definition sources can be upconverted to high definition as part of the routing process, as well as cross converting from one HD format to another. All you have to do is select a SMPTE standard for a particular destination, and all sources routed to that destination will be converted to that format.

Multiple Intuitive Control Options

Control and configuration of the NXT 410 and 410-H 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's 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.



ENSEMBLE DESIGNS

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BrightEye NXT 410 and 410-H
Clean HDMI Routers

Serial Digital Input

Number	Two to Five, configurable, BNC and SFP
Signal Type	270 Mb/s SD SDI, SMPTE 259M
	1.485 Gb/s HD SDI,SMPTE 274M, 292M, 296M
	2.97 Gb/s HD SDI, SMPTE 424M, 425M
Impedance	75 Ω
Return Loss	>15 dB
Max Cable Length	300 meters for 270 Mb/s
	100 meters for 1.485 Gb/s

Automatic Input Cable Equalization

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 Five, configurable, BNC and SFP
Type	270 Mb/s SD SDI, SMPTE 259M
	1.485 Gb/s HD SDI,SMPTE 274M, 292M, 296M
	2.97 Gb/s HD SDI, SMPTE 424M, 425M
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	Four (or Five with SFP)
Type	HDMI 1.3
Format	Supports HDMI signals which map to the video standards listed below

HDMI Output

Number	One (or Two with SFP)
Type	HDMI 1.3
Format	Follows input

HDCP (410-H Only)

HDMI output can be configured to generate HDCP encryption. This allows both encrypted and non-encrypted HDMI and SDI sources to be cleanly switched to this output.

Standards Supported

1080i 50, 59.94 or 60 Hz, SMPTE 274M -4,5,6
720p 50, 59.94 or 60 Hz, SMPTE 296M -1,2,3
1080p 23.98, 24 or 25 Hz, SMPTE 274M -9,10,11
1080p 50, 59.94, 60 Hz, SMPTE 424M, 425M, Level A
1080sF 23.98, 24 or 25 Hz, RP211 -14,15,16
625i 50
525i 59.94

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 12 oz
Power	12 volts, 20 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.

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. The exclusive front panel LCD displays realtime full motion video of your router sources. There is incredible power built into a small 1RU by 1/3 RU wide footprint – about the size of a club sandwich.

Clean Switch – Use Asynchronous Sources

The BrightEye NXT 430 Compact Router gives you two clean switched outputs. The router's built-in clean switch provides full frame synchronization which means you can switch or dissolve cleanly between asynchronous sources. Features include variable duration mix transitions, independent audio level adjustments and channel assignment of all 16 audio channels on an input-by-input basis.

If you don't need clean switching or audio processing, you may prefer the BrightEye NXT 415 Compact Router. The NXT 415 has all the capability of the 430, except for clean switched outputs. The NXT 415 also supports ASI signals.

Assignable I/O and Flexible Architecture

You get to configure the number of inputs and outputs; the configuration is changeable on the fly. There are 2 fixed input BNCs, 2 fixed output BNCs and 7 assignable BNCs that you configure either as inputs or outputs. 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 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. Now, various formats of high definition and standard definition content can be converted to a common format and routed seamlessly to destinations. All you have to do is assign a SMPTE standard format to a destination and all sources routed to that destination will be converted to the assigned format – just select the source and hit TAKE.

Features

- **Router for 3G, HD, SD SDI, fiber and HDMI video**
- **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**
- **Dual built-in test pattern generator with moving element option and slate ID**
- **RS-232 and TCP/IP 3rd-party control interfaces**
- **Integrated web server for setup and operation**
- **5835 Router and Action Control Panel, fully customizable operator interface**
- **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**
- **Genlockable and timeable**
- **PiP-E*fx* – Picture in Picture option (430-X)**
- **DualPath option (430-X)**

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BrightEye NXT 430-X, 430 and 415
Compact Routers

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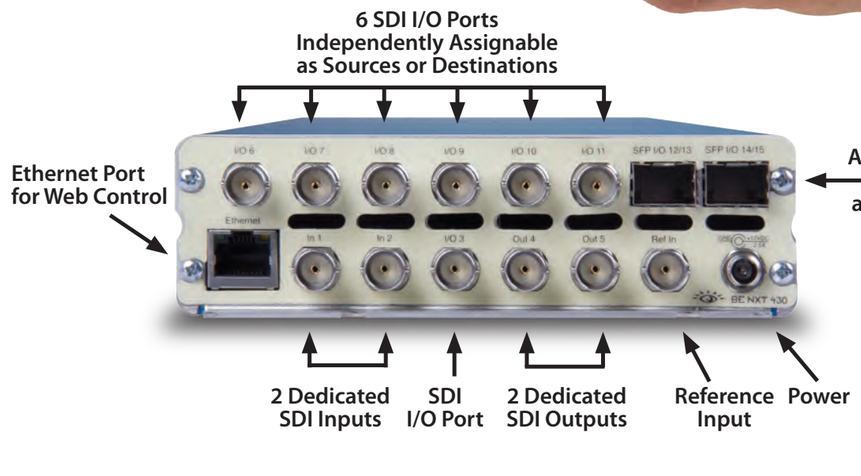
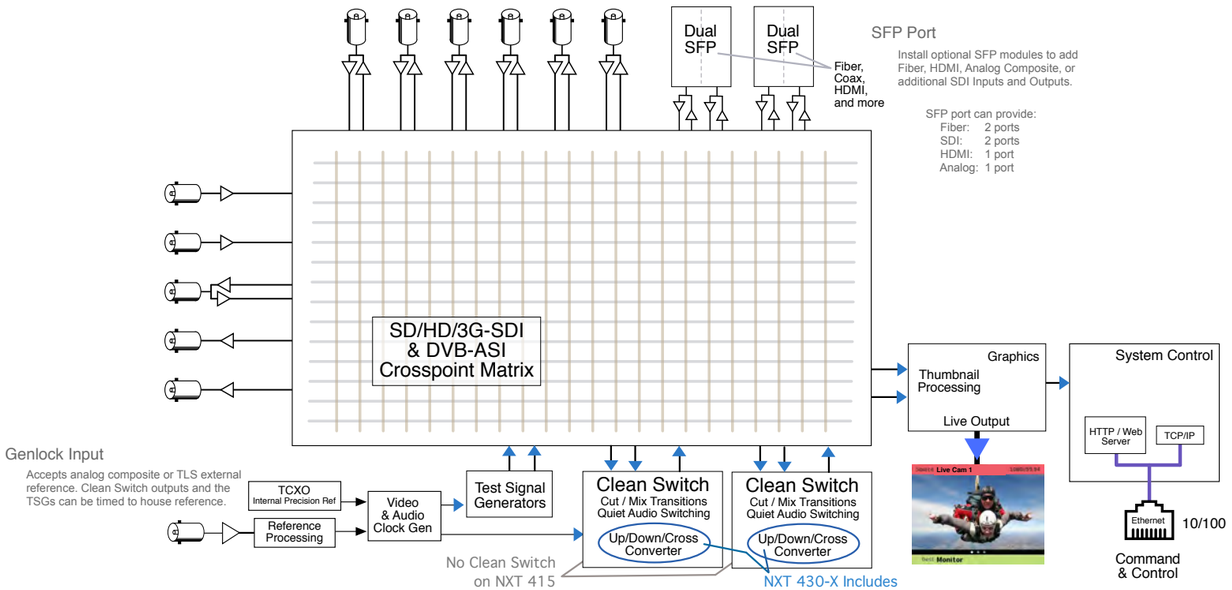


Order Info

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

Multiple Intuitive Control Options

Control and configuration of the NXT 415, 430 and 430-X 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's 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.



Test Signal Generators

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

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 430-X, 430 and 415
Compact Routers

Serial Digital Input

Number	Two to Thirteen, configurable, BNC and SFP
Signal Type	270 Mb/s SD SDI, SMPTE 259M
	1.485 Gb/s HD SDI,SMPTE 274M, 292M, 296M
	2.97 Gb/s HD SDI, SMPTE 424M, 425M
Impedance	75 Ω
Return Loss	>15 dB
Max Cable Length	300 meters for 270 Mb/s
	100 meters for 1.485 Gb/s

Automatic Input Cable Equalization

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 Thirteen, configurable, BNC and SFP
Type	270 Mb/s SD SDI, SMPTE 259M
	1.485 Gb/s HD SDI,SMPTE 274M, 292M, 296M
	2.97 Gb/s HD SDI, SMPTE 424M, 425M
Processing	12 and 16 bit
Impedance	75 Ω
Return Loss	>15 dB
Max Cable Length	100 meters for HD (Belden 1694A)
	300 meters for SD (Belden 1694A)

HDMI Input

Number: Two possible via SFP

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

HDMI Output

Number: Two possible via SFP

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

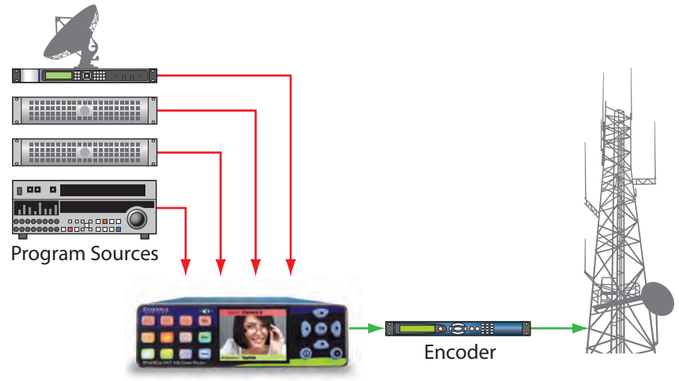
Standards Supported

1080i 50, 59.94 or 60 Hz, SMPTE 274M -4,5,6
720p 50, 59.94 or 60 Hz, SMPTE 296M -1,2,3
1080p 23.98, 24 or 25 Hz, SMPTE 274M -9,10,11
1080p 50, 59.94, 60 Hz, SMPTE 424M, 425M, Level A
1080sF 23.98, 24 or 25 Hz, RP211 -14,15,16
625i 50
525i 59.94

General Specifications

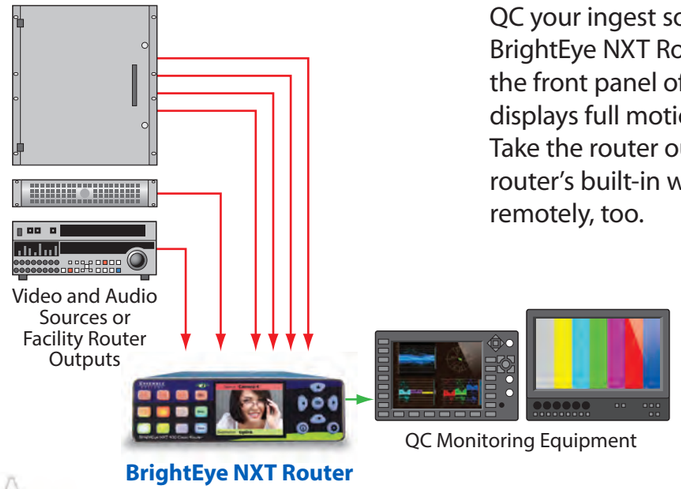
Size	5.63″W x 1.65″H x 6.75″D
	(143 mm x 42 mm x 172 mm)
	including connectors and flange
Weight	NXT 415 1 lb 10 oz
	NXT 430 1 lb 12 oz
Power	12 volts, 20 watts
	(100-230 VAC modular power supply)
Temperature Range	0 to 40° C ambient (all specs met)
Relative Humidity	0 to 95%, non-condensing
Altitude	0 to 10,000 ft.

Cuts-Only Master Control



Use the BrightEye NXT Router as a cuts-only master control, on the ground or in the air. Great for helicopters, sports and ENG, the BrightEye NXT Router has built-in frame syncs that let you use sources that don't have a reference. The router's output is clean and quiet, switching seamlessly between sources. Downstream devices such as routers and encoders receive a consistent video input signal.

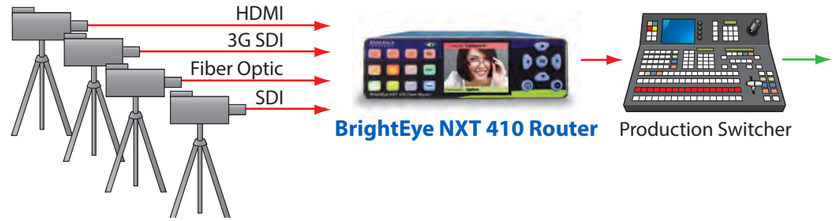
Quality Control and Signal Monitoring



QC your ingest sources or set top box feeds with the BrightEye NXT Router. Verify signal presence right on the front panel of the router. The BrightEye NXT's LCD displays full motion, realtime video of your sources. Take the router outputs to scopes and servers. Use the router's built-in web browser and QC your sources remotely, too.

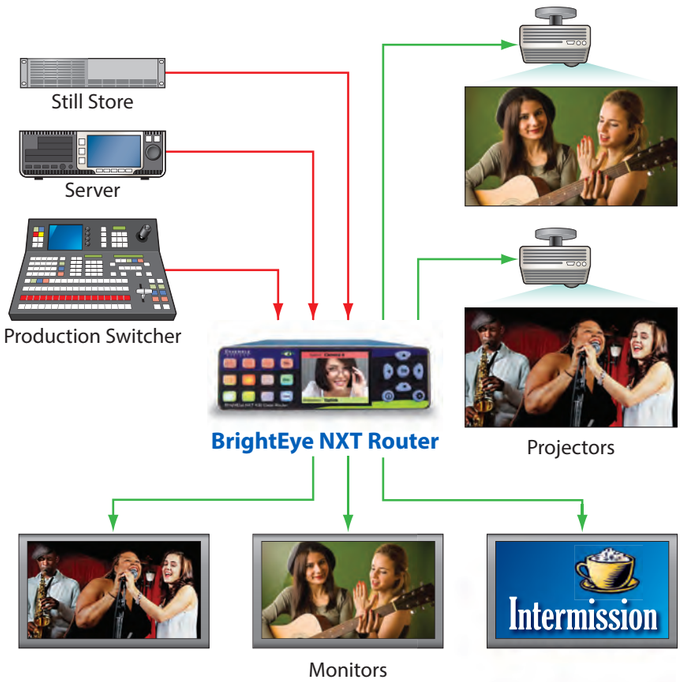
BrightEye NXT Routers
Application Examples

Multi-Stage Venue



Add more inputs to your production switcher or master control switcher. Feed cameras and other SDI and HDMI sources to a BrightEye NXT 410 Router and take one or more of the router outputs into the production switcher or master control switcher. This is also a great way to integrate HDMI signals into an SDI workflow.

Monitors and Projectors for Venues



Use the BrightEye NXT Router for live events and sports to route signals to monitors, switchers and projectors. The router's outputs can be easily configured to be in time with house, even when there are asynchronous sources on the input. Switch seamlessly between fiber optic, HDMI and SDI signals.

Designed and built in California
5 YEAR WARRANTY

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	
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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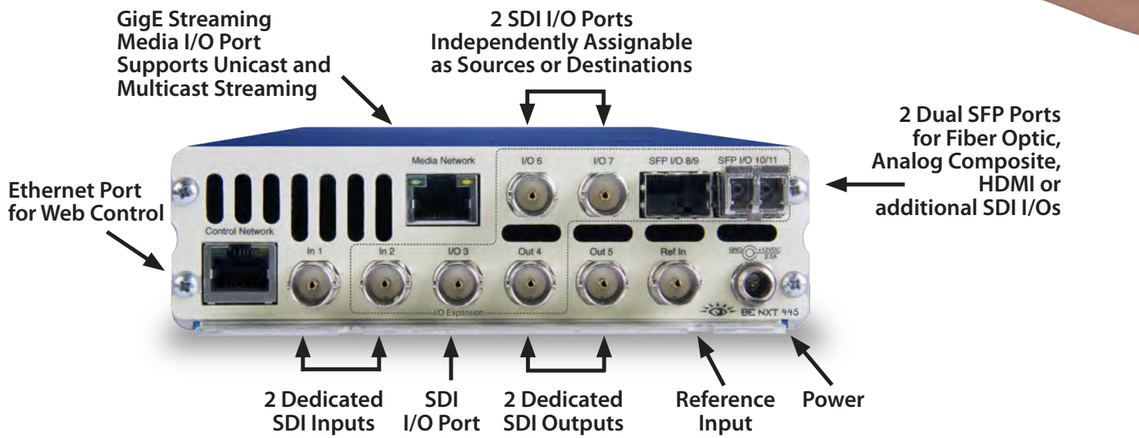
BrightEye NXT 445
Streaming Encoder



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

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**
- **5835 Router and Action Control Panel, fully customizable operator interface**
- **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**
- **DualPath option**

BrightEye NXT 450
Clean Streaming Router

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

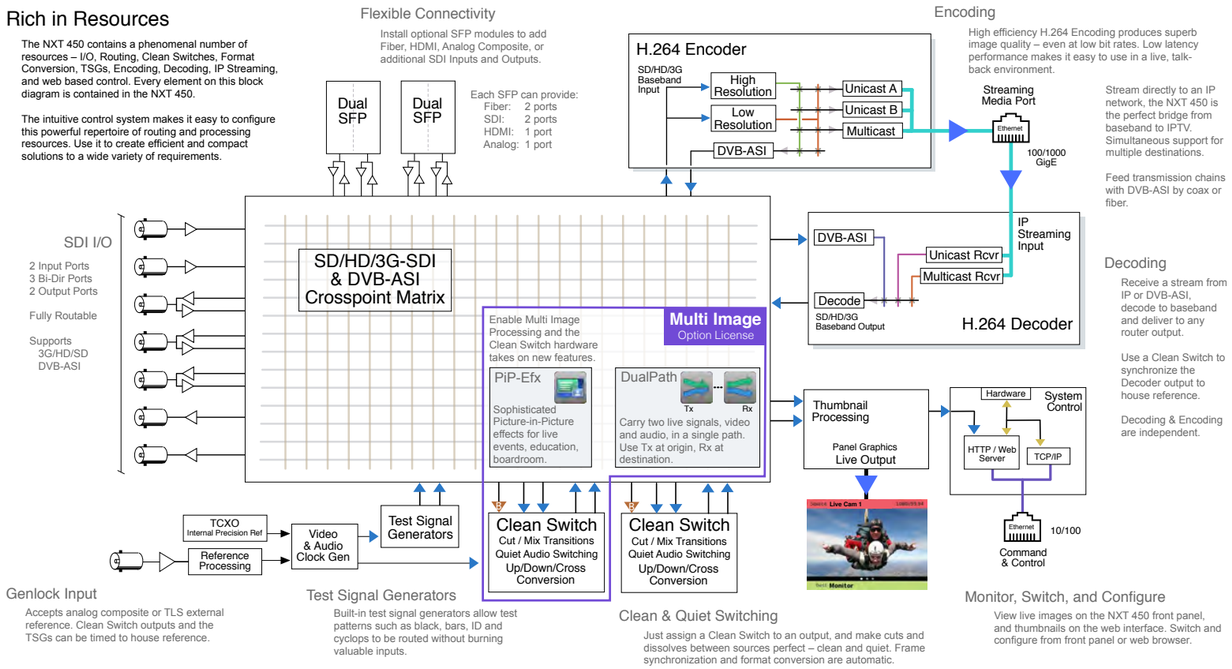
The NXT 450 contains two Clean Switches. When assigned to an output, they provide clean, quiet switching – even between asynchronous sources. The format conversion feature provides automatic conversion of inputs to the chosen output format. This makes it possible to cut and mix between different input 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.



BrightEye NXT 450
Clean Streaming Router

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

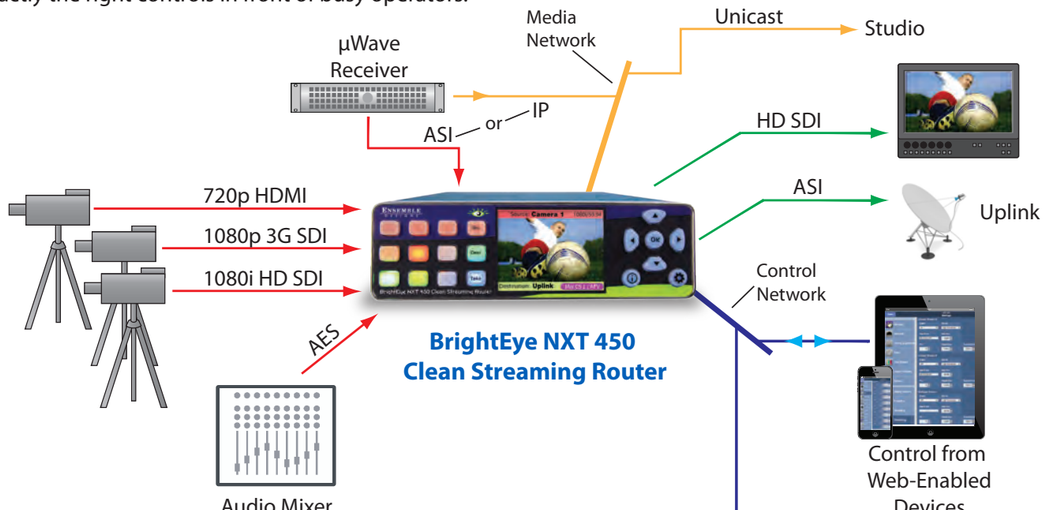
Control Port	RJ-45; 10/100
Media Port	RJ-45; 10/100/1000

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.

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.



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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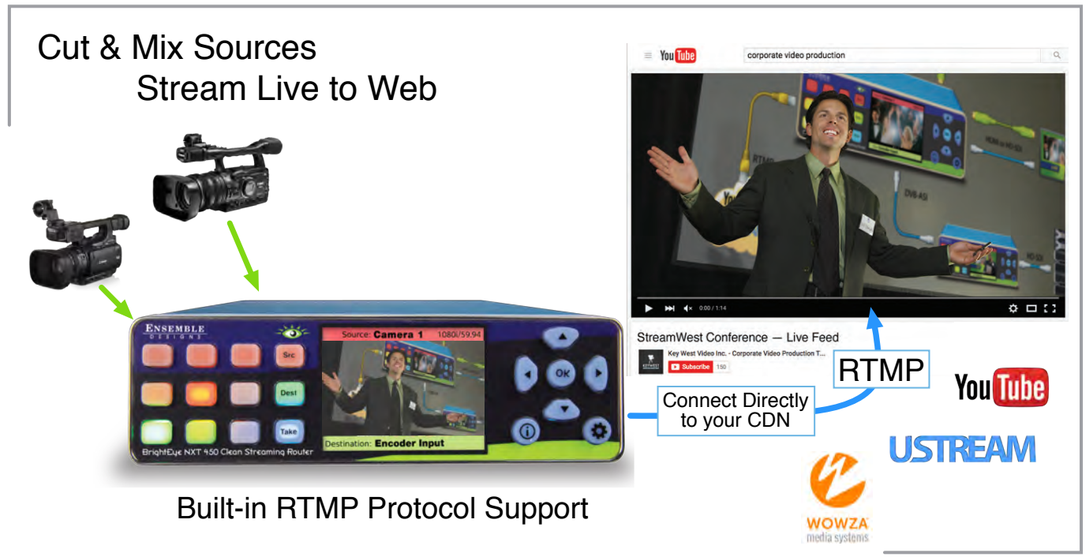
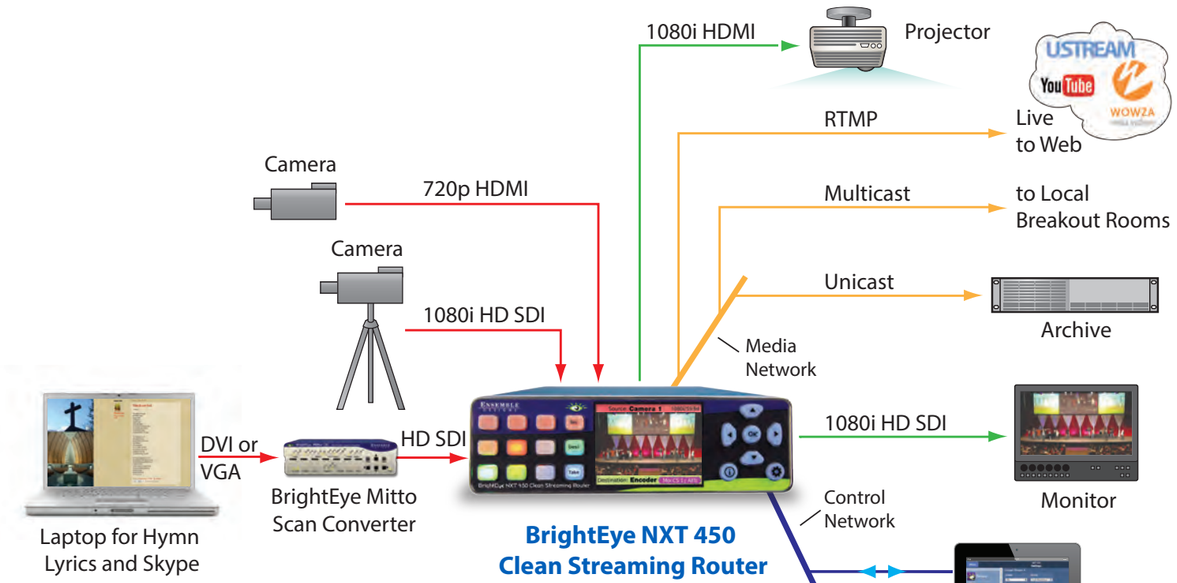
BrightEye NXT 450
Clean Streaming Router Applications





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 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.

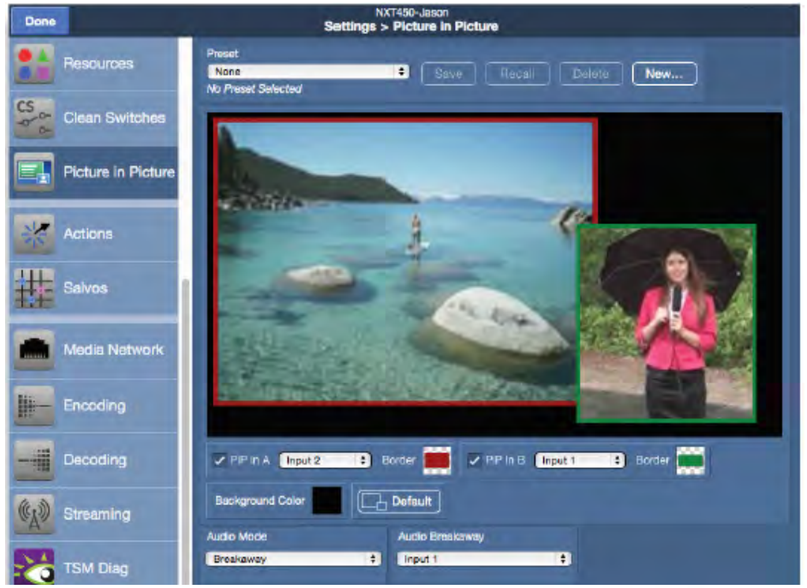
Up/Down/Cross conversion allows PiP input signals of different formats and frame rates to be combined together into the PiP output. Simply set the PiP output standard and you're done.

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

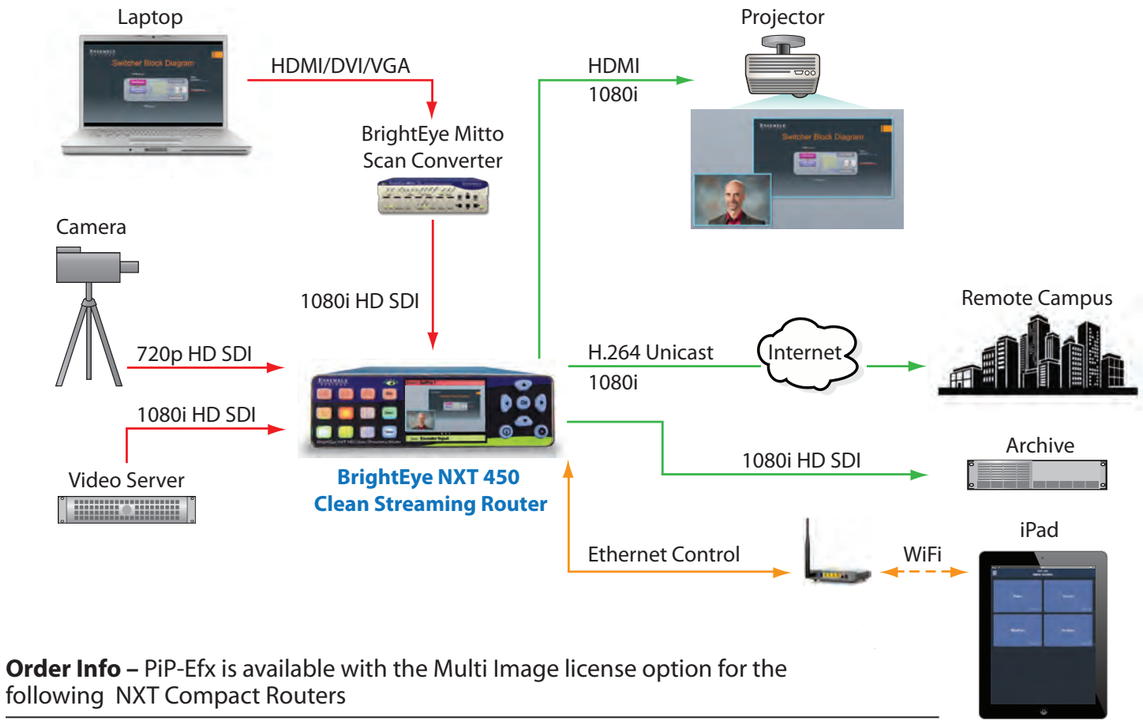
Simple, well thought-out user interface controls make creating PiP-Efx layouts a breeze. Full setup, control, and user preset recall can be accessed via any web browser enabled device: laptop, tablet, even a smartphone.



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.



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

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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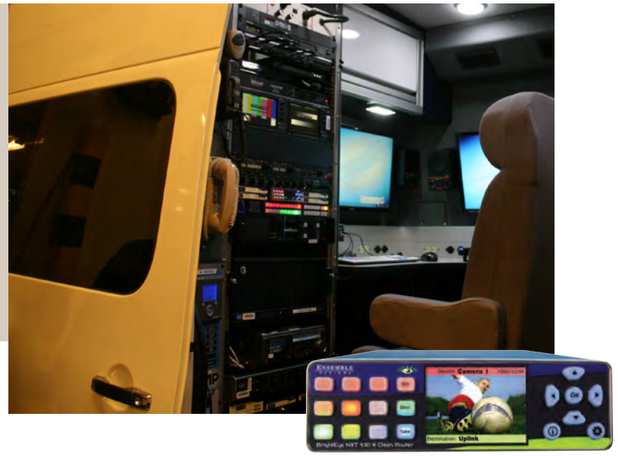
DualPath in the Field

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 1

Analog/SD SDI to SD SDI/Optical Converter with TBC and Frame Sync

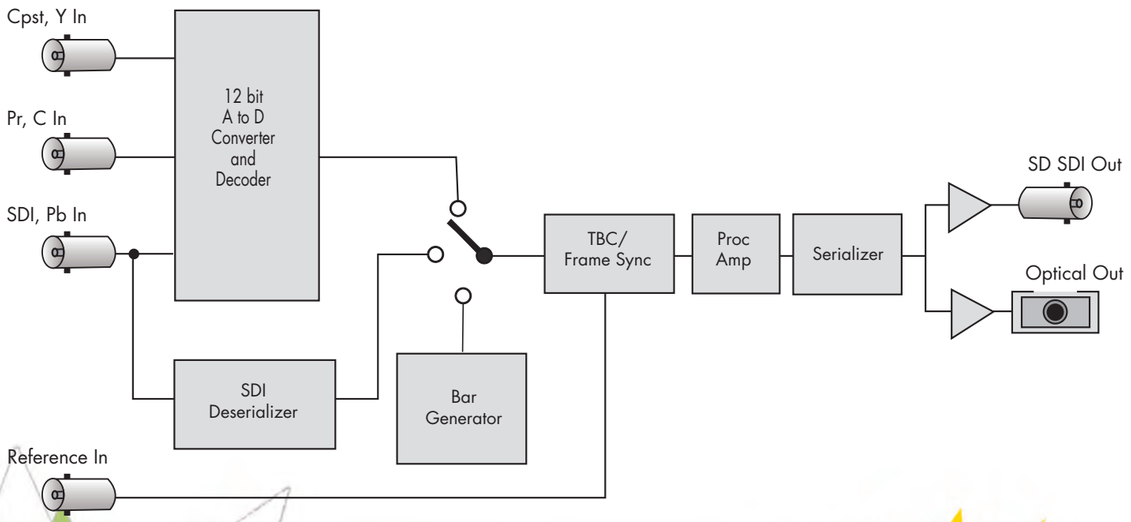
BrightEye 1 is a comprehensive solution to signal acquisition. With analog component, analog composite S-Video (Y/C), and SDI video inputs, it can take on any video source. The built-in time base corrector/frame synchronizer provides a rock steady output, even with marginal inputs. The reference input is used to genlock the converter output to house reference such as color black.

Front panel controls select input source, format and adjust video gain. Video levels can be adjusted through BrightEye Mac or PC software.

Simultaneous SD SDI (electrical) and optical outputs are provided, so you can deliver the signal just about anywhere. Both color bars and the SD SDI checkfield (pathological) test patterns are included to facilitate transmission path testing.

Features

- **Use with cameras, satellite receivers and VHS decks**
- **Analog and SD SDI input**
- **SD SDI and optical output**
- **TBC and frame sync**
- **12 bit processing**
- **Passes embedded audio**



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BrightEye 1

Analog/SD SDI to SD SDI/Optical Converter with TBC and Frame Sync

Serial Digital Input

Number	One
Signal Type	270 Mb/s SD Serial Digital (SMPTE 259M)
Impedance	75 Ω
Return Loss	>15 dB
Max Cable Length	300 meters
Automatic Input Cable Equalization	

Analog Input

Number	One
Type	Beta/SMPTE, Y, Pr, Pb NTSC, PAL Composite NTSC, PAL S-Video
Impedance	75 Ω
Return Loss	>40 dB
Input DC	+/-1 volt DC
Input Hum	<100 mV

Serial Digital Output

Number	One
Type	270 Mb/s SD Serial Digital (SMPTE 259M)
Delay	< 90 µSec
Impedance	75 Ω
Return Loss	>15 dB
Output DC	None (AC coupled)

Optical Output

Number	One
Type	270 Mb/s SD Serial Digital (SMPTE 259M) (Optical equivalent of 259M)
Wavelength	1310 nm (non-CWDM) (1550 non-CWDM by special order)
Power	–7 dBm
Maximum Cable Length	20 km (For greater distances, or higher power and larger loss budgets, please contact the factory)
Fiber Type	Single Mode Multi-mode compatible with attenuation at transmit end
Connector	SC

Analog to SDI Performance

Bit Resolution	12 bit input quantization 4 x oversampling
Signal to Noise	>62 dB, weighted
Frequency Response	
Composite and Y	±0.1 dB, 0 to 5.5 MHz
Pr, Pb	±0.1 dB, 0 to 2.75 MHz
Minimum Delay	90 µSec

Reference Input

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

General Specifications

Size	5.63" W x 0.8" H x 5.98" D (143 mm x 21 mm x 152 mm) including connectors and flange
Weight	14 oz
Power	12 volts, 7 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.

BrightEye 2
Analog to SD SDI Converter

BrightEye 2 provides uncompromised analog to digital video conversion of component and composite video. Analog inputs are digitized at 12 bits of resolution with 4x oversampling. Composite video is processed through an adaptive comb filter decoder. PAL / NTSC input detection is automatic.

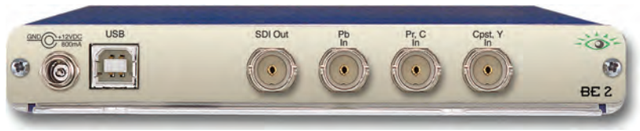
Input selection and gain adjustment is made from the front panel. A status display provides an input presence indication. Video levels can be adjusted through BrightEye Mac or PC software.

Supporting both Beta and SMPTE component, composite, and Y/C formats, BrightEye 2 adapts to many conversion needs.

Use BrightEye 2 to digitize analog VTRs and cameras.

Features

- **Use with VTRs and cameras**
- **Composite and S-Video input**
- **Component input**
- **SD SDI output**
- **12 bit processing**



BrightEye 2
Analog to SD SDI Converter

Analog Input

Number	One
Type	Beta/SMPTE, Y, Pr, Pb
	NTSC, PAL Composite
	NTSC, PAL S-Video
Impedance	75 Ω
Return Loss	>40 dB
Input DC	+/-1 volt DC
Input Hum	<100 mV

Serial Digital Output

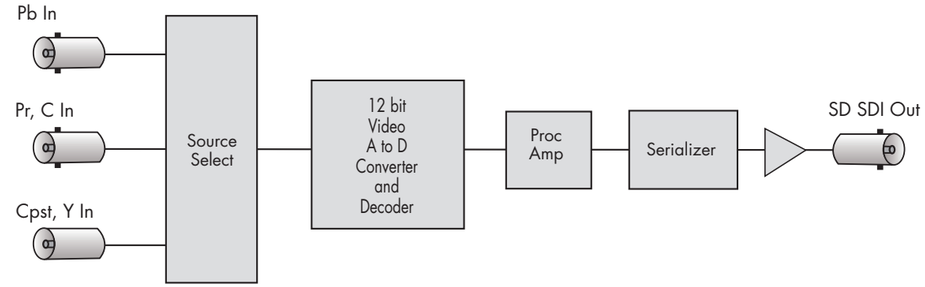
Number	One
Type	270 Mb/s SD Serial Digital (SMPTE 259M)
Delay	< 90 µSec
Impedance	75 Ω
Return Loss	>15 dB
Output DC	None (AC coupled)

Analog to SDI Performance

Bit Resolution	12 bit input quantization
	4 x oversampling
Signal to Noise	>62 dB, weighted
Frequency Response	
Composite and Y	±0.1 dB, 0 to 5.5 MHz
Pr, Pb	±0.1 dB, 0 to 2.75 MHz
Delay	90 µSec

General Specifications

Size	5.63"W x 0.8"H x 5.98"D
	(143 mm x 21 mm x 152 mm)
	including connectors and flange
Weight	14 oz
Power	12 volts, 5 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.



BrightEye 3

Analog to SD SDI Converter with TBC and Frame Sync

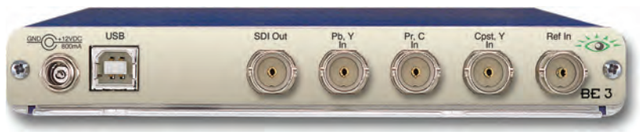
BrightEye 3 is an agile time base corrector and frame synchronizer with composite, component and Y/C inputs and SD SDI video out. Input signals are digitized to 12 bits of resolution and time base corrected by a noise tolerant tracking circuit. An external reference input allows genlock to a timing reference such as color black.

Input selection, gain control, and TBC enable is provided through the front panel interface. Video levels can be adjusted through BrightEye Mac or PC software.

Input and reference presence are indicated through front panel LEDs. BrightEye 3 is great for capturing consumer VCRs and DVD players into non-linear editing systems.

Features

- **Use with cameras, satellite receivers and VHS decks**
- **Analog input**
- **SD SDI output**
- **TBC and frame sync**
- **12 bit processing**



BrightEye 3

Analog to SD SDI Converter with TBC and Frame Sync

Analog Input

Number	One
Type	Beta/SMPTE, Y, Pr, Pb
	NTSC, PAL Composite
	NTSC, PAL S-Video
Impedance	75 Ω
Return Loss	>40 dB
Input DC	+/-1 volt DC
Input Hum	<100 mV

Serial Digital Output

Number	One
Type	270 Mb/s SD Serial Digital (SMPTE 259M)
Delay	Adjustable from < 90 µSec to 1 frame
Impedance	75 Ω
Return Loss	>15 dB
Output DC	None (AC coupled)

Analog to SDI Performance

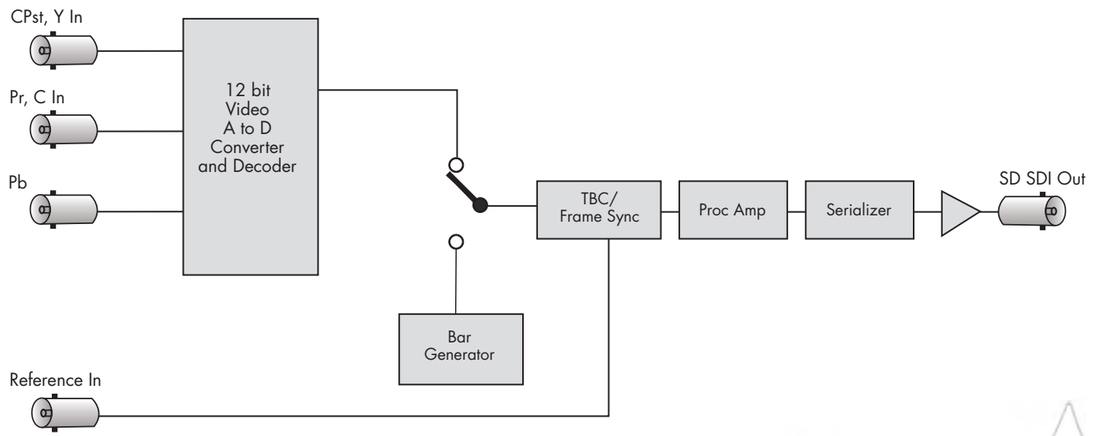
Bit Resolution	12 bit input quantization
	4 x oversampling
Signal to Noise	>62 dB, weighted
Frequency Response	
Composite and Y	±0.1 dB, 0 to 5.5 MHz
Pr, Pb	±0.1 dB, 0 to 2.75 MHz
Delay	Adjustable from < 90 µSec to 1 frame

Reference Input

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

General Specifications

Size	5.63" W x 0.8" H x 5.98" D
	(143 mm x 21 mm x 152 mm)
	including connectors and flange
Weight	14 oz
Power	12 volts, 5 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.



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BrightEye 5
Analog Composite TBC and Frame Sync

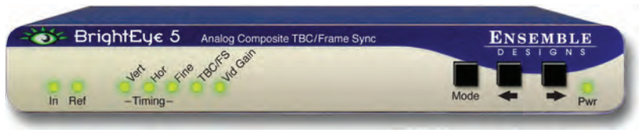
BrightEye 5 is a time base corrector with analog composite inputs and outputs. 12 bit digital signal processing ensures the best signal handling and a solid output. BrightEye 5 will time base correct signals from analog sources such as consumer VCRs, cameras and noisy microwave receivers.

The analog input is converted at 12 bits of resolution for digital processing. The signal is time base corrected and frame synchronized to the reference input and converted back to analog for output. BrightEye 5 auto detects the video standard of the input (PAL or NTSC).

Basic controls are provided on the front panel. With BrightEye Mac or PC software, you can control video proc functions; gain, chroma, pedestal, and hue. The vertical interval can be passed or blanked.

Features

- **Use with VCRs, cameras, satellite receivers**
- **Analog video inputs and outputs**
- **TBC and frame sync**
- **Format mode lock for use with noisy/intermittent input signals**
- **12 bit processing**



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Analog Video Input

Number	One
Type	NTSC, PAL Composite
Impedance	75 Ω
Return Loss	>40 dB, DC to 5.5 MHz
Input DC	+/-1 volt DC
Input Hum	<100 mV

Reference Input

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

Performance

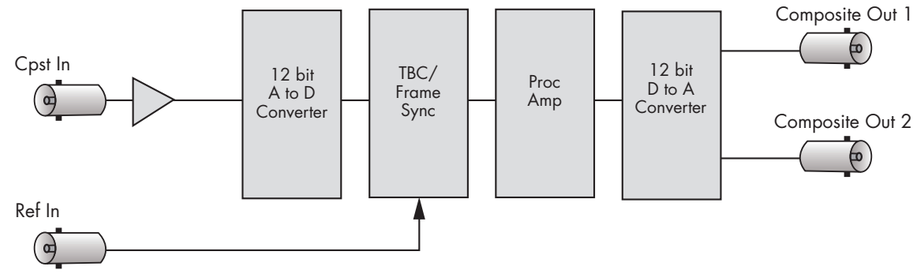
Frequency Response	±0.1 dB , 0 to 5.5 MHz
K Factor	<1%
ScH Phase Error	<±2°
Differential Phase	<1°
Differential Gain	<1%
Signal to Noise	>65 dB
Timing Window	Infinite (with respect to reference)
	Output ScH Phase matches reference
Timing Resolution	Adjustable to within 1° of subcarrier

Analog Video Output

Number	Two
Type	Composite PAL or NTSC (follows input)
Delay	Adjustable from < 90 µSec to 1 frame
Return Loss	>40 dB
Output DC	<100 mV

General Specifications

Size	5.63" W x 0.8" H x 5.98" D
	(143 mm x 21 mm x 152 mm)
	including connectors and flange
Weight	14 oz
Power	12 volts, 4 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.



BrightEye 10
Optical/SD SDI to Analog/SDI Converter

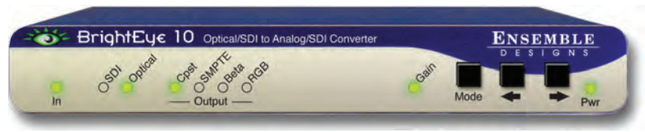
BrightEye 10 is a digital to analog video converter with both SD SDI (electrical) and fiber optic inputs. Output formats include Beta and SMPTE component, RGB, and composite (with simultaneous Y/C). Video processing, encoding and analog conversion is performed digitally at 12 bits of resolution with 8 x oversampling.

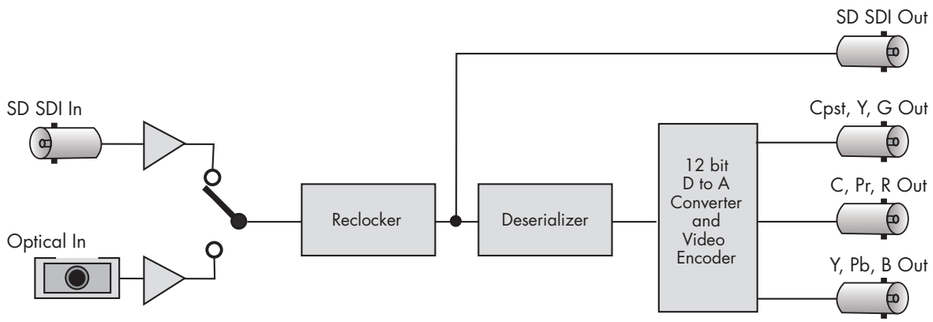
Front panel controls select between the optical and SDI input, choose the analog output format, and adjust gain. Video levels can be adjusted through BrightEye Mac or PC software.

The reclocked SD SDI output follows the input selector, thus providing optical to electrical conversion when the optical input is selected. BrightEye 10 combines fiber to SD SDI conversion and QC monitoring in one compact unit.

Features

- **Use with VCRs, cameras, satellite receivers**
- **Analog video inputs and outputs**
- **TBC and frame sync**
- **12 bit processing**
- **Passes embedded audio**





Serial Digital Input

Number	One
Signal Type	270 Mb/s SD Serial Digital (SMPTE 259M)
Impedance	75 Ω
Return Loss	>15 dB
Max Cable Length	300 meters
Automatic Input Cable Equalization	

Optical Input

Number	One
Type	SD (SMPTE 297M, optical equivalent of 259M)
Wavelength	830 to 1610 nm
Receiver sensitivity	–18 dBm
Max Cable Length	20 km (For greater distances, or higher power and larger loss budgets, please contact the factory)
Fiber Type	Single Mode Multi-mode compatible with attenuation at transmit end
Connector	SC

Analog Output

Number	One
Type	Beta/SMPTE, Y, Pr, Pb RGB NTSC, PAL Composite NTSC, PAL S-Video
Return Loss	>40 dB
Output DC	None (AC coupled)

Serial Digital Output

Number	One
Type	270 Mb/s SD Serial Digital (SMPTE 259M)
Impedance	75 Ω
Return Loss	>15 dB
Output DC	<50 mV

SDI to Analog Performance

Bit Resolution	12 bit output reconstruction 8 x oversampling
Signal to Noise	>65 dB
Frequency Response	±0.1 dB, 0 to 5.5 MHz
K Factor	<1%
ScH Phase Error	<±2 degrees
Differential Phase	<1 degree
Differential Gain	<1%

General Specifications

Size	5.63″W x 0.8″H x 5.98″D (143 mm x 21 mm x 152 mm) including connectors and flange
Weight	15 oz
Power	12 volts, 4 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.

BrightEye 11
SD SDI to Analog Converter

BrightEye 11 provides digital to analog video conversion with the full range of analog output formats available: Beta, SMPTE, RGB, and composite (with simultaneous Y/C).

12 bit processing and conversion at 8 x oversampling mean the best looking images possible.

Output format and gain are controlled from the front panel. A status display indicates input presence. Video levels can be adjusted through BrightEye Mac or PC software.

BrightEye 11 is the perfect choice to feed monitors, VTRs, or video projectors.

Features

- **Use with monitors, VTRs and projectors**
- **HD/SD SDI input**
- **Analog composite output**
- **Component, S-Video output**
- **12 bit processing**
- **Passes embedded audio**

BrightEye 11
SD SDI to Analog Converter

Serial Digital Input

Number	One
Signal Type	270 Mb/s SD Serial Digital (SMPTE 259M)
Impedance	75 Ω
Return Loss	>15 dB
Max Cable Length	300 meters

Automatic Input Cable Equalization

Analog Output

Number	One component or one composite and one Y/C
Type	Beta/SMPTE, Y, Pr, Pb RGB NTSC, PAL Composite NTSC, PAL S-Video
Return Loss	>40 dB
Output DC	None (AC coupled)

Serial Digital Output

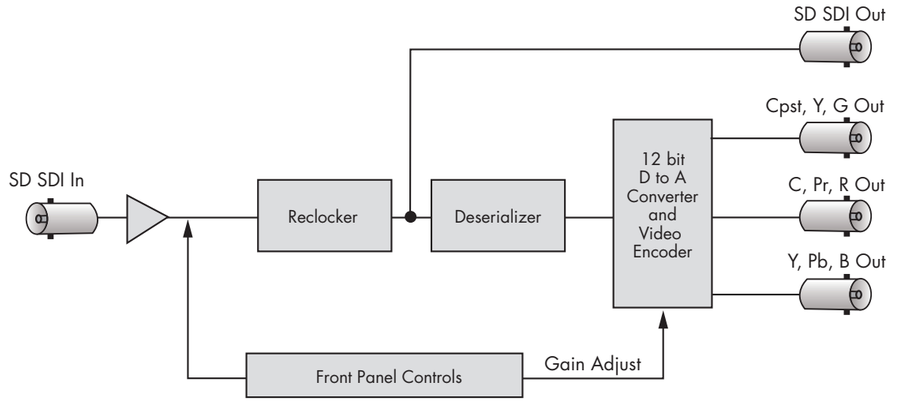
Type	SMPTE 259M
Impedance	75 Ω
Return Loss	>15 dB
Output DC	<50 mV

SDI to Analog Performance

Bit Resolution	12 bit output reconstruction 8 x oversampling
Signal to Noise	>65 dB
Frequency Response	±0.1 dB, 0 to 5.5 MHz
K Factor	<1%
ScH Phase Error	<±2 degrees
Differential Phase	<1 degree
Differential Gain	<1%

General Specifications

Size	5.63″W x 0.8″H x 5.98″D (143 mm x 21 mm x 152 mm) including connectors and flange
Weight	15 oz
Power	12 volts, 4 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.



BrightEye 11-HD
HD/SD SDI to Analog Converter

BrightEye 11-HD provides HD or SD digital to analog video conversion with the full range of analog output formats available for HD and SD. When an HD input is present HD RGB or YPrPb are output. When an SD input is present Beta, SMPTE, RGB or composite with simultaneous Y/C is output.

12 bit processing and conversion at 8 x oversampling mean the best looking images possible.

Output format and gain are controlled from the front panel. A status display indicates input presence. Video levels can be adjusted through BrightEye Mac or PC software.

Features

- **Use with HD or SD monitors, VTRs and projectors**
- **HD or SD SDI input**
- **Analog composite output**
- **Component, S-Video output**
- **12 bit processing**
- **Passes embedded audio**

BrightEye 11-HD
HD/SD SDI to Analog Converter

Serial Digital Input

Number	One
Type	HD Serial Digital 1.485 Gb/s SMPTE 274M, 292M or 296M or SD Serial Digital 270 Mb/s SMPTE 259M
Impedance	75 Ω
Return Loss	>15 dB
Max Cable Length	100 meters for HD 300 meters for SD (Belden 1694A)

Automatic Input Cable Equalization
HD Standards Supported:
1080i (SMPTE 274M -4,5,6) 50, 59.94 or 60 Hz
720p (SMPTE 296M -1,2,3) 50, 59.94 or 60 Hz
1080p (SMPTE 274M -9,10,11) 23.98, 24, 25 Hz
1080sF (RP211 -14,15,16) 23.98, 24, 25 Hz

Analog Output

HD input yields HD analog out,
SD input yields SD analog out

Number	One component or one composite and one Y/C
Type	Beta/SMPTE, Y, Pr, Pb RGB NTSC, PAL Composite NTSC, PAL S-Video
Return Loss	>40 dB
Output DC	None (AC coupled)

Serial Digital Output

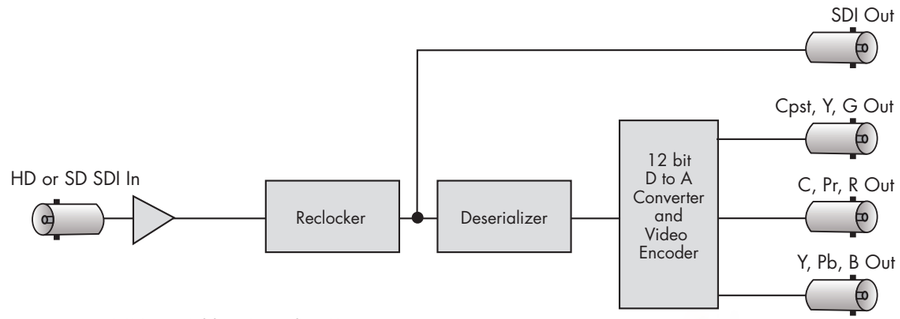
Number	One
Type	Follows input
Impedance	75 Ω
Return Loss	>15 dB
Max Cable Length	100 meters for HD 300 meters for SD (Belden 1694A)

SDI to Analog Performance

Bit Resolution	12 bit output reconstruction 8 x oversampling
Signal to Noise	>65 dB
Frequency Response	±0.1 dB, 0 to 5.5 MHz
K Factor	<1%
ScH Phase Error	<±2 degrees
Differential Phase	<1 degree
Differential Gain	<1%

General Specifications

Size	5.63″W x 0.8″H x 5.98″D (143 mm x 21 mm x 152 mm) including connectors and flange
Weight	1 lb 12 oz
Power	12 volts, 7 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.



HD SDI In Yields HD Analog Out
SD SDI In Yields SD Analog Out

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BrightEye 15

SD SDI to Analog Converter with Frame Sync/Genlock

BrightEye 15 is a digital to analog video converter with a timeable output. It's perfect for feeding analog switchers and routers, where signal timing is required.

BrightEye 15 has an SD SDI video input and a reference input. The input signal is converted to analog composite and synchronized (genlocked) to the reference signal. The analog composite output is fully timed with respect to the reference, including ScH phase.

Basic controls are provided on the front panel. With BrightEye Mac or PC software, you can control video proc functions; gain, chroma, pedestal, and hue. The vertical interval can be passed or blanked.

Features

- **Feed analog switchers and routers**
- **SD SDI input**
- **Analog video output**
- **Timing control for output**

Serial Digital Input

Number	One
Signal Type	270 Mb/s SD Serial Digital SMPTE 259M
Impedance	75 Ω
Return Loss	>15dB
Max Cable Length	300 meters
Automatic Input Cable Equalization	

Reference Input

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

Analog Video Output

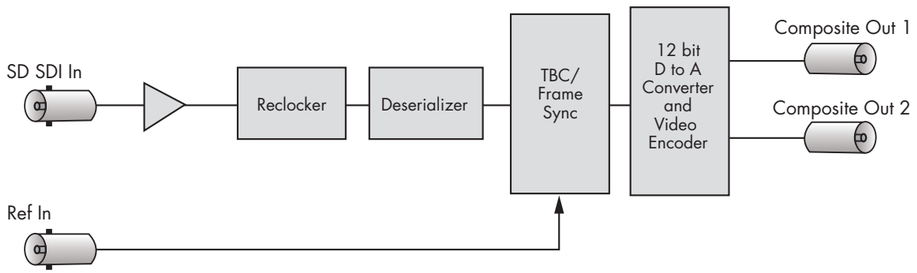
Number	Two
Type	Composite PAL or NTSC (follows input)
Delay	Adjustable from < 90 µSec to 1 frame
Return Loss	>40 dB
Output	DC < 100 mV

SDI to Analog Performance

Bit Resolution	12 bit output reconstruction 8 x oversampling
Signal to Noise	>65 dB
Timing Window	Infinite (with respect to reference)
Output	ScH Phase matches reference
Timing Resolution	Adjustable to within 1 degree of subcarrier
Frequency Response	±0.1 dB, 0 to 5.5 MHz
K Factor	<1%
ScH Phase Error	<±2 degrees
Differential Phase	<1 degree
Differential Gain	<1%

General Specifications

Size	5.63″W x 0.8″H x 5.98″D (143 mm x 21 mm x 152 mm) including connectors and flange
Weight	14 oz
Power	12 volts, 3 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.



BrightEye 16

SD SDI to Analog Video Converter with Frame Sync/Genlock and Audio Disembedder

BrightEye 16 is a digital to analog video converter with a timeable output. It's perfect for feeding analog switchers and routers, where signal timing is required. It's also a disembedder and provides four analog audio outputs.

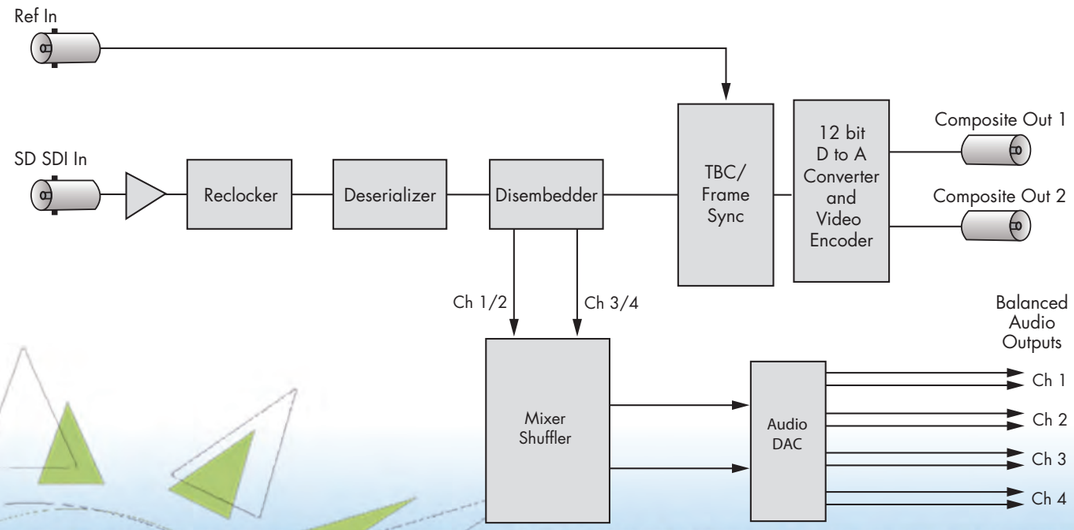
With timing controls, proc adjustments, and a built-in audio mixer, BrightEye 16 provides a complete solution for digital to analog conversion.

BrightEye 16 has an SDI video input and a reference input. The input signal is converted to analog composite and synchronized (genlocked) to the reference signal. The analog composite output is fully timed with respect to the reference, including ScH phase. Audio is disembedded with 24 bit precision and converted to analog.

Basic controls are accessed on the front panel. BrightEye Mac or PC software provides access to video proc functions and the built-in audio mixer. The vertical interval can be passed or blanked. VU indication is provided on the front panel and through BrightEye Mac or PC software.

Features

- **Feed analog switchers and routers**
- **SD SDI input**
- **Analog video output**
- **Timing control for output**
- **Audio disembedding**
- **Analog audio outputs**



BrightEye 16

SD SDI to Analog Video Converter with Frame Sync/Genlock and Audio Disembedder

Serial Digital Input

Number	One
Signal Type	270 Mb/s SD Serial Digital SMPTE 259M
Impedance	75 Ω
Return Loss	>15dB
Max Cable Length	300 meters

Automatic Input Cable Equalization

Reference Input

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

Analog Video Output

Number	Two
Type	Composite PAL or NTSC (follows input)
Delay	Adjustable from < 90 µSec to 1 frame
Return Loss	>40 dB
Output	DC < 100 mV

SDI to Analog Performance

Bit Resolution	12 bit output reconstruction 8 x oversampling
Signal to Noise	>65 dB
Timing Window	Infinite (with respect to reference)
Output	ScH Phase matches reference
Timing Resolution	Adjustable to within 1 degree of subcarrier
Frequency Response	±0.1 dB, 0 to 5.5 MHz
K Factor	<1%
ScH Phase Error	<±2 degrees
Differential Phase	<1 degree
Differential Gain	<1%

Analog Audio Outputs

Number	Four
Type	Balanced, transformerless
Impedance	30 Ω
Max Output Level	24 dBu
Resolution	24 bits, 128 x oversampled
Reference Level	-10 dBu to +4 dBu
Frequency Response	± 0.1dB, 20 Hz to 20 KHz
Crosstalk	<106 dB
Dynamic Range	>106 dB

General Specifications

Size	5.63" W x 0.8" H x 5.98" D (143 mm x 21 mm x 152 mm) including connectors and flange
Weight	1 lb
Power	12 volts, 5 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.

BrightEye 20
Analog Audio/AES Embedder or Disembedder

BrightEye 20 is a versatile audio mux/demux. With SD SDI video I/O, and both analog and AES I/O, it is field configurable for embedding or disembedding.

When configured as a multiplexer, BrightEye 20 has one serial digital video input and two AES digital audio inputs. Alternately, the 4 channel analog audio input can be used. The audio is embedded into the digital video stream. The output is a serial digital video stream that contains the original video plus the two AES streams or four analog audio channels.

When configured as a demultiplexer, audio signals present in the incoming serial digital video signal are extracted and delivered simultaneously as two AES digital audio streams and as four analog audio channels.

Audio mixing, level adjustments, and channel shuffling can be applied to both the multiplexer and demultiplexer modes, and are accessed through BrightEye Mac or PC software. Audio group selection is also made through BrightEye Mac or PC software.
A variety of audio connectors and adapters are available for integrating BrightEye 20 to any type of system.

Features

- **Audio embedder or disembedder**
- **Analog and digital inputs**
- **Analog and digital outputs**
- **Use in desktop and broadcast applications**

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BrightEye 20
Analog Audio/AES Embedder or Disembedder

Video Input

Number	One
Signal Type	270 Mb/s SD Serial Digital (SMPTE 259M)
Impedance	75 Ω
Return Loss	>15 dB
Max Cable Length	300 meters
Automatic Input Cable Equalization	

Video Output

Number	One
Signal Type	270 Mb/s SD Serial Digital (SMPTE 259M)
Delay	< 1 µSec to SDI path
Impedance	75 Ω
Return Loss	>15 dB
Output DC	None (AC coupled)

Analog Audio Inputs

Number	Four (selectable as inputs or outputs)
Type	Balanced
Impedance	>15K Ω
Maximum Input Level	24 dBu
CMRR	>60 dB, 20 Hz to 10 KHz
Quantization	24 bits, 128 x oversampled
Sample Rate	48 KHz
Reference Level	-10 dBu or +4 dBu
Frequency Response	±0.1 dB, 20 Hz to 20 KHz
Crosstalk	<106 dB
Dynamic Range	>106 dB

AES/EBU Digital Inputs

Number	Two (total of four channels) (selectable as inputs or outputs)
Type	AES3id
Connector	Coaxial, 75 Ω
Bit Depth	20 and 24 Bit
Sample Rate	30 KHz to 96 KHz (Sample Rate Converted internally to 48 KHz)
Reference Level	-18 or -20 dBFS (selectable)
AC-3, Dolby-E	Supported when inputs are synchronous

Analog Audio Outputs

Number	Four (selectable as inputs or outputs)
Type	Balanced, transformerless
Delay	< 250 µSec to audio I/O
Impedance	30 Ω
Maximum Output Level	24 dBu
Resolution	24 bits, 128 x oversampled
Reference Level	-10 dBu or +4 dBu
Frequency Response	± 0.1 dB, 20 Hz to 20 KHz
Crosstalk	<106 dB
Dynamic Range	>106 dB

AES/EBU Digital Outputs

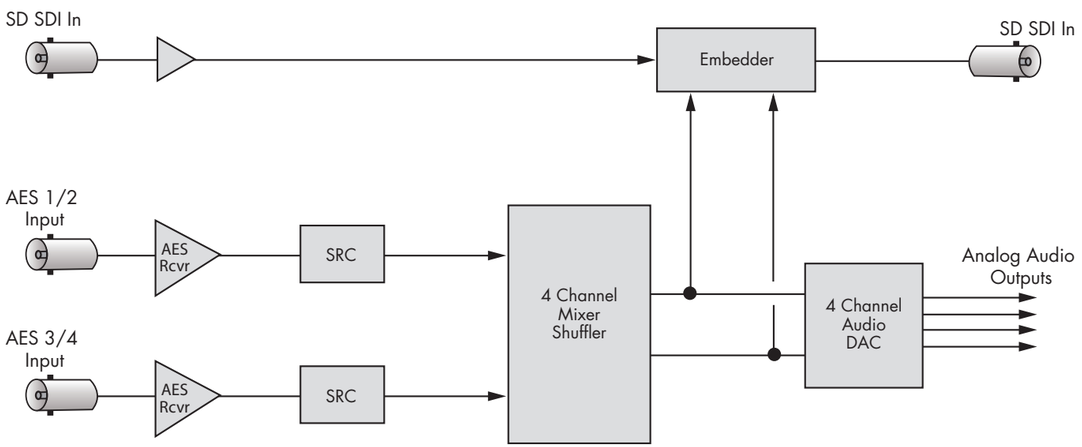
Number	Two (total of four channels) (selectable as inputs or outputs)
Type	AES3id
Connector	Coaxial, 75 Ω
Bit Depth	24 Bit
Sample Rate	48 KHz Synchronous to video output
Reference Level	-18 or -20 dBFS (selectable)

General Specifications

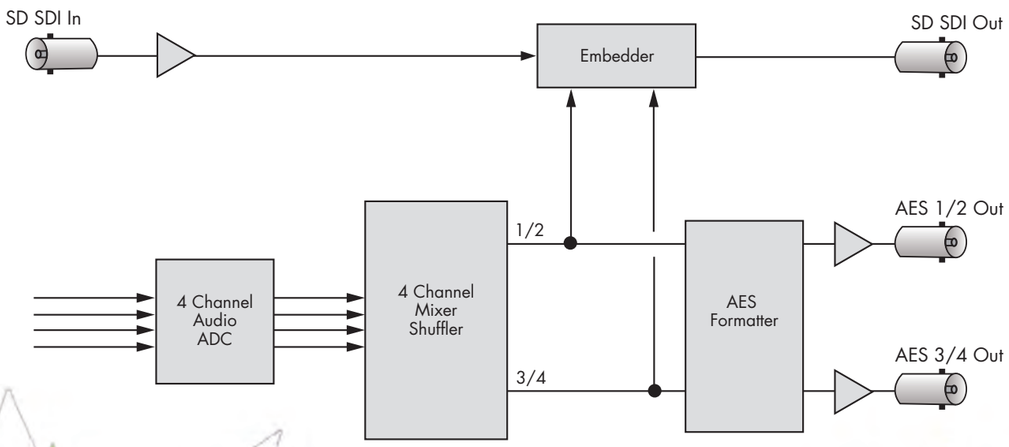
Size	5.63"W x 0.8"H x 5.98"D (143 mm x 21 mm x 152 mm) including connectors and flange
Weight	1 lb
Power	12 volts, 7 watts (100-230 VAC modular power supply)
Temperature Range	0 to 40° C ambient (all specs met)
Relative Humidity	0 to 95%, non-condensing
Altitude	0 to 10,000 ft.

BrightEye 20 Block Diagrams on following pages

AES Mux (Cascade or Replace) Mode



Analog Mux (Cascade or Replace) Mode



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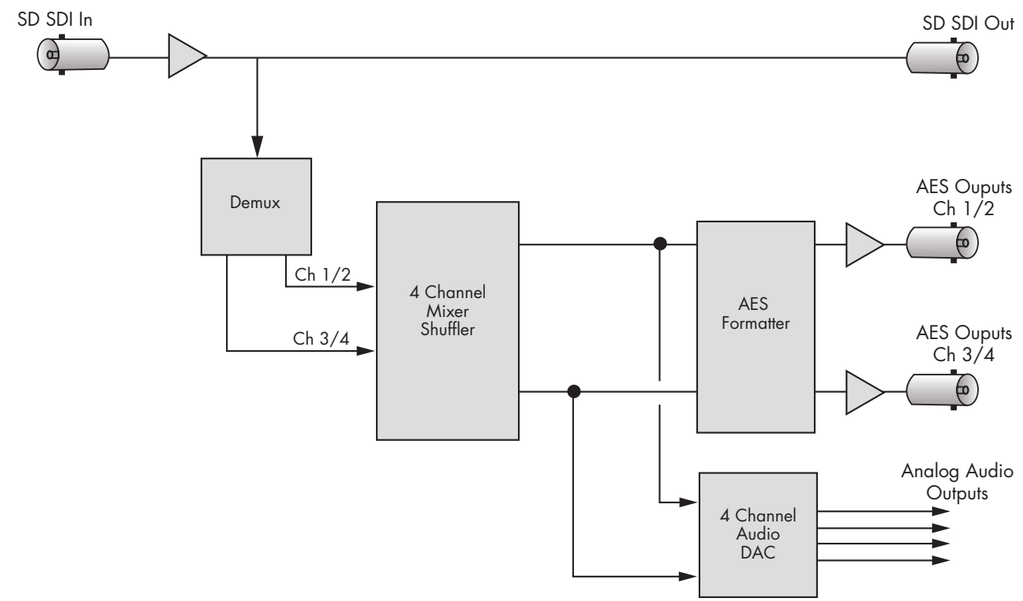
Demux Mode



BrightEye 21
AES/SD SDI Embedder

BrightEye 21 is an embedder, or multiplexer, with one standard definition serial digital video input and two AES digital audio inputs. The two AES audio streams are embedded into the digital video stream. The output is a serial digital video stream that contains the original video plus the two AES pairs.

Audio mixing, level adjustments, and channel shuffling are accessed through BrightEye Mac or PC software. Audio group selection is also made through BrightEye Mac or PC software. Use BrightEye 21 in desktop and broadcast applications.

Features

- **Use with desktop and broadcast applications**
- **Use with servers, workstations and routers**
- **Audio embedder**
- **SD SDI and AES inputs**
- **Embedded SDI output**

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BrightEye 21
AES/SD SDI Embedder

Video Input

Number	One
Signal Type	270 Mb/s SD Serial Digital SMPTE 259M
Impedance	75 Ω
Return Loss	>15 dB
Max Cable Length	300 meters

Automatic Input Cable Equalization

Video Output

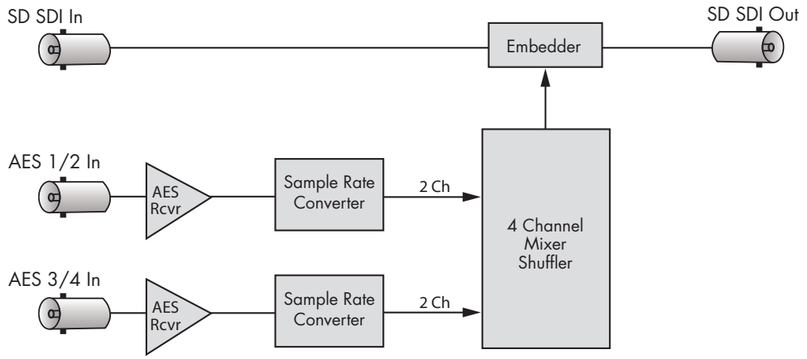
Number	One
Signal Type	270 Mb/s SD Serial Digital SMPTE 259M
Delay	< 1 µSec to SDI path
Impedance	75 Ω
Return Loss	>15 dB
Output DC	None (AC coupled)

AES/EBU Digital Inputs

Number	Two (total of four channels)
Type	AES3id
Delay	< 250 µSec to audio I/O
Connector	Coaxial, 75 Ω
Bit Depth	20 and 24 Bit
Sample Rate	30 KHz to 96 KHz (Sample Rate Converted internally to 48 KHz)
Reference Level	-18 or -20 dBFS (selectable)
AC-3, Dolby-E	Supported when inputs are synchronous

General Specifications

Size	5.63"W x 0.8"H x 5.98"D (143 mm x 21 mm x 152 mm) including connectors and flange
Weight	15 oz
Power	12 volts, 3 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.



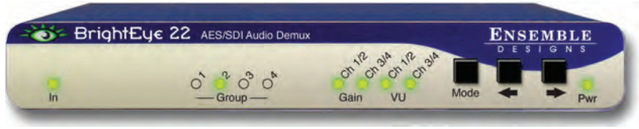
BrightEye 22
SD SDI/AES Disembedder

BrightEye 22 is a disembedder, or demultiplexer, for use in desktop and broadcast applications. Audio signals present in the incoming standard definition serial digital video signal are extracted and delivered as two AES digital audio streams.

Audio mixing, level adjustments, and channel shuffling are accessed through BrightEye Mac or PC software. Audio group selection is also made through BrightEye Mac or PC software.

Features

- **Use with servers and satellite receivers**
- **Audio disembedder**
- **Embedded SDI input**
- **SD SDI and AES outputs**



BrightEye 22
SD SDI/AES Disembedder

Video Input

Number	One
Signal Type	270 Mb/s SD Serial Digital SMPTE 259M
Impedance	75 Ω
Return Loss	>15 dB
Max Cable Length	300 meters
Automatic Input Cable Equalization	

Video Output

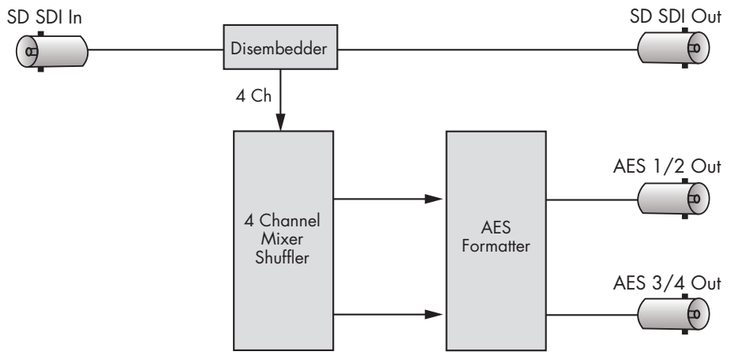
Number	One
Signal Type	270 Mb/s SD Serial Digital SMPTE 259M
Delay	< 1 µSec to SDI path
Impedance	75 Ω
Return Loss	>15 dB
Output DC	None (AC coupled)

AES/EBU Digital Outputs

Number	Two (total of four channels)
Type	AES3id
Delay	< 250 µSec to audio I/O
Connector	Coaxial, 75 Ω
Bit Depth	24 Bit
Sample Rate	48 KHz, Synchronous to Video output
Reference Level	-18 or -20 dBFS (selectable)

General Specifications

Size	5.63"W x 0.8"H x 5.98"D (143 mm x 21 mm x 152 mm) including connectors and flange
Weight	15 oz
Power	12 volts, 3 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.



BrightEye 23
Analog Audio/SD SDI Embedder

BrightEye 23 is an embedder, or multiplexer with one standard definition serial digital video input and a four channel analog audio input. The four analog audio channels are digitized and then embedded into the digital video stream. The output is a serial digital video stream that contains the original video plus the four analog audio channels.

Audio mixing, level adjustments, and channel shuffling are accessed through BrightEye Mac or PC software. Audio group selection is also made through BrightEye Mac or PC software. A variety of audio connectors and adapters are available for integrating BrightEye 23 to any type of system.

Features

- **Use with VTRs, workstations and satellite receivers**
- **Audio embedder**
- **SD SDI and analog audio inputs**
- **Embedded SDI output**

Video Input

Number	One
Signal Type	270 Mb/s SD Serial Digital SMPTE 259M
Impedance	75 Ω
Return Loss	>15 dB
Max Cable Length	300 meters
Automatic Input Cable Equalization	

Video Output

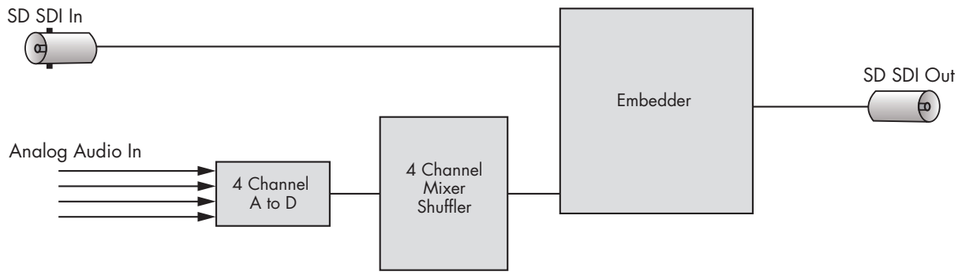
Number	One
Signal Type	270 Mb/s SD Serial Digital SMPTE 259M
Delay	< 1 µSec to SDI path
Impedance	75 Ω
Return Loss	>15 dB
Output DC	None (AC coupled)

Analog Audio Inputs

Number	Four
Type	Balanced
Delay	< 250 µSec to audio I/O
Impedance	>15K Ω
Maximum Input Level	24 dBu
CMRR	>60 dB, 20 Hz to 10 KHz
Quantization	24 bits, 128 x oversampled
Sample Rate	48 KHz
Reference Level	-10 dBu or +4 dBu
Frequency Response	±0.1 dB, 20 Hz to 20 KHz
Crosstalk	<106 dB
Dynamic Range	>106 dB

General Specifications

Size	5.63"W x 0.8"H x 5.98"D (143 mm x 21 mm x 152 mm) including connectors and flange
Weight	15 oz
Power	12 volts, 4 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.



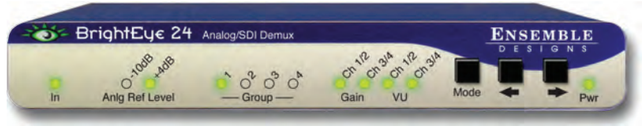
BrightEye 24
SD SDI to Analog Converter and Disembedder

BrightEye 24 is both a disembedder (demultiplexer) and a digital to analog video converter. The incoming standard definition serial digital video signal is converted to an analog composite output. Audio signals present in the incoming digital video signal are extracted and delivered as four channels of analog audio.

Audio mixing, level adjustments, and channel shuffling are accessed through BrightEye Mac or PC software. Audio group selection is also made through BrightEye Mac or PC software. A variety of audio connectors and adapters are available for integrating BrightEye 24 to any type of system. Use BrightEye 24 in desktop and broadcast applications.

Features

- **Use with servers, VTRs and workstations**
- **Disembedder and converter**
- **Embedded SDI input**
- **Analog audio output**
- **Composite video output**



ENSEMBLE DESIGNS

Designed and built in California
5 YEAR WARRANTY

Video Input

Number	One
Signal Type	270 Mb/s SD Serial Digital (SMPTE 259M)
Impedance	75 Ω
Return Loss	>15 dB
Max Cable Length	300 meters
Automatic Input Cable Equalization	

Video Output

Number	One
Type	NTSC or PAL Composite Standard follows input
Delay	< 1 µSec to SDI path
Impedance	75 Ω
Return Loss	>40 dB
Output DC	<50 mV

SDI to Analog Performance

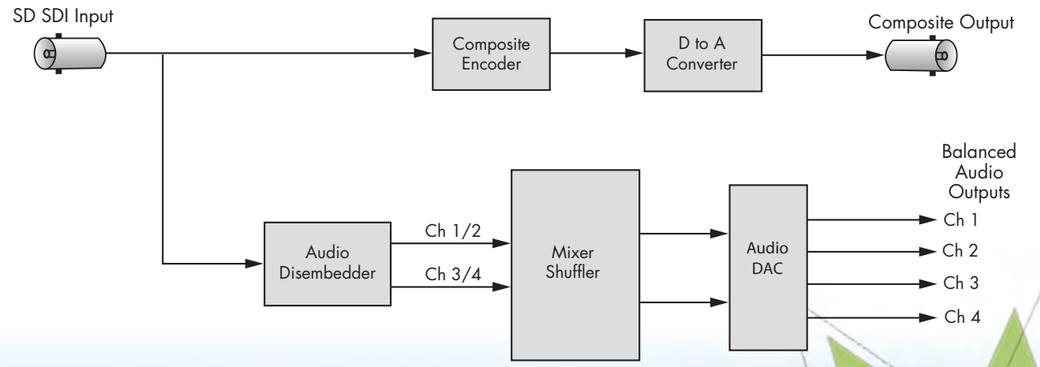
Bit Resolution	10 bit output reconstruction 2 x oversampling
Signal to Noise	>65 dB
Frequency Response	± 0.1 dB, 0 to 5.5 MHz
K Factor	<1%
Differential Phase	<1 degree
Differential Gain	<1%

Analog Audio Outputs

Number	Four
Type	Balanced, transformerless
Delay	< 250 µSec to audio I/O
Impedance	30 Ω
Maximum Output Level	24 dBu
Resolution	24 bits, 128 x oversampled
Reference Level	-10 dBu or +4 dBu
Frequency Response	±0.1 dB, 20 Hz to 20 KHz
Crosstalk	<106 dB
Dynamic Range	>106 dB

General Specifications

Size	5.63″W x 0.8″H x 5.98″D (143 mm x 21 mm x 152 mm) including connectors and flange
Weight	1 lb
Power	12 volts, 4 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.



BrightEye 25

Analog Video/Audio to SD SDI Converter with TBC and Embedder

BrightEye 25 converts analog composite video to SD SDI, with simultaneous conversion of four channels of audio and embedding. A TBC/frame sync is a standard feature and allows this BrightEye to work with any sort of video input. Great for broadcast and desktop applications, BrightEye 25 can be used with sources such as VTRs and incoming satellite feeds.

The analog input is converted at 12 bits of resolution and digitally decoded to 10 bit YCrCb components. The signal is then time base corrected and frame synchronized to the reference input. The audio is converted to digital and then it passes through the built-in four channel mixer with shuffle and level control. The video and audio signals join up in an embedder which can be targeted to any of the four groups.

Basic controls are accessed on the front panel. BrightEye Mac or PC software provides access to video proc functions and the built-in audio mixer. The vertical interval can be passed or blanked. VU indication is provided on the front panel and through BrightEye Mac or PC software.

Features

- **Convert analog sources to embedded SDI**
- **Analog audio and video inputs**
- **Embedded SDI output**
- **TBC and frame sync**
- **12 and 24 bit processing**
- **For fiber optic output, choose BrightEye 26**

BrightEye 25

Analog Video/Audio to SD SDI Converter with TBC and Embedder

Analog Video Input

Number	One
Type	NTSC, PAL Composite
Impedance	75 Ω
Return Loss	>40 dB, DC to 5.5 MHz
Input	DC +/-1 volt DC
Input Hum	<100 mV

Reference Input

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

Serial Digital Output

Number	Two
Type	270 Mb/s SD Serial Digital SMPTE 259M
Delay	Adjustable from < 90 µSec to 1 frame
Impedance	75 Ω
Return Loss	>15 dB
Output	DC None (AC coupled)

Analog Video to SDI Performance

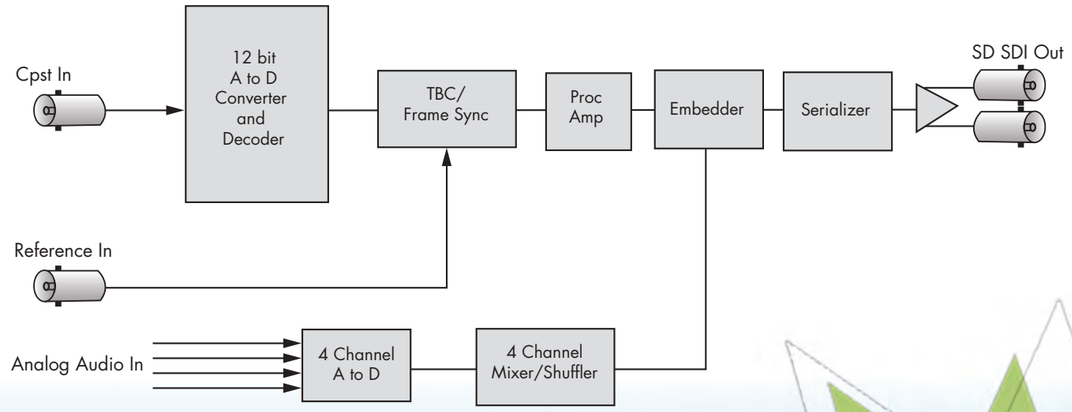
Bit Resolution	12 bit input quantization, 4 x oversampling
Decoding	Adaptive Comb Filter, 3 or 5 line selectable
Signal to Noise	>62 dB, weighted
Frequency Response	±0.1 dB, 0 to 5.5 MHz

Analog Audio Inputs

Number	Four
Type	Balanced
Impedance	>15K Ω
Maximum Input Level	24 dBu
CMRR	>60 dB, 20 Hz to 10 KHz
Quantization	24 bits, 128 x oversampled
Sample Rate	48 KHz
Reference Level	-10 dBu or +4 dBu
Frequency Response	±0.1 dB, 20 Hz to 20 KHz
Crosstalk	<106 dB
Dynamic Range	>106 dB

General Specifications

Size	5.63″W x 0.8″H x 5.98″D (143 mm x 21 mm x 152 mm) including connectors and flange
Weight	1 lb
Power	12 volts, 5 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.



Designed and built in California
5 YEAR WARRANTY

BrightEye 26

Analog Video/Audio to SD SDI/Optical Converter with TBC and Embedder

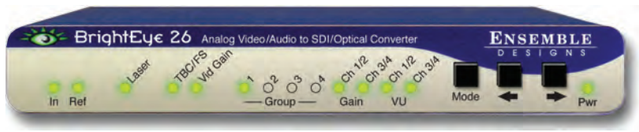
BrightEye 26 converts analog composite video to SD SDI, with simultaneous conversion of four channels of audio and embedding. It is similar to the BrightEye 25, with the addition of an optical output. A TBC/frame sync is a standard feature and allows this BrightEye to work with any sort of video input. Great for broadcast and desktop applications, BrightEye 26 can be used with sources such as VTRs and incoming satellite feeds.

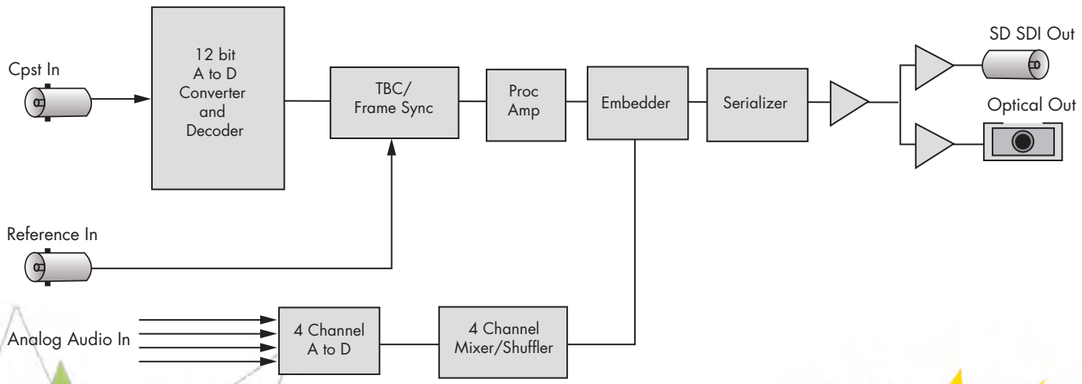
The analog input is converted at 12 bits of resolution and digitally decoded to 10 bit YCrCb components. The signal is then time base corrected and frame synchronized to the reference input. The audio is converted to digital and then it passes through the built-in four channel mixer with shuffle and level control. The video and audio signals join up in an embedder which can be targeted to any of the four groups.

Basic controls are accessed on the front panel. BrightEye Mac or PC software provides access to video proc functions and the built-in audio mixer. The vertical interval can be passed or blanked. VU indication is provided on the front panel and through BrightEye Mac or PC software.

Features

- **Optical transmitter**
- **Convert analog sources to embedded SDI**
- **Analog audio and video inputs**
- **Embedded SDI output**
- **TBC and frame sync**
- **12 and 24 bit processing**





ENSEMBLE DESIGNS

Designed and built in California 5 YEAR WARRANTY

BrightEye 26

Analog Video/Audio to SD SDI/Optical Converter with TBC and Embedder

Analog Video Input

Number	One
Type	NTSC, PAL Composite
Impedance	75 Ω
Return Loss	>40 dB, DC to 5.5 MHz
Input DC	+/-1 volt DC
Input Hum	<100 mV

Reference Input

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

Serial Digital Output

Number	One
Type	270 Mb/s SD Serial Digital (SMPTE 259M)
Delay	Adjustable from < 90 µSec to 1 frame
Impedance	75 Ω
Return Loss	>15 dB
Output	DC None (AC coupled)

Optical Output

Number	One
Type	SD (SMPTE 297M, optical equivalent of 259M)
Wavelength	1310 nm (non-CWDM) (1550 non-CWDM by special order)
Power	–7 dBm
Max Cable Length	20 km (For greater distances, or higher power and larger loss budgets, please contact the factory)
Fiber Type	Single Mode Multi-mode compatible with attenuation at transmit end
Connector	SC

Analog Video to SDI Performance`

Bit Resolution	12 bit input quantization, 4 x oversampling
Decoding	Adaptive Comb Filter, 3 or 5 line selectable
Signal to Noise	>62 dB, weighted
Frequency Response	±0.1 dB, 0 to 5.5 MHz

Analog Audio Inputs

Number	Four
Type	Balanced
Impedance	>15K Ω
Max Input Level	24 dBu
CMRR	>60 dB, 20 Hz to 10 KHz
Quantization	24 bits, 128 x oversampled
Sample Rate	48 KHz
Reference Level	-10 dBu to +4 dBu
Frequency Response	±0.1 dB, 20 Hz to 20 KHz
Crosstalk	<106 dB
Dynamic Range	>106 dB

General Specifications

Size	5.63″W x 0.8″H x 5.98″D (143 mm x 21 mm x 152 mm) including connectors and flange
Weight	1 lb
Power	12 volts, 5 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.

BrightEye 30
Audio ADC and DAC, Bidirectional

BrightEye 30 is a flexible audio converter that can be a two channel, Bidirectional ADC and DAC, or it can be configured as a four channel converter. Perfect in desktop, post and broadcast applications, 24 bit processing ensures beautiful audio.

As a Bidirectional converter, two channels of analog audio are converted to AES digital audio and at the same time an AES stream is converted to two channels of analog.

Alternately, the unit can be configured as a four channel AES to analog converter or a four channel analog to AES converter.

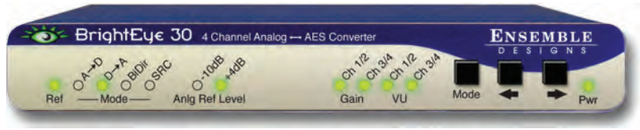
BrightEye 30 also serves as a sample rate converter. For example, a digital 44.1 KHz signal from a CD player can be fed to the input and a digital AES3id, 48 KHz signal synchronous to the reference input will be output.

Audio mixing, level adjustments, and channel shuffling are accessed through BrightEye Mac or PC software. A variety of audio connectors and adapters are available for integrating BrightEye 30 to any type of system.

A reference input is provided which allows digital outputs to be synchronized to either a PAL or NTSC video signal or AES reference.

Features

- **2 or 4 channel audio converter**
- **Analog and digital inputs**
- **Analog and digital outputs**
- **Bidirectional ADC/DAC**
- **Sample rate converter**



Analog Audio Inputs

Number	Four (selectable as inputs or outputs)
Type	Balanced
Impedance	>15K Ω
Maximum Input Level	24 dBu
CMRR	>60 dB, 20 Hz to 10 KHz
Quantization	24 bits, 128 x oversampled
Sample Rate	48 KHz
Reference Level	-10 dBu or +4 dBu
Frequency Response	±0.1 dB, 20 Hz to 20 KHz
Crosstalk	<106 dB
Dynamic Range	>106 dB

AES/EBU Digital Inputs

Number	Two (total of four channels) (selectable as inputs or outputs)
Type	AES3id
Connector	Coaxial, 75 Ω
Bit Depth	20 and 24 Bit
Sample Rate	30 KHz to 96 KHz (Sample Rate Converted internally to 48 KHz)
Reference Level	-18 or -20 dBFS (selectable)
AC-3, Dolby-E	Supported when inputs are synchronous

Analog Audio Outputs

Number	Four (selectable as inputs or outputs)
Type	Balanced, transformerless
Impedance	30 Ω
Maximum Output Level	24 dBu
Resolution	24 bits, 128 x oversampled
Reference Level	-10 dBu or +4 dBu
Frequency Response	±0.1 dB, 20 Hz to 20 KHz
Crosstalk	<106 dB
Dynamic Range	>106 dB

AES/EBU Digital Outputs

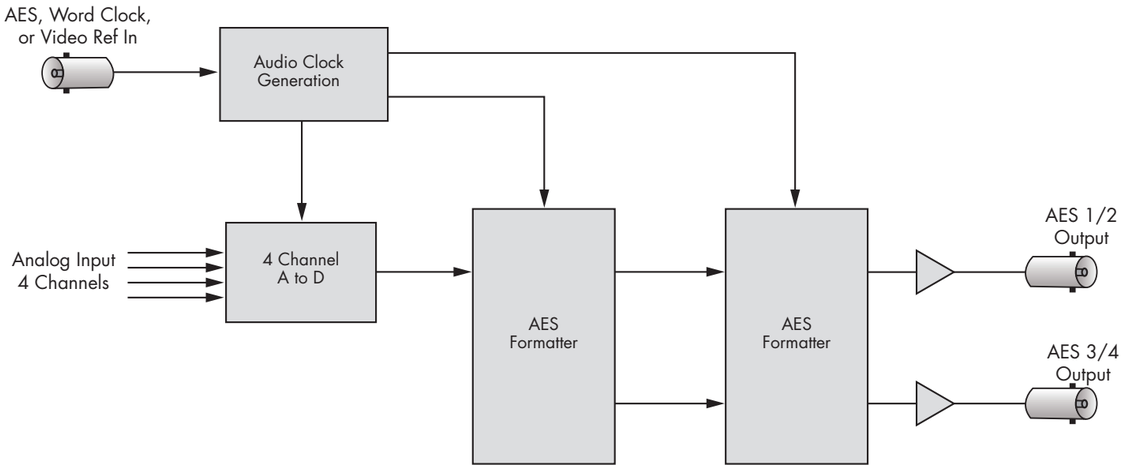
Number	Two (total of four channels) (selectable as inputs or outputs)
Type	AES3id
Connector	Coaxial, 75 Ω
Bit Depth	24 Bit
Sample Rate	48 KHz Synchronous to video output
Reference Level	-18 or -20 dBFS (selectable)

General Specifications

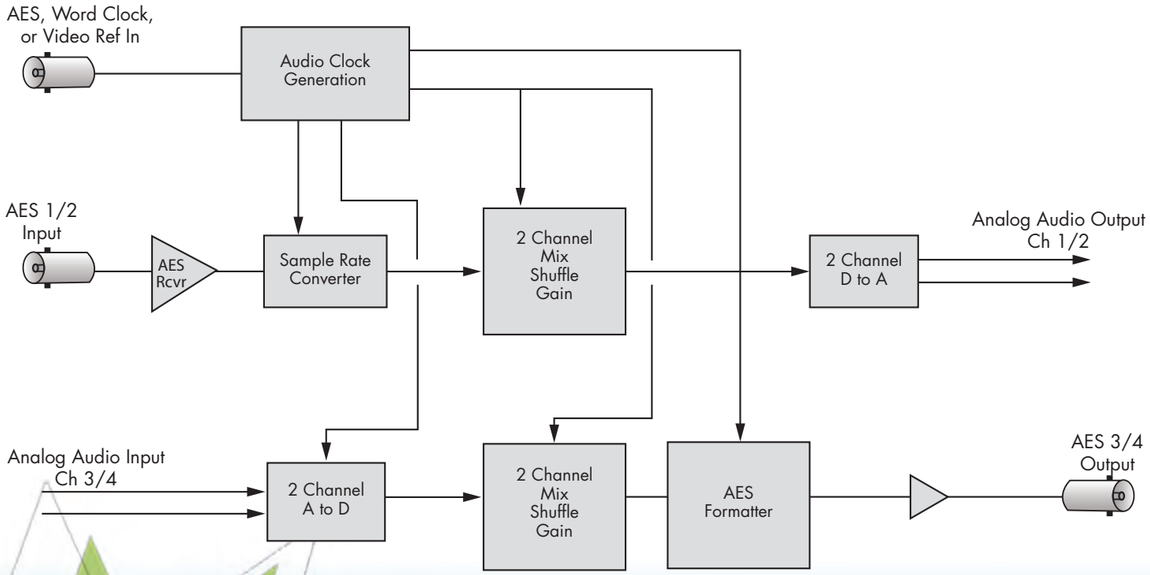
Size	5.63″W x 0.8″H x 5.98″D (143 mm x 21 mm x 152 mm) including connectors and flange
Weight	1 lb
Power	12 volts, 2 watts (100-230 VAC modular power supply)
Temperature Range	0 to 40° C ambient (all specs met)
Relative Humidity	0 to 95%, non-condensing
Altitude	0 to 10,000 ft.

BrightEye 30 Block Diagrams on following pages

ADC Mode

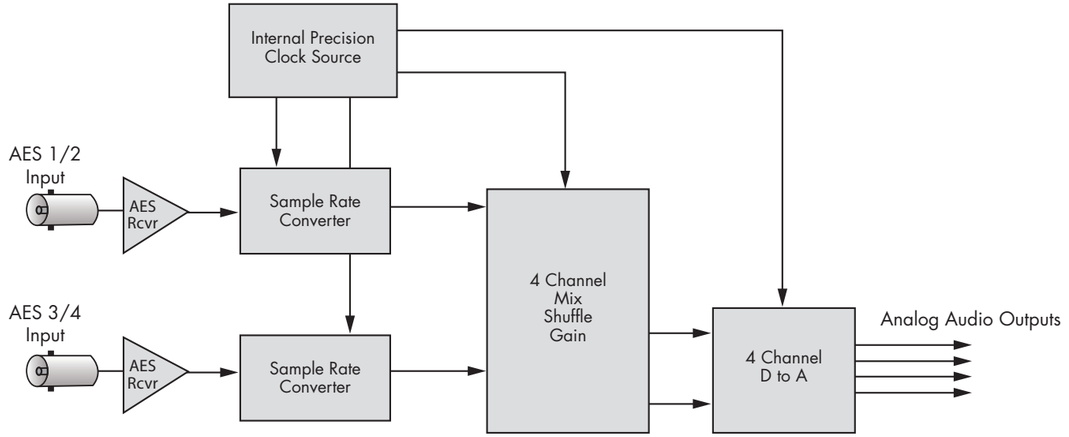


Bidirectional Mode

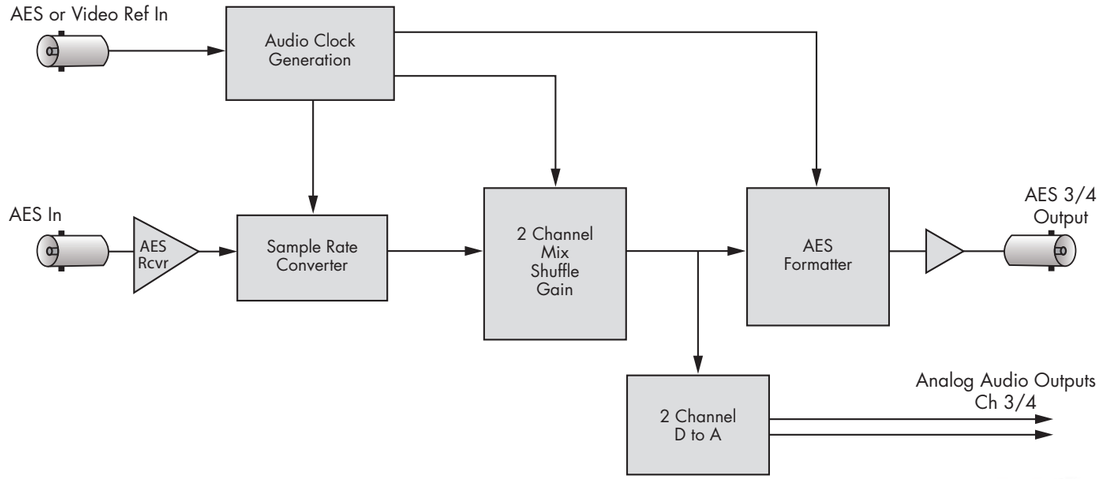


BiDirectional mode provides two independent paths, one is analog to digital conversion, the other is digital to analog.

DAC Mode



SRC Mode



BrightEye 30-D

Audio ADC and DAC, Bidirectional Converter with Delay

BrightEye 30-D is a flexible audio converter that can be a two channel, Bidirectional ADC and DAC, or it can be configured as a four channel converter. Perfect in desktop, post and broadcast applications, 24 bit processing ensures beautiful audio.

As a Bidirectional converter, two channels of analog audio are converted to AES digital audio and at the same time an AES stream is converted to two channels of analog.

Alternately, the unit can be configured as a four channel AES to analog converter or a four channel analog to AES converter.

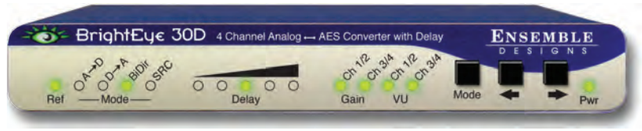
BrightEye 30-D also serves as a sample rate converter. For example, a digital 44.1 KHz signal from a CD player can be fed to the input and a digital AES3id, 48 KHz signal synchronous to the reference input will be output.

Audio mixing, level adjustments, channel shuffling and delay are accessed through BrightEye PC and BrightEye Mac. Audio delay adjustments simplify signal integration.
A variety of audio connectors and adapters are available for integrating BrightEye 30-D to any type of system.

A reference input is provided which allows digital outputs to be synchronized to either a PAL or NTSC video signal or AES reference.

Features

- **2 or 4 channel audio converter**
- **Analog and digital inputs**
- **Analog and digital outputs**
- **Bidirectional ADC/DAC**
- **Sample rate converter**
- **Adjustable audio delay**



ENSEMBLE DESIGNS

Designed and built in California 5 YEAR WARRANTY

BrightEye 30-D

Audio ADC and DAC, Bidirectional Converter with Delay

Analog Audio Inputs

Number	Four (selectable as inputs or outputs)
Type	Balanced
Impedance	>15K Ω
Maximum Input Level	24 dBu
CMRR	>60 dB, 20 Hz to 10 KHz
Quantization	24 bits, 128 x oversampled
Sample Rate	48 KHz
Reference Level	-10 dBu or +4 dBu
Frequency Response	±0.1 dB, 20 Hz to 20 KHz
Crosstalk	<106 dB
Dynamic Range	>106 dB

AES/EBU Digital Inputs

Number	Two (total of four channels) (selectable as inputs or outputs)
Type	AES3id
Connector	Coaxial, 75 Ω
Bit Depth	20 and 24 Bit
Sample Rate	30 KHz to 96 KHz (Sample Rate Converted internally to 48 KHz)

Analog Audio Outputs

Number	Four (selectable as inputs or outputs)
Type	Balanced, transformerless
Delay	Adjustable from 5 to 1000 msec
Impedance	30 Ω
Maximum Output Level	24 dBu
Resolution	24 bits, 128 x oversampled
Reference Level	-10 dBu or +4 dBu
Frequency Response	±0.1 dB, 20 Hz to 20 KHz
Crosstalk	<106 dB
Dynamic Range	>106 dB

AES/EBU Digital Outputs

Number	Two (total of four channels) (selectable as inputs or outputs)
Type	AES3id
Delay	Adjustable from 5 to 1000 msec
Connector	Coaxial, 75 Ω
Bit Depth	24 Bit
Sample Rate	48 KHz Synchronous to Video output
Reference Level	-18 or -20 dBFS (selectable)

General Specifications

Size	5.63″ W x 0.8″ H x 5.98″ D (143 mm x 21 mm x 152 mm) including connectors and flange
Weight	1 lb
Power	12 volts, 3 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.

BrightEye 30-D Block Diagrams on previous pages

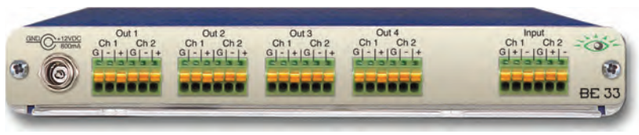
BrightEye 33
Analog Audio Distribution Amplifier

BrightEye 33 is a high performance audio distribution amplifier for the broadcast and recording industry. Exceptional performance features include excellent response, noise and distortion specifications. BrightEye 33 functions with either 8 mono outputs or 4 stereo outputs. Additionally, BrightEye 33 can be used to distribute LTC.

Gain adjustments are accessed from the front panel. This is a simple device with no USB port and no interface to BrightEye Mac or PC software.

Features

- **Analog audio DA for broadcast and post**
- **Use with LTC signals**
- **8 mono outputs or 4 stereo outputs**
- **Gain adjustments from the front panel**



BrightEye 33
Analog Audio Distribution Amplifier

Analog Audio Inputs

Number	Two
Type	Balanced
Impedance	>15K Ω
Maximum Input Level	24 dBu
CMRR	>60 dB, 20 Hz to 10 KHz

Analog Audio Outputs

Number	Four stereo or eight mono
Type	Balanced, transformerless
Impedance	30 Ω
Maximum Output Level	24 dBu

Performance

Gain Range	±6 dB
Frequency Response	<±0.1 dB, 20 Hz to 20 KHz
Isolation	>100 dB
S/N Ratio	>100 dB, unweighted

General Specifications

Size	5.63" W x 0.8" H x 5.98" D
	(143 mm x 21 mm x 152 mm) including connectors and flange
Power	12 volts, 4 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.

BrightEye 40
SD SDI Reclocking Distribution Amplifier

BrightEye 40 is a reclocking serial digital video distribution amplifier with four outputs. The SD SDI input will automatically equalize up to 300 meters (1000 feet) of digital cable. Following equalization, the 270 Mb/s SD SDI input signal is reclocked before being delivered to four simultaneous SD SDI outputs.

When using an analog to digital video converter and multiple outputs are needed, BrightEye 40 can be used to distribute and provide those additional output signals. BrightEye 40 works well with video converters BrightEye 3 and BrightEye 25. BrightEye 40 is also useful in conjunction with the BrightEye 54 sync pulse generator and test signal generator for distributing digital test signals.

This is a simple device with no USB port and no interface to BrightEye Mac or PC software. Front panel indicators show the presence of an input signal and power.

Features

- **Use with converters and SPGs in order to have more outputs**
- **DA for SD SDI**
- **Passes embedded audio**

BrightEye 40
SD SDI Reclocking Distribution Amplifier

Serial Input

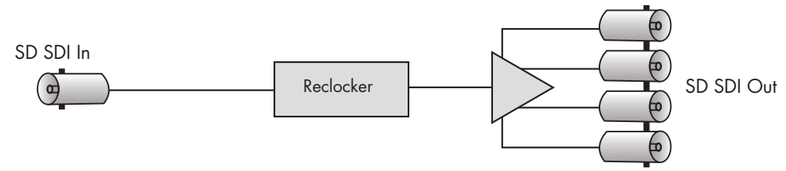
Number	One
Signal Type	270 Mb/s SD Serial Digital SMPTE 259M
Impedance	75 Ω
Return Loss	>15dB
Max Cable Length	300 meters

Serial Output

Number	Four
Signal Type	Serial Digital SMPTE 259M
Impedance	75 Ω
Return Loss	>15 dB
Output DC	None (AC coupled)

General Specifications

Size	5.63" W x 0.8" H x 5.98" D (143 mm x 21 mm x 152 mm) including connectors and flange
Weight	14 oz
Power	12 volts, 3 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.



BrightEye 41
Video/AES/Tri-Level Sync Distribution Amplifier

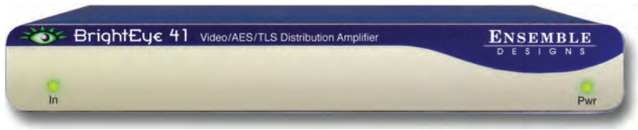
BrightEye 41 is a distribution amplifier that accepts analog video, AES digital audio, or Tri-Level Sync signal. It can also be used with SMPTE 310M, Dolby E and AC-3 signals. It provides unity gain fanout over a frequency range of DC to 10 MHz. It can handle composite and component analog video, coaxial AES digital audio, or a high definition Tri-Level Sync signal.

When using a digital to analog video converter and multiple outputs are needed, BrightEye 41 can be used to distribute and provide those additional output signals. BrightEye 41 works well with video converters BrightEye 10 and BrightEye 16. BrightEye 41 is also useful in conjunction with the BrightEye 54 sync pulse generator and test signal generator for distributing Tri-Level Sync, AES and composite signals.

This is a simple device, with no USB port and no interface to BrightEye Mac or PC software. Front panel indicators show the presence of an input signal and power.

Features

- **Use with converters and SPGs in order to have more outputs**
- **DA for analog video signals**
- **DA for high definition Tri-Level Sync**
- **DA for AES digital audio, AC-3 and Dolby E**
- **DA for SMPTE 310M**



BrightEye 41
Video/AES/Tri-Level Sync Distribution Amplifier

Input Signal

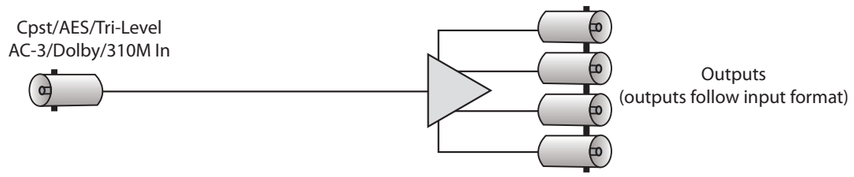
Number	One, terminating
Signal Type	NTSC/525, PAL/625 Composite video, AES digital audio or Tri-level Sync
Impedance	75 Ω
Return Loss	>40 dB to 5 MHz

Output Signal

Number	Four
Signal Type	Follows Input
Impedance	75 Ω
Return Loss	>40 dB to 5 MHz
DC offset	Follows input +/- 50 mV
Delay	10 ns (14° NTSC, 17° PAL)
Frequency Response	±0.1 dB, 0 to 5.5 MHz ±0.3 dB, 0 to 10 MHz
Signal to Noise	68 dB
K Factor	2T Pulse <0.25%
Differential Phase	10-90% apl <0.1 deg
Differential Gain	10-90% apl <0.15%
Gain Stability	<0.2 dB variation over operating temp

General Specifications

Size	5.63″ W x 0.8″ H x 5.98″ D (143 mm x 21 mm x 152 mm) including connectors and flange
Weight	14 oz
Power	12 volts, 1 watt (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.



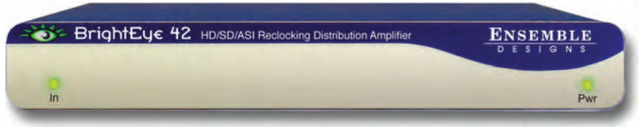
BrightEye 42
HD/SD/ASI Distribution Amplifier

BrightEye 42 is a reclocking distribution amplifier that can be used with high definition, standard definition or ASI signals. When used with SD or ASI input signals, the serial input automatically equalizes up to 300 meters of digital cable. When used with an HD input signal, the serial input automatically equalizes up to 100 meters of digital cable. The equalized signal is reclocked and delivered to four simultaneous outputs. The reclocker is ASI compliant and all four outputs have the correct ASI polarity.

This is a simple device with no USB port and no interface to BrightEye Mac or PC software. Front panel indicators show the presence of an input signal and power.

Features

- **Use with video converters and TSGs in order to have more outputs**
- **DA for digital HD or SD SDI signals**
- **DA for ASI signals**
- **Passes embedded audio**



BrightEye 42
HD/SD/ASI Distribution Amplifier

Serial Digital Input

Number	One
Signal Type	270 Mb/s SD Serial Digital (SMPTE 259M) or 1.485 Gb/s HD Serial Digital (SMPTE 274M or 296M)
Impedance	75 Ω
Return Loss	>15 dB
Max Cable Length	300 meters for 270 Mb/s 100 meters for 1.485 Gb/s

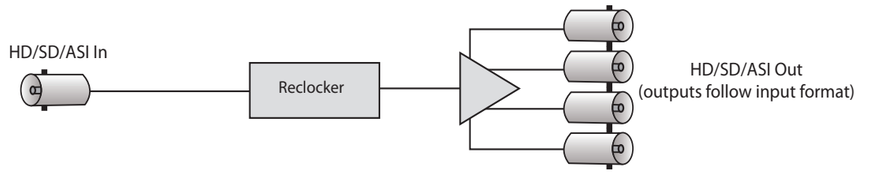
Automatic Input Cable Equalization

Serial Digital Output

Number	Four
Signal Type	HD/SD/ASI Serial Digital (SMPTE 259M or SMPTE 274M, 292M or 296M), follows input
Impedance	75 Ω
Return Loss	>15 dB
Output DC	None (AC coupled)

General Specifications

Size	5.625" W x 0.8" H x 5.5" D (143 mm x 21 mm x 152 mm) including connectors and flange
Weight	14 oz
Power	12 volts, 2 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.



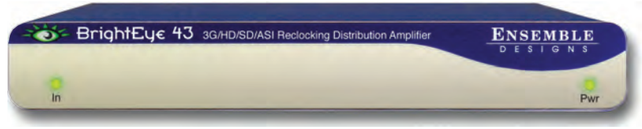
BrightEye 43
3G/HD/SD/ASI Distribution Amplifier

BrightEye 43 is a reclocking distribution amplifier that can be used with standard definition video signals, 3 Gb/s and 1.5 Gb/s high definition signals, or ASI signals. The signal is equalized, reclocked and delivered to the outputs.

This is a simple device with no USB port and no interface to BrightEye Mac or PC software. Front panel indicators show the presence of an input signal and power.

Features

- **Use with video converters and TSGs in order to have more outputs**
- **DA for digital HD or SD signals**
- **DA for 3G HD, Level A and Level B supported**
- **DA for ASI signals**
- **Passes embedded audio**



ENSEMBLE DESIGNS

Designed and built in California 5 YEAR WARRANTY

BrightEye 43
3G/HD/SD/ASI Distribution Amplifier

Serial Digital Input

Number	One
Signal Type	270 Mb/s SD Serial Digital (SMPTE 259M)
	1.485 Gb/s HD Serial Digital (SMPTE 274M, 292M or 296M)
2.97 Gb/s HD Serial Digital	(SMPTE 424M, 425M) Level A, Level B
Impedance	75 Ω
Return Loss	>15 dB to 1.485 GHz
	>10 dB to 2.97 GHz
Max Cable Length	300 meters for 270 Mb/s
	100 meters for 1.485 Gb/s
	70 meters for 2.97 Gb/s
	(Belden 1694A)

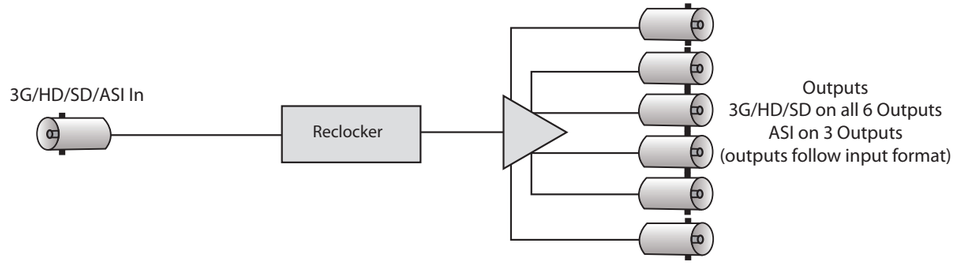
Automatic Input Cable Equalization

Serial Digital Output

Number	Six (Three for ASI)
Signal Type	3G/HD/SD/ASI Serial Digital follows input
Impedance	75 Ω
Return Loss	>15 dB to 1.485 GHz
	>10 dB to 2.97 GHz
Output DC	None (AC coupled)

General Specifications

Size	5.63″W x 0.8″H x 5.98″D (143 mm x 21 mm x 152 mm) including connectors and flange
Weight	15 oz
Power	12 volts, 7 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.



BrightEye 46

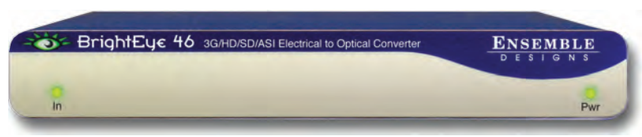
3G/HD/SD/ASI Electrical to Optical Converter

BrightEye 46 is an electrical to optical converter and distribution amplifier that can be used with standard definition video signals, 3 Gb/s and 1.5 Gb/s high definition signals, or ASI signals. The video input is reclocked and presented on four BNCs and is also converted to an optical signal and presented on an optical LC connector. This optical output can drive single mode fiber to a distance of 20 kilometers. With an optical launch power attenuator, multi-mode fiber can also be used with BrightEyes.

This is a simple device with no USB port and no interface to BrightEye Mac or PC software. Front panel indicators show the presence of an input signal and power.

Features

- **Optical transmitter**
- **Electrical to optical converter**
- **Use with HD or SD signals**
- **Use with ASI signals**
- **3G HD, Level A and Level B supported**
- **Serves as a distribution amplifier**
- **Passes embedded audio**



BrightEye 46

3G/HD/SD/ASI Electrical to Optical Converter

Serial Digital Input

Number	One
Signal Type	270 Mb/s SD Serial Digital (SMPTE 259M) 1.485 Gb/s HD Serial Digital (SMPTE 274M, 292M or 296M) 2.97 Gb/s HD Serial Digital (SMPTE 424M, 425M) Level A, Level B
Impedance	75 Ω
Return Loss	>15 dB to 1.485 GHz >10 dB to 2.97 GHz
	Max Cable Length 300 meters for 270 Mb/s 100 meters for 1.485 Gb/s 70 meters for 2.97 Gb/s (Belden 1694A)

Automatic Input Cable Equalization

Serial Digital Output

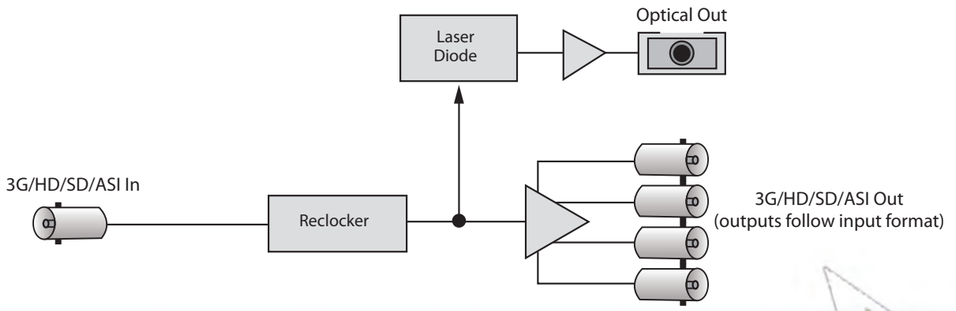
Number	Four
Signal Type	3G/HD/SD/ASI Serial Digital , follows input
Impedance	75 Ω
Return Loss	>15 dB to 1.485 GHz >10 dB to 2.97 GHz
Output DC	None (AC coupled)

Optical Output

Number	One
Type	SD and ASI (SMPTE 297M, optical equivalent of 259M) 1.485 Gb/s HD (SMPTE 274M, 292M or 296M) 2.97 Gb/s HD (SMPTE 424M, 425M)
Wavelength	1310 nm (non-CWDM) Wavelengths 170 nm – 1610 nm at 20 nm CWDM spacing available. Call factory for price and specify part number BE46-SP.
Weight	1lb 2.3oz
Power	-7 dBm
Max Cable Length	20 km (For greater distances, or higher power and larger loss budgets, please contact the factory)
Fiber Type	Single Mode Multi-mode compatible with attenuation at transmit end
Connector	LC/UPC

General Specifications

Size	5.63″ W x 0.8″ H x 5.98″ D (143 mm x 21 mm x 152 mm) including connectors and flange
Weight	15 oz
Power	12 volts, 7 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.



BrightEye 48

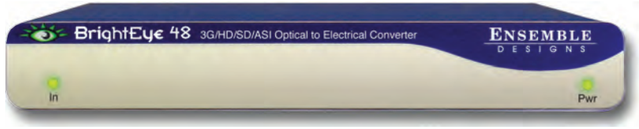
3G/HD/SD/ASI Optical to Electrical Converter

BrightEye 48 is an optical to electrical converter that can be used with standard definition video signals, 3 Gb/s and 1.5 Gb/s high definition signals, or ASI signals. The optical input is converted to electrical form and the resulting serial digital signal is reclocked and delivered to BNC outputs. Providing six electrical outputs, the BrightEye 48 also serves as a distribution amplifier. An input status indicator shows whether a proper optical signal is detected at the converter input.

This is a simple device with no USB port and no interface to BrightEye Mac or PC software. Front panel indicators show the presence of an input signal and power.

Features

- **Optical receiver**
- **Optical to electrical converter**
- **Use with HD or SD signals**
- **3G HD, Level A and Level B supported**
- **Use with ASI signals**
- **Serves as a distribution amplifier**
- **Passes embedded audio**



Optical Input

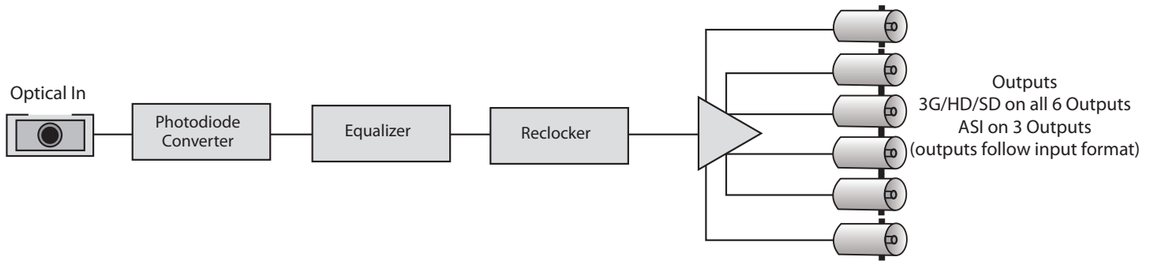
Number	One
Type	SD and ASI (SMPTE 297M, optical equivalent of 259M) 1.485 Gb/s Gb/s HD Serial Digital (SMPTE 274M, 272M or 296M) 2.97 Gb/s HD Serial Digital (SMPTE 424M, 425M) Level A, Level B
Wavelength	830 to 1610 nm
Receiver Sensitivity	SD and ASI: -18 dBm HD: -18 dBm
Max Cable Length	20 km (For greater distances, or higher power and larger loss budgets, please contact the factory)
Fiber Type	Single Mode Multi-mode compatible with attenuation at transmit end
Connector	LC/UPC

Serial Digital Output

Number	Six (Three for ASI)
Signal Type	Follows input
Impedance	75 Ω
Return Loss	>15 dB to 1.485 GHz >10 dB to 2.97 GHz
Max Cable Length	300 meters for 270 Mb/s 100 meters for 1.485 Gb/s 70 meters for 2.97 Gb/s (Belden 1694A)

General Specifications

Size	5.63″W x 0.8″H x 5.98″D (143 mm x 21 mm x 152 mm) including connectors and flange
Weight	15 oz Power 12 volts, 7 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.



BrightEye 54

Sync Generator and Test Signal Generator

BrightEye 54 is a master sync generator and test signal generator that is perfect as a master reference generator for remote trucks, desktop and fly packs. It is a stable timing source, operating from an internal precision standard that meets full broadcast specifications.

Color black, bars, crosshatch, multiburst, and SDI checkfield (pathological) are just some of the signals simultaneously available on the SDI and analog composite outputs.

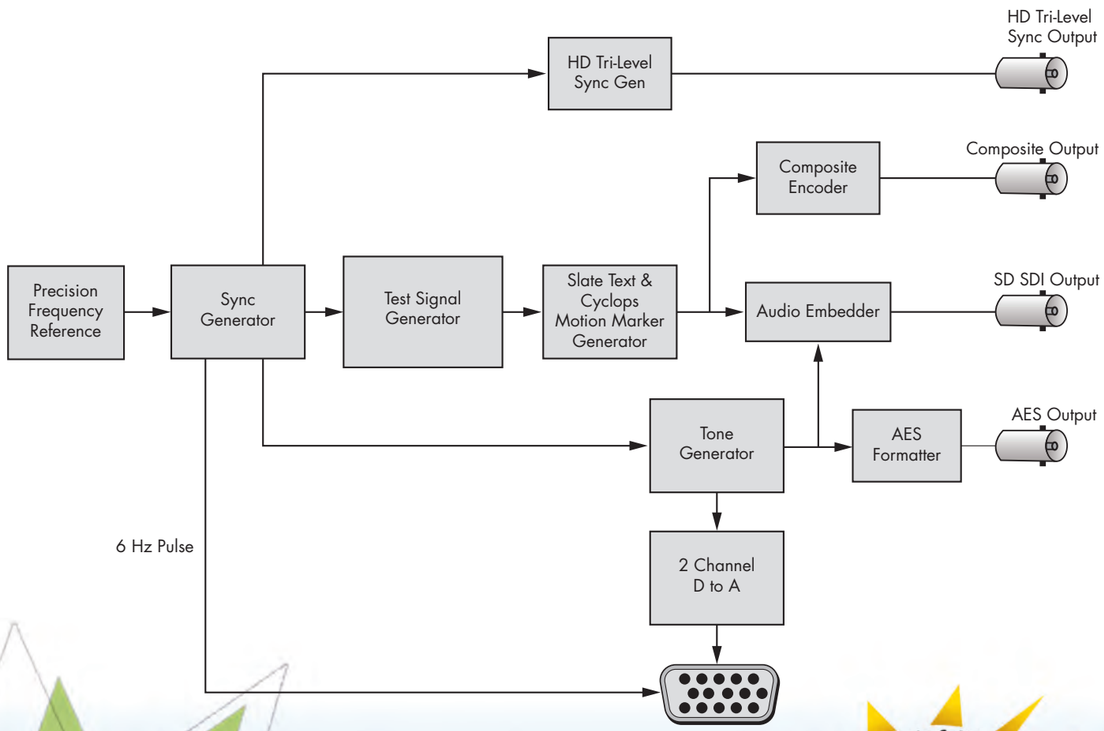
An ID slate with user programmable text can overlay the test pattern. The cyclops feature adds a motion element to the video test signal, handy for live applications.

The Tri-level Sync output provides reference to high definition equipment, such as VTRs, disc recorders and workstations. There are a wide variety of user selectable formats including: 720p, 1080i, 1080sF, and 1080p. Format selections and other controls are accessed through BrightEye Mac or PC software.

AES3id digital audio, analog audio and embedded audio reference outputs are provided.

Features

- **Reference generator for all video and audio gear**
- **Sync pulse generator**
- **Test signal generator**
- **Composite, SD SDI, HD Tri-Level outputs**
- **Audio outputs**



ENSEMBLE DESIGNS

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Composite Output

Number	One
Signal Type	NTSC/PAL
Impedance	75 Ω
Return Loss	>40 dB DC to 5.5 MHz
Frequency Response	-0.1 dB 10 KHz to 5.0 MHz
Output DC	±50 mV
K Factor	<1.0%
Differential Phase	<1.0 degree
SCH Phase	±5 degrees

Accuracy and Timing Stability

Internal TCXO	
PAL Fsc	4.43361875 MHz +/- 1 Hz
NTSC Fsc	3.579545 MHz +/- 1 Hz
601 Fs	27.000000 MHz +/- 5 Hz
Long Term Drift	<1 ppm/year
Analog Jitter	<1 ns
Digital Jitter	<0.2 UI (0.13 UI typical)

Serial Digital Output

Number	One
Signal Type	Serial Digital (SMPTE 259M)
Return Loss	>15 dB, DC to 270 MHz

AES Audio Output

Number	One
Type	AES3id, 1 KHz tone
Resolution	24 bit

Analog Audio Output

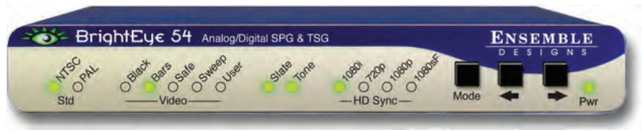
Number	One stereo pair or two mono
Type	1 KHz tone
Impedance	30 Ω, balanced
Reference Level	-10 to + 4 dBu, adjustable

Tri-Level Sync Output

Number	One, 75 Ω
Type	1080i (SMPTE 274M -5, 6) 50, 59.94, 60 Hz 720p (SMPTE 296M -2, 3) 50, 59.94, 60 Hz 1080p (SMPTE 274M -9, 11) 23.98, 24, 25 Hz 1080sF (RP211 -14, 16) 23.98, 24, 25 Hz
Output DC	±50 mV
Return Loss	>30 dB to 30 MHz

General Specifications

Size	5.63"W x 0.8"H x 5.98"D (143 mm x 21 mm x 152 mm) including connectors and flange
Weight	1 lb
Power	12 volts, 4 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.



BrightEye 55

Genlockable Sync Generator and Test Signal Generator

BrightEye 55 is a genlockable sync generator and test signal generator that can be used as either a slave or master reference generator. It can lock to house reference or it can lock to its own internal precision standard. BrightEye 55 is well suited for remote trucks, desktop and fly packs.

Color black, bars, crosshatch, multiburst, and SDI checkfield (pathological) are just some of the signals simultaneously available on the SDI and analog composite outputs.

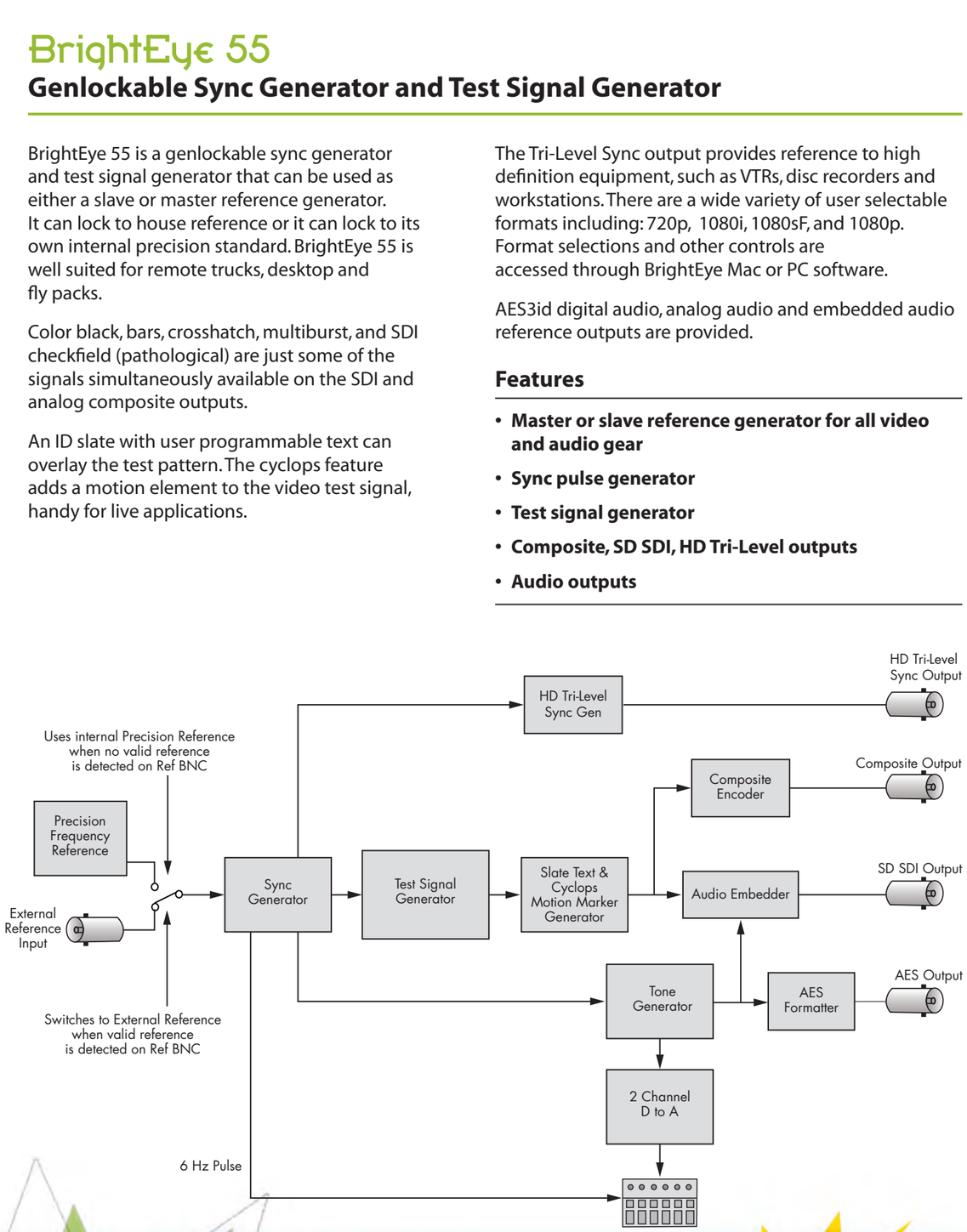
An ID slate with user programmable text can overlay the test pattern. The cyclops feature adds a motion element to the video test signal, handy for live applications.

The Tri-Level Sync output provides reference to high definition equipment, such as VTRs, disc recorders and workstations. There are a wide variety of user selectable formats including: 720p, 1080i, 1080sF, and 1080p. Format selections and other controls are accessed through BrightEye Mac or PC software.

AES3id digital audio, analog audio and embedded audio reference outputs are provided.

Features

- **Master or slave reference generator for all video and audio gear**
- **Sync pulse generator**
- **Test signal generator**
- **Composite, SD SDI, HD Tri-Level outputs**
- **Audio outputs**



ENSEMBLE DESIGNS

Designed and built in California 5 YEAR WARRANTY

Genlockable Sync Generator and Test Signal Generator

Reference Input

Number	One
Signal Type	1 V P-P Composite Video PAL or NTSC
Return Loss	>40 dB DC to 5.5 MHz

Composite Output

Number	One
Signal Type	NTSC/PAL
Impedance	75 Ω
Return Loss	>40 dB DC to 5.5 MHz
Frequency Response	-0.1 dB 10 KHz to 5.0 MHz
Output DC	±50 mV
K Factor	<1.0%
Differential Phase	<1.0 degree
SCH Phase	±5 degrees

Accuracy and Timing Stability

Internal TCXO	
PAL Fsc	4.43361875 MHz +/- 1 Hz
NTSC Fsc	3.579545 MHz +/- 1 Hz
601 Fs	27.000000 MHz +/- 5 Hz
Long Term Drift	<1 ppm/year
Analog Jitter	<1 ns
Digital Jitter	<0.2 UI (0.13 UI typical)

Serial Digital Output

Number	One
Signal Type	Serial Digital (SMPTE 259M)
Return Loss	>15 dB, DC to 270 MHz

Tri-Level Sync Output

Number	One, 75 Ω
Type	1080i (SMPTE 274M -5, 6) 50, 59.94, 60 Hz 720p (SMPTE 296M -2, 3) 50, 59.94, 60 Hz 1080p (SMPTE 274M -9, 11) 23.98, 24, 25 Hz 1080sF (RP211 -14, 16) 23.98, 24, 25 Hz
Output DC	±50 mV
Return Loss	>30 dB to 30 MHz

AES Audio Output

Number	One
Type	AES3id, 1 KHz tone
Resolution	24 bit

Analog Audio Output

Number	One stereo pair or two mono
Type	1 KHz tone
Impedance	30 Ω, balanced
Reference Level	-10 to + 4 dBu, adjustable

General Specifications

Size	5.63″W x 0.8″H x 5.98″D (143 mm x 21 mm x 152 mm) including connectors and flange
Weight	15 oz
Power	12 volts, 4 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.

BrightEye 56

HD/SD/Analog Test Signal and Sync Pulse Generator

BrightEye 56 is a genlockable sync generator and test signal generator that can be used as either a slave or master reference generator. It can lock to house reference or it can lock to its own internal precision standard. BrightEye 56 is well suited for remote trucks, post, helicopters and fly packs.

HD or SD SDI test signals or black with embedded audio is output on the SDI BNCs. Composite, Tri-level Sync and AES digital audio outputs are also provided. There are three user programmable outputs that are selectable between AES, LTC, Word Clock or 6 Hz Pulse. Analog audio and AES outputs provide tone or silence.

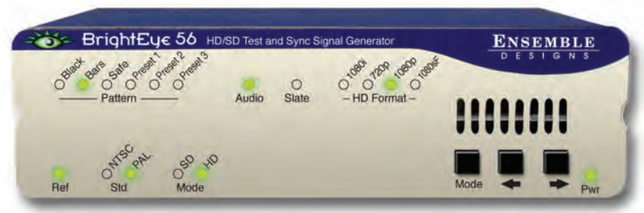
Color black, bars, crosshatch, multiburst, and SDI checkfield (pathogenic) are just some of the signals simultaneously available on the SDI and analog composite outputs. The cyclops feature adds a motion element to the selected video test signal. An ID slate with user programmable text can overlay the test pattern.

The internal timecode generator feeds DVITC on the SDI outputs and VITC on the composite outputs, timecode can also be selected in LTC form on the programmable Aux outputs.

Many controls can be adjusted through the intuitive front panel. BrightEye Mac and BrightEye PC software provide a complete user interface for all adjustments and controls.

BrightEye 56

HD/SD/Analog Test Signal and Sync Pulse Generator



Features

- **Master or slave reference generator for all video and audio gear**
- **Sync pulse generator**
- **30+ HD and SD test signals**
- **Composite, SD SDI, Tri-Level outputs**
- **Timecode generator**
- **Analog, AES and embedded audio outputs**

Reference Input

Number	One
Signal Type	1 V P-P Composite Video PAL or NTSC, Tri-Level Sync, or 10 MHz
Return Loss	>40 dB DC to 5.5 MHz

Composite Output

Number	Two
Signal Type	NTSC/PAL
Impedance	75 Ω
Return Loss	>40 dB DC to 5.5 MHz
Frequency Response	-0.1 dB 10 KHz to 5.0 MHz
Output DC	±50 mV
K Factor	<1.0%
Differential Phase	<1.0 degree
SCH Phase	±5 degrees

Accuracy and Timing Stability

Internal	TCXO
PAL Fsc	4.43361875 MHz +/- 1 Hz
NTSC Fsc	3.579545 MHz +/- 1 Hz
601 Fs	27.000000 MHz +/- 5 Hz
Long Term Drift	<1 ppm/year
Analog Jitter	<1 ns
Digital Jitter	<0.2 UI (0.13 UI typical)

Serial Digital Output

Number	Two
Signal Type	270 Mb/s SD Serial Digital (SMPTE 259M) 1.485 Gb/s HD Serial Digital (SMPTE 274M, 292M or 296M)
Return Loss	>15 dB for 270 Mb/s >15 dB for 1.485 Gb/s
Max Cable Length	300 meters for 270 Mb/s 100 meters for 1.485 Gb/s 70 meters for 2.97 Gb/s (Belden 1694A)

Tri-Level Sync Output

Number	Two, 75 Ω
Output	DC ±50 mV
Return Loss	>30 dB to 30 MHz

BrightEye 56
HD/SD/Analog Test Signal and Sync Pulse Generator

Standards Supported:

1080i (SMPTE 274M -4, 5, 6) 50, 59.94 or 60 Hz
720p (SMPTE 296M -1, 2, 3) 50, 59.94 or 60 Hz
1080p (SMPTE 274M -9, 10, 11) 23.98, 24, 25 Hz
1080sF (RP211 -14, 15, 16) 23.98, 24, 25 Hz
625i 50, 525i 59.94, Composite PAL, NTSC

AES Audio Output

Number	One
Type	AES3id, 1 KHz tone or silence
Resolution	24 bit

Analog Audio Output

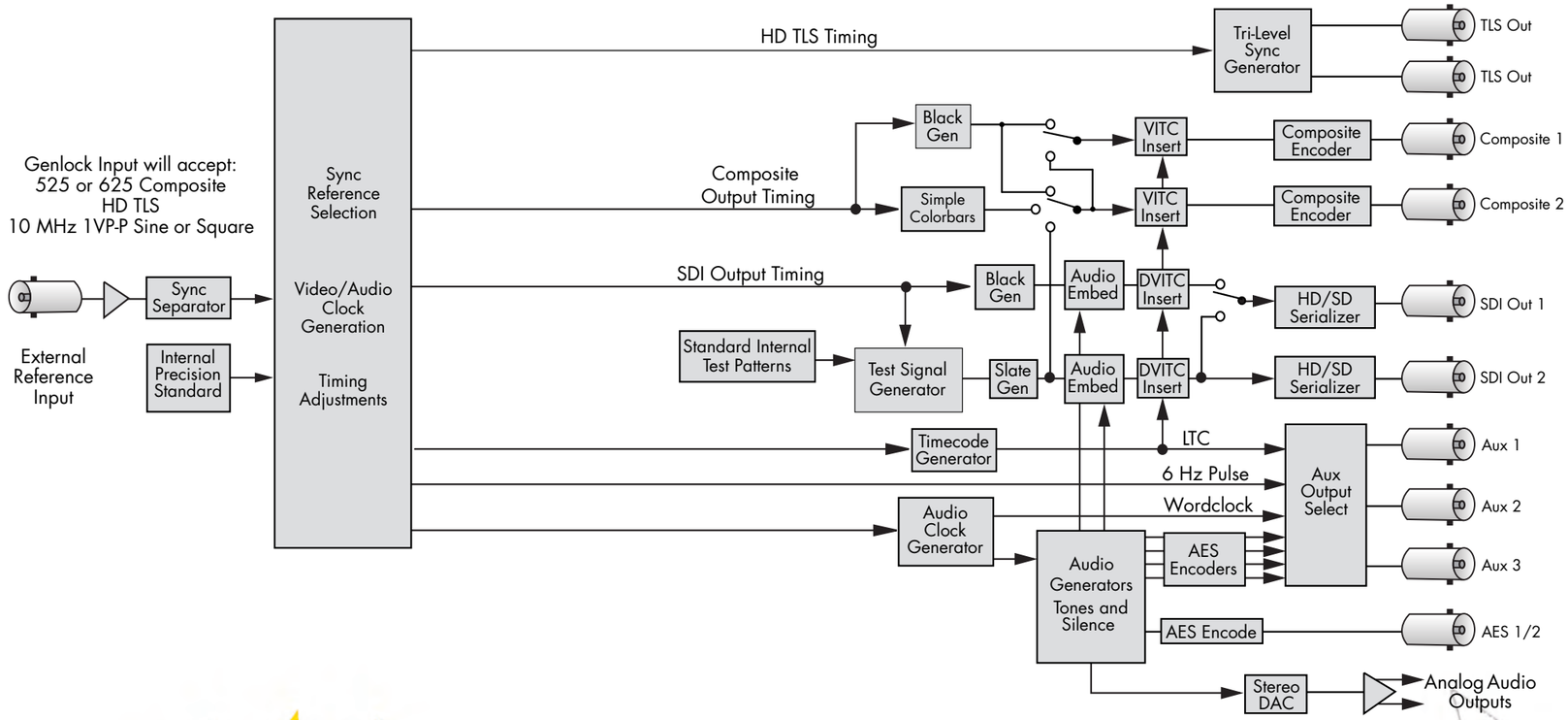
Number	One stereo pair or two mono
Type	1 KHz tone or silence
Impedance	30 Ω, balanced
Reference Level	-10 to + 4 dBu, adjustable

Programmable Outputs

Number	Three
Type	Selectable between AES, LTC, Wordclock or 6 Hz Pulse
Impedance	75 Ω

General Specifications

Size	5.63" W x 1.65" H x 5.98" D (143 mm x 42 mm x 152 mm) including connectors and flange
Weight	1 lb 7 oz
Power	12 volts, 12 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.



BrightEye 57

3G/HD/SD/Analog Test Signal and Sync Pulse Generator

BrightEye 57 is a genlockable sync generator and test signal generator that can be used as either a slave or master reference generator. It can lock to house reference or it can lock to its own internal precision standard. BrightEye 57 is well suited for remote trucks, post, helicopters and fly packs.

1.5 Gb/s HD, 3 Gb/s HD or SD SDI test signals or black with embedded audio is output on the SDI BNCs. Composite, Tri-level Sync and AES digital audio outputs are also provided. There are three user programmable outputs that are selectable between AES, LTC, Word Clock or 6 Hz Pulse. Analog audio and AES outputs provide tone or silence.

Color black, bars, crosshatch, multiburst, and SDI checkfield (pathogenic) are just some of the signals simultaneously available on the SDI and analog composite outputs. The cyclops feature adds a motion element to the selected video test signal. An ID slate with user programmable text can overlay the test pattern.

The internal timecode generator feeds DVITC on the SD SDI outputs and VITC on the composite outputs, timecode can also be selected in LTC form on the programmable Aux outputs.

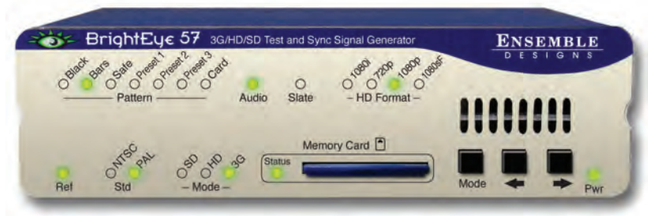
In addition to the standard suite of test patterns, users can create custom test patterns on a computer. Simply transfer test patterns to the included Secure Digital flash memory card and then insert the memory card into the front of the BrightEye 57. Test patterns can include motion.

Many controls can be adjusted through the intuitive front panel. BrightEye Mac and PC software provide a complete user interface for all adjustments and controls.

For facilities and manufacturers using 3 Gb/s video, BrightEye units can be combined to form a complete 3G signal chain. The BrightEye 57 test signal generator's 3G output can be distributed through the BrightEye 43 3G distribution amplifier or the BrightEye 46 and BrightEye 48 E/O 3G fiber optical transmitter/receiver set.

BrightEye 57

3G/HD/SD/Analog Test Signal and Sync Pulse Generator



Features

- **Master or slave reference generator for all video and audio gear**
- **Composite, HD SDI, SD SDI, Tri-Level outputs**
- **3 Gb/s HD, Level A supported**
- **30+ HD and SD test signals**
- **Create your own test patterns, transfer via secure digital flash memory**
- **Sync pulse generator**
- **Timecode generator**
- **Analog, AES and embedded audio outputs**

Designed and built in California
5 YEAR WARRANTY

Reference Input

Number	One
Signal Type	1 V P-P Composite Video PAL or NTSC, Tri-Level Sync, or 10 MHz
Return Loss	>40 dB DC to 5.5 MHz

Composite Output

Number	Two
Signal Type	NTSC/PAL
Impedance	75 Ω
Return Loss	>40 dB DC to 5.5 MHz
Frequency Response	-0.1 dB 10 KHz to 5.0 MHz
Output DC	±50 mV
K Factor	<1.0%
Differential Phase	<1.0 degree
SCH Phase	±5 degrees

Accuracy and Timing Stability

Internal TCXO	
PAL Fsc	4.43361875 MHz +/- 1 Hz
NTSC Fsc	3.579545 MHz +/- 1 Hz
601 Fs	27.000000 MHz +/- 5 Hz
Long Term Drift	<1 ppm/year
Analog Jitter	<1 ns
Digital Jitter	<0.2 UI (0.13 UI typical)

Serial Digital Output

Number	Two
Signal Type	270 Mb/s SD Serial Digital (SMPTE 259M) 1.485 Gb/s HD Serial Digital (SMPTE 274M, 292M or 296M) 2.97 Gb/s HD Serial Digital (SMPTE 424M, 425M), Level A
Return Loss	>15 dB to 1.485 GHz >10 dB to 2.97 GHz
Max Cable Length	300 meters for 270 Mb/s 100 meters for 1.485 Gb/s 70 meters for 2.97 Gb/s (Belden 1694A)

Tri-Level Sync Output

Number	Two, 75 Ω
Output DC	±50 mV
Return Loss	>30 dB to 30 MHz

Standards Supported:

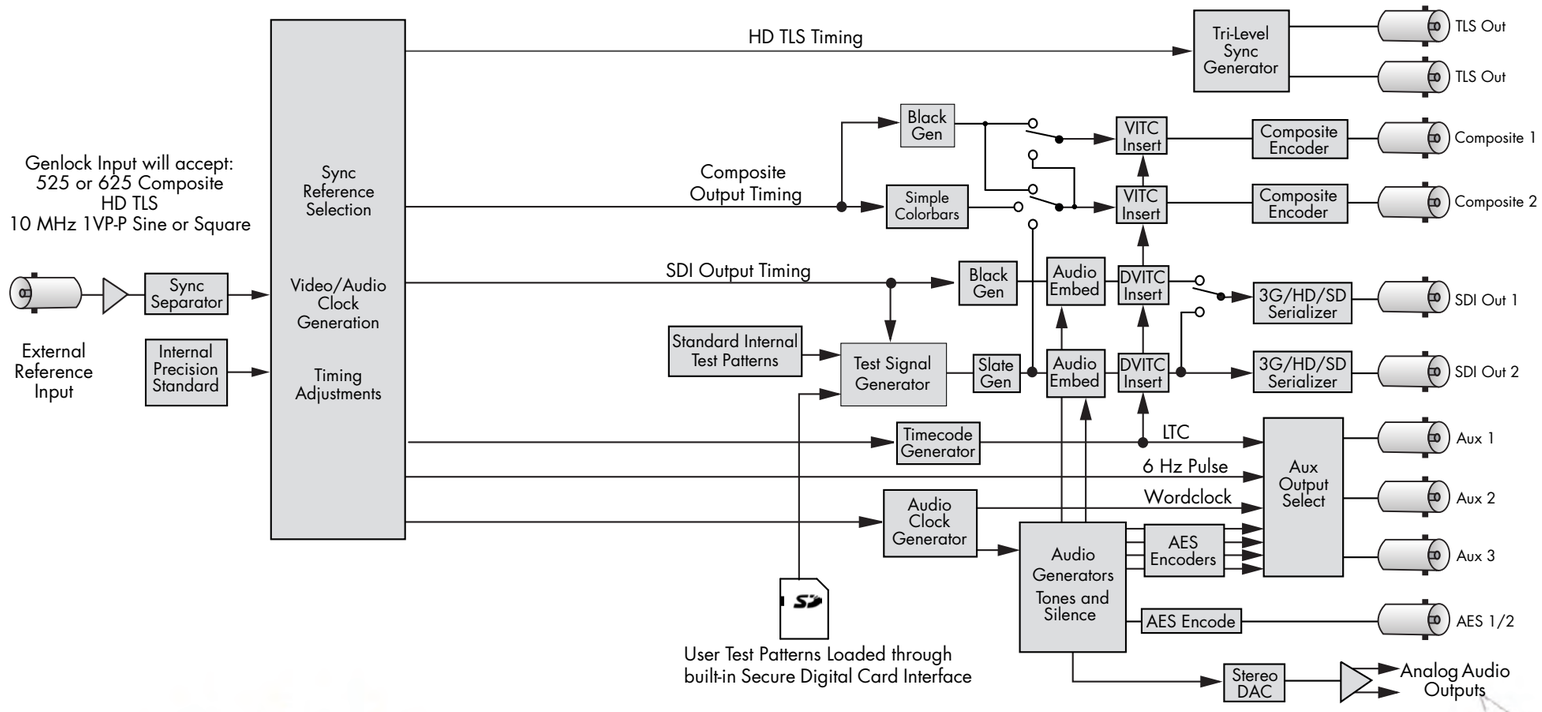
1080i (SMPTE 274M -4, 5, 6) 50, 59.94 or 60 Hz
720p (SMPTE 296M -1, 2, 3) 50, 59.94 or 60 Hz
1080p (SMPTE 274M -9, 10, 11) 23.98, 24, 25 Hz
1080sF (RP211 -14, 15, 16) 23.98, 24, 25 Hz
1080p (SMPTE 424M, 425M), 50, 59.94, 60, Level A
625i 50, 525i 59.94, Composite PAL, NTSC

AES Audio Output

Number	One
Type	AES3id, 1 KHz tone or silence
Resolution	24 bit

Analog Audio Output

Number	One stereo pair or two mono
Type	1 KHz tone or silence
Impedance	30 Ω, balanced
Reference Level	-10 to + 4 dBu, adjustable



BrightEye 57
3G/HD/SD/Analog Test Signal and Sync Pulse Generator

Programmable Outputs

Number	Three
Type	Selectable between AES, LTC, Wordclock, or 6 Hz Pulse
Impedance	75 Ω

Flash Memory

Number	One
Type	Secure Digital SD Flash Memory Card
Size	2 GB card included

File Type

Video	.tga

General Specifications

Size	5.63" W x 1.65" H x 5.98" D (143 mm x 42 mm x 152 mm) including connectors and flange
Weight	1 lb 7 oz
Power	12 volts, 12 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.

BrightEye 70
HD/SD AES Embedder/Disembedder

The BrightEye 70 is a dual rate eight channel audio embedder or disembedder for 1.5 Gb/s high definition video signals or for 270 Mb/s standard definition signals. Four AES ports automatically configure as inputs or outputs depending if the module is configured as mux or demux.

When configured as a multiplexer, the BrightEye 70 has one serial digital video input and four AES audio inputs. These four AES streams are embedded into the video stream. AES inputs are sample rate converted, allowing the use of asynchronous audio. The output of the module is a digital stream that contains the original video signal and four AES pairs.

When configured as a demultiplexer, audio signals present in the incoming video signal are extracted and delivered as standard AES digital audio streams.

The BrightEye 70 includes an eight channel audio mixer with channel swap and shuffle capability that allows you to completely re-arrange and re-mix audio channels. It provides precise control over audio level, with up to 12 dB of gain to compensate for low level sources. All audio processing is performed at full 24 bit resolution by a digital signal processor (DSP). Delay is adjustable up to one second. The Data mode operation allows embedding or disembedding of Dolby E or AC-3 signals.

Features

- **Use with servers, workstations and satellite receivers**
- **HD/SD audio embedder or disembedder**
- **8 channel audio mixing**
- **Adjustable delay**
- **Data mode for Dolby E and AC-3**
- **Passes embedded audio**

ENSEMBLE DESIGNS

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Serial Digital Input

Number	One
Type	HD Serial Digital 1.485 Gb/s SMPTE 274M, 292M or 296M or SD Serial Digital 270 Mb/s SMPTE 259M
Impedance	75 Ω
Return Loss	>15 dB
Max Cable Length	100 meters for HD 300 meters for SD (Belden 1694A)

HD Standards Supported:

1080i (SMPTE 274M -4,5,6) 50, 59.94 or 60 Hz
720p (SMPTE 296M -1,2,3) 50, 59.94 or 60 Hz
1080p (SMPTE 274M -9,10,11) 23.98, 24, 25 Hz
1080sF (RP211 -14,15,16) 23.98, 24, 25 Hz

Serial Digital Output

Number	One
Type	Follows input
Delay	< 1 µSec Audio is adjustable to 1 second
Impedance	75 Ω
Return Loss	>15 dB
Output DC	None (AC coupled)

AES/EBU Digital Inputs

Number	Four (total of eight channels)
Type	AES3id
Connector	Coaxial, 75 Ω
Bit Depth	20 and 24 Bit
Sample Rate	30 KHz to 100 KHz (sample rate converted internally to 48 KHz)
Crosstalk	<144 dB
Dynamic Range	>144 dB
Reference Level	-18 or -20 dBFS (selectable)
	AC-3, Dolby-E
	Supported when inputs are synchronous

Embedded Inputs

Number	Four AES Streams (from video input) Eight channels from any two of four groups
Channels	Eight
Bit Depth	20 and 24 Bit

AES/EBU Digital Outputs

Number	Four (total of 8 channels)
Type	AES3id
Connector	Coaxial, 75 Ω
Bit Depth	24 Bit
Sample Rate	48 KHz, synchronous to video output
Reference Level	-18 or -20 dBFS (selectable)

Embedded Output (In SDI Outputs)

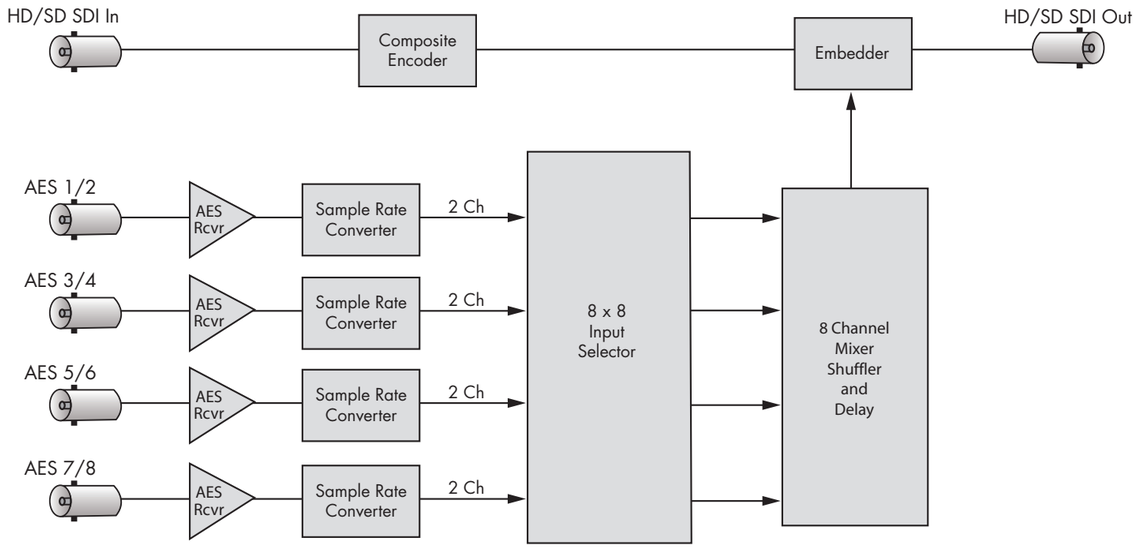
Group Assign	Cascade or replace any two of four groups
Channels	Eight
Bit Depth	24 Bit

General Specifications

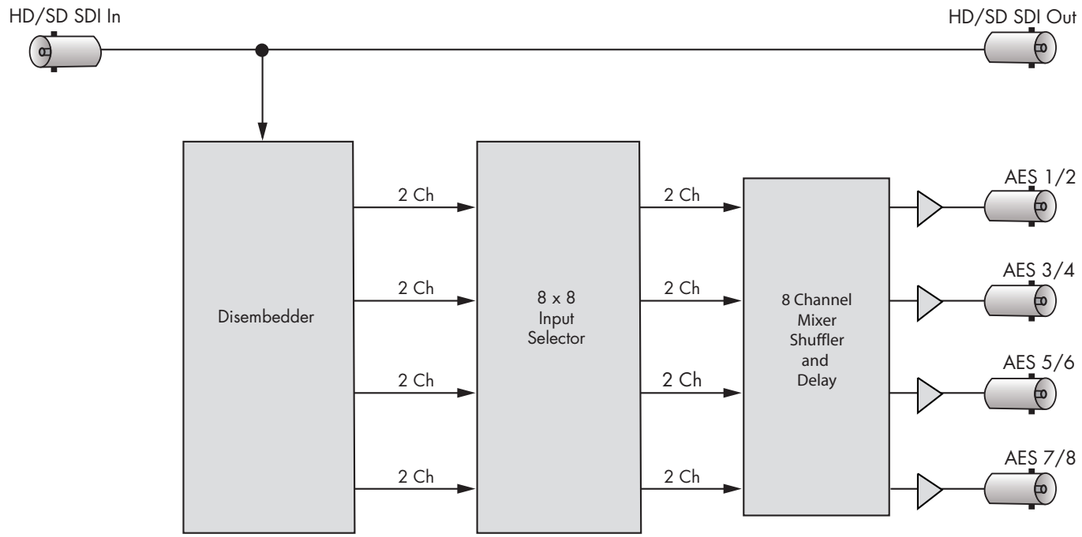
Size	5.63"W x 0.8"H x 5.98"D (143 mm x 21 mm x 152 mm) including connectors and flange
Weight	15 oz
Power	12 volts, 3 watts (100-230 VAC modular power supply)
Power Consumption	12 volts, 8 watts
Temperature Range	0 to 40° C ambient (all specs met)
Relative Humidity	0 to 95% non-condensing
Altitude	0 to 10,000 ft.

BrightEye 70 Block Diagrams on following pages

Mux Mode



Demux Mode



BrightEye 71 & 71-F

HD/SD 8 Channel Analog Audio Embedder/Disembedder

The BrightEye 71 is a dual rate eight channel analog audio embedder or disembedder for 1.5 Gb/s high definition video signals or for 270 Mb/s standard definition signals. The analog audio ports automatically configure as inputs or outputs depending if the module is configured as mux or demux.

When configured as a multiplexer, the BrightEye 71 has one serial digital video input and eight analog audio inputs. The audio streams are embedded into the video stream. The output of the module is a digital stream that contains the original video and audio signals.

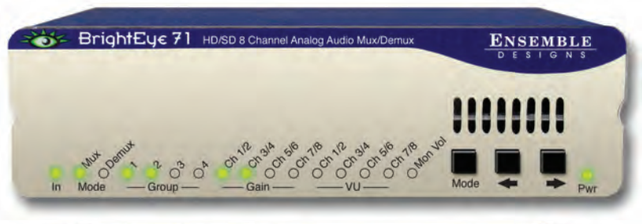
When configured as a demultiplexer, audio signals present in the incoming video signal are extracted and delivered as analog audio.

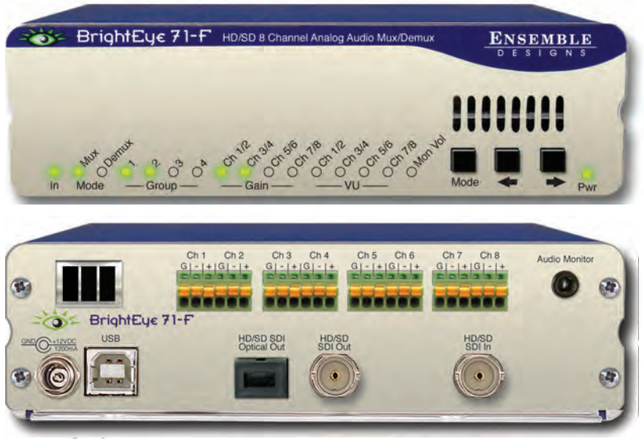
The BrightEye 71 includes an eight channel audio mixer with channel swap and shuffle capability that allows you to re-arrange and re-mix audio channels. It provides precise control over audio level, with up to 12 dB of gain to compensate for low level sources. All audio processing is performed at full 24 bit resolution by a digital signal processor (DSP). Delay is adjustable up to one second.

Order the BrightEye 71-F if you need an optical output.

Features

- **Use with servers, workstations and satellite receivers**
- **HD/SD audio embedder or disembedder**
- **8 channel audio mixing**
- **Adjustable delay**
- **Optical output available on BrightEye 71-F**
- **Passes embedded audio**





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BrightEye 71 & 71-F

HD/SD 8 Channel Analog Audio Embedder/Disembedder

Serial Digital Input

Number	One
Type	HD Serial Digital 1.485 Gb/s SMPTE 274M, 292M or 296M or SD Serial Digital 270 Mb/s SMPTE 259M
Impedance	75 Ω
Return Loss	>15 dB
Max Cable Length	100 meters for HD 300 meters for SD (Belden 1694A)

Automatic Input Cable Equalization

HD Standards Supported:

1080i (SMPTE 274M -4,5,6) 50, 59.94 or 60 Hz
720p (SMPTE 296M -1,2,3) 50, 59.94 or 60 Hz
1080p (SMPTE 274M -9,10,11) 23.98, 24, 25 Hz
1080sF (RP211 -14,15,16) 23.98, 24, 25 Hz

Analog Audio Inputs

Number	Eight (selectable as inputs or outputs)
Type	Balanced
Impedance	>15K Ω
Maximum Input Level	24 dBu
CMRR	>60 dB, 20 Hz to 10 KHz
Quantization	24 bits, 128 x oversampled
Sample Rate	48 KHz
Reference Level	-10 dBu or +4 dBu
Frequency Response	±0.1 dB, 20 Hz to 20 KHz
Crosstalk	<106 dB
Dynamic Range	>106 dB

Analog Audio Outputs

Number	Eight (selectable as inputs or outputs)
Type	Balanced, transformerless
Impedance	30 Ω
Maximum Output Level	24 dBu
Resolution	24 bits, 128 x oversampled
Reference Level	-10 dBu or +4 dBu
Frequency Response	± 0.1 dB, 20 Hz to 20 KHz
Crosstalk	<106 dB
Dynamic Range	>106 dB

Embedded Output (In SDI Outputs)

Group Assign	Cascade or replace any two of four groups
Channels	Eight
Bit Depth	24 Bit

Serial Digital Output

Number	Two (BE 71) One (BE 71-F)
Type	Follows input
Delay	< 1 µSec Audio is adjustable to 1 second
Impedance	75 Ω
Return Loss	>15 dB
Output DC	None (AC coupled)

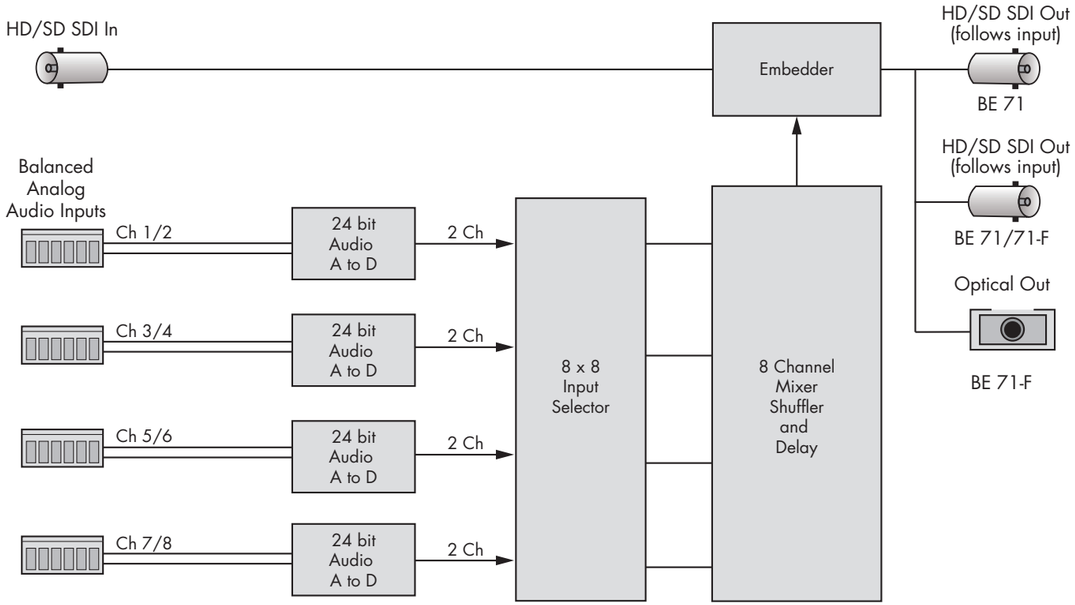
Optical Output (only on the BrightEye 71-F)

Number	One
Connector	SC/UPC
Type	SD (SMPTE 297M, optical equivalent of 259M) HD (SMPTE 274M or 296M)
Wavelength	1310 nm (non-CWDM) (1550 non-CWDM by special order)
Power	-7 dBm
Max Cable Length	20 km (For greater distances, or higher power and larger loss budgets, please contact the factory)
Fiber Type	Single Mode Multi-mode compatible with attenuation at transmit end

General Specifications

Size	5.63"W x 1.65"H x 5.98"D (143 mm x 42 mm x 152 mm) including connectors and flange
Weight	1 lb 5 oz
Power	12 volts, 8 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.

Mux Mode

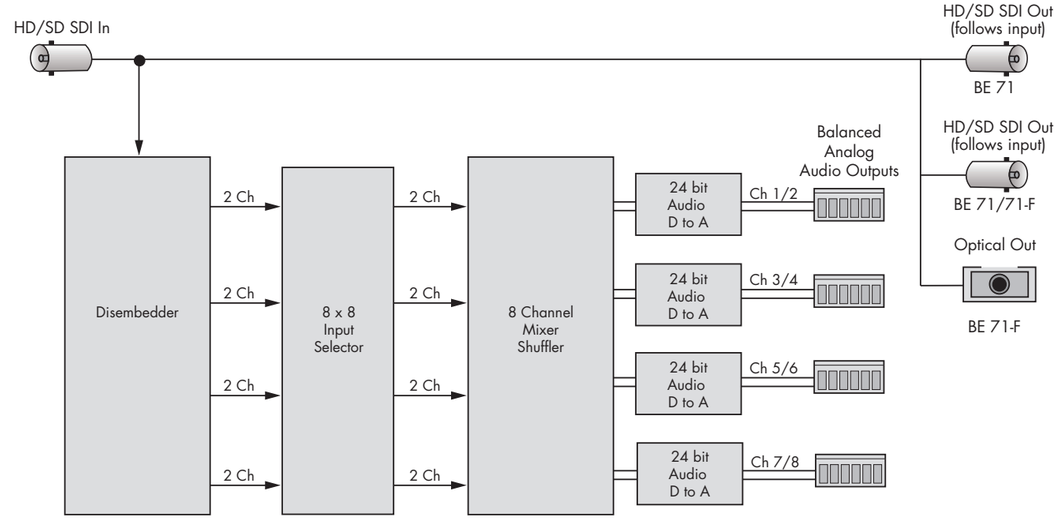


BrightEye 71 has two electrical SDI outputs

BrightEye 71-F has one electrical SDI output and one optical output

BrightEye 71 & 71-F
HD/SD 8 Channel Analog Audio Embedder/Disembedder

Demux Mode



BrightEye 71 has two electrical SDI outputs

BrightEye 71-F has one electrical SDI output and one optical output

BrightEye 72 & 72-F

SDI to HDMI Converter, Color Corrector and Broadcast Confidence Monitor

Pay a tenth of the cost for your monitors. Combine BrightEye 72 with any HDMI monitor for high-end display applications in broadcast and post. Color correction and temperature adjustments are made easy with the front panel and computer controls. Open captions, timecode and audio presence can be displayed on your monitor giving you confidence your signal is correct.

BrightEye 72 accepts an SD, 1.5 Gb/s HD or 3 Gb/s HD SDI digital signal and outputs HDMI.

Front panel controls include: complete proc amp, built-in test signals for use in aligning the monitor, graticule, H/V pulse delay, on screen audio VU meters, timecode burn in, AFD indicator and open caption decoding.

BrightEye 72 can display open captions on any HDMI video monitor. 608 or 708 caption data is decoded and displayed on-screen.

Audio presence is reported and on-screen VU meters show all 16 audio channels. If audio or Dolby E are embedded on the SDI input, audio is passed through on the HDMI output.

Horizontal and vertical split modes provide an easy way to see data in the vertical and horizontal intervals, including audio and closed caption data blocks.

A special Mirror Flip Output mode can be enabled, causing the output image to be flipped left to right for use with on-camera talent. Open captions are displayed correctly when Mirror mode is selected.

Use BrightEye 72 in studio applications where you need to adjust the color temperature of on-set monitors so they look right on-camera.

For facilities using 3G, the issue of monitoring the signal becomes a challenge. The BrightEye 72 provides a convenient way to monitor any type of digital video signal.

Order the BrightEye 72-F if you need an optical input.

Features

- **Turn any monitor into a high-end broadcast monitor**
- **Built-in color corrector – great for adjusting color temperature of on-set monitors**
- **Broadcast confidence monitor features including caption decoding, timecode display, AFD and audio level meters**
- **H & V shift for easy trouble shooting**
- **Safe Title/graticule overlay**
- **Mirror output mode for on-camera talent**
- **Use in post with 4:4:4 material**
- **Analog audio outputs**
- **Use with HD or SD monitors, VTRs and projectors**
- **Optical input available on BrightEye 72-F**

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BrightEye 72 & 72-F

SDI to HDMI Converter, Color Corrector and Broadcast Confidence Monitor

Serial Digital Input for BrightEye 72

Number	One
Type	1.485 Gb/s HD Serial Digital (SMPTE 274M, 292M or 296M) 2.97 Gb/s HD Serial Digital (SMPTE 424M, 425M), Level A SD Serial Digital (270 Mb/s SMPTE 259M)
Impedance	75 Ω
Return Loss	>15 dB to 2.97 GHz
Max Cable Length	300 meters for 270 Mb/s 100 meters for 1.485 Gb/s 70 meters for 2.97 Gb/s (Belden 1694A)

Automatic Input Cable Equalization

Optical Input for BrightEye 72-F

Number	One
Connector	LC/UPC
Type	270 Mb/s (SMPTE 297M, optical equivalent of 259M) 1.485 Gb/s Gb/s HD Serial Digital (SMPTE 274M, 272M or 296M) 2.97 Gb/s HD Serial Digital (SMPTE 424M, 425M)
Wavelength	830 to 1610 nm
Receiver Sensitivity	-18 dBm
Max Cable Length	20 km (For greater distances, or higher power and larger loss budgets, please contact the factory)
Fiber Type	Single Mode Multi-mode compatible with attenuation at transmit end

SDI Standards Supported

1080i (SMPTE 274M -4,5,6) 50, 59.94 or 60 Hz
720p (SMPTE 296M -1,2,3) 50, 59.94 or 60 Hz
1080p (SMPTE 274M -9,10,11) 23.98, 24, 25 Hz
1080sF (RP211 -14,15,16) 23.98, 24, 25 Hz
1080p (SMPTE 424M, 425M), 50, 59.94, 60, Level A
525i, 625i (SMPTE 259M)

HDMI Output

Number	One
Type	HDMI 1.3
Format	Follows input

Serial Digital Output

Number	One, loopback
Type	Follows input
Delay	< 5 µSec
Impedance	75 Ω
Return Loss	>15 dB to 2.97 GHz
Max Cable Length	300 meters for 270 Mb/s 100 meters for 1.485 Gb/s 70 meters for 2.97 Gb/s (Belden 1694A)

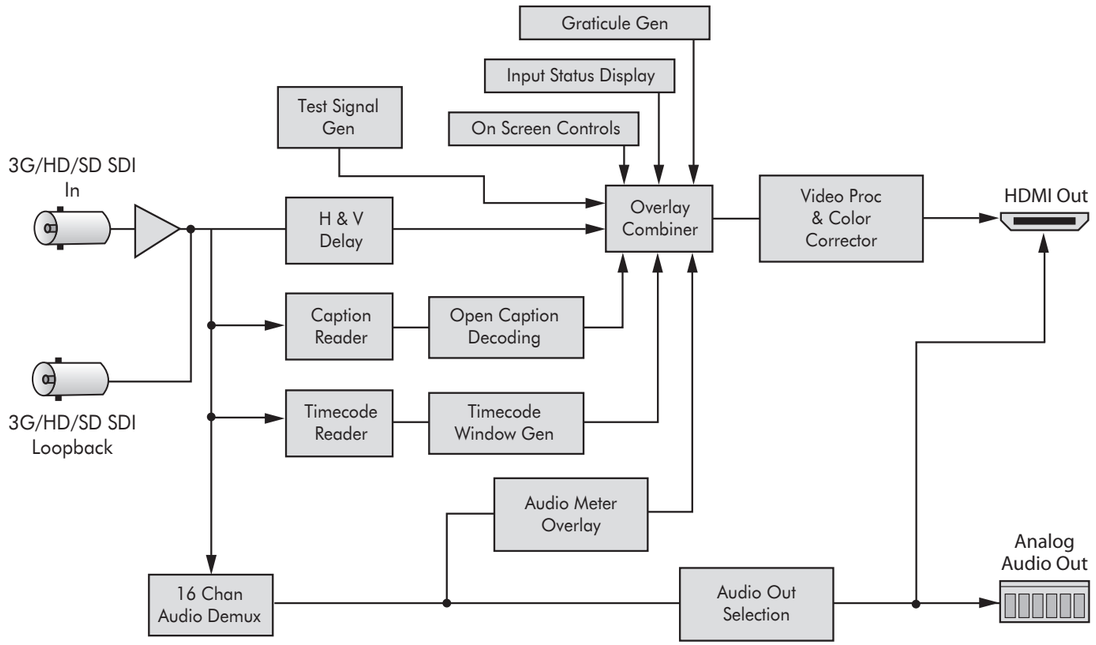
Analog Audio Output

Number	8 channels

General Specifications

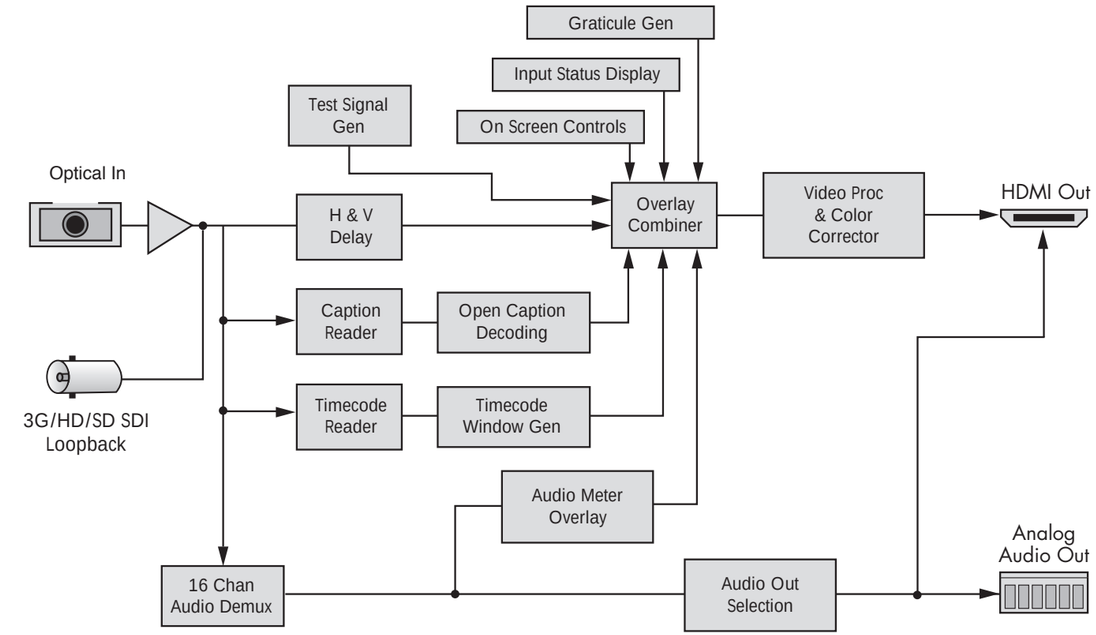
Size	5.63" W x 0.8" H x 5.98" D (143 mm x 21 mm x 152 mm) including connectors and flange
Weight	14 oz
Power	12 volts, 7 watts (100-230 VAC modular power supply)
Temperature Range	0 to 40° C ambient (all specs met)
Relative Humidity	0 to 95%, non-condensing
Altitude	0 to 10,000 ft.

BrightEye 72 SDI to HDMI Converter, Color Corrector and Broadcast Confidence Monitor



BrightEye 72 & 72-F
SDI to HDMI Converter, Color Corrector and Broadcast Confidence Monitor

BrightEye 72-F SDI to HDMI Converter, Color Corrector and Broadcast Confidence Monitor with Fiber Optic Input



BrightEye 73
HD/SD AES Embedder with Optical Out

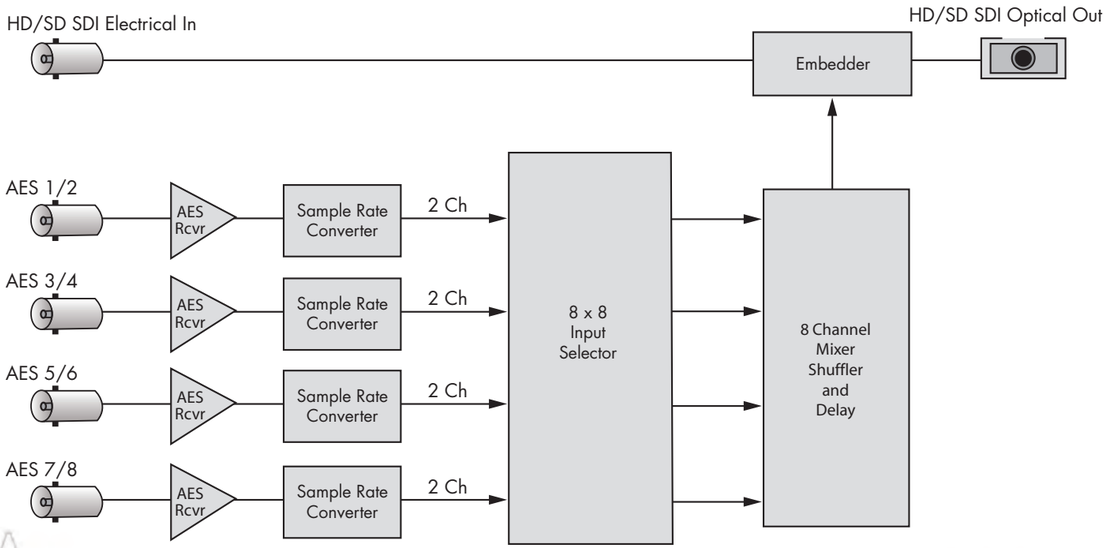
The BrightEye 73 is a dual rate eight channel audio embedder for 1.5 Gb/s high definition video signals or for 270 Mb/s standard definition signals.

There is one serial digital video input and four AES audio inputs. These four AES streams are embedded into the video stream. AES inputs are sample rate converted, allowing the use of asynchronous audio. The output of the module is an optical signal that contains the original video signal and four AES pairs.

The BrightEye 73 includes an eight channel audio mixer with channel swap and shuffle capability that allows you to completely re-arrange and re-mix audio channels. It provides precise control over audio level, with up to 12 dB of gain to compensate for low level sources. All audio processing is performed at full 24 bit resolution by a digital signal processor (DSP). Delay is adjustable up to one second. The Data mode operation allows Dolby E or AC-3 inputs.

Features

- **Optical transmitter**
- **Use with servers, workstations and routers**
- **8 channel audio embedder**
- **Adjustable delay**
- **HD/SD SDI electrical and AES inputs**
- **Optical embedded output**
- **Passes embedded audio**



BrightEye 73
HD/SD AES Embedder with Optical Out

Serial Digital Input

Number	One
Type	HD Serial Digital 1.485 Gb/s SMPTE 274M, 292M or 296M or SD Serial Digital 270 Mb/s SMPTE 259M
Delay	< 1 µSec Audio is adjustable to 1 second
Impedance	75 Ω
Return Loss	>15 dB
Max Cable Length	100 meters (Belden 1694A)
Automatic Input Cable Equalization	

HD Standards Supported

1080i (SMPTE 274M -4,5,6) 50, 59.94 or 60 Hz
720p (SMPTE 296M -1,2,3) 50, 59.94 or 60 Hz
1080p (SMPTE 274M -9,10,11) 23.98, 24, 25 Hz
1080sF (RP211 -14,15,16) 23.98, 24, 25 Hz

AES/EBU Digital Inputs

Number	Four (total of eight channels)
Type	AES3id
Connector	Coaxial, 75 Ω
Bit Depth	20 and 24 Bit
Sample Rate	30 KHz to 100 KHz (sample rate converted internally to 48 KHz)
Crosstalk	<144 dB
Dynamic Range	>144 dB
Reference Level	-18 or -20 dBFS (selectable)
AC-3, Dolby-E	Supported when inputs are synchronous

Optical Output

Number	One
Type	SD and ASI (SMPTE 297M, optical equivalent of 259M) HD (SMPTE 274M or 296M)
Wavelength	1310 nm (non-CWDM) (1550 non-CWDM by special order)
Power	-7 dBm
Max Cable Length	20 km (For greater distances, or higher power and larger loss budgets, please contact the factory)
Fiber Type	Single Mode Multi-mode compatible with attenuation at transmit end
Connector	SC

Embedded Output (In Optical Outputs)

Group Assign	Cascade or replace any two of four groups
Channels	Eight
Bit Depth	24 Bit

General Specifications

Size	5.63"W x 0.8"H x 5.98"D (143 mm x 21 mm x 152 mm) including connectors and flange
Weight	15 oz
Power	12 volts, 3 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.

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BrightEye 74
Optical Disembedder with HD/SD Electrical Out

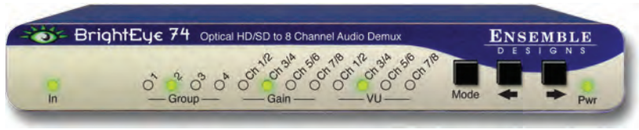
The BrightEye 74 is an eight channel audio disembedder for 1.5 Gb/s high definition video signals or for 270 Mb/s standard definition signals.

The BrightEye 74 accepts either an HD or SD optical signal. The digital video output is present on a BNC and is either HD SDI or SD SDI, following the input standard. Audio signals present in the incoming video signal are extracted and delivered as standard AES digital audio streams.

The BrightEye 74 includes an eight channel audio mixer with channel swap and shuffle capability that allows you to completely re-arrange and re-mix audio channels. It provides precise control over audio level, with up to 12 dB of gain to compensate for low level sources. All audio processing is performed at full 24 bit resolution by a digital signal processor (DSP). Delay is adjustable up to one second. The data mode allows disembedding of Dolby E or AC-3 signals.

Features

- **Optical receiver**
- **Use with satellite receivers and video servers**
- **HD/SD audio disembedder**
- **8 channel audio mixing**
- **Adjustable delay**
- **Passes embedded audio**



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BrightEye 74
Optical Disembedder with HD/SD Electrical Out

Optical Input

Number	One
Type	SD and ASI (SMPTE 297M, optical equivalent of 259M) HD (SMPTE 274M, 292M or 296M)
Wavelength	830 to 1610 nm
Receiver Sensitivity	SD and ASI: -18 dBm HD: -18 dBm
Max Cable Length	20 km (For greater distances, or higher power and larger loss budgets, please contact the factory)
Fiber Type	Single Mode Multi-mode compatible with attenuation at transmit end
Connector	SC

Embedded Inputs

Number	Four AES Streams (from optical input) Eight channels from any two of four groups
Channels	Eight
Bit Depth	20 and 24 Bit

HD Standards Supported

1080i (SMPTE 274M -4,5,6) 50, 59.94 or 60 Hz
720p (SMPTE 296M -1,2,3) 50, 59.94 or 60 Hz
1080p (SMPTE 274M -9,10,11) 23.98, 24, 25 Hz
1080sF (RP211 -14,15,16) 23.98, 24, 25 Hz

Serial Digital Output

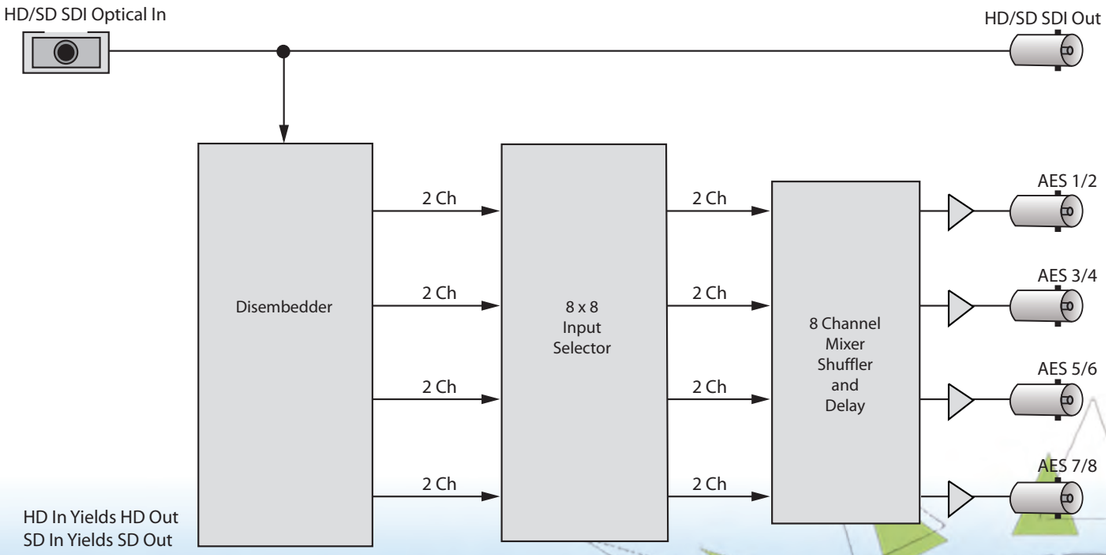
Number	One
Type	Follows input
Delay	< 1 µSec. Audio is adjustable to 1 second
Impedance	75 Ω
Return Loss	>15 dB
Output DC	None (AC coupled)

AES/EBU Digital Outputs

Number	Four (total of 8 channels)
Type	AES3id
Connector	Coaxial, 75 Ω
Bit Depth	20 and 24 Bit
Sample Rate	48 KHz, synchronous to video output
Reference Level	-18 or -20 dBFS (selectable)

General Specifications

Size	5.63" W x 0.8" H x 5.98" D (143 mm x 21 mm x 152 mm) including connectors and flange
Weight	15 oz
Power	12 watts, 3 watts
Temperature Range	0 to 40° C ambient (all specs met)
Relative Humidity	0 to 95% non-condensing
Altitude	0 to 10,000 ft.



BrightEye 75
HD/SD Analog to Digital Video Converter

BrightEye 75 is an analog video to digital converter and audio embedder. Standard definition component or composite, or high definition analog component video is accepted on the input BNCs. Two channels of analog audio are input on a plugable Phoenix connector.

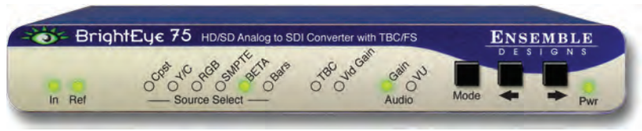
This unit is perfect for use with HD cameras or other devices with analog I/O. The digital output will carry the full, un-compressed input, synchronous to a genlock reference. You can turn a hand-held HD camera into a digital source. A three camera, live studio suddenly becomes affordable.

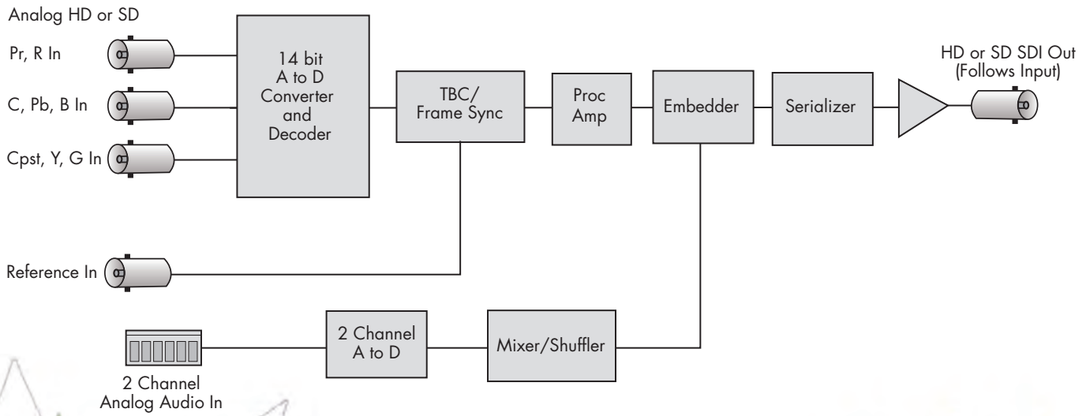
The built-in TBC/frame synchronizer allows you to feed asynchronous or noisy signals to the BrightEye 75. The input is digitized to 12 bits of resolution and time base corrected by a noise tolerant tracking circuit. An external reference input allows genlock to a house reference. Input selection, gain control, and TBC enable is provided through the front panel interface. Video levels can be adjusted through BrightEye Mac or PC software.

The video and audio signals are embedded and presented on a BNC. The output follows the SD or HD input standard.

Features

- **Use with analog HD cameras and set top boxes**
- **Turn analog camera into digital HD source**
- **HD/SD analog inputs**
- **Analog audio inputs**
- **Serial digital HD or SD embedded output**
- **TBC and frame sync**





ENSEMBLE DESIGNS

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BrightEye 75
HD/SD Analog to Digital Video Converter

Analog Video Input

Number	One
Type	HD or SD: Y, Pr, Pb (SMPTE or Beta levels) HD or SD: Analog Component RGB (sync on green) Analog Composite PAL or NTSC Analog S-Video PAL or NTSC
Resolution	Digitized at 12 bits
Impedance	75 Ω
Return Loss	>40 dB
Input DC	+/-1 volt DC
Input Hum	<100 mV

Analog Audio Inputs

Number	Two
Type	Balanced
Impedance	>15K Ω
Max Input Level	24 dBu
CMRR	>60 dB, 20 Hz to 10 KHz
Quantization	24 bits, 128 x oversampled
Sample Rate	48 KHz
Reference Level	-10 dBu or +4 dBu
Frequency Response	±0.1 dB, 20 Hz to 20 KHz
Crosstalk	<106 dB
Dynamic Range	>106 dB

Serial Digital Output

Number	One
Type	Follows input standard HD Serial Digital 1.485 Gb/s SMPTE 274M, 292M or 296M or SD Serial Digital 270 Mb/s SMPTE 259M
Impedance	75 Ω
Return Loss	>15 dB
Max Cable Length	100 meters for HD 300 meters for SD (Belden 1694A)

Analog Video to SDI Performance

Bit Resolution	14-bit input quantization 4 x oversampling
Decoding	Fully adaptive comb filter
K Factors	> 1%
Signal to Noise	> 64 dB weighted
Freq Response	± 0.1 dB, 0 to 5.5 MHz in SD ± 0.1 dB, 0 to 12 MHz; ± 0.5 dB, 12 to 30 MHz in HD

HD Standards Supported

1080i (SMPTE 274M -4,5,6) 50, 59.94 or 60 Hz
720p (SMPTE 296M -1,2,3) 50, 59.94 or 60 Hz
1080p (SMPTE 274M -9,10,11) 23.98, 24, 25 Hz
1080sF (RP211 -14,15,16) 23.98, 24, 25 Hz

Embedded Output (In Serial Output)

Group Assign	One of four groups
Channels	Two
Bit Depth	24 Bit

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

General Specifications

Size	5.63" W x 0.8" H x 5.98" D (143 mm x 21 mm x 152 mm) including connectors and flange
Weight	15 oz
Power	12 volts, 6 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.

BrightEye 76

HD/SD Analog to Digital Video Converter with Optical Out

BrightEye 76 is an analog video to digital converter and audio embedder. Standard definition component or composite, or high definition analog component video is accepted on the input BNCs. Two channels of analog audio are input on a plugable Phoenix connector.

This unit is perfect for use with HD cameras or other devices with analog I/O. The digital output will carry the full, un-compressed input, synchronous to a genlock reference. You can turn a hand-held HD camera into a digital source. A three camera, live studio suddenly becomes affordable.

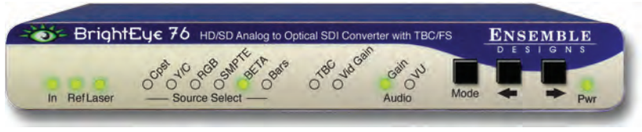
The built-in TBC/frame synchronizer allows you to feed asynchronous or noisy signals to the BrightEye 76. The input is digitized to 12 bits of resolution and time base corrected by a noise tolerant tracking circuit. An external reference input allows genlock to a house reference.

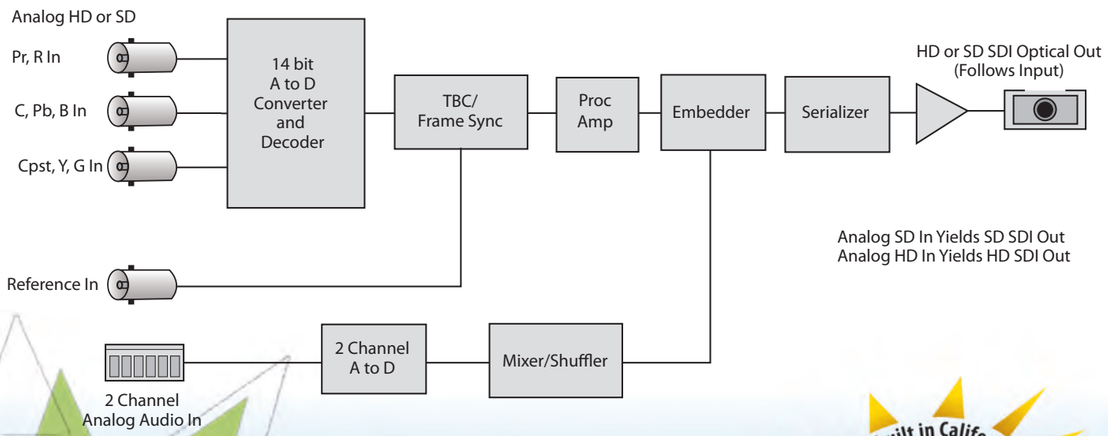
Input selection, gain control, and TBC enable is provided through the front panel interface. Video levels can be adjusted through BrightEye Mac or PC software.

The video and audio signals are embedded and presented as an optical output. The output follows the SD or HD input standard.

Features

- **Optical transmitter**
- **Use with analog HD cameras and set top boxes**
- **Turn analog camera into digital HD source**
- **Analog component HD or SD inputs**
- **Analog audio inputs**
- **Optical embedded output**
- **TBC and frame sync**





ENSEMBLE DESIGNS

Designed and built in California 5 YEAR WARRANTY

BrightEye 76

HD/SD Analog to Digital Video Converter with Optical Out

Analog Video Input

Number	One
Type	HD or SD: Y, Pr, Pb (SMPTE or Beta levels) HD or SD: Analog Component RGB (sync on green) Analog Composite PAL or NTSC Analog S-Video PAL or NTSC
Resolution	Digitized at 12 bits
Impedance	75 Ω
Return Loss	>40 dB
Input DC	+/-1 volt DC
Input Hum	<100 mV

Analog Audio Inputs

Number	Two
Type	Balanced
Impedance	>15K Ω
Maximum Input Level	24 dBu
CMRR	>60 dB, 20 Hz to 10 KHz
Quantization	24 bits, 128 x oversampled
Sample Rate	48 KHz
Reference Level	-10 dBu or +4 dBu
Frequency Response	±0.1 dB, 20 Hz to 20 KHz
Crosstalk	<106 dB
Dynamic Range	>106 dB

Optical Output

Number	One
Type	SD and ASI (SMPTE 297M, optical equivalent of 259M) HD (SMPTE 274M, 292M or 296M)
Wavelength	1310 nm (non-CWDM) (1550 non-CWDM by special order)
Power	-7 dBm
Max Cable Length	20 km (For greater distances, or higher power and larger loss budgets, please contact the factory)
Fiber Type	Single Mode Multi-mode compatible with attenuation at transmit end
Connector	SC

Analog Video to SDI Performance

Bit Resolution	14-bit input quantization, 4x oversampling
Decoding	Fully adaptive comb filter
K Factors	> 1%
Signal to Noise	> 64 dB weighted
Freq Response	± 0.1 dB, 0 to 5.5 MHz in SD ± 0.1 dB, 0 to 12 MHz; ± 0.5 dB, 12 to 30 MHz in HD

Embedded Output (In Optical Output)

Group Assign	One of four groups
Channels	Two
Bit Depth	24 Bit

HD Standards Support:

1080i (SMPTE 274M -4,5,6) 50, 59.94 or 60 Hz
720p (SMPTE 296M -1,2,3) 50, 59.94 or 60 Hz
1080p (SMPTE 274M -9,10,11) 23.98, 24, 25 Hz
1080sF (RP211 -14,15,16) 23.98, 24, 25 Hz

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

General Specifications

Size	5.63" W x 0.8" H x 5.98" D (143 mm x 21 mm x 152 mm) including connectors and flange
Weight	15 oz
Power	12 volts, 6 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.

BrightEye 81
3G/HD/SD SDI to HDMI Converter

Convert HD or SD SDI video feeds to HDMI with the BrightEye 81. Convenient for feeding a video monitor, BrightEye 81 provides a reliable way to achieve confidence monitoring in post and broadcast applications.

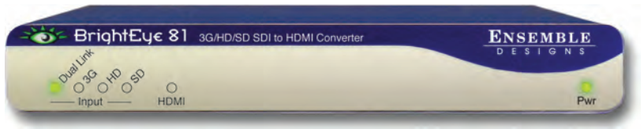
BrightEye 81 supports standard definition video signals, 3 Gb/s and 1.5 Gb/s high definition signals. The HDMI output is not HDCP encrypted.

BrightEye 81 also functions as a Dual Link to HDMI and 3G SDI converter. When the input is Dual Link 4:4:4, the BrightEye 81 provides two identical SDI outputs that are the 3G Level B version of the input video, and the HDMI output is HD 4:4:4.

Signal monitoring and control is provided through the included BrightEye Mac and PC software.

Features

- **3G, HD and SD SDI to HDMI converter**
- **Use with video monitors that have HDMI input**
- **Dual Link to HDMI converter**
- **Dual Link to 3G SDI converter**
- **Use with HD or SD signals**
- **Passes embedded audio**



Serial Digital Input

Number	One SDI, BNC or Two for Dual Link, BNC
Signal Type	270 Mb/s SD Serial Digital (SMPTE 259M) 1.485 Gb/s HD Serial Digital (SMPTE 274M, 292M or 296M) Dual Link HD SDI (SMPTE 372M) 2.97 Gb/s HD Serial Digital (SMPTE 424M, 425M) Level A
Impedance	75 Ω
Return Loss	>15 dB to 1.485 GHz >10 dB to 2.97 GHz
Max Cable Length	300 meters for 270 Mb/s 100 meters for 1.485 Gb/s 70 meters for 2.97 Gb/s (Belden 1694A)

Automatic Input Cable Equalization

SDI Standards Supported

1080i (SMPTE 274M -4,5,6) 50, 59.94 or 60 Hz
720p (SMPTE 296M -1,2,3) 50, 59.94 or 60 Hz
1080p (SMPTE 274M -9,10,11) 23.98, 24, 25 Hz
1080sF (RP211 -14,15,16) 23.98, 24, 25 Hz
1080p (SMPTE 424M, 425M), 50, 59.94, 60, Level A
Dual Link HD SDI 1080 RGB 4:4:4 (SMPTE 372M)
525i, 625i (SMPTE 259M)

HDMI Output

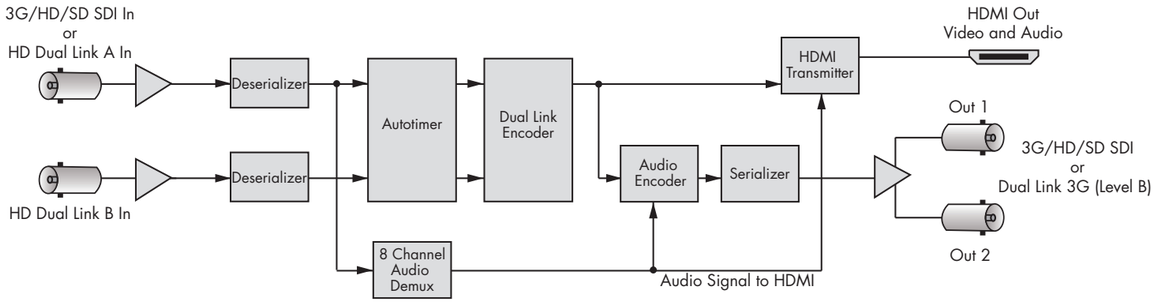
Number	One
Type	HDMI 1.3
Format	HDMI 1.3

Serial Digital Output

Number	Two, BNC
Signal Type	Follows input When input is Dual Link HD SDI, the SDI outputs are identical 3G Level B SDI signals (SMPTE 425M)
Impedance	75 Ω
Return Loss	>15 dB to 1.485 GHz >10 dB to 2.97 GHz
Output DC	None (AC coupled)

General Specifications

Size	5.63" W x 0.8" H x 5.98" D (143 mm x 21 mm x 152 mm) including connectors and flange
Power	12 volts, 7 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.



BrightEye 81-F

Optical to HDMI and 3G/HD/SD SDI Electrical Converter

Convert optical HD or SD video feeds to HDMI and electrical with the BrightEye 81-F. Convenient for feeding a video monitor, BrightEye 81-F provides a reliable way to monitor optical feeds in broadcast and mobile applications.

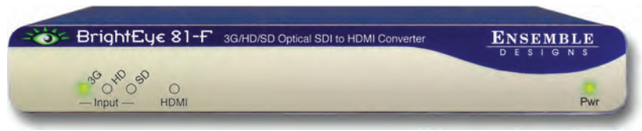
BrightEye 81-F is an optical to HDMI and electrical converter for use with standard definition video signals and 3 Gb/s and 1.5 Gb/s high definition signals. The video input is received on an optical LC connector, converted, and then output on both a BNC connector and an HDMI connector. The HDMI output is not HDCP encrypted.

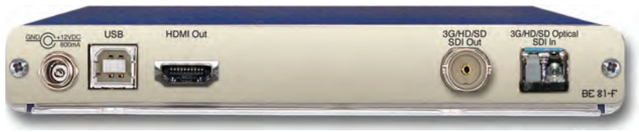
For facilities using 3G, the issue of monitoring the signal becomes a challenge. A 3G video signal can be easily viewed via the HDMI output.

Signal monitoring and control is provided through the included BrightEye Mac and BrightEye PC software.

Features

- **Optical to HDMI converter**
- **Optical to electrical converter**
- **Use with video monitors that have HDMI input**
- **Use with HD or SD signals**
- **3G HD, Level A supported**
- **Optical receiver**
- **Passes embedded audio**





BrightEye 81-F
Optical to HDMI and 3G/HD/SD SDI Electrical Converter

Optical Input

Number	One, LC/UPC
Type	270 Mb/s (SMPTE 297M, optical equivalent of 259M) 1.485 Gb/s Gb/s HD Serial Digital (SMPTE 274M, 272M or 296M) 2.97 Gb/s HD Serial Digital (SMPTE 424M, 425M), Level A
Wavelength	830 to 1610 nm
Receiver Sensitivity	-18 dBm
Max Cable Length	20 km (For greater distances, or higher power and larger loss budgets, please contact the factory)
Fiber Type	Single Mode Multi-mode compatible with attenuation at transmit end

SDI Standards Supported

1080i (SMPTE 274M -4,5,6) 50, 59.94 or 60 Hz
720p (SMPTE 296M -1,2,3) 50, 59.94 or 60 Hz
1080p (SMPTE 274M -9,10,11) 23.98, 24, 25 Hz
1080sF (RP211 -14,15,16) 23.98, 24, 25 Hz
1080p (SMPTE 424M, 425M), 50, 59.94, 60, Level A
525i, 625i (SMPTE 259M)

HDMI Output

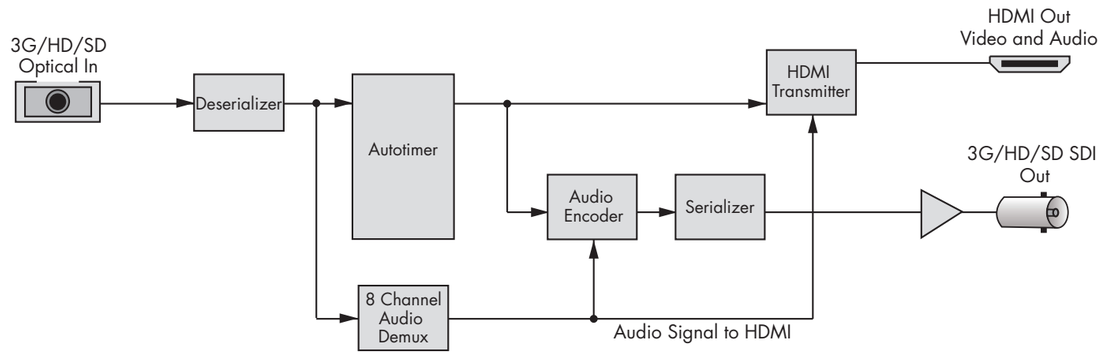
Number	One
Type	HDMI 1.3
Format	Follows input

Serial Digital Output

Number	One, BNC
Signal Type	Follows input
Impedance	75 Ω
Return Loss	>15 dB to 1.485 GHz >10 dB to 2.97 GHz
Output DC	None (AC coupled)

General Specifications

Size	5.63"W x 0.8"H x 5.98"D (143 mm x 21 mm x 152 mm) including connectors and flange
Power	12 volts, 7 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.



Designed and built in California
5 YEAR WARRANTY

BrightEye 83 and BrightEye 83-H

HDMI to 3G/HD/SD SDI Converter with HDCP Option

Convert HDMI to HD or SD SDI with the BrightEye 83. Convenient for broadcast video cameras and other sources with an HDMI output, BrightEye 83 presents the serial digital video signal on two BNC outputs.

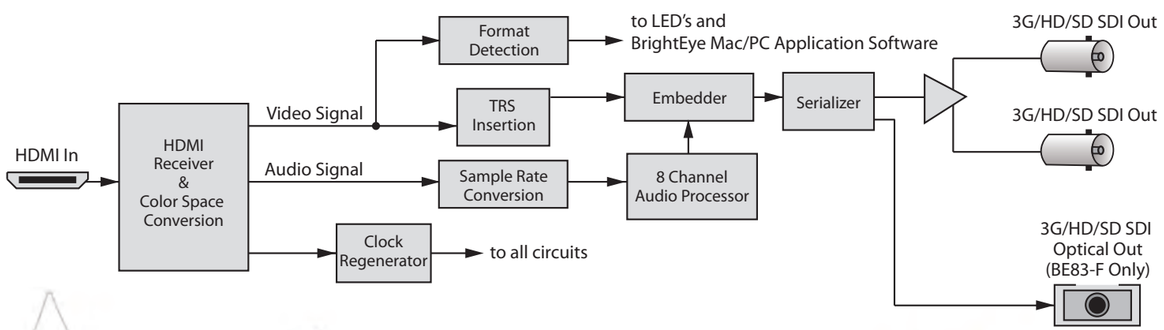
BrightEye 83 is an HDMI converter for use with standard definition video signals and 3 Gb/s and 1.5 Gb/s high definition signals.

Signal monitoring and control is provided through the included BrightEye Mac and BrightEye PC software.

In compliance with the licensing restrictions on HDCP encrypted material, BrightEye 83 cannot convert encrypted signals to SDI form.

Features

- **HDMI to HD and SD SDI converter**
- **Use with cameras and other sources that have an HDMI output**
- **Passes embedded audio**
- **BrightEye 83-H supports HDCP encrypted content**



BrightEye 83-F

HDMI to Optical and Electrical 3G/HD/SD SDI Converter

Convert HDMI to HD or SD SDI with the BrightEye 83-F. Convenient for broadcast video cameras and other sources with an HDMI output. BrightEye 83-F presents both electrical and optical serial digital outputs.

The optical output can drive single mode fiber to a distance of 20 kilometers. With an optical launch power attenuator, multi-mode fiber can also be used.

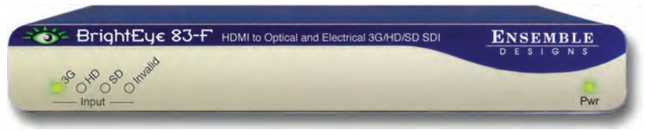
BrightEye 83-F is for use with standard definition video signals and 3 Gb/s and 1.5 Gb/s high definition signals.

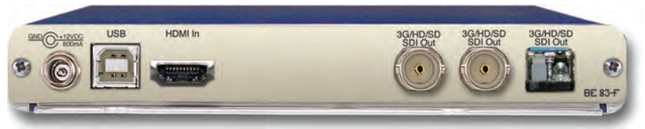
Signal monitoring and control is provided through the included BrightEye Mac and BrightEye PC software.

In compliance with the licensing restrictions on HDCP encrypted material, BrightEye 83-F cannot convert encrypted signals to SDI form.

Features

- **HDMI to optical and electrical converter**
- **Use with cameras and other sources that have an HDMI output**
- **Passes embedded audio**





Input

Number	One 83-H supports HDCP encrypted content
Type	HDMI 1.3
Format	Supports HDMI signals which map to the video standards listed below

SDI Standards Supported

1080i (SMPTE 274M -4,5,6) 50, 59.94 or 60 Hz
720p (SMPTE 296M -1,2,3) 50, 59.94 or 60 Hz
1080p (SMPTE 274M -9,10,11) 23.98, 24, 25 Hz
1080sF (RP211 -14,15,16) 23.98, 24, 25 Hz
1080p (SMPTE 424M, 425M), 50, 59.94, 60, Level A
525i, 625i (SMPTE 259M)

Serial Digital Output

Number	Two, BNC
Signal Type	Follows input
Impedance	75 Ω
Return Loss	>15 dB to 1.485 GHz >10 dB to 2.97 GHz
Output DC	None (AC coupled)

Optical Output (BE83-F Only)

Number	One, LC/UPC
Type	Follows input
Wavelength	1310 nm (non-CWDM) Wavelengths 170 nm –1610 nm at 20 nm CWDM spacing available. Call factory for price and specify part number BE83-F-SP.
Power	-7 dBm
Max Cable Length	20 km (For greater distances, or higher power and larger loss budgets, please contact the factory)
Fiber Type	Single Mode Multi-mode compatible with attenuation at transmit end

General Specifications

Size	5.63″ W x 0.8″ H x 5.98″ D (143 mm x 21 mm x 152 mm) including connectors and flange
Power	12 volts, 5 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.

Designed and built in California
5 YEAR WARRANTY

BrightEye 90

HD Up/Down/Cross Converter and ARC with AES Audio

Easy To Use

BrightEye 90 is a versatile up/down/cross converter or aspect ratio converter for use with analog and digital video signals. Simply set the BrightEye 90 to output your facility's preferred HD or SD standard. The BrightEye 90 will accommodate whatever input you connect – analog composite, SD SDI or HD SDI. After setting the output standard, BrightEye 90 automatically converts the selected input to the correct standard for your facility. BrightEye 90 will upconvert, downconvert, cross convert, or act as an ARC, as needed. The HDMI, SDI and composite outputs are all extremely high quality, suitable for any part of your signal chain. A special Mirror Flip Output mode can be enabled, causing the output image to be flipped left to right for use with on-camera talent. The built-in frame synchronizer allows you to feed asynchronous signals to the BrightEye 90. An external reference input allows genlock to a house reference. All vertical interval data and closed captioning is faithfully passed.

Upconverting to High Definition

Feed the analog composite or SD SDI output of a camera to a BrightEye 90 and upconvert to HD. You can take the HDMI and HD SDI signals from the BrightEye 90 into your switcher or projection system. Upconverting existing SD equipment lets you leverage the equipment you already have and operate in the HD domain.

While some cameras may have firewire out, using the video output and upconverting before distribution is preferable since longer cable runs can be achieved and quality is superior. Additionally, the BrightEye 90's reference input allows you to time the upconverted video output for use with a production switcher.

Downconverting to Standard Definition

BrightEye 90 will downconvert any type of HD signal and provides HDMI, SD SDI and an analog composite outputs suitable for broadcast or monitoring.

Cross Conversion

It's easy to convert between various HD standards, whether 720p or 1080i. Simply select the output standard you need and connect the input – that's all there is to it.

Aspect Ratio Conversion

For converting between SD 4:3 and HD 16:9, BrightEye 90 has you covered. Just select the output standard you need and connect the input.

Audio Processing Made Simple

BrightEye 90 handles both embedded audio and discrete AES digital audio streams. Sixteen channels of embedded audio are supported in BrightEye 90. If the incoming video has embedded audio, the audio will be safely bypassed around the video processing and lipsync will be preserved. Audio mixing is available for two of the four embedded groups of audio. The AES I/O ports can be configured for eight channels of incoming audio or for eight channels of audio output. The audio mixer can be used for AES channels as well. Mixer controls are accessed through BrightEye Mac or PC software.

Easy Audio Monitoring

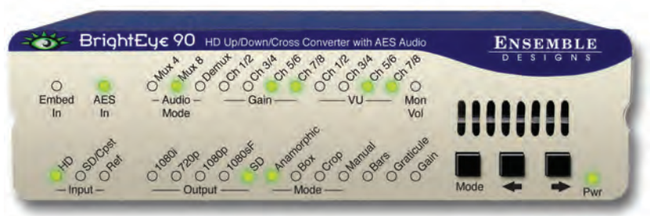
Audio monitoring is easy with BrightEye 90's convenient 3.5 mm mini jack. Select the audio channels you want to monitor from the front panel and plug in a headset.

Front Panel and Software Control

Input selection, gain control, and test pattern controls are provided through the front panel interface. Audio presence LEDs indicate which channels are detected. Controls for crop, letterbox and pillarbox are accessed from the front panel or BrightEye Mac or PC software. Video and audio levels and the audio mixer can be adjusted through BrightEye Mac or PC software.

BrightEye 90

HD Up/Down/Cross Converter and ARC with AES Audio



Features

- **Use with cameras and projection systems**
- **Turn analog camera into digital HD source**
- **HD and SD digital and analog composite video I/O**
- **HDMI output**
- **AES digital audio I/O**
- **Analog audio monitor output**
- **Mirror output mode for on-camera talent**
- **Graticule and Safe Title generator**
- **Frame sync**
- **12 and 16 bit processing**
- **Passes embedded audio**

Analog Video Input

Number	One
Type	Analog Composite PAL or NTSC
Resolution	Digitized at 12 bits
Impedance	75 Ω
Return Loss	>40 dB
Input DC	+/-1 volt DC
Input Hum	<100 mV

Serial Digital Input

Number	One
Signal Type	270 Mb/s SD Serial Digital (SMPTE 259M or 1.485 Gb/s HD Serial Digital (SMPTE 274M or 296M)
Impedance	75 Ω
Return Loss	>15 dB
Max Cable Length	300 meters for 270 Mb/s 100 meters for 1.485 Gb/s

Automatic Input Cable Equalization

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

Analog Video Output

Number	One
Type	Composite PAL or NTSC
Return Loss	>40 dB
Output	DC <100 mV

Serial Digital Output

Number	Two
Type	HD Serial Digital 1.485 Gb/s SMPTE 274M, 292M or 296M or SD Serial Digital 270 Mb/s SMPTE 259M
Delay	Adjustable from 1 field to 1 frame
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)

HD Standards Supported

1080i (SMPTE 274M -4,5,6) 50, 59.94 or 60 Hz
720p (SMPTE 296M -1,2,3) 50, 59.94 or 60 Hz
1080p (SMPTE 274M -9,10,11) 23.98, 24, 25 Hz
1080sF (RP211 -14,15,16) 23.98, 24, 25 Hz

AES/EBU Digital Inputs

Number	Four (total of eight channels) (selectable as inputs or outputs)
Type	AES3id
Connector	Coaxial, 75 Ω
Bit Depth	20 and 24 Bit
Sample Rate	30 KHz to 96 KHz (Sample Rate Converted internally to 48 KHz)
Reference Level	-18 or -20 dBFS (selectable)

AES/EBU Digital Outputs

Number	Four (total of eight channels) (selectable as inputs or outputs)
Type	AES3id
Connector	Coaxial, 75 Ω
Bit Depth	24 Bit
Sample Rate	48 KHz, synchronous to video output
Reference Level	-18 or -20 dBFS (selectable)

Embedded Output (In Serial Output)

Group Assign	Two of four groups
Channels	Sixteen passed
Bit Depth	24 Bit

HDMI Output

Number	One
Connector	HDMI
Type	Follows SDI out

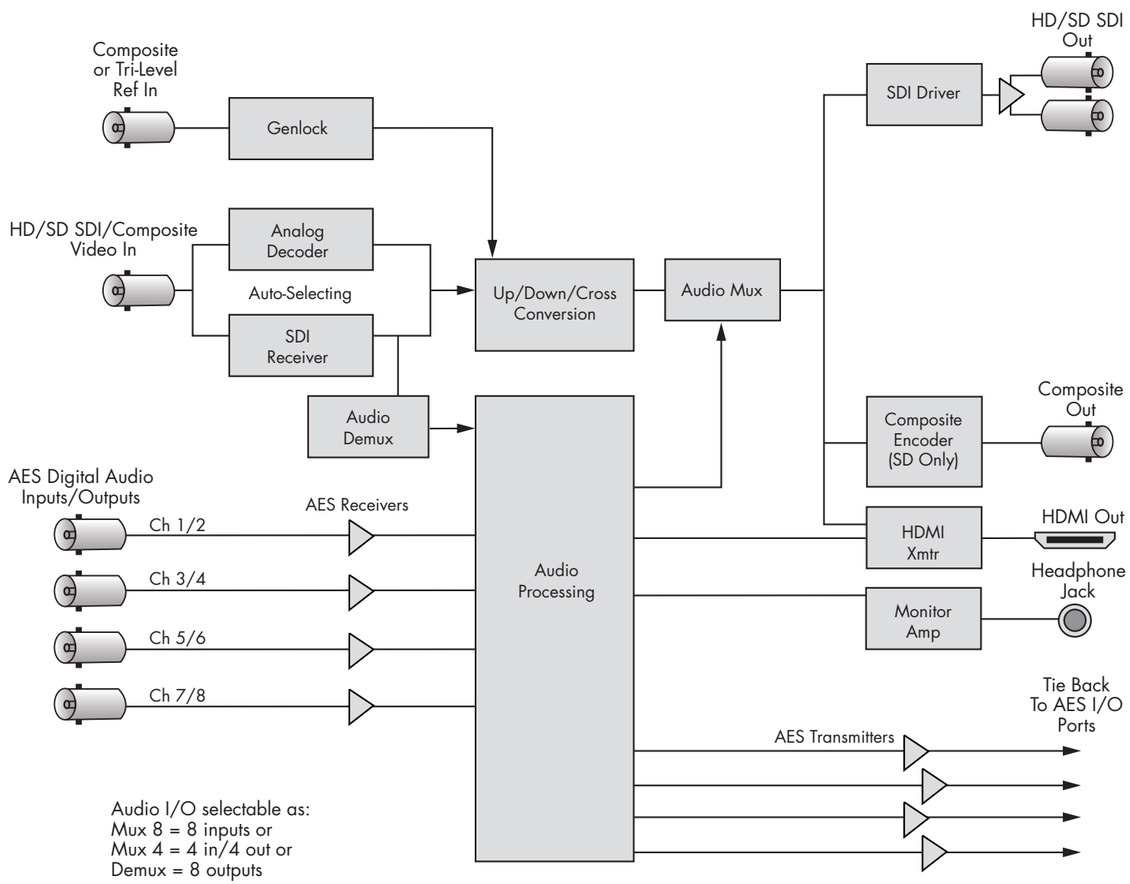
Audio Monitoring Output

Number	One (Select from sixteen channels)
Connector	3.5 mm stereo mini jack

General Specifications

Size	5.63″W x 1.65″H x 5.98″D (143 mm x 42 mm x 152 mm) including connectors and flange
Weight	1 lb 8 oz
Power	12 volts, 12 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.

BrightEye 90
HD Up/Down/Cross Converter and ARC with AES Audio



Audio I/O selectable as:
Mux 8 = 8 inputs or
Mux 4 = 4 in/4 out or
Demux = 8 outputs

Provides embedded pass through of all 16 audio channels

BrightEye 90-A

HD Up/Down/Cross Converter and ARC with Analog Audio

Easy To Use

BrightEye 90-A is a versatile up/down/cross converter or aspect ratio converter for use with analog and digital video signals. Simply set the BrightEye 90-A to output your facility's preferred HD or SD standard. The BrightEye 90-A will accommodate whatever input you connect – analog composite, SD SDI or HD SDI. After setting the output standard, BrightEye 90-A automatically converts the selected input to the correct standard for your facility. BrightEye 90-A will upconvert, downconvert, cross convert, or act as an ARC, as needed. The HDMI, SDI and composite outputs are all extremely high quality, suitable for any part of your signal chain. A special Mirror Flip Output mode can be enabled, causing the output image to be flipped left to right for use with on-camera talent. The built-in Frame Synchronizer allows you to feed asynchronous signals to the BrightEye 90-A. An external reference input allows genlock to a house reference. All vertical interval data and closed captioning is faithfully passed.

Upconverting to High Definition

Feed the analog composite or SD SDI output of a camera to a BrightEye 90-A and upconvert to HD. You can take the HDMI and HD SDI signals from the BrightEye 90-A into your switcher or projection system. Upconverting existing SD equipment lets you leverage the equipment you already have and operate in the HD domain.

While some cameras may have firewire out, using the video output and upconverting before distribution is preferable since longer cable runs can be achieved and quality is superior. Additionally, the BrightEye 90-A's reference input allows you to time the upconverted video output for use with a production switcher.

Downconverting to Standard Definition

BrightEye 90-A will downconvert any type of HD signal and provides HDMI, SD SDI and an analog composite outputs suitable for broadcast or monitoring.

Cross Conversion

It's easy to convert between various HD standards, whether 720p or 1080i. Simply select the output standard you need and connect the input – that's all there is to it.

Aspect Ratio Conversion

For converting between SD 4:3 and HD 16:9, BrightEye 90-A has you covered. Just select the output standard you need and connect the input.

Audio Processing Made Simple

BrightEye 90-A handles both embedded audio and eight channels of analog audio. Sixteen channels of embedded audio are supported in BrightEye 90-A. If the incoming video has embedded audio, the audio will be safely bypassed around the video processing and lipsync will be preserved. Audio mixing is available for two of the four embedded groups of audio. The analog audio I/O ports can be configured for eight channels of incoming audio or for eight channels of audio output. The audio mixer can be used for analog audio as well. Mixer controls are accessed through BrightEye Mac or PC software.

Easy Audio Monitoring

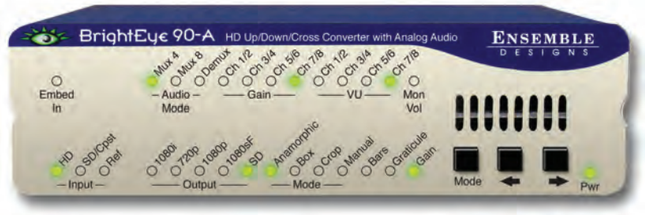
Audio monitoring is easy with BrightEye 90-A's convenient 3.5 mm mini jack. Select the audio channels you want to monitor from the front panel and plug in a headset.

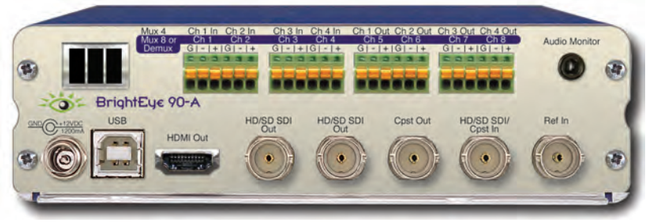
Front Panel and Software Control

Input selection, gain control, and test pattern controls are provided through the front panel interface. Audio presence LEDs indicate which channels are detected. Controls for crop, letterbox and pillarbox are accessed from the front panel or BrightEye Mac or PC software. Video and audio levels and the audio mixer can be adjusted through BrightEye Mac or PC software.

BrightEye 90-A

HD Up/Down/Cross Converter and ARC with Analog Audio





Features

- **Use with cameras and projection systems**
- **Turn analog camera into digital HD source**
- **HD and SD digital and analog composite video I/O**
- **Analog audio I/O**
- **Analog audio monitor output**
- **Mirror output mode for on-camera talent**
- **Graticule and Safe Title generator**
- **HDMI output**
- **Frame sync**
- **12 and 16 bit processing**
- **Passes embedded audio**

Analog Video Input

Number	One
Type	Analog Composite PAL or NTSC
Resolution	Digitized at 12 bits
Impedance	75 Ω
Return Loss	>40 dB
Input DC	+/-1 volt DC
Input Hum	<100 mV

Serial Digital Input

Number	One
Signal Type	270 Mb/s SD Serial Digital (SMPTE 259M) or 1.485 Gb/s HD Serial Digital (SMPTE 274M or 296M)
Impedance	75 Ω
Return Loss	>15 dB
Max Cable Length	300 meters for 270 Mb/s 100 meters for 1.485 Gb/s

Automatic Input Cable Equalization

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

Analog Video Output

Number	One
Type	Composite PAL or NTSC
Delay	Adjustable from 1 field to 1 frame
Return Loss	>40 dB
Output	DC <100 mV

Serial Digital Output

Number	Two
Type	HD Serial Digital 1.485 Gb/s SMPTE 274M, 292M or 296M or SD Serial Digital 270 Mb/s SMPTE 259M
Delay	Adjustable from 1 field to 1 frame
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)

HD Standards Supported

1080i (SMPTE 274M -4,5,6) 50, 59.94 or 60 Hz
720p (SMPTE 296M -1,2,3) 50, 59.94 or 60 Hz
1080p (SMPTE 274M -9,10,11) 23.98, 24, 25 Hz
1080sF (RP211 -14,15,16) 23.98, 24, 25 Hz

Analog Audio Inputs

Number	Eight (selectable as inputs or outputs)
Type	Balanced
Impedance	>15K Ω
Max Input Level	24 dBu
CMRR	>60 dB, 20 Hz to 10 KHz
Quantization	24 bits, 128 x oversampled
Sample Rate	48 KHz
Reference Level	-10 dBu or +4 dBu
Frequency Response	±0.1 dB, 20 Hz to 20 KHz
Crosstalk	<106 dB
Dynamic Range	>106 dB

Analog Audio Outputs

Number	Eight (selectable as inputs or outputs)
Type	Balanced, transformerless
Impedance	30 Ω
Maximum Output Level	24 dBu
Resolution`n	24 bits, 128 x oversampled
Reference Level	-10 dBu or +4 dBu
Frequency Response	± 0.1 dB, 20 Hz to 20 KHz
Crosstalk	<106 dB
Dynamic Range	>106 dB

Embedded Output (In Serial Output)

Group Assign	Two of four groups
Channels	Sixteen passed
Bit Depth	24 Bit

HDMI Output

Number	One
Connector	HDMI
Type	Follows SDI out

Audio Monitoring Output

Number	One (select from sixteen channels)
Connector	3.5 mm stereo mini jack

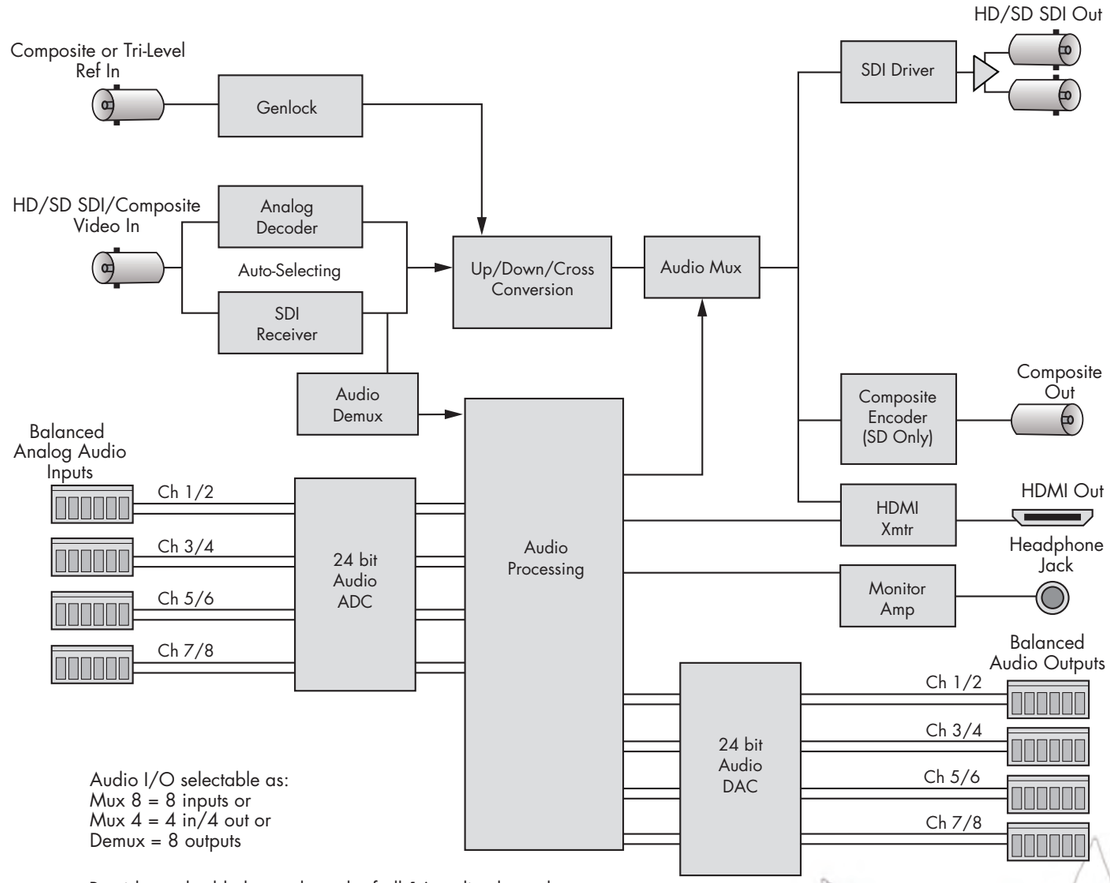
ENSEMBLE DESIGNS

Designed and built in California 5 YEAR WARRANTY

BrightEye 90-A
HD Up/Down/Cross Converter and ARC with Analog Audio

General Specifications

Size	5.63″W x 1.65″H x 5.98″D (143 mm x 42 mm x 152 mm) including connectors and flange
Weight	1 lb 8 oz
Power	12 volts, 15 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.



Audio I/O selectable as:
Mux 8 = 8 inputs or
Mux 4 = 4 in/4 out or
Demux = 8 outputs

Provides embedded pass through of all 16 audio channels

BrightEye 90-F

HD Up/Down/Cross Converter and ARC with AES Audio and Optical Output

Easy To Use

BrightEye 90-F is a versatile up/down/cross converter or aspect ratio converter for use with analog and digital video signals with the addition of an optical output. Optical connectivity allows for long cable runs between buildings or in mobile applications. Simply set the BrightEye 90-F to output your facility's preferred HD or SD standard. The BrightEye 90-F will accommodate whatever input you connect – analog composite, SD SDI or HD SDI. After setting the output standard, BrightEye 90-F automatically converts the selected input to the correct standard for your facility. BrightEye 90-F will upconvert, downconvert, cross convert, or act as an ARC, as needed. The HDMI, SDI and composite outputs are all extremely high quality, suitable for any part of your signal chain. The built-in frame synchronizer allows you to feed asynchronous signals to the BrightEye 90-F. A special Mirror Flip Output mode can be enabled, causing the output image to be flipped left to right for use with on-camera talent. An external reference input allows genlock to a house reference. All vertical interval data and closed captioning is faithfully passed.

Upconverting to High Definition

Feed the analog composite or SD SDI output of a camera to a BrightEye 90-F and upconvert to HD. You can take the HDMI and HD SDI signals from the BrightEye 90-F into your switcher or projection system. Upconverting existing SD equipment lets you leverage the equipment you already have and operate in the HD domain.

While some cameras may have firewire out, using the video output and upconverting before distribution is preferable since longer cable runs can be achieved and quality is superior. Additionally, the BrightEye 90-F's reference input allows you to time the upconverted video output for use with a production switcher.

Downconverting to Standard Definition

BrightEye 90-F will downconvert any type of HD signal and provides HDMI, fiber optic, SD SDI and analog composite outputs suitable for broadcast or monitoring.

Cross Conversion

It's easy to convert between various HD standards, whether 720p or 1080i. Simply select the output standard you need and connect the input – that's all there is to it.

Aspect Ratio Conversion

For converting between SD 4:3 and HD 16:9, BrightEye 90-F has you covered. Just select the output standard you need and connect the input.

Audio Processing Made Simple

BrightEye 90-F handles both embedded audio and discrete AES digital audio streams. Sixteen channels of embedded audio are supported in BrightEye 90-F. If the incoming video has embedded audio, the audio will be safely bypassed around the video processing and lipsync will be preserved. Audio mixing is available for two of the four embedded groups of audio. The AES I/O ports can be configured for eight channels of incoming audio or for eight channels of audio output. The audio mixer can be used for AES channels as well. Mixer controls are accessed through BrightEye Mac or PC software.

Easy Audio Monitoring

Audio monitoring is easy with BrightEye 90-F's convenient 3.5 mm mini jack. Select the audio channels you want to monitor from the front panel and plug in a headset.

Front Panel and Software Control

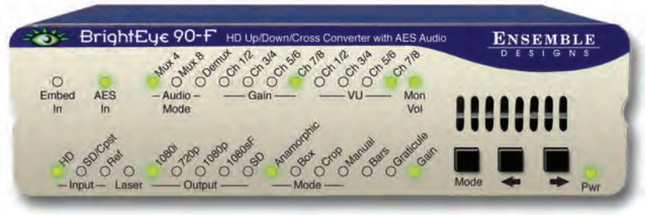
Input selection, gain control, and test pattern controls are provided through the front panel interface. Audio presence LEDs indicate which channels are detected. Controls for crop, letterbox and pillarbox are accessed from the front panel or BrightEye Mac or PC software. Video and audio levels and the audio mixer can be adjusted through BrightEye Mac or PC software.

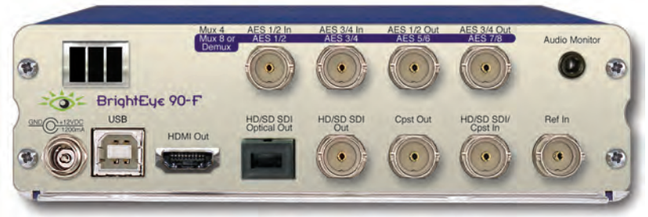
ENSEMBLE DESIGNS

Designed and built in California 5 YEAR WARRANTY

BrightEye 90-F

HD Up/Down/Cross Converter and ARC with AES Audio and Optical Output





Features

- **Use with cameras and projection systems**
- **Turn analog camera into digital HD source**
- **HD and SD digital and analog composite video I/O**
- **HDMI output**
- **AES digital audio I/O**
- **Analog audio monitor output**
- **Mirror output mode for on-camera talent**
- **Graticule and Safe Title generator**
- **Optical output for long cable runs**
- **Frame sync**
- **12 and 16 bit processing**
- **Passes embedded audio**

HD Up/Down/Cross Converter and ARC with AES Audio and Optical Output

Analog Video Input

Number	One
Type	Analog Composite PAL or NTSC
Resolution	Digitized at 12 bits
Impedance	75 Ω
Return Loss	>40 dB
Input DC	+/-1 volt DC
Input Hum	<100 mV

Serial Digital Input

Number	One
Signal Type	270 Mb/s SD Serial Digital (SMPTE 259M) or 1.485 Gb/s HD Serial Digital (SMPTE 274M or 296M)
Impedance	75 Ω
Return Loss	>15 dB
Max Cable Length	300 meters for 270 Mb/s 100 meters for 1.485 Gb/s

Automatic Input Cable Equalization

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

Analog Video Output

Number	One
Type	Composite PAL or NTSC
Delay	Adjustable from 1 field to 1 frame
Return Loss	>40 dB
Output	DC <100 mV

Serial Digital Output

Number	One
Type	HD Serial Digital 1.485 Gb/s SMPTE 274M, 292M or 296M or SD Serial Digital 270 Mb/s SMPTE 259M
Delay	Adjustable from 1 field to 1 frame
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)

HD Standards Supported

1080i (SMPTE 274M -4,5,6) 50, 59.94 or 60 Hz
720p (SMPTE 296M -1,2,3) 50, 59.94 or 60 Hz
1080p (SMPTE 274M -9,10,11) 23.98, 24, 25 Hz
1080sF (RP211 -14,15,16) 23.98, 24, 25 Hz

Embedded Output (In Serial Output)

Group Assign	Two of four groups
Channels	Sixteen passed
Bit Depth	24 Bit

AES/EBU Digital Inputs

Number	Four (total of eight channels) (selectable as inputs or outputs)
Type	AES3id
Connector	Coaxial, 75 Ω
Bit Depth	20 and 24 Bit
Sample Rate	30 KHz to 96 KHz (Sample Rate Converted internally to 48 KHz)
Reference Level	-18 or -20 dBFS (selectable)

AES/EBU Digital Outputs

Number	Four (total of eight channels) (selectable as inputs or outputs)
Type	AES3id
Connector	Coaxial, 75 Ω
Bit Depth	24 Bit
Sample Rate	48 KHz, synchronous to video output
Reference Level	-18 or -20 dBFS (selectable)

Optical Output

Number	One
Type	SD (SMPTE 297M, optical equivalent of 259M) HD (SMPTE 274M or 296M)
Wavelength	1310 nm (non-CWDM) (1550 non-CWDM by special order)
Power	-7 dBm
Max Cable Length	20 km (For greater distances, or higher power and larger loss budgets, please contact the factory)
Fiber Type	Single Mode Multi-mode compatible with attenuation at transmit end
Connector	SC

ENSEMBLE DESIGNS

Designed and built in California 5 YEAR WARRANTY

HD Up/Down/Cross Converter and ARC with AES Audio and Optical Output

HDMI Output

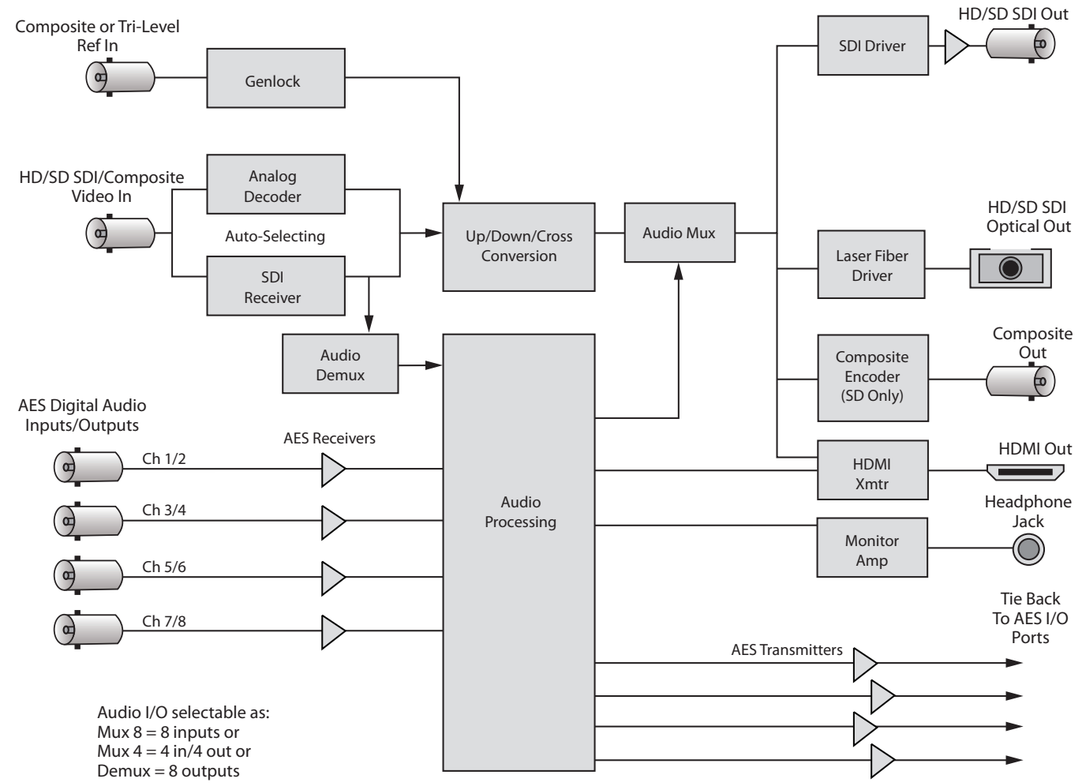
Number	One
Connector	HDMI
Type	Follows SDI out

Audio Monitoring Output

Number	One (Select from sixteen channels)
Connector	3.5 mm stereo mini jack

General Specifications

Size	5.63" W x 1.65" H x 5.98" D (143 mm x 42 mm x 152 mm) including connectors and flange
Weight	1 lb 9 oz
Power	12 volts, 12 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.



Provides embedded pass through of all 16 audio channels

BrightEye 90-FA

HD UP/Down/Cross Converter and ARC with Analog Audio and Optical Output

Easy To Use

BrightEye 90-FA is a versatile up/down/cross converter or aspect ratio converter for use with analog and digital video signals with the addition of an optical output. Optical connectivity allows for long cable runs between buildings or in mobile applications. Simply set the BrightEye 90-FA to output your facility's preferred HD or SD standard. The BrightEye 90-FA will accommodate whatever input you connect – analog composite, SD SDI or HD SDI. After setting the output standard, BrightEye 90-FA automatically converts the selected input to the correct standard for your facility. BrightEye 90-FA will upconvert, downconvert, cross convert, or act as an ARC, as needed. The HDMI, SDI and composite outputs are all extremely high quality, suitable for any part of your signal chain. The built-in frame synchronizer allows you to feed asynchronous signals to the BrightEye 90-FA. A special Mirror Flip Output mode can be enabled, causing the output image to be flipped left to right for use with on-camera talent. An external reference input allows genlock to a house reference. All vertical interval data and closed captioning is faithfully passed.

Upconverting to High Definition

Feed the analog composite or SD SDI output of a camera to a BrightEye 90-FA and upconvert to HD. You can take the HDMI and HD SDI signals from the BrightEye 90-FA into a switcher or projection system. Upconverting existing SD equipment lets you leverage the equipment you already have and operate in the HD domain.

While some cameras may have firewire out, using the video output and upconverting before distribution is preferable since longer cable runs can be achieved and quality is superior. Additionally, the BrightEye 90-FA's reference input allows you to time the upconverted video output for use with a production switcher.

Downconverting to Standard Definition

BrightEye 90-FA will downconvert any type of HD signal and provides HDMI, fiber optic, SD SDI and analog composite outputs suitable for broadcast or monitoring.

Cross Conversion

It's easy to convert between various HD standards, whether 720p or 1080i. Simply select the output standard you need and connect the input – that's all there is to it.

Aspect Ratio Conversion

For converting between SD 4:3 and HD 16:9, BrightEye 90-FA has you covered. Just select the output standard you need and connect the input.

Audio Processing Made Simple

BrightEye 90-FA handles both embedded audio and eight channels of analog audio. Sixteen channels of embedded audio are supported in BrightEye 90-FA. If the incoming video has embedded audio, the audio will be safely bypassed around the video processing and lipsync will be preserved. Audio mixing is available for two of the four embedded groups of audio. The analog audio I/O ports can be configured for eight channels of incoming audio or for eight channels of audio output. The audio mixer can be used for analog audio as well. Mixer controls are accessed through BrightEye Mac or PC software.

Easy Audio Monitoring

Audio monitoring is easy with BrightEye 90-FA's convenient 3.5 mm mini jack. Select the audio channels you want to monitor from the front panel and plug in a headset.

Front Panel and Software Control

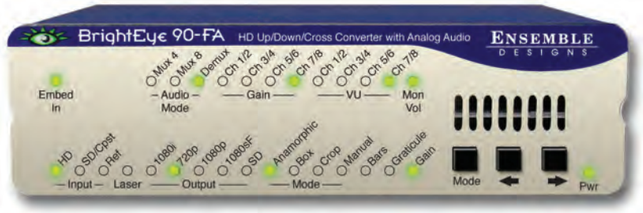
Input selection, gain control, and test pattern control are provided through the front panel interface. Audio presence LEDs indicate which channels are detected. Controls for crop, letterbox and pillarbox are accessed from the front panel or BrightEye Mac or PC software. Video and audio levels and the audio mixer can be adjusted through BrightEye Mac or PC software.

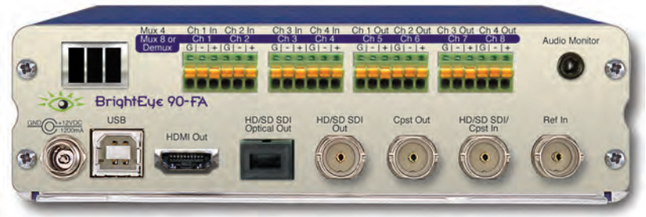
ENSEMBLE DESIGNS

Designed and built in California 5 YEAR WARRANTY

BrightEye 90-FA

HD UP/Down/Cross Converter and ARC with Analog Audio and Optical Output





Features

- **Use with cameras and projection systems**
- **Turn analog camera into digital HD source**
- **HD and SD digital and analog composite video I/O**
- **HDMI output**
- **Analog audio I/O**
- **Analog audio monitor output**
- **Mirror output mode for on-camera talent**
- **Graticule and Safe Title generator**
- **Optical output for long cable runs**
- **Frame sync**
- **12 and 16 bit processing**
- **Passes embedded audio**

HD UP/Down/Cross Converter and ARC with Analog Audio and Optical Output

Analog Video Input

Number	One
Type	Analog Composite PAL or NTSC
Resolution	Digitized at 12 bits
Impedance	75 Ω
Return Loss	>40 dB
Input DC	+/-1 volt DC
Input Hum	<100 mV

Serial Digital Input

Number	One
Signal Type	270 Mb/s SD Serial Digital (SMPTE 259M) or 1.485 Gb/s HD Serial Digital (SMPTE 274M or 296M)
Impedance	75 Ω
Return Loss	>15 dB
Max Cable Length	300 meters for 270 Mb/s 100 meters for 1.485 Gb/s

Automatic Input Cable Equalization

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

Analog Video Output

Number	One
Type	Composite PAL or NTSC
Delay	Adjustable from 1 field to 1 frame
Return Loss	>40 dB
Output	DC <100 mV

Serial Digital Output

Number	One
Type	HD Serial Digital 1.485 Gb/s SMPTE 274M, 292M or 296M or SD Serial Digital 270 Mb/s S SMPTE 259M
Delay	Adjustable from 1 field to 1 frame
Processing	12 and 16 bit
Impedance	75 Ω
Return Loss	>15 dB
Max Cable Length	100 meters for HD 300 meters for SD

HD Standards Supported

1080i (SMPTE 274M -4,5,6) 50, 59.94 or 60 Hz
720p (SMPTE 296M -1,2,3) 50, 59.94 or 60 Hz
1080p (SMPTE 274M -9,10,11) 23.98, 24, 25 Hz
1080sF (RP211 -14,15,16) 23.98, 24, 25 Hz

Analog Audio Inputs

Number	Eight (selectable as inputs or outputs)
Type	Balanced
Impedance	>15K Ω
Max Input Level	24 dBu
CMRR	>60 dB, 20 Hz to 10 KHz
Quantization	24 bits, 128 x oversampled
Sample Rate	48 KHz
Reference Level	-10 dBu or +4 dBu
Frequency Response	±0.1 dB, 20 Hz to 20 KHz
Crosstalk	<106 dB
Dynamic Range	>106 dB

Analog Audio Outputs

Number	Eight (selectable as inputs or outputs)
Type	Balanced, transformerless
Impedance	30 Ω
Maximum Output Level	24 dBu
Resolution	24 bits, 128 x oversampled
Reference Level	-10 dBu or +4 dBu
Frequency Response	± 0.1 dB, 20 Hz to 20 KHz
Crosstalk	<106 dB
Dynamic Range	>106 dB

Embedded Output (In Serial Output)

Group Assign	Two of four groups
Channels	Sixteen passed
Bit Depth	24 Bit

Optical Output

Number	One
Type	SD (SMPTE 297M, optical equivalent of 259M) HD (SMPTE 274M or 296M)
Wavelength	1310 nm (non-CWDM) (1550 non-CWDM by special order)
Power	-7 dBm
Max Cable Length	20 km (For greater distances, or higher power and larger loss budgets, please contact the factory)
Fiber Type	Single Mode Multi-mode compatible with attenuation at transmit end
Connector	SC

BrightEye 90-FA

HD UP/Down/Cross Converter and ARC with Analog Audio and Optical Output

HDMI Output

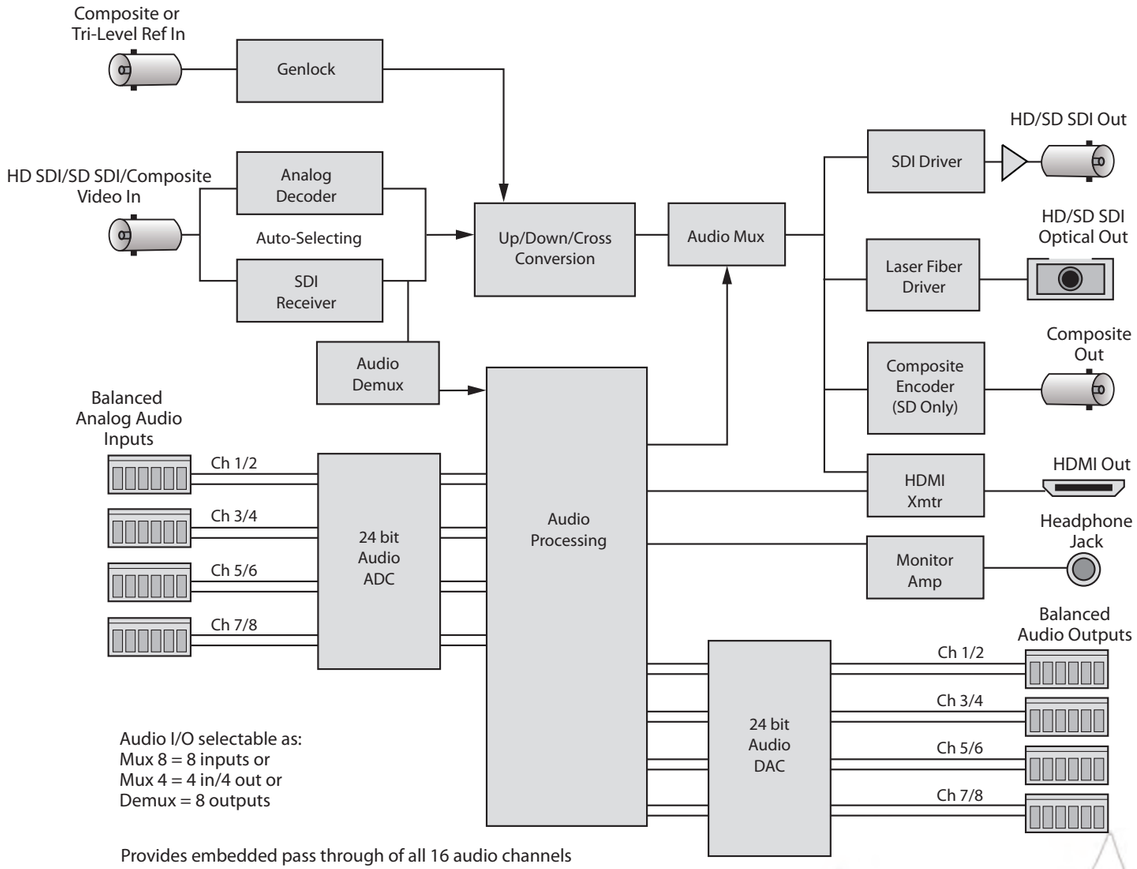
Number	One
Connector	HDMI
Type	Follows SDI out

Audio Monitoring Output

Number	One (select from sixteen channels)
Connector	3.5 mm stereo mini jack

General Specifications

Size	5.63" W x 1.65" H x 5.98" D (143 mm x 42 mm x 152 mm) including connectors and flange
Weight	1 lb 8 oz
Power	12 volts, 15 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.



BrightEye 91
HD Upconverter with AES Audio

Easy To Use

BrightEye 91 is an upconverter with analog composite and SD SDI inputs. Feed the analog composite or SD SDI output of a camera to a BrightEye 91 and upconvert to HD. You can take the HDMI and HD SDI signals from the BrightEye 91 into a switcher or projection system. Upconverting existing SD equipment lets you leverage the equipment you already have and operate in the HD domain.

A special Mirror Flip Output mode can be enabled, causing the output image to be flipped left to right for use with on-camera talent. An external reference input allows genlock to a house reference. All vertical interval data and closed captioning is faithfully passed.

Upconvert Before Distribution

While some cameras may have firewire out, using the video output and upconverting before distribution is preferable since longer cable runs can be achieved and quality is superior. Additionally, the BrightEye 91's reference input allows you to time the upconverted video output for use with a production switcher.

Audio Processing

BrightEye 91 handles both embedded audio and discrete AES digital audio inputs. Sixteen channels of embedded audio are supported in BrightEye 91. If the incoming video has embedded audio, the audio will be safely bypassed around the video processing and lipsync will be preserved. Audio mixing is available for two of the four embedded groups of audio.

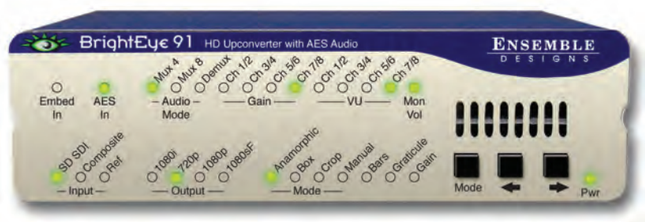
Audio Monitoring

Audio monitoring is easy with BrightEye 91's convenient 3.5 mm mini jack. Just select the audio channels you want to monitor from the front panel and plug in a headset.

Front Panel and Software Control

Input selection, gain control, and test pattern controls are provided through the front panel interface. Audio presence LEDs indicate which channels are detected. Controls for crop, letterbox and pillarbox are accessed from the front panel or BrightEye Mac or PC software. Video and audio levels and the audio mixer can be adjusted through BrightEye Mac or PC software.

BrightEye 91
HD Upconverter with AES Audio



Features

- **Use with cameras and projection systems**
- **Turn analog camera into digital HD source**
- **SD digital and analog composite video inputs**
- **HDMI output**
- **AES inputs**
- **Analog audio monitor output**
- **Mirror output mode for on-camera talent**
- **Graticule and Safe Title generator**
- **Frame sync**
- **12 and 16 bit processing**
- **Passes embedded audio**

Designed and built in California
5 YEAR WARRANTY

Analog Video Input

Number	One
Type	Analog Composite PAL or NTSC
Resolution	Digitized at 12 bits
Impedance	75 Ω
Return Loss	>40 dB
Input DC	+/-1 volt DC
Input Hum	<100 mV

Serial Digital Input

Number	One
Signal Type	270 Mb/s SD Serial Digital (SMPTE 259M)
Impedance	75 Ω
Return Loss	>15 dB
Max Cable Length	300 meters for 270 Mb/s

Automatic Input Cable Equalization

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
Type	HD Serial Digital 1.485 Gb/s SMPTE 274M, 292M or 296M
Delay	Adjustable from 1 field to 1 frame
Processing	12 and 16 bit
Impedance	75 Ω
Return Loss	>15 dB
Max Cable Length	100 meters for HD

HD Standards Supported

1080i (SMPTE 274M -4,5,6) 50, 59.94 or 60 Hz
720p (SMPTE 296M -1,2,3) 50, 59.94 or 60 Hz
1080p (SMPTE 274M -9,10,11) 23.98, 24, 25 Hz
1080sF (RP211 -14,15,16) 23.98, 24, 25 Hz

AES/EBU Digital Inputs

Number	Four (total of eight channels) (selectable as inputs or outputs)
Type	AES3id
Connector	Coaxial, 75 Ω
Bit Depth	20 and 24 Bit
Sample Rate	30 KHz to 96 KHz (Sample Rate Converted internally to 48 KHz)
Reference Level	-18 or -20 dBFS (selectable)

AES/EBU Digital Outputs

Number	Four (total of eight channels) (selectable as inputs or outputs)
Type	AES3id
Delay	Adjustable from 1 field to 1 frame
Connector	Coaxial, 75 Ω
Bit Depth	24 Bit
Sample Rate	48 KHz, synchronous to video output
Reference Level	-18 or -20 dBFS (selectable)

Embedded Output (In Serial Output)

Group Assign	Two of four groups
Channels	Sixteen passed
Bit Depth	24 Bit

HDMI Output

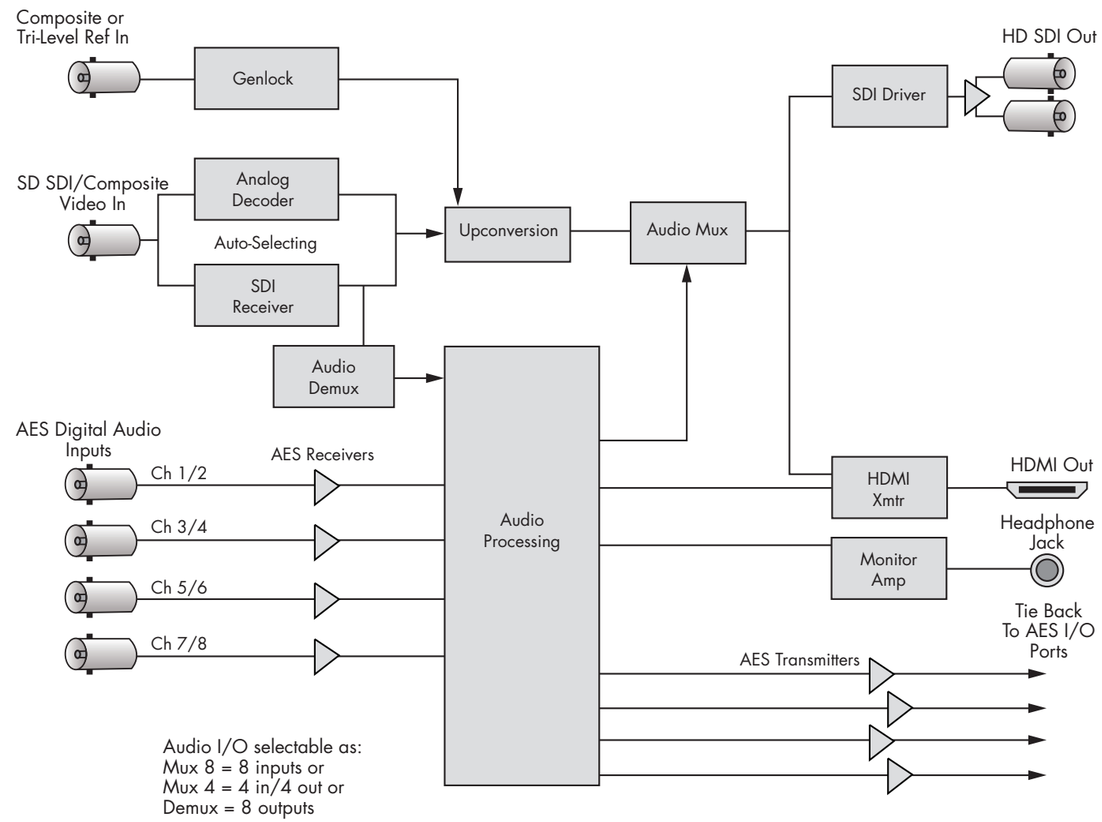
Number	One
Connector	HDMI
Type	Follows SDI out

Audio Monitoring Output

Number	One (select from sixteen channels)
Connector	3.5 mm stereo mini jack

General Specifications

Size	5.63″W x 1.65″H x 5.98″D (143 mm x 42 mm x 152 mm) including connectors and flange
Weight	1 lb 8 oz
Power	12 volts, 11 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.



Provides embedded pass through of all 16 audio channels

BrightEye 91-A
HD Upconverter with Analog Audio

Easy To Use

BrightEye 91-A is an upconverter with analog composite and SD SDI inputs. Feed the analog composite or SD SDI output of a camera to a BrightEye 91-A and upconvert to HD. You can take the HDMI and HD SDI signals from the BrightEye 91-A into a switcher or projection system. Upconverting existing SD equipment lets you leverage the equipment you already have and operate in the HD domain. A special Mirror Flip Output mode can be enabled, causing the output image to be flipped left to right for use with on-camera talent. An external reference input allows genlock to a house reference. All vertical interval data and closed captioning is faithfully passed.

Upconvert Before Distribution

While some cameras may have firewire out, using the video output and upconverting before distribution is preferable since longer cable runs can be achieved and quality is superior. Additionally, the BrightEye 91-A's reference input allows you to time the upconverted video output for use with a production switcher.

Audio Processing

BrightEye 91-A handles both embedded audio and eight analog audio inputs. Sixteen channels of embedded audio are supported in BrightEye 91-A. If the incoming video has embedded audio, the audio will be safely bypassed around the video processing and lipsync will be preserved. Audio mixing is available for two of the four embedded groups of audio.

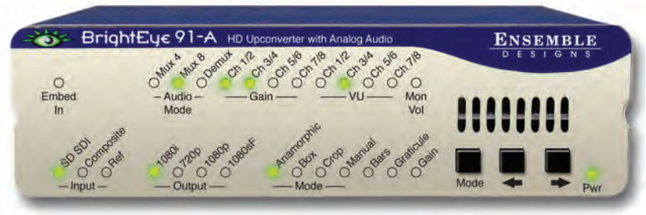
Audio Monitoring

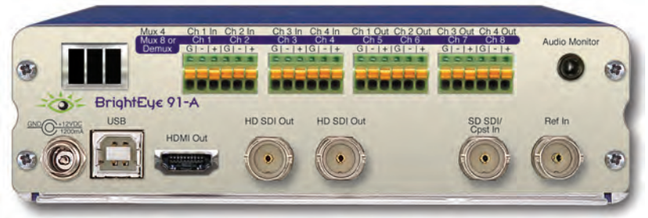
Audio monitoring is easy with BrightEye 91-A's convenient 3.5 mm mini jack. Just select the audio channels you want to monitor from the front panel and plug in a headset.

Front Panel and Software Control

Input selection, gain control, and test patterns control are provided through the front panel interface. Audio presence LEDs indicate which channels are detected. Controls for crop, letterbox and pillarbox are accessed from the front panel or BrightEye Mac or PC software. Video and audio levels and the audio mixer can be adjusted through BrightEye Mac or PC software.

BrightEye 91-A
HD Upconverter with Analog Audio





Features

- **Use with cameras and projection systems**
- **Turn analog camera into digital HD source**
- **SD digital and analog composite video inputs**
- **Analog audio inputs**
- **Analog audio monitor output**
- **Mirror output mode for on-camera talent**
- **Graticule and Safe Title generator**
- **HDMI output**
- **Frame sync**
- **12 and 16 bit processing**
- **Passes embedded audio**

Analog Video Input

Number	One
Type	Analog Composite PAL or NTSC
Resolution	Digitized at 12 bits
Impedance	75 Ω
Return Loss	>40 dB
Input DC	+/-1 volt DC
Input Hum	<100 mV

Serial Digital Input

Number	One
Signal Type	270 Mb/s SD Serial Digital (SMPTE 259M)
Impedance	75 Ω
Return Loss	>15 dB
Max Cable Length	300 meters for 270 Mb/s

Automatic Input Cable Equalization

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
Type	HD Serial Digital 1.485 Gb/s SMPTE 274M, 292M or 296M
Delay	Adjustable from 1 field to 1 frame
Processing	12 and 16 bit
Impedance	75 Ω
Return Loss	>15 dB
Max Cable Length	100 meters for HD (Belden 1694A)

HD Standards Supported

1080i (SMPTE 274M -4,5,6) 50, 59.94 or 60 Hz
720p (SMPTE 296M -1,2,3) 50, 59.94 or 60 Hz
1080p (SMPTE 274M -9,10,11) 23.98, 24, 25 Hz
1080sF (RP211 -14,15,16) 23.98, 24, 25 Hz

Analog Audio Inputs

Number	Eight (selectable as inputs or outputs)
Type	Balanced
Impedance	>15K Ω
Max Input Level	24 dBu
CMRR	>60 dB, 20 Hz to 10 KHz
Quantization	24 bits, 128 x oversampled
Sample Rate	48 KHz
Reference Level	-10 dBu or +4 dBu
Frequency Response	±0.1 dB, 20 Hz to 20 KHz
Crosstalk	<106 dB
Dynamic Range	>106 dB

Analog Audio Outputs

Number	Eight (selectable as inputs or outputs)
Type	Balanced, transformerless
Impedance	30 Ω
Maximum Output Level	24 dBu
Resolution	24 bits, 128 x oversampled
Reference Level	-10 dBu or +4 dBu
Frequency Response	± 0.1 dB, 20 Hz to 20 KHz
Crosstalk	<106 dB
Dynamic Range	>106 dB

Embedded Output (In Serial Output)

Group Assign	Two of four groups
Channels	Sixteen passed
Bit Depth	24 Bit

HDMI Output

Number	One
Connector	HDMI
Type	Follows SDI out

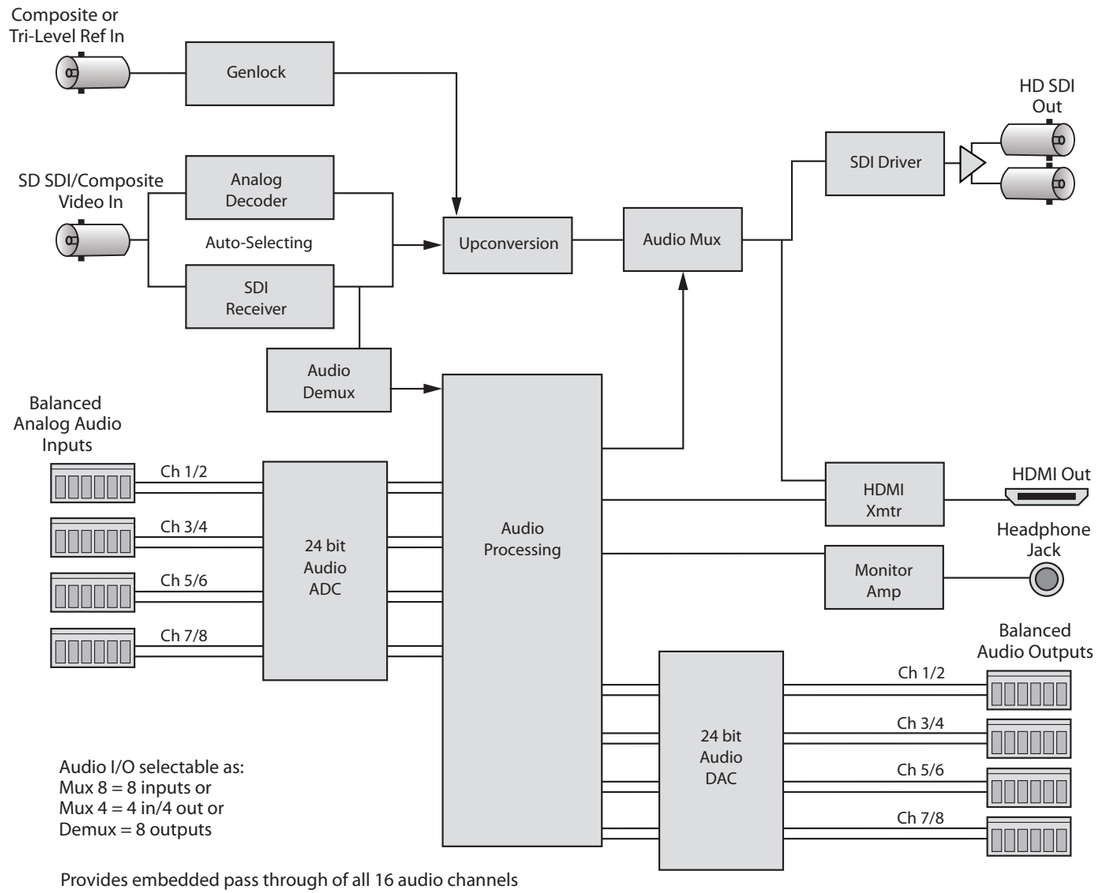
Audio Monitoring Output

Number	One (select from sixteen channels)
Connector	3.5 mm stereo mini jack

General Specifications

Size	5.63″W x 1.65″H x 5.98″D (143 mm x 42 mm x 152 mm) including connectors and flange
Weight	1 lb 8 oz
Power	12 volts, 14 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.

BrightEye 91-A
HD Upconverter with Analog Audio



Audio I/O selectable as:
Mux 8 = 8 inputs or
Mux 4 = 4 in/4 out or
Demux = 8 outputs

Provides embedded pass through of all 16 audio channels

BrightEye 92-A
HD Downconverter with Analog Audio

Easy To Use

BrightEye 92-A will downconvert any type of HD signal and provides HDMI, SD SDI and analog composite outputs that are suitable for broadcast or monitoring. The built-in frame synchronizer allows you to feed asynchronous signals to the BrightEye 92-A. A special Mirror Flip Output mode can be enabled, causing the output image to be flipped left to right for use with on-camera talent. An external reference input allows genlock to a house reference. All vertical interval data and closed captioning is faithfully passed.

Downconverting to Standard Definition

BrightEye 92-A will downconvert any type of HD signal and provides HDMI, SD SDI and an analog composite outputs that are all extremely high quality, suitable for any part of your signal chain.

Audio Processing

BrightEye 92-A handles both embedded audio and analog audio. Sixteen channels of embedded audio are supported in BrightEye 92-A. If the incoming video has embedded audio, the audio will be safely bypassed around the video processing and lipsync will be preserved. Audio mixing is available for two of the four embedded groups of audio.

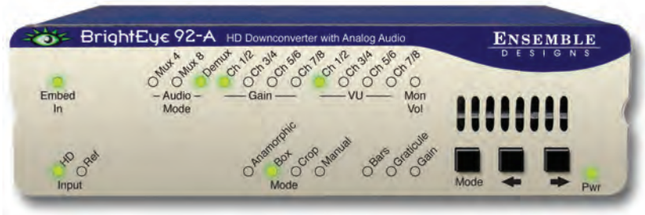
Audio Monitoring

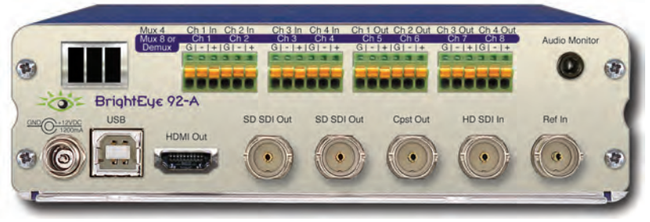
Audio monitoring is easy with BrightEye 92-A's convenient 3.5 mm mini jack. Select the audio channels you want to monitor from the front panel and plug in a headset.

Front Panel and Software Control

Input selection, gain control, and test pattern controls are provided through the front panel interface. Audio presence LEDs indicate which channels are detected. Controls for crop, letterbox and pillarbox are accessed from the front panel or BrightEye Mac or PC software. Video and audio levels and the audio mixer can be adjusted through BrightEye Mac or PC software.

BrightEye 92-A
HD Downconverter with Analog Audio





Features

- **Downconversion for monitoring or broadcast**
- **SD SDI, HDMI, analog composite video outputs**
- **Analog audio inputs and outputs**
- **Analog audio monitor output**
- **Mirror output mode for on-camera talent**
- **Graticule and Safe Title generator**
- **Frame sync**
- **12 and 16 bit processing**
- **Passes embedded audio**

Serial Digital Input

Number	One
Signal Type	1.485 Gb/s HD Serial Digital (SMPTE 274M, 292M or 296M)
Impedance	75 Ω
Return Loss	>15 dB
Max Cable Length	100 meters for 1.485 Gb/s

Automatic Input Cable Equalization

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

Analog Video Output

Number	One
Type	Composite PAL or NTSC
Delay	Adjustable from 1 field to 1 frame
Return Loss	>40 dB
Output	DC <100 mV

Serial Digital Output

Number	Two
Type	SD Serial Digital 270 Mb/s SMPTE 259M
Delay	Adjustable from 1 field to 1 frame
Processing	12 and 16 bit
Impedance	75 Ω
Return Loss	>15 dB
Max Cable Length	300 meters

HD Standards Supported

1080i (SMPTE 274M -4,5,6) 50, 59.94 or 60 Hz
720p (SMPTE 296M -1,2,3) 50, 59.94 or 60 Hz
1080p (SMPTE 274M -9,10,11) 23.98, 24, 25 Hz
1080sF (RP211 -14,15,16) 23.98, 24, 25 Hz

Analog Audio Inputs

Number	Eight (selectable as inputs or outputs)
Type	Balanced
Impedance	>15K Ω
Max Input Level	24 dBu
CMRR	>60 dB, 20 Hz to 10 KHz
Quantization	24 bits, 128 x oversampled
Sample Rate	48 KHz
Reference Level	-10 dBu or +4 dBu
Frequency Response	±0.1 dB, 20 Hz to 20 KHz
Crosstalk	<106 dB
Dynamic Range	>106 dB

Analog Audio Outputs

Number	Eight (selectable as inputs or outputs)
Type	Balanced, transformerless
Impedance	30 Ω
Maximum Output Level	24 dBu
Resolution	24 bits, 128 x oversampled
Reference Level	-10 dBu or +4 dBu
Frequency Response	± 0.1 dB, 20 Hz to 20 KHz
Crosstalk	<106 dB
Dynamic Range	>106 dB

Embedded Output (In Serial Output)

Group Assign	Two of four groups
Channels	Sixteen passed
Bit Depth	24 Bit

HDMI Output

Number	One
Connector	HDMI
Type	Follows SDI out

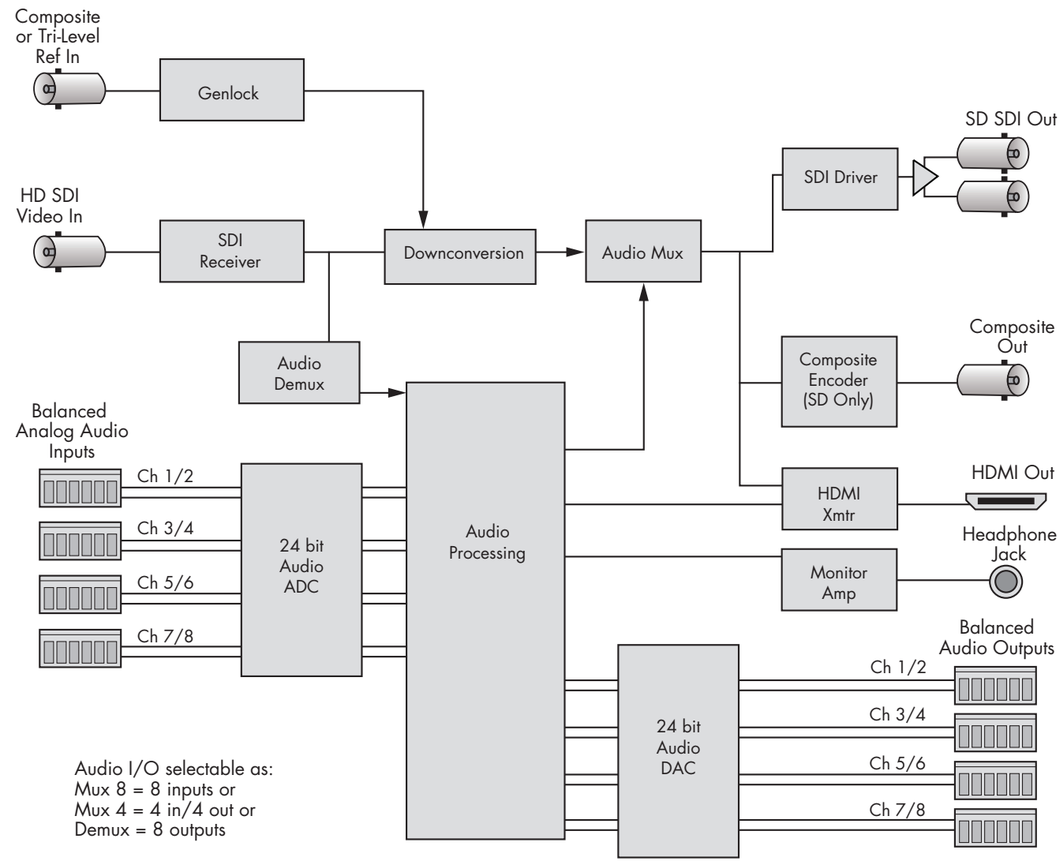
Audio Monitoring Output

Number	One (select from sixteen channels)
Connector	3.5 mm stereo mini jack

General Specifications

Size	5.63″W x 1.65″H x 5.98″D (143 mm x 42 mm x 152 mm) including connectors and flange
Weight	1 lb 8 oz
Power	12 volts, 12 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.

BrightEye 92-A
HD Downconverter with Analog Audio



BrightEye 92-M
HD Downconverter

BrightEye 92-M will downconvert any type of HD signal and provides HDMI, SD SDI and analog composite outputs that are suitable for broadcast or monitoring. A special Mirror Flip Output mode can be enabled, causing the output image to be flipped left to right for use with on-camera talent. The built-in frame synchronizer allows you to feed asynchronous signals to the BrightEye 92-M. An external reference input allows genlock to a house reference.

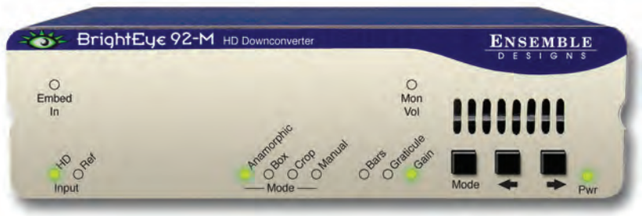
All vertical interval data and closed captioning is faithfully passed. Sixteen channels of embedded audio are supported. If the incoming video has embedded audio, the audio will be safely bypassed around the video processing and lipsync will be preserved.

Audio monitoring is easy with BrightEye 92-M's convenient 3.5 mm mini jack. Just select the audio channels you want to monitor from the front panel and plug in a headset.

Input selection, gain control, and test pattern controls are provided through the front panel interface. Audio presence LEDs indicate which channels are detected. Controls for crop, letterbox and pillarbox are accessed from the front panel or BrightEye Mac or PC software.

Features

- **Downconversion for monitoring or broadcast**
- **SD SDI, HDMI, analog composite video outputs**
- **Analog audio monitor output**
- **Mirror output mode for on-camera talent**
- **Graticule and Safe Title generator**
- **Frame sync**
- **12 and 16 bit processing**
- **Passes embedded audio**



BrightEye 92-M
HD Downconverter

Serial Digital Input

Number	One
Signal Type	1.485 Gb/s HD Serial Digital (SMPTE 274M, 292M or 296M)
Impedance	75 Ω
Return Loss	>15 dB
Max Cable Length	100 meters for 1.485 Gb/s
Automatic Input Cable Equalization	

Reference Input

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

Analog Video Output

Number	One
Type	Composite PAL or NTSC
Delay	Adjustable from 1 field to 1 frame
Return Loss	>40 dB
Output	DC < 100 mV

Serial Digital Output

Number	Two
Type	SD Serial Digital 270 Mb/s SMPTE 259M
Delay	Adjustable from 1 field to 1 frame
Processing	12 and 16 bit
Impedance	75 Ω
Return Loss	>15 dB
Max Cable Length	300 meters

HD Standards Supported

1080i (SMPTE 274M -4,5,6) 50, 59.94 or 60 Hz
720p (SMPTE 296M -1,2,3) 50, 59.94 or 60 Hz
1080p (SMPTE 274M -9,10,11) 23.98, 24, 25 Hz
1080sF (RP211 -14,15,16) 23.98, 24, 25 Hz

HDMI Output

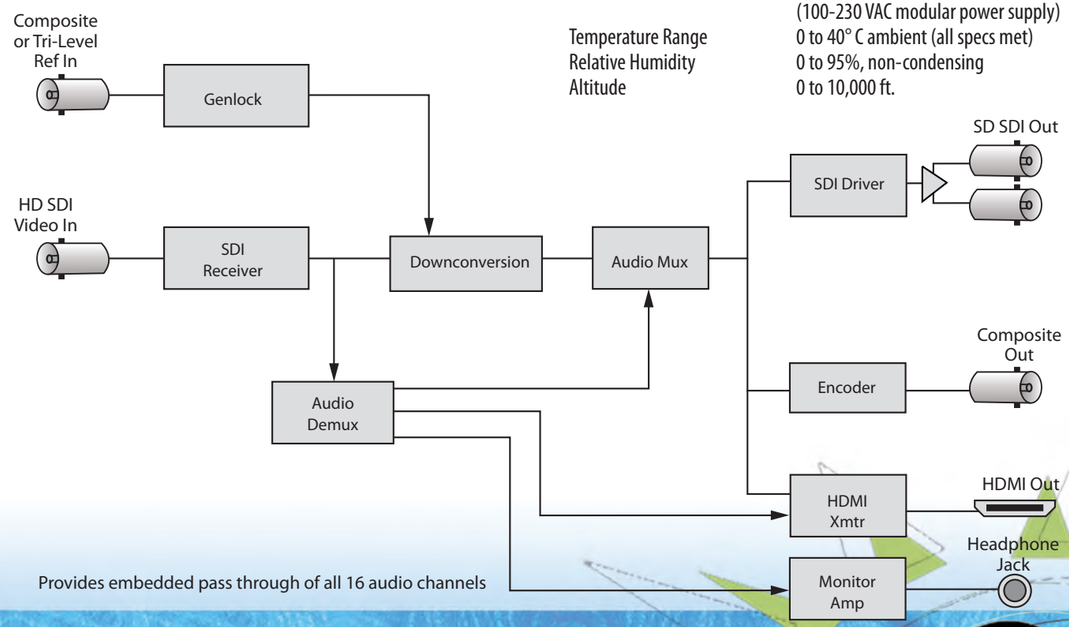
Number	One
Connector	HDMI
Type	Follows SDI out

Audio Monitoring Output

Number	One (select from sixteen channels)
Connector	3.5 mm stereo mini jack

General Specifications

Size	5.63" W x 1.65" H x 5.98" D (143 mm x 42 mm x 152 mm) including connectors and flange
Weight	1 lb 7 oz
Power	12 volts, 10 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.



Designed and built in California
5 YEAR WARRANTY

BrightEye 93
HD Cross Converter

BrightEye 93 converts between various HD standards, whether 720p or 1080i. Simply select the output standard you need and connect the input – that's all there is to it. A special Mirror Flip Output mode can be enabled, causing the output image to be flipped left to right for use with on-camera talent. An external reference input allows genlock to a house reference.

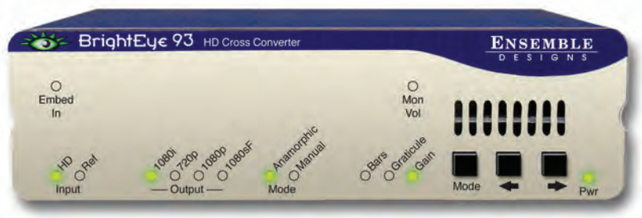
All vertical interval data and closed captioning is faithfully passed. Sixteen channels of embedded audio are supported. If the incoming video has embedded audio, the audio will be safely bypassed around the video processing and lipsync will be preserved.

An external reference input allows genlock to a house reference. All vertical interval data and closed captioning are faithfully passed.

Input selection, gain control, and test pattern controls are provided through the front panel interface. Audio presence LEDs indicate which channels are detected.

Features

- **Convert between HD standards**
- **Timeable output**
- **Analog audio monitor output**
- **Mirror output mode for on-camera talent**
- **Graticule and Safe Title generator**
- **HD SDI and HDMI outputs**
- **Frame sync**
- **12 and 16 bit processing**
- **Passes embedded audio**



ENSEMBLE DESIGNS

Designed and built in California 5 YEAR WARRANTY

BrightEye 93
HD Cross Converter

Serial Digital Input

Number	One
Signal Type	1.485 Gb/s HD Serial Digital (SMPTE 274M, 292M or 296M)
Impedance	75 Ω
Return Loss	>15 dB
Max Cable Length	100 meters for 1.485 Gb/s

Automatic Input Cable Equalization

Reference Input

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

Serial Digital Output

Number	Two
Type	HD Serial Digital 1.485 Gb/s SMPTE 274M or 296M
Delay	Adjustable from 1 field to 1 frame
Processing	12 and 16 bit
Impedance	75 Ω
Return Loss	>15 dB
Max Cable Length	100 meters for HD (Belden 1694A)

HD Standards Supported

1080i (SMPTE 274M -4,5,6) 50, 59.94 or 60 Hz
720p (SMPTE 296M -1,2,3) 50, 59.94 or 60 Hz
1080p (SMPTE 274M -9,10,11) 23.98, 24, 25 Hz
1080sF (RP211 -14,15,16) 23.98, 24, 25 Hz

HDMI Output

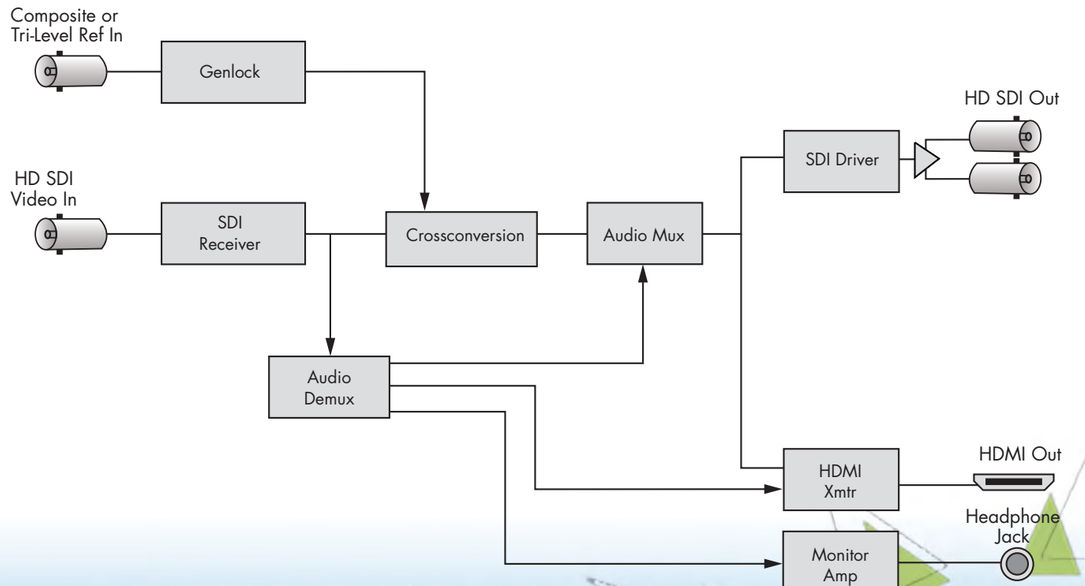
Number	One
Connector	HDMI
Type	Follows SDI out

Audio Monitoring Output

Number	One (select from sixteen channels)
Connector	3.5 mm stereo mini jack

General Specifications

Size	5.63" W x 1.65" H x 5.98" D (143 mm x 42 mm x 152 mm) including connectors and flange
Weight	1 lb 7 oz
Power	12 volts, 11 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.



Provides embedded pass through of all 16 audio channels

BrightEye 94
SD Aspect Ratio Converter

BrightEye 94 is a standard definition aspect ratio converter. You can easily convert signals from 4:3 to SD 16:9, and vice versa.

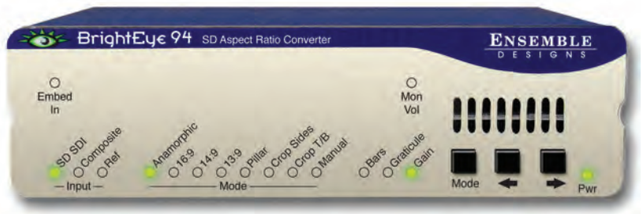
All vertical interval data and closed captioning are faithfully passed. Sixteen channels of embedded audio are supported. If the incoming video has embedded audio, the audio will be safely bypassed around the video processing and lipsync will be preserved. An external reference input allows genlock to a house reference.

Input selection, gain control, and test pattern controls are provided through the front panel interface. Audio presence LEDs indicate which channels are detected. Controls for crop, letterbox and pillarbox are accessed from the front panel or BrightEye Mac or PC software.

A special Mirror Flip Output mode can be enabled, causing the output image to be flipped left to right for use with on-camera talent.

Features

- **SD ARC**
- **Timeable output**
- **Mirror output mode for on-camera talent**
- **Graticule and Safe Title generator**
- **SDI, composite video and HDMI outputs**
- **Frame sync**
- **12 and 16 bit processing**
- **Passes embedded audio**



ENSEMBLE DESIGNS

Designed and built in California — 5 YEAR WARRANTY

BrightEye 94
SD Aspect Ratio Converter

Analog Video Input

Number	One
Type	Analog Composite PAL or NTSC
Resolution	Digitized at 12 bits
Impedance	75 Ω
Return Loss	>40 dB
Input DC	+/-1 volt DC
Input Hum	<100 mV

Serial Digital Input

Number	One
Signal Type	270 Mb/s SD Serial Digital (SMPTE 259M)
Impedance	75 Ω
Return Loss	>15 dB
Max Cable Length	300 meters for 270 Mb/s
Automatic Input Cable Equalization	

Analog Video Output

Number	One
Type	Composite PAL or NTSC
Delay	Adjustable from 1 field to 1 frame
Return Loss	>40 dB
Output	DC <100 mV

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
Type	SD Serial Digital 270 Mb/s SMPTE 259M
Delay	Adjustable from 1 field to 1 frame
Processing	12 and 16 bit
Impedance	75 Ω
Return Loss	>15 dB
Max Cable Length	300 meters

HDMI Output

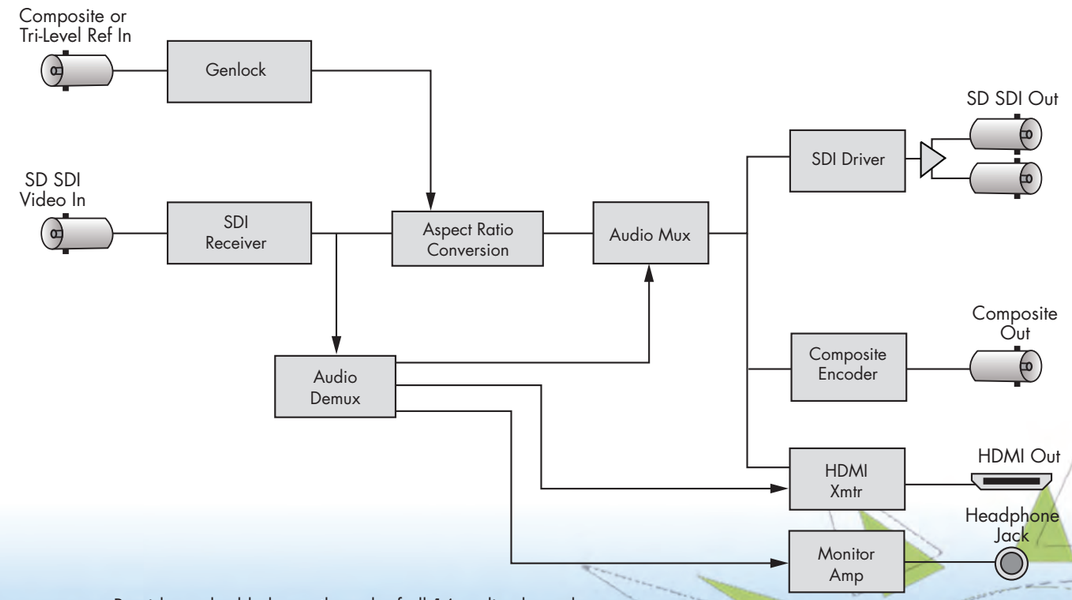
Number	One
Connector	HDMI
Type	Follows SDI out

Audio Monitoring Output

Number	One (select from sixteen channels)
Connector	3.5 mm stereo mini jack

General Specifications

Size	5.63″W x 1.65″H x 5.98″D (143 mm x 42 mm x 152 mm) including connectors and flange
Weight	1 lb 7 oz
Power	12 volts, 9 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.



Provides embedded pass through of all 16 audio channels

Glossary

AES/EBU – The digital audio standard defined as a joint effort of the Audio Engineering Society and the European Broadcast Union. AES/EBU or AES3 describes a serial bitstream that carries two audio channels, thus an AES stream is a stereo pair. The AES/EBU standard covers a wide range of sample rates and quantizations (bit depths.) In television systems, these will generally be 48 KHz and either 20 or 24 bits.

AFD – Active Format Description is a method to carry information regarding the aspect ratio of the video content. The specification of AFD was standardized by SMPTE in 2007 and is now beginning to appear in the marketplace. AFD can be included in both SD and HD SDI transport systems. There is no legacy analog implementation. (See WSS).

ASI – A commonly used transport method for MPEG video streams, ASI or Asynchronous Serial Interface, operates at the same 270 Mb/s data rate as SD SDI. This makes it easy to carry an ASI stream through existing digital television infrastructure. Known more formally as DVB-ASI, this transport mechanism can be used to carry multiple program channels.

Aspect Ratio – The ratio of the vertical and horizontal measurements of an image. 4:3 is the aspect ratio for standard definition video formats and television and 16:9 for high definition. Converting formats of unequal ratios is done by letterboxing (horizontal bars) or pillar boxing (vertical pillars) in order to keep the original format's aspect ratio.

Bandwidth – Strictly speaking, this refers to the range of frequencies (i.e. the width of the band of frequency) used by a signal, or carried by a transmission channel. Generally, wider bandwidth will carry and reproduce a signal with greater fidelity and accuracy.

Beta – Sony Beta SP video tape machines use an analog component format that is similar to SMPTE, but differs in the amplitude of the color difference signals. It may also carry setup on the luminance channel.

Bit – A binary digit, or bit, is the smallest amount of information that can be stored or transmitted digitally by electrical, optical, magnetic, or other means. A single bit can take on one of two states: On/Off, Low/High, Asserted/Deasserted, etc. It is represented numerically by the numerals 1 (one) and 0 (zero). A byte, containing 8 bits, can represent 256 different states. The binary number 11010111, for example, has the value of 215 in our base 10 numbering system. When a value is carried digitally, each additional bit of resolution will double the number of different states that can be represented. Systems that operate with a greater number of bits of resolution, or quantization, will be able to capture a signal with more detail or fidelity. Thus, a video digitizer with 12 bits of resolution will capture 4 times as much detail as one with 10 bits.

Blanking – The Horizontal and Vertical blanking intervals of a television signal refer to the time periods between lines and between fields. No picture information is transmitted during these times, which are required in CRT displays to allow the electron beam to be repositioned for the start of the next line or field. They are also used to carry synchronizing pulses which are used in transmission and recovery of the image. Although some of these needs are disappearing, the intervals themselves are retained for compatibility purposes. They have turned out to be very useful for the transmission of additional content, such as teletext and embedded audio.

CAV – Component Analog Video. This is a convenient shorthand form, but it is subject to confusion. It is sometimes used to mean ONLY color difference component formats (SMPTE or Beta), and other times to include RGB format. In any case, a CAV signal will always require 3 connectors – either Y/R-Y/B-Y, or R/G/B.

Checkfield – A Checkfield signal is a special test signal that stresses particular aspects of serial digital transmission. The performance of the Phase Locked-Loops (PLLs) in an SDI receiver must be able to tolerate long runs of 0's and 1's. Under normal conditions, only very short runs of these are produced due to a scrambling algorithm that is used. The Checkfield, also referred to as the Pathological test signal, will "undo" the scrambling and cause extremely long runs to occur. This test signal is very useful for testing transmission paths.

Chroma – The color or chroma content of a signal, consisting of the hue and saturation of the image. See also Color Difference.

Component – In a component video system, the totality of the image is carried by three separate but related components. This method provides the best image fidelity with the fewest artifacts, but it requires three independent transmission paths (cables). The commonly used component formats are Luminance and Color Difference (Y/Pr/Pb), and RGB. It was far too unwieldy in the early days of color television to even consider component transmission.

Composite – Composite television dates back to the early days of color transmission. This scheme encodes the color difference information onto a color subcarrier. The instantaneous phase of the subcarrier is the color's hue, and the amplitude is the color's saturation or intensity. This subcarrier is then added onto the existing luminance video signal. This trick works because the subcarrier is set at a high enough frequency to leave spectrum for the luminance information. But it is not a seamless matter to pull the signal apart again at the destination in order to display it or process it. The resultant artifacts of dot crawl (also referred to as chroma crawl) are only the most obvious result. Composite television is the most commonly used format throughout the world, either as PAL or NTSC. It is also referred to as Encoded video.

Color Difference – Color Difference systems take advantage of the details of human vision. We have more acuity in our black and white vision than we do in color. This means that we need only the luminance information to be carried at full bandwidth, we can scrimp on the color channels. In order to do this, RGB information is converted to carry all of the luminance (Y is the black and white of the scene) in a single channel. The other two channels are used to carry the "color difference". Noted as B-Y and R-Y, these two signals describe how a particular pixel "differs" from being purely black and white. These channels typically have only half the bandwidth of the luminance.

Decibel (dB) – The decibel is a unit of measure used to express the ratio in the amplitude or power of two signals. A difference of 20 dB corresponds to a 10:1 ratio between two signals, 6 dB is approximately a 2:1 ration. Decibels add while the ratios multiply, so 26 dB is a 20:1 ratio, and 14 dB is a 5:1 ratio. There are several special cases of the dB scale, where the reference is implied. Thus, dBm refers to power relative to 1 milliwatt, and dBu refers to voltage relative to .775V RMS. The original unit of measure was the Bel (10 times bigger), named after Alexander Graham Bell.

dBFS – In Digital Audio systems, the largest numerical value that can be represented is referred to as Full Scale. No values or audio levels greater than FS can be reproduced because they would be clipped. The nominal operating point (roughly corresponding to 0 VU) must be set below FS in order to have headroom for audio peaks. This operating point is described relative to FS, so a digital reference level of -20 dBFS has 20 dB of headroom before hitting the FS clipping point.

DVI – Digital Visual Interface. DVI-I (integrated) provides both digital and analog connectivity. The larger group of pins on the connector are digital while the four pins on the right are analog.

EDH – Error Detection and Handling is a method to verify proper reception of an SDI or HD SDI signal at the destination. The originating device inserts a data packet in the vertical interval of the SDI signal and every line of the HD signal which contains a checksum of the entire video frame. This checksum is formed by adding up the numerical values of all of the samples in the frame, using a complex formula. At the destination this same formula is applied to the incoming video and the resulting value is compared to the one included in the transmission. If they match, then the content has all arrived with no errors. If they don't, then an error has occurred.

Embedded Audio – Digital Audio can be carried along in the same bitstream as an SDI or HD SDI signal by taking advantage of the gaps in the transmission which correspond to the horizontal and vertical intervals of the television waveform. This technique can be very cost effective in transmission and routing, but can also add complexity to signal handling issues because the audio content can no longer be treated independently of the video.

Eye Pattern – To analyze a digital bitstream, the signal can be displayed visually on an oscilloscope by triggering the horizontal timebase with a clock extracted from the stream. Since the bit positions in the stream form a very regular cadence, the resulting display will look like an eye – an oval with slightly pointed left and right ends. It is easy to see from this display if the eye is "open", with a large central area that is free of negative or positive transitions, or "closed" where those transitions are encroaching toward the center. In the first case, the open eye indicates that recovery of data from the stream can be made reliably and with few errors. But in the closed case data will be difficult to extract and bit errors will occur. Generally it is jitter in the signal that is the enemy of the eye.

Frame Sync – A Frame Synchronizer is used to synchronize the timing of a video signal to coincide with a timing reference (usually a color black signal that is distributed throughout a facility). The synchronizer accomplishes this by writing the incoming video into a frame buffer memory under the timing direction of the sync information contained in that video. Simultaneously the memory is being read back by a timing system that is genlocked to a house reference. As a result, the timing or alignment of the video frame can be adjusted so that the scan of the upper left corner of the image is happening simultaneously on all sources. This is a requirement for both analog and digital systems in order to perform video effects or switch glitch-free in a router. Frame synchronization can only be performed within a single television line standard. A synchronizer will not convert an NTSC signal to a PAL signal, it takes a standards converter to do that.

Frequency Response – A measurement of the accuracy of a system to carry or reproduce a range of signal frequencies. Similar to Bandwidth.

H.264 – The latest salvo in the compression wars is H.264 which is also known as MPEG-4 Part 10. MPEG-4 promises good results at just half the bit rate required by MPEG-2.

HD – High Definition. This two letter acronym has certainly become very popular. Here we thought it was all about the pictures – and the radio industry stole it.

HDCP – (High-bandwidth Digital Content Protection) is a content encryption system for HDMI. It is meant to prevent copyright content from being copied. Protected content, like a movie on a Blu-Ray disc is encrypted by its creator. Devices that want to display the protected content, like a television, must have an authorized key in order to decode the signal and display it. The entity that controls the HDCP standard strictly limits the kinds of devices that are allowed decryption keys. Devices that decrypt the content and provide an unencrypted copy are not allowed.

HDMI – The High Definition Multimedia Interface comes to us from the consumer marketplace where it is becoming the de facto standard for the digital interconnect of display devices to audio and video sources. It is an uncompressed, all-digital interface that transmits digital video and eight channels of digital audio. HDMI is a bit serial interface that carries the video content in digital component form over multiple twisted-pairs. HDMI is closely related to the DVI interface for desktop computers and their displays.

IEC – The International Electrotechnical Commission provides a wide range of worldwide standards. Among them, they have provided standardization of the AC power connection to products by means of an IEC line cord. The connection point uses three flat contact blades in a triangular arrangement, set in a rectangular connector. The IEC specification does not dictate line voltage or frequency. Therefore, the user must take care to verify that a device either has a universal input (capable of 90 to 230 volts, either 50 or 60 Hz), or that a line voltage switch, if present, is set correctly.

Interlace – Human vision can be fooled to see motion by presenting a series of images, each with a small change relative to the previous image. In order to eliminate the flicker, our eyes need to see more than 30 images per second. This is accomplished in television systems by dividing the lines that make up each video frame (which run at 25 or 30 frames per second) into two fields. All of the odd-numbered lines are transmitted in the first field, the even-numbered lines are in the second field. In this way, the repetition rate is 50 or 60 Hz, without using more bandwidth. This trick has worked well for years, but it introduces other temporal artifacts. Motion pictures use a slightly different technique to raise the repetition rate from the original 24 frames that make up each second of film—they just project each one twice.

IRE – Video level is measured on the IRE scale, where 0 IRE is black, and 100 IRE is full white. The actual voltages that these levels correspond to can vary between formats.

ITU-R 601 – This is the principal standard for standard definition component digital video. It defines the luminance and color difference coding system that is also referred to as 4:2:2. The standard applies to both PAL and NTSC derived signals. They both will result in an image that contains 720 pixels horizontally, with 486 vertical pixels in NTSC, and 576 vertically in PAL. Both systems use a sample clock rate of 27 MHz, and are serialized at 270 Mb/s.

Jitter – Serial digital signals (either video or audio) are subject to the effects of jitter. This refers to the instantaneous error that can occur from one bit to the next in the exact position of each digital transition. Although the signal may be at the correct frequency on average, in the interim it varies. Some bits come slightly early, others come slightly late. The measurement of this jitter is given either as the amount of time uncertainty or as the fraction of a bit width. For 270 Mb/s SD video, the allowable jitter is 740 picoseconds, or 0.2 UI (Unit Interval – one bit width). For 1.485 Gb/s HD, the same 0.2UI spec corresponds to just 135 pico seconds.

Luminance – The "black & white" content of the image. Human vision had more acuity in luminance, so television systems generally devote more bandwidth to the luminance content. In component systems, the luminance is referred to as Y.

MPEG – The Moving Picture Experts Group is an industry group that develops standards for the compression of moving pictures for television. Their work is an on-going effort. The understanding of image processing and information theory is constantly expanding. And the raw bandwidth of both the hardware and software used for this work is ever increasing. Accordingly, the compression methods available today are far superior to the algorithms that originally made the real-time compression and decompression of television possible. Today, there are many variations of these techniques, and the term MPEG has to some extent become a broad generic label.

Metadata – This word comes from the Greek, meta means 'beyond' or 'after'. When used as a prefix to 'data', it can be thought of as 'data about the data'. In other words, the metadata in a data stream tells you about that data – but it is not the data itself. In the television industry, this word is sometimes used correctly when, for example, we label as metadata the timecode which accompanies a video signal. That timecode tells you something about the video, i.e. when it was shot, but the timecode in and of itself is of no interest. But in our industry's usual slovenly way in matters linguistic, the term metadata has also come to be used to describe data that is associated with the primary video in a datastream. So embedded audio will (incorrectly) be called metadata when it tells us nothing at all about the pictures. Oh well.

Multi-mode – Multi-mode fibers have a larger diameter core than single mode fibers (either 50 or 62.5 microns compared to 9 microns), and a correspondingly larger aperture. It is much easier to couple light energy into a multi-mode fiber, but internal reflections will cause multiple "modes" of the signal to propagate down the fiber. This will degrade the ability of the fiber to be used over long distances. See also Single Mode.

NTSC – The color television encoding system used in North America was originally defined by the National Television Standards Committee. This American standard has also been adopted by Canada, Mexico, Japan, Korea, and Taiwan. (This standard is referred to disparagingly as Never Twice Same Color.)

Optical – An optical interface between two devices carries data by modulating a light source. This light source is typically a laser or laser diode (similar to an LED) which is turned on and off at the bit rate of the datastream. The light is carried from one device to another through a glass fiber. The fiber's core acts as a waveguide or lightpipe to carry the light energy from one end to another. Optical transmission has two very significant advantages over metallic copper cables. First, it does not require that the two endpoint devices have any electrical connection to each other. This can be very advantageous in large facilities where problems with ground loops appear. And secondly, and most important, an optical interface can carry a signal for many kilometers or miles without any degradation or loss in the recovered signal. Copper is barely useful at distances of just 1000 feet.

Oversampling – A technique to perform digital sampling at a multiple of the required sample rate. This has the advantage of raising the Nyquist Rate (the maximum frequency that can be reproduced by a given sample rate) much higher than the desired passband. This allows the use of more easily realized anti-alias filters.

PAL – During the early days of color television in North America, European broadcasters developed a competing system called Phase Alternation by Line. This slightly more complex system is better able to withstand the differential gain and phase errors that appear in analog amplifiers and transmission systems. Engineers at the BBC claim that it stands for Perfection At Last.

Pathological Test Pattern – see Checkfield

Progressive – An imaging scanning technique that progresses through all of the lines of a frame in a single pass. Computer monitors all use progressive displays. This contrasts to the Interlace technique common to television systems.

Return Loss – An idealized input or output circuit will exactly match its desired impedance (generally 75 ohms) as a purely resistive element, with no reactive (capacitive or inductive) elements. In the real world, we can only approach the ideal. So, our real inputs and outputs will have some capacitance and inductance. This will create impedance matching errors, especially at higher frequencies. The Return Loss of an input or output measures how much energy is returned (reflected back due to the impedance mismatch). For digital circuits, a return loss of 15 dB is typical. This means that the energy returned is 15 dB less than the original signal. In analog circuits, a 40 dB figure is expected.

RGB – RGB systems carry the totality of the picture information as independent Red, Green, and Blue signals. Television is an additive color system, where all three components add to produce white. Because the luminance (or detail) information is carried partially in each of the RGB channels, all three must be carried at full bandwidth in order to faithfully reproduce an image.

Setup – In the NTSC Analog Composite standard, the term Setup refers to the addition of an artificial offset or pedestal to the luminance content. This places the Black Level of the analog signal 54 mV (7.5 IRE) positive with respect to ground. The use of Setup is a legacy from the early development of television receivers in the vacuum tube era. This positive offset helped to prevent the horizontal retrace of the electron beam from being visible on the CRT, even if Brightness and Contrast were mis-adjusted. While the use of Setup did help to prevent retrace artifacts, it did so at the expense of dynamic range (contrast) in the signal because the White Level of the signal was not changed.

Setup is optional in NTSC systems, but is never used in PAL systems (see 'Perfection' characteristic of PAL). This legacy of Setup continues to persist in North American NTSC systems, while it has been abandoned in Japan.

In the digital component world (SD and HD SDI) there is obviously no need for, and certainly every reason to avoid, Setup. In order for the interfaces between analog and digital systems to operate as transparently as possible, Setup must be carefully accounted for in conversion products. When performing analog to digital conversion, Setup (if present) must be removed and the signal range gained up to account for the 7.5% reduction in dynamic range. And when a digital signal is converted back to analog form, Setup (if desired on the output) must be created by reducing the dynamic range by 7.5% and adding the 54 mV positive offset. Unfortunately, there is no truly foolproof algorithm to detect the presence of Setup automatically, so it's definitely a case of installer beware.

ScH Phase – Used in composite systems, ScH Phase measures the relative phase between the leading edge of sync on line 1 of field 1 and a continuous subcarrier sinewave. Due to the arithmetic details of both PAL and NTSC, this relationship is not the same at the beginning of each frame. In PAL, the pattern repeats every 4 frames (8 fields) which is also known as the Bruch Blanking sequence. In NTSC, the repeat is every 2 frames (4 fields.) This creates enormous headaches in editing systems and the system timing of analog composite facilities.

SDI – Serial Digital Interface. This term refers to inputs and outputs of devices that support serial digital component video. This could refer to standard definition at 270 Mb/s, HD SDI or High Definition Serial Digital video at 1.485 Gb/s, or to the newer 3G standard of High Definition video at 2.97 Gb/s.

SMPTE – The Society of Motion Picture and Television Engineers is a professional organization which has done tremendous work in setting standards for both the film and television industries. The term "SMPTE'" is also shorthand for one particular component video format - luminance and color difference.

Single Mode – A Single mode (or mono mode) optical fiber carries an optical signal on a very small diameter (9 micron) core surrounded with cladding. The small diameter means that no internally reflected lightwaves will be propagated. Thus only the original "mode" of the signal passes down the fiber. A single mode fiber used in an optical SDI system can carry a signal for up to 20 kilometers. Single mode fibers require particular care in their installation due to the extremely small optical aperture that they present at splice and connection points. See also Multi-mode.

TBC – A Time Base Corrector is a system to reduce the Time Base Error in a signal to acceptable levels. It accomplishes this by using a FIFO (First In, First Out) memory. The incoming video is written into the memory using its own jittery timing. This operation is closely associated with the actual digitization of the analog signal because the varying position of the sync timing must be mimicked by the sampling function of the analog to digital converter. A second timing system, genlocked to a stable reference, is used to read the video back out of the memory. The memory acts as a dynamically adjusting delay to smooth out the imperfections in the original signal's timing. Very often a TBC will also function as a Frame Synchronizer. See also Frame Sync.

Time Base Error – Time base error is present when there is excessive jitter or uncertainty in the line to line output timing of a video signal. This is commonly associated with playback from video tape recorders, and is particularly severe with consumer type heterodyne systems like VHS. Time base error will render a signal unusable for broadcast or editing purposes.

Timecode – Timecode, a method to uniquely identify and label every frame in a video stream, has become one of the most recognized standards ever developed by SMPTE. It uses a 24 hour clock, consisting of hours, minutes, seconds, and television frames. Originally recorded on a spare audio track, this 2400 baud signal was a significant contributor to the development of video tape editing. We now refer to this as LTC or Longitudinal Time Code because it was carried along the edge of the tape. This allowed it to be recovered in rewind and fast forward when the picture itself could not. Timecode continues to be useful today and is carried in the vertical interval as VITC, and as a digital packet as DVITC. Timecode is the true metadata.

Tri-Level Sync – For many, many years, television systems used composite black as a genlock reference source. This was a natural evolution from analog systems to digital implementations. With the advent of High Definition television, with even higher data rates and tighter jitter requirements, problems with this legacy genlock signal surfaced. Further, a reference signal with a 50 or 60 Hz frame rate was useless with 24 Hz HD systems running at film rates. Today we can think of composite black as a bi-level sync signal – it has two levels, one at sync tip and one at blanking. For HD systems, Tri-Level Sync, which has the same blanking level (at ground) of bi-level sync, but the sync pulse now has both a negative and a positive element. This keeps the signal symmetrically balanced so that its DC content is zero. And it also means that the timing pickoff point is now at the point where the signal crosses blanking and is no longer subject to variation with amplitude. This makes Tri-Level Sync a much more robust signal and one which can be delivered with less jitter.

USB – The Universal Serial Bus, developed in the computer industry to replace the previously ubiquitous RS-232 serial interface, now appears in many different forms and with many different uses. It actually forms a small local area network, allowing multiple devices to coexist on a single bus where they can be individually addressed and accessed.

VGA – Video Graphics Array. Traditional 15-pin, analog interface between a PC and monitor.

WSS – Wide Screen Signaling is used in the PAL/625 video standards, both in analog and digital form, to convey information about the aspect ratio and format of the transmitted signal. Carried in the vertical interval, much like closed captioning, it can be used to signal a television receiver to adjust its vertical or horizontal sizing to reflect incoming material. Although an NTSC specification for WSS exists, it never achieved any traction in the marketplace.

Word Clock – Use of Word Clock to genlock digital audio devices developed in the audio recording industry. Early digital audio products were interconnected with a massive parallel connector carrying a twisted pair for every bit in the digital audio word. A clock signal, which is a square wave at the audio sampling frequency, is carried on a 75 ohm coaxial cable. Early systems would daisy chain this 44.1 or 48 kilohertz clock from one device to another with coax cable and Tee connectors. On the rising edge of this Work Clock these twisted pairs would carry the left channel, while on the falling edge, they would carry the right channel. In most television systems using digital audio, the audio sample clock frequency (and hence the 'genlock' between the audio and video worlds) is derived from the video genlock signal. But products that are purely audio, with no video reference capability, may still require Word Clock.

YUV – Strictly speaking, YUV does not apply to component video. The letters refer to the Luminance (Y), and the U and V encoding axes using in the PAL composite system. Since the U axis is very close to the B-Y axis, and the V axis is very close to the R-Y axis, YUV is often used as a sort of shorthand for the more long-winded "Y/R-Y/B-Y".

Y/Cr/Cb – In digital component video, the luminance component is Y, and the two color difference signals are Cr (R-Y) and Cb (B-Y).

Y/Pr/Pb – In analog component video, the image is carried in three components. The luminance is Y, the R-Y color difference signal is Pr, and the B-Y color difference signal is Pb.

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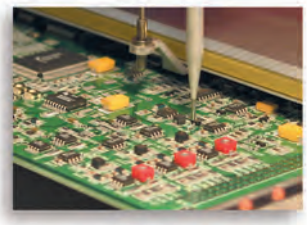

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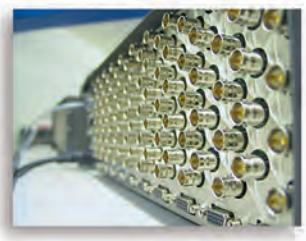

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