LYNX Technik AG

bluBox™ SHUFFLEMAX

Multi-format
SD/HD/3G
BB 7289 U/D

SHUFFLEMAX

Manage multi-channel audio, metadata, and audio / video delays in a digital multi-format video environment with the new **bluBox** *SHUFFLEMAX*

To address complex multi-channel audio issues, LYNX Technik has developed the new **bluBox** *SHUFFLEMAX*, a self-contained compact 1RU, rack mountable solution ith integrated control panel and external PC control (LAN).

Primary function:
• Audio and metadata embedder / de-embedder with powerful internal shuffling

Additional functions:
• Audio processing
• DolbyE synchronization
• Programmable audio delays

bluBox *SSHUFFLEMAX* has an integrated control panel for local control and in addition includes the LYNX APPolo control system, which provides an intuitive graphical visualization for the status, control, monitoring and configuration of the system.

- an invaluable problem solver -

Applications

Audio Embedder / De-embedder – **bluBox** *SHUFFLEMAX* functions as a fully featured 16-channel audio embedder / de-embedder for SD/HD/3G SDI video streams. It features eight individually assigned AES I/O ports.

Audio Processor - Three large mono crossbars and a full 32 channel internal audio processing stage let users remap embedded and external audio while maintaining full control over the audio settings.

32 channels of audio gain and phase adjustment with invert, mute and sum functionality, plus overload and silence detection are part of the **bluBox** *SHUFFLEMAX* audio processing features.

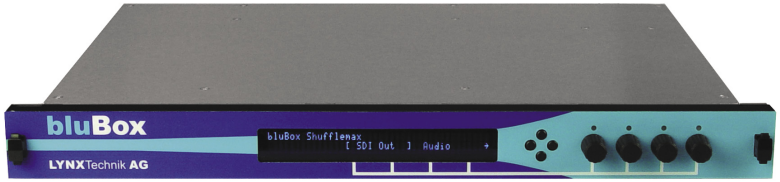
If required, **bluBox** *SHUFFLEMAX* also provides fully automatic AV timing compensation ensuring the input to output timing is always maintained. User adjustable timing offsets are provided for all audio I/O.

DolbyE Synchronizer – One AES audio path can be assigned to the internal DolbyE synchronizer. **bluBox** *SHUFFLEMAX* maintains alignment of the critical guard band for an embedded DolbyE stream. It will also provide full synchronization and guard band alignment to the connected SDI video for an external asynchronous DolbyE stream.

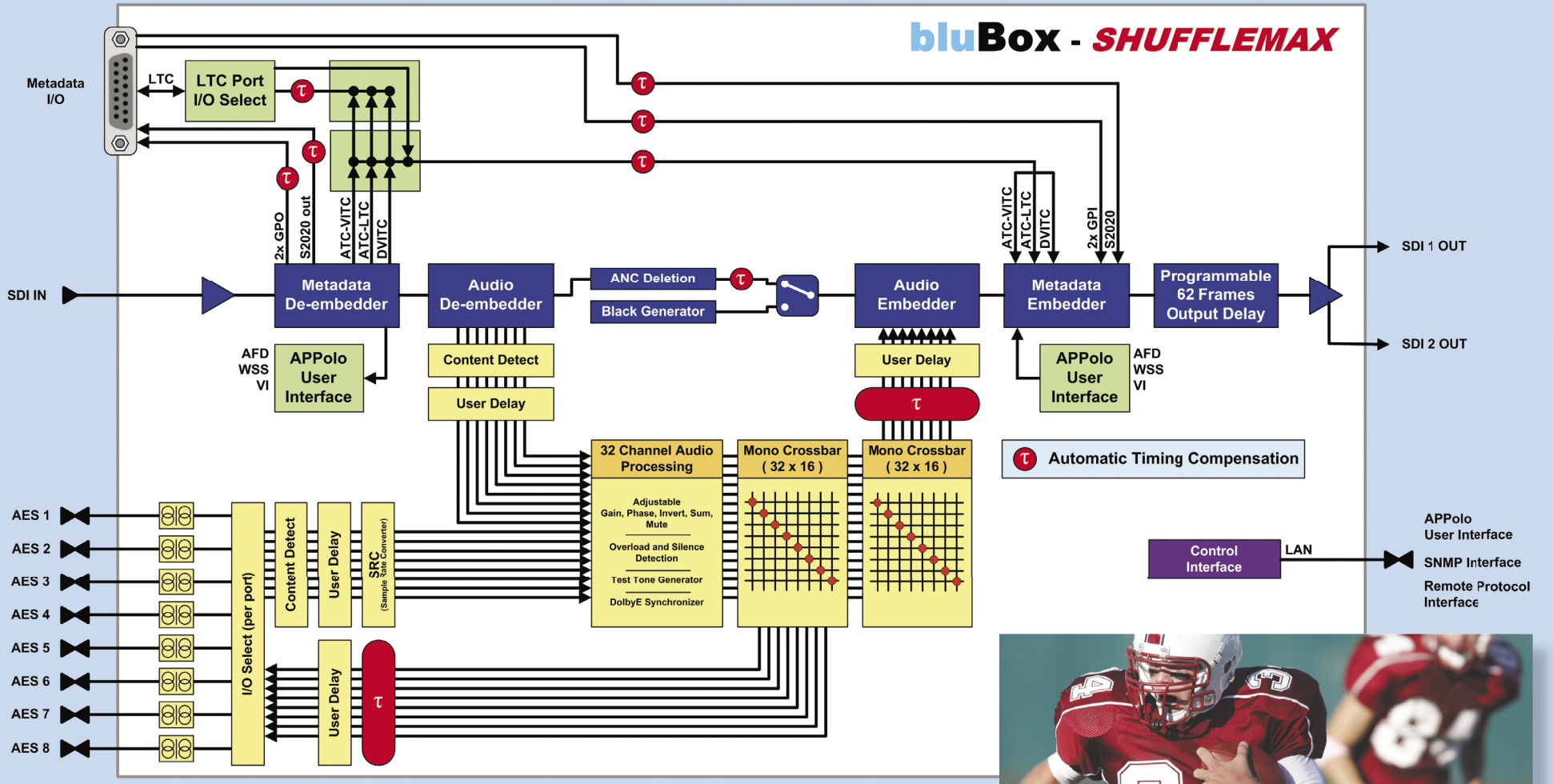
Video and Audio Delay Processor - A fully programmable 62 frame video delay as well as four sets of 8 x AES audio delays that have up to 10 seconds of manual adjustment are provided. There is almost no external AV delay problem that cannot be corrected.

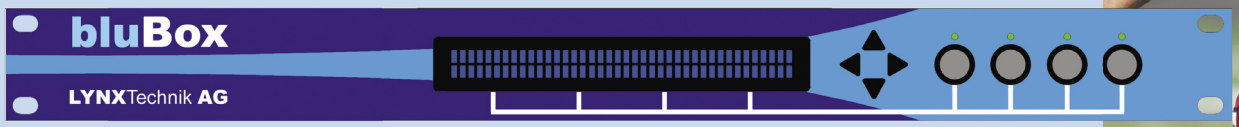
Metadata Extractor and Embedder - **bluBox** *SHUFFLEMAX* provides visualization of all digital ANC packets that are present in HANC and VANC. These can be passed transparently, removed or overwritten with new data. **bluBox** *SHUFFLEMAX* provides considerable flexibility;

• Visualize, decode and shuffle any metadata that is present
• Specify the line number used for embedding metadata in HANC or VANC
• Decode SMPTE 2000 audio metadata from the SDI signal
• Insert external SMPTE 2020 audio metadata and embed it into SDI
• Receive, decode and shuffle timecode (ATC-LTC, ATC-VITC, D-VITC)
• User configured timecode LTC port for extraction or embedding of timecode
• Visualization and control over AFD, WSS, VI and Closed Caption metadata
• Transport and process 2 GPI input / output triggers in metadata



bluBox™ SHUFFLEMAX





Integrated local control panel can be used standalone or in parallel with the included **APPolo | Control** software on PC

Selectable Timecode Burn In.
Display up to 4 timecode values. Position anywhere on screen

bluBox™ SHUFFLEMAX

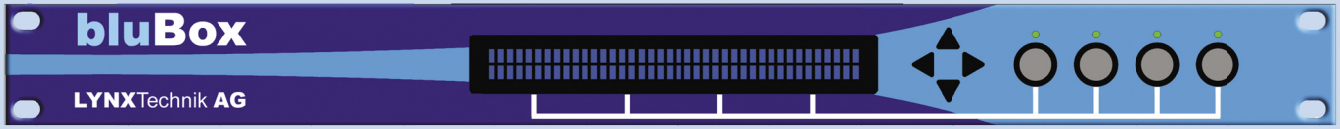
CONNECTION PANEL OPTIONS

BB 7289 D

Shufflemax with balanced AES inputs and outputs on 25pin SubD connector

BB 7289 U

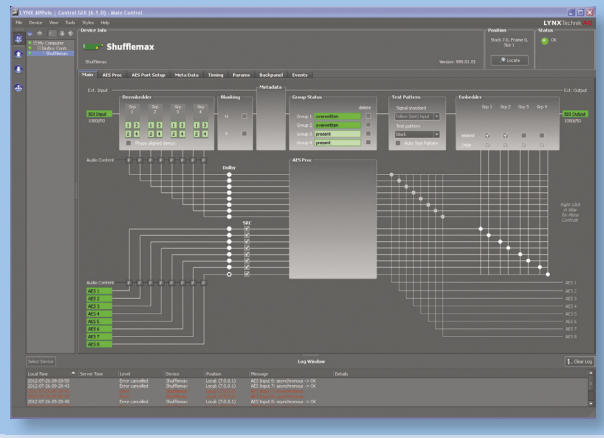
Shufflemax with unbalanced AES inputs and outputs on Mini Din connectors

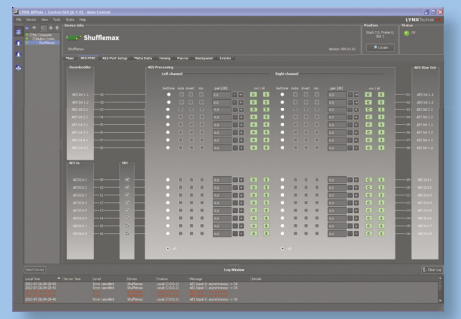


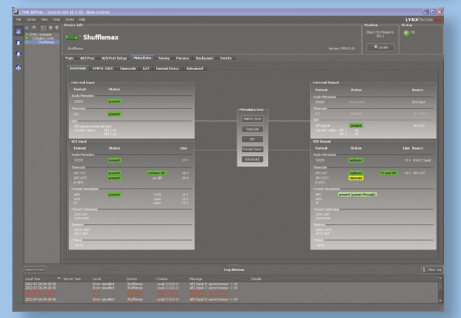
Features

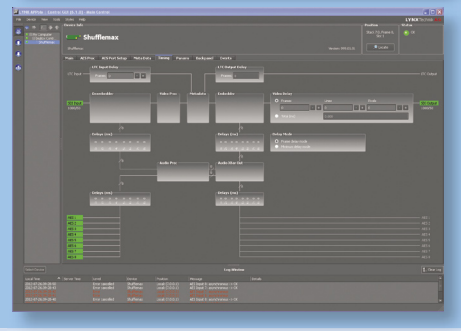
- Auto-detecting multi-format SDI support for SD/HD/3G
- 8 external AES inputs or outputs – individually assigned
- Transformer coupled audio I/O
- Balanced AES3 or unbalanced AES3id versions available
- 16 channel AES audio embedder / de-embedder
- Delete, overwrite, extract, re-map, process or pass audio transparently
- "Auto black" uses a black frame of video if SDI input is not present
- 2 internal mono crossbars for complete audio mapping control
- Auto-detect audio format, PCM or encoded (DolbyE)
- 8 selectable sample rate converters for external AES inputs
- Automatic timing compensation to maintain audio I/O timing accuracy
- 10 seconds of user adjustable audio delay
- User adjustable timing offsets for each AES channel – four sets provided
- DolbyE synchronizer – maintains critical guard band timing
- 32 channel audio processing stage with individual adjustments for:
  - *Gain*
  - *Phase (0-180°)*
  - *Invert*
  - *Mute*
  - *Sum (left + right)*
- 32 channels of overload and silence detection
- External metadata I/O port
- Embed and de-embed metadata
- Visualize all ANC packets for both HANC and VANC, includes;
  - *Timecode ATC-LTC, ATC-VITC and D-VITC*
  - *SMPTE 2020 Audio metadata*
  - *GPI/GPO signaling in metadata*
  - *Any other ANC data present*
- Metadata can be extracted, replaced or passed transparently
- Extract or insert LTC timecode from external I/O connection
- Clean switching of crosspoints and audio delay
- Extract or insert SMPTE 2020 audio metadata using external RS 422 port
- Extract or insert up to 2 GPI / GPO (relay) triggers in metadata
- Timecode burn in. Display up to 4 timecodes and position anywhere on screen
- Programmable 62 frame video delay; in frames / lines / pixels or milliseconds
- All settings automatically stored in modules flash ram
- Integrated control panel for local control
- APPolo PC control software included

APPolo | Control









Specifications

Video Input	
Signal Type	Serial digital video SMPTE 292M, 424M, 259M with automatic video format and standard detection
Supported Formats	SDI formats up to 3Gbit/s* (see table)
No. of Inputs	1
Connector / Impedance	BNC, 75 Ohms
Return Loss	> 15dB (270Mbit) , > 10dB (2.97Gbit)

Video Outputs	
No. of Outputs	2
Signal Type	Serial digital video SMPTE 292M, 424M, 259M
Output Format	Follows input format
Connector / Impedance	BNC, 75 Ohm
Jitter	< 0.20 UI (270Mbit) < 1.0 UI - Timing, < 0.20 UI - Alignment (1.485Gbit) < 2.0 UI - Timing, < 0.30 UI - Alignment (2.97Gbit)
Return Loss	> 15dB (1.485Gbit), > 10dB (2.97Gbit)

AES Audio Inputs / Outputs	
No. of Inputs / Outputs	8 (Individually assign 8 external channels as inputs or outputs)
Signal	BB 7289 U = 8 x AES3id unbalanced (single ended) BB 7289 D = 8 x AES3 balanced
Connectors	BB 7289 U = MiniDin, 75 Ohm BB 7289 D = Female 25 pin SubD, 110 Ohm balanced
Output Level	BB 7289 U = 1 v peak to peak nominal BB 7289 D = 4v peak to peak nominal
Coupling	Transformer (isolated) inputs or outputs

Audio Processing	
Audio Proc Functions	Adjustable Gain / Mute / Phase Invert / Mixdown (32 channels) Silence and overload protection (32 channels)
Audio Crossbars	32 x 16 mono external output crossbar 32 x 16 mono embedder crossbar
Embedder	8 x AES (16 channel) embedder, input configured by crossbar
De-embedder	8 x AES (16 channel) de-embedder
DolbyE Synchronizer	User assignable single channel DolbyE synchronizer to maintain guard band alignment and synchronize asynchronous DolbyE (either de-embedded DolbyE or external DolbyE input)

Video and Audio Delay	
Nominal Processing Delay	1 frame with automatic timing compensation to keep video and audio aligned. (0.5 frame min delay is possible - refer to manual)
Video Delay	Up to 62 frames manually adjustable in frame / line / pixel increments
Audio Delay	Up to 10 seconds total - provided via four 8 x AES arrays, individually adjustable in various areas of processing path (refer to diagram) **Note:** These adjustment are offsets to the automatic timing compensation

Metadata	
External I/O Connector	15 pin female SubD connector, with multiple I/O: • LTC input or output (user configured) • 2 x GPI inputs and outputs (GPI/O transported in metadata) • SMPTE 2020 audio metadata I/O (RS 422 connections)
Timecode Support	SMPTE 12M-1 2008 and SMPTE 12M-2 2008 • **ATC-LTC** (SMPTE 291M 2006) • **ATC-VITC** (SMPTE 291M 2006) • **D-VITC** (SDTV only - SMPTE 266 M 2008) Selectable burn in display of timecode
Audio Metadata	SMPTE 2020
Other Metadata	Visualize **ALL** metadata packets in VANC or HANC Detect / visualise and process AFD,WSS,VI and CC metadata
Timing Compensation	Automatic timing compensation is applied to ensure I/O timing is correct

GPI / GPO Interface	
Transport	2 x GPI/O signals are endoded / decoded from metadata
Connector	15 pin SubD
GPI Inputs	External passive closure between pins (short) to trigger Max input switching frequency 25Hz (50 operations / second) Input insulation 3.75kV
GPO Outputs	Internal contact closure (relay) Max switching frequency: 25Hz (50 operations / second) Max switching power: 220VDC / 0.25A or 250VAC / 0.25A Output insulation: 3.75kV

Connections (termination panel)	
LAN connection	RJ45 (10/100 Base T)
Alarms	GPO outputs / GPI input on terminal strip **Alarm Major + Alarm Minor** - Relay contact closures (max 220VDC/250AV 2A) **GPO outputs** - Opto coupled outputs (max 60VDC/0.6A) **GPI input** - Opto coupled input (max 60VDC/0.6A)
Reference Input	(Not Used)
Primary AC Input	Standard IEC 60320 C13 AC power connector, double pole fused (2A)
Redundant DC Input (option)	Molex Minifit 4 pin power connector, 12VDC input (External brick power supply option: RPS 5000)

Performance	
Cable Equalization	Up to 250m (820 feet) using Belden 8281 (270Mbit) Up to 140m (459 ft) using Belden 1694A (1.485Gbit) Up to 80m (262ft) using Belden 1694A (2.97Gbit)
Control	Local control and configuration via integrated control panel. Remote control / status monitoring possible when using the APPolo control system (included)

Electrical Specifications	
Power Input	90-250VAC, 47-63Hz
No of AC Inputs	1
AC Connector	IEC 60320 C13 (10/15A)
Protection	AC input is double pole fused (2.0A max)
Power Consumption	?? W max.
Safety	IEC 60950 / EN 60950 / VDE0805

Mechanical	
Size	?? L X ?? H x ?? W (standard 19" rack mount)
Weight	5.2 kg (11.5 lbs)

Ambient	
Temperature	5°C to 40°C (41°F to 104°F) maintaining specifications
Humidity	90% Maximum, non-condensing

* Supported Video Formats / Standards	
Bits / Color	10 Bit / 4:2:2 (Y,Cr,Cb)
Formats : SDTV	**525** / 59.94Hz, **625**/50Hz
Formats : 1.5 Gbit	**720p** / 60 / 59.94 / 50 / 30 / 29.97 / 25 / 24 / 23.98 Hz **1080i** / 60 / 59.94 / 50 Hz **1080p** / 30 / 29.97 / 25 / 24 / 23.98 Hz **1080psF** / 25 / 24 / 23.98 Hz
Formats : 3.0 Gbit	**1080p** / 60 / 59.94 / 50 Hz (Level A)

Ordering Information

Part #	Model	Description
7100005289	**BB 7289 U**	bluBox SHUFFLEMAX (unbalanced AES)
7000005289	**BB 7289 D**	bluBox SHUFFLEMAX (balanced AES)

All specifications are subject to change without notice

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