LYNX Technik AG

P DM 5290 U/D

Multi-format SD/HD/3G

SHUFFLEMAX II - Audio and Metadata Embedder / De-embedder

SHUFFLEMAX II ™

Managing multi-channel audio, Metadata as well as audio / video delays in a modern digital multi-format video infrastructure can be an overwhelming and complex task.

To address these issues, LYNX Technik has developed *SHUFFLEMAX II*, a single, affordable card module for the **Series | 5000** product line.

SHUFFLEMAX II is primarily an audio and metadata embedder plus de-embedder with powerful internal shuffling functionality. Additional functions include: audio processing, DolbyE synchronization, video synchronization and programmable AV delays. Making it ideal for many applications.

SHUFFLEMAX II is driven by the LYNX APPolo control system, which provides an intuitive graphical visualization surface for the status, control, monitoring and configuration of the module.

- an invaluable problem solver -

Applications

Audio embedder / de-embedder – *SHUFFLEMAX II* 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 *SHUFFLEMAX II* audio processing features.

SHUFFLEMAX II 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 channels if required.

DolbyE Synchronizer – One AES audio path can be assigned to the internal DolbyE synchronizer. *SHUFFLEMAX II* 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.

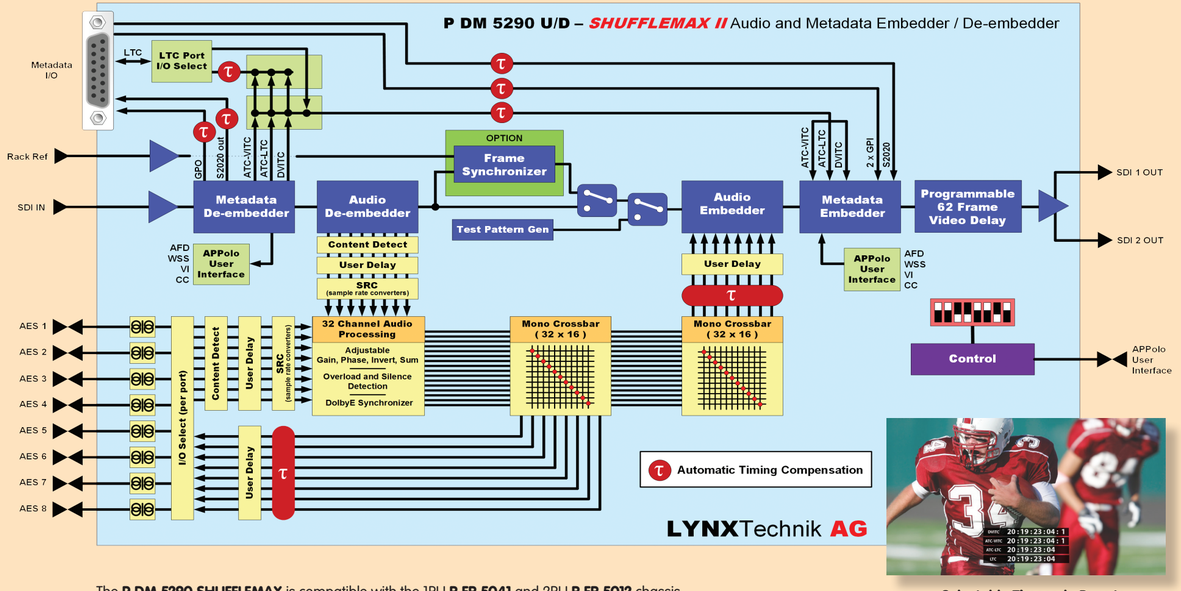
Video Frame Synchronizer - The optional firmware upgrade adds a fully featured multi-format video frame synchronizer to take care of asynchronous SDI video sources. Includes user adjustable delay and sophisticated signal processing which provides synchronized audio free from "pops and clicks" even when adding and dropping frames.

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 virtually no external AV delay problem that cannot be corrected.

Metadata Extractor and Embedder - *SHUFFLEMAX II* 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. *SHUFFLEMAX II* provides considerable flexibility including:

- Visualize, decode and shuffle any metadata that is present
- Specify the line number used for embedding metadata in HANC or VANC
- Decode SMPTE 2020 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

P DM 5290 *SHUFFLEMAX II*



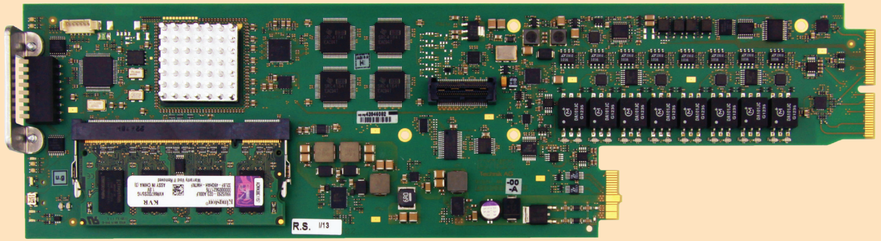
Selectable Timecode Burn In
Display up to 4 timecode values
Position anywhere on screen

The **P DM 5290 SHUFFLEMAX** is compatible with the 1RU **R FR 5041** and 2RU **R FR 5012** chassis
All chassis provide (LAN) remote control using the **APPolo Control System**

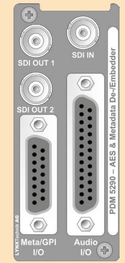
R FR 5041 1RU Chassis

R FR 5012 2RU Chassis

P DM 5290 *SHUFFLEMAX II*

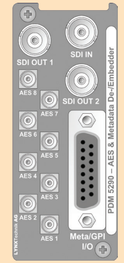


P DM 5290 D



Balanced AES3 Audio
25 pin SubD Connector

P DM 5290 U



Unbalanced AES3id Audio
Mini Din 75Ω Connectors

CONNECTION PANEL OPTIONS

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
- Optional fully featured SDI Frame Synchronizer with adjustable delay
- No audio "pops and clicks" when Frame Sync is dropping and adding frames
- "Auto Test" uses a selectable internal test pattern if the 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
- User adjustable timing offsets for each AES channel – four sets provided
- DolbyE synchronizer – SMPTE 2020 Metadata sub-frames alignment to rack reference
- 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
- Support for AFD / WSS / VI and Closed Caption Metadata via APPolo control system
- Metadata can be extracted, replaced or passed transparently
- Extract or insert LTC timecode from external I/O connection
- Extract or insert SMPTE 2020 Audio Metadata using external RS 422 port
- Extract or insert up to 2 GPI / GPO (relay) triggers in Metadata
- Programmable 62 frame video delay, in frames / lines / pixels or milliseconds
- Powerful, intuitive user interface using APPolo control system
- All settings automatically stored in module's flash RAM
- Selectable timecode burn in on SDI output
- SNMP error reporting if used with OH-RCT-5023 SERVER option
- Hot swappable

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 (270Mbit, > 10dB (2.97Gbit)
AES Audio Inputs / Outputs	
No. of Inputs / Outputs	8 (Individually assign 8 external channels as inputs or outputs)
Signal	P DM 5290 U = 8 x AES3id unbalanced (single ended) P DM 5290 D = 8 x AES3 balanced
Connectors	P DM 5290 U = Mini Din, 75 Ohm P DM 5290 D = Female 25 pin SubD, 110 Ohm balanced
Output Level	P DM 5290 U = 1 v peak to peak nominal P DM 5290 D = 4 v 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)
Output Delay	Up to 62 frames manually adjustable in frame / line / pixel increments
Audio Delay	Up to 10 seconds total. Adjustable for each incoming and outgoing audio channel. **Note**: These adjustments are offsets to the automatic processing 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 (RS422 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 timecode burn in on SDI output
Audio Metadata	SMPTE 2020
Other Metadata	Visualize **ALL** metadata packets in VANC or HANC Detect / visualize 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 encoded / 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
Performance	
Cable Equalization	Up to 250m (820 ft) using Belden 8281 (270Mbit) Up to 140m (459 ft) using Belden 1694A (1.485Gbit) Up to 80m (262 ft) using Belden 1694A (2.97Gbit)
Control	Basic local settings are made using DIP switches and reset switch. Full remote control / status monitoring possible when using the APPolo control system. (**Note:** Remote control is mandatory for full access to the extensive features this module provides)
Status Monitoring	Card edge LED indicators
Electrical Specifications	
Operating Voltage	12 VDC
Power Consumption	< 8.5W
Safety	IEC 60950/ EN 60950/VDE 0805
Mechanical	
Size	283mm x 78mm
Weight	Card module 120g (4.2 oz), connector plate 50g (1.8 oz)
Ambient	
Temperature	5°C to 40°C (41°F to 104°F) maintaining specifications
Humidity	90% maximum, non-condensing

Note
The use of the APPolo control system is **mandatory** for full control of this module. The local controls provide access to basic setup and configurations only.

* Supported Video 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

Model	Description
P DM 5290 D	SHUFFLEMAX II Audio and Metadata embedder / De-embedder (balanced AES)
P DM 5290 U	SHUFFLEMAX II Audio and Metadata embedder / De-embedder (unbalanced AES)
OC-PDM5290-FSYNC	**Option** - Multi-format SDI Frame Synchronizer (license code)

All specifications are subject to change without notice

LYNX Technik AG
Brunnenweg 3
D-64331 Weiterstadt
Germany
PH +49 (0) 6150 1817 0
info@lynx-technik.com

LYNX Technik Inc
26366 Ruether Ave.
Santa Clarita, CA 91350
USA
PH +1 (661) 251 8600
infousa@lynx-technik.com

LYNX Technik Pte Ltd
19 Burn Road
#01-01 Advance Building
Singapore, 369974
PH +65 648 1622
infoasia@lynx-technik.com

www.lynx-technik.com