yellobrik®

CHD 1812-1

3Gbit HDMI® to SDI Converter + Frame Synchronizer

- SDI video output formats up to 3Gbit (1080p60)
- 3G SDI Level A and Level B support
- Support for single link 3D formats
- Integrated Frame Synchronizer
- Multi-format sync reference input - cross lock compatible
- 2 x SDI outputs with optional SDI fiber output
- HDMI embedded audio passed transparently
- 2 x external analog audio inputs
- Professional balanced analog audio inputs or unbalanced line level audio inputs
- Selectable AES channel for embedding external audio
- HDMI, reference and audio present LED indication
- LynxCentraal and yelloGUI compatible to access additional internal settings

Shown with Fiber
SFP Option Installed

The CHD 1812-1 is a versatile and compact HDMI to SDI converter with integrated frame synchronizer. It is an ideal solution for any application which requires a fully synchronized SDI input from an external asynchronous HDMI source.

The flexible reference sync input will accept any analog video sync format including SD bi-level sync, black burst, colorbars and tri-level HD sync. The sync input is auto detecting and fully cross lock compatible. For example: An SDTV reference can be used to frequency lock an HD HDMI input. If no reference is present, the converter performs a standard asynchronous HDMI to SDI conversion.

A pair of stereo analog inputs can be embedded into any AES channel. Audio inputs can be either professional balanced audio with selectable full scale level, or unbalanced consumer line level audio. By default any audio present in the HDMI stream will be embedded into the SDI output or it can be replaced with the external audio signals.

The module is also compatible with the yelloGUI software package, which provides access to a host of additional internal settings including adjustable video delay for timing purposes.

An SDI fiber output is also provided with a variety of plug in SFP options available.

Note: For legal reasons, HDMI capture devices from LYNX Technik AG are designed not to capture, convert or transmit video or audio from HDCP copy-protected sources (e.g. Satellite receivers, Cable receivers, BD players etc.)

Fiber I/O Options:

SDI Fiber Transmitter Options		
Model	Description	Power
OH-TX-1-LC / ST / SC	SFP Fiber TX - Singlemode - LC, ST or SC conn. - 10km*	-5dBm (1310nm)

SDI CWDM Fiber Transmitter Options		
Model	Description	Power
OH-TX-4-XXXX-LC	CWDM SFP Fiber TX - Singlemode LC Conn. - 40km* XXXX=Wavelength. 18 according to ITU T G692.2 1270nm through 1610nm	-1dBm

*Distance is an approximation. Actual distances achieved can be longer or shorter depending on the type of cable. Determine link losses and perform optical budget calculations to ensure correct operation.

⚠ **CAUTION:** This is a high power module. If mounting the module in the RFR 1200 rack frame please leave an empty slot each side of the module to allow for adequate airflow to prevent the risk of overheating.

Technical Specifications

HDMI Input	3D compatible input using type A connector For a detailed list of supported formats please refer to the article in our knowledge base (www.lynx-technik.com > Support > Knowlege Base)
	Up to 8 channels embedded audio in HDMI is passed transparently or replaced with external analog audio input
Reference Input	SDTV: Analog 525 or 625 bi-level sync, black burst or colorbars HDTV: All tri-level sync standards (exceptions 1080p 50/59.94/60Hz) Cross lock compatible
	SMPTE 274M, SMPTE 296M - 75 Ohm BNC connector
Frame Synchronizer	Functional if valid reference is detected, otherwise operates in free run (async) mode. Ext. audio and HDMI input are frequency locked to external reference, fully cross lock compatible across standards. One frame adjustable delay (in line and pixel increments) using LynxCentraal yelloGUI
SDI Outputs	2 x SDI video 75 Ohm BNC (both w/ same signal - NOT dual link) SMPTE 424M, SMPTE 292M, SMPTE 259M, SMPTE 297M 3G Level A & B-DL & B-DS according to SMPTE ST 425-1 and ST 425-2 (3D) with image formats 1280 x 720 and 1920 x 1080 For a detailed list of supported formats please refer to the article in our knowledge base (www.lynx-technik.com > Support > Knowledge Base)
	Electrical Return Loss: >15dB from 5MHz to 1.5GHz, >10dB from 1.5GHz to 3GHz
Fiber Output	Optional plug in SFP for optical SDI output (see fiber options table) SMPTE 297M - 2006
Audio Inputs	Left and right analog audio using 1/4 inch jack plugs
	10k Ohm differential balanced input mode with 24, 22, 20, 18, 15, 12 dBu full scale (selectable)
	Unbalanced mode with (line level) at -10 dBV (1/4 inch Jack Plug to RCA connection adapters supplied)
	Selectable AES channel for audio embedding (1 through 8) (Overwrites any HDMI embedded audio present in selected channel)
	Frequency response: <+/- 0.2dB 20Hz to 20KHz
	48kHz A/D sample rate (free run or frequency locked to ref input)
Power	+12V DC @ 4.7W nominal - (supports 10 - 24V DC input range)
Physical	Size: 138mm x 90mm x 22mm (5.43" x 3.54" x 0.86") incl. connectors Weight: 230g (8.11oz)
Ambient	5 - 40ºC (41 - 104ºF) 90% Humidity (non condensing)
Model #	CHD 1812-1 - (EAN# 4250479318335)
Includes	Module, AC power supply, RCA adapters, HDMI + USB cable

CHD1812-1_DS_rev12 Specifications subject to change

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CHD 1812-1

Video Output Resolution

The SDI output format is automatically selected based on the detected HDMI input resolution. The module does not have an internal scaler, so if the input resolution does not match any of the supported SDI formats then the module will automatically select an appropriate SDI standard with a similar number of lines and pixels and map the signal into the SDI output, which may result in some image cropping (cut) or boxing (blanking)

The table below shows the input to output resolution settings that are applied in AUTOMATIC mode. The yelloGUI interface provides the ability to manually set the output resolution interdependently of the input resolution. For these cases the table below also lists the conversion mode applied to optimally fit the manually selected SDI output format by either cropping or boxing the image (C > Horizontal and Vertical crop, B > Horizontal and Vertical box, V=C / H=B > vertical crop and horizontal box, V=C > vertical crop only).

SDI Output	HDMI Input Resolution								
	SDTV 720 x 525/625	720p 1280x720	1080i 1920x1080	1080p 1920x1080	VGA 640x480	SVGA 800x600	XGA 1024x768	WXGA 1280x768	WUXGA 1920X1200
<auto>	SDTV	720p	1080i	1080p	720p	720p	1080p	1080p	1080p
SDTV	n.a.	C	C	C	V=C / H=B	V=C / H=B	C	C	C
720p	n.a.	n.a.	n.a.	C	B	V=C / H=B	V=C / H=B	V=C	C
1080i	B	B	n.a.	n.a.	B	B	B	B	V=C
1080p	n.a.	B	n.a.	n.a.	B	B	B	B	V=C

Cross Lock and Frame Rate Conversion

The frame synchronizer is fully cross lock compatible, meaning it can cross lock between different standards. With a given reference signal connected the synchronizer will drop or add frames to achieve a correctly synchronized (frame rate converted) SDI output.

Note: This conversion drops and adds frames to achieve the desired output frame rate and will not provide the performance typical of a sophisticated standards converter. Please refer to the tables below for the conversion possibilities. Red = Drop Frame, Yellow = Adding Frames

HDMI inputs with @ 23.98/29.97/59.94Hz Frame Rates

Reference Signal	23.98Hz		24Hz
	29.97Hz	30Hz	25Hz
	59.94Hz	60Hz	50Hz
HDMI Input	SDI Output Formats		
525 / 59.94Hz	525 / 59.94Hz	525 / 60Hz	625 / 50Hz
720p / 59.94Hz	720p / 59.94Hz	720p / 60Hz	720p / 50Hz
720P / 29.97Hz	720p / 29.97Hz	720p / 30Hz	720p / 25Hz
720p / 23.98Hz	720p / 23.98Hz	720p / 30Hz	720p / 24Hz
1080i / 59.94Hz	1080i / 59.94Hz	1080i / 60Hz	1080i / 50Hz
1080p / 59.94Hz	1080p / 59.94Hz	1080p / 60Hz	1080p / 50Hz
1080p / 29.97Hz	1080p / 29.97Hz	1080p / 30Hz	1080p / 25Hz
1080p / 23.98Hz	1080p / 23.98Hz	1080p / 30Hz	1080p / 24Hz

HDMI inputs with @ 24/30/60Hz Frame Rates

Reference Signal	23.98Hz		24Hz
	29.97Hz	30Hz	25Hz
	59.94Hz	60Hz	50Hz
HDMI Input	SDI Output Formats		
525 / 60Hz	525 / 59.94Hz	525 / 60Hz	625 / 50Hz
720p / 60Hz	720p / 59.94Hz	720p / 60Hz	720p / 50Hz
720P / 30Hz	720p / 29.97Hz	720p / 30Hz	720p / 25Hz
720p / 24Hz	720p / 23.98Hz	720p / 30Hz	720p / 24Hz
1080i / 60Hz	1080i / 59.94Hz	1080i / 60Hz	1080i / 50Hz
1080p / 60Hz	1080p / 59.94Hz	1080p / 60Hz	1080p / 50Hz
1080p / 30Hz	1080p / 29.97Hz	1080p / 30Hz	1080p / 25Hz
1080p / 30Hz	1080p / 23.98Hz	1080p / 30Hz	1080p / 24Hz

HDMI inputs with @ 25/50Hz Frame Rates

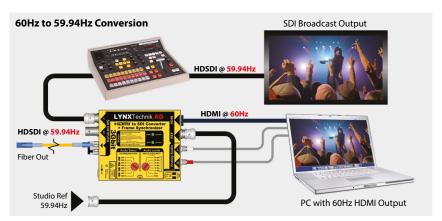| Reference Signal	23.98Hz		24Hz
	29.97Hz	30Hz	25Hz
	59.94Hz	60Hz	50Hz
HDMI Input	SDI Output Formats		
625 / 50Hz	525 / 59.94Hz	525 / 60Hz	625 / 50Hz
720p / 50Hz	720p / 59.94Hz	720p / 60Hz	720p / 50Hz
720P / 25Hz	720p / 29.97Hz	720p / 30Hz	720p / 25Hz
1080i / 50Hz	1080i / 59.94Hz	1080i / 60Hz	1080i / 50Hz
1080p / 50Hz	1080p / 59.94Hz	1080p / 60Hz	1080p / 50Hz
1080p / 25Hz	1080p / 29.97Hz	1080p / 30Hz	1080p / 25Hz

DROP FRAME CONVERSION	ADD FRAME CONVERSION

CHD 1812-1 Frame Rate Conversion Applications

In North American (or legacy NTSC) markets the HDMI signals from most devices tends to be at the consumer 60Hz frame rate and not 59.94Hz which is the required frame rate for broadcast and production.

The CHD 1812-1 can be used to solve this problem and convert a 60Hz HDMI signal to a 59.94Hz SDI signal. This is accomplished using the integrated frame synchronizer (which will drop frames to achieve the correct frame rate)

If fact, the module can also convert between 50Hz and 60Hz standards using the frame synchronizer, which is useful for monitoring applications.

Its also possible to precisely adjust the timing of the SDI output up to one full frame relative to the reference sync in pixel and line increments - which is useful for timing and synchronizing SDI sources into production switchers or routers etc.

60Hz to 59.94Hz Conversion — SDI Broadcast Output — HDSDI @ 59.94Hz — HDMI @ 60Hz — HDSDI @ 59.94Hz — Fiber Out — Studio Ref 59.94Hz — PC with 60Hz HDMI Output

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