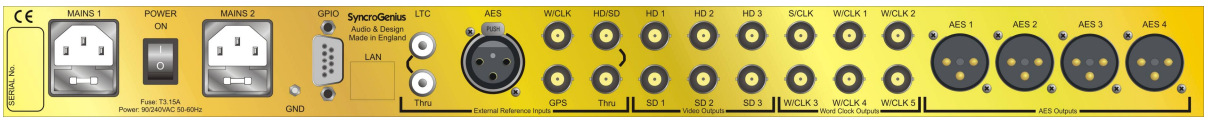
SyncroGenius HD & HD PRO

VIDEO & AES REFERENCE GENERATOR

Manual Issue 2.0e

July 2010



SyncroGenius

HD/HD PRO

Video & Digital source

AES/SPG Reference Generator

Genlock / Master Sync Generator especially designed to cater for all video and digital audio synchronisation requirements within the post-production, studio and broadcasting industry.

The SyncroGenius provides a very high quality, extremely low jitter symultanious AES-3/EBU reference clock, Word Clock, as well as HD and SD video sync generators. These outputs can be genlocked to any input reference source such as HD Tri level video sync, SD bi-level video sync, AES-3 or Word Clock, GPS reference clock or LTC.

These outputs can also be generated from an internal temperature compensated or *****ovened crystal oscillator to AES-3 Grade 1 performance to form a very high quality master sync generator. All video and digital outputs are frequency locked and phase coherent.

***** See Broadcast Pack options

Front panel selection allows AES/EBU and Word Clock outputs at 44.1KHz, 48KHz, 88.2KHz, 96KHz, 176.4KHz, and 192KHz rates with jitter performance of <40ps - wide band at all sampling rates.

3 individually buffered HD Tri level video outputs are simultaneously available on the rear panel.

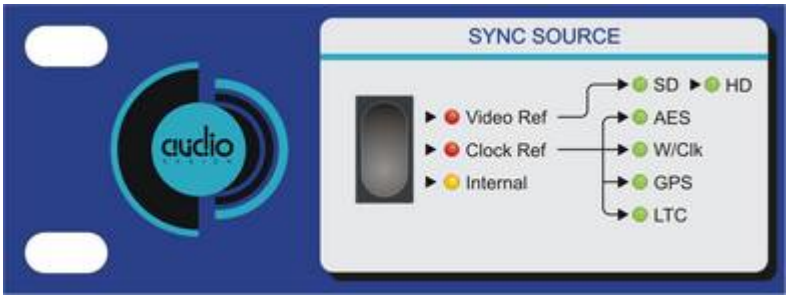
3 individually buffered SD Bi level video outputs are simultaneously available on the rear panel.

4 individually buffered AES/EBU outputs and 4 Word Clock outputs are available simultaneously on the rear panel. An additional 2x & 4x Word Clock is also given.

Digital clocks and Video sync signals can be generated from any external video or digital reference or internally - selected on the front panel.

All the panel controls can be set in tamper-proof mode.

FRONT PANEL FUNCTION DESCRIPTION

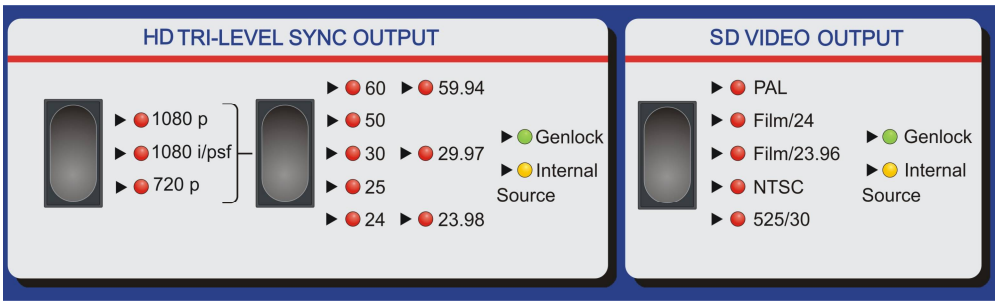


Sync source selector switch.

This enables the outputs to lock to an external video source, to digital source or an internal selected precision crystal source.

Video/digital source led's (green), indicate which video or digital standard the unit is locking to when in the external mode (video Ref or Clock Ref). Each led will glow at half brightness when a valid input is connected. When the input is selected the led will go to full brightness.

Softlock: If the selected sync input is interrupted or lost, the unit will automatically switch to Internal mode and the selected (lost) input led and internal led will flash alternately, indicating that the unit has internally switched to a master video & digital generator. When the input signal is recovered, the unit automatically reverts back to its original operation. Whenever this condition occurs, the SyncroGenius employs a technique called "***Softlock***". This uses a real-time DSP function, which is able to simulate the video & digital clock outputs to remain frame & frequency accurate to the last known input value. At re-sync, the positive going frame and clock edges in the video and digital clock outputs will phase lock to input reference frame edges, ensuring consistent performance. This will also ensure that when the original input source is recovered that **no output disturbance is experienced**



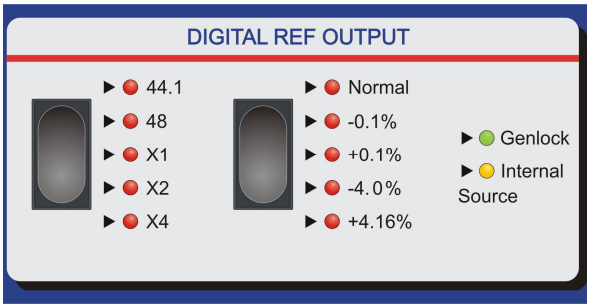
HD Tri level sync & SD Bi level sync outputs:

All HD & SD standards and frame rates can be independently generated as either a master SPG output (internal led on) or Genlocked to a selected input ref sync source. Both standards are simultaneously available.

The Genlock leds glow at full brightness and flash while attempting to lock to a phase coherent input source, or glow steady state at half brightness when the input source and generated outputs are frequency locked only. If the input reference signal is lost, the internal led will light to show that the output has been switched to lock to the internal frequency generator and is acting as a master video and clock generator. When the input reference signal is re established, the genlock leds will

flash before coming on solid to indicate the outputs are re locking to the selected input reference.

HD Version: “Genlock” function is replaced with “Input” status. When on, this will automatically distribute any valid selected video input reference to the associated HD Tri-level or SD video outputs. Indication of the output status is given automatically by the frame rate led’s.



Digital Ref Output:

Digital AES & Word Clock outputs are generated from 44.1KHz – 192KHz using x1 – x4 selections. Frequency offset. Allows the adjustment of any select frequency by +/- 0.1% (PAL/NTSC correction) and or +4.16% /- 4% (Tele-cine/Video correction).

Memory & Lock:

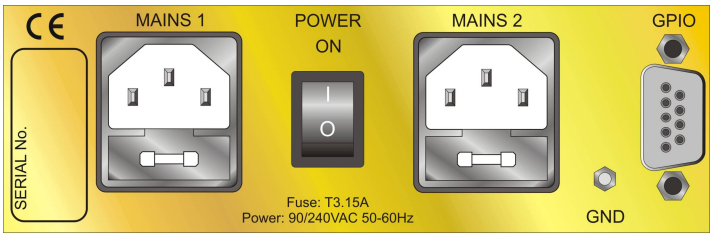
*3 memory settings can be set. To update a memory change appropriate front panel configuration, memory light will go to half brightness and flash slowly to tell you the memorised setting has been altered. Press and hold the memory switch and the led will flash fast for approximately 3 seconds until it lights continuously. This will now be the new setting for that memory position. Each memory configuration can also be selected via GPIO 9way D connector on the rear panel. See pinout connection sheet for details.

* Memory facility on HD Pro model only.

Lock switch. A flush fitting front panel tamper proof switch can enable the operator to fix all switch settings after set-up.

REAR PANEL FUNCTION DESCRIPTION

Mains Power and GPIO Section:



Fused mains input and common mains switch. Voltage input can be between 100v to 250v 50/60Hz and is mains filtered to enhance EMC performance.

*Broadcast pack option (when fitted) also has dual Mains inlets (shown) and internal power supplies for full redundancy. Supply failure indicated by closing contacts on GPI 9way D connector.

HD & HD Pro versions have 1 mains input and a single internal power supply. (Illustration shows additional mains input socket fitted for Broadcast Pack Option)

GPIO 9way D socket: Gives power supply & external lock status and *remote memory switching operation. See GPIO table below * HD Pro vision only

Input section:

LTC input/Thru, RCA connector Hi-Z -40 to +20dBu 600R 1Vpp

AES 3 reference sync input. XLR, 110 ohms transformer balanced.

Word Clock input, 75 ohm terminated BNC accepts word clock sample rates from 32 to 192 KHz. 1 – 5 Vpp.

GPS Clock/ 10MHz input, 75 ohm terminated BNC accepts 1, 2, 5 & 10MHz reference signals 0.5 – 5Vpp.

HD or SD video reference input, 75 ohm terminated BNC. Input will auto detect between all HD tri level and SD bi-level sync signals.

Video Loop through - BNC allows reference input to be chained out to other equipment. When not in use, this socket should be terminated with 75 ohms (supplied)

Output Section:

HD Tri level sync outputs, 3x 75 ohms BNC individually buffered & fully DC Coupled 1v video.

SD Bi level sync outputs, 3x 75 ohms BNC individually buffered & fully DC coupled 1v video.

Word Clock outputs, 4x 75 ohm BNC individually buffered output, distributing word clock at 44.1KHz, 48KHz, 88.2KHz, 96KHz, 176.4KHz or 192KHz sample rates, 50/50 mark space ratio. Output jitter < 40ps rms at all frequencies. These output rates can be pulled up or pulled down by +/-0.1% or +/- 4%

Word clock x 2 outputs, 1x 75 ohms BNC individually buffered output distributing 2x selected word clock frequency. This output is simultaneous with the normal x1 clock outputs.

Word clock x 4 outputs, 1x 75 ohms BNC individually buffered output distributing 4x selected word clock frequency. This output is simultaneous with the normal x1 clock outputs.

Digital AES 3 output, 4x XLR 110 ohm individually transformer balanced outputs, distributing ASE 3 at 48KHz, 88.2KHz, 96KHz, 176.4KHz, 176.4KHz or 192KHz sample rates. Output jitter < 40ps rms at all frequencies. These output rates can be pulled up or pulled down by +/-0.1% or +/- 4%

*Broadcast Pack (Option)

This facility is supplied as a factory fitted option and gives the following additions to both HD & HD Pro units.

Internal TCXO Crystal is replaced with an OCXO 10Meg Crystal giving a higher output frequency stability with time (typically < 0.7ppm over 1 year/4ppm over ten years) and temperature (typically +/-0.015ppm over 0 -/+60deg C).

A second mains inlet and internal power supply is fitted to give additional security against mains and power loss (dual redundant power supplies).

GPIO 9way D type socket Connections.

Power Supply failure (HD & HD Pro):

With single/dual mains and internal power supplies, normal operation dry relay contacts pins 1 & 6 are open. If either mains input and or an internal power supply fails pins 1 & 6 close. If an external reference or Gen lock is lost, pins 1 & 6 close. Note: Switching to internal mode will open the contacts for normal use.

Memory Operation (HD Pro only):

To activate a memory momentarily connect required Memory –ve (pin 9 or 8 or 7) to pin 5 (factory default) with internal board links GPI1, GPI2 & GPI3 fitted

With links GPI1, GPI2 & GPI3 removed apply a voltage of +5 to +12v between required Memory +ve & -ve pins.

Pinout for SyncroGenius HD / *HD Pro GPI Facility.

Pin Number	Function		
1	PSU & External Lock Fail	dry relay contact	Normal operation – open circuit pins 1&6 Failure pins 1&6 closed
6	PSU & External Lock Fail	dry relay contact	
4	Memory 1 +ve	Opto IP	Link GPI1 fitted (default) Do Not Connect GPI1 removed momentary +5 to +12v between pins 4 & 9 to activate
9	Memory 1 -ve	Opto IP	Link GPI1 fitted (default) momentary connection to pin 5 to activate.
3	Memory 2 +ve	Opto IP	Link GPI2 fitted (default) Do Not Connect GPI2 removed momentary +5 to +12v between pins 3 & 8 to activate
8	Memory 2 -ve	Opto IP	Link GPI2 fitted (default) momentary connection to pin 5 to activate.
2	Memory 3 +ve	Opto IP	Link GPI3 fitted (default) Do Not Connect GPI3 removed momentary +5 to +12v between pins 2 & 7 to activate
7	Memory 3 -ve	Opto IP	Link GPI3 fitted (default) momentary connection to pin 5 to activate.
5	0V (Memory)		Connect to Memory -ve pin if board links are fitted.

9way D Female fitted to unit

The table below describes some common uses for the Pull up/pull down facility. 48KHz sampling rate is shown as an example - the same set of frequency-offset ratios apply to all other nominal rates.

Fs KHz	Description	Film Speed fps	Pull up/down %	Application
48	Standard DVD rate			
47.952	Film to NTSC Video	24 to 23.974	-0.1	Original film sound track - DVD-V release
48.048	NTSC video to film	23.974 to 24	+0.1	NTSC pulled Audio to fit correct length PAL
46.080	PAL video to film	25 to 24	-4%	Original PAL film sound for audio clean up, film restored from cine, but NOT varispeed for remastered PAL/NTSC.
50.000	Film to PAL video	24 to 25	+4.16	Standard "old style" PAL telecine (most UK release films run 4 mins shorter than PAL/NTSC
46.034	PAL video (originally pulled up) to NTSC video (pulled down)	25 to 23.974	-4 & -0.1	Original PAL (pulled up) film sound for audio cleanup, but pulled down for the NTSC release
49.950	*		+4.16 & -0.1	Re-engineering previously made pull up/down errors.
46.126	*		-4 & +0.1	Re-engineering previously made pull up/down errors
50.050	NTSC video (originally pulled down) to PAL (pulled up)	23.974 to 25	+4.16 & +0.1	NTSC (pulled) speed audio for PAL (pulled) release

Video Frame Rate vs Digital Audio Sample Rate - Phase & Frequency Genlock Conditions using SyncroGenius HD Pro.

Video Output Set To	Digital Output Set To	Video Reference Input: NTSC 60/30 Dig	NTSC 60/30 Vid	NTSC 59.94/29.97 Dig	NTSC 59.94/29.97 Vid	PAL 50/25 Dig	PAL 50/25 Vid	Slow PAL 24 Dig	Slow PAL 24 Vid	NTSC 23.98 Dig	NTSC 23.98 Vid
NTSC 60/30	48/96/192kHz	✓	✓	✓	X	✓	✓	✓	✓	✓	X
	-0.10%	X	X	✓	X	X	X	X	X	X	X
	+0.1%	✓	✓	X	X	✓	✓	✓	✓	X	X
	-4%	✓	✓	X	X	✓	✓	✓	✓	X	X
	-4 -0.1%	X	X	✓	X	X	X	X	X	✓	X
	-4 +0.1%	X	X	X	X	X	X	X	X	X	X
	+4%	✓	✓	✓	X	✓	✓	✓	✓	✓	X
	+4 -0.1%	X	X	✓	X	X	X	X	X	✓	X
	+4 +0.1%	✓	✓	X	X	✓	✓	✓	✓	X	X
	44.1/88.2/176.4kHz	✓	✓	X	X	✓	✓	✓	✓	X	X
	-0.10%	X	X	✓	X	X	X	X	X	✓	X
	+0.1%	X	X	X	X	X	X	X	X	X	X
	-4%	✓	✓	X	X	✓	✓	✓	✓	X	X
	-4 -0.1%	X	X	✓	X	X	X	X	X	✓	X
	-4 +0.1%	X	X	X	X	X	X	X	X	X	X
	+4%	✓	✓	X	X	✓	✓	✓	✓	X	X
	+4 -0.1%	X	X	✓	X	X	X	X	X	✓	X
	+4 +0.1%	X	X	X	X	X	X	X	X	X	X

Video Output Set To	Digital Output Set To	Video Reference Input: NTSC 60/30 Dig	NTSC 60/30 Vid	NTSC 59.94/29.97 Dig	NTSC 59.94/29.97 Vid	PAL 50/25 Dig	PAL 50/25 Vid	Slow PAL 24 Dig	Slow PAL 24 Vid	NTSC 23.98 Dig	NTSC 23.98 Vid
NTSC 59.94/29.97	48/96/192kHz	✓	X	✓	✓	✓	X	✓	X	✓	✓
	-0.10%	X	X	✓	✓	X	X	X	X	✓	✓
	+0.1%	✓	X	X	✓	✓	X	✓	X	X	✓
	-4%	✓	X	X	✓	✓	X	✓	X	X	✓
	-4 -0.1%	X	X	✓	✓	X	X	X	X	✓	✓
	-4 +0.1%	X	X	X	✓	X	X	X	X	X	✓
	+4%	✓	X	✓	✓	✓	X	✓	X	✓	✓
	+4 -0.1%	X	X	✓	✓	X	X	X	X	✓	✓
	+4 +0.1%	✓	X	X	✓	✓	X	✓	X	X	✓
	44.1/88.2/176.4kHz	✓	X	X	✓	✓	X	✓	X	X	✓
	-0.10%	X	X	✓	✓	X	X	X	X	✓	✓
	+0.1%	X	X	X	✓	X	X	X	X	X	✓
	-4%	✓	X	X	✓	✓	X	✓	X	X	✓
	-4 -0.1%	X	X	✓	✓	X	X	X	X	✓	✓
	-4 +0.1%	X	X	X	✓	X	X	X	X	X	✓
	+4%	✓	X	X	✓	✓	X	✓	X	X	✓
	+4 -0.1%	X	X	X	✓	X	X	X	X	✓	✓
	+4 +0.1%	X	X	X	✓	X	X	X	X	X	✓

Video Output Set To	Digital Output Set To	Video Reference Input: NTSC 60/30 Dig	NTSC 60/30 Vid	NTSC 59.94/29.97 Dig	NTSC 59.94/29.97 Vid	PAL 50/25 Dig	PAL 50/25 Vid	Slow PAL 24 Dig	Slow PAL 24 Vid	NTSC 23.98 Dig	NTSC 23.98 Vid
NTSC 23.96	48/96/192kHz	✓	X	✓	✓	✓	X	✓	X	✓	✓
	-0.10%	X	X	✓	✓	X	X	X	X	✓	✓
	+0.1%	✓	X	X	✓	✓	X	✓	X	X	✓
	-4%	✓	X	X	✓	✓	X	✓	X	X	✓
	-4 -0.1%	X	X	✓	✓	X	X	X	X	✓	✓
	-4 +0.1%	X	X	X	✓	X	X	X	X	X	✓
	+4%	✓	X	✓	✓	✓	X	✓	X	✓	✓
	+4 -0.1%	X	X	✓	✓	X	X	X	X	✓	✓
	+4 +0.1%	✓	X	X	✓	✓	X	✓	X	X	✓
	44.1/88.2/176.4kHz	✓	X	X	✓	✓	X	✓	X	X	✓
	-0.10%	X	X	✓	✓	X	X	X	X	✓	✓
	+0.1%	X	X	X	✓	X	X	X	X	X	✓
	-4%	✓	X	X	✓	✓	X	✓	X	X	✓
	-4 -0.1%	X	X	✓	✓	X	X	X	X	✓	✓
	-4 +0.1%	X	X	X	✓	X	X	X	X	X	✓
	+4%	✓	X	X	✓	✓	X	✓	X	X	✓
	+4 -0.1%	X	X	X	✓	X	X	X	X	✓	✓
	+4 +0.1%	X	X	X	✓	X	X	X	X	X	✓

Video Output Set To	Digital Output Set To	Video Reference Input: NTSC 60/30 Dig	NTSC 60/30 Vid	NTSC 59.94/29.97 Dig	NTSC 59.94/29.97 Vid	PAL 50/25 Dig	PAL 50/25 Vid	Slow PAL 24 Dig	Slow PAL 24 Vid	NTSC 23.98 Dig	NTSC 23.98 Vid
PAL 50/25	48/96/192kHz	✓	✓	✓	X	✓	✓	✓	✓	✓	X
	-0.10%	X	✓	✓	X	X	✓	X	✓	✓	X
	+0.1%	✓	✓	X	X	✓	✓	✓	✓	X	X
	-4%	✓	✓	X	X	✓	✓	✓	✓	X	X
	-4 -0.1%	X	✓	✓	X	X	✓	X	✓	✓	X
	-4 +0.1%	X	✓	X	X	X	✓	X	✓	X	X
	+4%	✓	✓	✓	X	✓	✓	✓	✓	✓	X
	+4 -0.1%	X	✓	✓	X	X	✓	X	✓	✓	X
	+4 +0.1%	✓	✓	X	X	✓	✓	✓	✓	X	X
	44.1/88.2/176.4kHz	✓	✓	X	X	✓	✓	✓	✓	X	X
	-0.10%	X	✓	✓	X	X	✓	X	✓	✓	X
	+0.1%	X	✓	X	X	X	✓	X	✓	X	X
	-4%	✓	✓	X	X	✓	✓	✓	✓	X	X
	-4 -0.1%	X	✓	✓	X	X	✓	X	✓	✓	X
	-4 +0.1%	X	✓	X	X	X	✓	X	✓	X	X
	+4%	✓	✓	X	X	✓	✓	✓	✓	X	X
	+4 -0.1%	X	✓	✓	X	X	✓	X	✓	✓	X
	+4 +0.1%	X	✓	X	X	X	✓	X	✓	X	X

Video Output Set To	Digital Output Set To	Video Reference Input: NTSC 60/30 Dig	NTSC 60/30 Vid	NTSC 59.94/29.97 Dig	NTSC 59.94/29.97 Vid	PAL 50/25 Dig	PAL 50/25 Vid	Slow PAL 24 Dig	Slow PAL 24 Vid	NTSC 23.98 Dig	NTSC 23.98 Vid
SLOW PAL/FILM 24	48/96/192kHz	✓	✓	✓	X	✓	✓	✓	✓	✓	X
	-0.10%	X	✓	✓	X	X	✓	X	✓	✓	X
	+0.1%	✓	✓	X	X	✓	✓	✓	✓	X	X
	-4%	✓	✓	X	X	✓	✓	✓	✓	X	X
	-4 -0.1%	X	✓	✓	X	X	✓	X	✓	✓	X
	-4 +0.1%	X	✓	X	X	X	✓	X	✓	X	X
	+4%	✓	✓	✓	X	✓	✓	✓	✓	✓	X
	+4 -0.1%	X	✓	✓	X	X	✓	X	✓	✓	X
	+4 +0.1%	✓	✓	X	X	✓	✓	✓	✓	X	X
	44.1/88.2/176.4kHz	✓	✓	X	X	✓	✓	✓	✓	X	X
	-0.10%	X	✓	✓	X	X	✓	X	✓	✓	X
	+0.1%	X	✓	X	X	X	✓	X	✓	X	X
	-4%	✓	✓	X	X	✓	✓	✓	✓	X	X
	-4 -0.1%	X	✓	✓	X	X	✓	X	✓	✓	X
	-4 +0.1%	X	✓	X	X	X	✓	X	✓	X	X
	+4%	✓	✓	X	X	✓	✓	✓	✓	X	X
	+4 -0.1%	X	✓	✓	X	X	✓	X	✓	✓	X
	+4 +0.1%	X	✓	X	X	X	✓	X	✓	X	X

X	Output is not Phase Coherent but can be Frequency Locked - Genlock lights glow dim
✓	Full Phase & Frequency Genlock Condition - Genlock lights glow bright.

SPECIFICATION SyncroGenius HD & HD PRO

OPERATION: ***HD-Pro* version**: *Genlock all video and clock outputs from any selected video or clock reference input. Internal generation for all HD & SD video and clock outputs. *Genlock outputs are frequency and phase locked to reference input.

***HD* version**: All video inputs selected are copied to video outputs. Clock outputs are only genlocked to selected video or clock reference input. Internal generation for all HD & SD video and clock outputs.

Optional Broadcast Pack can be fitted to both versions for AES-3 Grade 1 reference performance with dual mains and power supplies.

INPUTS: Selectable from video Ref:
1080p - 60Hz, 59.94Hz, 50Hz, 30Hz, 29.97Hz, 25Hz, 24Hz, 23.98 Hz. **1080i** - 60Hz, 59.94Hz, 50Hz. **720i** - 60Hz, 59.94Hz, 50Hz.

Selectable from Clock Ref:
AES - 44.1 KHz to 192KHz. **Word Clock** – 44.1KHz to 192KHz.+/-4% window. **GPS** - 0.5-5vpp 75R 10MHz, 5MHz, 2MHz, 1MHz.
LTC - Linear time code auto detect from 24, 25, 29.97 & 30 frames. +/-4% window.

OUTPUTS: **VIDEO:** 3x BNC electronically buffered DA, selectable HD Tri-level 1vpp into 75R. **1080p** - 60Hz, 59.94Hz, 50Hz, 30Hz, 29.97Hz, 25Hz, 24Hz, 23.98Hz. **1080i/psf** - 60Hz/30Hz, 59.94Hz/29.97Hz, 50Hz/25Hz, 48Hz/24Hz, 47.96/23.98Hz. **720p** - 60Hz, 59.94Hz, 50Hz. Plus 3x BNC electronically buffered DA,**selectable SD Bi-level 1vpp into75R - 525/30Hz, 29.97Hz NTSC 25Hz PAL, Film/24Hz (slow PAL), Film/23.98Hz .**(***HD-Pro* version only)

CLOCK: 4x BNC electronically buffered DA, 2.7vpp into 75R - 192KHz, 176.4KHz, 96KHz, 88.2KHz, 48KHz, 44.1KHz, <40ps rms sample-to-sample jitter – wide band. Pullup/pulldown +4.16%/-4% & or +/-0.1%.

1x BNC electronically buffered, 2.7vpp into 75R - 2x Word Clock <40ps rms sample to sample jitter – wide band

1x BNC electronically buffered, 2.7vpp into 75R - 4x Word Clock <40ps rms sample to sample jitter – wide band

AES-3: 4x XLR electronically buffered DA, 3.0v into110R AES-3 black digits - 192KHz, 176.4KHz, 96KHz, 88.2KHz, 48KHz, 44.1KHz, <40ps rms sample-to-sample jitter – wide band. Pullup/pulldown +4.16%/-4% & or +/-0.1%.

Frequency Stability with Broadcast Pack fitted: <0.7ppm within 1 year, & 4.0ppm within 10 years
HD* /*HD-Pro with standard TCXO fitted: <0.5ppm within 24 hours
Stability over ambient change: <0.015ppm from 0 – 60 Celsius.

Loop thru: HD/SD Video DC Coupled 1v Video, & LTC (RCA) Hi-Z, –40 to +20dBu

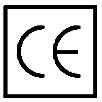
GPIO: 1x 9way D type: PSU & External Lock output status via closing contacts if failed.
**Up to 3 different front panel function settings selectable via closing contacts.
(*HD-Pro* version only)

FRONT PANEL: **3 recallable memory settings. **(***HD-Pro* version only)
Front panel tamperproof recessed switch.

POWER: 90 - 260 volts ~ 50/60Hz - Fused 1A delay type 20x5mm ceramic
(Dual mains and power supplies when Broadcast Pack fitted).

SIZE: 482.60mm (19") wide x 44.45mm (1U) high x 229mm deep

WEIGHT: 1.95Kg (net)



EMC Compliance.

Audio & Design Reading Ltd. Hereby confirm that the SyncroGenius HD & SyncroGenius HD Pro conform to the requirements of EN50081-1 & EN60950 Provided they are used as described in this manual and in the sections below:

To comply with the EMC Directive EN50081-1 (generic), it is recommended that all-digital input and output cabling be of Belden type 1696A or its exact equivalent. All input/output connectors must be of good quality and be constructed with RF protected covers. All interconnections via cables must carry a full earth shield, which should be connected to the RF shielded covers at all times. Input/output cables must be terminated to comply with the AES/EBU and IEC958 digital audio standards protocol.

This unit is wired so that a technical earth is connected to the chassis via the mains input socket. It is recommended that this connection be made to the mains earth system at all times to minimise the effects of radiated and conducted RF emissions.

Low Voltage Directive EN60950:
There are no serviceable parts within the unit. All repair work must be referred to a qualified electronic engineer or returned to the factory. In the case where the unit contains plug in modules, always switch off the unit before removing or replacing any module.

Audio & Design Reading Ltd does not accept responsibility for non-compliance if the above criteria are not met in full.

WARRANTY:
All Audio & Design products are of the highest quality and designed to give long, trouble free service. Nevertheless they are fully guaranteed for one year from the date of purchase. Provided any faulty equipment is returned, post paid, to Audio & Design or its established Agent by the original purchaser during the relevant period we will repair, or at our opinion replace, entirely free of charge all breakdowns due to faulty workmanship or materials. In keeping with normal practice, breakdowns due to fair wear and tear, misuse, neglect or faulty adjustment by the user, are outside the scope of this warranty.

Warning: Warranty repairs are subject to serial number checking. We reserve the right not to service any equipment whose serial number has in any way, been defaced or altered.

WEEE Directive: The end user must excise due care when disposing of this product at the time it is deemed as waste material.

RoHS: The current status of Audio & Design products can be obtained from www.adrl.co.uk/Rohs.htm

Audio & Design Reading Ltd.
51 Paddick Drive, Lower Earley, Reading,
Berks, RG6 4HF.
Tel: 0118 324 0046 Fax: 0118 324 0048
www.adrl.co.uk sales@adrl.co.uk