SFS6803+AO+T

3G/HD/SDCapable A/V Frame Synchronizer with Analog Audio inputs/outputs

The SFS6803+AX+T 3G/HD/SD video frame synchronizer is an auto-timing serial digital frame synchronizer and audio synchronizer processing module for the 6800+™ frame.

The module provides video frame synchronization and delay for 3G/HD/SD signals and can be used in any broadcast, post-production, cable or mobile facility where processing and synchronization of HD or SD video and audio (AES embedded and/or discrete and Analog discrete) signals are required. The SFS6803+AX+T have the capability to re-time an I/O signal to a local station clock for the clean processing of all synchronized signals.

The base model SFS6803+AX+T supports SD-SDI and HD-SDI with embedded audio and either analog audio inputs or analog audio outputs. 3G-SDI capability can be added with the optional software license, SFS68OPT-3G. Unbalanced AES audio inputs and outputs can be added with the optional software licenses, SFS68OPT-AES4 and SFS68OPT-AES8. A breakout cable for unbalanced AES and a mating connector for analog audio are included.

Features

- Video frame and audio sync with genlock support
- Full 3 Gb/s support
- Audio embedder and de-embedder
- Seamless sound functionality: audio embedding on loss of video
- Fast Switch feature allows for clean/quiet output on hot switch at the input with no output frame freeze
- Dolby® header adjustment
- Fiber TX or RX
- Eight AES inputs and outputs. Two models available, one with balanced and the other with unbalanced I/O
- Eight balanced discrete Analog Audio inputs OR outputs (different ordering P/N)
- 10-bit video processing
- Passes all HANC samples
- Passes VANC with user-selectable option for VBI/ANC line-by-line video deleting
- Up to eight frames of HD and 50 frames of SD video delay
- Ability to embed AES on output (fiber or SDI) without video source or genlock
- Ability to de-embed metadata and embed external metadata
- Operates video standards:
  - 525 and 625 (SMPTE 259M)
  - 1080i/p
  - 720p (SMPTE 274M/296M)
  - 3 Gb/s (SMPTE 424M) upgradeable
- Loss of video modes:
  - Pass
  - Black
  - Freeze

- Video processing amplifier with controls for:
  - Luminance gain
  - Luminance offset
  - Chrominance gain
  - Chrominance offset
  - White clip
  - Black clip
  - Hue adjustment
- Audio processing amplifier for de-embedded and external audio channels:
  - Gain
  - Swap
  - Invert
  - Delay
  - Mix (sum)

- Video and audio test generator
- 16, 20- or 24-bit audio processing
- DATA I/O signal provides audio tracking and hot-switching information to other modules
- C, U and V bit transparency
- VBI line-by-line deleting
- Auto-detect or user-forced input video standard

- Inputs:
  - One video serial digital input
  - Genlock input (composite or tri-level sync) frame or card user selectable
  - Eight AES inputs (unbalanced, balanced compatible with external baluns)
  - Eight Analog audio inputs
  - DARS input (unbalanced, balanced compatible with external baluns)
  - RS-232/422 serial port for external metadata source
  - Optional fiber receiver (OP+SFS+AI+T))
- Outputs:
  - Four synchronized serial video digital outputs
  - One DATA I/O signal for tracking audio processing
  - Eight AES outputs (unbalanced, balanced compatible with external baluns)
  - Eight Analog audio outputs
  - RS-232/422 serial port metadata output
  - Optional fiber transmitter (OP+SFS+AO+R+T)
- Shadowed/restored parameter settings when switching video standards
- Card-edge control
- Ethernet remote control and monitoring
- Q-SEE™ thumbnail support

Features Supported
Video frame and audio sync with genlock support
Audio embedder and de-embedder
Audio metadata embedder and de-embedder
Audio embedding on loss of video
Data embedder and de-embedder
Dolby® header adjustment
Fiber TX and/or RX
Advanced audio procamp with audio routing
Audio limiter
VBI line-by-line deleting
Video procamp
Eight AES in/out support
Eight Analog Audio in/out support (separate P/N)
AFD metadata handling

Specifications

Specifications and designs are subject to change without notice

SERIAL VIDEO INPUT	
Number	1
Standards	1080p (SMPTE 424M): 3 Gb/s HD 1080i/p (SMPTE 274M); 720p (SMPTE 296M): HD-SDI SMPTE 259M-C, 270 Mb/s, 525/625 component: SD-SDI

SERIAL VIDEO INPUT	
Connector	BNC per IEC 169-8
Impedance	75 ohms
Frame Rate	1080i/p: 23.98, 24, 25, 29.97, 30, 50, 59.94, 60 Hz (3 Gb/s rates are future software upgradeable) 720p: 50, 59.94, 60 Hz
Return Loss	>15 dB from 5 to 1485 MHz; >12 dB from 1485 to 2970 MHz
Equalization	SD = 984 ft (>300 m), typical HD = 984 ft (>300 m), typical 3G = 459 ft (>140 m), typical

SERIAL VIDEO OUTPUT	
Number	4 synchronized
Standards	0p (SMPTE 424M): 3 Gb/s HD 1080i/p (SMPTE 274M); 720p (SMPTE 296M): HD-SDI SMPTE 259M-C, 270 Mb/s, 525/625 component: SD-SDI
Frame Rate	1080i: 25, 29.97, 30 Hz 1080p: 23.98 (p/psf), 24 (p/psf), 25, 29.97, 30, 50, 59.94, 60 Hz (3 Gb/s rates are software upgradeable) 720p: 50, 59.94, 60 Hz 525, 625
Connector	BNC per IEC 169-8
Impedance	75 ohms
Return Loss	>15 dB from 5 to 1485 MHz; >12 dB from 1485 to 2970 MHz
D.C. Offset	0 V ±0.5 V
Signal Level	800 mV ±10%
Rise and Fall Time	<135 ps: 3G <270 ps: HD-SDI 0.4 to 1.5 ns: SD-SDI
Overshoot/Undershoot	<10%
Jitter	3 Gb/s: <2 UI pk-pk of timing jitter (>10 Hz); <0.3 UI pk-pk of alignment jitter (>100 kHz) HD: <1 UI pk-pk of timing jitter (>10 Hz); <0.2 UI pk-pk of alignment jitter for (>100 kHz) SD: <0.2 UI pk-pk (>10 Hz)
Delay	Up to 8 frames less 2 lines for 3G/HD; 50 frames for SD
Frame Synchronizer Lock Range	At least ±45 ppm

REFERENCE VIDEO	
Level	1 V pk-pk +6 dB/-3.5 dB
Signal Type	Analog composite 525/625 or tri-level sync (1080i/p/720p)
Connector	BNC per IEC 169-8
Impedance	75 ohms
Return Loss	>40 dB to 10 MHz, typical

AES/DARS INPUT	BALANCED/DARS (WITH SFS6803+BD OR EXTERNAL BALUN)	UNBALANCED/DARS
Standard	AES 3	AES 3, SMPTE 276M
Connector	44-pin connector; or	BNC (IEC 169-8)
Sensitivity	<200 mV	<100 mV

AES/DARS INPUT	BALANCED/DARS (WITH SFS6803+BD OR EXTERNAL BALUN)	UNBALANCED/DARS
Impedance	110 ohms ±20%	75 ohms
Return Loss	N/A	>25 dB, 0.1 to 6 MHz
Common Mode	0 to 7 V (0 to 20 kHz)	N/A
Input Audio Rate	32 to 108 kHz	32 to 108 kHz
Maximum Input	10 V pk-pk	N/A
Bits	16, 20, or 24	16, 20, or 24
Channel Status	Maintained, but professional mode	48 kHz

AES/AUDIO OUTPUTS	BALANCED	UNBALANCED
Standard	AES 3	AES 3, SMPTE 276M
Type	Balanced, transformer	Unbalanced, AC
Connector	44-pin connector; or	BNC (IEC 169-8)
Impedance	110 ohms ±20%	75 ohms
Return Loss	N/A	>25 dB, 0.1 to 6 MHz
Signal Amplitude	2 to 7 V pk-pk into 110	1 V pk-pk ±10%
Audio Rate	48 kHz	48 kHz
Jitter	±20 ns	±20 ns
Rise/Fall Time	5 to 30 ns (10% to 90%)	30 to 44 ns
Bits	24, 20, or 16	24, 20, or 16
Channel Status	Maintained, but professional mode	48 kHz

DATA I/O OUTPUT	
Number of Outputs	1
Connector	BNC (IEC 169-8)
Impedance	75 ohms
Return Loss (up to 6 MHz)	>20 dB
SFS6803+AI+T (Analog Audio Input)	
Number of Inputs	8 mono channels
Connector	Weidmuller 24-pin locking header-socket pair
Input Audio Level	28 dBu to 12 dBu (adjustable in 1 dB increments)
Input Impedance	High-Impedance or 600 ohms, jumper selectable
CMRR	>80 dB at 60 Hz, typical
Linearity	<±0.5 dB (to -100 dBFS)
Frequency Response	<±0.05 dB (20 Hz to 20 kHz), typical
THD	>100 dB (at -1 dBFS, 20 Hz to 20 kHz), typical
SNR	>100 dB

SFS6803+AO+T (ANALOG AUDIO INPUT)	
Number of Inputs	8 mono channels
Connector	Weidmuller 24-pin locking header-socket pair
Output Audio Level	28 dBu to 16 dBu (adjustable in 2 dB increments)
Output Impedance	66 ohms

SFS6803+AO+T (ANALOG AUDIO INPUT)	
Frequency Response	<±0.1 dB @ 0 dBFS (+28 dBu), 20 Hz to 20 kHz, typical
THD	>90 dB @ 1kHz, -1 dBFS = +23 dBu (66 ohms) or -1 dBFS =+17 dBm (600 ohms), typical
SNR	>100 dB @ -60 dBFS
Cross talk	>95 dB, 20 Hz to 20 kHz, typical
Linearity	<±1.0 dB (to -100 dBFS), typical

FIBER OPTIC OUTPUT (TRANSMITTER)	
Number of Outputs	1
Wavelengths (nm)	1310 FP 1270, 1290, 1310, 1330, 1350, 1370, 1430, 1450, 1470, 1490, 1520, 1530, 1550, 1570, 1590, 1610 CWDM
Connector	SC/PC per IEC 61754-4-1 ST/PC (optional) FC/PC (optional)
Output Power	-7 dBm ±1 dBm FP 0 dBm ±2 dBm CWDM
Extinction Ratio	8 dB, typical

FIBER OPTIC INPUT (RECEIVER)	
Number of Inputs	1
Wavelength	1260 to 1620 nm
Connector	SC/PC per IEC 61754-4-1
Overload Input Power	0 dBm PIN
Input Sensitivity	-20 dBm PIN

RS-232/RS-422 (METADATA I/O)	
Standard	Electrical specification EIA-232C
Connector	DB-9, RS-232/422 switchable

POWER AND TEMPERATURE	
Power Consumption	12 W maximum
Operating Temperature	41° to 113° F (5° to 45° C)

Ordering Information

SFS6803+AI+T	HD/SD-SDI A/V frame sync and processing amplifier, 3G ready (with appropriate software key), 8 discrete Analog Audio inputs. Includes triple-slot backmodule and breakout cable, QSEE-compliant
SFS6803+AO+T	HD/SD-SDI A/V frame sync and processing amplifier, 3G ready (with appropriate software key), 8 discrete Analog Audio outputs. Includes triple-slot backmodule and breakout cable, QSEE-compliant
FIBER VERSIONS	
OP+SFS+AI+13T	HD/SD-SDI A/V optical frame sync and processing amplifier, 3G ready (with appropriate software key), 8 discrete Analog Audio inputs, includes triple-slot backmodule and breakout cable, QSEE-compliant, Fiber Tx on 1310nm

FIBER VERSIONS	
OP+SFS+AI+CxxT	HD/SD-SDI A/V optical frame sync and processing amplifier, 3G ready (with appropriate software key), 8 discrete Analog Audio inputs, includes triple-slot backmodule and breakout cable, QSEE-compliant, Fiber Tx on CWDM 1270nm-1610nm
OP+SFS+AO+R+T	HD/SD-SDI A/V optical frame sync and processing amplifier, 3G ready (with appropriate software key), 8 discrete Analog Audio outputs,includes triple-slot backmodule and breakout cable, QSEE-compliant, Fiber Rx
SOFTWARE LICENSE OPTIONS	
SFS68OPT-3G	Optional firmware upgrade for SFS6800+ and SFS6803+ to provide 3Gbps and 1.5Gbps HD capability
SFS68OPT-AES4	Optional software key upgrade for SFS6803+ to provide four discrete AES inputs and outputs
SFS68OPT-AES8	Optional software key upgrade for SFS6803+ to provide eight discrete AES inputs and outputs
BREAKOUT CABLE	
6800+OPT+16CAPM	Audio breakout cable for SFS/HMX/HDX6803+ and OP+SFS/HMX/HDX series modules
FIBER OPTIONS	
OP+OPT+SC	OPTO+ SC standard default connector for OPTO+ fiber modules, no charge
OP+OPT+ST	OPTO+ ST connector option for OPTO+ fiber modules
OP+SFS+13D	SFS6803+ with fiber output option (1310nm wavelength, SC connector)
OP+SFS+C27D	SFS6803+ with fiber output option (1271nm, CWDM wavelength, SC connector)
OP+SFS+C29D	SFS6803+ with fiber output option (1291nm, CWDM wavelength, SC connector)
OP+SFS+C31D	SFS6803+ with fiber output option (1311nm, CWDM wavelength, SC connector)
OP+SFS+C33D	SFS6803+ with fiber output option (1331nm, CWDM wavelength, SC connector)
OP+SFS+C35D	SFS6803+ with fiber output option (1351nm, CWDM wavelength, SC connector)
OP+SFS+C37D	SFS6803+ with fiber output option (1371nm, CWDM wavelength, SC connector)
OP+SFS+C43D	SFS6803+ with fiber output option (1431nm, CWDM wavelength, SC connector)
OP+SFS+C45D	SFS6803+ with fiber output option (1451nm, CWDM wavelength, SC connector)
OP+SFS+C47D	SFS6803+ with fiber output option (1471nm, CWDM wavelength, SC connector)
OP+SFS+C49D	SFS6803+ with fiber output option (1491nm, CWDM wavelength, SC connector)
OP+SFS+C51D	SFS6803+ with fiber output option (1511nm, CWDM wavelength, SC connector)
OP+SFS+C53D	SFS6803+ with fiber output option (1531nm, CWDM wavelength, SC connector)
OP+SFS+C55D	SFS6803+ with fiber output option (1551nm, CWDM wavelength, SC connector)
OP+SFS+C57D	SFS6803+ with fiber output option (1571nm, CWDM wavelength, SC connector)
OP+SFS+C59D	SFS6803+ with fiber output option (1591nm, CWDM wavelength, SC connector)
OP+SFS+C61D	SFS6803+ with fiber output option (1611nm, CWDM wavelength, SC connector)
OP+SFS+R+D	SFS6803+ with fiber input option (PIN receiver, SC connector)
SFS6803+BD	HD-SDI A/V frame synch and processing amplifier, HD & 3G-capable (with appropriate software key), includes double-slot back module with balanced I/O, QSEE-compliant. No breakout cable provided by Imagine Communications
SFS6803+D	SD-SDI A/V frame synch and processing amplifier, HD & 3G ready (with appropriate software key), includes double-slot backmodule and breakout cable, QSEE-compliant
SFS68OPT-HD	Optional firmware upgrade for SFS6800+ and SFS6803+ to provide 1.5Gbps HD capability

FIBER OPTIONS	
SFS68OPT-HD-3G	Optional softkey for field upgrade of SFS6800+ and SFS6803+ from 1.5Gbps to 3Gbps capability
OP+SFS+AI+C27T	HD/SD-SDI A/V optical frame sync and processing amplifier, 3G ready (with appropriate software key), 8 discrete Analog Audio inputs, includes triple-slot backmodule and breakout cable, QSEE-compliant, Fiber Tx on CWDM 1270nm
OP+SFS+AI+C29T	HD/SD-SDI A/V optical frame sync and processing amplifier, 3G ready (with appropriate software key), 8 discrete Analog Audio inputs, includes triple-slot backmodule and breakout cable, QSEE-compliant, Fiber Tx on CWDM 1290nm
OP+SFS+AI+C31T	HD/SD-SDI A/V optical frame sync and processing amplifier, 3G ready (with appropriate software key), 8 discrete Analog Audio inputs, includes triple-slot backmodule and breakout cable, QSEE-compliant, Fiber Tx on CWDM 1310nm
OP+SFS+AI+C33T	HD/SD-SDI A/V optical frame sync and processing amplifier, 3G ready (with appropriate software key), 8 discrete Analog Audio inputs, includes triple-slot backmodule and breakout cable, QSEE-compliant, Fiber Tx on CWDM 1330nm
OP+SFS+AI+C35T	HD/SD-SDI A/V optical frame sync and processing amplifier, 3G ready (with appropriate software key), 8 discrete Analog Audio inputs, includes triple-slot backmodule and breakout cable, QSEE-compliant, Fiber Tx on CWDM 1350nm
OP+SFS+AI+C37T	HD/SD-SDI A/V optical frame sync and processing amplifier, 3G ready (with appropriate software key), 8 discrete Analog Audio inputs, includes triple-slot backmodule and breakout cable, QSEE-compliant, Fiber Tx on CWDM 1370nm
OP+SFS+AI+C43T	HD/SD-SDI A/V optical frame sync and processing amplifier, 3G ready (with appropriate software key), 8 discrete Analog Audio inputs, includes triple-slot backmodule and breakout cable, QSEE-compliant, Fiber Tx on CWDM 1430nm
OP+SFS+AI+C45T	HD/SD-SDI A/V optical frame sync and processing amplifier, 3G ready (with appropriate software key), 8 discrete Analog Audio inputs, includes triple-slot backmodule and breakout cable, QSEE-compliant, Fiber Tx on CWDM 1450nm
OP+SFS+AI+C47T	HD/SD-SDI A/V optical frame sync and processing amplifier, 3G ready (with appropriate software key), 8 discrete Analog Audio inputs, includes triple-slot backmodule and breakout cable, QSEE-compliant, Fiber Tx on CWDM 1470nm
OP+SFS+AI+C49T	HD/SD-SDI A/V optical frame sync and processing amplifier, 3G ready (with appropriate software key), 8 discrete Analog Audio inputs, includes triple-slot backmodule and breakout cable, QSEE-compliant, Fiber Tx on CWDM 1490nm
OP+SFS+AI+C51T	HD/SD-SDI A/V optical frame sync and processing amplifier, 3G ready (with appropriate software key), 8 discrete Analog Audio inputs, includes triple-slot backmodule and breakout cable, QSEE-compliant, Fiber Tx on CWDM 1510nm
OP+SFS+AI+C53T	HD/SD-SDI A/V optical frame sync and processing amplifier, 3G ready (with appropriate software key), 8 discrete Analog Audio inputs, includes triple-slot backmodule and breakout cable, QSEE-compliant, Fiber Tx on CWDM 1530nm
OP+SFS+AI+C55T	HD/SD-SDI A/V optical frame sync and processing amplifier, 3G ready (with appropriate software key), 8 discrete Analog Audio inputs, includes triple-slot backmodule and breakout cable, QSEE-compliant, Fiber Tx on CWDM 1550nm
OP+SFS+AI+C57T	HD/SD-SDI A/V optical frame sync and processing amplifier, 3G ready (with appropriate software key), 8 discrete Analog Audio inputs, includes triple-slot backmodule and breakout cable, QSEE-compliant, Fiber Tx on CWDM 1570nm
OP+SFS+AI+C59T	HD/SD-SDI A/V optical frame sync and processing amplifier, 3G ready (with appropriate software key), 8 discrete Analog Audio inputs, includes triple-slot backmodule and breakout cable, QSEE-compliant, Fiber Tx on CWDM 1590nm
OP+SFS+AI+C61T	HD/SD-SDI A/V optical frame sync and processing amplifier, 3G ready (with appropriate software key), 8 discrete Analog Audio inputs, includes triple-slot backmodule and breakout cable, QSEE-compliant, Fiber Tx on CWDM 1610nm

Images/Diagrams