UHD-SDI

FEATURING 2016 New UHD-SDI Solutions

Broadcast Video Selector Guide

- Equalizers
- Cable Drivers
- Reclockers
- Configurable Input/Output Devices
- Gearbox
- Transmitters
- Receivers
- Crosspoint Switches
- Timing

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Semtech Gennum Products

UHD-SDI

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Semtech's Gennum Products Group extends its 20+ year leadership in SDI technology by being first to market with an array of advanced UHD-SDI solutions. Semtech's multi-rate device line-up enables customer roadmaps, facilitating the creation of differentiated and advanced UHD-SDI products. We offer the world's most advanced solutions designed specifically for real world broadcast challenges, including the latest innovations designed to help push the boundaries of performance, reach, power and signal integrity while reducing time to market and design risks.

Comprehensive portfolio of industry-leading UHD-SDI products

We offer the most comprehensive, end-to-end portfolio of UHD-SDI video solutions available, including our new family of long-reach, multi-rate 12G retiming equalizers and cable drivers, low-power 3G equalizers, cable drivers and reclockers, integrated adaptive cable equalizers and cable driver, and innovative UHD-SDI gearbox solutions.

UHD-SDI: Enabling Commercial Off-The-Shelf UHDTV Infrastructures

New UHD-SDI solutions are needed with the emergence of next generation broadcast television and D-Cinema applications, including: UHDTV-1, 4K D-Cinema, UHDTV-2, high frame rate (HFR) and high dynamic range (HDR) production. UHD-SDI offers a simple, proven, uncompressed interface solution for the transport of high-quality multimedia content.

Dedicated to customer success

Our commitment to customer success is the driver for everything we do.
That's why we:

- Comprehensively test each component in production, assuring high yield on assembled boards.
- Offer complimentary design review and feedback on Semtech-based designs to shorten design cycles, reduce risks and optimize performance.
- Provide dedicated field and applications engineering support throughout the product's life cycle.

Equalizers

The industry's best-performing UHD-SDI equalizers – featuring integrated retiming, low power, long reach and support for data rates up to 11.88 Gb/s.

UHD-SDI RATES UP TO 12G SUPPORTS

Semtech offers multi-rate adaptive equalizers that support rates up to 11.88 Gb/s while offering industry-leading performance at 6G, 3G, HD and SD rates. Semtech's GS12141 adaptive cable equalizer features an integrated retimer to maximize performance at 12G while still offering best in class performance at lower rates. In addition to robust performance, Semtech adaptive cable equalizers comply to SMPTE ST-2081, ST2082, ST-424, ST292, ST-344 and ST259 standards.

LOW POWER AND SMALL PACKAGE SIZE

PCB board density continues to increase, placing additional requirements for both small package size and low power. Semtech's GS12141 adaptive cable EQ with integrated retiming features a 6x4 QFN package. This manufacturing friendly, asymmetric package facilitates high density designs by accommodating a very dense connector pitch with its narrow 4mm package width.

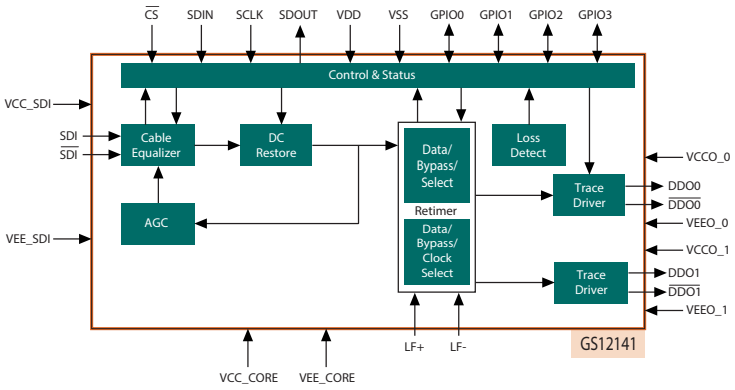
In addition, Semtech features a range of adaptive cable equalizers for applications requiring low power. The GS3140 low power, multi-rate 3G adaptive cable equalizer is ideal for applications requiring both low power and long cable reach.

LOWEST JITTER

Semtech adaptive cable equalizers feature reduced jitter at all cable lengths and for all data rates. The GS12141 adaptive cable equalizer with its integrated retimer features low output jitter, even at extended cable lengths.

CROSSTALK INTERFERENCE ROBUSTNESS

The advanced design minimizes the effect of inter-channel crosstalk interference in high channel-density applications.



GS12141 Functional Block Diagram

EQUALIZERS

Part Number	Data Rate (Mb/s)	Input 0/6dB gain	Output Coupling (V)	No. of Outputs	12G cable length (m)	6G Cable Length (m)	3G Cable Length (m)	HD Cable Length (m)	SD Cable Length (m)	Footprint Compat. with	Temp Range (°C)	Power (mW)	Size (mm)	Pkg
GS12141**	1-11880	YES*	1.2-2.5	2	70	90	180	240	300	–	-40-+85	320	6x4	40 LGA
GS3140	1-2970	YES*	1.0-2.5	1	–	–	200	280	500	–	-40-+85	83	4x4	16 QFN-COL
GS6042	125 - 5940	YES	1.2 - 3.3	1	–	80	210	300	550	all 16 QFN EQs	-40 to +85	180	4x4	16 QFN
GS3440	125 - 2970	YES	1.2 - 3.3	1	–	–	210	300	550	all 16 QFN EQs	-40 to +85	180	4x4	16 QFN
GS3441	125 - 2970	YES	1.2 - 3.3	2	–	–	210	300	550	GS2993	-40 to +85	212	4x4	24 QFN

**Features adjustable upstream launch swing compensation.*

***GS12141 specifications are preliminary and subject to change*

Cable Drivers

The industry's best-performing UHD-SDI cable drivers – featuring integrated retiming for the lowest output jitter, sophisticated easy-to-use eye shaping for SMPTE compliance and data rates up to 11.88 Gb/s.

MULTI-RATE

Semtech UHD-SDI cable drivers feature multi-rate operation up to 11.88 Gb/s to 143 Mb/s and comply to SMPTE ST-2081-1, ST2082-1, ST-424, ST292-1 and ST259 standards. Semtech offers a driver for every UHDTV-1, UHDTV-2, 3G, HD and SD application. The all-new high-performance GS12181 multi-rate 12G UHD-SDI cable driver with integrated retiming is the broadcast industry's best-performing 12G UHD-SDI cable driver. The GS12181's integrated retimer ensures the best possible performance at all rates up to 11.88Gb/s.

LOW POWER

Semtech UHD-SDI cable drivers feature low power consumption with power savings up to 45% in standby mode.

LOW JITTER

Ultra-low additive jitter at all data rates

INPUT TRACE EQUALIZATION

Input Trace Equalization: The GS12181 features input trace equalization to compensate for long input trace lengths. Input trace equalization is critical for optimizing performance in 12G UHD-SDI designs.

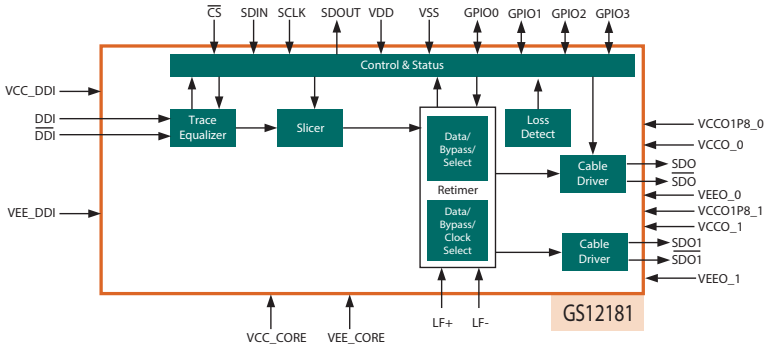
BEST OUTPUT RETURN LOSS

Output return loss performance that surpasses SMPTE specifications at all rates. This increased margin will simplify board optimization, speeding time to market.

OUTPUT SIGNAL PRESENCE

The GS12181 features an output signal presence detector, which provides status on the validity of the output.

The GS12181 offers higher maximum output swing to compensate for losses that occur after the cable driver output. A larger output swing enables passive mux solutions for creating larger systems.



GS12181 Functional Block Diagram

CABLE DRIVERS

Part Number	Data Rate (Mb/s)	Power (mW)	Power Supply (V)	Outputs	Input Trace EQ	Output Signal Presence	Max Output Swing (mV)	ESD Prot. (kV)	ORL (dB)	Circuit Compatible with	Temp Range (°C)	Size	Pkg
GS12181*	1-11880	310**	1.8	2	YES	YES	1600	4	12G: -10 6G:-10 3G: -15 HD:-19	–	-40 to +85	4x6	40 LGA
GS6080	143 - 5940	135	2.5 or 3.3	2	YES	YES	1800	2.5	6G: -10 3G: -15 HD: -19	GS2988	-40 to +85	4x4	16 QFN
GS6081	143 - 5940	205	2.5 or 3.3	4	YES	YES	1800	2.5	6G: -10 3G: -15 HD: -19	GS2989	-40 to +85	4x4	16 QFN
GS2988	143 - 2970	110	2.5 or 3.3	2	YES	YES	1800	2.5	3G: -15 HD: -19	GS1678, GS9077	-40 to +85	4x4	16 QFN
GS2989	143 - 2970	180	2.5 or 3.3	4	YES	YES	1800	2.5	3G: -15 HD: -19	GS1679	-40 to +85	4x4	16 QFN

**GS12181 specifications are preliminary and subject to change*

***Power specifications includes power consumed by integrated retimer*

Reclockers

Industry's best-performing reclockers

Reclocking is an important function required to maintain overall system robustness. As UHD-SDI infrastructure continues to grow in size and as greater amounts of processing are being integrated into broadcast products, overall system jitter can potentially increase. As a result, controlling overall system jitter is critical to reliable operation. Processing devices such as FPGAs can have poor input jitter tolerance (IJT) and frequently require external reclocking to maintain overall system margin. The rapid growth in UHD-SDI infrastructure and the associated higher rates make reclocking mandatory in most applications. Semtech offers a complete family of UHD-SDI reclockers for all data rates. The GS615x family of reclockers supports rates up to 5.94 Gb/s with low power consumption and is ideal for UHD-SDI applications.

ADVANCED FEATURE SET

The GS6152 includes programmable trace equalization to compensate for high-frequency losses associated with board level interconnects.

Two CML outputs interface to devices with a CML input reference between 1.2V and 2.5V. Similarly, programmable output swing and de-emphasis provide flexibility for managing signal integrity of the output signals.

The GS6152 can operate without an external frequency reference. For applications which require rapid signal lock, an external crystal may be used to set the VCO frequency when not locked to the input signal. The presence of an external reference crystal is automatically detected by the GS6152.

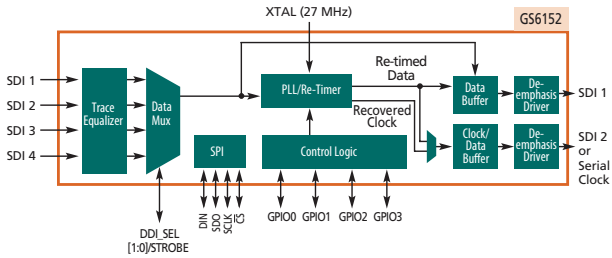
The new GS6151 and GS6152 both feature an integrated eye monitor. The mission-mode eye monitor can be used as a diagnostic tool for measuring the quality of an incoming signal. The GS6151 and GS6152 also feature an integrated PRBS generator and checker for measuring signal path integrity.

SMALL SIZE

The GS6152 features a compact 6x6 48 pin QFN package. A smaller package variant, the GS6151, is also available. The GS6151 with its 4x4 32 pin QFN package is ideal for high channel density designs or other applications where the layout is constrain by available PCB real estate.

LOW POWER

Semtech offers superior performance at the industry's lowest power consumption for a 6G UHD-SDI reclocker. The GS6152's low power consumption is ideal for designs with high channel density or in applications where low power consumption is a critical design requirement.



RECLOCKERS

Part Number	Data Rate (Mb/s)	Power Supply (V)	Integrated Eye Monitor	Output Jitter (UI)	Input Trace EQ	Output De-emphasis	Serial Interface	Input MUX	Dual Data Output	Temp Range (°C)	Power (mW)	Size (mm)	Pkg
GS6150	270 1485 2970 5940	1.8	NO	6G:0.13 3G:0.09 HD:0.06 SD:0.03	YES	YES	YES	4 : 1	YES	-40 to +85	130	6x6	48 QFN
GS6151	270 1485 2970 5940	1.8	YES	6G:0.13 3G:0.09 HD:0.06 SD:0.03	YES	YES	YES	2 : 1	YES	-40 to +85	130	4x4	32 QFN
GS6152	270 1485 2970 5940	1.8	YES	6G:0.13 3G:0.09 HD:0.06 SD:0.03	YES	YES	YES	4 : 1	YES	-40 to +85	130	6x6	48 QFN

Configurable SDI Input/Output - Equalizer/Cable Driver

Lowest jitter, best ORL and IRL, and data rates up to 3Gb/s

DESIGN FLEXIBILITY

The GS3490 is ideal for high-density applications with limited connector space where individual connectors may need to be configured as either an input or output. In addition, the GS3490 is suitable for multi-function PCBs that require individual IO to be configured based on final product configuration.

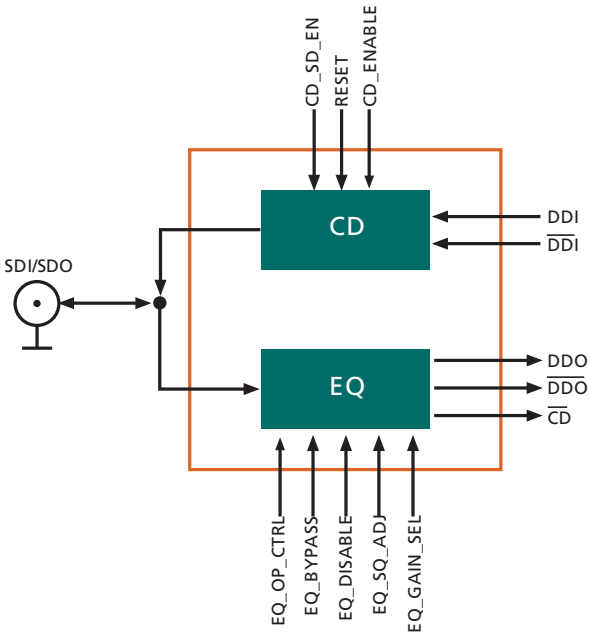
An external termination network ensures full access to components, which simplifies performance optimization. This provides an advantage over solutions that have internal, non-accessible termination networks.

BEST IN CLASS PERFORMANCE

Offering the longest cable reach for a configurable SDI I/O, the GS3490 is capable of 140m at 2.97Gb/s, 260m at 1.485Gb/s and 500m at 270Mb/s (SD and DVB/ASI). External termination components allow for flexibly of layout and tuning for PCB layout optimization.

SMALL PACKAGE SIZE

The GS3490 features a manufacturing friendly 5x5 QFN package, which is ideal for applications with a dense channel pitch and limited PCB space.



CONFIGURABLE SDI INPUT/OUTPUT - EQUALIZER/CABLE DRIVER

Part Number	Data Rate (Mb/s)	Power (mW)	Outputs	Cable Reach (m)	DVB-ASI	Temp (°C)	Size (mm)	Pkg
GS3490	125-2970	EQ: 202 CD: 215	EQ: 1 CD: 1	3G: 140 HD: 260 SD: 500	YES	-40-85	5x5	32 QFN

UHD-SDI Gearbox

Single chip UHDTV SDI rate conversion

The GS12070 is a four-input and four-output device which supports conversions between multi-link, dual-link and single-link UHD-SDI interfaces. A bypass mode is also available where the inputs can be routed directly to the outputs. The device supports 12Gb/s, 6Gb/s, 3Gb/s and 1.5Gb/s data rates in the conversion modes and additionally supports 270Mb/s in Bypass Mode.

The GS12070's features 100 ohm differential serial interfaces, allowing connection to Semtech equalizers, cable drivers as well as optical modules.

SINGLE-CHIP CONVERSION

The GS12070 supports both multiplex and de-multiplex modes in one device. The desired mode and conversion is set through mode-select pins.

The supported modes are		
12Gb/s	←→	Quad 3Gb/s
12Gb/s	←→	Dual 6Gb/s*
6Gb/s	←→	Dual 3Gb/s*
6Gb/s	←→	Quad 1.5Gb/s
3Gb/s	←→	Dual 1.5Gb/s*

* GS12070 can be used to perform these conversions two times.

ROBUST RECEIVE SOLUTION

The GS12070 eases the system challenge of receiving multi-link SDI signals by automatically compensating for input channel skew. In modes that convert from 12Gb/s ←→ 6Gb/s combinations, the GS12070 automatically compensates for up to 300ns of serial input channel skew. In all other conversion modes, up to 800ns of input channel skew is available. Also featured is automatic link ordering, which reduces the cost and time spent troubleshooting cabling issues during the installation of UHD-SDI infrastructures.

FLEXIBLE DISTRIBUTION MODES

In configuration modes where there are unused outputs available, the GS12070 can be programmed to duplicate existing outputs. In addition, inputs can be assigned to unused outputs for monitoring purposes.

The GS12070 also features an integrated 4x4 crosspoint which enables any input to be routed to any output. This is ideal for routing and distribution applications.

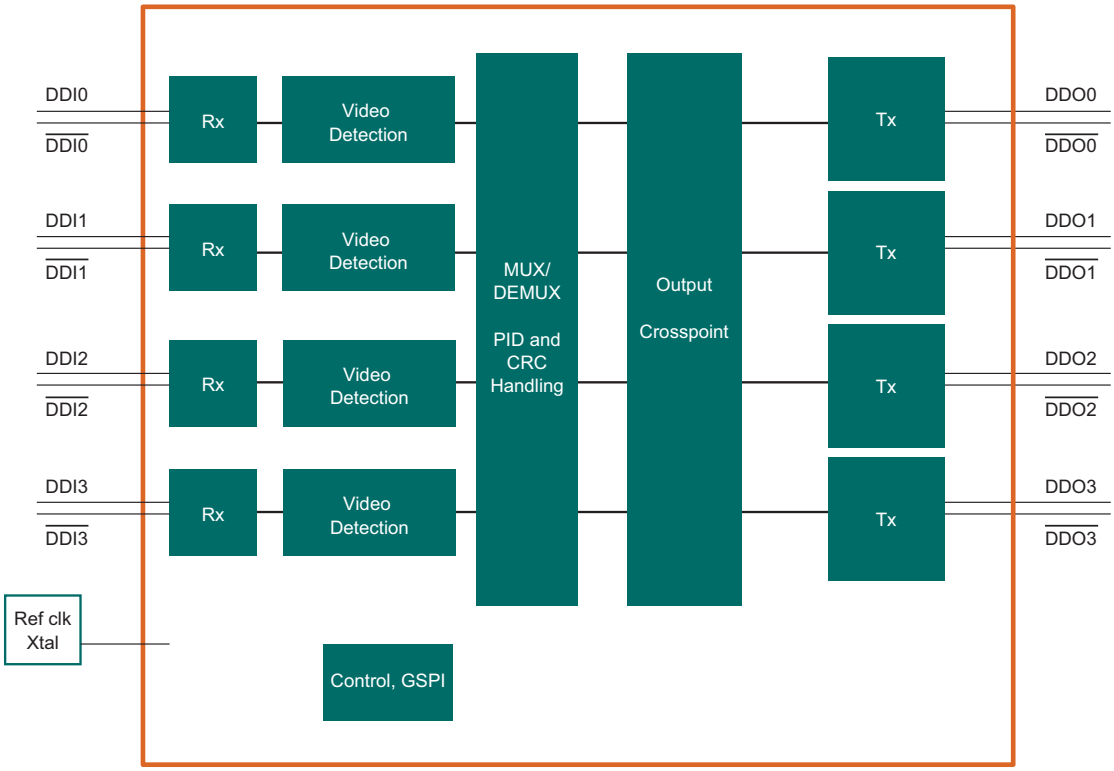
APPLICATIONS

- Multiplex / Demultiplex for 3G Router Applications
- UHD-SDI Distribution Amplifier
- 4:1<->1:4 Selector
- UHD-SDI crosspoint applications
- 12G UHD-SDI Interfacing
- Link Concatenation

GEARBOX							
Part Number	SDI Rates	Error and Format detection	SMPTE 352M Handling	Input SKEW adjustment	Per Lane output delay adjustment	Temp Range	Pkg
GS12070	HD, 3G, 6G, 12G, (270 Bypass)	YES	YES	YES	YES	-40 to +85	BGA196

UHD-SDI Gearbox

Single chip UHDTV SDI rate conversion



SDI Transmitters and Receivers

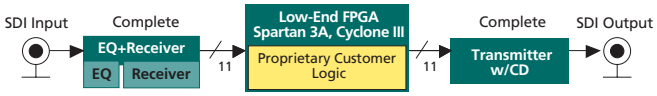
Choosing the right SDI transmitter and SDI receiver for your system

Designers have the choice of selecting components from different vendors. But when it comes to designs with SDI transmitters and SDI receivers, they must first choose an architecture. In implementing a design with a SDI transmitter and/or SDI receiver, there are 3 architectural choices: Semtech's complete SDI transmitter/SDI receiver solution architecture, an integrated-transceiver FPGA architecture and a FPGA-helper architecture. Let's explore these three options with an assessment of the following key parameters: jitter, power consumption, integration (component/features), time-to-market, system size and cost.

SEMTECH'S COMPLETE SOLUTION ARCHITECTURE

Leveraging our expertise in signal integrity and our deep understanding of broadcast video technologies, Semtech's SDI transmitter and SDI receiver offering encapsulates all the analog components (SerDes, VCO, CD, EQ, Reclocker) and digital SMPTE video and audio processing required to transmit and receive SDI video. Integrating all of these components into one package reduces the PCB footprint required to implement SDI transmit/receive, and the solution benefits from Semtech's superior jitter performance. This optimized, cost-effective and power efficient ASIC implementation allows customers to focus on their unique value-added processing for quicker time-to-market. Only Semtech offers a solution that scores high for each evaluation parameter.

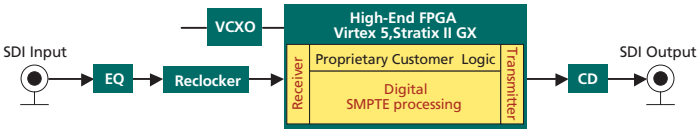
Gennum: Complete Solution Transmitter/Receiver



INTEGRATED-TRANSCEIVER FPGA ARCHITECTURE

Integrated-transceiver FPGAs typically offer the worst specifications in terms of jitter. Maximum output jitter and input jitter tolerance (IJT) are typically at the limit of the SMPTE standards and, in some cases, actually in violation of industry norms. That is why extra components, namely VCXOs and reclockers, are required to get the system jitter performance to an acceptable level. This comes at a penalty of higher power consumption, system footprint size and cost. Because of all the fine tuning required to get this architecture to work and because of the IP licensing/development required for the digital SMPTE video processing, this architecture unnecessarily prolongs time-to-market. Finally, while FPGAs integrate transceivers, they do not integrate routing components like cable drivers and equalizers.

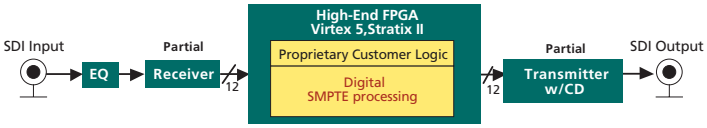
Integrated Transceiver FPGAs



FPGA-HELPER ARCHITECTURE

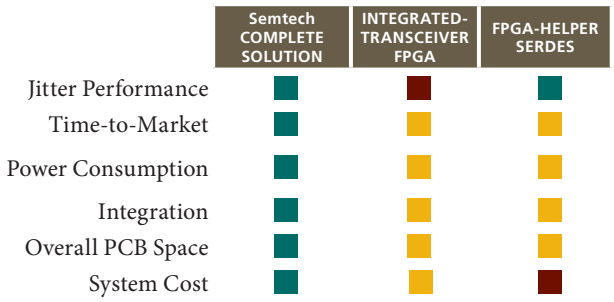
The FPGA-helper architecture, as depicted below, involves the use of a component that includes the physical media attachment part of a SMPTE SDI receiver/SDI transmitter with the digital SMPTE processing implemented in the FPGA. The result is an architecture that is taxing in terms of power consumption, and those FPGA-helper parts are lacking even basic SMPTE digital processing. In many cases, product specific FPGA IP already requires high utilization factors in small, low-cost FPGAs, and the added requirement of digital SMPTE video processing in the FPGA may drive adoption of a larger FPGA. This results in further penalties in power consumption, size and system cost. And while this architecture fares well in system jitter performance in certain cases, the added engineering effort in developing (or licensing) and stitching that video processing logic to product specific code ensures a slower time-to-market. Finally, while some FPGA-helper parts integrate a cable driver, the offering lacks an integrated equalizer.

FPGA-Helper SERDES



HOW THE SEMTECH SOLUTION STACKS UP

Compare the ratings of each of the 3 architectures for key parameters in an implementation of 1 Rx and 1 Tx channel.



SDI Transmitters

High-performance, integrated, low-power solution for SDI transmit links

3Gb/s SDI

Semtech's GS2972 and GS2962 are fully compatible with SMPTE ST424 and ST425 as well as new ST-2081-1 and ST2082-1 UHD-SDI standards. In addition, Semtech SDI transmitters feature integrated SMPTE video processing including scrambling, TRS detection, insertion and ancillary data insertion.

Semtech's GS2972 SDI transmitter includes an integrated audio embedder and supports AES, I2S and serial audio formats. The fully integrated functionality of Semtech's SDI transmitters, provides the lowest power and smallest footprint solution for a complete SDI transmit link.

COMPLETE VIDEO PROCESSING

Semtech SDI transmitters have the most complete video processing features available. These include, but are not limited to, scrambling, TRS detection or insertion, and ancillary data insertion.

GREAT FOR DVB-ASI

All Semtech SDI transmitters are DVB-ASI capable.

AUDIO EMBEDDING

Semtech's SDI transmitters include an integrated audio embedder supporting AES, I2S, and serial audio formats.

EXCELLENT JITTER PERFORMANCE

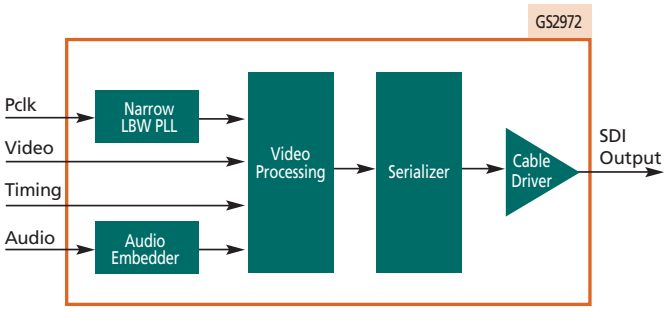
Due to the integrated PLL with narrow loop bandwidth, the SDI transmitters can reject up to 300ps of jitter on the parallel clock, outputting very low jitter, SMPTE-compliant SDI signals.

POWER AND AREA EFFICIENT

The high level of integration in Semtech's SDI transmitters provides the lowest power and smallest means of implementing a SDI link.

APPLICATIONS

Cameras, camera control units, multiviewers, routers, production switchers, master control switchers, VTRs, video servers, encoders/decoders, up/down/cross converters, audio embedders, format detectors, test and measurement equipment.



SDI TRANSMITTERS

Part Number	Data Rate (Mb/s)	Video Processing	DVB/ ASI	Ancillary Data Insert.	Audio Embed	Cable Driver	Output Jitter (ps)	Parallel Bus Width	CEA 861 Timing	Temp Range (°C)	Power (mW)	Stand-by	Pkg
GS2972	270 1485 2970	YES	YES	YES	YES	YES	3G: 40 HD: 50 SD: 200	10 or 20	YES	-40 to +85	400	YES	BGA 100
GS2962	270 1485 2970	YES	YES	YES	NO	YES	3G: 40 HD: 50 SD: 200	10 or 20	YES	-40 to +85	350	YES	BGA 100
GS1672	270 1485	YES	YES	YES	YES	YES	HD: 50 SD: 200	10 or 20	YES	-40 to +85	350	YES	BGA 100
GS1662	270 1485	YES	YES	YES	NO	YES	HD: 50 SD: 200	10 or 20	YES	-40 to +85	330	YES	BGA 100

SDI Receivers

High-performance, integrated, low power solution for SDI receive links

3Gb/s SDI

Semtech's GS2971A and GS2961A are SDI receive solutions featuring cable equalization, video and audio processing and are a comprehensive, high-performance single chip SDI receive solution. Semtech's GS2971A and GS2962 fully compatible with SMPTE ST424 and ST425 as well as new ST-2081-1 and ST2082-1 UHD-SDI standards. The GS2971A and GS61A feature a high performance, integrated, long reach adaptive cable equalizer which offers 140m of reach at 3Gb/s. The integration of the cable equalizer reduces overall PCB component footprint and power requirements.

Semtech's SDI receivers offer integrated SMPTE video processing including descrambling, word alignment, comprehensive error detection, and correction and ancillary data extraction.

In addition, the GS2971A includes an integrated audio deembedder supporting AES, I2S and serial audio formats. The GS2971A also features an integrated audio clock generator.

COMPLETE VIDEO PROCESSING

Semtech SDI receivers have the most complete set of video processing features available. These include, but are not limited to, descrambling, word alignment, comprehensive error detection and correction, and ancillary data extraction.

GREAT FOR DVB-ASI

All Semtech receivers are DVB-ASI capable.

AUDIO DE-EMBEDDING

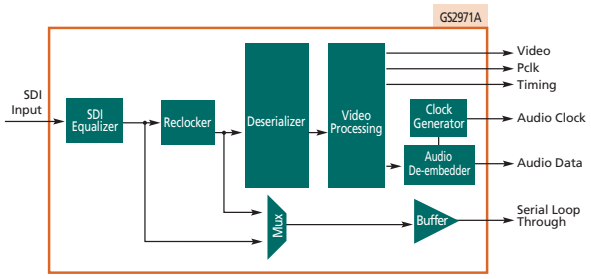
GS2971A includes an integrated audio de-embedder supporting AES, I2S, and serial audio formats. The chip also features an integrated audio clock generator.

INTEGRATED EQUALIZER

Semtech's GS2971A and GS2961A SDI receivers feature a high-performance integrated adaptive cable equalizer. The integration of the cable equalizer reduces overall PCB component footprint and power requirements.

APPLICATIONS

Monitors, camera control units, multiviewers, routers, production switchers, master control switchers, VTRs, video servers, encoders/decoders, up/down/cross converters, audio de-embedders, format detectors, test and measurement equipment.

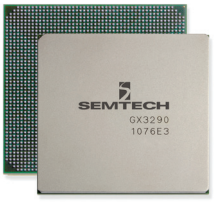


SDI RECEIVERS

Part Number	Data Rate (Mb/s)	EQ	Video Process	Serial Loop Through	IJT (UI)	ANC Extraction	Audio De-embed	Audio Clock Gen.	Par Bus Width	CEA 861 Timing	Temp Range (°C)	Power (mW)	Stand-by	Pkg
GS2971A	270 1485 2970	YES	YES	YES	0.7	YES	YES	YES	10 or 20	YES	-40 to +85	545	YES	BGA 100
GS2961A	270 1485 2970	YES	YES	YES	0.7	YES	NO	NO	10 or 20	YES	-40 to +85	515	YES	BGA 100
GS2970A	270 1485 2970	NO	YES	YES	0.7	YES	YES	YES	10 or 20	YES	-40 to +85	350	YES	BGA 100
GS2960A	270 1485 2970	NO	YES	YES	0.7	YES	NO	NO	10 or 20	YES	-40 to +85	320	YES	BGA 100
GS1661A[1]	270 1485	YES	YES	YES	0.7	YES	NO	NO	10 or 20	YES	-40 to +85	460	YES	BGA 100
GS1660A[2]	270 1485	NO	YES	YES	0.7	YES	NO	NO	10 or 20	NO	-40 to +85	280	YES	BGA 100

1-GS1671A audio version available, 2-GS1670A audio version available.

SDI Crosspoints



Semtech crosspoint switches provide an unmatched combination of size, features and performance. At sizes up to 290 inputs and 290 outputs, these are the largest, fully non-blocking asynchronous crosspoint switches in the industry.

MULTIPLE STROBES

Eight update enabled strobe pins allow the crosspoint to be partitioned into independently updatable blocks. This is useful in multi-format environments when the switches need to occur at different points in time. Each update strobe can be assigned on a per-output basis, enabling maximum flexibility.

DATA RATE MARGIN

Supporting data rates up to 3.5Gb/s means that there is significant margin for video systems operating up to 2.97Gb/s. This margin also means the product can be used in Xaui™, DisplayPort™ and HDMI switching applications.

FULLY INDEPENDENT INPUT AND OUTPUT CHANNELS

All our crosspoints provide independent input trace equalization and output de-emphasis, which can compensate for over 50 inches of PCB trace loss. This provides higher signal integrity and lower jitter in designs utilizing long traces or passive splitting. In addition, with output swing configurable as low as 200mV, system power can be significantly reduced.

ON-CHIP PATTERN GENERATORS AND EYE PATTERN DIAGNOSTICS

Independent pattern generators and checkers can be used for testing signal paths on either the input or output side of the system. The pattern checker can be configured to check for bit errors using one of three PRBS patterns or any arbitrary pattern, important for evaluating system performance with video pathological signals. All crosspoint devices can check for bit errors at arbitrary phase offsets from the received data, and jitter margin can be determined by measurement of the horizontal eye opening.

TEMPERATURE SENSORS

Four on-chip temperature sensors monitor the junction temperature of the chip. This enables automated control of fan speed and power down sequences to meet environmental demands for energy conservation.

LOW POWER

When compared to competitive solutions, Semtech crosspoints provide industry leading per channel power consumption with less than 1W consumed in stand-by mode. System power can be further reduced by taking advantage of the crosspoint's high input sensitivity while using Semtech equalizers configured for minimum output swing levels.

FLEXIBLE FOOTPRINT

All Semtech crosspoints are pin compatible, sharing the same control interface and register set. This allows a single platform design to be easily scaled to the necessary switch size with no re-work required in either hardware or software.

INPUT SENSITIVITY

To address losses typical in many router architectures, the Semtech crosspoint family provides for high input sensitivity, resulting in additional system margin. In addition, high input sensitivity facilitates better system optimization, including reduced swing on upstream drivers, providing substantial power savings.

APPLICATIONS

Routers, multiviewers, production switchers, master control switchers and broadcast modular equipment.

CROSSPOINT SWITCHES

Part Number	Data Rate (Gb/s)	Inputs	Input Sensitivity (mV)	Input Trace EQ	Outputs	Output De-emphasis	DC coupling	Temp Range (°C)	Power (W)	Size (mm)	Pkg
GX3290	3.5	290	80	YES	290	YES	1.2V, 1.8V, 2.5V	0 to +85	34	50x50	2377 BGA
GX3190	3.5	146	80	YES	290	YES	1.2V, 1.8V, 2.5V	0 to +85	25	50x50	2377 BGA
GX3246	3.5	290	80	YES	146	YES	1.2V, 1.8V, 2.5V	0 to +85	18	50x50	2377 BGA
GX3202	3.5	202	80	YES	202	YES	1.2V, 1.8V, 2.5V	0 to +85	24	50x50	2377 BGA
GX3146	3.5	146	80	YES	146	YES	1.2V, 1.8V, 2.5V	0 to +85	18	50x50	2377 BGA

Timing (GEN-Clocks)

A complete timing solution for broadcast video

GS4900B/GS4901B/GS4910B/GS4911B CLOCK GENERATORS

GENLOCK CAPABILITY

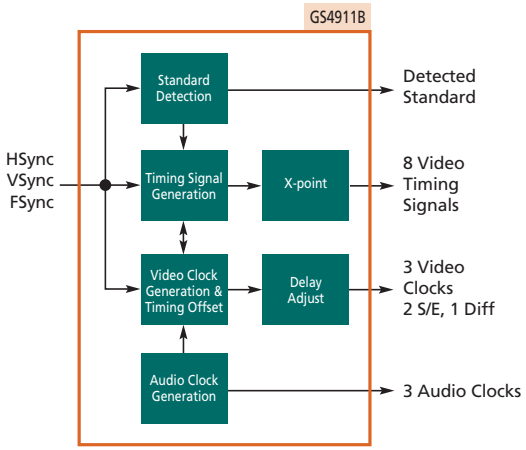
Semtech clock generators can be genlocked to reference with a variable offset. On loss of reference, the video clocks will flywheel to maintain their frequency.

GENERATES MULTIPLE CLOCKS

Three video clocks (2 single-ended and one differential), 3 single-ended audio clocks, and 8 single-ended configurable timing signals can be generated. Video clocks up to 165MHz can be produced in order to support up to 3Gb/s SDI and UXGA. In addition, the GS4911B features crosslocking capability where HD timing can be generated from an SD reference, increasing design flexibility.

INPUT STANDARD DETECTION

By supplying the clock generator with HSync, VSync and Fsync, the chip will determine if it matches one of 36 video or 16 graphics standards and will report the detected standard.



GS4915 ClockCleaner™

REDUCES JITTER TO MEET SMPTE SPECS

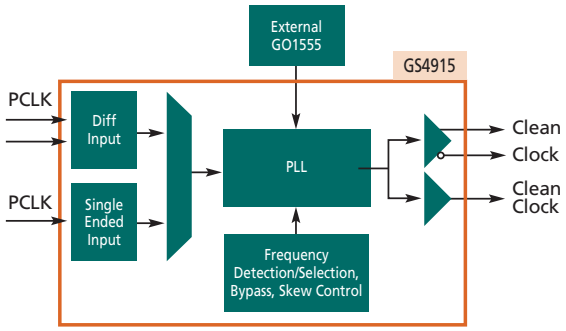
The GS4915 will reduce jitter on video clocks of 27, 74.25, 74.25/1.001, 148.5, and 148.5/1.001 MHz. Output jitter will typically be 20ps, which will guarantee 3Gb/s SDI compliance when used with a SDI transmitter.

FLEXIBLE I/O FREQUENCIES AND LEVELS

SD (27MHz) and HD (74.25, 74.25/1.001, 148.5, 148.5/1.001MHz) frequencies can be input and output from the GS4915. The chip also has single-ended and differential inputs and outputs to facilitate interfacing with a variety of chips.

FREQUENCY DOUBLER TO MEET 3Gb/s SDI REQUIREMENTS

If the input clock frequency is 74.25 or 74.25/1.001MHz, the GS4915 can double the output, providing a low jitter 148.5 or 148.5/1.001MHz output clock, which can be used for HD-SDI and 3Gb/s SDI applications.



CLOCK GENERATORS

Part Number	Input Video Standard	Output Video Standard	Max Output Video Clock (MHz)	Power Supply (V)	Pkg.	Size (mm)	Genlock	Audio Clocks	User Programmable	Power (mW)
GS4900B	3G/HD/SD/ Graphics	SD	54	3.3, 1.8	64 QFN	9 x 9	YES	NO	NO	215
GS4901B	3G/HD/SD/ Graphics	SD	54	3.3, 1.8	64 QFN	9 x 9	YES	YES	NO	265
GS4910B	3G/HD/ SDGraphics	3G/HD/SD/ Graphics	165	3.3, 1.8	64 QFN	9 x 9	YES	NO	YES	250
GS4911B	3G/HD/SD/ Graphics	3G/HD/SD/ Graphics	165	3.3, 1.8	64 QFN	9 x 9	YES	YES	YES	300

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- Customized evaluation boards
- Customer schematic and PCB layout review and suggestions
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- ESD testing and debug

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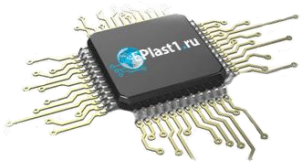

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