

Gennum Broadcast Video Portfolio:

CROSSPOINT SWITCHES

EQUALIZERS - NOW WITH LONGER REACH

RECLOCKERS

CABLE DRIVERS - ADVANCED NEW FEATURES

TIMING (GEN-CLOCKS)

SERIALIZERS

DESERIALIZERS

VIDEO OPTICAL MODULES - NEW CWDM MODULES

PCI EXPRESS®

END-TO-END PORTFOLIO OF BROADCAST VIDEO SOLUTIONS

2011 FALL PRODUCT GUIDE

Broadcast Video Solutions

Gennum = Broadcast

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As a pioneer in digital video and the only semiconductor company with a core focus on broadcast video, Gennum leads the way in proven SD, HD and 3Gb/s technologies. We offer the world's most advanced solutions designed specifically for real world broadcast challenges, including the latest innovations designed to help you push the boundaries of performance, reach and signal integrity, while reducing time to market and design risks.

In fact, there's a good chance that any TV broadcast or professional video you see passed through several Gennum components on its way to you. That's why we say Gennum = Broadcast.

A Broadcast-Focused Partner

As the industry's only broadcast-centric semiconductor company, Gennum's 20-plus years of video expertise gives us an intimate knowledge of end-to-end broadcast systems and workflow design. This unique perspective helps us work with you to deliver the best possible SDI solutions for the most challenging environments.

The Industry's Most Comprehensive Portfolio

We offer the most comprehensive, end-to-end portfolio of broadcast video solutions available, including our new family of long-reach and high-density adaptive equalizers, next generation cable drivers, our 3rd generation video SFP optical modules and the industry's most feature-rich crosspoint switches.

Dedicated to Your Success

Our commitment to your success is evident in 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 any Gennum-based designs to shorten design cycles, reduce risks and optimize performance
- Provide dedicated field and applications engineering support throughout your product's life-cycle

And with our ongoing contributions to and investments in SD, HD & 3Gb/s standardization and technologies, you know we'll be with you for the long run, easing the migration path for you to get to market quickly with differentiated solutions that are future-proofed for next-generation video formats, ever-increasing data rates, and evolving I/O and distance requirements.



Product Spotlight

We've leveraged our extensive history and expertise in the broadcast video industry to design and build the industry's first 290x290 fully non-blocking asynchronous switch—the flagship solution in our new family of crosspoints. These are not parts adapted from the data communications market. They were designed for broadcast video from the ground up.

Our years in the broadcast industry have given us a unique understanding of the video market. That's why we have built in industry-first features like eight strobe enable pins, which enable the crosspoint to be “broken up” into 8 smaller crosspoints. This gives system designers the flexibility to design for multi-format applications or for re-configuring only one part of the switch where necessary.

Crosspoint Solutions

Combining video-specific features with exceptional size, performance and power management

GENNUM'S LARGE CROSSPOINT FAMILY OFFERS EXCEPTIONAL VALUE AND PERFORMANCE

- Five new products:
 - GX3290 290 input by 290 output
 - GX3190 146 input by 290 output
 - GX3246 290 input by 146 output
 - GX3202 202 input by 202 output
 - GX3146 146 input by 146 output
- All products listed above at data rates run up to 3.5Gb/s, and are fully asynchronous and non-blocking
- All products feature industry leading input sensitivity and advance signal conditioning such as input trace equalization and output de-emphasis to support trace lengths in excess of 50 inches
- Built in pattern generators and checkers and diagnostic functionality options
- All ports are comprehensively tested against all specifications because Gennum understands the criticality of crosspoint reliability in mission critical broadcast operations. We do the testing so you don't have to!

CROSSPOINT SOLUTIONS

- Supports 3G, HD and SD data rates with margin
- Designed to interoperate with our complete portfolio of SDI solutions
- Supports an extensive range of video standards and formats including 3D TV

GENNUM'S 2X2 CROSSPOINT OFFERS ROOM FOR DATA RATE EXPANSION UP TO 14Gb/s

- GX4002 – world's first 2x2 14Gb/s crosspoint
- Fully asynchronous and non-blocking
- Ideal for input selection applications, redundancy switching, protection switching and driving long backplanes
- Independent input trace equalization and output de-emphasis



Crosspoint Switches

Video-specific Features Developed from the 'Ground Up' for SDI (SD, HD, & 3G), 3D, and Ultra HD

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

DESIGNED FOR BROADCAST

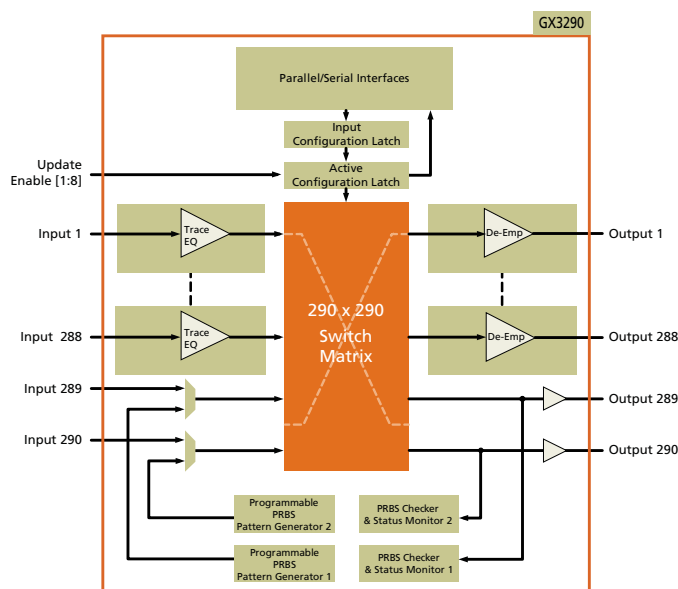
Gennum's history in the broadcast market has given us a thorough understanding of the nuances of broadcast equipment, allowing us to design specifically for these applications. Using this expertise, we introduced several features that are new to the industry such as multiple strobe enable pins, the industry's greatest input and output flexibility and a pattern checker that supports arbitrary patterns. All of these features make our crosspoints easy to use, while providing superior performance.

MULTIPLE STROBES

Eight update enable strobe pins allow the crosspoint to be broken into smaller pieces, each of which can be independently updated. Independent updates also allows for more deterministic control by allowing parallel operations to occur vs. serializing multiple time domain events. This is useful in multi-format environments when the switches will occur at different points in time. Because each update strobe can be assigned on a per-output basis, this feature enables maximum flexibility.

DATA RATE MARGIN

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



FULLY INDEPENDENT INPUT AND OUTPUT CHANNELS

All of Gennum's crosspoint products provide independent input trace equalization and output de-emphasis, which can compensate for over 50 inches of PCB trace loss. This industry leading trace equalization allows customers the flexibility to utilize long traces and/or passive splitting of signals in their designs with more confidence in overall signal integrity and lower jitter. Also, the wide input sensitivity (80-1200mV) means that output amplitudes from upstream chips can be reduced, saving overall system power. In addition, each output can be independently powered down for greater flexibility. With output wings as low as 200mV, system power can be significantly reduced when the crosspoint is followed closely by another device.

ON-CHIP PATTERN GENERATORS AND CHECKERS

With two independent pattern generators and pattern checkers on chip, the GX3290 (and family) can be used for testing and diagnosing system channel issues on either the input or output side of the system. Support for PRBS 7, 15, and 23 patterns in the generator means that there is enough flexibility to evaluate the system under different stress conditions. The pattern checker can check one of the three PRBS patterns above or it can be configured to check bit errors on any arbitrary pattern. This is particularly useful for evaluating system performance with stressful video pathological signals.

HOST INTERFACE FLEXIBILITY

By offering both serial and parallel host interfaces with normal and auto-increment modes, you can choose the interface and mode of operation that works best in your system. This makes it easy to interface to a variety of control devices, from FPGA and microcontroller based architectures.

EYE PATTERN DIAGNOSTICS

The GX3290 can check for bit errors at arbitrary phase offsets from the received data. This allows you to measure jitter margin using horizontal eye opening values.

Crosspoint Switches

Industry's largest crosspoint switch, designed specifically for broadcast

TEMPERATURE SENSORS

Four on-chip temperature sensors monitor the junction temperature of the chip and provide this information via registers, where the system can read them. This allows the user facilitates automated control of fan speed and power down sequences that prevent the chip and system from overheating.

DYNAMIC OUTPUT POWER DOWN AND SIGNAL INVERT

Having the output power down and signal invert functions tied to the strobe enable pins guarantees that outputs enter or exit power down mode when other switches tied to the same strobe are occurring in the matrix. This combination of dynamic output power down and high input sensitivity enables passive expansion using multiple crosspoint devices, eliminating the need for hundreds of costly and power-hungry splitter and combiner components.

LOW POWER

Even with higher output swing voltages, Gennum is able to achieve less than 40W for 290 active channels. Per channel power consumption is industry leading when compared to competitive solutions and is also highly scalable with less than 1W power consumption in stand-by mode. System power can be further reduced by taking advantage of the crosspoint's high input sensitivity and using Gennum's GS2993/94 and GS3440/41 equalizers at minimum output swing levels.

FLEXIBLE FOOTPRINT

The GX3290, 3190, 3246, 3202, and 3146 are all pin compatible. Also, sharing the same interface and register set, one design can be easily scaled to the necessary switch size with no rework required in either hardware or software, allowing multiple end products to be launched from one common platform.

INPUT SENSITIVITY

The GX3290 family of crosspoints feature industry leading input sensitivity. High input sensitivity provides additional system margin to address losses typical in many architectures attributable to long board traces, series connectors and passive splits. In addition, high input sensitivity facilitates better system optimization, including reduced swing on upstream drivers, providing substantial power savings.

INDUSTRY'S LARGEST SWITCH PRODUCT

Gennum's new family of crosspoint devices includes the industry's first 290x290 crosspoint switch. Even when the core switch requirements are less than a full 290x290, extra I/O can be used to provide additional opportunities for differentiation. For example, the I/O could be used as a loop back with auxiliary processing for signal reporting, monitoring and jitter cleaning.

As the broadcast industry evolves to support video formats such as 3D and UltraHD, the need to support multiple data rates and video formats will dramatically increase the size and complexity of next-generation broadcast video systems. Gennum's crosspoint portfolio not only delivers the superior size, performance and power management required by these systems, but gives equipment manufacturers and broadcasters alike the ability to monitor and control performance.

APPLICATIONS

Routers, multiviewers, production switchers, master control switchers and next generation, connected modular equipment.

	GX3290	GX3190	GX3246	GX3202	GX3146	GX4002
Data Rate (Gb/s)	3.5	3.5	3.5	3.5	3.5	14
Inputs	290	146	290	202	146	2
Input Sensitivity (mV)	80	80	80	80	80	80
Input Trace EQ	YES	YES	YES	YES	YES	YES
Outputs	290	290	146	202	146	2
Output De-emphasis	YES	YES	YES	YES	YES	YES
DC coupling	1.2V, 1.8V, 2.5V	1.2V, 1.8V, 2.5V	1.2V, 1.8V, 2.5V	1.2V, 1.8V, 2.5V	1.2V, 1.8V, 2.5V	3.3V
Temp Range (°C)	0 to +85	0 to +85	0 to +85	0 to +85	0 to +85	-40 to +100 (Case)
Power (W)	34	25	18	24	18	0.3
Size (mm)	50x50	50x50	50x50	50x50	50x50	5x5
Package	2377 BGA	2377 BGA	2377 BGA	2377 BGA	2377 BGA	32 QFN

Equalizers

Industry's most pervasive SDI equalizers– longest cable lengths, lowest jitter and data rates up to 3Gb/s



PERFORMANCE OPTIMIZED

Genum offers a comprehensive range of 3Gb/s adaptive cable equalizers optimized for real-world applications. The GS3440 long-reach 3Gb/s adaptive cable equalizer is optimized for robust performance in applications requiring 200 meters of 3Gb/s cable reach. For greater flexibility, the GS3441, a dual output version of the GS3440, is also available. For multi-channel applications utilizing high-density PCB layouts, Genum offers the GS3442 high-density 3Gb/s adaptive cable equalizer. With its high crosstalk immunity, the GS3442 is ideal for high density applications utilizing standard BNC connectors and next-generation high density connectors such as HD-BNC and DIN 1.0/2.3.

LONG CABLE REACH - PRODUCTION TESTED

Designed for applications requiring maximum cable reach and robust performance, the GS3440 and GS3441 feature the industry's longest reach, 200m at 3Gb/s. Genum equalizers are production tested at applicable data rates and cable lengths ensuring the best performance and highest board yields.

MULTI-RATE

Genum equalizers offer robust multi-standard operation from 125Mb/s to 2970Mb/s even in the presence of stressful video pathological signals and are fully SMPTE 424M, 292M, 344M and 259M compliant.

LOWEST JITTER

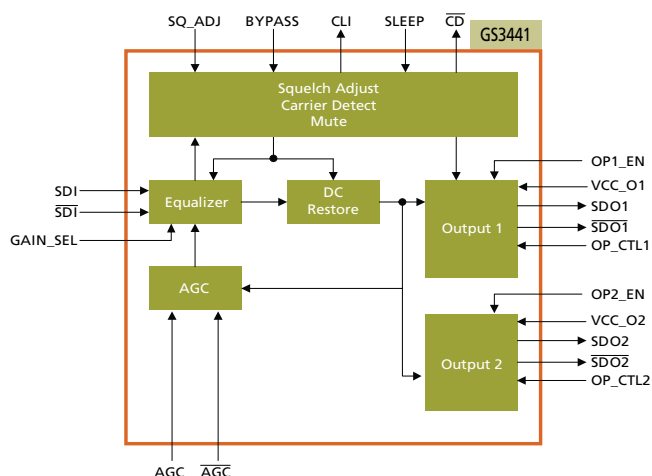
Genum continues to reduce jitter at all cable lengths and for all data rates. The GS3440 and GS3441 offer the industry's longest cable reach with robust performance.

LOW POWER

Genum equalizers feature low power consumption for power sensitive applications.

IMPROVED FEATURES

Enhanced ESD performance is critical for terminal I/O connectivity and will result in more robust and higher manufacturing yields.



	NEW						
	GS3442	GS3440*	GS2994*	GS2984	GS2964	GS1674	GS9074A
Data Rate (Mb/s)	125 - 2970	125 - 2970	143 - 2970	143 - 2970	143 - 2970	143 - 1485	143 - 360
Input 0/6dB gain	YES	YES	YES	YES	NO	NO	NO
Output Coupling	2.5/3.3V	1.2-3.3V	1.2-3.3V	2.5/3.3V	3.3V	3.3V	3.3V
No. of Outputs	1	1	1	1	1	1	1
3G Typical Cable Length (m)	140 Error Free	200 @ 0.55UI	140 @ 0.3UI	140 @ 0.3UI	100 @ 0.35UI	N/A	N/A
HD Typical Cable Length (m)	200 @ 0.25UI	250 @ 0.4UI	200 @ 0.2UI	200 @ 0.2UI	130 @ 0.25UI	220 @ 0.25UI	N/A
SD Typical Cable Length (m)	400	500 @ 0.3UI	400	400	170	400	350
Footprint Compatible With	all 16 QFN EQs	all 16 QFN EQs	all 16 QFN EQs	all 16 QFN EQs	all 16 QFN EQs	all 16 QFN EQs	all 16 QFN EQs
Temp Range (°C)	-40 to +85	-40 to +85	-40 to +85	-40 to +85	-40 to +85	-40 to +85	0 to +70
Power (mW)	195	167	165	195	215	195	215
Size (mm)	4 x 4	4 x 4	4 x 4	4 x 4	4 x 4	4 x 4	4 x 4
Package	16 QFN	16 QFN	16 QFN	16 QFN	16 QFN	16 QFN	16 QFN

* Dual output versions available . See equalizer table in the centre of the guide.

Reclockers

Industry's lowest power and lowest jitter 3Gb/s solutions



IMPROVED JITTER TOLERANCE

As routers and distribution systems grow in size, system jitter increases. Reclocking has become important in maintaining overall system robustness. In addition, as processing is being integrated into more and more devices, reducing the overall jitter in a system is critical given that many processing specific devices like FPGAs can have poor IJT. Performance leading reclockers such as the Gennum GS2985 can be utilized to increase overall system margin.

MULTI-RATE

Gennum reclockers offer robust multi-standard operation from 270Mb/s to 2970Mb/s and are SMPTE 424M, 292M and 259M-C compliant.

LOWEST POWER

Gennum offers high-performance at the industry's lowest power consumption.

BEST INPUT JITTER TOLERANCE

Gennum's unique reclocker architectures offer the industry's best input jitter tolerance for worry free design flexibility. The GS2965, GS2985 and GS2986 all have a minimum input jitter tolerance of 0.8UI, making them ideal for 3Gb/s SDI designs.

LOW OUTPUT JITTER

The GS2985 features robust performance with the industry's best output jitter.

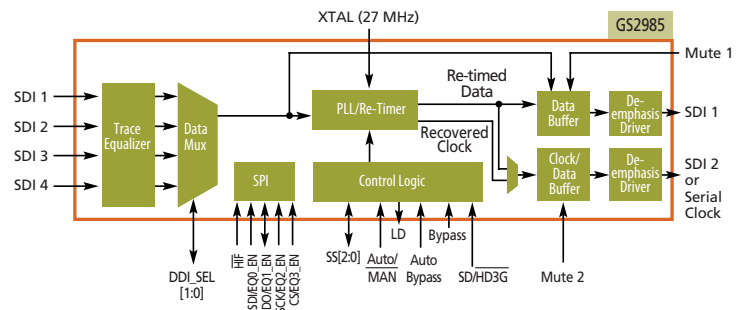
ADDITIONAL FEATURES

The GS2965, GS2985, and GS2986 add input trace equalization and output signal de-emphasis, which provides additional flexibility to system designers. In addition, the serial control interface to these devices provide multiple communication methods. These devices also feature automatic slew rate control when used with Gennum's cable drivers for multi-format applications.

The integrated 2:1 or 4:1 signal selection mux at the input of the Gennum reclockers allows them to be utilized in architectures that require switching matrices and failover redundancy. This reduces the need for additional signal path components and their associated jitter.

SIZE

The GS2985 maintains the same size as previous generations, while the GS2986 maintains the same features as the GS2985 but is 55% smaller. The GS2965 maintains nearly all the same features as the GS2985, but it is 69% smaller.



	GS2965	GS2985	GS2986	GS1675	GS9076
Data Rate (Mb/s)	270, 1485, 2970	270, 1485, 2970	270, 1485, 2970	270, 1485	270
Power Supply (V)	2.5 or 3.3	2.5 or 3.3	2.5 or 3.3	2.5 or 3.3	3.3
Output Jitter (UI)	3G: 0.05 HD: 0.03 SD: 0.01	3G: 0.05 HD: 0.03 SD: 0.01	3G: 0.05 HD: 0.03 SD: 0.01	HD: 0.03 SD: 0.01	SD: 0.02
Input Trace Equalization	YES	YES	YES	YES	NO
Output De-Emphasis	YES	YES	YES	YES	NO
Serial Interface	YES	YES	YES	YES	NO
Input MUX	2 : 1	4 : 1	4 : 1	2 : 1	4 : 1
Dual Data Output	YES	YES	YES	YES	YES
Temp Range (°C)	-40 to +85	-40 to +85	-40 to +85	-40 to +85	0 to +70
Power (mW)	180	180	180	180	400
Size (mm)	5 x 5	9 x 9	6 x 6	5 x 5	9 x 9
Package	32 QFN	64 QFN	40 QFN	32 QFN	64 QFN

Cable Drivers

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



THE INDUSTRY'S MOST ADVANCED CABLE DRIVER

Gennum offers a complete range of cable drivers that support data rates up to 2.97Gb/s. The GS3480 and GS3481 are Gennum's most advanced cable drivers and offer a comprehensive feature set for today's most demanding applications.

Gennum cable drivers offer robust multi-standard operation from DC to 2970Mb/s and are SMPTE 424M, 292M, 344M and 259M compliant.

CABLE-BOOST™

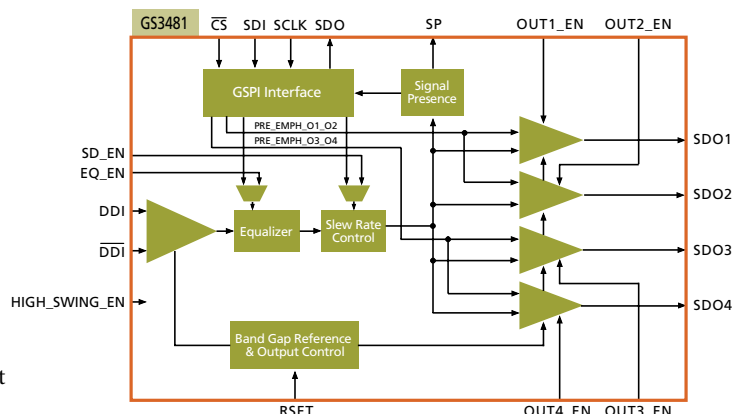
The GS3480 and GS3481 are the industry's only cable drivers featuring Cable-Boost. With up to 6dB (adjustable in 1dB increments) of output pre-emphasis, the GS3480 and GS3481 are ideal for use in long-reach applications, and where moving the SMPTE compliance point from the board connector to a point further downstream is desirable.

LARGEST OUTPUT SWING

The GS3480 and GS3481 feature the industry's largest output swing at 2400mV. High output swing can be utilized to compensate for losses that occur after the cable driver output. A larger output swing also enables passive mux solutions (for creating larger systems).

UP TO FOUR NON-INVERTED OUTPUTS

The GS3481 has 4 non-inverted outputs (the GS3480 has, 2 non-inverted outputs), making it ideal for distribution applications and applications utilizing polarity sensitive signal formats such as DVB-ASI.



	NEW						
	GS3480	GS3481	GS2988	GS2989	GS1678	GS1679	GS9077
Data Rate (Mb/s)	DC to 2970	DC to 2970	143 - 2970	143 - 2970	143 - 1485	143 - 1485	143 - 540
Power Supply (V)	2.5 or 3.3	2.5 or 3.3	2.5 or 3.3	2.5 or 3.3	2.5 or 3.3	2.5 or 3.3	3.3
Outputs	2 (non-inverted)	4 (non-inverted)	2	4	2	4	2
Output Cable Boost™ (db)	9 (1db steps)	9 (1db steps)					
Input Trace Equalization	YES	YES	YES	YES	NO	NO	NO
Output Signal Presence	YES**	YES**	YES	YES	YES	YES	NO
Maximum Output Swing (mV)	2400	2400	1800	1800	1200	1200	1040
ESD Protection (kV)	2	2	2.5	2.5	2.5	2.5	4
ORL (dB)	3G: -14 HD: -18	3G: -14 HD: -18	3G: -15 HD: -19	3G: -15 HD: -19	-19	-19	-20
Circuit Compatible With			GS1678, GS9077	GS1679	GS2988, GS9077	GS2989	GS1678, GS2988
Temp Range (°C)	-40 to +85	-40 to +85	-40 to +85	-40 to +85	-40 to +85	-40 to +85	0 to +70
Power (mW)	100*	122*	110	180	110	180	168
Size (mm)	4 x 4	4 x 4	4 x 4	4 x 4	4 x 4	4 x 4	4 x 4
Package	24 QFN	24 QFN	16 QFN	16 QFN	16 QFN	16 QFN	16 QFN

Power* with pre-emphasis OFF
Output signal presence** for data rates greater than 25Mb/s

Timing (GEN-Clocks)

Your complete timing solution for broadcast video



GS4900B/GS4901B/GS4910B/GS4911B CLOCK GENERATORS

GENLOCK CAPABILITY

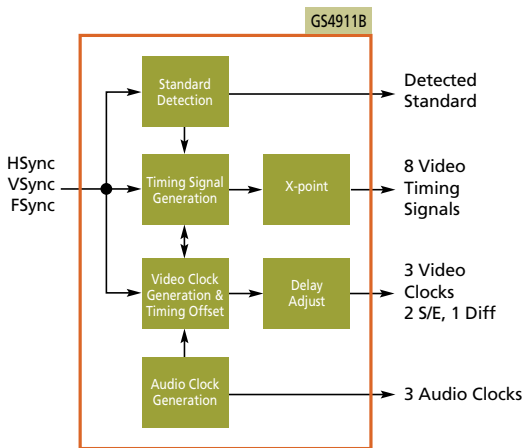
Gennum clock generators can be genlocked to reference with a variable offset. On loss of reference, the video clocks will flywheel to maintain their frequency.

GENERATES MULTIPLE CLOCKS

3 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

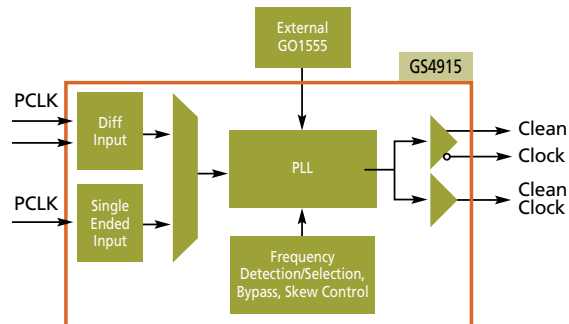
The GS4915 will reduce jitter on video clocks of 27, 74.25, 74.25/1.001, 148.5, and 148.5/1.001 MHz. Output jitter will typically be 20ps, which will guarantee 3Gb/s SDI compliance when used with a serializer.

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.



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

Product Guide

SERIALIZERS

	Data Rate (Mb/s)	Video Processing	VCO	Audio Embed	Cable Driver	Output Jitter (ps)	Parallel Bus Width	CEA 861 Timing	Standby	Temp Range (°C)	Power (mW)	Pkg
GS2972	270, 1485, 2970	YES	YES	YES	YES	3G: 40 HD: 50 SD: 200	10 or 20	YES	YES	-40 to +85	400	BGA 100
GS2962	270, 1485, 2970	YES	YES	NO	YES	3G: 40 HD: 50 SD: 200	10 or 20	YES	YES	-40 to +85	350	BGA 100
GS1672	270, 1485	YES	YES	YES	YES	HD: 50 SD: 200	10 or 20	YES	YES	-40 to +85	350	BGA 100
GS1662	270, 1485	YES	YES	NO	YES	HD: 50 SD: 200	10 or 20	YES	YES	-40 to +85	330	BGA 100
GS9092A	270	YES	YES	NO	YES	SD: 225	10	NO	NO	0 to +70	200	QFN 56

DESERIALIZERS

	Data Rate (Mb/s)	Equalizer	Video Processing	Serial Loop Through	IJT (UI)	VCO	ANC Extraction	Audio De-embed	CEA 861 Timing	Temp Range (°C)	Power (mW)	Pkg
GS2971A	270, 1485, 2970	YES	YES	YES	0.7	YES	YES	YES	YES	-40 to +85	525	BGA 100
GS2961A	270, 1485, 2970	YES	YES	YES	0.7	YES	YES	NO	YES	-40 to +85	500	BGA 100
GS2970A	270, 1485, 2970	NO	YES	YES	0.7	YES	YES	YES	YES	-40 to +85	350	BGA 100
GS2960A	270, 1485, 2970	NO	YES	YES	0.7	YES	YES	NO	YES	-40 to +85	320	BGA 100
GS1661A ¹	270, 1485	YES	YES	YES	0.7	YES	YES	NO	YES	-40 to +85	460	BGA 100
GS1660A ²	270, 1485	NO	YES	YES	0.7	YES	YES	NO	NO	-40 to +85	280	BGA 100
GS9091B	270	YES	YES	NO	0.5	YES	YES	NO	NO	0 to +70	350	BGA 100
GS9090B	270	NO	YES	NO	0.5	YES	YES	NO	NO	0 to +70	145	QFN 56

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

OPTICAL MODULES

	Description	Optical Inputs	Optical Outputs	3Gb/s Path. Rec. Sensitivity (dBm)	Output Power (dBm)	Wavelength (nm)	Data Rate (Mb/s)	Power (mW)	Temp Range (°C)	Supply (V)	Pkg
G02927	Dual Rx	2	–	-23	–	1260-1620	50-3000	600	0 to +70	3.3	Video SFP
G02917	Single Rx	1	–	-23	–	1260-1620	50-3000	300	0 to +70	3.3	Video SFP
G02929	Transceiver	1	1	-22	-2	Tx 1310 / Rx 1260-1620	50-3000	650	0 to +70	3.3	Video SFP
G02928	Dual Tx	–	2	–	-2	1310	50-3000	700	0 to +70	3.3	Video SFP
G02918	Single Tx	–	1	–	-2	1310	50-3000	350	0 to +70	3.3	Video SFP

CWDM OPTICAL FAMILY

		Description	Optical Inputs	Optical Outputs	3Gb/s Path. Rec. Sensitivity (dBm)	Output Power (dBm)	Wavelength (nm)	Data Rate (Mb/s)	Power (mW)	Temp Range (°C)	Supply (V)	Pkg
NEW	G02953 -xyyyCH	Dual Tx	0	2	–	0-5 / 2	1271-1611	50-3000	680	0 to +70	3.3	Video SFP
	G02952 -xxCH	Single Tx	0	1	–	0-5 / 2	1271-1611	50-3000	340	0 to +70	3.3	Video SFP
	G02951 -55CH	Transceiver	1	1	-22	0-5 / 2	Tx 1551* / Rx 1260-1620	50-3000	650	0 to +70	3.3	Video SFP

for full detail see chart page 16

CROSSPOINT SWITCHES

	Data Rate (Gb/s)	Power (W)	Inputs	Outputs	Input Trace EQ	Output De-emphasis	Pkg
GX3290	up to 3.5	34	290	290	YES	YES	2377 BGA
GX3190	up to 3.5	25	146	290	YES	YES	2377 BGA
GX3246	up to 3.5	18	290	146	YES	YES	2377 BGA
GX3202	up to 3.5	24	202	202	YES	YES	2377 BGA
GX3146	up to 3.5	18	146	146	YES	YES	2377 BGA
GX4002	up to 14	0.3	2	2	YES	YES	32 QFN

EQUALIZERS

		Data Rate (Mb/s)	Power (mW)	3G Cable Length (m)	HD Cable Length (m)	SD Cable Length (m)	Input 0/6dB gain	Number of Outputs	Output Coupling	Cable Length Indication	Temp Range (°C)	Pkg
NEW	GS3440	125 - 2970	167	200	250	500	YES	1	1.2 - 3.3V	NO	-40 to +85	16 QFN
	GS3441	125 - 2970	207	200	250	500	YES	2	1.2 - 3.3V	YES	-40 to +85	24 QFN
	GS3442	125 - 2970	195	140	200	400	YES	1	2.5/3.3V	NO	-40 to +85	16 QFN
	GS2993	143 - 2970	165	140	200	400	YES	2	1.2 - 3.3V	YES	-40 to +85	24 QFN
	GS2994	143 - 2970	165	140	200	400	YES	1	1.2 - 3.3V	NO	-40 to +85	16 QFN
	GS2984	143 - 2970	195	140	200	400	YES	1	2.5/3.3V	NO	-40 to +85	16 QFN
	GS2964	143 - 2970	215	100	130	170	NO	1	3.3V	NO	-40 to +85	16 QFN
	GS1674	143 - 1485	195	N/A	220	400	NO	1	3.3V	NO	-40 to +85	16 QFN
	GS9074A	143 - 360	215	N/A	N/A	350	NO	1	3.3V	NO	0 to +70	16 QFN

RELOCKERS

	Data Rate (Mb/s)	Power (mW)	Power Supply (V)	Input Trace EQ	Output De-emphasis	Input MUX	Temp Range (°C)	Size (mm)	Pkg
GS2965	270, 1485, 2970	180	2.5 or 3.3	YES	YES	2 : 1	-40 to +85	5x5	32 QFN
GS2985	270, 1485, 2970	180	2.5 or 3.3	YES	YES	4 : 1	-40 to +85	9x9	64 QFN
GS2986	270, 1485, 2970	180	2.5 or 3.3	YES	YES	4 : 1	-40 to +85	6x6	40 QFN
GS1675	270, 1485	180	2.5 or 3.3	YES	YES	2 : 1	-40 to +85	5x5	32 QFN
GS9076	270	400	3.3	NO	NO	4 : 1	0 to +70	9x9	64 QFN

CABLE DRIVERS

	Data Rate (Mb/s)	Power (mW)	Power Supply (V)	Outputs	Input Trace EQ	Output Signal Presence	Max Output Swing (mV)	Temp Range (°C)	Pkg
NEW	GS3480	DC to 2970	100*	2 [†]	YES	YES**	2400	-40 to +85	24 QFN
	GS3481	DC to 2970	122*	4 [†]	YES	YES**	2400	-40 to +85	24 QFN
	GS2988	143 - 2970	110	2	YES	YES	1800	-40 to +85	16 QFN
	GS2989	143 - 2970	180	4	YES	YES	1800	-40 to +85	16 QFN
	GS1678	143 - 1485	110	2	NO	NO	1200	-40 to +85	16 QFN
	GS1679	143 - 1485	180	4	NO	NO	1200	-40 to +85	16 QFN
	GS9077	143 - 540	168	2	NO	NO	1040	0 to +70	16 QFN

* Power with pre-emphasis off, ** Output signal presence for data rates greater than 25 Mb/s, [†] non-inverted (for full detail see chart page 7)

Choosing the Right SerDes For Your System

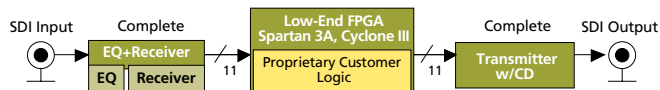
Serializers/Deserializers

As a designer, you have the choice of selecting components from different vendors. But when it comes to designs with serializers and deserializers, you first have to choose an architecture. In implementing a design with a serializer and/or deserializer, you have 3 architectural choices at your disposal: Gennum's complete serializer/deserializer solution architecture, an integrated-transceiver FPGA architecture and an 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.

GENNUM'S COMPLETE SOLUTION ARCHITECTURE

Leveraging our expertise in signal integrity and our deep understanding of broadcast video technologies, Gennum's SDI serializer and deserializer 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. This optimized, cost-effective and power efficient ASIC implementation that lets you focus on your value-added processing for quicker time-to-market. All of this integration into one package reduces the PCB footprint required to implement SDI transmit/receive, and you benefit from Gennum's superior jitter performance. Only Gennum offers a solution that scores high for each evaluation parameter.

Gennum: Complete Solution Transmitter/Receiver

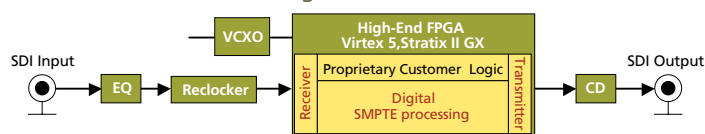


INTEGRATED-TRANSCIEVER FPGA ARCHITECTURE

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.

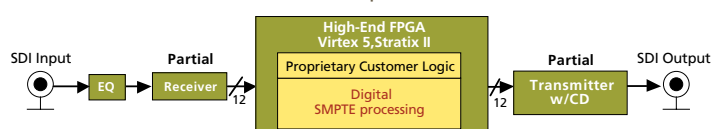
Integrated Transceiver FPGAs



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 deserializer/serializer, 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 to 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-Help SerDes



HOW THE GENNUM 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.

	GENNUM COMPLETE SOLUTION	INTEGRATED-TRANSCIEVER FPGA	FPGA-HELPER SERDES
Jitter Performance	■	■	■
Time-to-Market	■	■	■
Power Consumption	■	■	■
Integration	■	■	■
Overall PCB Space	■	■	■
System Cost	■	■	■

Serializers

The easiest, fastest, lowest power method of implementing an SDI or ASI link.



3Gb/s SDI

Gennum's GS2972 and GS2962 are fully compliant with SMPTE 424M and 425M including support for both Level A and Level B. In addition, these chips are the only ASIC solutions providing conversion from Level A to Level B. The full set of included features makes these devices the ideal choice for 1080p 50/60 transmission.

COMPLETE VIDEO PROCESSING

Gennum serializers 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 Gennum serializers are DVD-ASI capable.

AUDIO EMBEDDING

Gennum's serializers include an integrated audio embedder supporting AES, I²S, and serial audio formats.

EXCELLENT JITTER PERFORMANCE

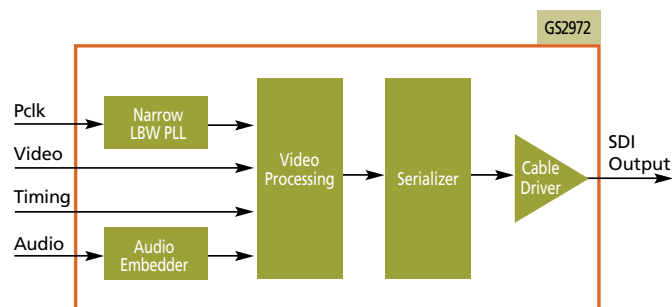
Due to the integrated PLL with narrow loop bandwidth, the serializers can reject up to 300ps of jitter on the parallel clock, outputting very low jitter, SMPTE compliant SDI signals.

POWER AND AREA EFFICIENT

The high level of integration in Gennum's serializers provides the lowest power and smallest means of implementing an 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.



	GS2972	GS2962	GS1672	GS1662	GS9092A
Data Rate (Mb/s)	270, 1485, 2970	270, 1485, 2970	270, 1485	270, 1485	270
Video Processing	YES	YES	YES	YES	YES
DVB/ASI	YES	YES	YES	YES	YES
VCO	YES	YES	YES	YES	YES
Ancillary Data Insertion	YES	YES	YES	YES	YES
Audio Embedder	YES	NO	YES	NO	NO
Cable Driver	YES	YES	YES	YES	YES
Serial Output Intrinsic Jitter (ps)	3G: 40 HD: 50 SD: 200	3G: 40 HD: 50 SD: 200	HD: 50 SD: 200	HD: 50 SD: 200	SD: 225
Parallel Bus Width	10 or 20	10 or 20	10 or 20	10 or 20	10
CEA 861 Timing	YES	YES	YES	YES	NO
Temp Range (°C)	-40 to +85	-40 to +85	-40 to +85	-40 to +85	0 to +70
Power (mW)	400	350	350	330	200
Standby	YES	YES	YES	YES	NO
Package	BGA 100	BGA 100	BGA 100	BGA 100	QFN 56

Deserializers

The easiest, fastest, lowest power method of implementing an SDI or ASI link.



3Gb/s SDI

Gennum's GS2971A and GS2961A deserializers take integration to the next level by incorporating Gennum's latest equalization technology for a compact, comprehensive, single-chip receive solution that also includes a VCO, a reclocker, and digital SMPTE video and audio processing. Gennum's 3Gb/s SDI deserializers are fully compliant with SMPTE 424M and 425M including support for both Level A and Level B. In addition, Gennum deserializers are the only ASIC solutions providing conversion from Level B to Level A. The full set of included features makes these devices the ideal choice for 1080p 50/60.

COMPLETE VIDEO PROCESSING

Gennum deserializers 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 Gennum receivers are DVB-ASI capable.

AUDIO DE-EMBEDDING

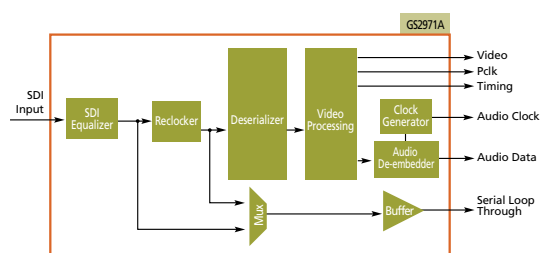
GS2971A includes an integrated audio de-embedder supporting AES, I²S, and serial audio formats. The chip also features an integrated audio clock generator.

INTEGRATED EQUALIZER

Gennum's GS2971A and GS2961A deserializers 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.



	GS2971A	GS2961A	GS2970A	GS2960A	GS1661A ¹	GS1660A ²	GS9091B	GS9090B
Data Rate (Mb/s)	270, 1485, 2970	270, 1485, 2970	270, 1485, 2970	270, 1485, 2970	270, 1485	270, 1485	270	270
Equalizer	YES	YES	NO	NO	YES	NO	YES	NO
Video Processing	YES	YES	YES	YES	YES	YES	YES	YES
DVB/ASI	YES	YES	YES	YES	YES	YES	YES	YES
Serial Loop Through	YES	YES	YES	YES	YES	YES	NO	NO
Input Jitter Tolerance (UI)	0.7	0.7	0.7	0.7	0.7	0.7	0.5	0.5
VCO	YES	YES	YES	YES	YES	YES	YES	YES
Ancillary Data Extraction	YES	YES	YES	YES	YES	YES	YES	YES
Audio De-embedder	YES	NO	YES	NO	NO	NO	NO	NO
Audio Clock Generator	YES	NO	YES	NO	NO	NO	NO	NO
Parallel Bus Width	10 or 20	10 or 20	10 or 20	10 or 20	10 or 20	10 or 20	10	10
CEA 861 Timing	YES	YES	YES	YES	YES	YES	NO	NO
Temp Range (°C)	-40 to +85	-40 to +85	-40 to +85	-40 to +85	-40 to +85	-40 to +85	0 to +70	0 to +70
Power (mW)	525	500	350	320	460	280	350	145
Standby	YES	YES	YES	YES	YES	YES	NO	NO
Package	BGA 100	BGA 100	BGA 100	BGA 100	BGA 100	BGA 100	BGA 100	QFN 56

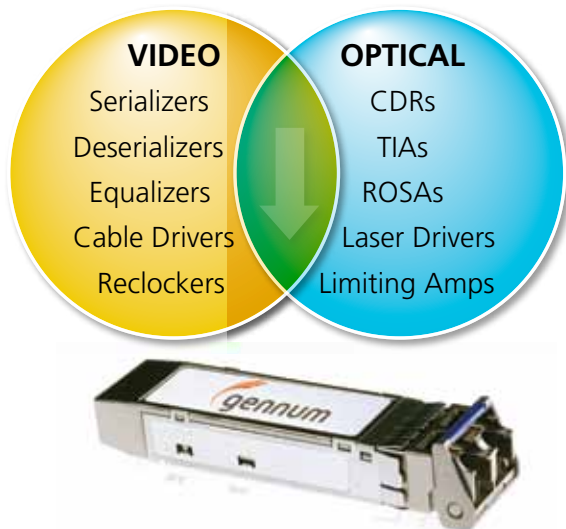
1-GS1671A audio version available, 2-GS1670A audio version available.

Fiber Optics in Broadcast

Fiber becoming a more integral part of broadcast infrastructure

As the building of 3Gb/s SDI capable infrastructure continues, there has been a sharp increase in the use of fiber optic interfaces for the transport and distribution of 3Gb/s SDI signals due to the declining implementation costs. At these higher data rates, fiber optic systems provide a number of advantages vs coax cables including virtually unlimited capacity and transmission distance and immunity from electromagnetic interference. Optical fiber is also significantly smaller and lighter than coax allowing smaller and lighter cable harnesses, which can be a huge benefit where space and weight is tightly constrained as in a production truck.

While the use of optical technology within the broadcast studio is increasing, not all solutions provide the same level of robustness, performance and reliability. For over 20 years Gennum has been bringing industry leading, innovative solutions and support to the broadcast market. This leadership also extends to the optical space where Gennum has been bringing innovative optical products to the datacom and telecom industries for over ten years. Gennum's Video SFP Optical modules are at the intersection of Gennum's excellence in both video and optical technologies.

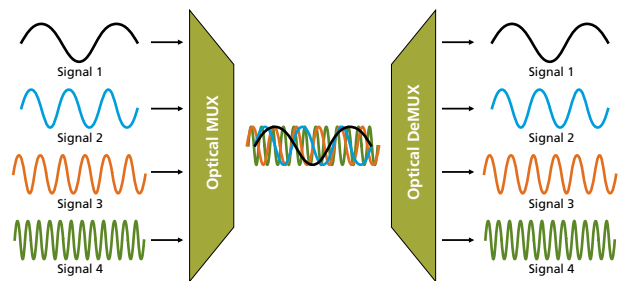


Leveraging years of technical experience in both the broadcast and optical markets, Gennum's Video SFP Optical modules are engineered to provide industry leading optical performance.

With our third generation Video SFP Optical modules now shipping in volume, we are expanding our module portfolio by launching a new CWDM family of products.

WHAT IS CWDM? WHY DO I NEED IT?

The third generation family of products offers robust, single point-to-point links for a single datastream per fiber. To send another signal, one could add another fiber link, but this is not always desirable or feasible. Since optical fiber has such a large bandwidth, it is possible to combine multiple signals and send them down a single fiber. This is known as multiplexing.



With CWDM (Coarse Wavelength Division Multiplexing), multiple lasers tuned to specific wavelengths are grouped together with optical filters (Optical MUX) and travel independently along a single fiber. At the end of the fiber, filters are used to separate (Optical DeMUX) the individual wavelengths. CWDM uses wavelengths separated by 20nm beginning at 1271nm to 1611nm. A total of 18 wavelengths are available to combine on a single fiber. The lasers used in CWDM transmitters also have a higher power and much narrower spectral width resulting in signals traveling much longer distances, up to 50 km in a 3Gb/s CWDM installation.

Gennum's video SFP Optical modules are engineered to provide industry leading optical performance and robustness for mission-critical broadcast applications. The module family is growing, as can be seen in the next few pages. Expect many more additions to the family moving forward.

Video Optical Modules

Extend the reach of 3Gb/s-SDI over optical fiber

ROBUST PERFORMANCE

Not all video optical modules are created equal. Gennum's optical modules are built upon Gennum's excellence in both SDI and optical technology. Incorporating custom receiver silicon, Gennum Rx modules feature an exceptional dynamic range ensuring maximum interoperability with SMPTE 297 compliant transmitters. Additionally, Gennum's modules provide robust performance across all operating conditions, ensuring a highly reliable optical link.

THIRD GENERATION PRODUCTS

Gennum's third generation video SFP optical modules demonstrate Gennum's ongoing commitment to supply the broadcast market with the most robust video SFP solutions. The latest modules provide exceptional value in short reach optical applications and offer design improvements and enhanced functionality.

Gennum's third generation SFPs offer an improved mechanical design with a superior latching and delatching mechanism. Additionally, all the new modules feature a user writable EEPROM that allows equipment manufacturers to program their own information within the SFP to enable their equipment to identify qualified modules.

VIDEO OR DATACOM PINOUT OPTION

Gennum is pleased to offer both video and datacom pinout variants for all new products. This allows network equipment manufacturers to add optical SDI interfaces to any existing products that were designed around the SFP MSA pinout.

COMPACT, PLUGGABLE, FLEXIBLE

Gennum's small form factor modules for digital video (Video SFP) are hot pluggable, easy to use, and offer the highest density optical solution for carrying digital video over optical fiber. The Video SFP pinout is designed so that one slot can be populated with a dual transmitter, dual receiver, single transmitter, single receiver, or a transceiver.

MULTI-RATE AND BACKWARD COMPATIBLE

Gennum's Video SFPs operate from 50Mb/s to 3Gb/s and seamlessly run at 3G-SDI, HD SDI and SD SDI rates without any system level intervention required to change the data rate. They can also be used for other formats such as Ethernet and SONET.

MONITORING AND CONTROL

All of Gennum's Video SFPs are equipped with an I²C interface for monitoring and control of key parameters such as module temperature, optical power and bias current.

	GO2927	GO2917	GO2929	GO2928	GO2918
Description	3Gb/s-SDI Dual Channel PIN Receiver	3Gb/s-SDI Single Channel PIN Receiver	3Gb/s-SDI 1310nm FP/PIN Transceiver	3Gb/s-SDI Dual Channel 1310nm FP Transmitter	3Gb/s-SDI Single Channel 1310nm FP Transmitter
No. of Optical Inputs	2	1	1	–	–
No. of Optical Outputs	–	–	1	2	1
3Gb/s Pathological Receive Sensitivity (dBm)	-23	-23	-22	–	–
Typical Ave. Optical Output Power (dBm)	–	–	-2	-2	-2
Nominal Optical Wavelength (nm)	1260-1620	1260-1620	Tx 1310/Rx 1260-1620	1310	1310
Data Rate (Mb/s)	50-3000	50-3000	50-3000	50-3000	50-3000
Power (mW)	600	300	650	700	350
Temp Range (°C)	0 to +70	0 to +70	0 to +70	0 to +70	0 to +70
Supply Voltage	3.3V	3.3V	3.3V	3.3V	3.3V
Typical Distance @ 3Gb/s-SDI (km)	–*	–*	10**	10**	10**
Package	Video SFP	Video SFP	Video SFP	Video SFP	Video SFP

* Maximum link distance is dependent on transmitter type and data rate.

** When used with a SMPTE 297-2006 compatible receiver over single mode fiber. Maximum distance is 21km for HD-SDI and 30km for SD-SDI.

CWDM Optical Family

New additions to the industry's best performing family of Video SFPs.



Building on the performance, robustness and reliability of our third generation optical modules, Genum is pleased to offer a new family of CWDM products. All 18 wavelengths are available from 1271nm to 1611nm, offered as dual channel transmitters, single channel transmitters and transceivers. They feature robust error free transmission for distances up to 50 km in a 3Gb/s CWDM installation – the performance you expect from Genum including support for video pathological patterns for SD-SDI, HD-SDI, and 3Gb/s SDI

	GO2953-xxxyCH	GO2952-xxCH	GO2951-55CH
Description	3Gb/s SDI Dual Channel CWDM Transmitter	3Gb/s SDI Single Channel CWDM Transmitter	3Gb/s SDI CWDM Transceiver
No. of Optical Inputs	0	0	1
No. of Optical Outputs	2	1	1
3Gb/s Pathological Receive Sensitivity (dBm)	–	–	-22
Optical Output Power (dBm)	0 – 5 / 2 typical	0 – 5 / 2 typical	0 – 5 / 2 typical
Nominal Optical Wavelength (nm)	1271-1611	1271-1611	Tx: 1551 Rx: 1260-1620
Data Rate (Mb/s)	50-3000	50-3000	50-3000
Power (mW)	680	340	650
Temp Range (°C)	0 to +70	0 to +70	0 to +70
Supply Voltage	3.3	3.3	3.3
Max. Distance @ 3Gb/s-SDI (km)	50	50	50
Package	Video SFP	Video SFP	Video SFP

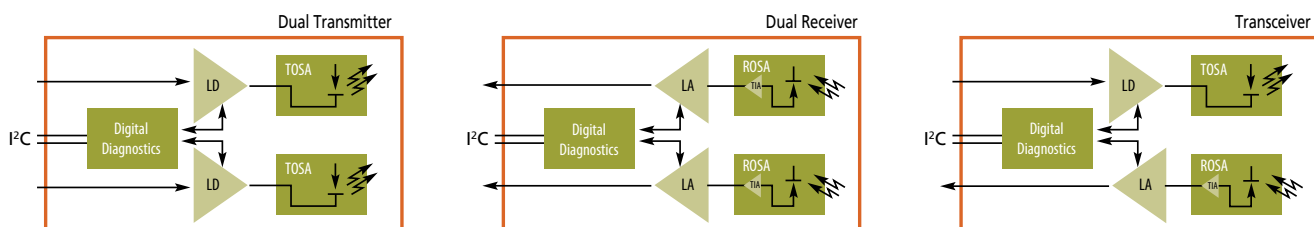
DUALS

GO2953	-2729CH	-3133CH	-3537CH	-3941CH	-4345CH	-4749CH	-5153CH	-5557CH	-5961CH	-3155CH
Channel 1	1271	1311	1351	1391	1431	1471	1511	1551	1591	1311
Channel 2	1291	1331	1371	1411	1451	1491	1531	1571	1611	1551

SINGLES

GO2952	-27CH	-29CH	-31CH	-33CH	-35CH	-37CH	-39CH	-41CH	-43CH	-45CH
Channel 1	1271	1291	1311	1331	1351	1371	1391	1411	1431	1451

GO2952	-47CH	-49CH	-51CH	-53CH	-55CH	-57CH	-59CH	-61CH
Channel 1	1471	1491	1511	1531	1551	1571	1591	1611



PCI Express® Video Solution

The easiest way to transport SDI video over PCI Express



COMPLETE PCI EXPRESS SOLUTION

Gennum provides a complete solution for video capture over PCI Express including the GN4124 PCI Express-to-local bus bridge, SDI serializers/deserializers, software, and firmware.

GN4124 PCI EXPRESS BRIDGE

The GN4124 is designed to work as a companion to FPGA devices to provide a complete bridging solution. Since the PCI Express transaction/link IP is hard-wired into the GN4124, there is no need to license PCIe IP. Using the GN4124 allows FPGA resources to be spent on differentiating features.

LIVE ON POWER-UP

The GN4124 devices are live on power-up so that a plug-and-play BIOS can auto-detect them without an attached FPGA having to be configured.

FPGA ON-THE-FLY CONFIGURATION LOADER

An FPGA configuration bitstream may be downloaded from the host system over PCIe to the attached FPGA.

LOCAL BUS INTERFACE

The local bus interface uses dual data rate to achieve up to 800MB/s of local bus peak throughput in each direction (1600MB/s total peak throughput).

FIRMWARE/SOFTWARE

The Gennum video capture solution includes FPGA firmware and driver software provided at no extra cost when used with the GN4124.

REFERENCE DESIGN KIT AVAILABLE

A complete RDK for video capture is available.

PCI EXPRESS CABLE EXTENSION SOLUTION

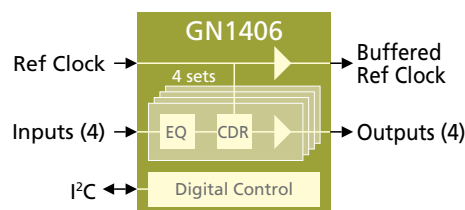
Gennum PCIe re-driver solutions provide new alternatives for system partitioning and extension. The GN1407 quad PCIe re-driver, and the GN1406 quad retiming re-driver, allow PCI Express to be extended across long cables.

PCI RE-DRIVER AND RETIMING RE-DRIVER

The GN1406 provides high-gain equalization (up to 24dB) for PCI Express for Gen1/Gen2 data rates to compensate for cable losses. Standard PCI Express cable or lower cost alternatives may be used. The GN1406 is unique in that also provides retiming in order to achieve the longest cable lengths and address impairments such as crosstalk, source jitter, interpair skew, and reflections that cannot be compensated for by equalization alone. By resetting the jitter budget through retiming, the GN1406 provides the greatest robustness and lowest jitter solution available. Each of the 4 channels in the GN1406 includes independently adjustable input equalization and output de-emphasis.

GN1407 is similar to GN1406, except that it does not have the retiming and output de-emphasis features.

A complete reference design kit, including schematics and board layout, is available from Gennum.



	GN1406	GN1407
Number of Channels	4	4
Data Rate Support (Gb/s)	Retimed: 2.5, 3.125, 5, 6.25 Equalizer Only: 1.25-8 Gb/s	1.25-8 Gb/s
Equalizer Gain	Programmable Up to 24dB	
Power Consumption (per channel)	Retimed: 100mW Equalizer Only: 70mW	70mW
Jitter Compensation	Serializer & Channel Deterministic & Random Jitter	Channel Deterministic Jitter
PCI Express Compliance	Protocol Transparent, Electrical Idle Preservation, Supports Spread Spectrum Clocking and Deserializer Detection by Switchable Input Termination, Fully PCIe compliant	
Device Control	Individual Channel Control and Monitoring, Control via Micro Using I²C or Initialize Using Small I²C EEPROM	
Output De-Emphasis	Programmable up to 20dB	–
Package	8x8 QFN (Footprint Compatible With GN1407)	8x8 QFN (Footprint Compatible With GN1406)

Evaluation Boards/Reference Design Kits (EBK/RDK)

PRODUCT FUNCTION	EBK/RDK PART	DESCRIPTION
SERIALIZERS		
3G SDI Serializer	EBK-GS2972-00	GS2972 evaluation board; mates with the GS2960A, GS2970A or GS2971A eval. boards
3G SDI Serializer	EBK-GS2962-00	GS2962 evaluation board; mates with the GS2960A, GS2970A or GS2971A eval. boards
HD-SDI Serializer	EBK-GS1582-00	Rev B GS1582 evaluation board
HD-SDI Serializer	EBK-GS1572-00	Rev A GS1572 evaluation board
SD-SDI Serializer	EBK-GS9092A-00	GS9092A evaluation board
DESERIALIZERS		
3G SDI Deserializer	EBK-GS2971A-00	GS2971A evaluation board that can mate with the GS2972 evaluation board, a Spartan-3A evaluation kit or a Cyclone III evaluation kit
3G SDI Deserializer	EBK-GS2970A-00	GS2970A evaluation board; mates with the GS2962 or GS2972 evaluation boards
3G SDI Deserializer	EBK-GS2960A-00	GS2960A evaluation board; mates with the GS2962 or GS2972 evaluation boards
SD-SDI Deserializer	EBK-GS9090B-00	GS9090B evaluation board
SD-SDI Deserializer	EBK-GS9091B-00	GS9091B evaluation board
SERIALIZERS & DESERIALIZERS		
3G SDI Transceiver + VOM	RDK-3GRXTXO-XLNX01	RDK with 2 SDI deserializers, 2 SDI serializers and 1 VOM input; mates with Spartan-3A evaluation kit; connectors for audio insertion and extraction
3G SDI Transceiver + VOM	RDK-3GRXTXO-ALTR01	RDK with 2 SDI deserializers, 2 SDI serializers and 1 VOM input; mates with Cyclone III evaluation kit; connectors for audio insertion and extraction
EQUALIZERS, RECLOCKERS, CABLE DRIVERS & DC RESTORE		
3G SDI Reclocker	EBK-GS2985-QUAD00	Quad channel evaluation board, to evaluate the GS2985 performance with varying trace lengths (GS2984x3; GS2985, GS2988x4)
3G SDI Reclocker	EBK-GS2985-01	GS2985 system evaluation board (GS2984, GS2985 and GS2988)
3G SDI Equalizer	EBK-GS2993-00	GS2993 evaluation board (GS2993 only. The GS2993 offers equivalent performance to the GS2994)
3G SDI Equalizer	EBK-GS2984-00	GS2984 evaluation board (GS2984 only)
3G SDI Equalizer	EBK-GS3440-00	GS3440 evaluation board (GS3440 only)
3G SDI Equalizer	EBK-GS3440-00	GS3441 evaluation board (GS3441 only)
3G SDI Equalizer	EBK-GS3442-00	GS3442 evaluation board (GS3442 only)
3G Cable Driver	EBK-GS3480-00	GS3480 evaluation board (GS3480 only)
3G Cable Driver	EBK-GS3481	GS3481 evaluation board (GS3481 only)
3G SDI Cable Driver	EBK-GS2989-00	GS2989 four output evaluation board (GS2989 only)
3G SDI DC Restore	EBK-GS2914-00	GS2914 evaluation board (GS2914 only)
TIMING		
SDI Timing	EBK-GS4911B-00	GS4911B evaluation board (GS4911B, GS4982)
OPTICAL MODULES		
3G SDI Optical Module	EBK-GO2900-00	Evaluation board compatible with all optical modules in GO29xx series (Video Pinout)
3G SDI Optical Module	EBK-SDI+VOM-VID00	Optical system evaluation board which integrates GO29xx series optical modules with GS2994, GS2985 and GS2988 (Video Pinout)
3G SDI Optical Module	EBK-SDI+VOM-MSA00	Optical system evaluation board which integrates GO29xx series optical modules with GS2994, GS2985 and GS2988 (MSA Pinout)
PCI EXPRESS®		
Gen1/2 Re-timing/Re-driver	EBK-GN1406-00	GN1406 evaluation board
Gen 1/2/3 Re-driver	EBK-GN1407-00	GN1407 evaluation board
Gen1 Bridge	RDK-GN4124-PCIE01	Video capture implementation using the GN4124
Gen1/2 Re-timing/Re-driver	RDK-GN1406-PCIE01	GN1406 RDK that includes: host interface board, expansion card, PCIe cable
Gen 1/2/3 Re-driver	RDK-GN1407-PCIE01	GN1407 RDK that includes: host interface board, expansion card, PCIe cable

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