

Genum Broadcast Video Portfolio:

CROSSPOINT SWITCHES
EQUALIZERS
RELOCKERS
VIDEO OPTICAL MODULES
CABLE DRIVERS
SERIALIZERS
DESERIALIZERS
TIMING (GEN-CLOCKS)
PCI EXPRESS®
ACTIVECONNECT™

END-TO-END PORTFOLIO OF BROADCAST VIDEO SOLUTIONS

2011 SPRING PRODUCT GUIDE



Broadcast Video Solutions

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Explore the Most Complete Lineup of SDI Products Available from a Single Source

Gennum offers the most comprehensive, end-to-end portfolio of broadcast video solutions available, including our new family of crosspoints. Our commitment to signal integrity and our knowledge of high-speed signal technologies are evident in everything we do. And, as a key contributor to SMPTE, we continue to pioneer transport solutions that push the envelope, allowing you to make the most of your innovative ideas.

Push the Boundaries of Performance, Reach and Signal Integrity

Gennum's award-winning portfolio of HD/3G components for the professional and broadcast video markets offers unmatched performance and signal integrity. In fact, Gennum solutions are so leading-edge that much of the industry's 3G test equipment utilizes them. Compare for yourself and you'll see why the industry leaders choose Gennum broadcast video solutions.

Get to Market Quickly

Gennum's portfolio of high-performance 3Gb/s-SDI solutions is designed to help you get to market quickly with feature-rich, differentiated products. We ease the migration path from current HD designs to future 3Gb/s products by offering a family of drop-in compatible solutions and we work closely with you to facilitate the design process. Our innovative family of serializers and deserializers features integration of digital SMPTE processing, speeding your design time.

Control Costs without Sacrificing Performance

Especially in times like these, you look for solutions that can help you make the most of your investment. Gennum answers the call with the most cost-effective solutions available. Our highly integrated solutions cut design costs, power requirements and board space. We test each component in production, assuring high yield on assembled boards, which translates into fewer product recalls and less waste of costly WIP material for you.

Gennum: A Partner for Today...and Tomorrow

At Gennum, the broadcast video market is a prime focus, not a sideline. In fact, Gennum has been creating innovative solutions for the video transport market since the 1980s and led the way in drafting the 3G SDI standard.

Gennum continues to push the envelope of performance and pursue new opportunities to enhance customer solutions in the broadcast market. We have been increasing our R&D investments and customer support network so you can focus on bringing your best solutions to market. Gennum's solid foundation, both financial and technical, means we're with you all the way.

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 datacomm 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

- Six 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
 - GX3074 74 input by 74 output
- All products listed above run up to 3.5Gb/s and are fully asynchronous and non-blocking
- All products feature independent advanced signal integrity conditioning such as input trace equalization and output de-emphasis to support trace lengths in excess of 50 inches
- Built in pattern generators and arbitrary pattern checkers ease system design
- All ports are fully tested for specifications based on Gennum's understanding of the applications for these crosspoints in mission critical broadcast operations

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 SOLUTIONS

- Gennum's crosspoint product lineup supports 3G, HD and SD data rates with margin
- Crosspoint product lineup interfaces with Gennum broadcast video products to provide a one-stop solution
- All crosspoint products support an extensive range of video standards and formats including those for 3D TV



Crosspoint Switches

Video-specific Features Developed from the 'Ground Up' for HD, 3D and Ultra HD

Gennum crosspoint switches provide an unmatched combination of size, features and performance. At sizes available 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're introducing 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 mean that Gennum crosspoints are easy to use and easy to de-bug, while providing superior performance.

MULTIPLE STROBE FEATURE

Eight update enable 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 they can be assigned on a per-output basis, this feature enables maximum flexibility.

DATA RATE MARGIN

Supporting input 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 trace lengths and/or passive splitting architectures in their designs with more confidence in overall signal integrity and lower jitter. Also, the wide input sensitivity (100-1200mV) means that drivers on previous chips can be reduced, saving overall system power. A flexible I/O architecture with outputs capable of driving 1600mV, ensures reliable passive splitting and muxing. In addition each output can be independently powered down for greater flexibility. With output swings as low as 200mV, system power can be significantly reduced when the chip is followed closely by another product.

ON-CHIP PATTERN GENERATORS AND CHECKERS

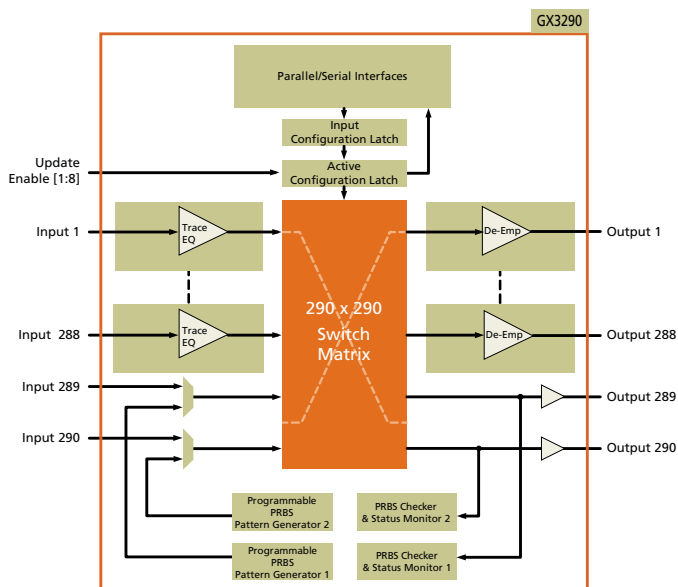
With two independent pattern generators and pattern checkers on chip, the GX3290 (and family) can be used for testing and diagnosing system channel issues on either the input or output side of the system. Support for PRBS7, 15, and 23 patterns in the pattern generator means that there is enough flexibility 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 under stressful video pathological signals.

HOST INTERFACE FLEXIBILITY

By offering both serial and parallel host interfaces with normal and auto-increment modes, customers can choose the interface and mode of operation that works best in their system. This makes it easy to interface to a variety of controlling chips and microcontrollers, from FPGAs to microprocessors.

HORIZONTAL EYE MEASUREMENT

The GX3290 can check for bit errors at arbitrary phase offsets from the received data. This allows the user to determine the value of the horizontal eye opening, which provides a measure of the system jitter margin.



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 to the registers, where the user can read them. This allows the user to control things like 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 powerdown mode when all other switches are occurring in the matrix. This is particularly important for large switch cards built using multiple crosspoint chips with passive combining to guarantee that two outputs are not driving the same line at the same time.

LOW POWER

At only 34W for 290 channels, per channel power consumption is industry leading when compared to other competitive solutions. System power can be further reduced by taking advantage of the Crosspoint's high input sensitivity and using Gennum's GS2993/2994 equalizers at minimum output swing levels.

FLEXIBLE FOOTPRINT

The GX3290, 3190, 3246, 3202, 3146, and 3074 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.

INDUSTRY'S LARGEST SWITCH PRODUCT

Gennum's new family of crosspoint devices includes the industry's first 290x290 crosspoint switch, which delivers one trillion bits of data throughput per second—also known as 1 terabit per second (Tb/s). With 84,100 unique paths at 3.5 gigabits per second (Gb/s), Gennum's GX3290 is the highest performance, highest speed solution for switching video currently available.

As the broadcast industry evolves to support next-generation video formats such as HD, 3D and UltraHD, the need to support multiple data rates and video formats will dramatically increase the size and complexity of next-generation video broadcast 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.

	GX3290	GX3190	GX3246	GX3202	GX3146	GX3074	GX4002
Data Rate (Gb/s)	3.5	3.5	3.5	3.5	3.5	3.5	14
Inputs	290	146	290	202	146	74	2
Outputs	290	290	146	202	146	74	2
Input Trace EQ	YES	YES	YES	YES	YES	YES	YES
Output De-emphasis	YES	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	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	0 to +85	-40 to +100 (Case)
Power (W)	34	25	18	24	18	10	0.3
Size (mm)	50x50	50x50	50x50	50x50	50x50	50x50	5x5
Package	2377 BGA	2377 BGA	2377 BGA	2377 BGA	2377 BGA	2377 BGA	32 QFN

Equalizers

Industry's most widely adopted equalizers in the history of SDI, longest cable lengths, lowest jitter and data rates up to 3Gb/s



MULTI-RATES

Genum equalizers offer robust multi-standard operation from 143Mb/s to 2970Mb/s even under stressful video pathological signals and are fully SMPTE 424M, 292M, 344M and 259M compliant.

PRODUCTION TESTED

All equalizers are production tested at applicable data rate and cable length.

LOWEST JITTER

Genum continues to reduce jitter at all cable lengths and for all data rates. The GS2984 offers the industry's lowest guaranteed and production tested output jitter.

LOW POWER

Genum offers the best performance at the lowest power consumption with an additional 10% power reduction from previous generations.

Power consumption stays at a low level across all operating conditions and cable lengths.

IMPROVED FEATURES

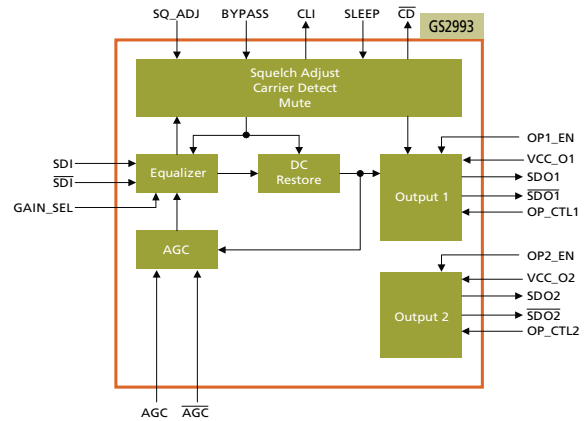
Industry leading ESD performance that is critical for terminal I/O connectivity - more robust and higher yields in manufacturing.

FLEXIBLE FOOTPRINT

Future proof your design by using Genum's QFN footprint compatible parts for SD, HD, or 3Gb/s applications (GS9074A, GS1574A, GS1674, GS2984, and GS2994).

APPLICATIONS

Routers, distribution amplifiers, camera control units, multiviewers, production switchers, master control switchers, VTRs, video servers, encoders/decoders, up/down/cross converters, test and measurement equipment.



	GS2993	GS2994	GS2984	GS2964	GS1674	GS9074A
Data Rate (Mb/s)	143 - 2970	143 - 2970	143 - 2970	143 - 2970	143 - 1485	143 - 360
Input 0/6dB gain	YES	YES	YES	NO	NO	NO
Output Coupling	1.2-3.3V	1.2-3.3V	2.5/3.3V	3.3V	3.3V	3.3V
Number of Outputs	2	1	1	1	1	1
Cable Length Indication	YES	NO	NO	NO	NO	NO
3G Typical Cable Length (m)	140 @ 0.3UI	140 @ 0.3UI	140 @ 0.3UI	100 @ 0.35UI	N/A	N/A
HD Typical Cable Length (m)	200 @ 0.2UI	200 @ 0.2UI	200 @ 0.2UI	130 @ 0.25UI	220 @ 0.25UI	N/A
SD Typical Cable Length (m)	400	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
Temp Range (°C)	-40 to +85	-40 to +85	-40 to +85	-40 to +85	-40 to +85	0 to +70
Power (mW)	165	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
Package	24 QFN	16 QFN	16 QFN	16 QFN	16 QFN	16 QFN

Reclockers

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



MULTI-RATES

Genuum reclockers offer robust multi-standard operation from 143Mb/s to 2970Mb/s and are SMPTE 424M, 292M, 344M and 259M compliant.

LOWEST POWER

Genuum offers high-performance at the industry's lowest power consumption. The GS2985 has a 55% power reduction from previous generations.

BEST INPUT JITTER TOLERANCE

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

LOW OUTPUT JITTER

The GS2985 has output jitter that is 50% of the GS2975A.

IMPROVED FEATURES

The GS2985 adds input trace equalization and output signal de-emphasis, which give additional design flexibility to system designers. The serial interface allows for multiple communication methods. Automatic slew rate control when working with our CD for multifunction applications.

Integrated 2x1/4x1 mux functionality enhances the functionality of Genuum reclockers and allows them to be utilized in architectures that require switching matrices and failover redundancy.

This minimizes the requirement for adding additional components to the signal path and their associated jitter.

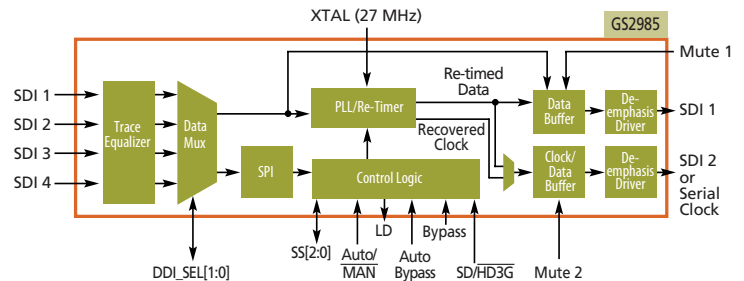
SIZE

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



APPLICATIONS

Routers, distribution amplifiers, camera control units, multiviewers, production switchers, master control switchers, VTRs, video servers, encoders/decoders, up/down/cross converters, test and measurement equipment.



	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

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 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 thereby ensuring a highly reliable optical link.

THIRD GENERATION PRODUCTS

Gennum's third generation video optical modules demonstrate Gennum's ongoing commitment to supply the broadcast market with the most robust video SFP solutions. The latest video optical modules provide exceptional value in short reach optical applications and offer design improvement 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 where equipment manufacturers can 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 per the SFP MSA pinout.

COMPACT, PLUGGABLE, FLEXIBLE

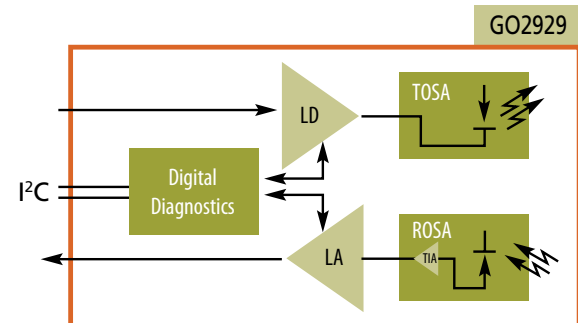
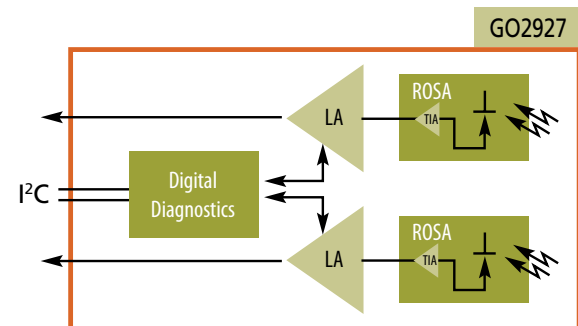
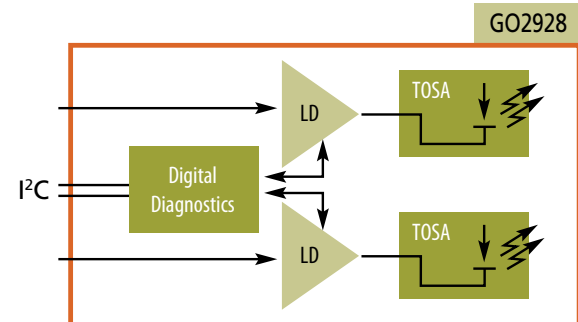
Gennum's small form factor modules for digital video (Video SFP) are hot pluggable, easy to use, and offer the highest density optical solution for carrying digital video over optical fiber. The Video SFP pinout is designed so that one slot can be populated with a dual transmitter, dual receiver, single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

MULTIRATE AND BACKWARDS COMPATIBLE

Gennum's Video SFPs operate from 50Mb/s to 3Gb/s and seamlessly run at 3Gb/s-SDI, HD SDI and SD SDI rates without any user 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 come 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
Max. 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 serializer 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.

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	370	BGA 100
GS1672	270, 1485	YES	YES	YES	YES	HD:50 SD: 200	10 or 20	YES	YES	-40 to +85	420	BGA 100
GS1662	270, 1485	YES	YES	NO	YES	HD: 50 SD: 200	10 or 20	YES	YES	-40 to +85	370	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	545	BGA 100
GS2961A	270, 1485, 2970	YES	YES	YES	0.7	YES	YES	NO	YES	-40 to +85	515	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
GS1661A¹	270, 1485	YES	YES	YES	0.7	YES	YES	NO	YES	-40 to +85	460	BGA 100
GS1660A²	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 Receiver 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

CROSSPOINT SWITCHES

	Data Rate (Gb/s)	Power (W)	Inputs	Outputs	Input Trace EQ	Output de-emphasis	Pkg
GX3290	3.5	34	290	290	YES	YES	2377 BGA
GX3190	3.5	25	146	290	YES	YES	2377 BGA
GX3246	3.5	18	290	146	YES	YES	2377 BGA
GX3202	3.5	24	202	202	YES	YES	2377 BGA
GX3146	3.5	18	146	146	YES	YES	2377 BGA
GX3074	3.5	10	74	74	YES	YES	2377 BGA
GX4002	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
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
GS2988	143 - 2970	125	2.5 or 3.3	2	YES	YES	1800	-40 to +85	16 QFN
GS2989	143 - 2970	220	2.5 or 3.3	4	YES	YES	1800	-40 to +85	16 QFN
GS2978	143 - 2970	168	3.3	2	NO	NO	1040	0 to +70	16 QFN
GS1678	143 - 1485	110	2.5 or 3.3	2	NO	NO	1200	-40 to +85	16 QFN
GS1679	143 - 1485	180	2.5 or 3.3	4	NO	NO	1200	-40 to +85	16 QFN
GS9077	143 - 540	168	3.3	2	NO	NO	1040	0 to +70	16 QFN

Cable Drivers

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



MULTI-RATES

Genuum cable drivers offer robust multi-standard operation from 143Mb/s to 2970Mb/s and are SMPTE 424M, 292M, 344M and 259M compliant.

LOW POWER

Genuum offers the best performance at the lowest power consumption with an additional 45% power reduction in standby mode.

LOW JITTER

Ultra low additive jitter at SD, HD, and 3Gb/s data rates.

BEST ORL

Better than -20dB output return loss (ORL) for HD applications and better than -12dB ORL for 3Gb/s applications.

INPUT TRACE EQUALIZATION

The GS2988 and GS2989 have trace equalization to equalize long input trace lengths.

LARGER OUTPUT SWING

The GS2988 and 2989 offer 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).

UP TO FOUR OUTPUTS

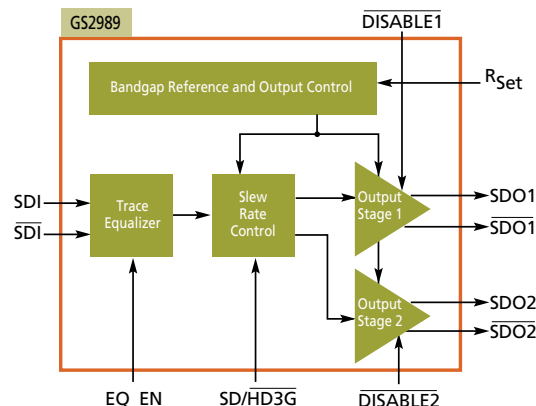
The GS2989 offers four outputs for distribution applications.

OUTPUT SIGNAL PRESENCE

The GS2988 and GS2989 offer an output signal presence detector which provides status on the validity of the output.

APPLICATIONS

Routers, distribution amplifiers, camera control units, multiviewers, production switchers, master control switchers, VTRs, video servers, encoders/decoders, up/down/cross converters, test and measurement equipment. Compatible with both standard BNC and newer, alternative connectors such as the HD-BNC and DIN 1.0/2.3.



	GS2988	GS2989	GS2978	GS1678	GS1679	GS9077
Data Rate (Mb/s)	143 - 2970	143 - 2970	143 - 2970	143 - 1485	143 - 1485	143 - 540
Power Supply (V)	2.5 or 3.3	2.5 or 3.3	3.3	2.5 or 3.3	2.5 or 3.3	3.3
Outputs	2	4	2	2	4	2
Input Trace Equalization	YES	YES	NO	NO	NO	NO
Output Signal Presence	YES	YES	NO	YES	YES	NO
Maximum Output Swing (mV)	1800	1800	1040	1200	1200	1040
ESD Protection (kV)	4	4	4	2.5	2.5	4
ORL (dB)	3G: -12 HD: -20	3G: -12 HD: -20	3G: -12 HD: -20	-19	-19	-20
Footprint Compatible With	GS2978		GS9077 GS1578A	GS9078 GS1578A	GS2988	GS1578A GS2978
Temp Range (°C)	-40 to +85	-40 to +85	0 to +70	-40 to +85	-40 to +85	0 to +70
Power (mW)	125	220	168	110	180	168
Size (mm)	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

Choosing the Right SerDes For Your System

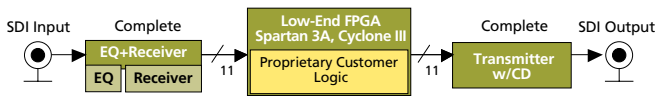
Serializers/Deserializers

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 its expertise in signal integrity and deep understanding of broadcast video technologies, Gennum's offering encapsulates all the analog components (SerDes, VCO, CD, EQ, Reclocker) as well as the digital SMPTE video and audio processing required to transmit and receive SDI video into one optimized, cost-effective and power efficient ASIC implementation that lets you focus on customer value-add processing for quicker time-to-market. All of this integration into one package reduces the system PCB footprint required to implement SDI transmit/receive, at no compromise to Gennum's superior jitter performance. Only Gennum offers a solution that scores high for each evaluation parameter.

Gennum: Complete Solution Transmitter/Receiver

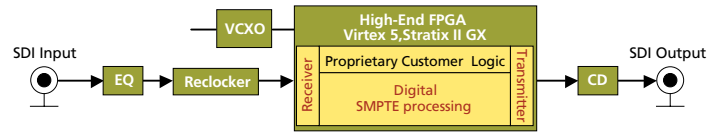


INTEGRATED-TRANSCIEVER FPGA ARCHITECTURE

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 a VCXO and reclockers, are required to get the system jitter performance to an acceptable level, but at the 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.

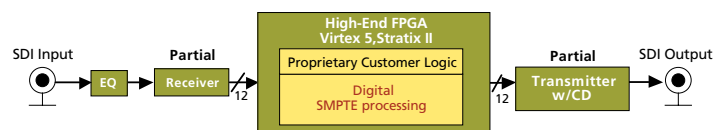
Integrated Transceiver FPGAs



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 that FPGA-helper parts are lacking, in terms of feature offering. In many cases, customer code 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, creating 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 with the customer code means 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 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 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 DVB/ASI capable.

AUDIO EMBEDDING

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

EXCELLENT JITTER PERFORMANCE

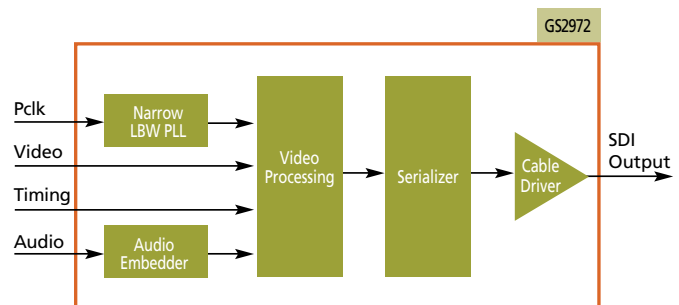
Due to the integrated PLL with narrow loop bandwidth, the serializers can reject up to 300ps of jitter on the parallel clock, outputting very low jitter, SMPTE compliant SDI signals.

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	370	420	370	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 3G 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 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 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

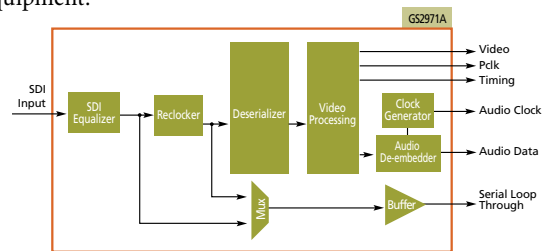
GS2971A includes an integrated audio de-embedder supporting AES, I²S, and serial audio formats. The chip also features an integrated audio clock generator.

UNPRECEDENTED CABLE LENGTHS

The next generation leading edge cable equalizer technology integrated into the GS2971A means that cables can run for very long distances before connecting to the GS2971A's BNC connector. The GS2971A can handle cable runs in excess of 150m at 3G data rates.

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)	545	515	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.

Timing (GEN-Clocks)

Your complete timing solution for broadcast video



GS4900B/GS4901B/GS4910B/GS4911B CLOCK GENERATORS

GENLOCK CAPABILITY

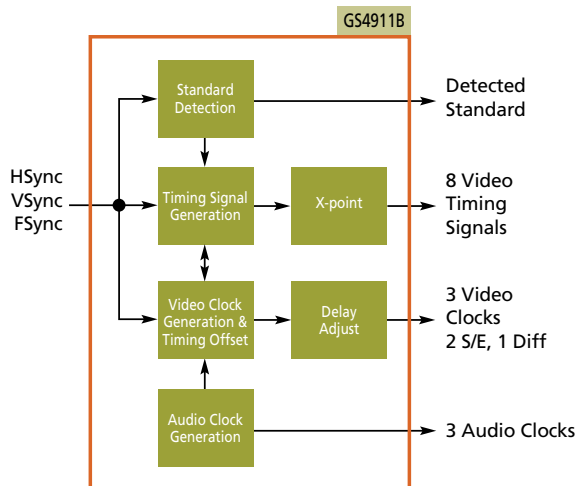
Gennum clock generators can be genlocked to reference with a variable offset. On loss of reference the video clocks will flywheel to maintain their frequency.

GENERATES MULTIPLE CLOCKS

3 video clocks (2 single-ended and one differential), 3 audio clocks, and 8 configurable timing signal clocks can be generated. Video clocks up to 165MHz can be produced in order to support up to 3G SDI and UXGA.

INPUT STANDARD DETECTION

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



GS4915 ClockCleaner™

REDUCES JITTER TO MEET SMPTE SPECS

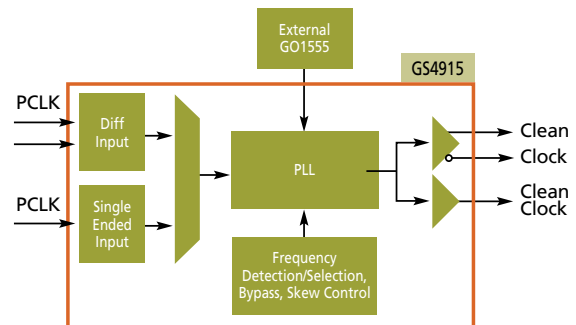
The GS4915 will reduce jitter on input video clocks of 27, 74.25, 74.25/1.001, 148.5, and 148.5/1.001 MHz. Output jitter will typically be 20ps, which will guarantee 3Gb/s-SDI compliance when used with a serializer.

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

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/ playback over PCI Express including the GN4124 PCI Express-to-local bus bridge, SDI serializers/deserializers, software, and firmware.

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 accomplish 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 is 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

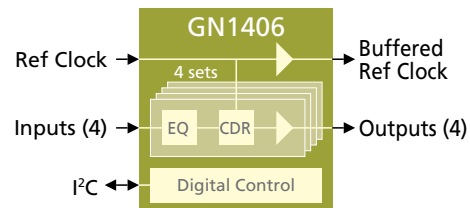
Gennum PCIe re-driver solutions provide new alternatives for system partitioning and extension. The GN1407 quad PCIe re-driver, and the GN1406 quad retiming re-driver, allow PCI Express to be extended across long cables.

PCIE 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 such as CAT5/6 may be used. The GN1406 is unique in that it 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 equalization and de-emphasis.

GN1407 is similar to GN1406, except that it does not have the retiming and 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, SIG Compliance Tested	
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)

ActiveConnect™ Solutions



Longest reach connectivity for HDMI® and DisplayPort™

HDMI version 1.3 and DisplayPort version 1.1 offer new and exciting next generation features such as higher resolution video, Deep Color, and higher frame rates that can enable a whole new user experience. But to get the full spectrum of features and benefits, higher data rates are required. Gennum's ActiveConnect solutions offer the benefits of impeccable signal integrity at these data rates over long reaches, along with the ability to support full HDMI 1.3 and DisplayPort.

LONGEST REACH

Gennum's ActiveConnect technology can enable the longest reach HDMI and DisplayPort solutions, with extension up to 100m over copper cables.

NEXT GENERATION PERFORMANCE

Future proof your design with ActiveConnect, the highest performance solution with twice the data rate of current HDMI 1.3 and DisplayPort 1.1 standards.

PLUG AND PLAY

Gennum offers fully adaptive plug and play solutions that automatically adjust to various cable lengths.

TURNKEY REFERENCE DESIGNS AVAILABLE

Turnkey reference design kits (RDKs) are available for different copper media such as Coax, CATx and shielded twisted pair (STP) cables. RDKs consist of evaluation units, design collateral and design files to help enable time to market. Please see table below for details on Gennum's ActiveConnect RDKs.



ACTIVECONNECT REFERENCE DESIGN KITS

	HDMI over Coax	HDMI over CATx	DisplayPort over STP
Chipset(s)	GV8500 Serializer GV8501 Deserializer	GV8500 Serializer GV8501 Deserializer	GV8502A Deserializer
Cable Type	RGBHV or RGBS	Cat5e or Cat6	DisplayPort Cables
Data Rate (Gb/s)	10.2	6.8	21.6
Max Distance @ 5Gb/s (1080p60)	100m	60m	30m
Auto-Adaptive / Fixed gain	Auto	Auto	Fixed

Evaluation Boards / Reference Design Kits (EB/RDK)

PRODUCT FUNCTION	EB/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 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 will all optical modules in GO29xx series
3G SDI Optical Module	EBK-GO2900-01	Optical system evaluation board which integrates GO29xx series optical modules with GS2975A, GS2974A and GS2978
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
ACTIVECONNECT™		
HDMI over 5-Coax	RDK-5COAX-HDMI00	Transmit/Receive RDK for HDMI 1.3 up to 100m using the GV8500 and GV8501
HDMI over CATx	RDK-CATX-HDMI00	Transmit/Receive RDK for HDMI 1.3 up to 60m using the GV8500 and GV8501
DisplayPort over STP	RDK-GV8502-DP02	Receive-only RDK for DP 1.1 signals up to 30m using the GV8502



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