



Semtech-Gennum Products 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

2012 SPRING PRODUCT GUIDE

Broadcast Video Solutions Gennum, your broadcast semiconductor partner

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As a pioneer in digital 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.

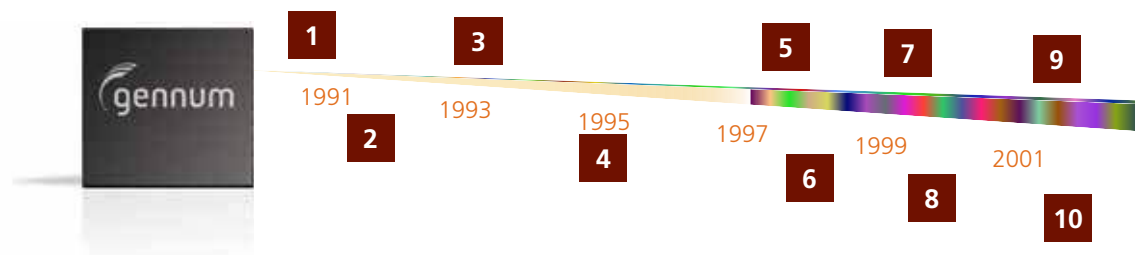
In fact, there's a good chance that any TV broadcast or professional video you see passed through several Gennum components on its way to you.

A Broadcast-Focused Partner

For 20-plus years Gennum has been focused on bringing innovative high performance solutions to the professional and broadcast video markets. This history of innovation and achievement is a result of a company wide focus and commitment to the broadcast industry sparking many industry first products with unparalleled performance and reliability.

Gennum's Rich History of Innovation in Broadcast:

- 1** First monolithic SD Adaptive Cable Equalizer operating to 143Mb/s;
- 2** The first complete multi-rate SD SDI solution for 360 Mb/s; Genlinx I®
- 3** The first monolithic Serializer and Deserializer supporting 10B1C formats operating up to 396Mb/s;
- 4** The first monolithic SD 8x9 crosspoint matrix operating up to 800Mb/s;
- 5** The first monolithic complete HD SDI solution: HDLinx®
- 6** The first complete multi-rate SDI solution for 540 Mb/s; Genlinx II®
- 7** The first monolithic integrated Adaptive Equalizer, Reclocker and Deserializer for 270Mb/s;
- 8** The first monolithic SD audio embedder/de-embedder;
- 9** The first monolithic multi-rate SDI solution supporting all SDI and DVB-ASI rates to 1.5Gb/s; HDLinx II®
- 10** The first combined HD/SD SDI / DVB-ASI SERDES with EDH and SMPTE 352M support;
- 11** The first SD SDI solution to provide pin and functional compatibility with existing HD SDI solutions



With this ongoing focus on the broadcast industry and as a key contributor to SMPTE, Gennum continues to pioneer transport technologies that deliver new experiences for the video broadcast market.

20-plus years of video expertise has given 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.

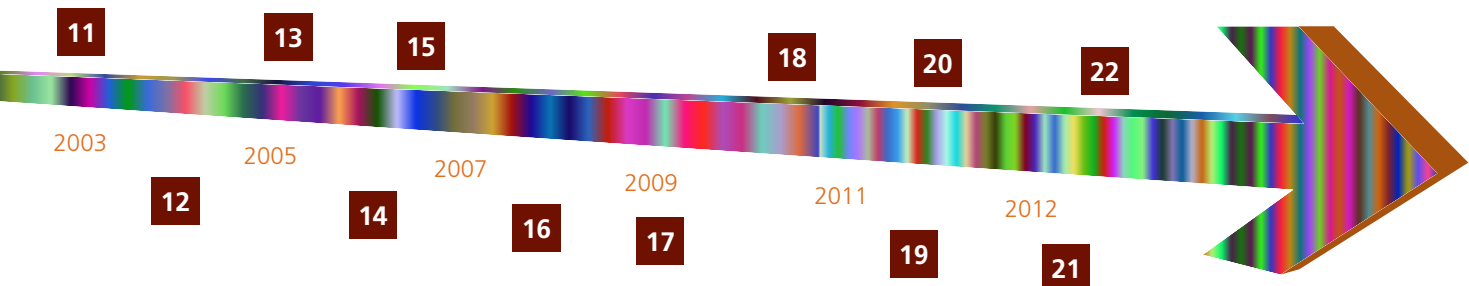
Dedicated to Your Success

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 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

- | | | | |
|--|---|---|--|
| 12 The smallest footprint, lowest price highest performance HD/SD and DVB-ASI family of semiconductor solutions | 14 Awarded Technical Emmy® for technology advances in Serial Digital Interface Solutions, enabling over 20 years of seamless studio and broadcast infrastructure migration | 16 Gennum launches Industry's first 3Gb/s Video Optical SFP | 19 Introduces family of CWDM Video SFPs |
| 13 The smallest footprint, lowest power equalizing de-serializer supporting up to 600m of coaxial cable for all SD SDI and DVB-ASI rates; | 15 The first multi-rate SDI solution supporting all SDI and DVB-ASI rates up to 3Gb/s | 17 First fully integrated 3G receiver and transmitter with built in video, audio, ANC data and serial IO | 20 Gennum launches Industry's first 3Gb/s Video Optical SFP |
| | | 18 Demonstrates longest high density signal interconnect solution for video applications | 21 Introduces Cable Boost™ technology in latest family of cable drivers |
| | | | 22 Introduces Next Generation EQ technology with 200m reach at 3G, 250m at HD and 500m at SD data rates |



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 for Broadcast applications.

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 enable 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 need to 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 (100-1200mV) 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 swing 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

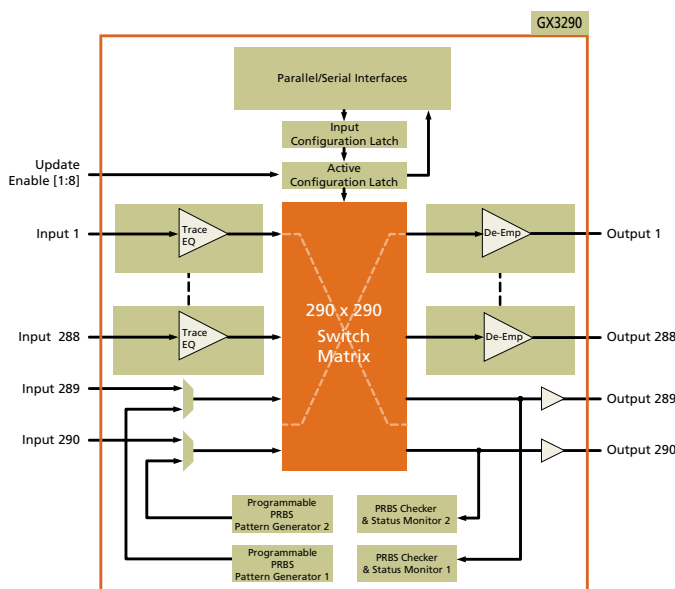
With two independent pattern generators and pattern checkers on chip, the GX3290 (and family) can be used for testing and diagnosing system channel issues on either the input or output side of the system. Support for PRBS 7, 15, and 23 patterns in the generator means that there is enough flexibility 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, to be read by the system. This enables 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 powerhungry splitter and combiner components.

LOW POWER

Even with higher output swing voltages, Gennum is able to achieve less than 35W 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

Gennum 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.

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. Gennum equalizers are production tested at applicable data rates and cable lengths ensuring the best performance and highest board yields.

MULTI-RATE

Gennum 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

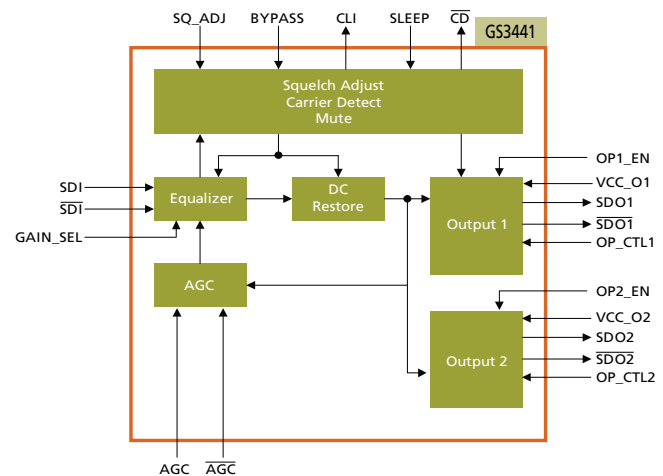
Gennum continues to reduce jitter at all cable lengths and for all data rates. The GS3440 and GS3441 offer the industry's longest cable reach with robust performance.

LOW POWER

Gennum 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 | | | | | | |
|-----------------------------|----------------|------------|----------------|----------------|----------------|----------------|----------------|
| | GS3440 | GS3441 | 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 | 1.2-3.3V | 1.2-3.3V | 1.2-3.3V | 2.5/3.3V | 3.3V | 3.3V | 3.3V |
| No. of Outputs | 1 | 2 | 1 | 1 | 1 | 1 | 1 |
| 3G Typical Cable Length (m) | 200 | 200 | 140 @ 0.3UI | 140 @ 0.3UI | 100 @ 0.35UI | N/A | N/A |
| HD Typical Cable Length (m) | 250 | 250 | 200 @ 0.2UI | 200 @ 0.2UI | 130 @ 0.25UI | 220 @ 0.25UI | N/A |
| SD Typical Cable Length (m) | 500 | 500 | 400 | 400 | 170 | 400 | 350 |
| Footprint Compatible With | all 16 QFN EQs | GS2993 | 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) | 197 | 210 | 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 | 24 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 architecture 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

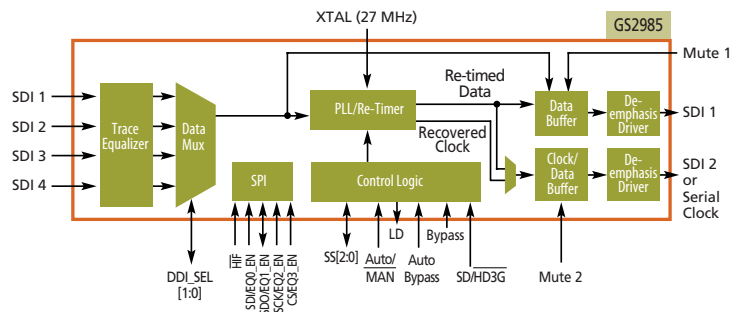
The GS2985 features robust performance with the industry's best output jitter.

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 multiformat 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 is 69% smaller than the GS2985.



| | 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

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

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

CABLE-BOOST™

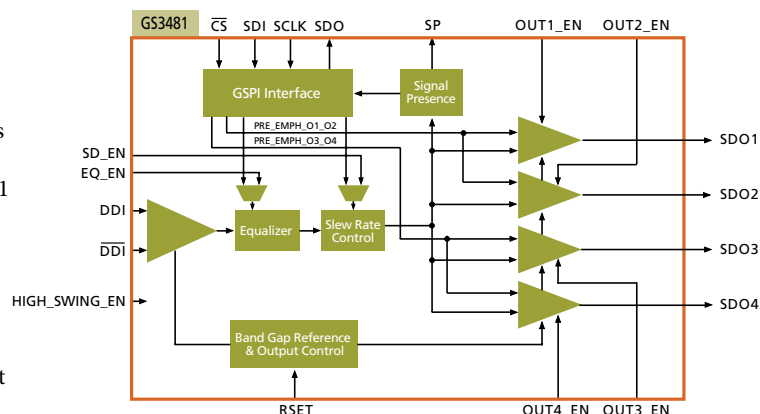
The GS3480 and GS3481 are the industry's only cable drivers featuring Cable-Boost. With up to 9db (adjustable in 1dB increments) of output pre-emphasis, the GS3480 and GS3481 are ideal for use in applications, where moving the SMPTE compliance point from the board connector to a point further downstream 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 |

Timing (GEN-Clocks)

Your complete timing solution for broadcast video



GS4900B/GS4901B/GS4910B/GS4911B CLOCK GENERATORS

GENLOCK CAPABILITY

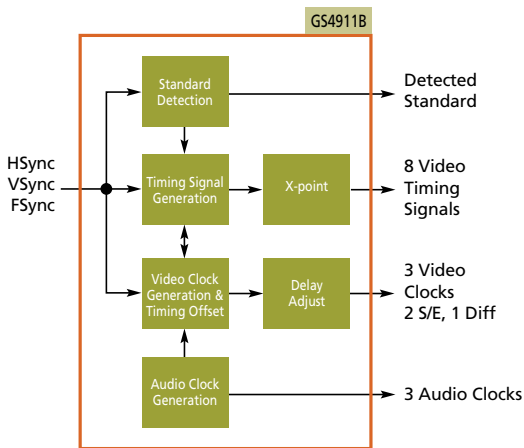
Genuem clock generators can be genlocked to reference with a variable offset. On loss of reference, the video clocks will flywheel to maintain their frequency.

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

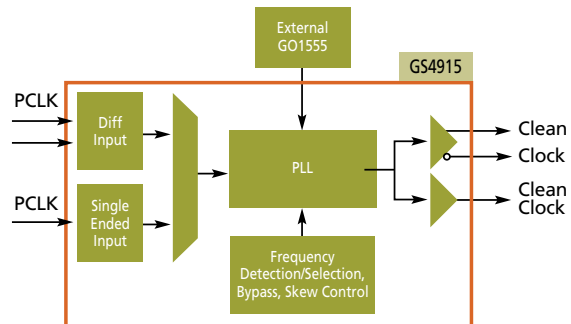
The GS4915 will reduce jitter on video clocks of 27, 74.25, 74.25/1.001, 148.5, and 148.5/1.001 MHz. Output jitter will typically be 20ps, which will guarantee 3Gb/s SDI compliance when used with a serializer.

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

DESERIALIZERS

| | Data Rate (Mb/s) | Equal-izer | Video Process-ing | Serial Loop Through | IJT (UI) | ANC Extrac-tion | Audio De-em-bed | CEA 861 Timing | Temp Range (°C) | Power (mW) | Pkg |
|----------------------------|------------------|------------|-------------------|---------------------|----------|-----------------|-----------------|----------------|-----------------|------------|---------|
| GS2971A | 270, 1485, 2970 | YES | YES | YES | 0.7 | YES | YES | YES | -40 to +85 | 525 | BGA 100 |
| GS2961A | 270, 1485, 2970 | YES | YES | YES | 0.7 | YES | NO | YES | -40 to +85 | 500 | BGA 100 |
| GS2970A | 270, 1485, 2970 | NO | YES | YES | 0.7 | YES | YES | YES | -40 to +85 | 350 | BGA 100 |
| GS2960A | 270, 1485, 2970 | NO | YES | YES | 0.7 | YES | NO | YES | -40 to +85 | 320 | BGA 100 |
| GS1661A¹ | 270, 1485 | YES | YES | YES | 0.7 | YES | NO | YES | -40 to +85 | 460 | BGA 100 |
| GS1660A² | 270, 1485 | NO | YES | YES | 0.7 | YES | NO | NO | -40 to +85 | 280 | BGA 100 |
| GS9091B | 270 | YES | YES | NO | 0.5 | YES | NO | NO | 0 to +70 | 350 | BGA 100 |
| GS9090B | 270 | NO | YES | NO | 0.5 | 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 |
|---------------|-------------|----------------|-----------------|------------------------------------|--------------------|------------------------|------------------|------------|-----------------|------------|-----------|
| GO2927 | Dual Rx | 2 | - | -23 | - | 1260-1620 | 50-3000 | 600 | 0 to +70 | 3.3 | Video SFP |
| GO2917 | Single Rx | 1 | - | -23 | - | 1260-1620 | 50-3000 | 300 | 0 to +70 | 3.3 | Video SFP |
| GO2929 | Transceiver | 1 | 1 | -22 | -2 | Tx 1310 / Rx 1260-1620 | 50-3000 | 650 | 0 to +70 | 3.3 | Video SFP |
| GO2928 | Dual Tx | - | 2 | - | -2 | 1310 | 50-3000 | 700 | 0 to +70 | 3.3 | Video SFP |
| GO2918 | 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 |
|----------------------|-------------|----------------|-----------------|------------------------------------|--------------------|-------------------------|------------------|------------|-----------------|------------|-----------|
| GO2953-xxyyCH | Dual Tx | - | 2 | - | 0-5 / 2 | 1271-1611 | 50-3000 | 680 | 0 to +70 | 3.3 | Video SFP |
| GO2952-xxCH | Single Tx | - | 1 | - | 0-5 / 2 | 1271-1611 | 50-3000 | 340 | 0 to +70 | 3.3 | Video SFP |
| GO2951 | 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 | 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 |
| 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 |
|-------------------|------------------|------------|---------------------|---------------------|---------------------|------------------|-------------------|-----------------|-------------------------|-----------------|--------|
| NEW GS3440 | 125 - 2970 | 197 | 200 | 250 | 500 | YES | 1 | 1.2 - 3.3V | NO | -40 to +85 | 16 QFN |
| GS3441 | 125 - 2970 | 210 | 200 | 250 | 500 | YES | 2 | 1.2 - 3.3V | YES | -40 to +85 | 24 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 | | 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 | 2.5 or 3.3 | 2 | YES | YES | 2400 | -40 to +85 | 24 QFN |
| GS3481 | DC to 2970 | 122 | 2.5 or 3.3 | 4 | YES | YES | 2400 | -40 to +85 | 24 QFN |
| GS2988 | 143 - 2970 | 110 | 2.5 or 3.3 | 2 | YES | YES | 1800 | -40 to +85 | 16 QFN |
| GS2989 | 143 - 2970 | 180 | 2.5 or 3.3 | 4 | YES | YES | 1800 | -40 to +85 | 16 QFN |
| GS1678 | 143 - 1485 | 110 | 2.5 or 3.3 | 2 | NO | YES | 1200 | -40 to +85 | 16 QFN |
| GS1679 | 143 - 1485 | 180 | 2.5 or 3.3 | 4 | NO | YES | 1200 | -40 to +85 | 16 QFN |
| GS9077 | 143 - 540 | 168 | 3.3 | 2 | NO | NO | 1040 | 0 to +70 | 16 QFN |

Choosing the Right SerDes For Your System

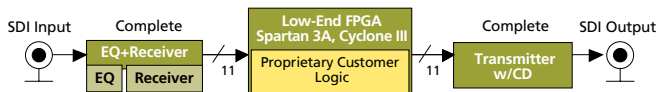
Serializers/Deserializers

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 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

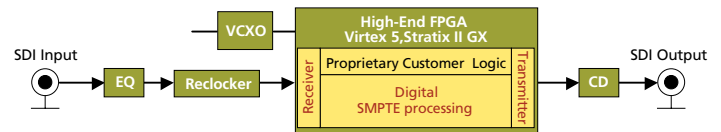


INTEGRATED-TRANSCIEVER FPGA ARCHITECTURE

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.

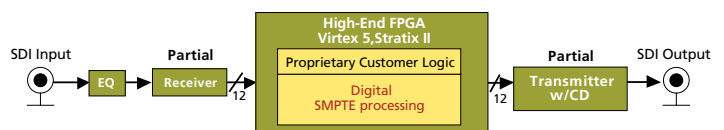
Integrated Transceiver FPGAs



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-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 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 DVB-ASI capable.

AUDIO EMBEDDING

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

EXCELLENT JITTER PERFORMANCE

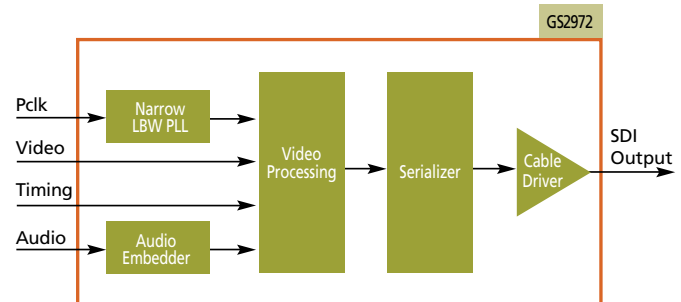
Due to the integrated PLL with narrow loop bandwidth, the serializers can reject up to 300ps of jitter on the parallel clock, outputting very low jitter, SMPTE compliant SDI signals.

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 |
| Ancillary Data Insertion | YES | YES | YES | YES | NO |
| 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

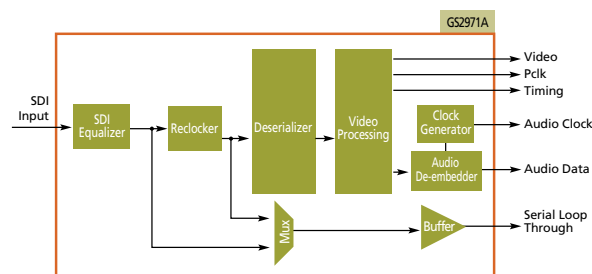
GS2971A includes an integrated audio de-embedder supporting AES, I2S, and serial audio formats. The chip also features an integrated audio clock generator.

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 |
| 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 |

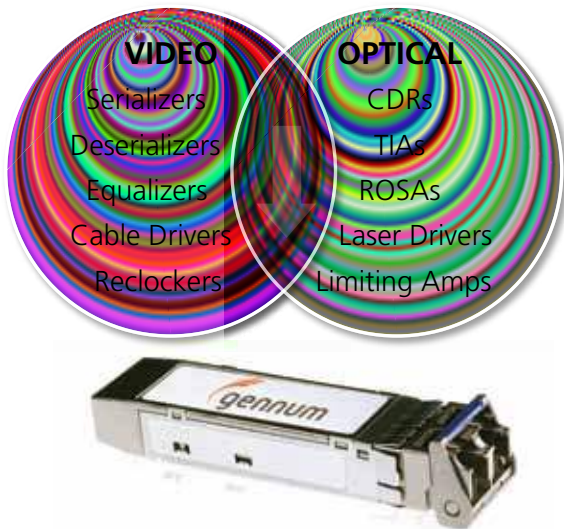
1-GS1671A audio version available, 2-GS1670A audio version available.

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, 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.

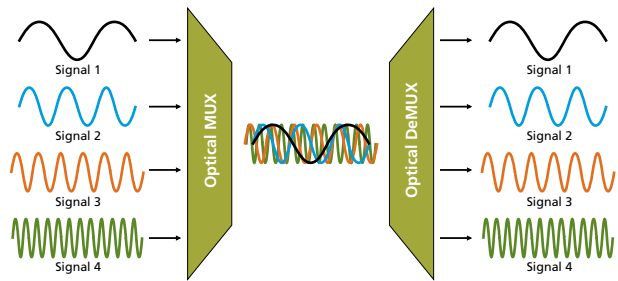


Leveraging years of technical experience in both the broadcast and optical markets, Gennum's Video SFP Optical modules are engineered to provide industry leading optical performance.

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-xxCH |
|--|---|---|--------------------------------|
| 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: 1271-1611 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 |

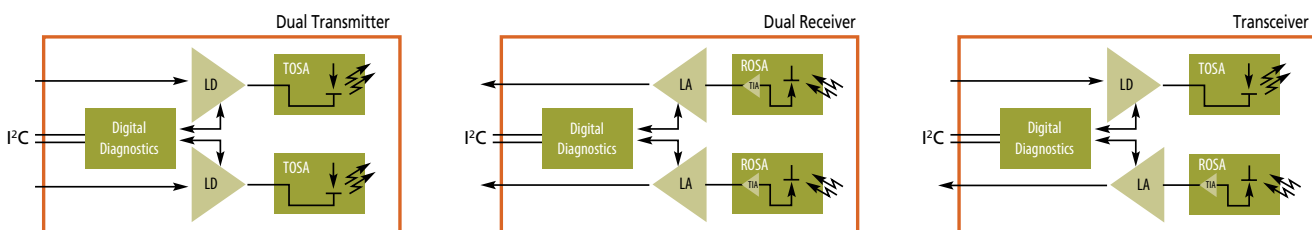
DUALS

| 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/ TRANSCEIVERS

| GO2951 GO2952 | -27CH | -29CH | -31CH | -33CH | -35CH | -37CH | -39CH | -41CH | -43CH | -45CH |
|------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Channel 1 | 1271 | 1291 | 1311 | 1331 | 1351 | 1371 | 1391 | 1411 | 1431 | 1451 |

| GO2951 GO2952 | -47CH | -49CH | -51CH | -53CH | -55CH | -57CH | -59CH | -61CH |
|------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| Channel 1 | 1471 | 1491 | 1511 | 1531 | 1551 | 1571 | 1591 | 1611 |



PCI Express® Redriver Solution



The easiest way to transport SDI redriver over PCI Express

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.

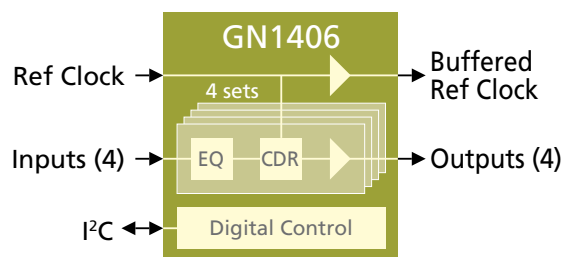
PCIE RE-DRIVER AND RETIMING RE-DRIVER

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 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 I ² C or Initialize Using Small I ² C 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 | 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-3GRXTXOXLNX01 | 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-3GRXTXOALTR01 | 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-GS3441-00 | GS3441 evaluation board (GS3441 only) |
| 3G Cable Driver | EBK-GS3480-00 | GS3480 evaluation board (GS3480 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 |
| Gen1/2 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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