

STARLINE® OPTICAL NODE FEATURING 3X TDM DIGITAL RETURN TECHNOLOGY



The Motorola Starline SG2000 is an 870 MHz enhanced Gallium Arsenide (E-GaAs) optical node that delivers high performance and rugged reliability. It provides four RF outputs and accommodates up to three optical receivers and:

- Two analog return transmitters, or
- One 3X DWDM digital return transmitter, or
- One CWDM digital return transmitter

This full-featured optical node is available with optional ingress control switches and a status monitoring transponder. The SG2000 supports redundant 60/90 volt powering and dual powering is also available, enabling to accept two independent AC sources for maximum reliability.

Currently rated to pass 15 amperes, the SG2000's electronics chassis implements ergonomic hot-swappable plug-ins for rapid replacement in the field. Fully configured to meet specific system requirements, the SG2000 is the answer in an expanding global market, as it fulfills the latest demands of one-way and two-way broadband network applications, including broadcast video, telephony, and data.

Forward Path

The SG2000 platform addresses split-band or redundancy applications. A standard split-band configuration has analog signals in the 52 to 550 MHz band feeding one receiver, while digital transmissions or narrowcast signals are carried between 550 MHz and 860 MHz on another fiber and processed by the second receiver. If the narrowcast receiver loses optical signal input, the optional third receiver can serve as a backup, with an automatic path switchover handled through status monitoring or manual control modules.



The SG2000 Optical Node sets the industry standard for performance, reliability, and value.

The SG2 receiver's integrated optical hybrid photo-detector improves RF performance over the entire 52 to 870 MHz pass band. The receiver is enabled and disabled in response to a signal from the status monitoring transponder, providing excellent isolation, reliability, and power consumption in redundant applications.

The optical power monitor circuit continually monitors the status of the fiber link. An integrated optical bulkhead connector provides superior fiber management and module link status indicators reduce troubleshooting time. The module is fully compatible with the status monitor transponder, allowing remote monitoring of module and link performance.

Return Path

The node's dual return path analog optical transmitters offer split-band or redundant functionality. In split-band applications, the RF inputs from ports one and three are combined on one transmitter and the RF inputs from ports two and four are combined onto a second optical transmitter. When configured for redundancy, both return lasers are active full-time, transmitting the combined RF return signals. In the event of path failure, return path redundancy is accomplished at the headend or receive site by switching to the alternate fiber.

HIGHLIGHTS:

- 870MHz E-GaAs performance
- Up to three optical receivers
- Up to two optical transmitters
- High speed digital return 3X technology
- HMS compliant status monitor transponder
- Hot-swap modules
- User-friendly fiber management
- Redundant powering capability
- 15A power passing
- Ingress control switches
- SC/APC and FC/APC connections

A full series of analog 1310 nm optical transmitters are available for the SG2000 platform. This product series, packaged to include connectors plus return path amplifiers, offer several advanced features. The SG2-IFPT/* transmitter uses an isolated Fabry-Perot laser operating at 400 uW. The SG2-EIFPT/* transmitter uses an isolated Fabry-Perot laser operating at 1 mW. The SG2-DFBT/* and DFBT3/* use state-of-the-art uncooled, isolated, distributed feedback (DFB) lasers operating at 1 mW and 2.0 mW respectively for improved link performance. A new 1550 nm DFBT6/SC 4.0 mW uncooled, isolated distributed feedback (DFB) laser is also available.

All transmitters carry a full 35 MHz of digital data or up to two video channels. The transmitters include thermal compensation circuitry to reduce the changes in received optical and RF signal levels as the node temperature varies. The transmitters are enabled and disabled in response to a signal from the status monitoring transponder for economical power consumption and enhanced reliability.

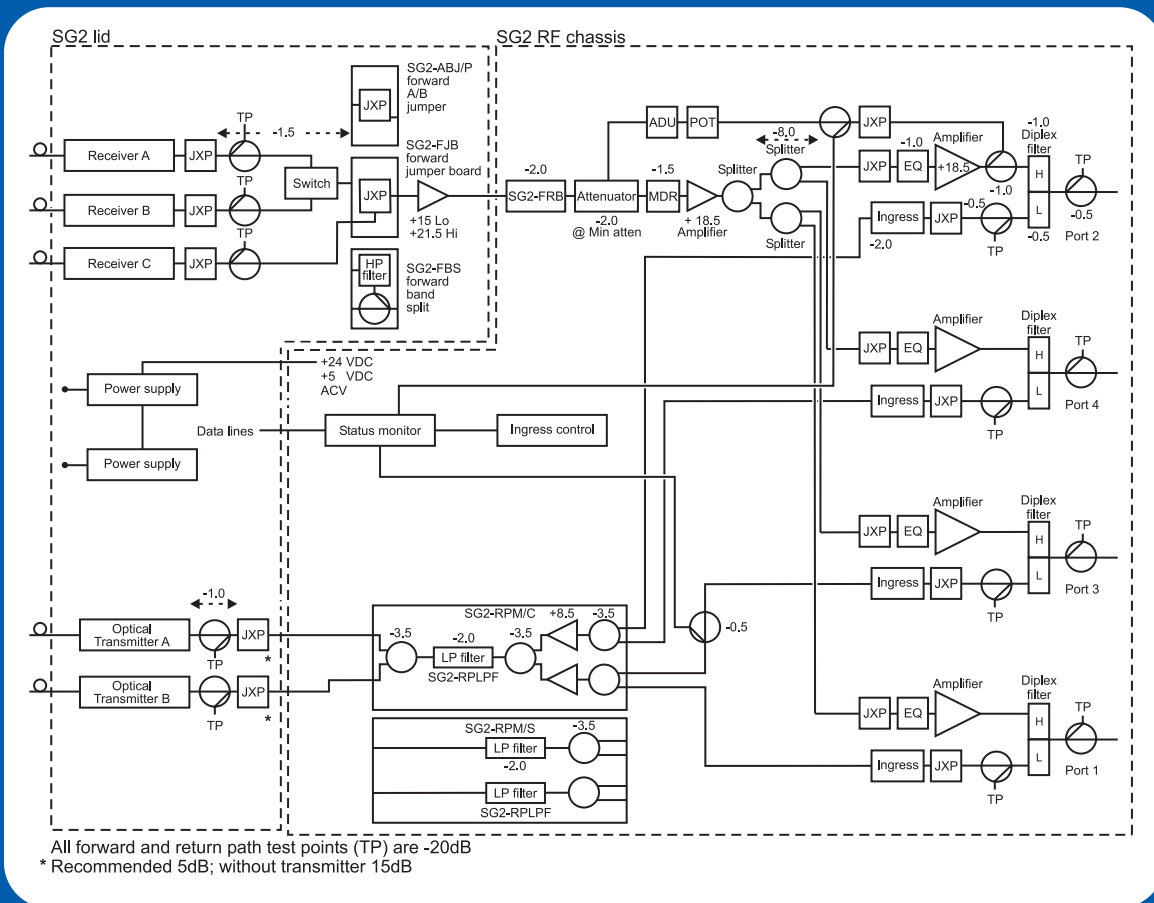
Motorola's high speed digital return transmitter, the SG2-DRT-3X is an excellent solution for node segmentation and wavelength aggregation issues. The SG2-DRT-3X Time Domain Multiplexing (TDM) system allows optimum use of the available bandwidth per subscriber by efficiently handling unbalanced distribution between ports.

Redundant Powering Capability

Equipped with optional dual power supplies, the SG2000 offers complete system redundancy. The dual module DC power supplies are located in the lid. Each DC power supply can deliver the total power required by a fully configured node: 4.3 Amperes at +24 Volts and 0.69 Amperes at +5 volts.



The multiple receiver functionality of the platform accommodates split band and/or redundancy applications. This diagram illustrates the signal flow path through the SG2000



Model	Part Number	Description
SG2-AB/J	410683-002-00	Redundant Receiver Plug-in
SG2-RPM/S-S	415353-001-00	Split Return Module 5-40 MHz
SG2-RPM/S-J	415353-002-00	Split Return Module 5-55 MHz
SG2-RPM/S-A	415353-003-00	Split Return Module 5-65 MHz
SG2-RPM/S-K	415353-004-00	Split Return Module 5-42 MHz
SG2-RPM/S-E	415353-005-00	Split Return Module 5-30 MHz
SG2-LR/FC	415354-001-00	FC/APC Receiver
SG2-LR/SC	415354-002-00	SC/APC Receiver
SG2-IFPT/FC	415355-001-00	Isolated Fabry Perot, FC, 0.4 mW Transmitter
SG2-IFPT/SC	415355-002-00	Isolated Fabry Perot, SC, 0.4 mW Transmitter
SG2-FBS/550	415586-001-00	Forward Band Split Plug-in
SG2-IS	415642-001-00	Ingress Control Switch
SG2-PS	415643-001-00	SG2-PS Power Supply
SG2-PS2	415644-001-00	SG2-PS2 Power Supply
SG2-DFBT/SC	415645-001-00	Distributed Feedback, SC, 1.0 mW Transmitter
SG2-DFBT/FC	415645-002-00	Distributed Feedback, FC, 1.0 mW Transmitter
SG2-MCB	453024-001-00	Manual Control Board and SIC cable
SG2-SERV CAB SC	453191-001-00	Fiber Service Cable, 50 foot, SC/APC 42 inch breakout
SG2-SERV CAB FC	453191-002-00	Fiber Service Cable, 50 foot, FC/APC 42 inch breakout
LL-SG2-SIC	463678-001-00	Status Monitor Interface Cable
SG2-DFBT3/SC	464388-001-00	Distributed Feedback, SC, 2.0 mW Transmitter
SG2-DFBT3/FC	464388-002-00	Distributed Feedback, FC, 2.0 mW Transmitter
SG2-1550-DFBT6/SC	464388-003-00	Distributed Feedback, SC, 4.0 mW Transmitter
SG2-SB	466739-001-00	Strand Bracket for aerial mount
SG2-RPM/C-S	474056-001-00	Return Path Combiner 5-40 MHz
SG2-RPM/C-J	474056-002-00	Return Path Combiner 5-55 MHz
SG2-RPM/C-A	474056-003-00	Return Path Combiner 5-65 MHz
SG2-RPM/C-K	474056-004-00	Return Path Combiner 5-42 MHz
SG2-RPM/C-E	474056-005-00	Return Path Combiner 5-30 MHz
SG2-EIFPT/SC	479939-001-00	Enhanced, Isolated Fabry Perot, SC, 1.0 mW Transmitter
SG2-EIFPT/FC	479939-006-00	Enhanced, Isolated Fabry Perot, FC, 1.0 mW Transmitter
SG2-HSG	495101-002-00	Spare Housing Assembly
SG2-PIC	504466-001-00	Power Interface Cable

When configured for redundancy, the dual power supplies are connected through a load-sharing circuit, if either supply fails the other will absorb the total load without system interruption. The new platform meets the 90 volt requirements of advanced network systems by supporting 60/90 volt powering, which enables the user to switch voltage supply.

Network Monitoring

Employing state-of-the-art network management, the status monitoring transponder handles optical link, receiver, transmitter, and RF electronics performance measurement control and alarm generation. The status monitoring transponder is also an effective tool to ensure system reliability. The status monitoring circuitry oversees optical power, laser bias current, receiver current, AC and DC voltages, temperature, lid tamper, forward and reverse RF current, RF level, auto drive voltage, and RF ingress switching control. The SG2000 is compatible with multiple status monitoring software vendors.

Configuration

To accommodate unique system design criteria, the SG2000 telecommunications optical node is shipped as a fully configured product. Hundreds of variations are available to address current and future system requirements, such as bi-directional transmissions, ingress switching, network monitoring, thermal control, and automatic level control. Service cable, surge protection, chromate housing finish, and a choice of SC or FC connectors are also available. Plus, today's advanced system can be easily upgraded with Motorola plug-in modules as needs change.

SPECIFICATIONS

Optical Receiver

Optical Wavelength	1310 ± 20 nm through 1550 ± 30 nm
Optical Input Power Range	-3.0 to +2.0 dBm continuous
Optical Connector Type	SC/APC or FC/APC
Optical Input Return Loss	40 dB min.

Station Performance

Output Level	+53 dBmV @ 870 MHz with -3dBm optical input power
Hum Modulation	-65 dBc, 5 - 870 MHz @ 15A
AC Bypass Current	15A
	Measured with 79 channels NTSC at 44 dBmV @ 547.25 MHz with 320MHz digital loading 6dB below analog, 20 km optical link, 0 dBm optical input power, 4% OMI, GX2 transmitter.
Composite Triple Beat (CTB)	-63 dBc
Composite Second Order (CSO)	-61 dBc
Carrier to Composite Noise (CCN)	52 dB

RF

Operational Bandwidth	Fmin - 870 MHz
Flatness	± 0.75 dB F min. to F max.
Output Slope	12.5 dB standard
Level Stability	± 1.0 dB over operating temperature range
RF Output Test Points	-20 +/-0.5 dB
RF Output Impedance	75 Ohm
RF Output Return Loss	16 dB min.

Mechanical / Environmental

Dimensions	21.6" L x 10.6" W x 11.0" D (54.86 cm x 26.92 cm x 27.94 cm)
Weight	42.0 lbs. (19 kgs.) fully loaded
Mounting	Aerial or Pedestal
RF Connector Types	SCTE compliant 5/8" housing, accepts 1.6" stinger
Operating Temperature Range	-40° C to +65° C (-40° F to +149° F)

Specifications are subject to change without notice.

MGBI

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