Digital Energy

Reason S20

Industrial Managed Ethernet Switch

MANAGED ETHERNET SWITCH FOR HARSH INDUSTRIAL ENVIRONMENTS

Using the Reason S20, packet switching between network devices is flexible, reliable and robust, even in situations where routing is necessary.

KEY BENEFITS

- Layer 2 and 3 Managed Ethernet Switch
- Media Access Control (MAC) bridges and Spanning Tree Protocol as standardized by the IEEE 802.1D
- Store-and-forward packet switching
- IP Routing functionalities: Static, Routing Information Protocol (RIP) and Open Shortest Path First (OSPF)
- Virtual Router Redundancy Protocol (VRRP) to eliminate a single point of failure in static routed environments
- Fully flexible Ethernet switch for industrial applications, including PRP redundant networks
- Ready for IEC 61850 networks (tests performed by KEMA)
- UltraRSTP (Rapid Spanning Tree Protocol - IEEE 802.1W) with fault recovery time less than 5 ms per hop, meeting IEC 61850-90-4 specifications
- Bridge Protocol Data Unit (BPDU) guard and filtering to prevent external interference in Spanning Tree networks
- Full cyber security features that help customers to comply with North American Electric Reliability Council (NERC) requirements
- Support for IPv4 and IPv6 protocols (Multicast, Unicast and Broadcast operation)
- Internal clock synchronization using NTP protocol
- Alarm contacts for detection of critical events
- Standard USB 2.0 configuration port

OVERVIEW

GE´s Reason S20 managed Ethernet switch range is designed for harsh environments, such as power systems and industry applications, providing all elements needed in an IEC 61850

digital substation network, including IEEE 1588v2 Precision Time Protocol (PTP). Using Reason S20, packet switching between network devices is flexible, reliable and robust, even in situations where routing is necessary.

The Reason S2020 is the most cost effective choice, offering a high density of Ethernet ports in a 1U form factor for easy rack mounting. This model supports up to 5 modules with 4 ports each and allows configurations with up to 20 fast Ethernet ports (100 Mbps), or up to 4 gigabit ports plus 16 fast Ethernet ports.

The Reason S2024 is the premium model, offering full gigabit Ethernet switch functionality. This model supports up to 24 ports, provided by 6 interface modules with 4 ports each. The 1U mechanical design is identical to the S2020 model.

In both S2020 and S2024 models, layer 3 functions and IEEE 1588v2 PTP may be upgraded via a licensing file.

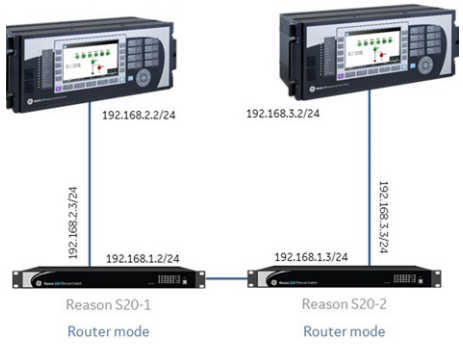
Cyber Security (FW 06A02 or greater)

The S20 cyber security enables the device to deliver full cyber security features (FW06A02 or greater) that help operators to comply with NERC CIP guidelines and regulations, by supporting core features such as:

- Password Complexity and Encryption
- AAA Server Support (Radius/TACACS+)
- Role Based Access Control (RBAC)
- Firmware digitally signed
- Syslog

IP Routing

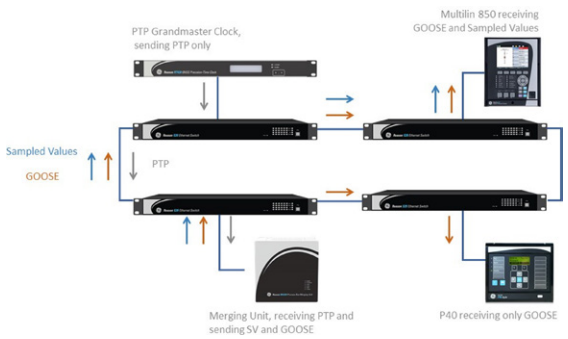
When S20 is operating as router, IP traffic is routed between all internal VLANs without any further configuration. S20 will recognize all IP address from VLANs and route the IP traffic internally when necessary. Static IP routing, RIP and OSPF are available on this mode and they can be used to route the traffic externally, to routers or gateways.

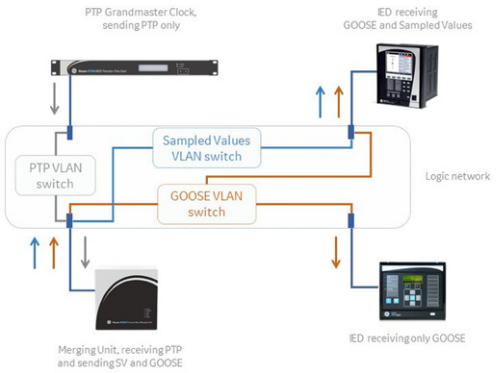


Virtual LAN (VLAN)

Traffic segregation is particularly important in modern Layer 2 network communication in order to make sure data transmission will flow as multicast communication, where each device receives the data it is supposed to received. If not properly configured, the data transmission will flow as broadcast, flooding the network and consequently the communication port from devices connected to the network.

In digital power system communication, 61850 networks have GOOSE, Sampled Values and Precision Time Protocol as multicast messages, and all of them can be mapped directly at Ethernet frame (Layer 2). Thus, each of these messages will flow separately.

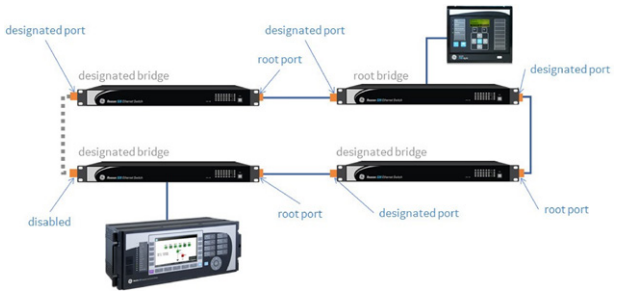




Spanning Tree Protocol (STP, RSTP, MSTP)

Spanning Tree protocol is a mechanism created to solve the problems that arise when a loop is inserted into a LAN. Ethernet networks were not developed to work in loop topologies, but as redundant paths are generally required for most of network applications, several protocols have been developed to fulfill this need. The most common protocol to identify loops is the Spanning Tree Protocol, defined by IEEE 802.1D-2004. In addition, the IEC 61850-90-4 Technical Report specifies the Rapid Spanning Tree Protocol (RSTP) when looped topologies, such as ring topology, are required at the station level of substation networks.

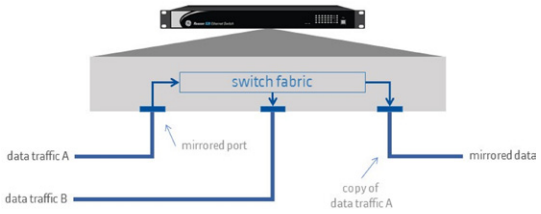
The protocol works to create a logical topology that resembles a tree. The first step is to define where the root of the tree is, in other words, which will be the root switch. The remaining switches act as a bridges as bridge. In this setup, the remaining ports from each Ethernet switch must be defined depending on the STP protocol version used (STP as follows, RSTP or MSTP).



When using STP, only one path is available and transmits the network data. In the case of failure in any link between two Ethernet switches, the STP protocol recalculates the best path once again and after a short period of time the communication is reestablished. The time to recover the communication is also dependent on the STP protocol version.

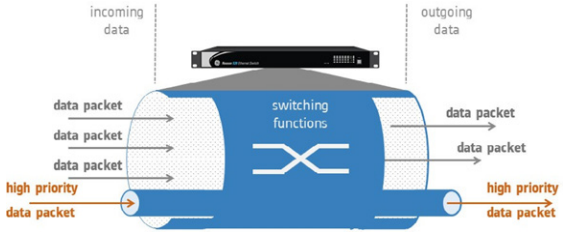
Port Mirroring

Port mirroring creates a copy of incoming and outgoing data from a specific port. The mirror port could be connected to a network analyzer, which would be useful for analysis and debugging data or network error diagnostics. Reason S20 has port-mirroring capabilities, which can be executed in the same switch or in different switches.



Quality of Service (QoS)

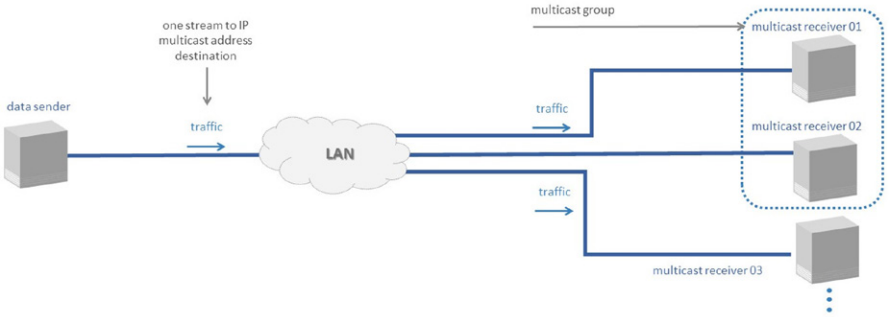
Quality of service function is used to guarantee traffic priority when LAN (or VLAN) network is congested. There are several ways to separate prioritized traffic from general purposes traffics, Reason S20 supports QoS function at the Class of Service (CoS) and DSCP bits, for layer 2 and layer 3 communication respectively. Considering the Ethernet port has reached its full bandwidth capacity, the QoS will ensure higher priority data bandwidth data will not be affected.



IP Multicast (IPMC) and Internet Group Management Protoco (IGMP) Snooping

Using multicast filters, a group of receivers in the LAN may be configured to receive the data from sender. Without multicast filtering, multicast messages are sent as broadcast messages.

When it comes to power systems communication, IGMP protocol can be used when there is multicast communication between a Phasor Measurement Unit (PMU) and a Phasor Data Concentrator (PDC). With IGMP snooping, the receiver can send a “join group” to join an IP multicast group. To stop receiving data, the receiver sends a “leave group”. Reason S20 has support to IGMPv1, IGMPv2 and IGMPv3 protocols.

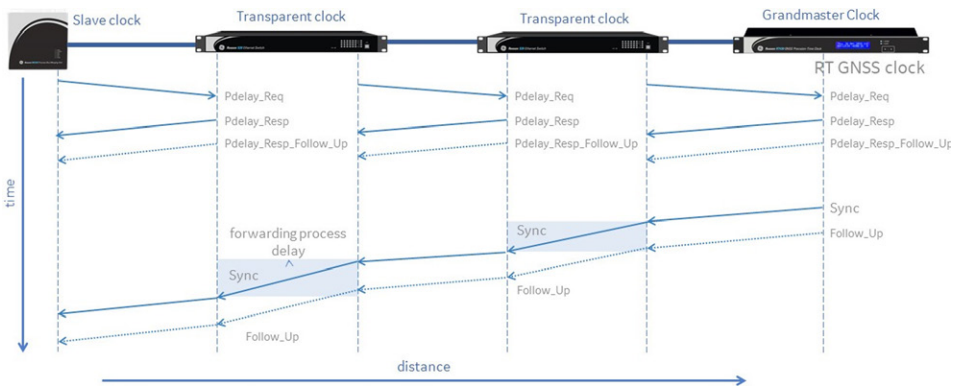


SNMP v1, v2c and v3

RFC 3584 shows that all versions can coexist in a given network. Whilst SNMPv1 networks can include SNMPv3 or SNMPv2c protocols, the capabilities of the SNMPv1 agents are not the same. When using different SNMP versions, make sure that the SNMP manager understands all used versions.

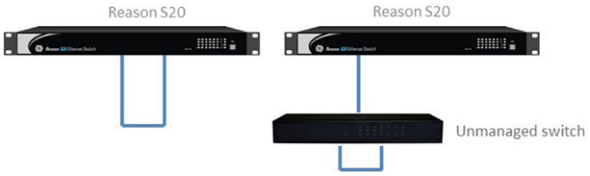
Precision Time Protocol (PTP) - IEEE 1588v2

Precision Time Protocol (PTP) is defined in the IEEE 1588 standard, which describes the precision clock synchronization protocol for networked measurement and control systems. Reason S20 complies with IEEE1588v2, and can operate either as transparent clock or boundary clock to ensure time accuracy for PTP-aware IEDs in the network.



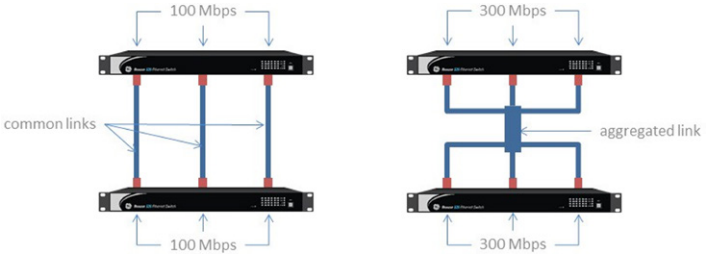
Loop Protection

The Loop Protection function is used to prevent loops between one port and another at the same switch, or at ports connected to unmanaged switches. For instance, unmanaged switches could drop spanning tree packets, thus interfering in its operation. To prevent problems caused by these situations, the Loop Protection function must be enabled at ports where a loop could happen.



Link Aggregation Control Protocol (LACP)

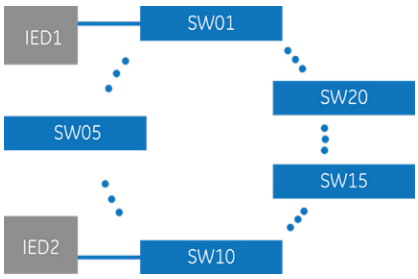
Link Aggregation function is defined by the IEEE 802.3ad standard. The purpose of LACP is to increase the performance and the availability of network devices with more than one connection, making parallel links work as if they were a single high performance link. This function is also known as Port Trunking or Port Bundling. The main benefits of using link aggregation are increased communication capacity, load balance on links and increased communication availability.



UltraRSTP using Reason S20

With UltraRSTP, Reason S20 achieves fault recovery times with less than 5ms per hop, reducing packets loss while maintaining interoperability with others standard RSTP devices. Reason S20 supports UltraRSTP natively and as it is performed by hardware, no extra configuration other than the standard RSTP is needed.

As an example of UltraRSTP performance, consider a network of twenty Reason S20s (SW01 – SW20) in a ring topology, as the fault recovery time is better than 5ms/hop, a fault in the communication between any of the twenty switches should result in a recovery time lower than 100ms. To confirm UltraRSTP performance, such a scenario with twenty Reason S20 was assembled and tested. The results showed fault recovery time was 49 ms in the worst-case.



Networking Standards Supported

IEEE 802.3i	10BASE-T
IEEE 802.3u	100BASE-T(X)/100BASE-FX
IEEE 802.3ab	1000BASE-T(X)
IEEE 802.3z	1000BASE-SX/LX/ZX
IEEE 802.3x	Full duplex operation, flow control
IEEE 802.1D	Media Access Control (MAC) bridges
IEEE 802.1w	Rapid Spanning Tree Protocol (RSTP)
IEEE 802.1s	Multiple Spanning Tree Protocol (MSTP)
IEEE 802.1Q	VLAN (Virtual Local Area Networks)
IEEE 802.1p	Class of service
IEEE 802.1X	Port-based Network Access Control
IEEE 802.3ad	Link Aggregation Control Protocol (LACP)
IEC 61850	Power Substation applications (tests performed by KEMA)
IEEE 1588 v2 PTP	IEEE Standard for a Precision Clock Synchronization Protocol for Networked Measurement and Control Systems

RJ45 Ethernet (10/100/1000 Mbps) Ports

Type	Two fixed options (FE or GE) One RJ45 SFP option	SFP Order Code: SFP1GCU02K
Speed	10/100/1000 Mbps (SFP or fixed) 10/100 Mbps (fixed only)	Auto-negotiating
Duplex	FDX/HDX (Full/Half duplex)	Auto-negotiation
Cable-type	Category 5	Shielded/Unshielded
Wiring Standard	TIA/EIA T568A/B	Auto-Crossover, Auto-Polarity
Max Distance	100 m	
Connector	RJ45	
Isolation	1,5 kV	RMS 1-minute

General Switching Characteristics

Switching Capacity	68 Gbps
Switching Latency	3 µs
Number of VLANs	up to 4095
MAC Table entries	up to 8192
Class of Service (CoS) levels	up to 8

Power Supply

Power supply AC High Voltage	**Input range**
Nominal Range	110-240 VAC, 50/60 Hz, 100-250 VDC
Operating Voltage Range	88-264 VAC, 50/60 Hz ± 3 Hz, 90-300 VDC
Maximum Current Consumption	0.3 A
Power Consumption	60 VA max 30 W typical
Nominal DC	24/48 VDC
Operation Voltage Range	18-75 VDC
Maximum Current Consumption	1.0 A
Power Consumption	45 VA max

Networking RFC Standards

RFC 4363	VLAN Management Information Base (MIB)
RFC 1058	Routing Information Protocol (RIP) version 1
RFC 2453	Routing Information Protocol (RIP) version 2
RFC 2328	Open Shortest Path First (OSPF) version 2
RFC 2338	Virtual Router Redundancy Protocol (VRRP)
RFC 2819	Remote Monitoring (RMON)
RFC 1213	MIB II
RFC 1215	Traps MIB
RFC 4188	Bridge MIB
RFC 4292	IP Forwarding Table MIB
RFC 4293	MIB for the Internet Protocol (IP)
RFC 5519	Multicast Group Membership Discovery MIB
RFC 4668	RADIUS Authentication Client MIB
RFC 4670	RADIUS Accounting MIB
RFC 3635	Ethernet-like MIB
RFC 2863	Interface Group MIB using SMI v2
RFC 3636	802.3 MAU MIB
RFC 4133	Entity MIB version 3
RFC 3411	SNMP Management Frameworks
RFC 3414	User-based Security Model for SNMPv3
RFC 3415	View-based Access Control Model for SNMP
RFC 5171	Unidirectional Link Detection (UDLD)
RFC 5905	Network Time Protocol (NTP) Synchronization
RFC 5424	Syslog Messages
RFC 5426	Log Messages through UDP protocol
RFC 1157	SNMP Protocol
RFC 3418	SNMP MIB
RFC 3584	SNMP v1, v2c, v3
RFC 4604	IGMPv3 & Multicast Listener Discovery (MLD) v2 Snooping
RFC 3260	Differentiated Services Code Point (DSCP)
RFC 6040	Explicit Congestion Notification (ECN)

Safety Compliance

IEC 60255-5	Insulation Class I
IEC 61010-1	Safety Requirements
IEC 60255-27	

Operating/Storage Temperature

Type	Level
Operation	-40°C to +55°C (continuously) -40°C to +85°C (16h)
Storage/shipping	-40°C to +85°C

Environmental Tests

Test	Description	Test Levels
IEC 60068-2-1	Cold temperature	-40 °C, 16 Hours
IEC 60068-2-2	Dry heat temperature	+85 °C, 16 Hours
IEC 60068-2-14	Change of temperature	Each cycle of 9-hour, temperature from -40°C to +55°C and 2.5 hours for each steady-state temperature periods.
IEC 60068-2-30	Damp heat temperature, cyclic (12 + 12 h cycle)	95% (non-condensing), 55 °C
IEC 60255-21-1	Mechanic vibration	2 g @ (10 - 150) Hz
IEC 60255-21-2	Mechanic shock	15 g @ 11 mS
IEC 60255-21-3	Mechanic Seismic	Class 2

Hardware Design

Dimensions	4,3 cm (Height) x 43,6 cm (Width) x 31 cm (Depth)
Weight	< 5 kg
Structure	1 mm galvanized steel
Cooling system	Fanless

Optical Transceivers (100/1000 Mbps)

Model	Rate	Maximum cable length (fiber type)	Wavelength	Optical power	Sensitivity
SFP1GFO05K	1.25 Gbps	0.5 km (MMF)	850nm	-9 / -3 dBm	-17 / 0 dBm
SFP1GFO20K	1.25 Gbps	20 km (SMF)	1310nm	-9 / -3 dBm	-23 / -3 dBm
SFP1GFO40K	1.25 Gbps	40 km (SMF)	1310nm	-5 / 0 dBm	-23 / -3 dBm
SFP1GFO80K	1.25 Gbps	80 km (SMF)	1550nm	0 / +5 dBm	-23 / -3 dBm
SFP01GFO2K	155Mbps	2 km (MMF)	1310nm	-20 / +14 dBm	-31 / -3 dBm

Ingress Protection & Pollution Degree

Frontal	IP30
Rear	IP20
Sides	IP20
Product safety protection	IP20
Pollution Degree	II

Failsafe Relay

Type of output	Dry contact NA and NF
Maximum AC Capacity	250 Vac / 2 A
Maximum DC Capacity	2 A @ 24 Vdc
	2A @ 48 Vdc 200 mA @ 125 Vdc 100 mA @ 250 Vdc (max voltage)

EMC Tests (IEC 60255-26)

Test	Description	Test Levels
IEC 61000-4-2	Electrostatic discharge immunity	6 kV contact / 8 KV air
IEC 61000-4-3	Radiated RFI	10 V/m
IEC 61000-4-4	Electrical fast	2 kV @5 kHz
	transient	
IEC 61000-4-5	Surge immunity	Differential mode: 1 kV Common mode: 2 kV
IEC 61000-4-6	Immunity to conducted disturbances induced by radio- frequency fields	10 V
IEC 61000-4-8	Magnetic Field	30 A/m continuous – 300 A/m @ 1 s
IEC 61000-4-11 IEC 61000-4-29	Voltage dips, short interruptions and voltage variations (AC and DC)	AC and DC voltage dips Test level: 0% residual voltage Duration time AC: 1 cycle DC: 16.6 ms Test level: 40% residual voltage Duration time AC: 12 cycles DC: 200 ms Test level: 70% residual voltage Duration time AC: 30 cycles DC: 500 ms AC and DC voltage interruptions Test level: 0% residual voltage Duration time AC: 300 cycles DC:5s
IEC 61000-4-17	Ripple on DC input power port immunity test	Test level: 1 % of rated DC value Test frequency: 120 Hz, sinusoidal waveform.

Test	Description	Test Levels
IEC 61000-4-18	Damped Oscillatory	Voltage oscillation frequency: 1 MHz Differential mode: 1 kV peak voltage; Common mode 2 kV peak voltage
IEC 60255-26	Gradual Startup	Shut-down ramp: 60 s Power off: 5 m Start-up ramp: 60 s
CISPR11	Radiated emission	30 to 230 MHz – 50 dB (µV/m) quasi peak at 3 m 230 to 1,000 MHz – 57 dB (µV/m) quasi peak at 3 m
CISPR22	Conducted and radiated emissions	Radiated emission: 1 to 2 GHz – 56 dB (µV/m) average; 76 dB (µV/m) peak at 3 m Limits defined by considering the maximum internal frequency of 125 MHz Conducted emission: 0.15 to 0.50 MHZ – 79 dB (µV) quasi peak; 66 dB (µV) average 0.5 to 30 MHz – 73 dB (µV) quasi peak; 60 dB (µV) average

Reason S20

Industrial Managed Ethernet Switch

S20 Ordering

Model Type	S20	*	*	*	P	*	*	*	*	*	*	*	07	B	
Number of Ports		20													Up to 20 ports (4x Gigabit)
		24													Up to 24 Gigabit ports
Power Supply 1			1												24-48 Vdc
			3												100-250 Vdc / 110-240 Vac
Power Supply 2				1											24-48 Vdc
				3											100-250 Vdc / 110-240 Vac
				C											Not installed
Mounting Options					P										19" Rack Mount / Rear Mount
Software Functionality (Licensing)						2									Standard Layer 2 packet switching (MAC Based)
						3									Advanced Layer 2 and Layer 3 packet switching (MAC Based and IP Based)
PTP Support (Licensing)							P								With PTP (IEEE 1588v2) support
							X								Without PTP (IEEE 1588v2) support
Interface Module 1								A							Four 1 Gbps RJ45 copper 10/100BASE-TX/1000BASE-T Ethernet ports
								B							Four slots for SFP transceivers (up to 1 Gbps)
								C							Four 1 Gbps LC-type SFP transceivers multi mode fiber 1000BASE-SX Ethernet for up to 0.5 km
								D							Four 1 Gbps LC-type SFP transceivers single mode fiber 1000BASE-LX Ethernet for up to 20 km
								E							Four 1 Gbps LC-type SFP transceivers single mode fiber 1000BASE-ZX Ethernet for up to 40 km
								F							Four 1 Gbps LC-type SFP transceivers single mode fiber 1000BASE-ZX Ethernet for up to 80 km
								G							Four 100 Mbps LC-type SFP transceivers multi mode fiber 100BASE-FX Ethernet for up to 2 km
								H							Four RJ45 copper 10/100BASE-TX
								I							Four 1 Gbps RJ45 SFP transceivers Ethernet 10/100BASE-TX/1000BASE-T 10/100BASE- TX/1000BASE-T
								J							Two 1 Gbps RJ45 SFP transceivers 10/100BASE-TX/1000BASE-T Ethernet ports + Two 1 Gbps LC-type SFP transceivers multi mode fiber 1000BASE-SX Ethernet for up to 0.5 km
								K							Two 1 Gbps RJ45 SFP transceivers 10/100BASE-TX/1000BASE-T Ethernet ports + Two 100 Mbps LC-type SFP transceivers multi mode fiber 100BASE-FX Ethernet for up to 2 km
								L							Two 1 Gbps LC-type SFP transceivers multi mode fiber 1000BASE-SX Ethernet for up to 0.5 km + Two 100 Mbps LC-type SFP transceivers multi mode fiber 100BASE-FX Ethernet for up to 2 km
Interface Module 2									A						Four 1 Gbps RJ45 copper 10/100BASE-TX/1000BASE-T Ethernet ports*
									B						Four slots for SFP transceivers (Up to 1 Gbps in the 24 ports model / Up to 100 Mbps in the 20 ports model)
									C						Four 1 Gbps LC-type SFP transceivers multi mode fiber 1000BASE-SX Ethernet for up to 0.5 km*
									D						Four 1 Gbps LC-type SFP transceivers single mode fiber 1000BASE-LX Ethernet for up to 20 km*
									E						Four 1 Gbps LC-type SFP transceivers single mode fiber 1000BASE-ZX Ethernet for up to 40 km*
									F						Four 1 Gbps LC-type SFP transceivers single mode fiber 1000BASE-ZX Ethernet for up to 80 km*
									H						Four 100 Mbps LC-type SFP transceivers multi mode fiber 100BASE-FX Ethernet for up to 2 km
									I						Four RJ45 copper 10/100BASE-TX
									J						Four 1 Gbps RJ45 SFP transceivers Ethernet 10/100BASE-TX/1000BASE-T *
									X						Not installed
Interface Module 3										A					Four 1 Gbps RJ45 copper 10/100BASE-TX/1000BASE-T Ethernet ports*
										B					Four slots for SFP transceivers (Up to 1 Gbps in the 24 ports model / Up to 100 Mbps in the 20 ports model)
										C					Four 1 Gbps LC-type SFP transceivers multi mode fiber 1000BASE-SX Ethernet for up to 0.5 km*
										D					Four 1 Gbps LC-type SFP transceivers single mode fiber 1000BASE-LX Ethernet for up to 20 km*
										E					Four 1 Gbps LC-type SFP transceivers single mode fiber 1000BASE-ZX Ethernet for up to 40 km*
										F					Four 1 Gbps LC-type SFP transceivers single mode fiber 1000BASE-ZX Ethernet for up to 80 km*
										H					Four 100 Mbps LC-type SFP transceivers multi mode fiber 100BASE-FX Ethernet for up to 2 km
										I					Four RJ45 copper 10/100BASE-TX
										J					Four 1 Gbps RJ45 SFP transceivers Ethernet 10/100BASE-TX/1000BASE-T *
										X					Not installed
Interface Module 4											A				Four 1 Gbps RJ45 copper 10/100BASE-TX/1000BASE-T Ethernet ports*

S20 Ordering

Model Type	S20 * * * P * * * * * * * * 07 B		
Interface Module 4		B	Four slots for SFP transceivers (Up to 1 Gbps in the 24 ports model / Up to 100 Mbps in the 20 ports model)
		C	Four 1 Gbps LC-type SFP transceivers multi mode fiber 1000BASE-SX Ethernet for up to 0.5 km*
		D	Four 1 Gbps LC-type SFP transceivers single mode fiber 1000BASE-LX Ethernet for up to 20 km*
		E	Four 1 Gbps LC-type SFP transceivers single mode fiber 1000BASE-ZX Ethernet for up to 40 km*
		F	Four 1 Gbps LC-type SFP transceivers single mode fiber 1000BASE-ZX Ethernet for up to 80 km*
		H	Four 100 Mbps LC-type SFP transceivers multi mode fiber 100BASE-FX Ethernet for up to 2 km
		I	Four RJ45 copper 10/100BASE-TX
		J	Four 1 Gbps RJ45 SFP transceivers Ethernet 10/100BASE-TX/1000BASE-T*
		X	Not installed
Interface Module 5		A	Four 1 Gbps RJ45 copper 10/100BASE-TX/1000BASE-T Ethernet ports*
		B	Four slots for SFP transceivers (Up to 1 Gbps in the 24 ports model / Up to 100 Mbps in the 20 ports model)
		C	Four 1 Gbps LC-type SFP transceivers multi mode fiber 1000BASE-SX Ethernet for up to 0.5 km*
		D	Four 1 Gbps LC-type SFP transceivers single mode fiber 1000BASE-LX Ethernet for up to 20 km*
		E	Four 1 Gbps LC-type SFP transceivers single mode fiber 1000BASE-ZX Ethernet for up to 40 km*
		F	Four 1 Gbps LC-type SFP transceivers single mode fiber 1000BASE-ZX Ethernet for up to 80 km*
		H	Four 100 Mbps LC-type SFP transceivers multi mode fiber 100BASE-FX Ethernet for up to 2 km
		I	Four RJ45 copper 10/100BASE-TX
		J	Four 1 Gbps RJ45 SFP transceivers Ethernet 10/100BASE-TX/1000BASE-T *
		X	Not installed
Interface Module 6 (Only available in the 24 ports model)		A	Four 1 Gbps RJ45 copper 10/100BASE-TX/1000BASE-T Ethernet ports*
		B	Four slots for SFP transceivers (Up to 1 Gbps in the 24 ports model / Up to 100 Mbps in the 20 ports model)
		C	Four 1 Gbps LC-type SFP transceivers multi mode fiber 1000BASE-SX Ethernet for up to 0.5 km*
		D	Four 1 Gbps LC-type SFP transceivers single mode fiber 1000BASE-LX Ethernet for up to 20 km*
		E	Four 1 Gbps LC-type SFP transceivers single mode fiber 1000BASE-ZX Ethernet for up to 40 km*
		F	Four 1 Gbps LC-type SFP transceivers single mode fiber 1000BASE-ZX Ethernet for up to 80 km*
		H	Four 100 Mbps LC-type SFP transceivers multi mode fiber 100BASE-FX Ethernet for up to 2 km
		I	Four RJ45 copper 10/100BASE-TX
		J	Four 1 Gbps RJ45 SFP transceivers Ethernet 10/100BASE-TX/1000BASE-T *
		X	Not installed
Firmware Version		07	Firmware release number 07
Hardware Design Suffix		B	Standard hardware release

* Only available in the 24 ports model

Contact Us
ge.com/digital/sales-contact-me