SIEMENS

Rugged network components
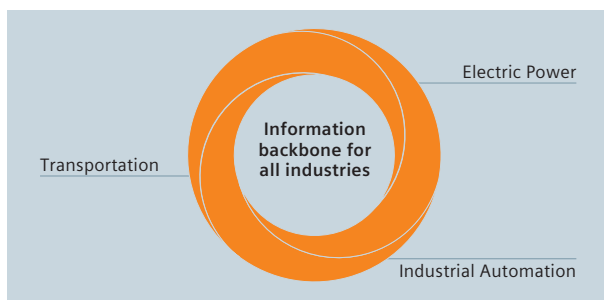
RUGGEDCOM RSG2488

Advanced utility grade, high density, Gigabit, Ethernet switch with IEEE 1588 V2 and IRIG-B conversion

The RUGGEDCOM RSG2488 is the first utility grade, field upgradable, non blocking 28 Gigabit port layer 2 switch, designed to reduce rack space needs, cut sparing costs and minimize time-to-repair while eliminating routine maintenance and separate timing cabling, delivering increased network availability and lowest total cost of ownership.

The RSG2488 is the latest addition to Siemens' extensive portfolio of products for industrial communication in every environment. With an operating temperature range of -40°C to +85°C, a 1U form factor, extruded all-aluminum enclosure and optional conformal coating, the RSG2488 can be placed in almost any location.

The RSG2488 provides up to 28 non-blocking ports that can be configured as 10/100/1000TX copper, 100FX, 1000SX or 1000LX fiber. With its 1U form factor and vertical loading design, the RSG2488 provides users with the flexibility and field maintenance simplicity needed to efficiently implement, maintain and evolve a broadband local area network.

The RSG2488's Rugged Rated hardware design and proven RUGGEDCOM Operating System (ROS®), offer improved system reliability, advanced cyber security and advanced networking features which make it ideal for creating secure Ethernet networks for mission-critical, real-time control applications.

Electric Power

Information backbone for all industries

Transportation

Industrial Automation

Answers for industry.

Features

Precision timing

RSG2488 can operate as an IEEE 1588 transparent clock, ordinary clock, master clock and supports both 1-step and 2-step operations. The available PTP module also allows the RSG2488 to get timing information from GPS and serve as a grandmaster clock for downstream time recipients.

Timing conversion

The RSG2488 supports IEEE 1588 (PTP), SNTP, IRIG-B and GPS. It can convert time between all of these formats.

Extreme flexibility

- Support for up to a total of 28 non-blocking ports (Six 4-port modules plus two 2-port modules)
- Up to 28 Ethernet ports: Full 10/100/1000TX, Full 1000SX/LX, Full 100FX or any mixture therein with different connector options and a minimum of two ports
- -40°C to +85°C operating temperature (fanless)
- All-aluminium construction

Vertical loading modular design

- Allows for simple, cost effective in-field servicing and upgrading

Compact 1U form factor

- Space-saving design

Fast network fault recovery

- Less than 5 ms per hop (typical)

Supports Siemens FastConnect™ RJ45 cabling system

Dual redundant smart power supplies

- Hot-swappable, cable-free
- HI voltage AC/DC: 88-300 VDC or 85-264 VAC
- Low voltage range: 24(13-36VDC), 48(37-72VDC)
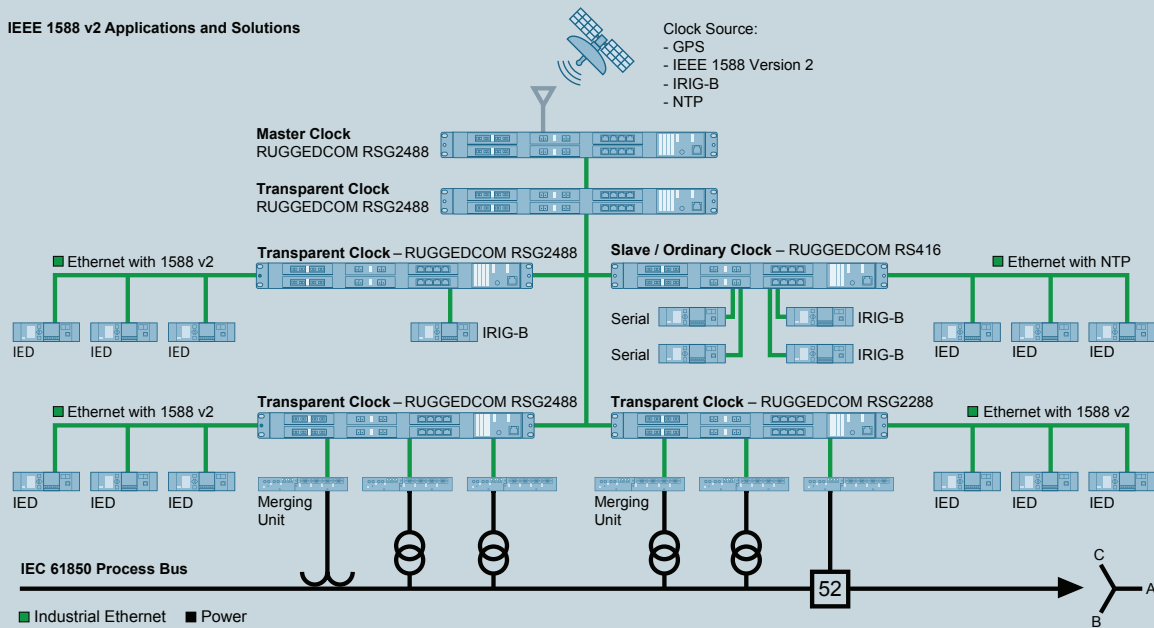- Smart power supplies able to detect loss of input voltage

Rugged Operating System (ROS®) features

- Simple plug and play operation - automatic learning, negotiation, and crossover detection
- MSTP 802.1Q-2005 (formerly 802.1s)
- RSTP (802.1w) and Enhanced Rapid Spanning Tree
- eRSTP network fault recovery (< 5ms)
- Quality of service (802.1p) for real-time traffic
- Port rate limiting
- Port configuration, status, statistics, mirroring, security
- SNTP time synchronization (client and server)
- Web-based, Telnet, CLI management interfaces
- SNMP v1/v2/v3 (56-bit encryption)
- Remote monitoring (RMON)
- Rich set of diagnostics with logging and alarms

Rugged Rated for reliability in harsh environments

- Immunity to EMI and heavy electrical surges
- Zero-Packet-Loss Technology
  – Meets IEEE 1613 Class 2 (electric utility substations)
  – Exceeds IEC 61850-3 (electric utility substations)
  – Exceeds IEC 61000-6-2 (generic industrial)
- -40°C to +85°C operating temperature (fanless)
- Conformal coated printed circuit boards (optional)

EMI and environmental type tests

IEC 61850-3 EMI TYPE TESTS

TEST	Description		Test levels	Severity levels
IEC 61000-4-2	ESD	Enclosure contact	+/- 8kV	4
		Enclosure air	+/- 15kV	
IEC 61000-4-3	Radiated RFI	Enclosure ports	20 V/m	X
IEC 61000-4-4	Burst (fast transient)	Signal ports	+/- 4kV @ 2.5kHz	
		D.C. power ports	+/- 4kV	4
		A.C. power ports		
		Earth ground ports(1)		
IEC 61000-4-5	Surge	Signal ports	+/- 4kV line-to-earth, +/- 2kV line-to-line	
		D.C. power ports	+/- 2kV line-to-earth, +/- 1kV line-to-line	3
		A.C. power ports	+/- 4kV line-to-earth, +/- 2kV line-to-line	4
IEC 61000-4-6	Induced (conducted) RFI	Signal ports	10Vrms	3
		D.C. power ports		
		A.C. power ports		
		Earth ground ports(1)		
IEC 61000-4-8	Power frequency	Enclosure ports	40 A/m continuous, 1000 A/m for 3s	5
IEC 61000-4-9	Pulsed		300 A/m	4
IEC 61000-4-10	Damped oscillatory		100 A/m for 2s	5
IEC 61000-4-29	Voltage dips & interrupts	D.C. power ports	30% for 0.1s, 60% for 0.1s, 100% for 0.05s	N/A
		A.C. power ports	30% for 1 period, 60% for 50 periods	
IEC 61000-4-11			100% for 5 periods, 100% for 50 periods(2)	
IEC 61000-4-12	Ring wave immunity	Signal ports D.C. power ports A.C. power ports	2.5kV common, 1kV diff. mode@1MHz	3
IEC 61000-4-16	Mains frequency voltage	Signal ports	30V continuous, 300V for 1s	4
		D.C. power ports		
IEC 61000-4-17	Ripple on D.C. power supply	D.C. power ports	10%	3
IEC 60255-5	Dielectric strength	Signal ports	2kVac (fail-safe relay output)	N/A
		D.C. power ports	1.5kV DC	
		A.C. power ports	2kVac	
	H.V. impulse	Signal ports	5kV (fail-safe relay output)	
		D.C. Power ports	5kV	
		A.C. Power ports		

(1) Only applicable to functional earth connections separated from the safety earth connection.
(2) Class 2 refers to "Measuring relays and protection equipment for which a very high security margin is required or where the vibration levels are very high. (e.g. shipboard application and for severe transportation conditions").

EMI and environmental type tests

IEEE 1613 (C37.90.x) EMI IMMUNITY TYPE TESTS

TEST	Description		Test levels	Severity levels
IEEE C37.90.3	ESD	Enclosure contact	+/- 8kV	N/A
		Enclosure air	+/- 15kV	
IEEE C37.90.2	Radiated RFI	Enclosure ports	35 V/m	
IEEE C37.90.1	Fast transient	Signal ports	+/- 4kV @ 2.5kHz	
		D.C. power ports	+/- 4kV	
		A.C. power ports		
		Earth ground ports(1)		
	Oscillatory	Signal ports	2.5kV common mode @1MHz	
		D.C. power ports	2.5kV common, 1kV diff. mode@1MHz	
		A.C. power ports		
IEEE C37.90	H.V. impulse	Signal ports	5kV (fail-safe relay output)	
		D.C. power ports	5kV	
		A.C. power ports		
	Dielectric strength	Signal ports	2kVac	
		D.C. power ports	1.5kV DC	
		A.C. power ports	2kVac	

Environmental type tests

TEST	Description		Test levels	Severity levels
IEC 60068-2-1	Cold temperature	Test Ad	-40°C, 16 Hours	N/A
IEC 60068-2-2	Dry heat	Test Bd	+85°C, 16 Hours	
IEC 60068-2-30	Humidity (damp heat, cyclic)	Test Dd	95% (non-condensing), 55°C , 6 cycles	
IEC 60255-21-1	Vibration		2g @ (10 - 150) Hz	
IEC 60255-21-2	Shock		30g @ 11mS	

RSG2488 order options	
Power supply 1 and 2[1]	
01	24VDC (13-36VDC)
02	48VDC (37-72VDC)
03	88-300VDC or 85-264VAC
04	No power supply (power supply 2 only)
Mounting options	
05	No mounting option
06	19" rack mount kit
07	DIN and panel mount kit
08	19" rack, DIN, and panel mount kit
Manufacturing modification	
09	Standard
10	Conformal coating
4-port modules slot 1 to slot 6	
11	RSG2488 4-port blank assembly module
12	4 x 10/100/1000Tx RJ45
13	4 x 10/100/1000Tx FastConnect™
14	4 x 10/100/1000BASE-TX M12 "A-Coded"
15	4 x 10/100/1000BASE-TX M12 "X-Coded"
16	4 x 1000LX/SX SFP – blank (no optical transceiver)
17	4 x 1000SX SFP – multimode, 850nm, LC, 500m
18	4 x 1000LX SFP – singlemode, 1310nm, LC, 10km
19	4 x 1000LX SFP – singlemode, 1300nm, LC, 25km
20	4 x 1000LX SFP – singlemode, 1550nm, LC, 70km
21	4 x 1000SX – multimode, 850 nm, LC, 500 m
22	4 x 1000LX – singlemode, 1310 nm, SC, 10 km
23	4 x 1000LX – singlemode, 1310nm, SC, 25km

RSG2488 order options	
24	4 x 1000LX – singlemode, 1310 nm, LC, 10 km
25	4 Port blank SFP module (no optics installed)
26	4 x 1000LX – singlemode, 1310nm, LC, 25km
27	4 x 100FX – multimode, 1300nm, SC, 2km
28	4 x 100FX – multimode, 1300nm, ST, 2km
29	4 x 100FX – multimode, 1300nm, LC, 2km
30	4 x 100FX – singlemode, 1310nm, SC, 20km
31	4 x 100FX – singlemode, 1310nm, ST, 20km
32	4 x 100FX – singlemode, 1310nm, LC, 20km
33	4 x 100FX – singlemode, 1310nm, SC, 50km
34	4 x 100FX – singlemode, 1310nm, LC, 50km
35	4 x 100FX – singlemode, 1310nm, SC, 90km
36	4 x 100FX – singlemode, 1310nm, LC, 90km
37	Precision Time Protocol (PTP) module: GPS in, IRIG-B AM/TTL in/out[2]
2-port modules slot 7 and slot 8	
38	RSG2488 2-port blank assembly module
39	2 x 10/100/1000Tx RJ45
40	2 x 10/100/1000Tx FastConnect™
41	2 x 10/100/1000BASE-TX M12 "A-Coded"
42	2 x 10/100/1000BASE-TX M12 "X-Coded"
43	2 x 1000LX SFP – blank (no optical transceiver)
44	2 x 1000SX SFP – multimode, 850 nm, LC, 500m
45	2 x 1000LX SFP – singlemode, 1310 nm, LC, 10 km
46	2 x 1000LX SFP – singlemode, 1310 nm, LC, 25 km
47	2 x 1000LX SFP – singlemode, 1550 nm, LC, 70 km
48	2 x 100FX SFP – multimode, 1310 nm LC 2 km

(1) Pluggable and screwable terminal block options available. Power supply 1 and power supply 2 will use the same terminal block option.
(2) PTP module must be installed on slot 1.

The RUGGEDCOM RSG2488 offers various IEEE 1588/PTP synchronization capabilities and can operate and provide time synchronization in several IEEE 1588 modes.

There are four *1-step only mode ports* located at slot 2/ port 4, slot 4/port 4, slot 6/port 4 and slot 7/port 2. The remaining 24 ports are *1-step and 2-step mode ports*.

IEEE 1588 / PTP synchronization capabilities		
1588 Mode	**1 and 2 Step mode ports**	**1 Step only mode ports**
1-Step peer-to-peer TC	•	•
2-Step peer-to-peer TC	•	•
End-to-end TC	•	•
End-to-end SC	•	
Peer-to-peer SC	•	
Peer-to-peer MC	•	•
Boundary clock	•	
End-to-end MC	•	
Peer-to-peer OC/TC hybrid	•	

TC: Transparent Clock
OC: Ordinary Clock
MC: Master Clock
SC: Slave Clock

Fiber specifications				
Parameter	Fiber port type			
Mode	Multimode	Singlemode	Singlemode	Singlemode
Connector	LC, LC-SFP, ST	SC, LC, LC-SFP	SC, LC, LC-SFP	LC-SFP
Typical distance	500 m	10 km	25 km	70 km
Optical wave-length	850 nm	1310 nm	1310 nm	1550 nm
Cable size core / cladding (um)	50/125 or 62.5/125	8/125 or 9/125	8/125 or 9/125	8/125 or 9/125
TX power (Min/Max dBm)	-9.5/-4	-9.5/-3	-7/-3	0/5
RX sensitivity (dBm)	-20	-22	-26	-23
RX saturation (dBm)	0	-3	-3	0
Typical budget (dBm)	14	17	19	25

Security information:

Siemens provides products and solutions with industrial security functions that support the secure operation of plants, solutions, machines, equipment and/or networks. They are important components in a holistic industrial security concept. With this in mind, Siemens' products and solutions undergo continuous development. Siemens recommends strongly that you regularly check for product updates.

For the secure operation of Siemens products and solutions, it is necessary to take suitable preventive action (e.g. cell protection concept) and integrate each component into a holistic, state-of-the-art industrial security concept. Third-party products that may be in use should also be considered. For more information about industrial security, visit
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