



Brochure

Edition
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RUGGED COMMUNICATIONS

RUGGEDCOM 19" Ethernet Layer 2 Switches

Rack Mountable

SIEMENS



RUGGEDCOM Ethernet switches are specifically designed to operate reliably in harsh industrial environments.

Contents

Features and benefits	3
RUGGEDCOM technology	4
RUGGEDCOM RSG2100	6
RUGGEDCOM RSG2100P	7
RUGGEDCOM RSG2200	8
RUGGEDCOM RST2228	9
RUGGEDCOM RST2228P	10
RUGGEDCOM RST2228 and RST2228P modules	11
RUGGEDCOM RPS2410 PoE Power Supply	11
RUGGEDCOM RSG2300	12
RUGGEDCOM RSG2300P	13
RUGGEDCOM RSG2488	14
RUGGEDCOM RSG2488 modules	15

I Features and benefits

RUGGEDCOM Ethernet switches are specifically designed to operate reliably in harsh industrial environments. All RUGGEDCOM switches meet and exceed the requirements of recognized (Electric power) industry standards, especially IEC 61850-3, IEEE 1613, and NEMA TS 2 (ITS) for ruggedness and reliable communications performance. They are ideal for mission-critical control applications requiring superior reliability and availability of network devices.

Common benefits

Maximum network availability and high reliability even in harsh environments

Zero Packet Loss™ technology for error-free performance despite high levels of electromagnetic interference (EMI) and high-speed network fault recovery (RSTP and eRSTP) ensures high availability of the network. Fault tolerant topologies (HSR/PRP) with zero second failover time are also available when using variants with redundant network access features.

Extract maximum performance from your device with a fully integrated power supply that doesn't need any external adapters and supports universal high voltage range as well as dual low voltage DC inputs.

Rugged design that ensures low total cost of ownership

Passive cooling across a wide operating temperature range of -40 °C to +85 °C and no mechanical

rotating components minimize risk of failures and provide a high MTBF (Mean Time Between Failures).

Functional features that simplify maintenance

Compact form factor and standard mounting options allow easy in-field installation in space-constrained cabinets. Removable storage media for configuration changes and firmware upgrade make it easy for on-site configuration and maintenance.

Secure and future-proof networks that maximize the return on your capital investment

Long-haul fiber optics with high bandwidth, high port density, and cybersecurity features in RUGGEDCOM switches make them well-suited for industrial networks with an increasing number of end-devices and evolving requirements, providing maximum return on CAPEX.

Firmware features (ROS)

Management	Layer 2	Cybersecurity	Additional Features (select models)
Web-based, secure console (via SSH)	RSTP (IEEE 802.1D-2004), eRSTP™ (Enhanced Rapid Spanning Tree)	Multi-level user passwords	HSR and PRP Redundancy Protocols (IEC 62439-3)
Command Line Interface (CLI)	For models with ROS 5.x, MSTP (IEEE 802.1Q-2005), and MRP (IEC 62439-2)	Secure File Transfer Protocol (SFTP)	IEEE 1588v2 time synchronization
Serial console	QoS (Quality of Service) IEEE 802.1p	Web-based management using SSL	Static Layer 3 IP switching
Plain ASCII format configuration file with encryption option	Class of Services (CoS) and DSCP (Differentiated Services)	RADIUS and TACACS+ authentication service for device management	Removable memory storage for configuration backup and firmware upgrade
SNMP v1/v2c/v3	VLAN (IEEE 802.1Q) and double VLAN-tagging (QinQ)	IEEE 802.1X port-based Network Access Control with PEAP (Protected Extensible Authentication Protocol) and EAP-TLS	<ul style="list-style-type: none"> MMS Bridge Object Model according to IEC 61850-90-4 Access Control Lists (ACL) for Layer 2 and Layer 3 Remote Traffic Mirroring
Remote monitoring (RMON)	Link aggregation (IEEE 802.3ad), Link Layer Discovery Protocol (LLDP) IEEE 802.11AB	SSL certificates in X.509v3 or PEM format; RSA key pair 1024-bit, 2048-bit, 3072-bit; or NIST P-256, P-384 or P-521	MACsec based on IEEE 802.1AE
Syslog, logging, and alarms	IGMPv1, IGMPv2, IGMPv3 snooping for multicast filtering	SSH public/private key in PEM format, DSA 1024-bit, 2048-bit, 3072-bit; or RSA key pair 1024-bit, 2048-bit, 3072-bit	
Modbus slave	GMRP, GVRP	Port rate limiting	
MMS Bridge Object Model (IEC 61850-90-4)	Port mirroring, port configuration, status, and statistics	Broadcast storm limiting	
	NTP, SNTP	Quarantine and Guest VLAN	
	DHCP Snooping and DHCP Relay (Option 82)		
	Dynamic ARP Inspection		

RUGGEDCOM technology

RUGGEDCOM products have been specifically designed and tested to withstand the demands of harsh environments.

Rugged rated

Highly Accelerated Life Testing (HALT) is used in the early stages of product development to detect any design and performance issues. Highly Accelerated Stress Screening (HASS) is performed on all RUGGEDCOM products, in order to ensure that customers get their orders free of manufacturing errors and random defects.

RUGGEDCOM products provide reliable and error-free operation in harsh electrical installations with high EMI.

Operation in industrial temperature range

- -40 °C to +85 °C normal operation
- Passive cooling – no fans

High availability

- Integrated single or redundant power supplies
- Universal high-voltage range: 88 – 300 V DC or 85 – 264 V AC
- Low voltage: 12 V DC, 24 V DC, or 48 V DC

Durable installations

- Full metal enclosure
- Heavy duty mounting
- Industrial terminal blocks for power and I/O connection

Zero Packet Loss™

The proliferation of IP networking technology from the office to industrial environments for use in real-time, mission critical control applications requires a level of immunity to electromagnetic interference (EMI) well beyond what is currently delivered by commercial grade networking products. In fact, even the EMI immunity requirements prescribed by IEC 61000-6-2 (generic standards – immunity for industrial environments) are inadequate for many environments.

One such environment is the electric utility substation, where EMI levels can be significantly higher than those in the generic industrial environment defined in IEC 61000-6-2. In order to address this risk, both the IEC and IEEE have developed and issued standards addressing EMI immunity requirements for communications networking equipment in electric utility substations.

In response to these requirements, RUGGEDCOM technology withstands all of the EMI type tests required by IEC 61850-3 without experiencing any communications loss or delays. Products featuring this technology also qualify as IEEE 1613 class 2 error-free devices. This innovation is known as Zero Packet Loss™ technology and it is designed to provide the same level of EMI immunity and reliability as that of protective relays.



IEC 61850

The IEC 61850 standard for communications in substations is composed of ten parts, which outline a complete framework for substation automation, including EMI (electromagnetic interference), immunity, and environmental requirements (IEC 61850-3) for communications networks in substations.

The EMI immunity requirements of IEC 61850-3 are derived from IEC 61000-6-5 (Immunity for Power Station and Substation Environments), which defines a set of potentially destructive EMI type tests designed to simulate both continuous and transient EMI phenomena in the substation.

This standard has a minimum requirement that the networking equipment must operate without any physical damage, reset, or latch-up while being subjected to a variety of destructive EMI immunity type tests.

IEEE 1613

IEEE 1613 specifies ratings, environmental performance, and testing requirements for communications networking devices installed in electric power substations.

Within the standard, two classes of devices are defined, based on the outcome of a specific set of potentially destructive EMI type tests (EMI stress) designed to simulate EMI phenomena in the substation. These type tests are derived from the same type tests applied to mission critical protective relays (i.e., C37.90.).

Class 1 – these devices are allowed to experience data errors, loss, or delays when exposed to EMI stress.

Class 2 – these devices must provide error-free (i.e., no data errors, delays, or loss) operation when exposed to EMI stress.

Neither class of device may experience any permanent damage under EMI stress.

The RUGGEDCOM family qualifies as IEEE 1613 Class 2 error-free devices.



RUGGEDCOM RSG2100

The RUGGEDCOM RSG2100 is a utility-grade, fully managed 19-port modular Ethernet switch with Gigabit uplinks specifically designed to operate reliably in electrically harsh and climatically demanding environments.



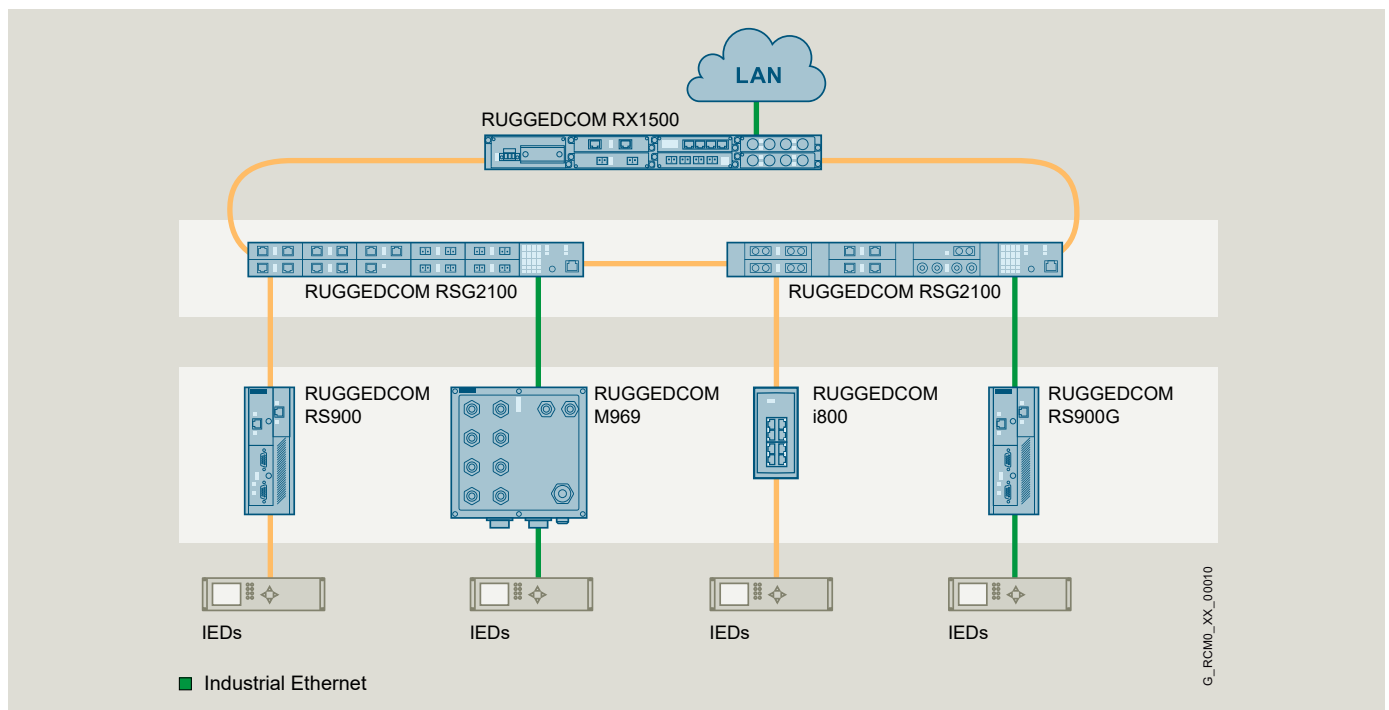
Ethernet ports

- Up to 19 ports:
 - 3 x 10/100/1000BASE-X ports
 - 16 x 10/100BASE-X ports
 - 2 port modules for added flexibility
- Industry standard fiber optic connectors: ST, MTRJ, LC, SC, RJ45, micro-D
- Copper, multi-mode, and single-mode optical transceivers

Universal power supply options

- Fully integrated, optional dual redundant power supplies
- Universal high-voltage range: 88 – 300 V DC or 85 – 264 V AC
- Low-voltage range: 24 V DC (10 – 36 V DC) or 48 V DC (36 – 72 V DC)
- Screw or pluggable terminal blocks for reliable, maintenance-free connections
- CSA/UL 62368 safety approved to +85 °C

Use case



The interface versatility of the RUGGEDCOM RSG2100 makes it ideal to connect different devices using a combination of fiber optic and copper with different connector types and speeds.

RUGGEDCOM RSG2100P

The RUGGEDCOM RSG2100P is a utility-grade, fully managed 19-port Power-over-Ethernet (PoE) enabled modular Ethernet switch with Gigabit uplinks specifically designed to operate reliably in electrically harsh and climatically demanding environments.



Ethernet ports

- Up to 19 ports:
 - 3 x 10/100/1000BASE-X ports
 - 16 x 10/100BASE-X ports
 - 2 port modules for added flexibility
- Industry standard fiber optic connectors: ST, MTRJ, LC, SC, RJ45, micro-D
- Copper, multi-mode, and single-mode optical transceivers

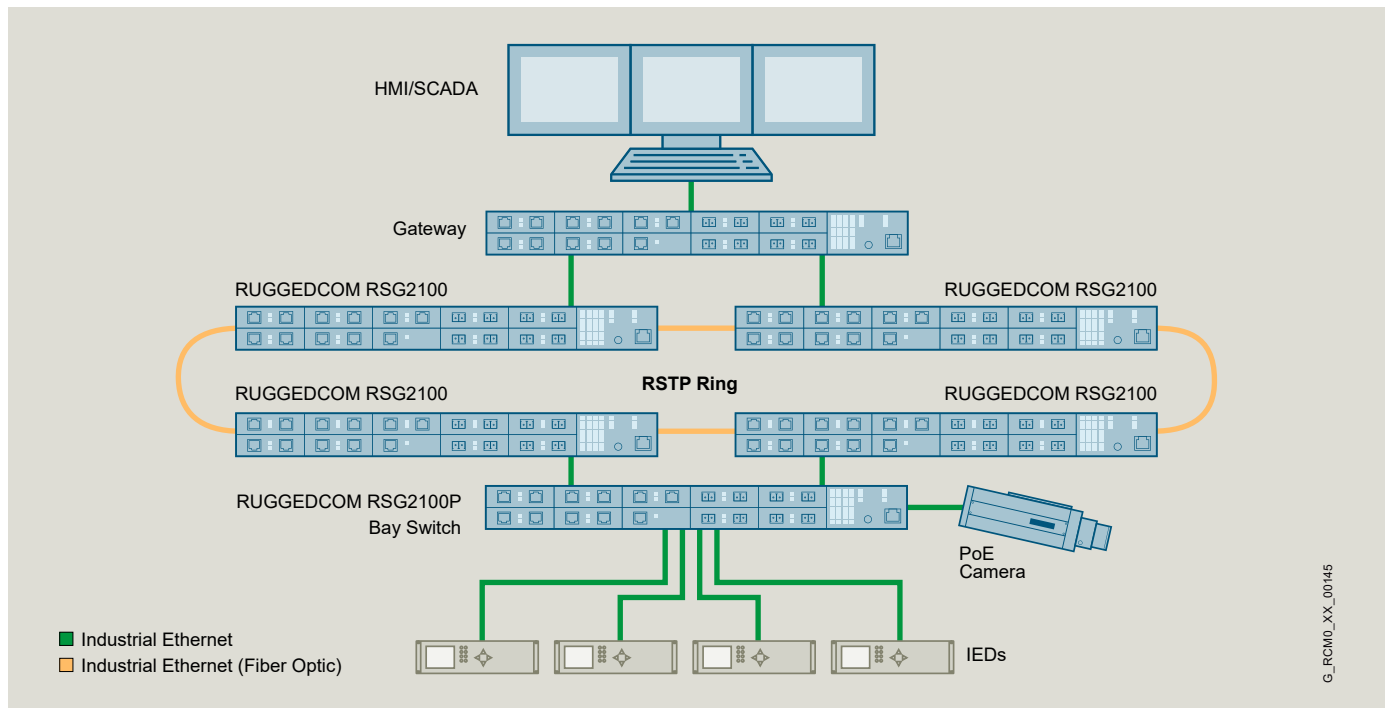
Power-over-Ethernet (PoE)

- Up to 4 PoE ports
- 4 x optional 10/100BASE-TX 802.3af compliant ports

Universal power supply options

- Fully integrated power supplies
- Universal high-voltage range: 88 – 300 V DC or 85 – 264 V AC
- Low-voltage range: 24 V DC (10 – 36 V DC) or 48 V DC (36 – 72 V DC)
- Screw or pluggable terminal blocks for reliable, maintenance-free connections
- CSA/UL 62368 safety approved to +85 °C

Use case



The RUGGEDCOM RSG2100 is deployed in a redundant ring network architecture based on RSTP for optimal reliability.

RUGGEDCOM RSG2200

The RUGGEDCOM RSG2200 is a utility-grade, fully managed 9-port modular Gigabit Ethernet switch specifically designed to operate reliably in harsh environments and to withstand high levels of electromagnetic interference.



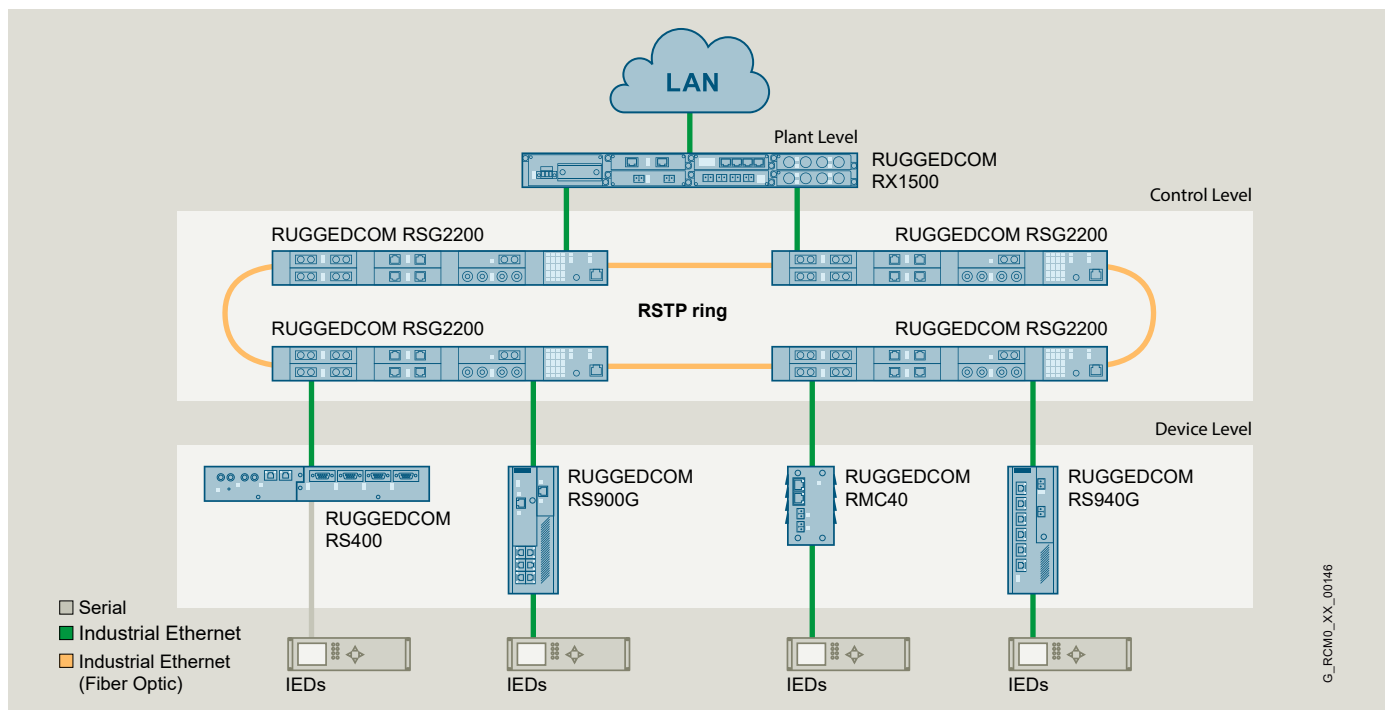
Ethernet ports

- Up to 9 x 10/100/1000BASE-X ports
- 2 port modules for added flexibility
- Industry standard fiber optic connectors: RJ45, ST, MTRJ, LC, SC
- Copper, multi-mode, and single-mode optical transceivers

Universal power supply options

- Fully integrated, optional dual redundant power supplies
- Universal high-voltage range: 88 – 300 V DC or 85 – 264 V AC
- Low-voltage range: 24 V DC (10 – 36 V DC) or 48 V DC (36 – 72 V DC)
- Screw or pluggable terminal blocks for reliable, maintenance-free connections
- CCSA/UL 62368 safety approved to +85 °C

Use case



With the RUGGEDCOM RSG2200, Gigabit communication is possible for a reliable and high-speed connection throughout the network.

RUGGEDCOM RST2228

The RUGGEDCOM RST2228 is a 28-port, field modular 19" Layer2/Layer3 rack switch with 10 Gbps uplinks and compliant with PTP IEEE 1588v2. It supports Layer 3 static unicast routing, imparting greater flexibility over standard Layer 2 switches for digital substation networks.



Ethernet ports

- 4 x 1000BASE-X/10GBASE-X uplinks
- Up to 24 x 10/100/1000BASE-X ports
- 4-port modules for added flexibility
- Industry standard connectors: RJ45, LC, and SFP
- Copper, single, and multi-mode optical transceivers

Engineered for the modern digital substation

- **Precision timing:** IEEE 1588v2 with hardware time stamping and support for Transparent Clock (TC) and Ordinary and Transparent Clocks (OC+TC).
- **Redundant protocols:** RSTP, eRSTP, MSTP, STP, HSR/PRP (with the RMM2972-2RNA line module), and link aggregation

Point-to-point wire-speed encryption:

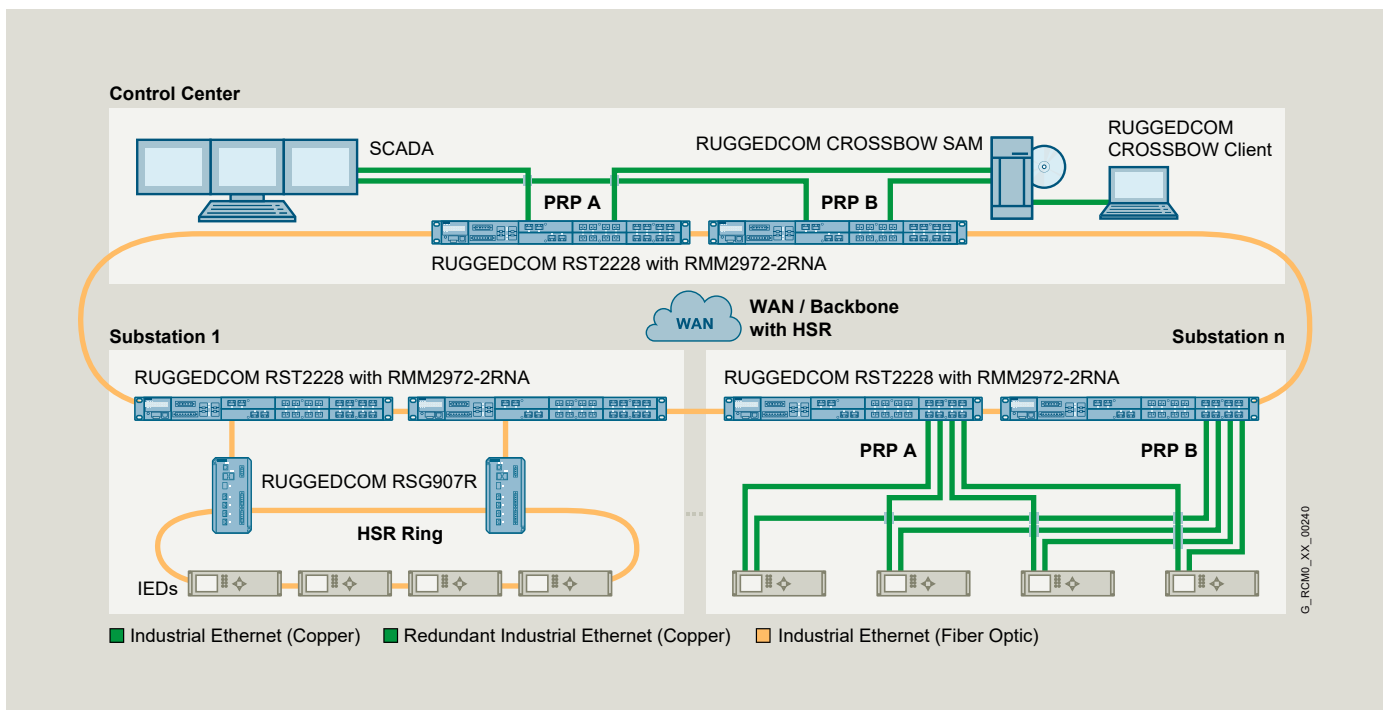
Supports MACsec functionality as per IEEE 802.1AE standard to secure data transmission at Layer 2 with the RMM2973M-4RJ45 and RMM2972M-4SFP line modules.

- **RUGGEDCOM CLP:** removable storage media port to easily save and reuse all configuration data

Universal power supply options

- Fully integrated, optional dual redundant power supplies
- Universal high-voltage range: 88 – 300 V DC or 85 – 264 V AC
- Screw or pluggable terminal blocks for reliable, maintenance-free connections
- CSA/UL 62368 safety approved to +85 °C
- Low-voltage power supply options 12 V DC (10.5 – 15 V DC), 24 V DC (13 – 36 V DC), and 48 V DC (36 – 72 V DC)

Use case



Up to 24 modern IEDs or other IEEE 1588 slaves can be connected directly to the RUGGEDCOM RST2228 via Fast Ethernet or Gigabit ports.

RUGGEDCOM RST2228P

The RUGGEDCOM RST2228P is a 28-port field modular Power-over-Ethernet (PoE) enabled, 19" Layer 2/Layer 3 rack switch with 10 Gbps uplinks and compliant with PTP IEEE 1588v2. It supports Layer 3 static unicast routing, imparting greater flexibility over standard Layer 2 switches for modern industrial networks.



Ethernet ports

- 4 x 1000BASE-X/10GBASE-X uplinks
- Up to 24 x 10/100/1000BASE-X ports
- 4-port modules for added flexibility
- Industry standard connectors: RJ45, LC, and SFP
- Copper, single, and multi-mode optical transceivers

Engineered for the modern industrial networks

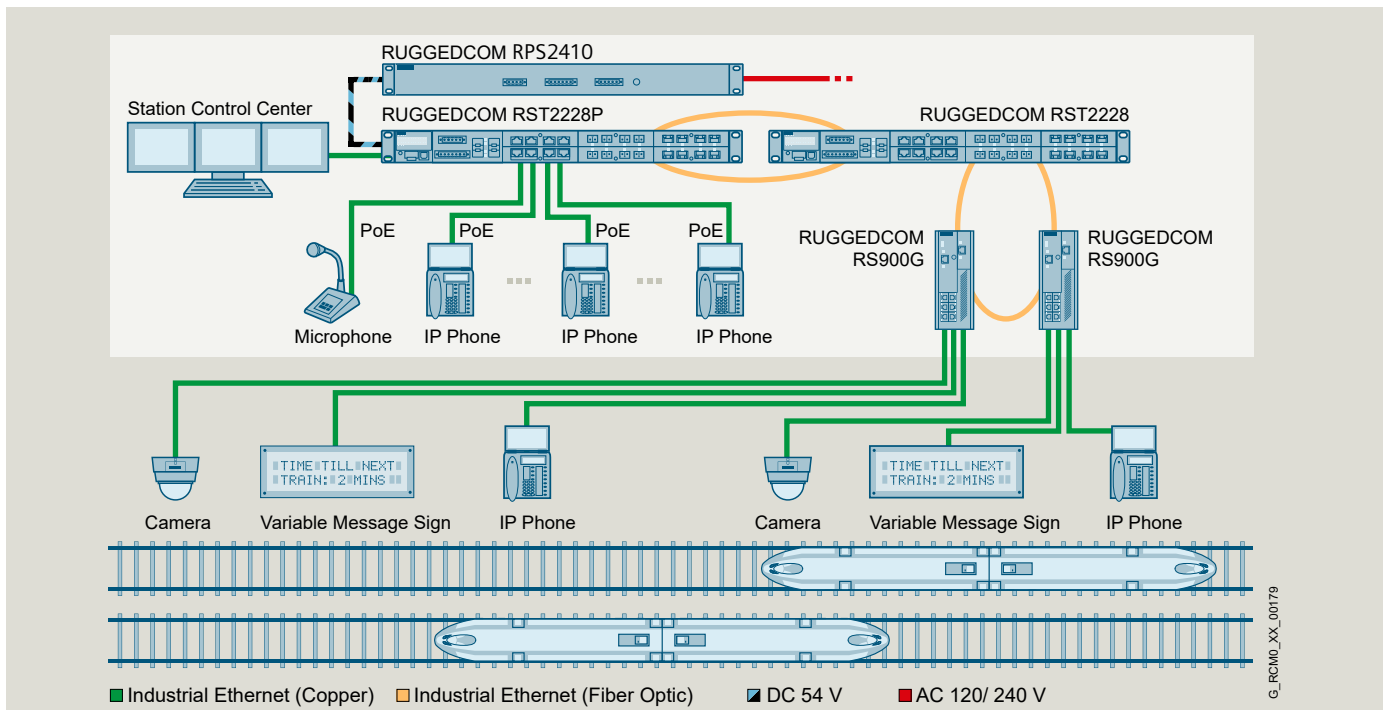
- **Power-over-Ethernet (PoE):** Up to 24 x 10/100/1000BASE-X IEEE 802.3af/at/bt Type 3 (up to 60 W/port) PoE ports and 500 W shared power budget per switch.
- **Precision timing:** IEEE 1588v2 with hardware time stamping and support for Transparent Clock (TC) and Ordinary and Transparent Clocks (OC+TC)

- **Redundant protocols:** RSTP, eRSTP, MSTP, STP, HSR/PRP (with the RMM2972-2RNA line module), and link aggregation
- **Point-to-point wire-speed encryption:** Supports MACsec functionality as per IEEE 802.1AE standard to secure data transmission at Layer 2 with the RMM2973M-4RJ45 and RMM2972M-4SFP line modules.
- **RUGGEDCOM CLP:** removable storage media port to easily save and reuse all configuration data

Universal power supply options

- Fully integrated, optional dual redundant power supplies
- Universal high-voltage range: 88 – 300 V DC or 85 – 264 V AC
- Screw or pluggable terminal blocks for reliable, maintenance-free connections
- CSA/UL 62368 safety approved to +85 °C
- Low-voltage power supply options 12 V DC (10.5 – 15 V DC), 24 V DC (13 – 36 V DC), and 48 V DC (36 – 72 V DC)

Use case



The high port density of the RST2228P makes it possible to connect a large number of PoE devices like VoIP telephones and IP cameras with a single switch.

RUGGEDCOM RST2228 and RST2228P modules

The RUGGEDCOM RST2228 and RST2228P are field modular Layer 2/Layer 3 Ethernet switches equipped with 6 slots for various media modules. Media modules are available with different interface options.



RUGGEDCOM RMM2972-2RNA

Ethernet ports

- 2 x 100/1000 Mbps RJ45 (SFP fiber and copper, backplane)
- HSR/PRP ports A & B, 100/1000 Mbps RJ45
- Supports RedBox and PRP to HSR coupling with the RST2228 and RST2228P according to the IEC 62439 standard.
- RUGGEDCOM RMM2972-2RNA line module for RUGGEDCOM RST2228 and RST2228P switches can be used to build fault-tolerant networks with zero millisecond failover time based on the IEC 62439 standard

RUGGEDCOM RPS2410 PoE Power Supply

The RUGGEDCOM RPS2410 600 W 19-inch rack power supply is designed to meet the high power demands of physical security, access control, wireless connectivity, lighting, and other PoE applications. Together with the RST2228P, it provides a small footprint high-power PoE solution, especially for ITS networks, as it is certified to the NEMA TS 2 standard



- Input: 150 – 250 V DC and 120 – 240 V AC, Output 54 V DC
- Operating temperature –40 °C to +75 °C
- IP40

RUGGEDCOM RSG2300

The RUGGEDCOM RSG2300 is a utility-grade, fully managed 32-port modular Ethernet switch specifically designed to operate reliably in electrically harsh and climatically demanding environments.



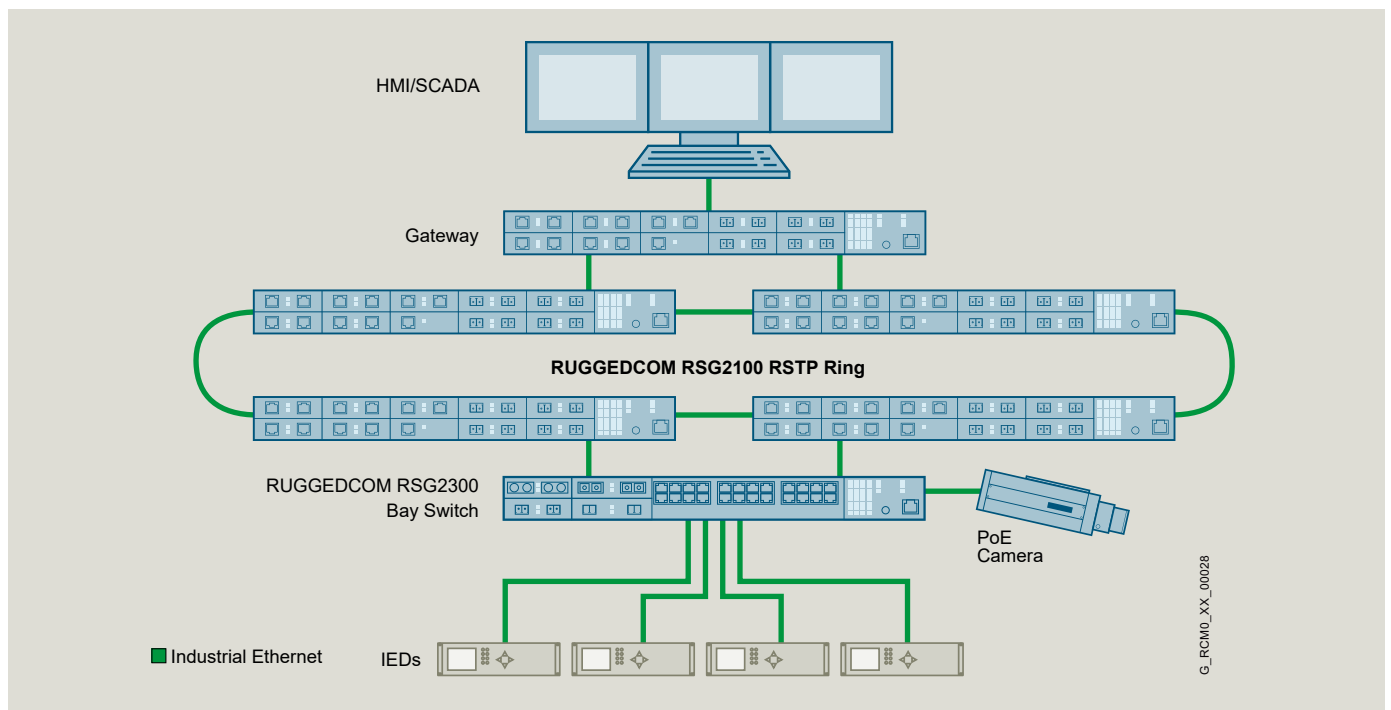
Ethernet ports

- Up to 32 ports:
 - 4 x optional 10/100/1000BASE-X ports
 - 4 x optional 10/100BASE-X ports
 - 24 x fixed 10/100BASE-TX ports
- 2-port modules for added flexibility
- Industry standard fiber optic connectors: RJ45, ST, MTRJ, LC, SC
- Copper, multi-mode, and single-mode optical transceivers

Universal power supply options

- Fully integrated, optional dual redundant power supplies
- Universal high-voltage range: 88 – 300 V DC or 85 – 264 V AC
- Low-voltage range: 24 V DC (10 – 36 V DC) or 48 V DC (36 – 72 V DC)
- Screw or pluggable terminal blocks for reliable, maintenance-free connections
- CSA/UL 62368 safety approved to +85 °C

Use case



With its high port density of copper interface, the RUGGEDCOM RSG2300 is ideal for connecting a large number of devices at the Bay level.

RUGGEDCOM RSG2300P

The RUGGEDCOM RSG2300P is a utility-grade, fully managed 32-port modular Power-over-Ethernet (PoE) enabled Ethernet switch specifically designed to operate reliably in electrically harsh and climatically demanding environments.



Ethernet ports

- Up to 32 ports:
 - 4 x optional 10/100/1000BASE-X ports
 - 4 x optional 10/100BASE-X ports
 - 24 x fixed 10/100BASE-TX ports
- 2-port modules for added flexibility
- Industry standard fiber optic connectors: RJ45, ST, MTRJ, LC, SC
- Copper, multi-mode, and single-mode optical transceivers

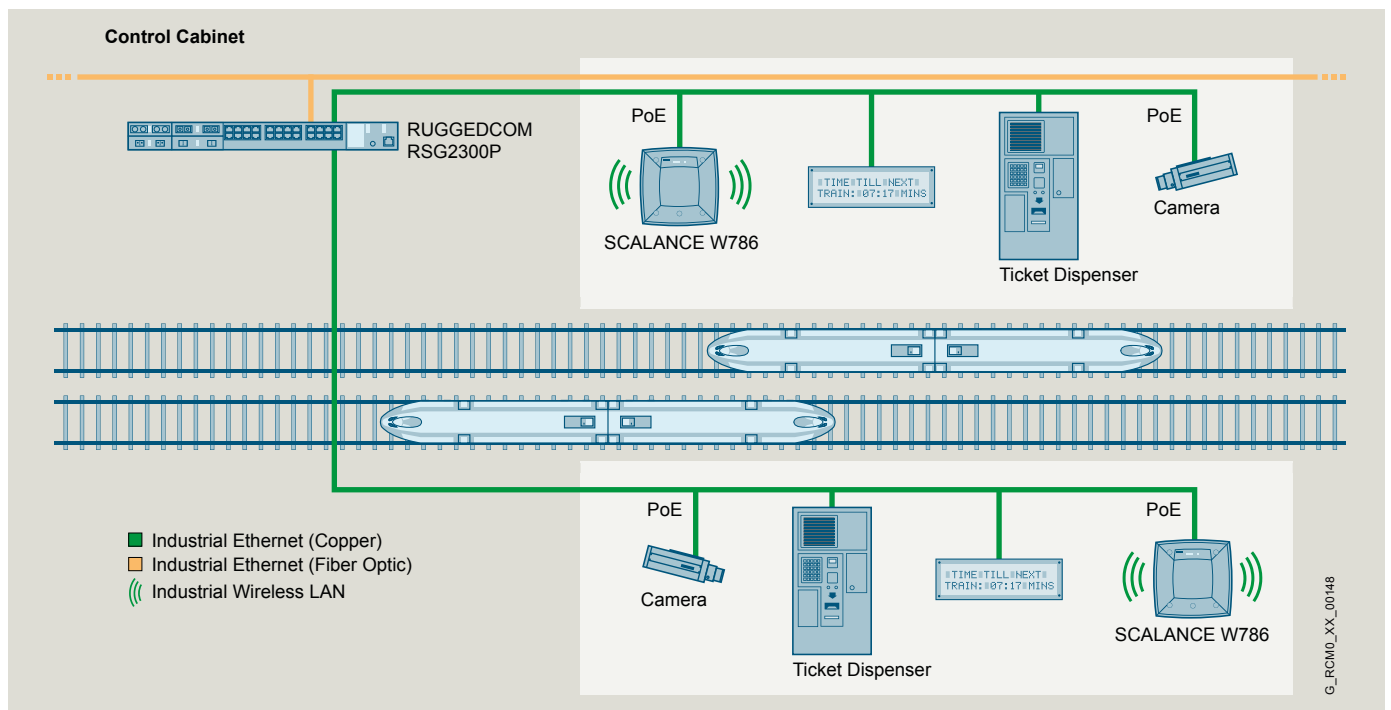
Power-over-Ethernet (PoE)

- Up to 4 PoE ports
 - 2 x fixed 10/100BASE-TX 802.3af compliant ports
 - 2 x optional 10/100BASE-TX 802.3af compliant ports

Universal power supply options

- Fully integrated power supplies
- Universal high-voltage range: 88 – 300 V DC or 85 – 264 V AC
- Low-voltage range: 24 V DC (10 – 36 V DC) or 48 V DC (36 – 72 V DC)
- Screw or pluggable terminal blocks for reliable, maintenance-free connections
- CSA/UL 62368 safety approved to +85 °C

Use case



The high port density of the RUGGEDCOM RSG2300P makes it ideal for connecting wireless LAN, IP cameras, and other peripheral devices.

RUGGEDCOM RSG2488

The RUGGEDCOM RSG2488 is a utility-grade, field upgradable, fully managed 28-port Gigabit Ethernet switch with hot-swappable dual redundant power supplies and full support for IEEE 1588 precision timing protocol. It is specifically designed to operate reliably in electrically harsh and climatically demanding environments.



Ethernet ports

- 28 x 10/100/1000BASE-X ports
- 4-port field replaceable modules
- Industry standard fiber optic connectors: RJ45, FastConnect, M12, ST, LC, SC
- Copper, multi-mode, and single-mode optical transceivers

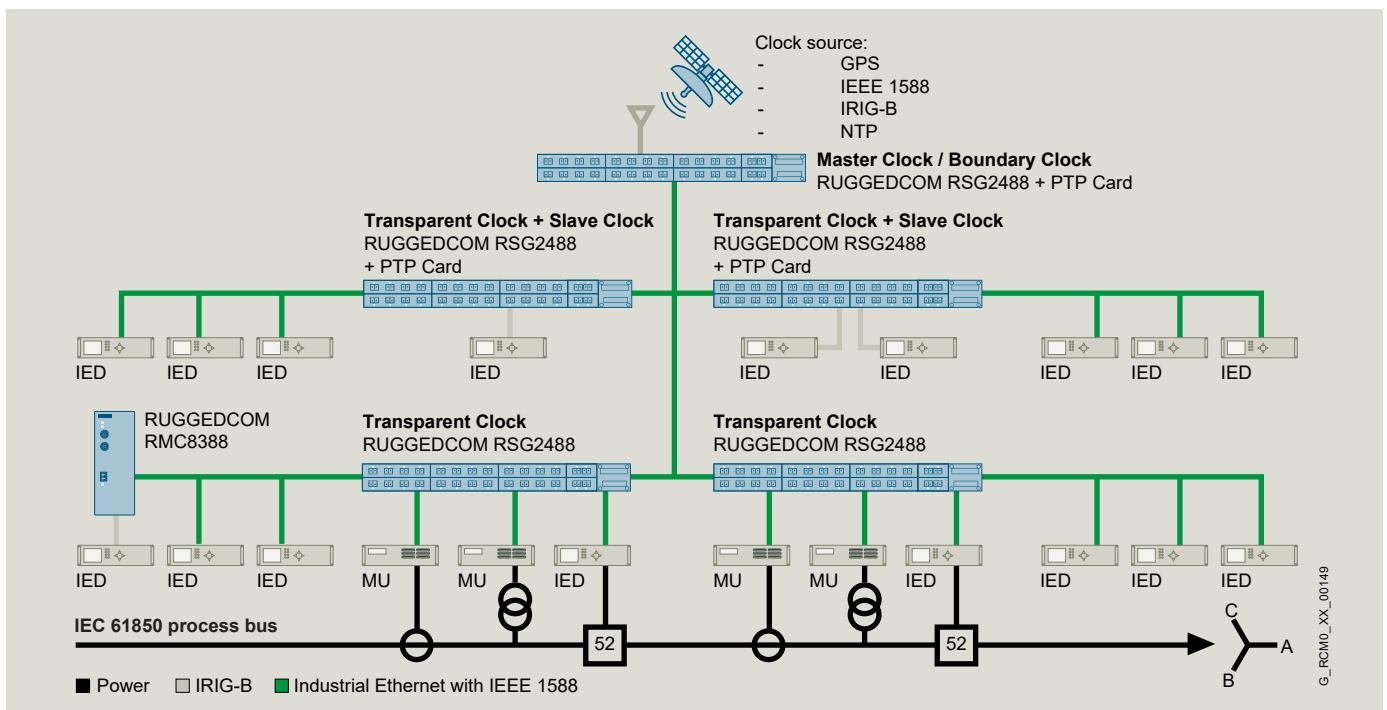
Precision timing

- IEEE 1588, SNTP, IRIG-B, and GPS conversion
- Supports IEEE 1588v2 1-step and 2-step hardware time stamping
- GPS input to serve as grandmaster clock
- Supports master, slave, ordinary, and transparent clock modes

Universal power supply options

- Fully integrated, hot-swappable dual redundant power supplies
- Universal high-voltage range: 100 – 300 V DC or 85 – 264 V AC
- Low-voltage range: 24 V DC (13 – 36 V DC) or 48 V DC (37 – 72 V DC)
- Screw or pluggable terminal blocks for reliable, maintenance-free connections
- CSA/UL 62368 safety approved to +85 °C

Use case



The field-modular RUGGEDCOM RSG2488 is the most versatile offering for IEEE 1588 time synchronization and can function as a Grandmaster, boundary, slave, and transparent Clock, when installed with the PTP module.

RUGGEDCOM RSG2488 modules

The RUGGEDCOM RSG2488 is a modular, field replaceable platform that supports different Ethernet connectors and speeds, making it ideally suited for electric power utilities, the industrial plant floor, as well as rail and traffic control systems.



SFP



LC



ST



M12



PTP



RJ45



RJ45 FastConnect



SC



RJ45



RJ45 FastConnect



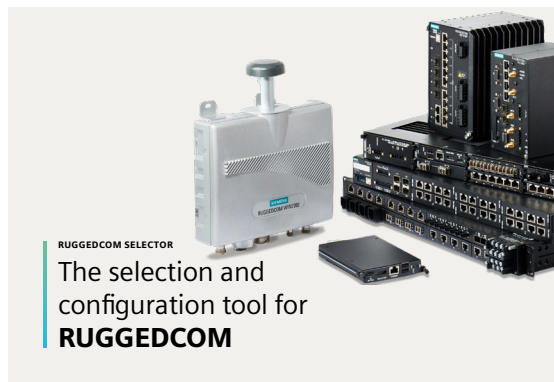
M12



SFP



LC



RUGGEDCOM SELECTOR

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Protect your investment for the longterm

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Security information

Siemens provides products and solutions with industrial security functions that support the secure operation of plants, systems, machines and networks.

In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art industrial security concept. Siemens' products and solutions only form one element of such a concept.

Customer is responsible to prevent unauthorized access to its plants, systems, machines and networks. Systems, machines and components should only be connected to the enterprise network or the internet if and to the extent necessary and with appropriate security measures (e.g. use of firewalls and network segmentation) in place.

Additionally, Siemens' guidance on appropriate security measures should be taken into account. For more information about industrial security, please visit: siemens.com/industrialsecurity

Siemens' products and solutions undergo continuous development to make them more secure. Siemens strongly recommends to apply product updates as soon as available and to always use the latest product versions. Use of product versions that are no longer supported, and failure to apply latest updates may increase customer's exposure to cyber threats.

To stay informed about product updates, subscribe to the Siemens Industrial Security RSS Feed under: siemens.com/industrialsecurity

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