SIEMENS

RUGGEDCOM Multi-Service Platforms

Modular Managed Layer 2 / 3 Ethernet Switches, Routers and Security Appliances

siemens.com/ruggedcom

The RUGGEDCOM Multi-Service Platforms include a rich array of carrier grade features designed and tested to withstand the demands of critical infrastructure environments.

Contents

RUGGEDCOM Multi-Service Platform features and benefits

Low total cost of ownership
- No hassle upgrades in the field, and the flexibility to adapt to the changing network

Reliability
- Utility-grade reliability designed in from the very beginning
- Current field demonstrated MTBF of 220 years
- Designed as per MIL-HDBK-217F reliability guidelines
- HALT analysis to enhance product robustness

Carrier grade performance
- Layer 2 and layer 3 switching and a rich set of WAN, serial, switching, routing, cybersecurity and management features

Immunity
- IEEE 1613 class 2 error-free for substations
- IEC 61850-3 performance for substations
- Class-B emissions for demanding installations

Suitable for all environments
- Certified to several industry standards: electric power, transportation, and MIL-STD
- Available in various form factors
- Best-in-class warranty, support, and services

IIoT platform for OT networks
Integrate commercially available applications for cybersecurity, Edge computing, network management, etc. using the RUGGEDCOM APE1808 line module

Common features

Management	Layer 2 (switching)	Layer 3 (routing)	Security
Web UI	QoS	MPLS	Integrated firewall
HTTPS	RSTP, eRSTP, MSTP, MRP	DHCP	IPsec
SSH	SNTP	VRRPv2 and VRRPv3	VPN
RMON	L2TPv2, L2TPv3, GRE	PIM SM, PIM-SSM, IGMPv3	HTTPS
SNMP	Port rate limiting	OSPF	VLANs
CLI	Link backup	BGP	SNMPv3
Secure remote syslog	Port mirroring	Traffic prioritization	Port-based access control
Real-time line traces	Broadcast storm filtering	WAN interfaces	MAC-based port security
USB mass-storage	Jumbo frame (9 kb)	Cellular interfaces	RADIUS, TACACS+
Serial console		IS-IS	Brute Force Attack prevention
		Virtual routing & forwarding (VRF)	Dead peer detection
		Dynamic L2TPv3	IPV6 tunneling
		DMVPN	IPV6 firewall
		R-GOOSE	
		NetFlow	

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. Siemens performs Highly Accelerated
Stress Screening (HASS) 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 VDC or 85–264 VAC
- Low voltage: 12 VDC, 24 VDC or 48 VDC

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
of 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 protective relays.

IEC 61850

IEC 61850 standard for communications in substations is composed of ten parts, which outlines 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 operates without any physical damage, reset or latch-up during the application of 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 must experience any permanent damage under EMI stress.

The RUGGEDCOM family qualifies as IEEE 1613 Class 2 error-free devices.
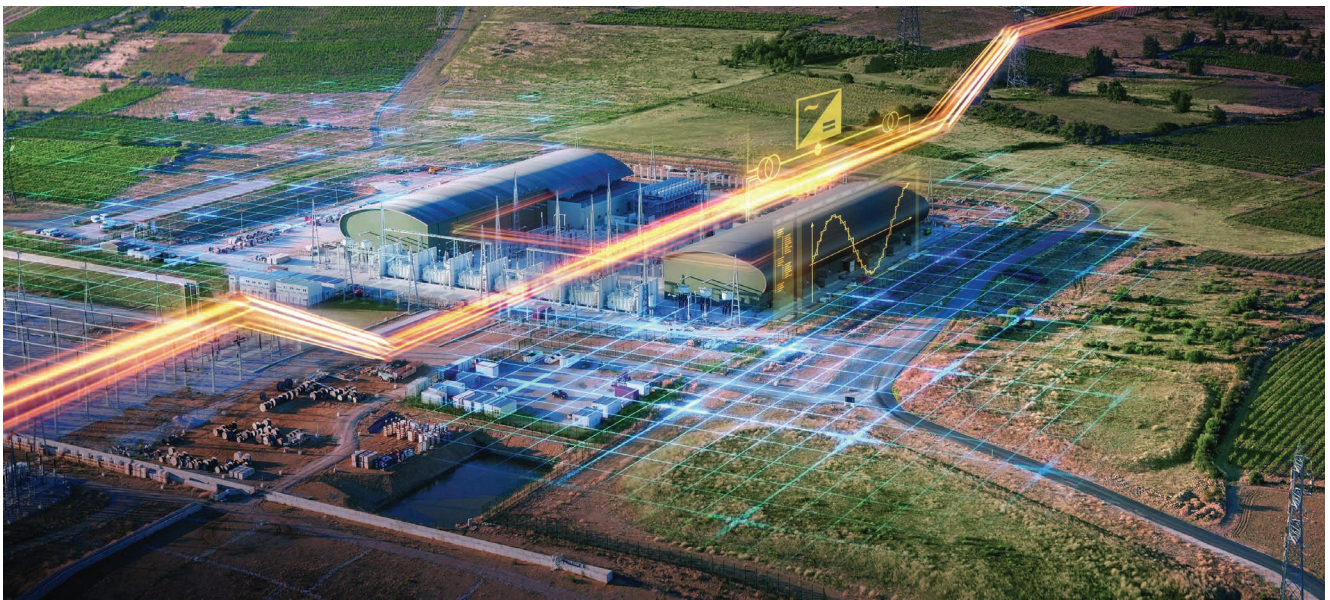
RUGGEDCOM RX1400

The RUGGEDCOM RX1400 is a multiprotocol intelligent node which combines Ethernet switching, routing, and firewall functionality with various wide area connectivity options.

The RUGGEDCOM RX1400 has an IP40 degree of protection, does not use internal fans for cooling and supports a wide temperature range of -40° C to +85° C. This device supports a LINUX virtual machine environment, the RUGGEDCOM VPE1400 virtual processing engine, allowing customers and third party application developers to deploy customized intelligence at the network edge.

Certifications
- Electric power (IEC 61850-3, IEEE 1613)
- Rail and transportation (NEMA TS 2, EN 50121-4)
- Oil and gas (IEC Ex, ATEX Zone II, HazLoc (Class 1, Div.2) available)

Specifications	RX1400
Cellular interface (optional)	
Connectors	2 x SMA-type
GSM/GPRS/EDGE	Quad band
UMTS/HSDPA+	850/900/1900/2100 MHz
LTE	B1, B2, B3, B4, B5, B7, B8, B12, B13, B14, B17, B20, B25, B26, B28, B29, B30, B38, B40, B41, B66, B71
Number of SIM cards supported	2
Wireless LAN interface (optional)	
Interfaces	2 x R-SMA-type
Standards	IEEE 802.11a/b/g/n (2.4/5 GHz)
Supported modes	Access Point, Client
Wired interfaces	
LAN	4 x RJ45 (10/100BASE-TX), 2x SFP-Slot (1000BASE-LX / 100BASE-FX)
Serial	2 x DB9 male connector
Console	1 x DB9 male connector
GPS interface (optional)	
Connectors	1 x SMA-type
Standards	GPS (Global Positioning System), GLONASS (Global Navigation Satellite System)
Power supply	
Number of supplies	1
Power supply range	9-36 VDC / 36-72 VDC / 98-300 VDC / 88-264 VAC
Power consumption	17 W
Permitted ambient conditions	
Operating temperature	-40° C to +85° C
Maximum heat dissipation	58 BTU/hr
Degree of protection	IP40
Constructional design	
Maximum weight	2.5 kg
Dimensions (w x h x d)	88 x 150 x 120 (mm) / 3.4 x 5.9 x 4.7 (in)

RUGGEDCOM RX1500 / RX1501 / RX1524 / RX1536

New

The RUGGEDCOM RX1500 series is a cost efficient utility grade layer 2 and layer 3 switch and router.

The RUGGEDCOM RX1500 family's design uses hot-swappable line modules and power supplies, allowing customers to select amongst WAN, serial and Ethernet options, even after it is installed in the network. This, coupled with a wide operating temperature range of -40° C to + 85° C and a high level of immunity to EMI, surge voltages and shocks, makes it ideal for electric power utilities, industrial networks, railways and traffic control systems.

RUGGEDCOM RX1524 and RX1536 are the latest additions to the rack mount RX1500 series. They provide customers with enhanced switching and routing performance along with upgraded security features, including increased IPsec VPN throughput.

Certifications
- Electric power (IEC 61850-3, IEEE 1613, IEC 60255)
- Rail and transportation
  (NEMA TS 2, EN 50155, EN 50121-4)

Specifications	RX1500 Family	RX1500	RX1501	RX1524	RX1536
Hot Swappable Modules		4	6	4	6
Connectivity	Type	Maximum port density			
Gigabit	LC, M12 (A, X-coded), RJ45, SFP	8	4	8	4
Fast Ethernet	LC, RJ45, M12 (D, A, X-coded), SFP	24	36	24	36
APE1808	RJ45, USB, Display port (Intel HD 500) and MicroSD reader	2	2	2	2
10 FL	ST – up to 2 km	12	18	12	18
Cellular	SMA (antennas), 2FF (mini-SIM), GSM, EDGE, HSPA, EVDO (network)	8	12	8	12
Serial	RJ45 (RS232, RS422, RS485)	24	36	24	36
Console and management	DB9/RJ45 console, RJ45 management, USB				
Power supply					
Number of supplies		2	1	2	1
Power supply range	9-15 VDC / 15-36 VDC / 36-72 VDC / 88-300 VDC or 85-264 VAC				
Power consumption	65 W				
Permitted ambient conditions					
Operating temperature	-40° C to +85° C				
Maximum heat dissipation	222 BTU/hr				
Degree of protection	IP30				
Constructional design					
Maximum weight	5 kg				
Dimensions (w x h x d)	440 x 300 x 44 (mm) 17.3 x 11.8 x 1.7 (in)				

RUGGEDCOM RX1510 / RX1511 / RX1512

The RUGGEDCOM RX1510 series is a compact, cost efficient utility-grade layer 2 and layer 3 switch and router.

The RUGGEDCOM RX1510 has an IP30 degree of protection, does not use internal fans for cooling and supports a wide temperature range of -40° C to +85° C. The RX1510's modular and field replaceable platform allows customers to select amongst WAN, serial and Ethernet options making it ideally suited for electric power utilities, the industrial plant floor, rail and traffic control systems.

Certifications
- Electric power (IEC 61850-3, IEEE 1613, IEC 60255)
- Rail and transportation
  (NEMA TS 2, EN 50155, EN 50121-4)

Specifications	RX1510 Family	RX1510	RX1511	RX1512
Hot Swappable Modules		4	2	2
Connectivity	Type	Maximum port density		
Power	Screw terminal / plug terminal	2	1	1 (internal)
Gigabit	LC, M12 (A, X-coded), RJ45, SFP	8	4	4
Fast Ethernet	LC, RJ45, M12 (D, A, X-coded), SFP	24	12	12
APE1808	RJ45, USB, DVI	2	2	0
10 FL	ST – up to 2 km	12	6	6
T1/E1	T1 = RJ48 (channelized), E1 = RJ48, BNC (channelized)	4	4	4
Cellular	SMA (antennas), 2FF (mini-SIM), GSM, EDGE, HSPA, EVDO (network)	8	4	4
Serial	RJ45 (RS232, RS422, RS485)	24	12	12
Console and management	DB9/RJ45 console, RJ45 management, USB			
Power supply				
Number of supplies		2	1	1
Power supply range	9-15 VDC / 15-36 VDC / 36-72 VDC / 88-300 VDC or 85-264 VAC			
Power consumption		65 W	35 W	30 W
Permitted ambient conditions				
Operating temperature	-40° C to +85° C			
Maximum heat dissipation		222 BTU/hr	120 BTU/hr	102 BTU/hr
Degree of protection	IP30			
Constructional design				
Maximum weight		5kg	3.5 kg	2.5 kg
Dimensions (w x h x d)		115 x 125 x 200 (mm) 2.4 in x 4.9 in x 7.8 (in)	155 x 125 x 200 (mm) 6.1 x 4.9 x 7.8 (in)	115 x 125 x 200 (mm) 6.1 x 4.9 in x 7.8 (in)

RUGGEDCOM RX5000 / MX5000

The RUGGEDCOM RX5000 and MX5000 are high-port density Ethernet routing and switching platforms designed to operate in harsh environments.

The RUGGEDCOM RX5000 and MX5000 have an IP30 degree of protection, do not use internal fans for cooling, can withstand high levels of electromagnetic interference, radio frequency interference and support a wide temperature range of -40° C to +85° C. These platforms are designed to meet the challenging climatic and environmental demands found in utility, industrial and military network applications.

Certifications
- Electric power (IEC 61850-3, IEEE 1613)
- Rail and transportation
  (NEMA TS 2, EN 50155, EN 50121-4)

Specifications	RX5000	MX5000	RX5000	MX5000
Hot Swappable Modules	8			
Connectivity	Type		Maximum port density	
Power	Screw terminal		2	
10 Gbps	SFP+, up to 80 km		2	
Gigabit	LC, RJ45, SFP	LC, micro-D, SFP	24	
Fast Ethernet	LC, RJ45, SFPBNC (channelized)	LC, micro-D, RJ45	96	
Serial	None		48	
Console and management	DB9 console, RJ45 management, USB			
Power supply				
Number of supplies	2			
Power supply range	88-300VDC or 85-264 VAC			
Power consumption	110 W			
Permitted ambient conditions				
Operating temperature	-40° C to +85° C			
Maximum heat dissipation	375 BTU/hr			
Degree of protection	IP30			
Constructional design				
Maximum weight	16 kg			
Dimensions (w x h x d)	440 x 176 x 220 (mm) 17.3 x 6.9 x 8.6 (in)			

RUGGEDCOM APE1808

Protect your networks and systems with the RUGGEDCOM APE1808: a small but powerful industrial application hosting platform that lets you tap a range of Siemens and leading third party cybersecurity applications in harsh, mission-critical environments.

Line module for the RUGGEDCOM RX1500 product family
- Microsoft Windows
- Linux

Two physically separated Gigabit Ethernet interfaces for:
- IPsec/VPN links
- IDS
- Secure access (RUGGEDCOM CROSSBOW)
- Protocol conversion (RUGGEDCOM ELAN)
- Third party software applications

Secure remote and local access
RUGGEDCOM CROSSBOW SAC (Station Access Controller) can be installed directly on the RUGGEDCOM RX1500 product family, or on the RUGGEDCOM APE1808. The APE1808 can be ordered with CROSSBOW ADM and can soon be ordered with SAM-L (Secure Access Manager–Local) applications pre-installed.

Protocol conversion
RUGGEDCOM ELAN can be ordered pre-installed on the RUGGEDCOM RX1500 product family or on the RUGGEDCOM APE1808
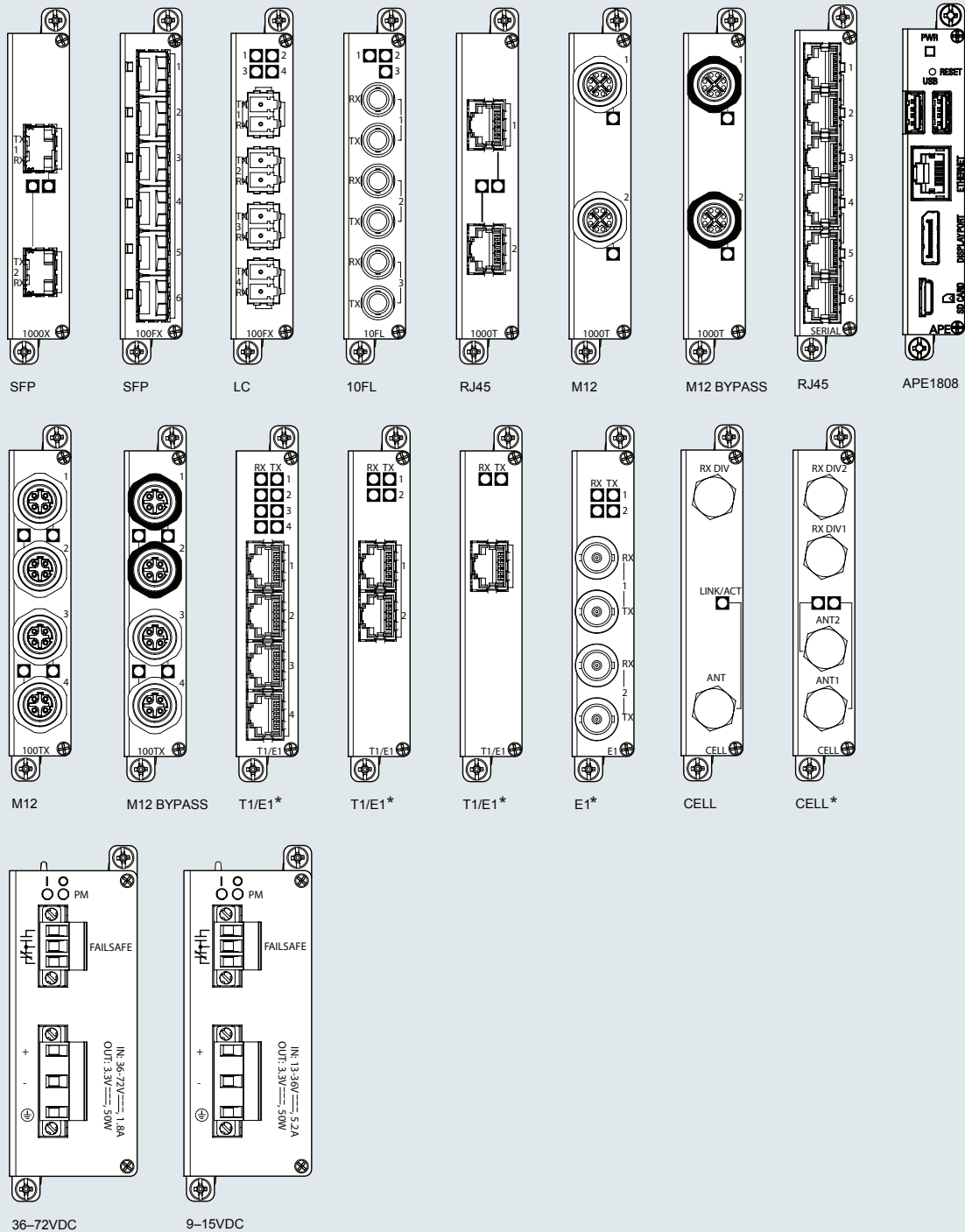- Performance limits apply to internal RUGGEDCOM ELAN installation
- Internal RUGGEDCOM ELAN installation must be ordered at the same time as the RUGGEDCOM RX1500 unit

The RUGGEDCOM APE1808 with Linux can be bundled with RUGGEDCOM Cybersecurity Services contracts for:
- Physical firewall
- Intrusion detection sensor and intrusion detection system with rules selection
- Intrustion prevention system

Specifications	APE1808LNX	APE1808W10
Front Ethernet	Gigabit, RJ45 port	
Backplane Ethernet	Gigabit, internal to RUGGEDCOM RX1500 series chassis	
USB Ports	2 USB 3.0	
Processor	Intel Atom x5-E3940, 4 cores, x86_64, 1.6 GHz (Burst 1.8 GHz), 2 MB L2 cache, Intel VT-x and VT-d	
Display	Intel HD 500 (Display port)	
RAM	8 GB DDR3 with ECC	
Operating system	Debian Linux	Windows 10 IoT Enterprise LTSC 2019
Storage	64 GB eMMC	

Hot-swappable RUGGEDCOM RX1500 series modules

SFP   SFP   LC   10FL   RJ45   M12   M12 BYPASS   RJ45   APE1808

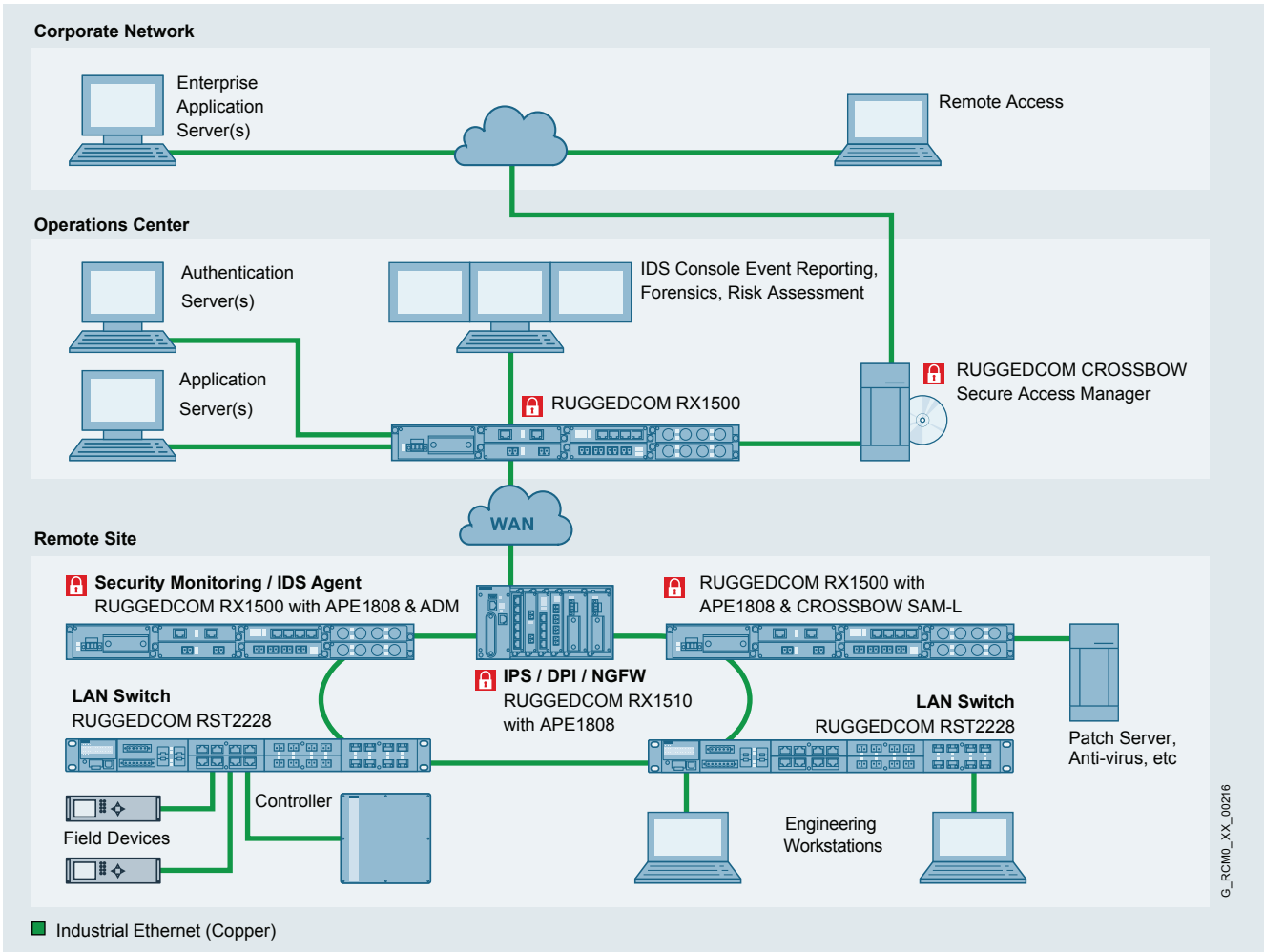M12   M12 BYPASS   T1/E1*   T1/E1*   T1/E1*   E1*   CELL   CELL*

36–72VDC   9–15VDC

* Not compatible with the RUGGEDCOM RX1524 / RX1536

Hot-swappable RUGGEDCOM RX5000 series modules

CPU	Switch	Switch	LC	Micro-D	RJ45

DB9	LC	RJ45	Micro-D	Power
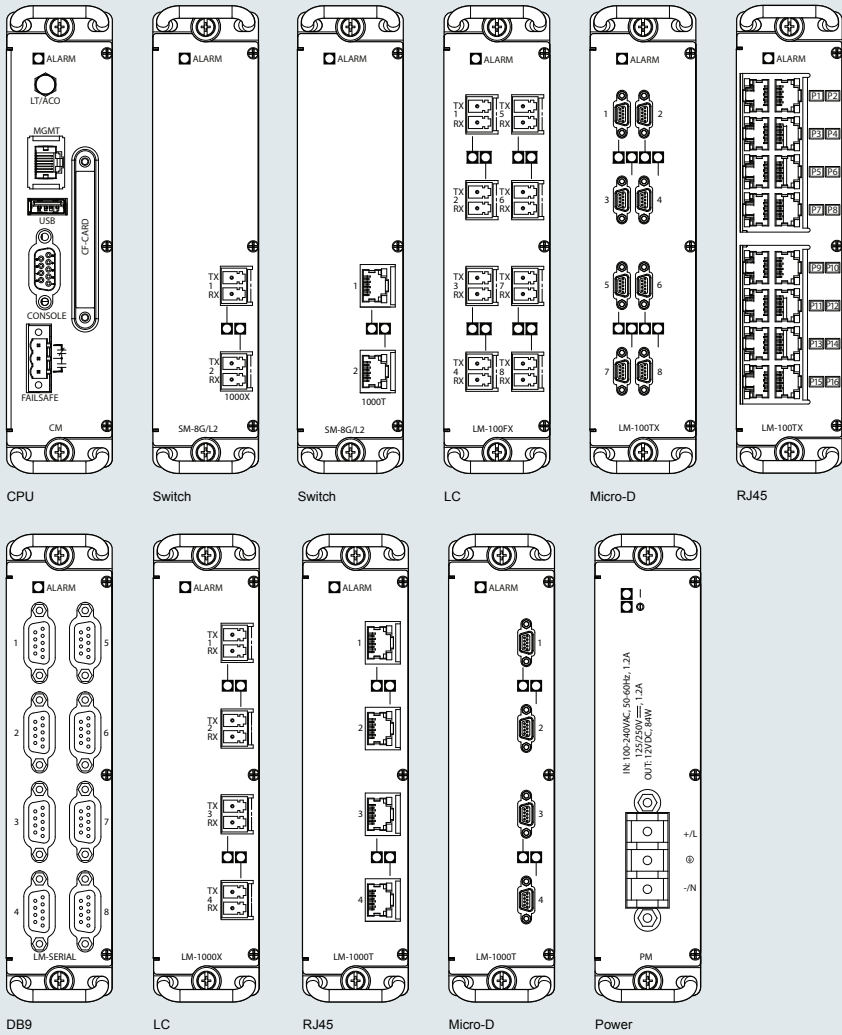
Use cases

RUGGEDCOM cybersecurity solutions installed on the RUGGEDCOM Multi-Service Platform designed for harsh environments and mission-critical applications.
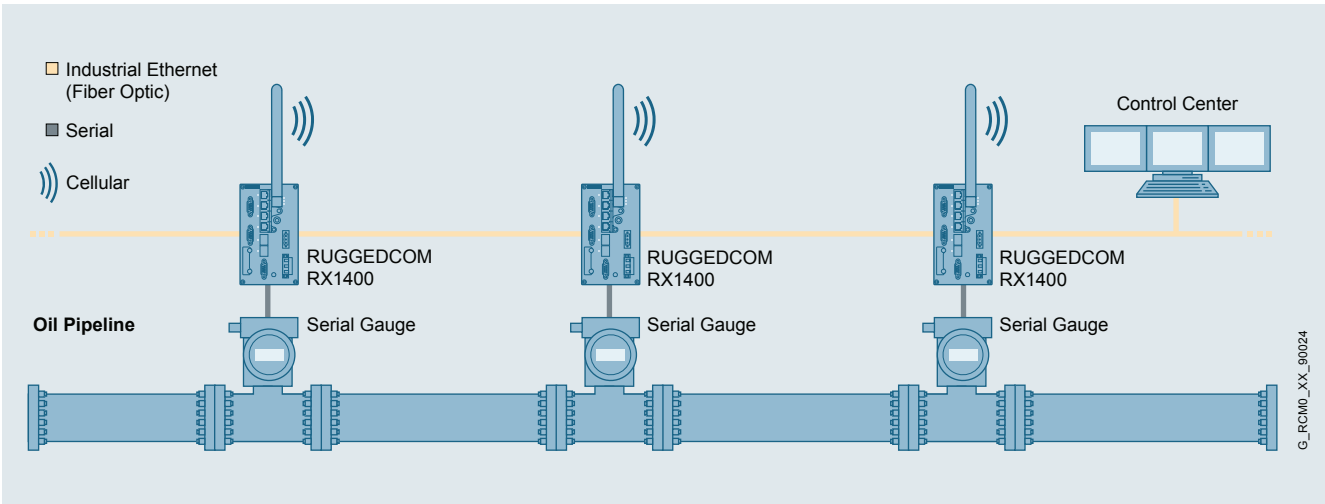
The compact RUGGEDCOM RX1400 is an ideal field device in oil & gas environments.
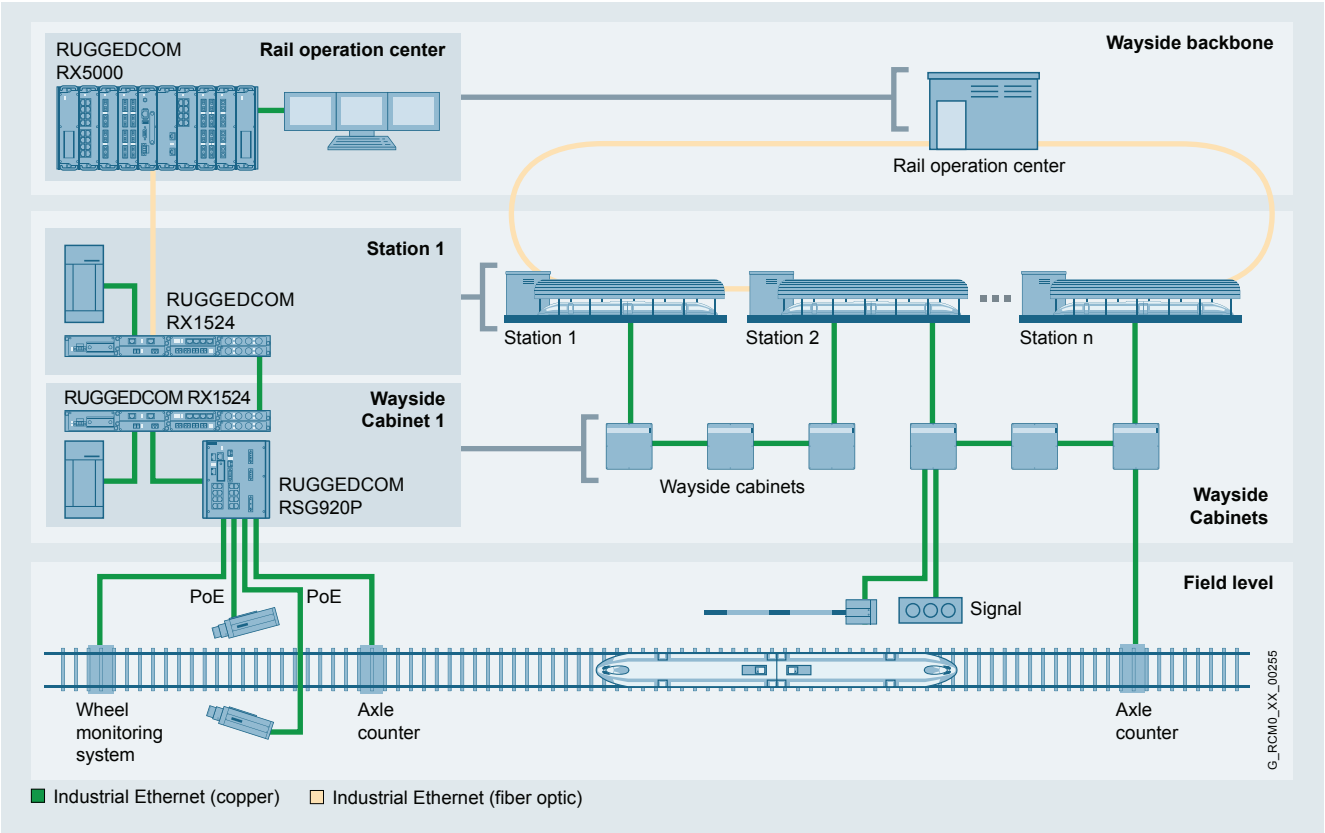
RUGGEDCOM Multi-Service Platforms provide ideal and versatile communication solutions for the rail industry.
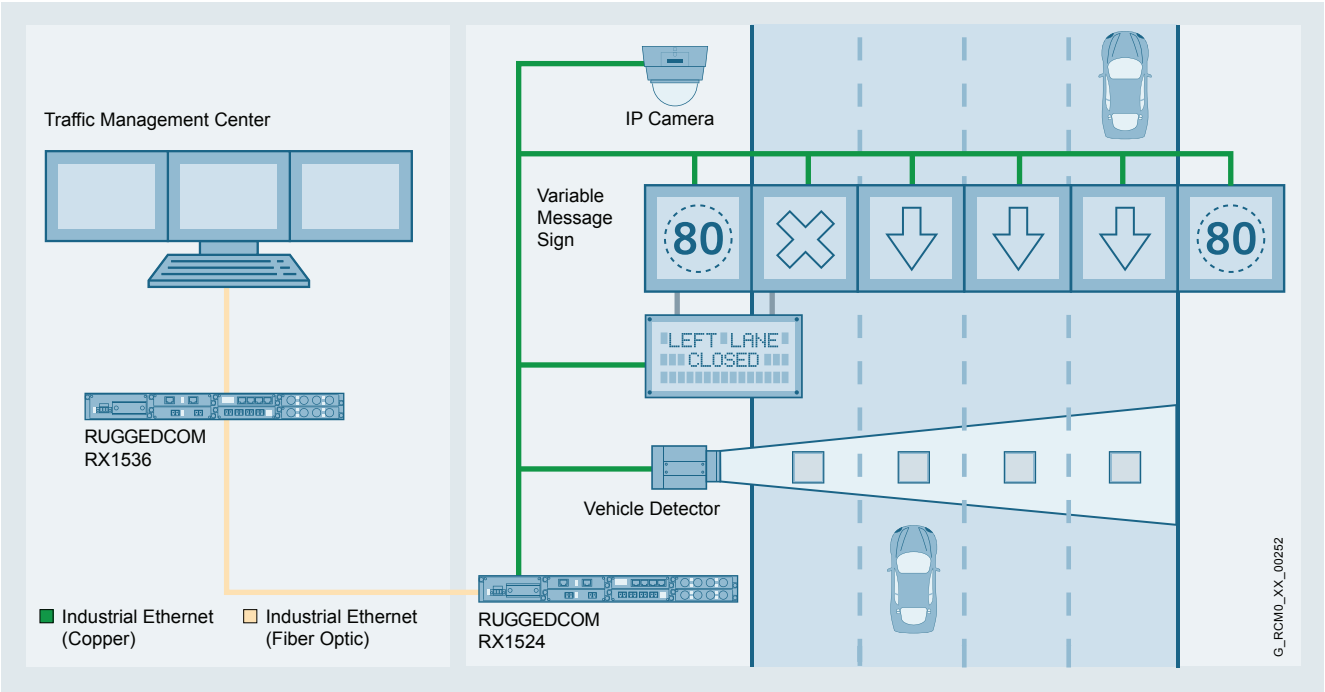
RUGGEDCOM Multi-Service Platforms are used for traffic management in intelligent transportation systems.

Accessories

| Type | Media | Distance (km) | SFP Name | Article Number | RX1400 | RX1500 Family | | RX5000 | | | |
						FG50	FX50/6FX50	4FG50	8FX50	SM69	SM09/SM39
Copper	RJ45	0.1	SFP1112-1	6GK6000-8CG01-0AA0	●	●		●			●
			SFP1112-1I	6GK6000-8CG02-0AA0	●	●		●			●
100 Mbit/s Active	MM	2	SFP1121-1FX2A	6GK6000-8FE50-0AA0	●						
	SM	10	SFP1131-1FX10A	6GK6000-8FE60-0AA0	●						
		40	SFP1131S-1FX40A	6GK6000-8FE62-0AA0	●						
100 Mbit/s	MM	2	SFP1121-1FX2	6GK6000-8FE51-0AA0		●	●	●	●		
	SM	20	SFP1131-1FX20	6GK6000-8FE52-0AA0		●	●	●	●		
		50	SFP1131-1FX50	6GK6000-8FE53-0AA0		●	●	●	●		
		90	SFP1131-1FX90	6GK6000-8FE54-0AA0		●	●	●	●		
1 Gbit/s Single-fiber Bidirectional	SM	10	SFP1132-1BX10R	6GK6000-8FB51-0AA0	●	●		●			●
			SFP1132-1BX10T	6GK6000-8FB52-0AA0	●	●		●			●
		40	SFP1132-1BX40R	6GK6000-8FB53-0AA0	●	●		●			●
			SFP1132-1BX40T	6GK6000-8FB54-0AA0	●	●		●			●
1 Gbit/s	MM	0.5	SFP1122-1SX	6GK6000-8FG51-0AA0	●	●		●			●
		2	SFP1122-1SX2	6GK6000-8FE58-0AA0		●		●			●
	SM	10	SFP1132-1LX10	6GK6000-8FG52-0AA0	●	●		●			●
		25	SFP1132-1LX25	6GK6000-8FG53-0AA0	●	●		●			●
		40	SFP1132-1LX40	6GK6000-8FG57-0AA0	●	●		●			●
		70	SFP1132-1LX70	6GK6000-8FG54-0AA0	●	●		●			●
		100	SFP1132-1LX100	6GK6000-8FG55-0AA0	●	●		●			●
		115	SFP1132-1LX115	6GK6000-8FE56-0AA0		●		●			●
10 Gbit/s	MM	0.4	SFP2123-1SR	6GK6000-8FT50-0AA0						●	
	SM	10	SFP2133-1LR10	6GK6000-8FT51-0AA0						●	
		40	SFP2133-1ER40	6GK6000-8FT53-0AA0						●	
		80	SFP2133-1ZR80	6GK6000-8FT52-0AA0						●	

* SM = Single-mode, MM = Multi-mode

The tool for selection and configuration of RUGGEDCOM products.

RUGGEDCOM Selector

With the RUGGEDCOM Selector you can transfer the order number to the Siemens Industry Mall and order your products.

To use the RUGGEDCOM Selector for the selection and configuration of RUGGEDCOM products, visit: **siemens.com/ruggedcom-selector**

For more information on wireless approvals, visit: **siemens.com/wireless-approvals**

FastConnect Cabling System

Stringent demands are placed on the installation of cables in an industrial environment. Siemens offers FastConnect, a system that fulfills all these requirements: on-site assembly – quick, easy and error-free. For more information, visit: **siemens.com/fastconnect**

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**

Scan this
QR code
for more
information