SIEMENS

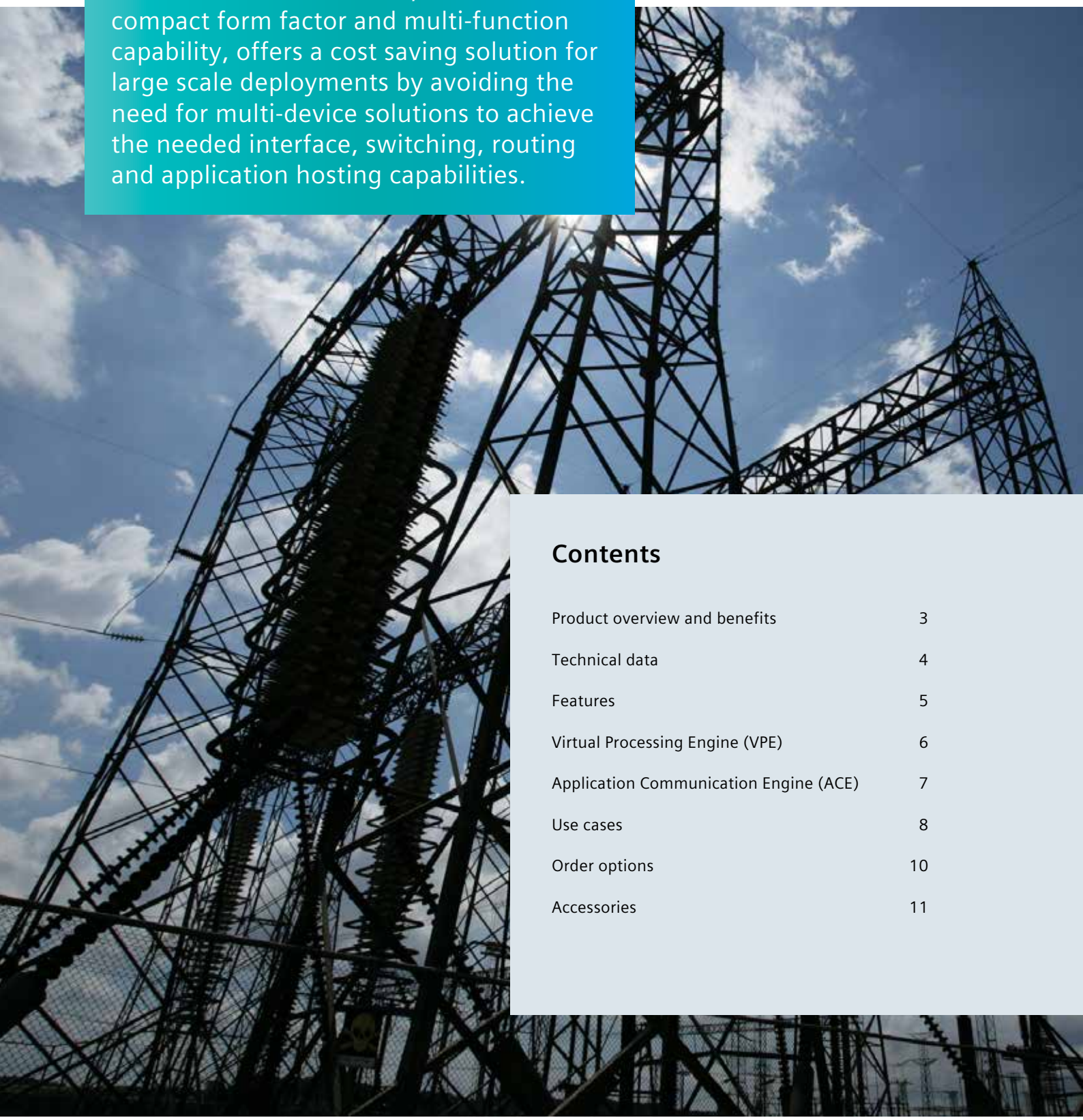
RUGGEDCOM RX1400

Multiprotocol Intelligent Node

Brochure 11/2016

siemens.com/ruggedcom

The RUGGEDCOM RX1400, thanks to its compact form factor and multi-function capability, offers a cost saving solution for large scale deployments by avoiding the need for multi-device solutions to achieve the needed interface, switching, routing and application hosting capabilities.



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Product overview and benefits

RUGGEDCOM RX1400 is a Multiprotocol Intelligent Node which combines Ethernet switching, routing, and firewall functionality with various wide area connectivity options. The device has IP40 degree of protection, does not use internal fans for cooling and supports -40° C to +85° C extended temperature range. With the release of ROX 2.9 software, the RUGGEDCOM RX1400 supports a LINUX virtual machine environment, allowing customers and third party application developers to deploy customized intelligence at the network edge.

The RUGGEDCOM RX1400 provides a high level of immunity to electromagnetic interference, heavy electrical surges, extreme temperature and humidity for reliable operation in mission critical applications. It can be found in electric utility substations, traffic control cabinets, railways, oil and gas and other harsh environments.

Cost effective solution for large scale deployments
The RUGGEDCOM RX1400 is a compact Layer 3 integrated switch and router – ideal for large scale, hierarchical networks, capable of transporting data from both modern Ethernet-based IEDs and from legacy or low cost serial IEDs.

High availability
The RUGGEDCOM RX1400 uses fiber and cellular connections simultaneously. The dual SIM card slots enable cellular provider redundancy, allowing selection of the best performing network.

Space saving installation
The RUGGEDCOM RX1400's small form factor allows it to fit into existing enclosures used in substation automation, distribution automation, roadside and oil & gas applications.

Reduced maintenance costs
The RUGGEDCOM RX1400's rugged design delivers the same high field demonstrated MTBFs as the rest of the RUGGEDCOM product portfolio, reducing truck rolls and maintenance costs.

Technical data

Serial
2 x RS232 / 422 / 485

Ethernet
4 x 10/100 TX

Pluggable optics
2 x SFP ports Gigabit / 100 FX

Carrier
Dual SIM support

Memory
Micro SD slot
for application
data storage

Cellular connectivity
4G / 3G / 2G

Wireless LAN
802.11 a/b/g/n

GPS
GPS input for location data

Relay
Failsafe relay form C

Power supply
+/- 12-24 VDC (9 - 36 VDC)
+/- 48 VDC (36-72 VDC)
HI (88 – 264 VAC / 98 – 300 VDC)

Management
Local serial console

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, B7, B8, B13, B17, B19, B20, B21, B25
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)

Features

Software
The RUGGEDCOM RX1400 runs the ROX II operating system and delivers carrier grade routing and switching performance to the network edge and beyond.

The ROX firmware supports the most common network technologies, such as different routing protocols, multiple network fault recovery solutions, including Siemens eRSTP (enhanced Rapid Spanning Tree Protocol), and others.

Software features
- Enhanced security / reliability through data and control path separation
- Single file configuration automation ensures easy installation and configuration control
- Automatic rollback in the event of configuration errors
- NETCONF and SNMP configuration interface supports powerful remote configuration and status features
- Port rate and Broadcast Storm Limiting
- Port configuration, status, statistics, mirroring
- Routing Protocols OSPF, BGP, RIPv1 and v2
- Virtual Router Redundancy Protocol (VRRP)
- NTP time synchronization (client and server)
- Redundancy protocols MSTP 802.1Q-2005, RSTP (802.1w) and Enhanced Rapid Spanning Tree (eRSTP) for network fault recovery
- Quality of service (802.1p) for real-time traffic

Rugged Rated
The RUGGEDCOM RX1400 is a Rugged Rated product, which means that it has been specifically designed and tested to withstand the demands of harsh environments. As with all Rugged Rated products, Highly Accelerated Life Testing (HALT) has been used in the early stages of product development – to detect any design and performance issues.

Reliable operation in harsh electrical environments
- IEC 61850-3 and IEEE 1613 (electric power substations)
- IEC 61000-6-2 and IEC 61800-3 (industrial environments)
- NEMA TS-2 (traffic control equipment)
- EN 50121-4 (railway applications)
- IECEx, ATEX and HazLoc (Class I, Division 2) available

Operation over a wide temperature range
- -40° C to +85° C
- Passive cooling – no fans
- CSA/UL 60950 safety approved to +85° C

Cyber security
Cyber security is an important issue in many industries where advanced automation and communications networks play a crucial role in mission critical applications and where high reliability is of paramount importance. Key RUGGEDCOM RX1400 features that address security issues at the local area network level include:
- IPSEC – the integrated hardware encryption engine delivers high performance IPSEC VPN traffic without using the main processor
- Passwords – compliant with NERC guidelines including provision for RADIUS based authentication
- SSH / SSL – extends capability of password protection to add encryption of passwords and data as they cross the network
- Enable / disable ports – capability to disable ports so unauthorized devices can't connect to unused ports
- VLAN and Edge MPLS – provides the ability to logically segregate traffic between predefined ports on switches
- SNMPv3 – encrypted authentication and access security
- HTTPS – for secure access to the web interface
- 802.1x – to ensure only permitted devices can connect to the device
- MAC access list – control access to devices that do not support RADIUS

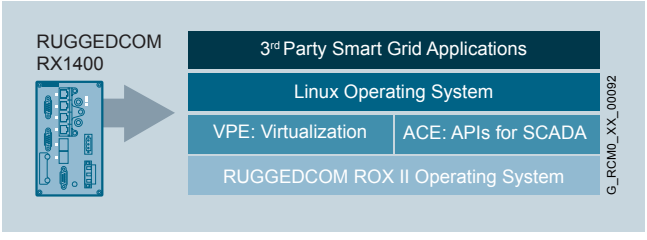
Error-free operation in high EMI environments
- Zero-Packet-Loss technology for fiber-based networking devices
- IEEE 1613 class 2 error-free performance under EMI stress
- Fiber-optic ports supporting both short and long haul fiber

High availability
- Integrated power supply
- Low: +/- 12 or 24 VDC (9-36 VDC)
- Medium: +/- 48 VDC (36-72 VDC)
- High DC: 98-300 VDC
- High AC: 88-264 VAC

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

Virtual Processing Engine (VPE)

The RUGGEDCOM VPE1400 provides a rugged, cost effective hardware platform with a virtual environment to run a guest Linux operating system and third party applications, responding to the trend of pushing the intelligence to the edge of the network.



Virtualization allows a full Linux image (with dedicated storage media and I/O ports) to run in parallel with the RUGGEDCOM ROX II, using a Linux KVM (Kernel Virtual Machine) based solution. The KVM ensures that the guest OS and third party applications can run without impacting RUGGEDCOM RX1400 core services running on the system.

A front-end management interface is added for the deployment and configuration of virtual machines. Once installed and configured, users can launch a Linux-based guest operating system and install third party applications on top of the image. The system can be configured to allow third-party applications access to the network and serial interfaces on the RUGGEDCOM RX1400. A native console connection to the guest OS is available via the ROX CLI or WebUI interface.

Once up and running, a standard ROX networking interface is created for the virtual machine. This interface can be configured like any other ROX interface, including routing, assigning an IP, or membership in a virtual switch or VLAN. This mechanism allows connectivity to all copper, fiber, and wireless interfaces on the RUGGEDCOM RX1400. The virtual machine also has native access to the RUGGEDCOM RX1400 serial ports.

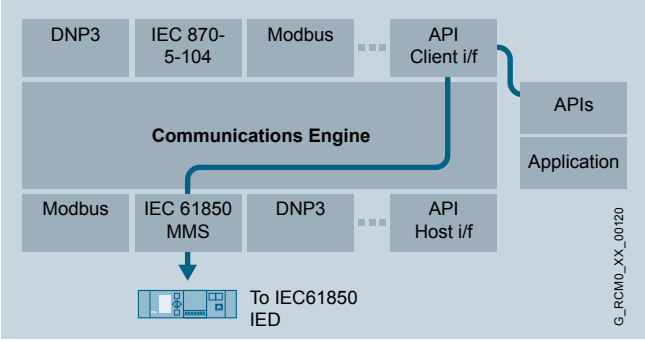
The VPE functionality is enabled using a feature key loaded via the ROX interface.

Application Communication Engine (ACE)

Applications running at the network edge may need to communicate with SCADA devices for status and control functions. To minimize the effort for application developers, Siemens has developed the RUGGEDCOM Application Communication Engine (ACE).

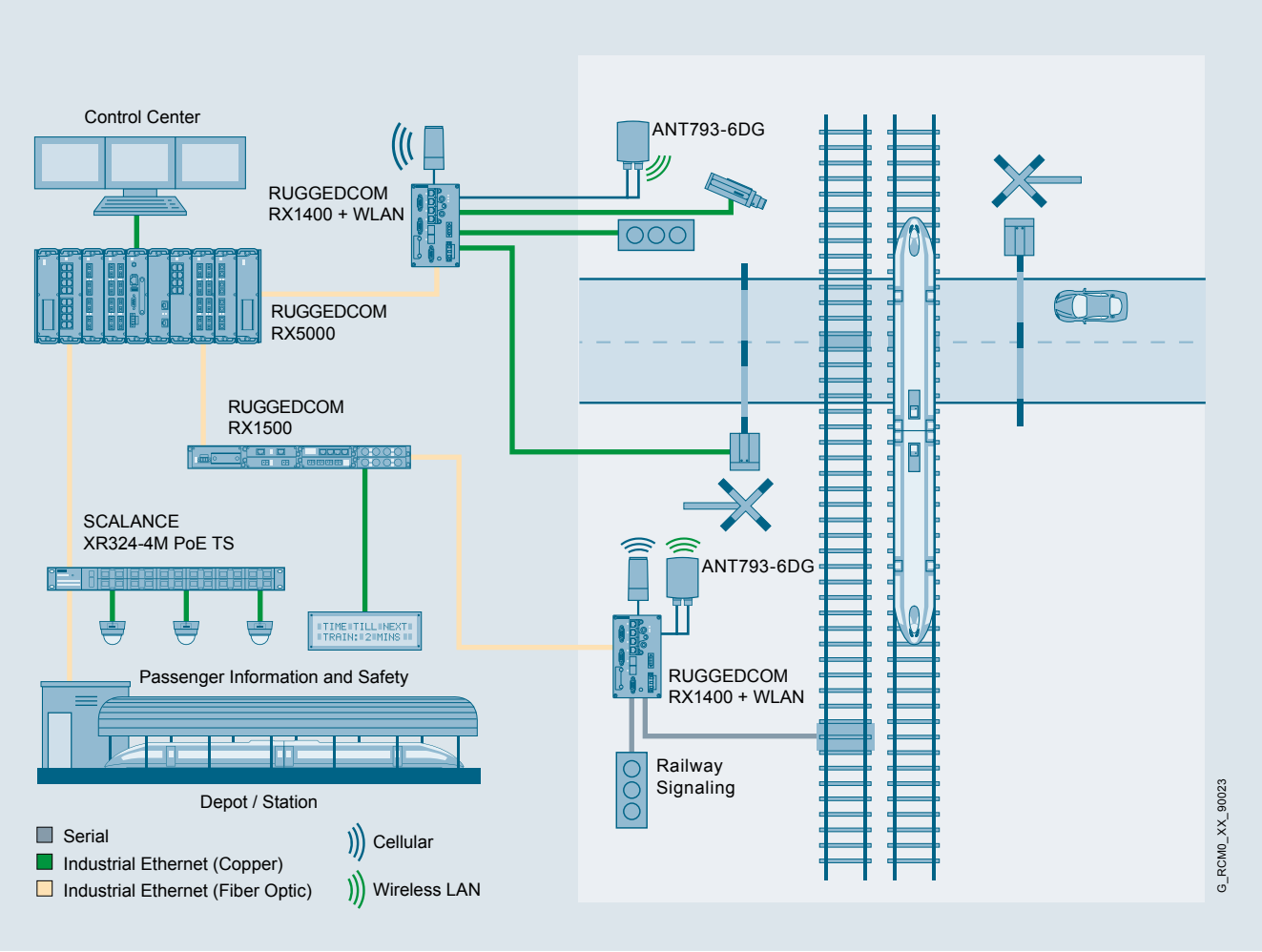
The RUGGEDCOM ACE provides all the necessary Application Programming Interfaces (APIs) to connect, disconnect, initiate communications to, as well as manage data provided by supported Intelligent Electronic Devices (IEDs).

RUGGEDCOM ACE is based on a flexible, modular software architecture that supports a plug and play environment based on the Linux operating system. RUGGEDCOM ACE can run natively on the RUGGEDCOM RX1400 providing a single box solution.

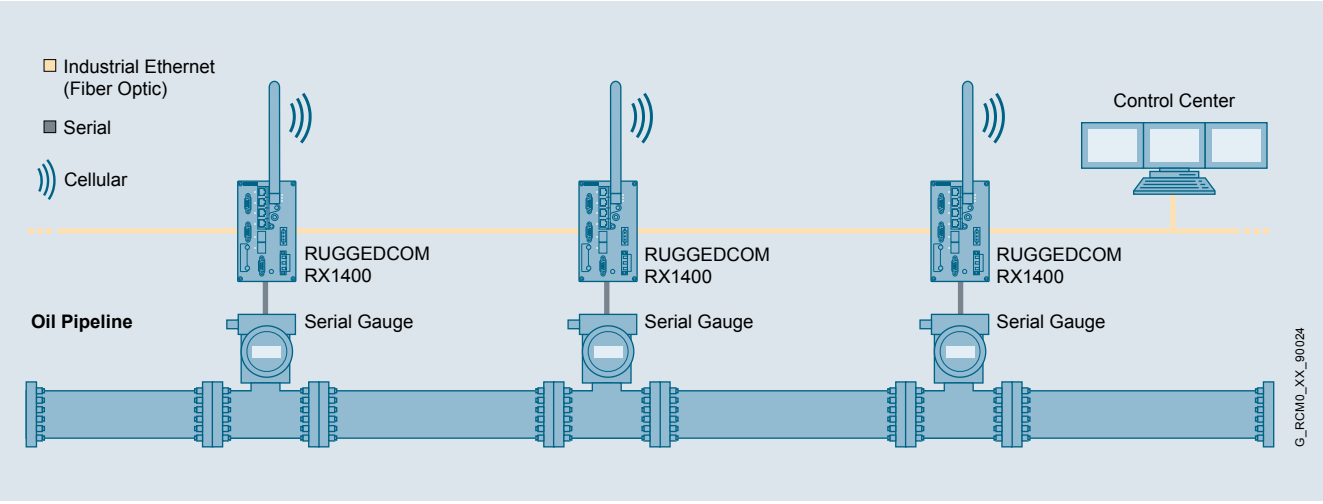


RUGGEDCOM ACE enables 3rd party applications to communicate with downstream IEDs via standard SCADA protocols, eliminating the need for developers to implement complex protocol stacks within their own applications.

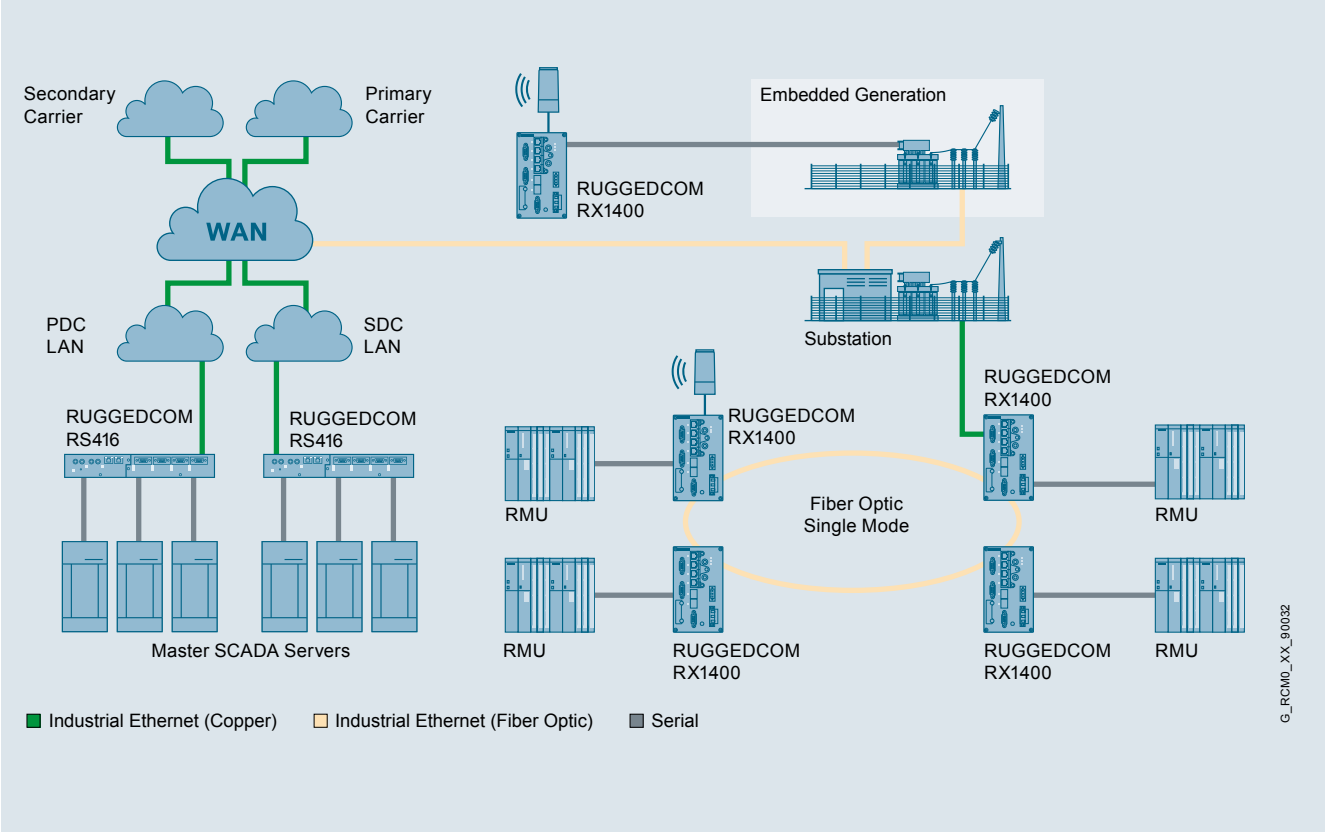
Use cases



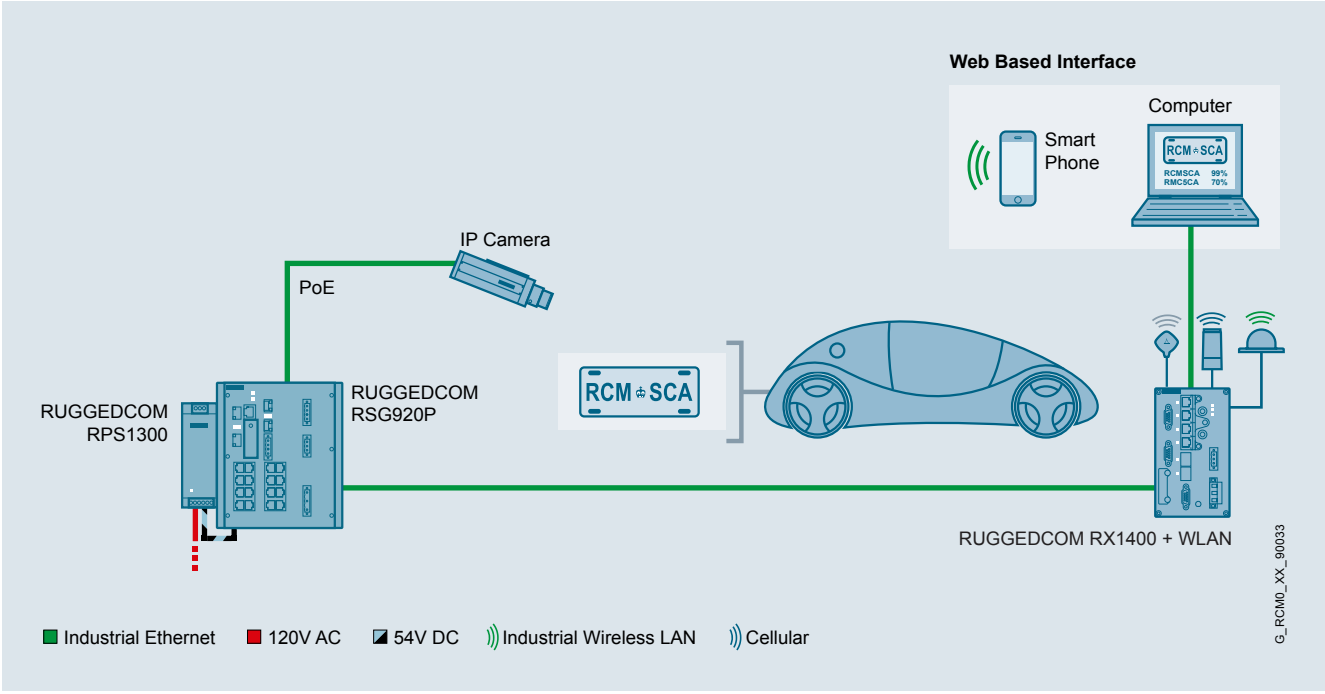
The RUGGEDCOM RX1400 provides redundant connection of end devices by fiber-optic and / or cellular networks for more reliability in case of network failure.



The RUGGEDCOM RX1400 makes it possible to remotely monitor field data using multiple kinds of communications through cellular networks, fiber-optics, or both in a redundant way.



The RUGGEDCOM RX1400 can be used to connect low voltage substations and distributed generation plants reliably via public celullar networks.



Automated license plate recognition with the RUGGEDCOM RX1400 running a custom application in the virtual environment from the RUGGEDCOM VPE1400

Order options

Product	Article number								
RUGGEDCOM RX1400	6GK6014-0AM2	.	–	0	.	A	.	–	Z
Power Supply 1									
+/- 12-24 VDC (9 - 36 VDC)		1							
+/- 48 VDC (36-72 VDC)		2							
HI (88 – 264 VAC / 98 – 300 VDC)		3							
Mounting kit									
No mounting option					A				
DIN rail mounting kit					B				
Panel mounting kit					C				
19" rack mounting kit					D				
Manufacturing modification									
None							0		
Conformal coating							1		
Conformal coating with IECEx and ATEX zone 2 approval							3		

Z-options		
Modems		
Without modem	A00	
Modem for Europe	A01	
Modem for North America (AT&T, Rogers, Bell, Telus)	A02	
Modem for North America (Verizon)	A03	
Modem for Asia Pacific	A04	
Modem for Japan	A05	
Wireless LAN interfaces		
No wireless LAN	B00	
Wireless LAN for United States of America only	B01	
Wireless LAN for the rest of the world	B02	
Interfaces	**Port 5**	**Port 6**
Without SFP	C00	D00
SFP, multi-mode, 500m, 850nm, 1000BASE-SX (-20° C to +85° C)	C01	D01
SFP, single-mode, 10Km, 1310nm, 1000BASE-LX (-40° C to +85° C)	C02	D02
SFP, single-mode, 25Km, 1310nm, 1000BASE-LX (-40° C to +85° C)	C03	D03
SFP, single-mode, 40Km, 1550nm, 1000BASE-ZX (-20° C to +85° C)	C04	D04
SFP, single-mode, 70Km, 1550nm, 1000BASE-ZX (-20° C to +85° C)	C05	D05
SFP, single-mode,100Km, 1550nm, 1000BASE-ZX (0° C to +70° C)	C06	D06
SFP, single-mode, 10Km, 1310 nm TX / 1490 nm RX, 1000BASE-BX (-40° C to +85° C)	C07	D07
SFP, single-mode, 40Km, 1310 nm TX / 1490 nm RX, 1000BASE-BX (-40° C to +85° C)	C08	D08
SFP, single-mode, 10Km, 1490 nm TX / 1310 nm RX, 1000BASE-BX (-40° C to +85° C)	C09	D09
SFP, single-mode, 40Km, 1490 nm TX / 1310 nm RX, 1000BASE-BX (-40° C to +85° C)	C10	D10
SFP, multi-mode, 2Km, 1310nm, 100BASE-FX (-40° C to +85° C)	C11	D11
RJ45-ports		
Standard RJ45 ports	E00	
Secure collar for FastConnect cables	E01	
Software		
L3SEL = Layer 3 Standard Edition	F00	
L3SECL = Layer 3 Security Edition	F01	
Antenna		
Without antenna	G00	
Single ANT1096-4MA (direct connect LTE swivel antenna)	G01	
Dual ANT1096-4MA (direct connect LTE swivel antenna)	G02	
Virtual Processing Engine (VPE1400)		
Without VPE1400	V00	
With VPE1400	V01	

Accessories

RUGGEDCOM accessories		Description	Article Number
	RUGGEDCOM ANT1096-4MA	Mobile radio antenna with omnidirectional characteristics for GSM (2G), UMTS (3G) and LTE(4G), for direct mounting with SMA connector, radially rotatable with additional joint, antenna gain 2 dBi, -40 °C to +75 °C.	6GK6000-8NT01-0AA0
	RUGGEDCOM ANT1096-4ME	Mobile radio antenna with omnidirectional characteristics for GSM (2G), UMTS (3G) and LTE(4G), for detached mounting with N-Connect female connector; antenna gain 3 dBi, -40 °C to +75 °C.	6GK6000-8NT01-1AA0
	RUGGEDCOM ANT1390-4ML	GPS Antenna with integrated signal amplifier, for remote mounting with 30 cm. cable and N-Connect female connector; antenna gain 3 dBi at 90° elevation angle, -40 °C to +75 °C.	6GK6000-8NP01-1AA0
	RUGGEDCOM SFP1132-1FX2A	SFP with active transceiver, 1 X 100MBit/s, 100BASE-FX, LC-Interface for multi-mode fiber-optic up to max. 2 km, 1310 nm, -40 °C to +75 °C.	6GK6000-8FE50-0AA0
	RUGGEDCOM antenna cable N-Connect Male/SMA Male 1m.	Preassembled flexible antenna cable 1 meter long. Suitable for connecting detached antennas to the RUGGEDCOM RX1400.	6GK6000-8VH10-1FB0
	RUGGEDCOM antenna cable N-Connect Male/SMA Male 2m.	Preassembled flexible antenna cable 2 meters long. Suitable for connecting detached antennas to the RUGGEDCOM RX1400.	6GK6000-8VH20-1FB0
	RUGGEDCOM antenna cable N-Connect Male/SMA Male 5m.	Preassembled flexible antenna cable 5 meters long. Suitable for connecting detached antennas to the RUGGEDCOM RX1400.	6GK6000-8VH50-1FB0

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**

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**

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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:
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