

SIEMENS



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# Industrial Ethernet

Expanded network components for all industries

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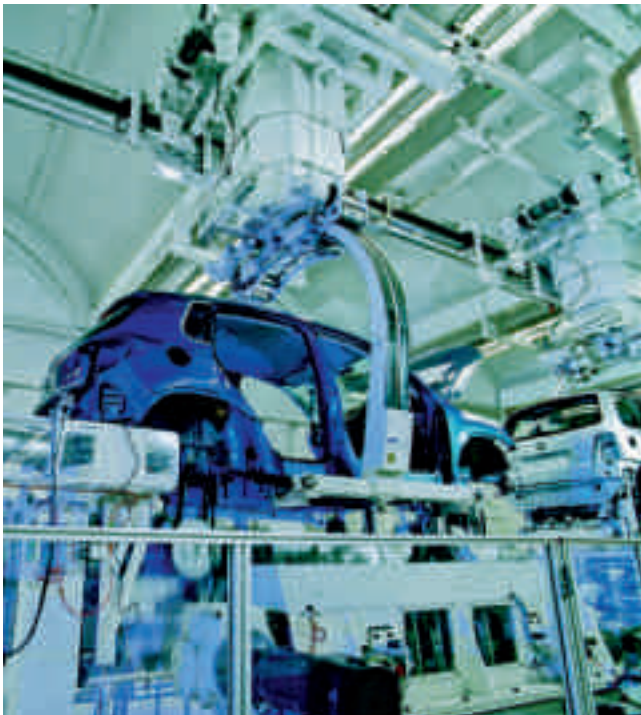
# Industrial Ethernet

## Expanded network components for all industries

Industrial communication with products and systems from Siemens ensures greater efficiency throughout the plant. System-wide, high-performance data networks can be implemented that also meet the requirements of the future by means of first-class components based on proven standards. From a simple sensor connection to the acquisition and transmission of all the quality and production data of an entire factory: SIMATIC NET network components are part of Totally Integrated Automation (TIA), the integrated portfolio of products and systems, and ensure integration from the field level up to the corporate management level. Following the acquisition of the Canadian supplier RUGGEDCOM, the Industrial Ethernet product family of Siemens will be considerably expanded. The RUGGEDCOM products will in future be integrated into the SIMATIC NET portfolio.

### Industrial Ethernet Switches and Routers

The communication network is of the utmost importance for automation solutions. With SIMATIC NET, Siemens offers Industrial Ethernet switches and routers for structuring networked machines and plants and for integrating into the overall corporate network. The portfolio of switches ranges from small, compact XB-000 switches for small networks in machine or plant islands up to X-500 switches as the central interface between Industrial Ethernet/PROFINET and IT networks.



### Industrial Ethernet Security

By integrating into the corporate network, the increased networking of industrial plants enables a degree of integration and openness that provides many benefits such as remote access to plant sections over the Internet. However, this also results in certain risks with regard to data security. The Siemens Industrial Security concept offers a holistic approach for this that meets the specific requirements ranging from production to infrastructure.

### Industrial Wireless Communication

Thanks to wireless communication with programmable controllers, even greater flexibility is achieved, maintenance work is simplified, and service and standstill times are reduced. Industrial Wireless WLAN makes these advantages available through a coordinated portfolio of WLAN equipment for industrial use, even for fail-safe communication in the context of operator and machine safety.

### Industrial Remote Communication

Industrial processes often range over large areas, even crossing national borders in some circumstances. For reliable monitoring, operators require secure and cost-effective access to their remote plants and machinery. With Industrial Remote Communication, Siemens offers efficient telecontrol solutions for the most diverse applications. They allow outstations to be monitored and controlled from a central control point over a communications network.

### Network Management

Wired or wireless networks need a powerful network management to safeguard their availability and permanent optimization. Siemens offers tailor-made solutions for the increase of reliability and documentation of networks, as well as the integration of network diagnostics in SCADA systems.

### Cabling Technology

In addition to the active components, a professional cabling technology is essential for the reliability of a network. Siemens offers a well-designed quick assembly system for copper and fiber optic with cables, connectors and assembly tools for quick and error-free on-site setup or modifications.

### Expansion of the portfolio for new applications under difficult ambient conditions

The SIMATIC NET industrial communication components have been designed mainly for industrial applications. The portfolio expansion to include the RUGGEDCOM product line opens up new possibilities of use in the utility e.g. power plants, power switchgear, in transportation, and in infrastructure applications.

The RuggedCom product family is a line of communications networking equipment specifically designed to withstand the demands of harsh environments. The product family includes multi-service platforms, Ethernet switches, network routers, wireless devices (including WiMAX), serial device servers, media converters and software etc.



<b>Industrial Ethernet Switches and Routers</b>	
For applications in industry . . . . .	6
For utility / transportation . . . . .	16
<b>Media Converters / Serial Device Server</b>	
For applications in industry . . . . .	22
For utility / transportation . . . . .	23
<b>Industrial Ethernet Security</b>	
For applications in industry . . . . .	25
For utility / transportation . . . . .	26
<b>Modems</b>	
For applications in industry . . . . .	27
For utility / transportation . . . . .	28
<b>Industrial Wireless Communication</b>	
For applications in industry . . . . .	30
For utility / transportation . . . . .	38
<b>Network Management</b>	
For applications in industry . . . . .	39
For utility / transportation . . . . .	40
<b>Software Tools</b>	
For utility. . . . .	40
<b>Cabling Technology</b>	
For applications in industry and for utility / transportation. . . . .	42
<b>Wireless Communication</b>	
For infrastructure applications . . . . .	43

# Industrial Ethernet

## Expanded network components for all industries

### Portfolio overview

Industrial Ethernet Switches and Routers			Media Converter / Serial Device Servers			Industrial Ethernet Security		
Industry	Utility	Transportation	Industry	Utility	Transportation	Industry	Utility	Transportation
 <p>SCALANCE X-000 ... X-500</p>	 <p>RuggedBackbone Multi Service Platform</p>			 <p>RuggedServer Serial Device Servers</p>			 <p>CrossBow Software Suite</p>	
	 <p>RuggedSwitch 19" Ethernet Switches</p>					 <p>SCALANCE S623</p>	 <p>RuggedRouter Cyber Security Routers</p>	
	 <p>SCALANCE X-300EEC/ XR-300EEC</p>					 <p>SCALANCE S612</p>		
 <p>RuggedSwitch Compact Ethernet Switches</p>	 <p>SCALANCE X-300TS/ XR-300 TS</p>							
	 <p>SCALANCE X204-2TS</p>	 <p>SCALANCE X204RNA</p>						
 <p>Compact Switch Modules</p>	 <p>RuggedSwitch Compact Ethernet Switches</p>	 <p>SCALANCE X-100 Media Converter</p>		 <p>RuggedMC Media Converters</p>		 <p>SCALANCE S602</p>	 <p>RuggedBackbone Multi Service Platform</p>	

Modems			Industrial Wireless Communication			Network Management			Cabling Technology	Wireless Communication
Industry	Utility	Transportation	Industry	Utility	Transportation	Industry	Utility	Transportation	Industry/Utility/Transportation	Infrastructure
 EGPRS-Router MD741-1   UMTS-Router SCALANCE M873/875	 UMTS-Router SCALANCE M875   RuggedVDSL EoVDSL Ethernet Switches	 Access Points IEEE 802.11n   Controller / Controller Access Points IEEE 802.11n   Access Points IEEE 802.11a/b/g   Controller Access Points IEEE 802.11a/b/g   Client Modules IEEE 802.11n   Client Modules IEEE 802.11a/b/g	 Access Points IEEE 802.11a/b/g      RuggedAIR Wireless LAN Extension	 SINEMA Server	 RuggedNMS Network Management Software	 Industrial Ethernet FastConnect (Twisted Pair)   FastConnect FO Systems	    RuggedMAX WiMAX Product Family			

# Industrial Ethernet Switches and Routers

For applications in industry

## Compact Switch Modules

The Compact Switch Modules LOGO! CSM, CSM 1277 and CSM 377 are unmanaged switches for simple and rapid connection of a LOGO!, SIMATIC S7-1200, S7-300, or ET 200M to an electrical Industrial Ethernet network.

The low-cost switches are thus suitable for the integration of small machines into existing automation networks, for stand-alone operation of machines, or to set up small, local Ethernet networks.

### LOGO! CSM unmanaged

- Multiplication of the Ethernet interfaces of a LOGO! logic module. One port is on the front for easy diagnostics access
- Two versions for the voltage ranges 12/24 V DC or 230 V AC/DC
- Low-cost solution for implementing small, local Ethernet networks

### CSM 1277 unmanaged

- Saving on installation costs and installation space compared to the use of an external network component
- Multiplication of the Ethernet interfaces on a SIMATIC S7-1200 for additional connection of programming devices, operator controls, and other Ethernet nodes
- Lowest-cost solution for implementing small, local Ethernet networks with a SIMATIC S7-1200

### CSM 377 unmanaged

- Integration into SIMATIC S7-300 and ET200 M for implementing small, local Ethernet networks
- Diagnostics on the device by means of LEDs (power, link status, data communication)
- RJ45 sockets with retaining sleeve for additional strain relief, designed for PROFINET-compliant IE FC RJ45 plug



## SCALANCE X-000 unmanaged / SCALANCE XB-000 unmanaged

### SCALANCE X005

The Industrial Ethernet switch SCALANCE X005 is an unmanaged switch with five RJ45 ports, 10/100 Mbit/s. The product is a low-cost solution for establishing small star or line topologies with switching functionality in machines islands or process cells. SCALANCE X005 has a rugged metal housing (IP30) for space-saving installation in the control cabinet, on standard rails or S7-300 rails, or for direct wall mounting.

- Diagnostics on the device by means of LEDs (power, link status, data communication)
- RJ45 sockets with retaining sleeve for additional strain relief, designed for PROFINET-compliant IE FC RJ45 plug
- Integrated autocrossover function makes the use of uncrossed connection cables possible
- Automatic detection and negotiation of the data transmission rate by means of autosensing and autonegotiation function
- Use in railway and traffic applications (SCALANCE X005TS only)

### SCALANCE XB-000

The SCALANCE XB-000 Industrial Ethernet switches are compact, unmanaged switches with up to eight ports that enable low-cost establishment of Industrial Ethernet line and star topologies. They have a rugged plastic enclosure (IP20) and save space when installed on standard mounting rails in the control cabinet or control box.

- Diagnostics on the device by means of LEDs (power, link status, data communication)
- Integrated autocrossover function makes the use of uncrossed connection cables possible
- Automatic detection and negotiation of the data transmission rate by means of autosensing and autonegotiation function



Industry	Utility	Transportation	Time Sync	Redundancy	PoE	Zero-Packet-Loss	High-Temperature-Range	TIA-Integration
●		●					● <sup>1)</sup>	



### Zero-Packet-Loss (ZPL)

The proliferation of Ethernet networking technology from the office environment 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. RuggedCom has responded to this challenge by developing Zero-Packet-Loss technology to provide error-free communications for high EMI environments.

<sup>1)</sup> Depending on the product variant

# Industrial Ethernet Switches and Routers

For applications in industry

## SCALANCE X-100 unmanaged

The unmanaged switches of the SCALANCE X-100 product range with up to 24 ports are very suitable for setting up line and star structures (10/100 Mbit/s) and perfect for the on-site diagnosis in machine-level applications. They are suitable for industry and save room in the control cabinet with their compact housing.

- Diagnostics on the device by means of LEDs (power, link status, data communication) and signaling contact (signaling mask can be set on site using buttons)
- Redundant power supply
- RJ45 sockets with retaining sleeve for additional strain relief, designed for PROFINET-compliant IE FC RJ45 plug
- Integrated autocrossover function makes the use of uncrossed connection cables possible
- Automatic detection and negotiation of the data transmission rate by means of autosensing and autonegotiation function
- Power supply of up to two Power-over-Ethernet-enabled terminals via four-core data line (SCALANCE X108PoE only)



Industry	Utility	Transportation	Time Sync	Redundancy	PoE	Zero-Packet-Loss	High-Temperature-Range	TIA-Integration
●					●			

## SCALANCE X-200 / XF-200 / X-200IRT /XF-200IRT managed

### SCALANCE X-200

The managed switches of the SCALANCE X-200 product range are very well suited for the setup of line, star, and ring structures (10/100 Mbit/s). Redundant ring topologies can be established via the SCALANCE X-200 switches. On the failure of a transmission link or a SCALANCE X-200 switch in the ring, the transmission path is reconfigured within 200 ms.

With the C-PLUG swap medium, devices can be exchanged without a programming device; the configuration or application data are secured on the C-PLUG and can be implemented in another SCALANCE X-200 switch without special know-how. Based on PROFINET, the switches of the SCALANCE X-200 product line can be easily integrated into the process and system diagnostics



Industry	Utility	Transportation	Time Sync	Redundancy	PoE	Zero-Packet-Loss	High-Temperature-Range	TIA-Integration
●		●		●			● <sup>1)</sup>	●

<sup>1)</sup> Depending on the product variant



## SCALANCE X-200 / XF-200 / X-200IRT /XF-200IRT managed

### SCALANCE XF-200

The SCALANCE XF-200 switches have an extra-flat design. These industry-standard units with IP20 degree of protection and special port arrangement with angled cable outlet allows easy installation of the switches in the control cabinet or control box. In addition, they offer an integrated redundancy manager function, which allows the network to be reestablished within milliseconds following an error.

### SCALANCE X-200PRO

Thanks to its rugged design, the SCALANCE X-200PRO Industrial Ethernet switch with IP65 degree of protection allows the setup of a star network topology outside the control cabinet. If needed, the network can be powered by 24 V DC, or with 230 V AC using the PS791-1PRO power supply.

### SCALANCE XF-200IRT/SCALANCE XF-204IRT

With the versions SCALANCE X-200IRT, real time and isochronous real time networks can be set up. As a result, one network is available for hard real-time and standard data transmission (TCP/IP), preventing the need for a double infrastructure. Redundant ring structures can be set up and two sub-networks, e.g. rings, can be connected redundantly via the SCALANCE X-200IRT switches (standby function).

### Common Features

- Fast Start-Up for optimized start-up behavior (link building, data forwarding) of PROFINET network components and I/O devices
- Diagnostics on the device by means of LEDs (power, link status, data communication) and signaling contact (signaling mask can be set on site using buttons)
- Redundant power supply
- RJ45 sockets with retaining sleeve for additional strain relief, designed for PROFINET-compliant IE FC RJ45 plug
- Integrated autocrossover function makes the use of uncrossed connection cables possible
- Integrated redundancy manager for constructing Fast Ethernet ring topologies with high-speed media redundancy.
- Automatic detection and negotiation of the data transmission rate by means of autosensing and autonegotiation function
- Remote diagnosis is performed by means of SNMP, web browser and PROFINET IO diagnostics
- Integrated configuration and diagnostics in STEP 7
- Integration of the switches in existing network management infrastructure by means of SNMP access
- Automatic e-mail sending function
- C-PLUG swap medium for rapid replacement of devices



Industry	Utility	Transportation	Time Sync	Redundancy	PoE	Zero-Packet-Loss	High-Temperature-Range	TIA-Integration
●		●		●			● <sup>1)</sup>	●

<sup>1)</sup> Depending on the product variant

# Industrial Ethernet Switches and Routers

For applications in industry

## SCALANCE X204RNA

The SCALANCE X-200RNA (Redundant Network Access) managed Industrial Ethernet network access points are used to connect up to two non-PRP-enabled (Parallel Redundancy Protocol in accordance with IEC 62439-3) terminal devices or network segments to parallel networks.

- Electrical or optical connection to stations or network in accordance with the port type of the devices
- Media redundancy thanks to duplicate transmission of frames in two parallel, separate networks
- High system availability since frames are sent simultaneously over two separate networks
- Reconfiguration times in a subnetwork do not affect the propagation time because the frames are transmitted via two separate networks (bumpless redundancy)
- Redundant 24 V DC voltage infeed or wide-range power supply unit, depending on device version
- SNMP access, integrated Web server and automatic e-mail transmission function for remote diagnostics and signaling via the network



Industry	Utility	Transportation	Time Sync	Redundancy	PoE	Zero-Packet-Loss	High-Temperature-Range	TIA-Integration
●				●				●

## SCALANCE X-300 / XR-300 / X-300PoE / XR-300PoE managed

### SCALANCE X-300

The compact Gigabit switches of the SCALANCE X-300 product range are Industrial Ethernet switches for setting up line, star, and ring topologies (10/100/1000 Mbit/s) for high-performance networks. They enable the construction of optical and/or electrical networks with high network availability, since, for example, they enable ring redundancy in combination with a redundancy manager function and have a redundant power supply.

With the C-PLUG swap medium, devices can be exchanged without programming device; the configuration or application data are secured on the C-PLUG and can be implemented in another SCALANCE X-300 switch without special expertise.



Industry	Utility	Transportation	Time Sync	Redundancy	PoE	Zero-Packet-Loss	High-Temperature-Range	TIA-Integration
●		●	●	●	● <sup>1)</sup>		● <sup>1)</sup>	●

<sup>1)</sup> Depending on the product variant

## SCALANCE X-300 / XR-300 / X-300PoE / XR-300PoE managed

### SCALANCE XR-300

The SCALANCE XR-300 is an industry-standard Industrial Ethernet 19" rack switch with IP20 degree of protection that features IT functions such as VLAN, IGMP Snooping/Querier, or STP/RSTP. The main application areas for the SCALANCE XR-300 switches are high-performance plant networks with a connection to the enterprise network, as well as power distribution centers. Thanks to the compact, space-saving 19" design, the SCALANCE XR-300 can be installed in 19" control cabinets. SCALANCE XR-300 switches permit the configuration of switched networks at the field level and control level, which not only demand high availability of the network and extensive diagnostic options, but also high transmission rates.

### SCALANCE X-300PoE/XR-300PoE

The SCALANCE X-300PoE product line for constructing electrical and/or optical line, star and ring topologies operating at 10/100/1000 Mbit/s has the functionality of SCALANCE X-300. The SCALANCE X308-2M PoE and XR-300PoE switches supply PoE-compatible devices, such as IWLAN access points SCALANCE W, IP cameras or IP telephones, with energy over the data cable and are suitable for constructing electrical and/or optical Industrial Ethernet line, star or ring structures.

#### Common Features

- Simple adaptation to the structure of a plant thanks to the modularity offered by 2-port media modules
- Diagnostics on the device by means of LEDs (power, link status, data communication) and signaling contact (signaling mask can be set on site using buttons)
- Redundant power supply
- Reduction of the network installation costs due to savings in power cables and additional network components when Power-over-Ethernet is used
- High flexibility thanks to variable mounting options of the power supply unit, and choice between front or rear cable outlet on the device (depending on the device variant)
- RJ45 sockets with retaining sleeve for additional strain relief, designed for PROFINET-compliant IE FC RJ45 plug
- Integrated autocrossover function makes the use of uncrossed connection cables possible



Industry	Utility	Transportation	Time Sync	Redundancy	PoE	Zero-Packet-Loss	High-Temperature-Range	TIA-Integration
●		●	●	●	● <sup>1)</sup>		● <sup>1)</sup>	●

<sup>1)</sup> Depending on the product variant

- Automatic detection and negotiation of the data transmission rate by means of autosensing and autonegotiation function
- Remote diagnosis is performed by means of SNMP, web browser and PROFINET IO diagnostics
- Integrated configuration and diagnostics in STEP 7
- Integrated redundancy manager for constructing Fast Ethernet and Gigabit Ethernet ring topologies with high-speed media redundancy
- Integration of the switches in existing network management infrastructure by means of SNMP access
- Automatic e-mail sending function
- C-PLUG swap medium for rapid replacement of devices
- Multicast and broadcast limitation
- Support of VLAN permits integration into enterprise security policies
- IGMP Snooping and IGMP Query support Multicast filtering and limiting

# Industrial Ethernet Switches and Routers

For applications in industry

## Media modules for modular SCALANCE X-300 managed switches

Different 2-port media modules support versatile configuration of the partly and fully modular switches

- SCALANCE X308-2M/X308-2M TS/X308-2M PoE and
- SCALANCE XR-300/XR-300PoE/XR-300EEC

The media modules are available both as electrical versions with RJ45 ports and as optical versions with BFOC, SC and LCports for the use of multimode and singlemode fiber-optic cables.

Using a 2-port SFP media module (Small Form-Factor Pluggable) the optional use of fiber optic SFP plug-in transceivers with LC connection technology is possible.

Their versatility (electrical/optical, multimode/singlemode, Fast Ethernet, Gigabit Ethernet) with media modules which can be differently equipped allows significantly reduced stocking of device variants.

- Flexibility on network expansion or conversion
- Reductions in stock-keeping costs and upkeep
- Different variants:  
electrical or optical, multimode or singlemode



### SCALANCE X-400 managed (Layer 3)

The modular switches of the SCALANCE X-400 product range are Industrial Ethernet switches for setting up line, star, and ring structures (10/100/1000 Mbit/s) for high-performance networks. They allow flexible setup of optical or electrical networks, which can be adapted in their topology, port number, and port type to the respective network structures. They allow high network availability, since, for example, they enable ring redundancy in combination with a redundancy manager function, have redundant power supply or permit exchange and extension of media modules during operation.

With the C-PLUG swap medium, devices can be exchanged without programming device; the configuration or application data are secured on the C-PLUG and can be implemented in another SCALANCE X-400 switch without special know-how.

SCALANCE X-400 switches have a modular structure, in which media modules and/or extender modules can be connected to the switch as required. Thanks to these expansions, up to eight electrical and eight optical ports are additionally available.

The gigabit ports are typically used for connecting the switches to each other and for a possible connection to higher network levels. Optical connections are available by means of media modules. The SCALANCE X-400 switches are well suited, for example, to process control systems such as PCS7.

- Diagnostics on the device by means of LEDs (power, link status, data communication) and signaling contact (signaling mask can be set on site using buttons)
- Redundant power supply
- RJ45 sockets with retaining sleeve for additional strain relief, designed for PROFINET-compliant IE FC RJ45 plug
- Flexible, modular design
- Integrated autocrossover function makes the use of uncrossed connection cables possible
- Automatic detection and negotiation of the data transmission rate by means of autosensing and autonegotiation function



Industry	Utility	Transportation	Time Sync	Redundancy	PoE	Zero-Packet-Loss	High-Temperature-Range	T/A-Integration
●				●				●

- Integrated redundancy manager for constructing Fast Ethernet and Gigabit Ethernet ring topologies with high-speed media redundancy
- Integrated configuration and diagnostics in STEP 7
- Integration of the switches in existing network management infrastructure by means of SNMP access
- Automatic e-mail sending function
- C-PLUG swap medium for rapid replacement of devices
- Multicast and broadcast limitation
- Support of VLAN permits integration into enterprise security policies
- IGMP Snooping and IGMP Query support Multicast filtering and limiting
- Layer 3 functionality (IP Routing; SCALANCE X414-3E)

# Industrial Ethernet Switches and Routers

For applications in industry

## SCALANCE X-500 managed (Layer 3)

SCALANCE X-500 switches are fully modular, high-performance, and industry-standard switches for the construction of electrical and optical line, ring and star topologies with transfer rates of up to 10 Gbit/s, designed for installation in 19" control cabinets.

The SCALANCE X-500 switches are ideal for use in industrial networks and for integrating the industrial network into an existing corporate network. From the control level to the management level, the switch handles the networking of plant sections as well as distributed field devices and ensures high plant availability with extensive diagnostics options and high transmission speeds.

Thanks to the scalability of the basic unit and the optionally available layer 3 switching function, the network can be established specially for the relevant application.

### Common Features

- Simple adaptation to the structure of a plant thanks to the modularity offered by 4-port media modules
- Diagnostics on the device by means of LEDs (power, link status, data communication) and signaling contact (signaling mask can be set on site using buttons)
- High availability of the network thanks to
  - Redundant power supply
  - Integrated redundancy manager for constructing Fast Ethernet and Gigabit Ethernet ring topologies with high-speed media redundancy
  - Easy device replacement by means of plug-in C-PLUG/KEY-PLUG<sup>1)</sup> swap medium
  - Very fast reconfiguration of the network in event of a fault
- KEY-PLUG<sup>1)</sup> swap medium for layer 3 functionality during operation
- Thanks to support for the Dual Stack Routing function, both IPv4 and IPv6 addressing can be operated in one network
- High flexibility thanks to variable mounting options of the power supply unit, and choice between front or rear cable outlet on the device (depending on the device variant)
- Reduction of the network installation costs due to savings in power cables and additional network components when Power-over-Ethernet is used



Industry	Utility	Transportation	Time Sync	Redundancy	PoE	Zero-Packet-Loss	High-Temperature-Range	TIA-Integration
●				●	●			●

- RJ45 sockets with retaining sleeve for additional strain relief, designed for PROFINET-compliant IE FC RJ45 plug
- Integrated autocrossover function makes the use of uncrossed connection cables possible
- Automatic detection and negotiation of the data transmission rate by means of autosensing and autonegotiation function
- Remote diagnosis is performed by means of SNMP, web browser and PROFINET IO diagnostics<sup>1)</sup>
- Integrated configuration and diagnostics in STEP 7
- Integration of the switches in existing network management infrastructure by means of SNMP access
- Automatic e-mail sending function
- Multicast and broadcast limitation
- Support of VLAN permits integration into enterprise security policies
- IGMP Snooping and IGMP Query support Multicast filtering and limiting

- TIA-Integration<sup>1)</sup>

<sup>1)</sup> Available soon

## Media modules for SCALANCE X-500 managed switches (Layer 3)

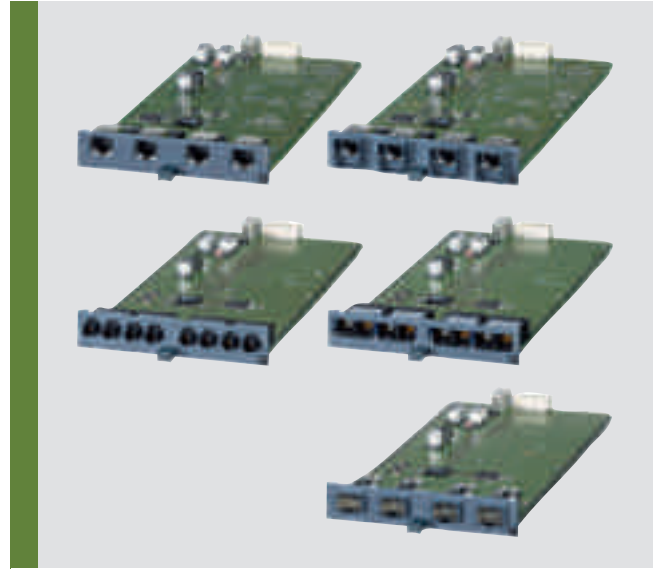
Different 4-port media modules support versatile configuration of SCALANCE X-500 switches.

Electrical versions with RJ45 ports are available as well as optical versions with BFOC and SC ports for the use of multimode and singlemode fiber-optic cables.

- Using a 4-port SFP media module, the optional use of fiber-optic SFP plug-in transceivers (Small Form-Factor Pluggable) with LC connection technology is possible
- SFP+ and SFP plug-in transceivers for flexible equipping of the four integral SFP+ slots in SCALANCE X-500

Their versatility (electrical/optical, multimode/singlemode, Fast Ethernet, Gigabit Ethernet) with media modules which can be differently equipped allows significantly reduced stocking of device variants.

- Unlimited flexibility for network expansions, conversion, or increasing the performance
- Reductions in stock-keeping costs and upkeep



## RuggedSwitch\* – Compact Ethernet Switches

### i80x Series

Compact Managed or Unmanaged Ethernet Switches

A series of compact Ethernet switches with the flexibility of choosing from managed or unmanaged, regular or extended temperature, fiber optic or copper interfaces and fast or Gigabit Ethernet. The i80x series is the perfect choice for a wide variety of demanding industrial environments such as those found in process control applications (oil and gas, petro-chemical, metals and mining, wind farms).

### Common Features

- Proven Rugged Operating System
- Extremely compact form factor
- -20 to +60 °C operating temperature
- Managed or unmanaged option
- Conformal coating available



Industry	Utility	Transportation	Time Sync	Redundancy	PoE	Zero-Packet-Loss	High-Temperature-Range
●		●		●		●	●

\* This product is manufactured by RuggedCom Inc. and will in future be integrated into the Siemens Industrial Ethernet portfolio.

# Industrial Ethernet Switches and Routers

For utility / transportation

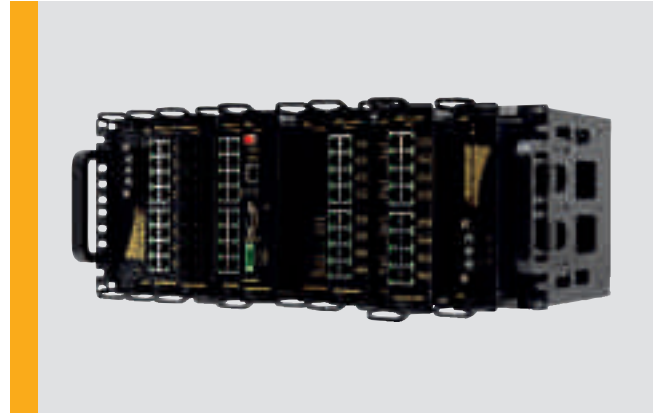
## RuggedBackbone\* – Multi Service Platform

### RX5000

High Density Layer 2 and Layer 3 Switch and Router

A high port density, Ethernet routing and switching platform designed to meet the challenging climatic and environmental demands found in utility, industrial and military network applications. The device can withstand high levels of electromagnetic interference, radio frequency interference and a wide temperature range of -40°C to +85°C. The RX5000 features field replaceable line modules and hot swappable power supply modules, which minimizes technological obsolescence costs – future-proof design.

- Modular Layer 2 and Layer 3 switch and router
- Support for up to 96 TX (electrical) ports, 48 100FX (optical) ports or 24 GigE (Gigabit Ethernet) ports
- Meets/exceeds IEC61850-3 & IEEE1613 Class 2
- Dual redundant power supplies
- Firewall/VPN Support



Industry	Utility	Transportation	Time Sync	Redundancy	PoE	Zero-Packet-Loss	High-Temperature-Range
●	●	●		●		●	●



## RuggedBackbone\* – Multi Service Platform

### RX15xx

#### Layer 2 and Layer 3 Switch and Router

A cost effective, utility grade, layer 2 and layer 3 switch and router in one box with a variety of communication interfaces and physical media; fiber, copper, SFPs (Small Form-factor Pluggable), cellular, serial and WAN options. The series features field replaceable line modules and hot swappable power supply modules, which minimizes technological obsolescence costs – future-proof design.

### RX1500

- Support for up to 8 GigE ports or 24 100FX ports
- Redundant modular power supplies

### RX1501

- Support for up to 4 GigE ports or 36 100FX ports
- Single modular power supply

### RX1510

- Support for up to 8 GigE ports or 24 100FX ports
- DIN mount
- Redundant modular power supplies

### RX1511

- Support for up to 4 GigE ports or 12 100FX ports
- DIN mount
- Compact form factor
- Single modular power supply

### RX1512

- Support for up to 4 GigE ports or 12 100FX ports
- DIN mount
- Compact form factor
- Fixed DC power supply



Industry	Utility	Transportation	Time Sync	Redundancy	PoE	Zero-Packet-Loss	High-Temperature-Range
●	●	●		●		●	●

### Common Features

- Modular, layer 2 and layer 3 switch and router
- Operate reliably in the harshest conditions
- Meets/exceeds IEC61850-3 & IEEE1613 Class 2
- Firewall/VPN support

\* This product is manufactured by RuggedCom Inc. and will in future be integrated into the Siemens Industrial Ethernet portfolio.

# Industrial Ethernet Switches and Routers

For utility / transportation

## RuggedSwitch\* – Compact Ethernet Switches

### Small Form Factor Managed Ethernet Switches

A series of small form factor, managed Ethernet switches feature optional DIN rail mounting and single mode fiber, allowing for long-range links.

The RS9xx series also provides built in security features to ensure traffic segregation between multiple applications. These devices are the perfect choice for creating an Ethernet network for mission-critical, real-time control applications where space is limited.

#### RS900

- Managed Ethernet switch with fiber uplinks
- 9 ports: 6 10/100BaseTX + optional 3 100BaseFX or 3- 10/100BaseTX

#### RS9xxG

- Managed Ethernet switch
- 8 Ports: 6 10/100/1000BaseTX + optional 2 1000BaseX (gigabit) or 10 Ports: 8 10/100BaseTX + 2-1000BaseX (gigabit)
- EN50121-4 (railway applications)

#### RS969

- Managed Ethernet switch with fiber uplinks
- Waterproof: IP66 (water jets) and IP67 (water immersion)
- 10 ports: 8 10/100BaseTX Ports + 2 1000BaseX (gigabit)
- IP67 rated M12 or RJ45 copper port connectors
- Integrated power supply (24, 48, 88-300 V DC/85-264 V AC)
- Optional dual redundant power supplies

#### Common Features

- Small form factor
- Long haul fiber support



Industry	Utility	Transportation	Time Sync	Redundancy	PoE	Zero-Packet-Loss	High-Temperature-Range
●	●	●		●		●	●

- Meets/exceeds IEC61850-3 & IEEE1613 Class 2
- -40°C to +85°C operating temperature (no fans)
- Hazardous location certification: Class 1 Division 2
- Fully integrated power supply (no external adaptors)
- Universal high-voltage range: 88-300 V DC or 85-264 V AC
- Dual low-voltage DC inputs: 24 V DC (10-36 V DC) or 48 V DC (36-59 V DC)

## RuggedSwitch\* - 19" Ethernet Switches

### RSG2xxx Series

#### RSG2x00

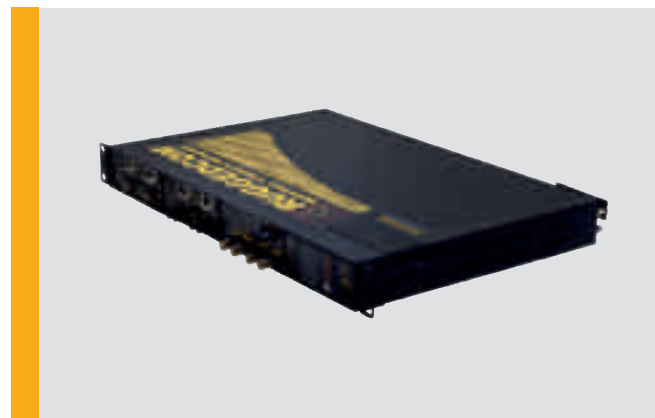
- Managed gigabit Ethernet switch
- Up to 9 Ports: 1000BaseX (Gigabit) and/or 10/100/1000BaseTX or up to 19 Ports: 3 1000BaseX (Gigabit) + 16 10/100BaseX or
- Up to 32 Ports: 24 10/100BaseTX and optional 4 1000BaseX (Gigabit) or 8 100BaseX
- Power over Ethernet (PoE) version available
- EN50121-4 (railway applications)

#### RSG2288

- Managed gigabit Ethernet switch with IEEE 1588 v2 and IRIG-B conversion
- Up to 9 Ports: 1000BaseX (Gigabit) and/or 10/100/1000BaseTX

#### Common Features

- 1U (height unit) form factor
- Many different fiber port options available
- Long haul fiber support
- Meets/exceeds IEC61850-3 & IEEE1613 Class 2
- -40°C to +85°C operating temperature (no fans)
- Hazardous location certification: Class 1 Division 2
- Fully integrated power supply (no external adaptors)
- Universal high-voltage range: 88-300 V DC or 85-264 V AC
- Dual low-voltage DC inputs: 24 V DC (10-36 V DC) or 48 V DC (36-59 V / 72 V DC)
- DIN or panel mounting options provide secure mechanical reliabilityOptional dual redundant power supplies



Industry	Utility	Transportation	Time Sync	Redundancy	PoE	Zero-Packet-Loss	High-Temperature-Range
●	●	●	●	●	●	●	●

\* This product is manufactured by RuggedCom Inc. and will in future be integrated into the Siemens Industrial Ethernet portfolio.

# Industrial Ethernet Switches and Routers

For utility / transportation

## SCALANCE X204RNA EEC

The SCALANCE X-204RNA EEC (Redundant Network Access) managed Industrial Ethernet network access points are used to connect up to two non-PRP-enabled (Parallel Redundancy Protocol in accordance with IEC 62439-3) terminal devices or network segments to parallel networks.

- Electrical or optical connection to stations or network in accordance with the port type of the devices
- Media redundancy thanks to duplicate transmission of frames in two parallel, separate networks
- High system availability since frames are sent simultaneously over two separate networks
- Reconfiguration times in a subnetwork do not affect the propagation time because the frames are transmitted via two separate networks (bumpless redundancy)
- Redundant 24 V DC voltage infeed or wide-range power supply unit, depending on device version
- SNMP access, integrated Web server and automatic e-mail transmission function for remote diagnostics and signaling via the network



Industry	Utility	Transportation	Time Sync	Redundancy	PoE	Zero-Packet-Loss	High-Temperature-Range	TIA-Integration
●	●			●			●	●

## SCALANCE X-300EEC / XR-300EEC managed

The switches of the product line SCALANCE X-300EEC/ XR-300EEC (Enhanced Environmental Conditions) are managed Industrial Ethernet switches with degree of protection IP30 or IP20. They are designed for use in harsh industrial environments as well as in power switchgear.

They permit the communication of switching and protection devices in low-voltage and high-voltage switchgear. The switches meet all the necessary EMC approvals for this field of application (IEC standard 61850-3). The devices for increased availability requirements are offered with redundant wide-range power supplies (for 60 V to 250 V DC / 100 V to 240 V AC).

SCALANCE X-300EEC switches with conformal coating can also be used in harsh environments.



Industry	Utility	Transportation	Time Sync	Redundancy	PoE	Zero-Packet-Loss	High-Temperature-Range	TIA-Integration
	●	●	●	●		●	●	●

## Media modules for modular SCALANCE X-300 managed switches

Different 2-port media modules support versatile configuration of the partly and fully modular switches

- SCALANCE X308-2M/X308-2M TS/X308-2M PoE and
- SCALANCE XR-300/XR-300PoE/XR-300EEC

The media modules are available both as electrical versions with RJ45 ports and as optical versions with BFOC, SC and LC ports for the use of multimode and singlemode fiber-optic cables.

Using a 2-port SFP media module (Small Form-Factor Pluggable) the optional use of fiber optic SFP plug-in transceivers with LC connection technology is possible.

Their versatility (electrical/optical, multimode/singlemode, Fast Ethernet, Gigabit Ethernet) with media modules which can be differently equipped allows significantly reduced stocking of device variants.

- Flexibility on network expansion or conversion
- Reductions in stock-keeping costs and upkeep
- Different variants:  
electrical or optical, multimode or singlemode



# Media Converters / Serial Device Server

For applications in industry

## SCALANCE X-100 media converter

Media converter for converting electrical signals to optical signals and for connecting existing networks, e.g. AUI networks.

The unmanaged Industrial Ethernet media converters of the SCALANCE X-100 product line are ideally suited to the conversion of different transmission media in Industrial Ethernet networks at 10/100 Mbit/s in line, star and ring topologies.

The SCALANCE X101-1POF media converter is ideally suitable for integrating devices with POF interfaces into existing network structures. They are suitable for industry and save room in the control cabinet with their compact housing.

- Diagnostics on the device by means of LEDs (power, link status, data communication) and signaling contact (signaling mask can be set on site using buttons)
- RJ45 sockets with a sleeve for additional strain relief, designed for PROFINET-compliant IE FC RJ45 plug
- Redundant power supply



## For utility / transportation

### RuggedMC\* – Media Converters

#### Industrial Strength Media Converters

The RMCxx series is a family of fiber-to-copper media converters, which are specifically designed to operate reliably in harsh industrial environments. The devices offer media conversion with an integrated power supply (no external adaptors) in one economical package. The RMCxx series meets or exceeds recognized industry standards (e.g. IEC 61850-3, IEEE 1613, NEMA TS 2) for design and communications performance.

#### RMC

- Ethernet media converter (copper to fiber)
- 10BaseT to 10BaseFL
- 100BaseTX to 100BaseFX

#### RMC20

- Serial media converter (copper to fiber)
- RS485, RS422 or RS232 conversion to multimode fiber optics
- RS232 to RS485/422 conversion mode

#### RMC40

- Ethernet media and speed converter
- 2 10/100TX Ports + 1 100FX port
- 2 10/100TX Ports + 2 100FX port
- 4 10/100TX Ports

#### RMC41

- Ethernet media and speed converter
- 10/100TX port + 1 100FX port (SC/ST)



Industry	Utility	Transportation
●	●	●

#### Common Features

- -40°C to +85°C operating temperature (no fans)
- Integrated power supply (24, 48, 88-300 V DC/85-264 V AC)

\* This product is manufactured by RuggedCom Inc. and will in future be integrated into the Siemens Industrial Ethernet portfolio.

# Media Converters / Serial Device Server

For utility / transportation

## RuggedServer\* - Serial Device Servers

### Industrial Strength Serial Device Servers

The RS4xx series, RS910, RMC30 and RX1500 are serial-to-Ethernet servers, which are specifically designed to operate in harsh industrial environments. All devices meet or exceed industry standards (e.g. IEC 61850-3, IEEE 1613, NEMA TS 2) for ruggedness and communications performance in mission critical real-time control applications requiring high levels of reliability and availability.

#### RS416

- Integrated managed Ethernet switch and IEEE 1588 v2 to IRIG-B conversion
- Modular: up to 16 serial ports (4 port modules)
- RS485/RS422/RS232 (DB9 or RJ45)
- Serial fiber interface (ST)
- Optional dual redundant power supplies
- Power over Ethernet (PoE) version available

#### RS400

- Integrated managed 4 port Ethernet switch
- 4 RS485/RS422/RS232 serial ports (DB9, RJ45 or screw)
- Integrated V.90 modem (optional)

#### RS910

- Integrated managed 3 port Ethernet switch
- 2 RS485/RS422/RS232 serial ports (DB9 or RJ45)
- Serial fiber interface option (ST)
- Up to 3 Ethernet ports

#### RMC30

- 1 RS232 and 1 RS422/485 port
- 1 10BaseTX



Industry	Utility	Transportation	Time Sync	Redundancy	PoE	Zero-Packet-Loss	High-Temperature-Range
●	●	●	●	●	●	●	●

### Common Features

- Transmit serial data over an IP network
- Support for Modbus TCP, DNP3, TIN serial protocols
- Raw socket mode allows for conversion of any serial protocols

### Serie RX15xx

see descriptions on page 17

\* This product is manufactured by RuggedCom Inc. and will in future be integrated into the Siemens Industrial Ethernet portfolio.



# Industrial Ethernet Security

For applications in industry

## SCALANCE S

Security modules for the protection of automation networks and security during data exchange between automation systems.

- Communication is only possible between authenticated and authorized devices
  - Protection against operator mistakes
  - Prevention of unauthorized access
  - Prevention of faults and communications overload
- Rugged, industry-standard station connections with PROFINET-compatible RJ45 connectors that offer additional strain relief and bending strain relief thanks to latching on the housing
- Easier handling thanks to minimal configuration and no special knowledge of IT security is required
- No modification or adaptation of the existing network structure, applications or stations is required
- Safeguarding of communication is independent of the protocol (e.g. PROFINET or other Ethernet-based field-bus solutions)
- Remote access via the Internet possible without restrictions and with any providers



# Industrial Ethernet Security

For utility / transportation

## CrossBow\*

### Secure Access Management & Station Access Controller

CrossBow is a proven secure access management (SAM) solution designed to provide NERC CIP compliant access to intelligent electronic devices (IEDs). The CrossBow station access controller (SAC) complements the product family by providing a solution at the substation for managing local IED access, while maintaining stringent security methodologies in line with NERC CIP compliance and industry best practices. This allows the CrossBow product to further enhance productivity gains for administrators and users while achieving full NERC compliance in managing, securing and reporting on remote access. When used in combination, the CrossBow SAM and SAC form an integrated, comprehensive solution with a seamless configuration environment

Industry	Utility	Transportation
	●	

- Individual user accounts and access permissions
- High level of automation for device management (e.g. passwords, firmware and configurations)
- Support for IED polling applications (e.g. SEL 5040)
- Supports wide range of remote gateways and servers

## RuggedRouter\* – Cyber Security Routers / RuggedBackbone – Multi Service Platform

A portfolio of utility grade routers with integrated firewall and VPN functionality. These routers can be used to establish an electronic security perimeter around critical cyber assets found in utility substations and other control and automation systems, in order to prevent the disruption of operations by accidental or malicious acts. The devices are designed to protect and secure SCADA system networks connected directly to the Internet or within a company's wide area network (WAN) or local area network (LAN).

### RX1000

- Power over Ethernet (PoE) version available
- Linux based embedded OS
- Integrated router/firewall/VPN
- WAN port: up to 8 ports (T1/E1, T3/D3, DSL, DDS)
- Ethernet ports: up to 4 10/100BaseTX or 100BaseFX
- Serial Ports: up to 8 RS485/RS422/RS232
- GPS/IRIG-B/NTP/IEEE1588 time synchronization server
- -40°C to +85°C operating temperature (no fans)
- Integrated power supply (10-36 V DC, 36-59 V / 72 V DC, 88-300 V DC/85-264 V AC) - optional dual redundant



### Additional for RX1 100 Cyber Security Appliance

- NERC CIP (North American Electric Reliability Corporation, Critical Infrastructure Protection) cyber security compliance
- Intrusion detection system (IDS)

### Rugged Backbone – Multi Server Platform

#### RX5000 / RX15xx Series

see descriptions on page 16/17

\* This product is manufactured by RuggedCom Inc. and will in future be integrated into the Siemens Industrial Ethernet portfolio.

# Modems

## For applications in industry

### EGPRS-Router MD741-1

IP communication from Industrial Ethernet-based automation devices over GSM mobile radio networks

- Four times the transmission speed by means of EGPRS
- Integrated security functions with firewall and VPN (IPsec) UMTS, EGPRS- (GPRS with Edge) and GPRS router for wireless IP communication from Industrial Ethernet-based automation devices over UMTS-/GSM mobile radio networks



Industry	Utility	Transportation	Time Sync	Redundancy	PoE	Zero-Packet-Loss	High-Temperature-Range	TIA-Integration
●	1)	2)	●					

### UMTS-Router SCALANCE M873/875

UMTS, EGPRS (Edge GPRS) and GPRS router for wireless IP communication of Industrial Ethernet-based PLCs over UMTS/GSM mobile wireless networks

- High data transfer rate thanks to UMTS
- Integrated security functions with firewall
- Use both as VPN server and as client (IPsec)



Industry	Utility	Transportation	Time Sync	Redundancy	PoE	Zero-Packet-Loss	High-Temperature-Range	TIA-Integration
●	1)	2)	●					

<sup>1)</sup> Essentially, all three components are used for utility, even if not EEC

<sup>2)</sup> e1/E1 have all components;  
EN 51055 is only envisaged for SCALANCE M875

# Modems

For utility / transportation

## UMTS-Router SCALANCE M875

UMTS, EGPRS (Edge GPRS) and GPRS router for wireless IP communication of Industrial Ethernet-based PLCs over UMTS/GSM mobile wireless networks

- High data transfer rate thanks to UMTS
- Integrated security functions with firewall
- Use both as VPN server and as client (IPsec)



Industry	Utility	Transportation	Time Sync	Redundancy	PoE	Zero-Packet-Loss	High-Temperature-Range	TIA-Integration
●	● <sup>1)</sup>	● <sup>2)</sup>	●				●	

<sup>1)</sup> Essentially, all three components are used for utility, even if not EEC

<sup>2)</sup> e1/E1 have all components;  
EN 51055 is only envisaged for SCALANCE M875

## RuggedVDSL\* – EoVDSL Ethernet Switches

### Managed Ethernet Switch with Ethernet Over VDSL Uplinks

A series of Ethernet switches, which provides reliable, long distance Ethernet communications over telephone grade cable. With speeds up to 35 Mbit/s over 5km distances, the RS9xxL series of switches cut implementation time and cost by utilizing existing phone lines for high-speed data communications. The devices are built for high reliability in harsh industrial environments with a wide operating temperature range and immunity to high levels electromagnetic interference.

#### RS900L

- Managed, industrial strength Ethernet switch with EoVDSL uplinks
- 1 EoVDSL + 6 10/100BaseTX + optional 2 10/100BaseTX or 2 100BaseFX

#### RS910L

- Serial and Ethernet device server with Ethernet over VDSL uplinks
- 1 EoVDSL + 2 Serial + 2 10/100BaseTX or 2 100BaseFX

#### RS920L

- Ethernet over VDSL with integrated dual port, serial device server
- 2 EoVDSL + 2 Serial

#### RS930L

- Managed Ethernet switch with dual port Ethernet over VDSL uplinks
- 2 EoVDSL + 6 10/100BaseT



Industry	Utility	Transportation	Time Sync	Redundancy	PoE	Zero-Packet-Loss	High-Temperature-Range
●	●	●		●		●	●

### Common Features

- Long Distance Ethernet communications over telephone grade cable
- Support communications up to 35 Mbit/s over 5 km
- Long haul fiber support
- Meets/exceeds IEC61850-3 & IEEE1613 Class 2
- -40°C to +85°C operating temperature (no fans)
- Hazardous location certification: Class 1 Division 2
- Fully integrated power supply (no external adaptors)
- Universal high-voltage range: 88-300 V DC or 85-264 V AC
- Dual low-voltage DC inputs: 24 V DC (10-36 V DC) or 48 V DC (36-59 V / 72 V DC)
- DIN or panel mounting option

\* This product is manufactured by RuggedCom Inc. and will in future be integrated into the Siemens Industrial Ethernet portfolio.

# Industrial Wireless Communication

For applications in industry

## IWLAN – Access Points IEEE 802.11n

The Access Points of the SCALANCE W780 product line are ideally suited for setting up Industrial Wireless LANs (IWLAN) for 2.4 GHz or 5 GHz. They can be used in all applications that require a high degree of operational reliability, even in extremely harsh ambient conditions.

- High transmission rates (up to 450 Mbit/s in conjunction with Channel Bonding) due to 3x3 MIMO technology (Multiple Input, Multiple Output); for this purpose, SCALANCE W Access Points use three streams each for simultaneous sending and receiving
- Suitable for any application:
  - for installation in a control cabinet
  - for cabinet-free installation indoors
  - for outdoor environments with demanding climatic requirements
- Reliable thanks to rugged, impact-resistant housing, protected from water and dust (IP65), resistant to shock, vibration and electromagnetic fields
- Complex applications with redundancy requirements and high bandwidths, e.g. for video, by using IEEE 802.11n
- Configuration support by means of wizards and online help; easy management via web server and SNMP
- Fast replacement of devices in event of failure by means of optional C-PLUG (Configuration Plug)



Industry	Utility	Transportation	Single Radio	Dual Radio	IEEE 802.11			IP30	IP65
					bg	a	n		
●			●	● <sup>1)</sup>	●	●	●	●	

<sup>1)</sup> Triple Radio

## IWLAN – Controller and Controller Access Points IEEE 802.11n

The network infrastructures in the industrial and office areas are coming ever-closer together. This applies also in the area of wireless communication, causing a constant increase in the number of access points and WLAN clients to be managed. If such networks are established with a large number of stand-alone access points, with each one having to be configured separately, this results in huge costs for initial configuration and operation.

Central wireless LAN controllers enable low-cost, user-friendly and secure operation of large WLAN infrastructures here. Management of the WLAN clients connected to such WLANs is significantly simplified thanks to their division into user groups with different security policies.

### SCALANCE WLC711

The SCALANCE WLC711 Wireless LAN Controller is an IWLAN controller for centralized management of a wireless LAN in the industrial environment (configuration, diagnostics, firmware updates, access control, security settings, coordination).

#### Common Features

- Fast establishment of a new WLAN or expansion of an existing WLAN with the help of controller-based access points
- Parallel operation of different services (e.g. communication between programmable controllers, Internet access, Voice-over-IP telephony and video transmission) on the same controller-based WLAN infrastructure
- Seamless transition between production WLAN and corporate WLAN
- Cost savings in commissioning and operation as well as increased reliability and security thanks to the central management functions of the IWLAN controller in comparison to a WLAN comprising stand-alone access points that have to be configured individually



Industry	Utility	Transportation	Single Radio	Dual Radio	IEEE 802.11			IP30	IP65
					bg	a	n		
●		●		●	●	●	●	●	●

# Industrial Wireless Communication

For applications in industry

## IWLAN – Access Points IEEE 802.11a/b/g

The access points of the SCALANCE W780 product line are optimized for the configuration of Industrial Wireless LAN (IWLAN) wireless networks for 2.4 GHz or 5 GHz with data transmission rates up to 54 Mbit/s. They can be used in all applications that require a high degree of operational reliability, even under extremely harsh environmental conditions

- Suitable for any application:
  - for installation in a cabinet or integration in devices
  - for cabinet-free installation indoors
  - for outdoor environments with demanding climatic requirements
- Reliable thanks to rugged, impact-resistant housing, protected from water and dust (IP65), resistant to shock, vibration and electromagnetic fields
- Approved for operation in hazardous areas in Zone 2
- Demanding applications with real-time and redundancy requirements, such as PROFINET with PROFIsafe
- In conformance with standards, as it supports IEEE 802.11; expansions with software functions, especially for applications demanding high reliability, e.g. channel hopping procedure (iHOP), cyclic real-time data traffic, and very high-speed roaming (iPCF)
- Quick commissioning of Access Points with the optional swap medium PRESET-PLUG and quick device exchange in case of faults with the optional swap medium C-PLUG (Configuration Plug)



Industry	Utility	Transportation	Single Radio	Dual Radio	IEEE 802.11			IP30	IP65
					bg	a	n		
●		●		●	●		●	●	



## IWLAN – Controller Access Points IEEE 802.11a/b/g

### SCALANCE W786-2HPW

SCALANCE W786-2HPW controller-based access points can only be operated on the SCALANCE WLC IWLAN Controller and Enterasys Wireless Controller (previously HiPath Wireless Controller)

- Support for the WLAN standards IEEE 802.11a/b/g/h
- Especially well suited to applications with high climatic requirements when installed outdoors and in areas accessible to the public



Industry	Utility	Transportation	Single Radio	Dual Radio	IEEE 802.11			IP30	IP65
					bg	a	n		
●		●		●	●	●		●	

# Industrial Wireless Communication

For applications in industry

## IWLAN – Client Modules IEEE 802.11n

The Client Modules from the SCALANCE W748 product line are optimal for integrating Industrial Ethernet stations into Industrial Wireless LANs (IWLANS) for 2.4 GHz and 5 GHz.

- High transmission rates (up to 450 Mbit/s in conjunction with Channel Bonding) due to 3x3 MIMO technology (Multiple Input, Multiple Output); for this purpose, SCALANCE W Client Modules use three streams each for simultaneous sending and receiving
- Suitable for any application:
  - for installation in a control cabinet
  - for cabinet-free installation
- Reliable thanks to rugged enclosure, protected from water and dust (IP65), resistant to shock, vibration and electromagnetic fields
- Complex applications with redundancy requirements and high bandwidths, e.g. for video, by using IEEE 802.11n
- Configuration support by means of wizards and online help; easy management via web server and SNMP
- Fast replacement of devices in event of failure by means of optional C-PLUG (Configuration Plug)



Industry	Utility	Transportation	Single Radio	Dual Radio	IEEE 802.11			IP30	IP65
					bg	a	n		
●			●		●	●	●	●	

## IWLAN – Client Modules IEEE 802.11a/b/g

The Ethernet Client Modules from the SCALANCE W740 product line are optimal for integrating Industrial Ethernet stations into Industrial Wireless LANs (IWLANS) for 2.4 GHz and 5 GHz with transmission rates of up to 54 Mbit/s.

- Suitable for any application:
  - for installation in a cabinet or integration in devices
  - for cabinet-free installation
- Reliable thanks to rugged housing, protected from water and dust (IP65), resistant to shock, vibration and electromagnetic fields
- Approved for operation in hazardous areas in Zone 2
- Demanding applications with real-time and redundancy requirements, such as PROFINET with PROFIsafe
- In conformance with standards, as it supports IEEE 802.11; additional functional expansions with software functions, especially for applications demanding high reliability, e.g. channel hopping procedure (iHOP), cyclic real-time data traffic, and very high-speed roaming (iPCF)
- Quick commissioning of Client Modules with the optional swap medium PRESET-PLUG and quick device exchange in case of faults with the optional swap medium C-PLUG (Configuration Plug)



Industry	Utility	Transportation	Single Radio	Dual Radio	IEEE 802.11			IP30	IP65
					bg	a	n		
●		●	●		●	●		●	

# Industrial Wireless Communication

For applications in industry

## IWLAN antennas

Remote antennas increase the reliability of wireless links by optimizing the receiving and emission of signals.

- Use in Industrial Wireless LAN (IWLAN) and WLAN in accordance with IEEE 802.11 at 2.4 GHz and 5 GHz with transmission rates of up to 450 Mbit/s
- Coordinated range of antennas for the most diverse applications both indoors and outdoors
- Antennas with two (dual-slant) or three (MIMO) connections for increased data throughput and increased reliability of the wireless connection thanks to selective use of multiple path propagation
- Suitable for use in hazardous areas (Zone 2); no special approvals necessary



## IWLAN RCoax cables

The RCoax cables are radiating cables that function as special antennas for the SCALANCE W Access Points in environments with complex radio coverage. Its design means that a defined, cone-shaped radio field is generated along the RCoax cable. The radiating cables are therefore perfectly suitable for use in all types of applications with track-bound vehicles.

- Rugged coaxial cable which can be easily installed
- Two cables for use in the frequency bands 2.4 GHz and 5 GHz
- Connection as external antenna to SCALANCE W780 Access Points
- Connection of mobile nodes via SCALANCE W740 Client Modules and IWLAN/PB Link PN IO using an antenna aligned to the RCoax
- Suitable for use in hazardous areas (Zone 2); no special approvals necessary



## IWLAN cabling technology

A comprehensive, coordinated range of coaxial accessories is offered for flexible combination and installation of the individual IWLAN components indoors and outdoors.

This range encompasses connecting cables as well as diverse connectors, lightning protection elements, a power splitter and an attenuator.



## Power Supply PS791-1PRO

The PS791-1 PRO power supply is an AC/DC power supply for input voltages of 90 to 265 V AC for numerous SCALANCE products with IP65 degree of protection.

- Robust metal housing with IP65 protection against water and dust
- Operating temperature -20°C to +60°C



# Industrial Wireless Communication

For utility / transportation

## RuggedAIR\* – Wireless LAN Extension

### Utility Grade Wireless LAN Devices

A series of wireless Ethernet switches, which integrate IEEE 802.11b/g secure wireless LAN with fully managed Ethernet switches and optional serial server functionality. With the installation of these devices, a network designer will achieve the integration of wired and wireless networks. The RS9xxW series can be configured as an access point, client, or bridge device.

#### RS900W

- Wireless Ethernet with integrated switch
- 8 ports: 6 10/100BaseTX + optional 2 10/100BaseTX or 2 100BaseFX
- Can be configured as an access, client or bridge device

#### RS910W

- Wireless device server
- 4 ports: 2 serial and/or 2 Ethernet ports
- RS485/RS422/RS232 (DB9 or RJ45)
- Copper or fiber Ethernet ports

#### RS920W

- Wireless serial device server
- 1 Ethernet over VDSL (EoVDSL) interface
- 2 serial ports RS485/RS422/RS232 (DB9 or RJ45)

#### RS930W

- Wireless Ethernet with integrated switch
- 1 Ethernet over VDSL interface
- 6 10/100BaseTX Ethernet ports
- Can be configured as an access, client or bridge devices



Industry	Utility	Transportation	Single Radio	Dual Radio	IEEE 802.11			IP30	IP65
					bg	a	n		
●	●	●	●		●			●	

### Common Features

- IEEE 802.11b/g compliant (up to 54 Mbit/s)
- WPA2/802.11i for robust security and encryption
- WPA (Wi-Fi Protected Access) with TKIP for enhanced security and encryption
- IEEE 802.1X/RADIUS using EAP-PEAP for secure "enterprise class" authentication configuration
- Pre-shared Key Mode (PSK) for "personal" mode authentication configuration
- Central management through RuggedNMS
- Many different fiber port options available
- Meets/exceeds IEC61850-3 & IEEE1613 Class 2
- -40°C to +85°C operating temperature (no fans)
- Integrated power supply (10-36 V DC, 36-59 V DC, 88-300 V DC/85-264 V AC)

\* This product is manufactured by RuggedCom Inc. and will in future be integrated into the Siemens Industrial Ethernet portfolio.

# Network Management

For applications in industry

## SINEMA Server

SINEMA Server is a web-based network monitoring software that significantly reduces the response time to communications problems in industrial networks, and thus avoids downtimes and saves costs.

- Simple operator input even for plant operators or service personnel, to enable autonomous detection and correction of communications problems
- Graphical representation of industrial network structures (automatic topology detection)
- Standardized network documentation (reports for SLAs, i.e. Service Level Agreements)
- Simple operation via web browser or via an HMI/SCADA application, without special IT knowledge
- Automatic saving of network data such as network topology and device information
- Low installation and maintenance costs, especially thanks to the use of pre-installed industrial PCs (SIMATIC IPC427C Microbox PC)



# Network Management

For utility / transportation

## RuggedNMS\* – Network Management Software

RuggedNMS is fully featured, enterprise grade, network management software based on the OpenNMS platform. Specifically for the industrial communications industry, RuggedNMS provides a comprehensive platform for monitoring, configuring, and maintaining mission-critical IP based communications networks.

- Supports Windows XP, Windows 7, Windows Server 2003/2008 and Debian Linux (Lenny) operating systems
- Centralized management and monitoring of network, networked devices and WiMAX base stations to achieve desired level of network availability, performance and operational efficiency
- Advanced Adobe Flash based mapping system provide real-time status updates
- Scalable and distributed architecture that can support very large networks
- Greater network visibility to enable proactive corrective actions and improved capacity utilization
- Web based UI with graphical network view with highly versatile and configurable auto discovery and polling subsystem
- Rich set of pre-packaged reports and tools to create user-defined reports

# Software Tools

For utility

## Reflex\*

Reflex is a monitoring and control application purpose built for distribution networks, allowing the creation of systems that cover the spectrum from single user HMI to mobile distribution management to enterprise level SCADA. Utilities now have a costeffective visualization facility to monitor, remotely control and report on their networks.

- Single Line diagram
- Multiple protocol support
- Faceplate emulation of many IEDs
- Alarm acknowledgement and summary
- Sequence of events summary
- Graphical trending of values
- Extensive reporting facility
- Historian option to record years of information
- Email and SMS notification for all system events
- Simple licensing model
- Powerful, drag and drop graphics editor
- Secure - integrated support for MS Active
- Directory authentication



# Software Tools

## For utility

### eLAN\*

#### Substation Automation Software Solution

The eLAN product family solves a wide range of communications and data integration issues, from the substation to the control center and into the enterprise. The eLAN family of products is based on the Linux operating system and includes the Substation Communications Server, Universal DNP (Distributed Network Protocol) Gateway and Front End Processor. Each product is focused on a specific application within the utility's communication infrastructure. The central benefit of using eLAN solutions is that a broad range of users within the utility are given secure access to the IED information that they require, made available in a format they understand, whenever they need it.

- Open and flexible access to all substation and distribution devices from any authorized user or application
- Preserves investment in legacy devices and control center applications
- Protocol conversion/normalization of legacy and current protocols
- Support for both SCADA and non-SCADA hosts
- Automated retrieval of fault file data from relays and digital fault recorders
- Powerful Soft PLC automation processor available
- Reliable extraction/presentation of relay target data
- Wide range of security options
- Web interface for data and diagnostic visibility

### OpenHouse\*

#### Engineering Asset Management

OpenHouse is an enterprise asset management application specifically designed to address the historical data needs of the operations, engineering, maintenance and planning departments of an electric utility. OpenHouse represents the next logical step in addressing the complete needs of a utility seeking to archive and present field information to many users with varying requirements. This enterprise-wide information resource streamlines what is now an intricate mixture of interfaces and legacy applications that are difficult to enhance and expensive to maintain. Long-term storage, analysis and presentation of substation and feeder information is the primary goal of the OpenHouse solution. Combined with eLAN automation solutions and professional services, the system provides an easy to deploy and robust platform for data archiving and decision support.

Based on the proven PI System from OSIsoft and SQL Server relational database from Microsoft, OpenHouse provides a cost effective solution to address current needs as well as a scalable architecture to meet future requirements.

- Data Historian
- Condition based maintenance
- Fault file normalization & viewing
- SCADA backup
- Scalable from single substation to large enterprise

\* This product is manufactured by RuggedCom Inc. and will in future be integrated into the Siemens Industrial Ethernet portfolio.

# Cabling Technology

For applications in industry and for utility / transportation

## Industrial Ethernet FastConnect

With the FastConnect (FC) system for Industrial Ethernet, structured cabling from the office environment becomes industry-compatible for installation in the production hall.

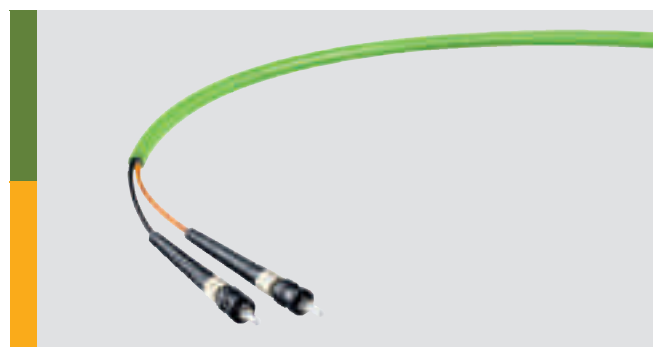
- Industrial Ethernet FC installation cables designed for fast assembly; 4-core (2x2) Cat5e
  - IE FC TP Standard Cable GP/IE FC TP Flexible Cable GP
  - IE FC TP Trailing Cable GP/IE FC TP Trailing Cable
  - IE TP Torsion Cable
  - IE FC TP Marine Cable
  - IE FC TP FRNC Cable GP
  - IE FC TP Food Cable
  - IE FC TP Festoon Cable GP
- 8-core (4 x 2) Cat6 certified, with appropriate UL approval:
  - IE FC TP Standard Cable GP (AWG 22/AWG 24)
  - IE FC TP Flexible Cable (AWG 24)
- User-friendly stripping technique with FC Stripping Tool
- Noise-resistant FC RJ45 and FC M12 Plugs (10/100/1000 Mbit/s), an ideal solution for installation on 4 or 8-core IE FC cables at the field level thanks to the rugged metal enclosure
- The prepared cable is connected in the Industrial Ethernet FC Outlet RJ45 (10/100 Mbits/s; 4-core) or IE FC RJ45 Modular Outlet (10/100/1000 Mbits/s; 8-core) using insulation displacement
- Suitable for any application:
  - for installation in a cabinet or integration in devices
  - for cabinet-free installation
- Time-saving, error-free installation on-site
- RJ45 cabling technology is used as the permanent standard
- The ideal solution for assembly of RJ45 and M12 connectors in the field area with 4-core (2 x 2) Industrial Ethernet FC cables
- The ideal solution for assembly of the IE FC RJ45 Modular Outlet with 8-core (4 x 2) Industrial Ethernet FC cables
- Mistakes are prevented thanks to color coding and the transparent contact cover
- Coordinated system of FC plug-in connectors and an extensive FC cable spectrum with appropriate UL approvals

## FastConnect LWL-System

Fiber-optic cables with glass core (62.5/200/230) are offered for the FastConnect fiber-optic cable system:

### FC glass fiber-optic cable

- duplex cable for indoor and outdoor fiber-optic networks
- The fiber structure corresponds to that of the PCF. This allows simple assembly on site.
- Simple on-site assembly of glass FOC in the field
- Optical signal transmission
- No radiation emission from the cable
- Unaffected by external noise fields
- No grounding problems
- Electrical isolation
- Low weight
- Simple laying of cables



# Wireless Communication

## For infrastructure applications

### RuggedMAX\* – WiMAX Product Family

#### High-Performance Broadband Wireless

A series of high-performance, long range and secure wireless devices, which are fully compliant with the WiMAX 802.16e Wave 2 (MIMO) mobile broadband wireless standard. The devices are designed to extend IP networks over large distances to fixed and mobile users. The product family includes a variety of base stations and subscriber stations with differing output powers, form factors and frequency options for use in licensed or license exempt bands.

The series has gone through extensive end-to-end network interoperability testing to support multiple different ASN gateway platforms and 3rd party subscriber devices in order to give customers flexibility by leveraging the full WiMAX ecosystem.

#### WiN7000

- High power base station
- Available in multiple frequencies (new 1.8 GHz in Canada)
- High output power of 2x 36dBm
- Single Cable power and Ethernet or fiber optic interface options

#### WiN7200

- Outdoor standard power base station
- Available in multiple frequencies (including 3.65 GHz in North America)
- Small form factor and low power consumption
- Power over Ethernet single cable design

#### WiN5100

- Vehicular subscriber unit
- 2 antenna connectors for external/roof top antenna connection
- Powered directly through 10-30 V DC

\* This product is manufactured by RuggedCom Inc. and will in future be integrated into the Siemens portfolio.



#### WiN5200

- Outdoor subscriber unit
- High gain integrated antenna
- Power over Ethernet (available in a more rugged version)

#### Common Features

- Native IEC 61850 GOOSE messaging support
- Supports standard ASN gateway for full mobility
- Supports unique standalone architecture for low latency applications
- Excellent performance in NLOS conditions – overcoming multipath and deep fading
- Greater than 40 Mbit/s aggregate throughput
- Mobile-WiMAX compliance based on IEEE 802.16 standard and WiMAX Forum Wave2 (MIMO) certification
- Multiservice support including voice, SCADA, mission-critical control data, video and more
- Available in 1.x, 2.x, 3.x GHz frequency bands, including IC & FCC 3.65 GHz and IC 1.8 GHz
- Central management through RuggedNMS

For more information on WiMAX Product Family please contact: [smart.grid.ic@siemens.com](mailto:smart.grid.ic@siemens.com)

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