SWMM-H-9528 & 9628

MODULAR 10GE SWITCH
IEC61850 - PTP - HSR/PRP

MODULAR

12 to 28 ports

_____

HSR / PRP

Zero packet loss
resiliency

_____

PTP IEEE.1588

BC and TC
Sync-E

_____

IEC-61850-3

Ruggedize

_____

LAYER 2 & 3

RIP OSPF VRRP

Introduction

SWMM-H-9528 and SWMM-H-9628 are 19'' manageable switches that bring higher versatility to industrial networks. The range of products is made of 6 products with options for 10GE uplink ports, IEEE 1588 PTP hardware synchronization, redundant power converters with 24-48 Vdc or 110-230 Vac inputs. Three modular cards can be inserted in the equipment with a choice of 4 different cards for RJ45 or SFP interfaces PTP & Sync-E and HSR-PRP options.

SWMM-H-9628 adds layer 3 protocols including IMGP, RIP, OSPF and VRRP.

Designed for the Utility Substation : SWMM-H-9528 is certified according the environmental requirements of the IEC-61850-3 standard. It is a great solution for the electricity substations thanks to its modularity and its PTP and HSR-PRP services that enable best development of IEC-61850 electricity transport and distribution networks.

High accuracy synchronization : SWMM-H-9528 embeds a hardware synchronization system for IEEE-1588 PTP and Sync-e services with a high accuracy OCXO oscillator for best quality synchronization and hold-over with a stability performance better than 1μs / day. With both PTP and Sync-e features, SWMM-H-8528 is also a nice solution for Telecoms applications.

Higher availability, versatility, performance : with the **HSR-PRP cards**, SWMM-H-9528 suits the most demanding requirements of the electricity networks and it ensures zero packet loss resiliency to GOOSE messages. The high performances of the SMM-H-9528 perform network recovery within less than 20ms based on ring protection protocols such as G.8032 or RSTP / MSTP / MRP. SWMM-H-9528 is highly manageable and it supports all functionalities for QoS, VLAN, IGMP, 802.1X and Radius authentication for stronger network security.
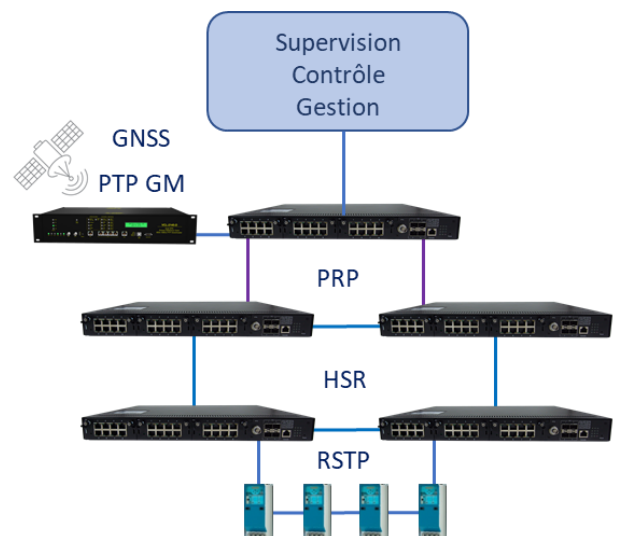
Applications

SWMM-H-9528 brings critical services to the electricity networks. IEE-1588 v2 PTP synchronisation service supports both Transparent and Boundary Clock modes with the IEC-61850 Power Profile and nano-second accuracy thanks to its hardware based design and OCXO oscillator.

SWMM-H-9528 has 3 slots to host HSR-PRP cards with 4x RJ45 or SFP ports to support both HSR and PRP modes and configurations such as 4x HSR, or 4x PRP or even 2xHSR + 2xPRP.

SWMM-H-9528 provides a great versatility thanks to its modular design, its GE/10GE uplink ports and choice of add-on cards.

Supervision
Contrôle
Gestion

GNSS
PTP GM

PRP

HSR

RSTP

Boundary Clock Application

High accuracy delivered, even in holdover mode

A boundary clock, is normally a switch that doesn't act transparently to the slaves in the network. Directly connected to the Grandmaster, large networks with thousands of slaves would overload the Grandmaster. So the need for a device that acts as a slave towards the master and as a master towards slaves is achieved with a boundary clock. SWMM-H-9528 Boundary clock, once synchronized, achieves the 50ns precision set forth in the ITU-T G.8271.1 recommendation. And it is equipped with a high-precision OCXO to guar- antee that precision in the event of a link or device failure, with a maximum time-drift of 250ns per from from GNSS time. All this can guarantee a maximum 1.5us end-to-end time deviation budget from the GNSS to the end-application, up to 10 BC hierarchies.
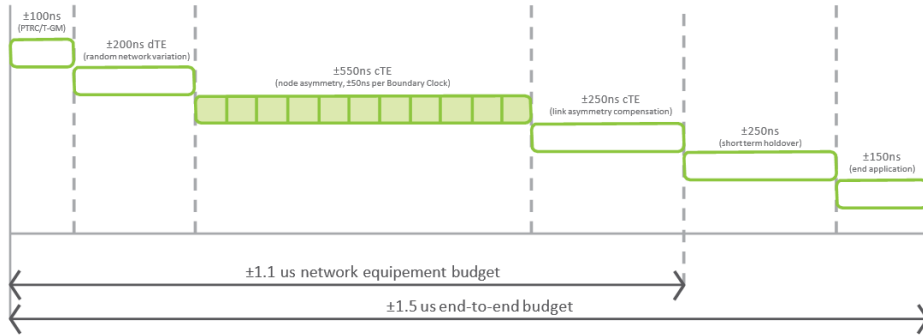
Application Example

The network diagram shows the use of a Grandmaster Clock and SWMM-H-9528 Boundary clock application. SWMM-H-9528 can easily function as both Access/ Aggregation switch with up to 4x1/10Gbps SFP slots and as a PTP boundary clock. Up to 28 ports can be individually configured to run different instances of IEEE1588v2. A wide variety of settings are allowed within profiles – such as the Power and the Enterprise profiles. SWMM-H-9528 supports Synchronous Ethernet, allowing the transport of time and frequency, which is important for legacy networks such as SDH-SONET

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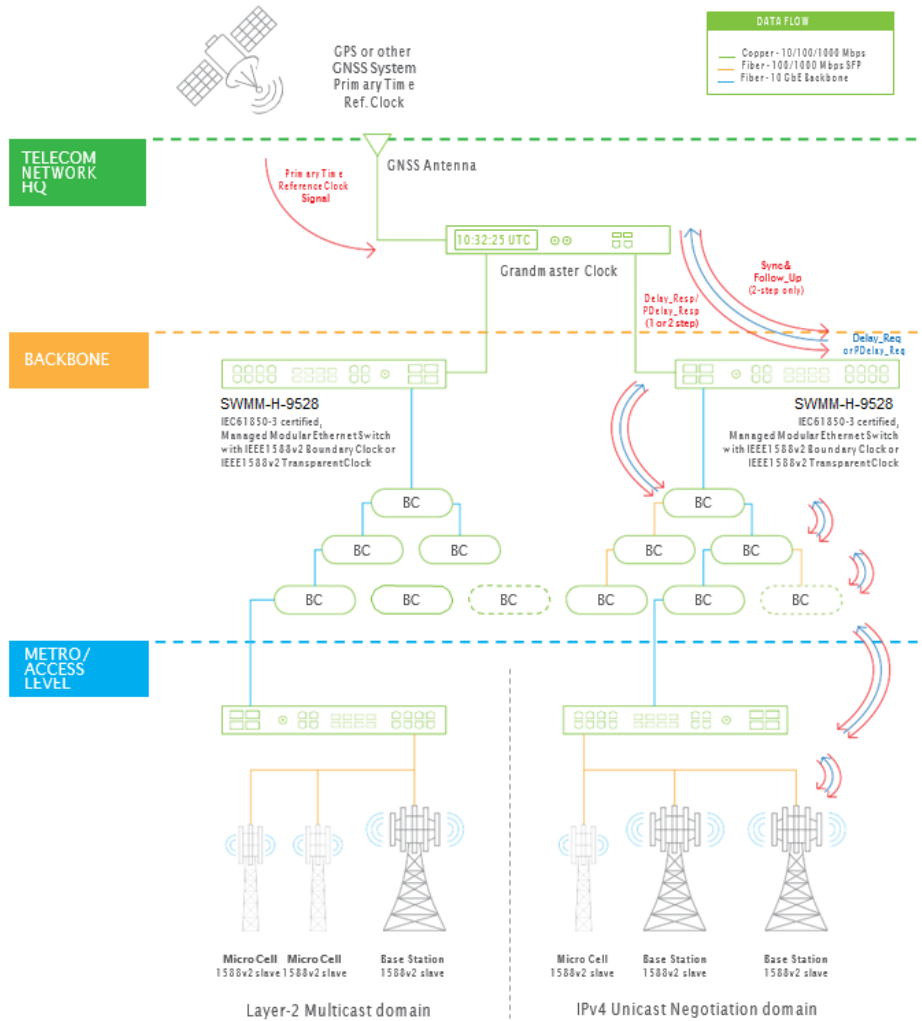
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High Availability Application

Zero packet loss, on multiple ports

Install a 4-port Gigabit RJ45 or SFP High-Availability module in any of the module slots in SWMM-H-9528 CPU board, and you're good to go. Congratulations: your network is now fully compliant with IEC62439-3 Clause 4- 2016 (PRP) and IEC62439-3 Clause 5-2016 (HSR). Simultaneously. Though this 4-port module.

Through HSR/PRP technology, CXR's device will replicate the packet through 2 redundant paths and the end-application will have the risks of losing a packet almost zeroed. This is an example of a mixed HSR/PRP network, where SWMM-H-9528 is used flexibly as a Trans- parent or a Boundary Clock and as an HSR/PRP manager.
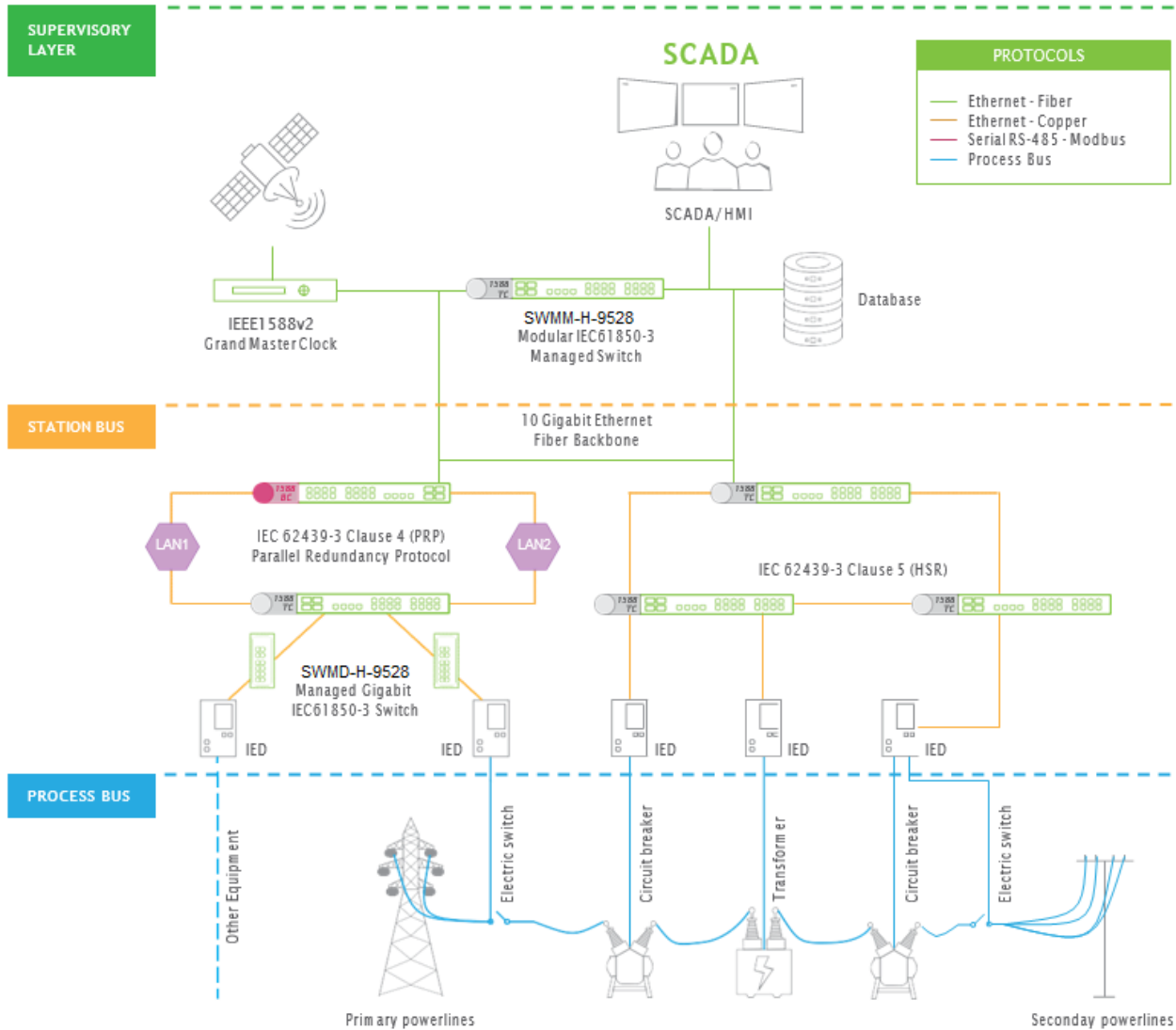
IEEE1588v2 PTP, IEC61850-9-3 Power Profile and HSR/PRP

SWMM-H-9528 is an advanced and flexible platform. It embeds high-bandwidth Switching fabric, Accurate hardware-based Boundary Clock or Transparent Clock, IEC61850-3 compliant hardware, and fully supports IEC/IEEE61850-9-3 - 2016 Power Profile. Also on HSR/PRP ports. When properly configured, our Switch can seamlessly provide Peer-to-Peer transparent clock and Boundary Clock on all ports, HSR/PRP ports included.

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Specifications

Switch	
Model	SWMM-H-9528

Ethernet	
Priority Queues	8
VLAN Table	512
MAC-Based VLAN	512
VLAN ID Range	VID 1 to 4094
Trunk Group	8
Static IGMP Groups	128
Dynamic IGMP Groups	256
MAC Table Size	16k
Packet Buffer Size	1.5 MB
Jumbo Frame	9216 Byte
Switching Fabric Capacity	128 Gbps
Maximum throughput	95.24 Mpps

Ethernet and IP Protocols	
Standards	IEEE 802.3 for 10BASE-T IEEE 802.3u for 100BASE-T(X) IEEE 802.3u for 100BASE-FX IEEE 802.3ab for 1000BASE-T(X) IEEE 802.3z for 1000BASE-X IEEE 802.3ae For 10 Gigabit Ethernet Fiber IEEE 802.3x for Flow Control, backpressure control IEEE 802.1D-2004 for Rapid Spanning Tree Protocol IEEE 802.1s for Multiple Spanning Tree Protocol IEEE 802.1Q for VLAN Tagging IEEE 802.1p for Class of Service IEEE 8021X for Authentication IEEE 802.1AB Link Layer Discovery Protocol (LLDP) IEEE 802.1Q VLAN. IEEE 802.3ad for Port Trunk with LACP IEC-62439-3 PRP (Parallel Redundancy Protocol) IEEE1588v2 PTP (Hardware-based) - (-SB version only) ITU-T G.8261 Synchronous Ethernet
Ethernet Protocols	IPv4, IPv6, IGMPv1/v2/v3, GMRP, GVRP, SNMPv1/v2c/v3, SNMP Inform,ICMP, Telnet, SSH, DHCP Server/Relay/Client, DHCP Option 66/67/82, BootP, TFTP, NTP Server/Client, SNTP, SMTP, RMON, HTTP, HTTPS, Telnet, Syslog, MRP, ERPS, LLDP, IEEE 1588 PTP V2(Hw-based), 802.1x, RADIUS, SyncE, HSR, PRP
Layer 3 IP Protocols SWMM-H-9628	Routing : static, RIP v1/v2, OSPF v2 Multicast : IGMP v1/v2/v3, DVMRP, PIM-DM, PIM-SM, PIM-SSM L3 Resiliency : VRRP
Resiliency	IEC62439-3 High-Avail-Seamless-Redundancy(HSR) IEC62439-4 Parallel-Redundancy-Protocol (PRP) ITU-T G.8032 ERPS, STP, RSTP, MSTP, MRP, Compatible Ring/Chain, U-Ring
Automation Profile	Modbus TCP
MIB	MIB II, IF-MIB, SNMPv2 MIB, BRIDGE-MIB, RMON MIB Group 1,2,3,9

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Specifications

PTP Sync-E Synchronization			
Synchronization	NTP Server	NTP Server/Client, SNTP	
	PTP IEEE 1588 v2	Std Version	IEEE1588v1 BC (SW) IEEE1588v2 BC (SW) IEEE1588v2 TC (HW)-ns accuracy
		PTP (-SB) Version	IEEE1588v2 BC (HW)-ns accuracy IEEE1588v2 TC (HW)-ns accuracy Synchronous Ethernet
	Holdover	Boundary Clock/ SyncE (-SB)	<30 ns/s (complies with IEEE61850-9-3)
	PTP	Layer-2: Multicast, E2E/P2P, one or two-step Layer-3 (IPv4):Multicast,Unicast,Unicast Neg. (E2E/P2P)	
	Profiles PTP (version -SB)	C37.238 -2017 Power Profile IEC/ IEEE61850-9-3 Power Profile (2016)	
	Other interfaces	BC/TC with hardware implementation, for modular add-on cards and 4x GE/10GE uplink ports. 1PPS output, square wave, BNC-F socket	

Power suplpy	
Input voltage range	DC : 2x 24 to 120 Vdc inputs and converters AC : 2x 110—230 Vac inputs and converters HD : 2x 120 to 370 Vdc inputs and converters
Max input current	0.25 A (240 VAC) 0.6A (90 VAC) 0.5 A (125 VDC) 2.16 A (30 VDC)
Max power consumption	< 70W (85°C).
Reverse Polarity Protection	Yes
Relay output	1 dry relay output (24V/1A)
Connectors	AC: screw bloc – 4 points 9.52 mm DC: screw bloc – 3 points 13mm

Mechanical specifications	
Enclosure Dimensions (W x H x D) Weight Installation	Metallic enclosure with IP30 protection 440 x 44x 355 mm (without screw, connectors and 19'' brackets) 5 kg (no add-on card – each add-on card : 0.55 kg) 1U / 19'', 19'' mounting kit included

Environmental specifications	
Operating temperature Stocking temperature Hygrometry Electromagnetic Environment Conformity MTBF	-40°C to 85°C -40°C to 85°C 5% to 95% at 55°C, non-condensing EN-61000-6-2, EN-61000-6-4 IEC-61850-3, MIL-STD-810-F/G CE, EN-63268-1, ROHS 185 000 Hours

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Mechanical specifications
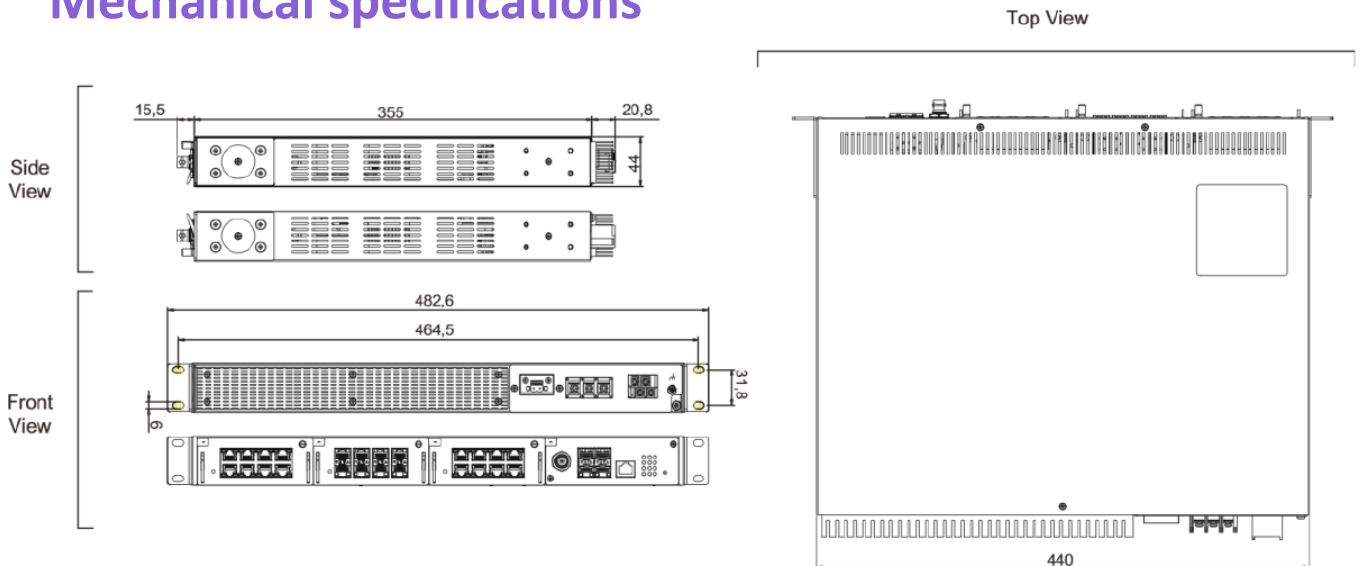
Ordering informations

SWMM-H-9528 & SWMM-H-9628 Ethernet Switch					
Reference	**Layer 3 routing**	**Slots**	**Uplink**	**PTP - SyncE**	**Power input**
SWMM-H-9628-SB-2A	RIP OPF VRRP	3	4x 10GE SFP+	Yes	2x 110-230 Vac
SWMM-H-9628-SB-2D	RIP OPF VRRP	3	4x 10GE SFP+	Yes	2x 24-48 Vdc
SWMM-H-9628-SB-2HD	RIP OPF VRRP	3	4x 10GE SFP+	Yes	2x 120-270 Vdc
SWMM-H-9528-SB-2A	-	3	4x 10GE SFP+	Yes	2x 110-230 Vac
SWMM-H-9528-SB-2D	-	3	4x 10GE SFP+	Yes	2x 24-48 Vdc
SWMM-H-9528-2A	-	3	4x 10GE SFP+	-	2x 110-230 Vac
SWMM-H-9528-2D	-	3	4x 10GE SFP+	-	2x 24-48 Vdc

Modular add-on cards for SWMM-H-9528 & SWMM-H-9628			

Characteristics	SWMM9528-8R-PTP	SWMM9528-8S-PTP	SWMM9528-4R-HSRPRP	SWMM9528-4S-HSRPRP
10/100/1000BT RJ45	8	-	4	-
100/1000FX SFP	-	8		4
PTP IEE 1588	BC / TC	BC / TC	BC / TC	BC / TC
HSR - PRP	-	-	2x groupes	2x groupes

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