

# NETWORK NODES FOR THE CONVERGENCE OF APPLICATIONS

SNN 110 transmission equipments are switch/router of level 2 and 3, the ideal solution for private packet networks, over optical fibre or copper, local (LAN) and geographically extended (WAN).

The ideal system both for the HV power substations automation (Substation Automation System), the power distribution network (MT) and the management of the relevant distributed generation (Smart Grids).

SNN 110 equipment includes 10/100 BaseT Ethernet interfaces for the connection with all users based on standard Ethernet packet communication and 100 BaseFX fiber-optic interfaces with SFP (monomode and multimode) or MTRJ (multimode) slot.

SNN equipment offers advanced level 2 and level 3 networking functionalities. For level 2 networks it supports the Rapid Spanning Tree Protocol (RSTP, IEEE 802.1d-2004), besides the traditional STP, to solve conflicts between multiple paths within meshed architectures.

This capability, combined with the possibility to set VLAN (IEEE 802.1q) and to manage priorities (IEEE 802.1p), makes SNN 110 the ideal solution for the Utilities, guaranteeing high availability and prompt response time.

For networks of Level 3 SNN 110 provides static and dynamic algorithms and routing protocols (RIP, OSPF) for meshed architectures, tunneling mechanisms through OPENVPN to implement VPNs over the public grid (internet), and through GRE and L2TPv3 protocols to make IP and level 2 virtual tunnels.

The introduction of QoS mechanisms with different classes of traffic and with the definition of guaranteed bands allows the management optimization, guaranteeing high remote control and monitoring performances also with applications where different services (voice, video and data) are converging on the network.

<ul> <li>Performances</li> <li>Integration of networking and time synchronization functions.</li> <li>Integration of UMTS 3G Modem and LTE</li> <li>Networking level 2 and 3</li> <li>QoS and level 2 priority (VLAN)</li> </ul>
 TEC 61850-3 and TEEE 1613 Class 2 certification (Zero Packet Loss)

selta.com



### Application: HV POWER SUBSTATION

The main goal of the SNN110 network node, designed for the AT power substations, is creating a level 2 ring architecture, to guarantee the necessary application redundancy.

The device can be housed in the racks located in the bay.

The connectors are located on the back to simplify the wiring inside the cabinet.

The unit is equipped with DC/DC converter (with redundant capability) having 110 Vdc input voltage and with a IRIG-B synchronism hub on RJ45 port (up to 3 outputs) and on ST optical port (up to 4 outputs).

The device is currently synchronized via NTP protocol, required by the IEC 61850 standard, and its hardware can be adapted to the new synchronism standard via IEEE 1588 protocol (Transparent Clock mode), having thus only one optical communication infrastructure for data and time.

The IEC 61850-3 certification completes the main features of the SAS release.









### Application: SMART GRIDS

SNN110 for SMART GRIDS was conceived as a node for "always on" packet communication networks. It features high reliability, resiliency and availability to meet the high value services travelling on the energy Utility infrastructures, in particular remote control and monitoring of electromechanical assets.

Unlike the case of SAS, the Smart Grid application requires realizing a level 3 networking framework (often the connectivity service is contracted to Telco operators) with the possibility to create the VPN and encrypted applicative tunnels to ensure appropriate confidentiality to data conveyed over a public infrastructure.

The device is equipped with a 24/48 Vdc power supply (with redundant capability). All connectors are located on the apparatus front, in order to facilitate indoor or pole installation in plastic cabinets typical of power distribution network.

The WAN level interfaces fulfil all system requirements (FO, 2G/UMTS integrated modem, LTE modem). At the protocol level are provided Level 2 "tunnelling" mechanisms (IEEE 802.1q to ensure the ability to convey GOOSE messages according to the IEC 61850 standard) and Level 2/3 via GRE, OpenVPN and L2TPv3 protocols, encrypted using IPSec to ensure appropriate safety standards.



**S**selta.com



### Performances

- IP Routing and remote bridge integrated functions Management of Quality of Service, of VLANs (IEEE 802.1g and IEEE 802.1p), of priorities and of guaranteed Management of alternative paths for Level 2 solutions bandwidth to allow different services on the same (RSTP) network DHCP support (Master/Slave) PAP/CHAP, Radius and TACACS authentication Router redundancy (VRRP) Safety management through Access Control and Level 3 static and dynamic routing management (RIPv2, encryption mechanisms with IPSec protocol OSPF) **Statefull firewall** Network reset within 50 ms (100 Mb/s optical network) IEC 60870-5-101 and TD065 legacy protocol conversion Management of virtual tunnelling mechanisms: vs IEC 60870-5-104 application level through VPN SSL/TLS Performance Monitoring and events/alarms recording in IP level through GRE (Generic Routing Encapsulation) non-volatile memory and L2TPv3 (Layer2 Tunnelling Protocol) protocols
  - Remote management through SNMP, SSH and TELNET
  - X.20 Terminal Adapter function and transport of remote control protocols
  - 10/100BT Ethernet Interfaces (over copper); 100 FXBase Ethernet (overfibre optic).

Release	Cable openings	Ethernet interfaces		WAN and service interfaces		
		10/100 TXBase	100 FX Base	2G/3G Modem	V.24/V.28	Irig-B Splitter
SNN 110	rear	6 + 2*	2 (over MTRJ)	-	2	1 (Optional)
SNN 110	front	Up to 8	2 (over SFP)	YES	2	-

NTP Synchronization (Master/Slave), management of

protocol on FO (4 ST outputs) or RJ45 (3 outputs)

synchronization acquisition and enhancement in IRIG-B

\* 2 interfaces can be 10/100 Base TX or 10/100 Base FX in a mutually exclusive way

## **Technical Features**

**Mechanical Solutions** 

10/100 Base T 10/100 Ethernet Interface conforming with the IEEE802.3

Fast Ethernet Interface conforming with 100 Base FX the IEEE802.3

### Features of the optical interfaces

100 FX Base Interface (Fast Ethernet) over MTRJ

Kind of F.O.	Attenuatio n		Wavelengt h		Flow rate		Connector
MM	17 dB		1300 nm		2 Km		MTRJ
Modul e	Kind of F.O.	At n	tenuatio	W lei	awe nght	Flow rate	Connector
FE/MM	MM		11 dB	1	.310 nm	2 Km	LC
FE/SR	SM		16 dB	1	.310 nm	20 Km	LC
FE/IR	SM		29 dB	1	.310 nm	40 Km	LC
FE/LR	SM		29 dB	1	.550 nm	80 Km	LC

Headquarters Head Offices

SNMP support for the alarms/events monitoring SSH or TELNET support for configuration Password management with user profiles and access logs.

Input voltage (redundant capability):

24/48 Vcc

110/132 Vcc 150/220 Vca Power consumption: 15 W

Operating Temperature Range: -25 ÷ 70 °C Relative humidity: 93% to 40°C (conforming with the IEC 721-3-3)

Dimensions:		Subrack 19" 10			
Weight:	<5 Kgs				
Power connecto	ors:	switchable cable clamp			
(Vcc) and pole se	ocket (Vca)				
Ethernet copper	connectors:	RJ-45			
Ethernet optical	connectors:	SFP or MTRJ			
V.28 interface co	onnectors:	RJ-45 (console)			
		- I ( )			

9 pole cannon (users)





Ed. 3.1 - 02/2018