Grid Solutions

GRIDCOM DIP.NET

Prompt, dependable and secure transmission of commands and control signals across the grid

Conventional and IEC61850 Teleprotection for Transmission & Distribution Grids

Teleprotection channels have a critical role in ensuring the continuity of the power delivery system, requiring them to be fast, dependable and secure. Gridcom DIP.net is an efficient, modern and reliable communication solution transporting critical messages and commands for managing the grid to prevent failure and network damage.

Gridcom DIP.net is the optimal protection signaling solution for ensuring critical communications in evolving power system automation architecture for advanced substation-to-substation exchanges.

Designed upon proven teleprotection principles while hosting advanced automation technologies, the Gridcom DIP.net is a versatile interface between the electrical substation and the telecom network.

Assessing Performance

Gridcom DIP.net provides a dedicated set of link and network quality monitoring features according to protection service requirements in order to detect communication impairments and assess the acceptability of the communication.

Interface Modularity

Gridcom DIP.net bridges the gap between conventional protection communications and the emerging packet network environment in the electrical substation. The product's interface modularity, both at the substation side and at the communication network side, facilitates grid transition whichever be the path and pace adopted for the power network.

Future Network Ready

The flexible I/O cross-connect and multiple configuration capabilities provide protection engineers with extensive flexibility and numerous design possibilities without external relaying cubicle logics. Transmission of critical information over an area becomes easier to design, deploy and maintain.

Smooth Migration

The transition toward the digital substation can be performed smoothly with a modular teleprotection. Gridcom DIP.net not only provides IEC 61850 MMS and GOOSE interfaces for your future substation, but also optional I/0 binary interface for wiring to your legacy protection and control devices.

Highlights

- Modular teleprotection to match your substation migration plan in two size factors: SLIM and 19 inch 3U rack versions
- User-oriented design for more efficient operations
- Comprehensive User Interface

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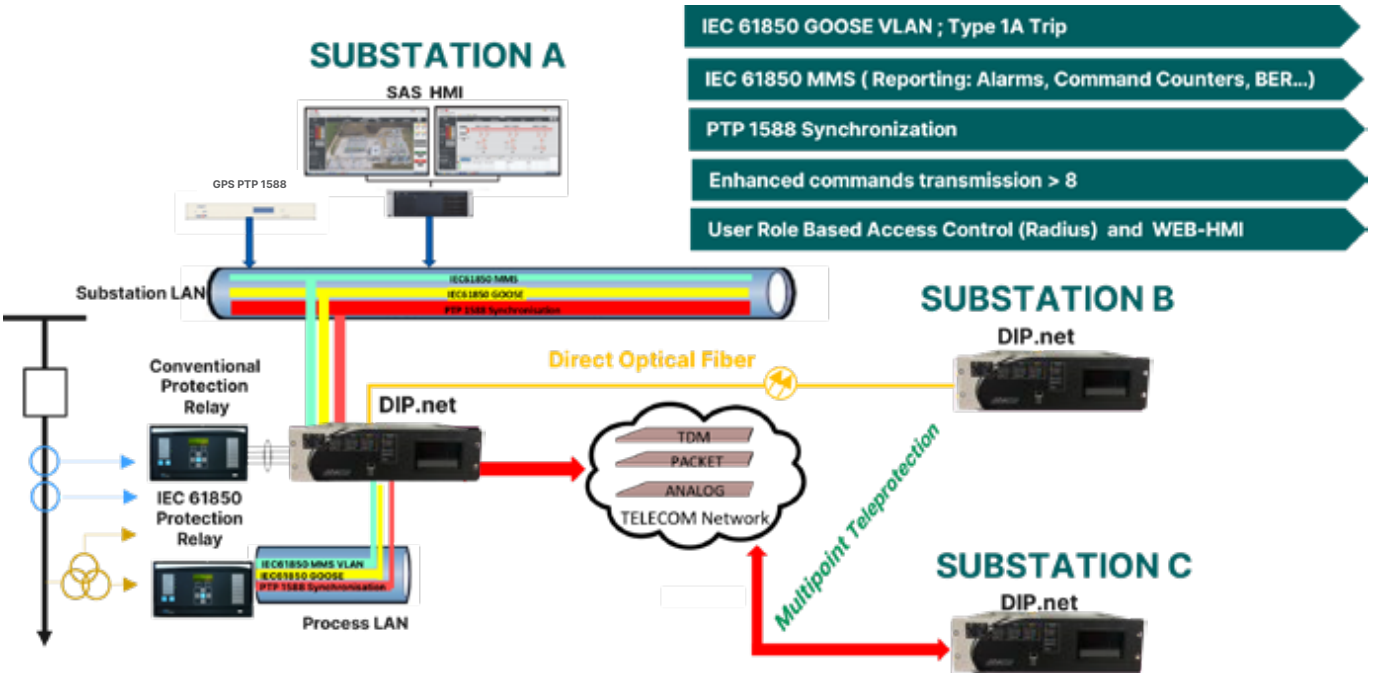
Example of Transition Towards IEC 61850 Substation



Cyber Security

Bringing remote management capability into the substation may introduce vulnerability in the system. Powerful authentication and encryption protocols incorporated into Gridcom DIP.net provide secure remote access for operations.

Interoperability

Taking into account the evolution of IEC 61850 in time, Gridcom DIP.net assures interoperability with earlier versions of the standard already deployed in substations, as well as the present edition and provides for easy upgrades in the future.

Easy to Use

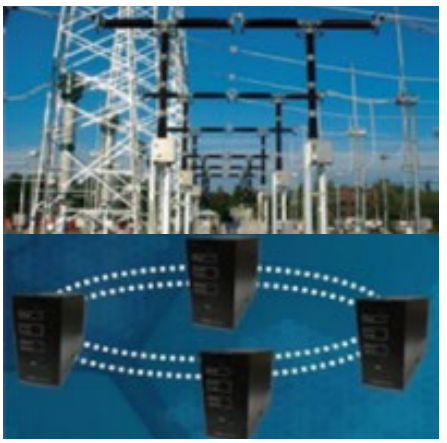
Deployment and maintenance interventions are substantially facilitated through an adapted mechanical design as well as an advanced set of functional tools embedded in the firmware of the device.

Protection Specific Metrics

The performance criteria expected by protection engineering can be set more easily with a comprehensive set of thresholds and alarm settings.

DIP.net Controller – Centralized Management and Control SW

DIP.net Controller is a centralized SW application to manage and control a network of interconnected DIP.net devices having the capability to provide the system logical diagram to follow and implementing: security, performance, events, status configuration, applications SW, events count, status, history.



Technical Specifications (Two sizes factor versions, SLIM / 19 inch 3U Rack)

Communication interface	
Line interface	Direct OF (Up to 250 Km), IEEE C37.94
	Ethernet (IEC61850), V11, E1/T1 , G703 64 kbps, Analog
Hardware specification DIP.net SLIM version	
TP COM communication interface module:	
	Six (6) IEC61850 Fast ETH 10/100 Mbps RJ45 SFP ports One (1) remote RJ45 ETH port Two (2) direct OF and/or IEEE C37.94 SFP ports Up to two (2) V11, E1/T1, G703 64kbps, analog extension boards with RJ45 connector and 3 Alarm Output Relays 8 Pin Connector CAN BUS Electrical interface RJ45 port for connection between modules Five (5) LED indicating system status IRIG-B, NTP Time Synchronization PTP 1588 Time Synchronization (Optional) IEC61850 (Optional)
TP I/O Input-Output interface module:	
	Four (4) digital acquisition inputs Four (4) restitution heavy duty outputs (4 NO) Three (3) restitution heavy duty outputs (1 NO/NC, 2 NO) Three (3) restitution heavy duty outputs (3 NO/NC) CAN BUS Electrical interface RJ45 port for connection between modules Five (5) LED indicating system status
TP OG Optical interface module:	
	Two (2) IEC61850 Fast ETH 10/100 Mbps RJ45 SFP ports Two (2) direct OF and/or IEEE C37.94 SFP ports CAN BUS Electrical interface RJ45 port for connection between modules Five (5) LED indicating system status IRIG-B Synchronization interface PTP 1588 Time Synchronization (Optional) IEC61850 (Optional)
PS-1, PS-2 Power supply module:	
	PS-1 Range: 30 - 60 VDC PS-2 Range: 80 - 370 VDC; 85 - 277 VAC (50/60 Hz) CAN BUS Electrical interface RJ45 port for connection between modules Two (2) LED indicating system status One (1) NO/NC alarm output contact
Hardware specification DIP.net 19 inch 3U rack	
	Four (4) IEC61850 Fast ETH 10/100 Mbps RJ45 SFP ports One (1) RJ45 ETH port on rear side for remote access One (1) RJ45 ETH port on front side for local access Two (2) direct OF and/or IEEE C37.94 SFP ports Up to two (2) V11, E1/T1, G703 64kbps, analog extension boards with RJ45 connector and 3 Alarm Output Relays 8 Pin Connector Up to three (3) I/O interface boards providing: - Four (4) digital acquisition inputs - Four (4) restitution heavy duty outputs (4 NO) - Six (6) restitution heavy duty outputs (4 NO/NC, 2NO) Up to two (2) power supply boards for following voltage ranges: - PS1: 48 – 127VDC (30-160VDC) - PS2: 230VDC/VAC (180-280VDC/VAC) Eighteen (18) LED indicating system status IRIG-B, NTP Time Synchronization PTP Time synchronization (Optional) IEC61850 (Optional) LCD tactile and colorful display (optional)

Technical Specifications

Dimensions TP COM, TP I/O TP OG, PS-1, PS-2 19 inch 3U version **Weight** TP COM, TP I/O TP OG, PS-1, PS-2 19 inch 3U version	 148 H x 70 W x 204 D mm 5.83 H x 2.76 W x 8.03 D in 19 inch 3U rack 2.5kg (5.5 lbs) 7 kg (15.4 lbs)
Standards	• IEC 60834-1 • IEC 61850-2 • IEC 61000-6-2, IEC 61000-6-4, IEC 61000-6-5 • IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4 • IEC 61000-4-5, IEC 61000-4-6, IEC 61000-4-8, IEC 61000-4-18, IEC 61000-4-11, IEC 61000-4-16 • IEC 61000-4-17, IEC 61000-4-29 • IEC 60255-27, IEC60068 • IEEE C37.90.1, IEEE C37.90.2, IEEE C37.90.3
Communication Interface	E1/T1/V11, G703 64 kbps, Analogue, Ethernet (IEC61850), Direct optical, C37.94
Transmission Mode	Point to point, point to multipoint
Minimum Number of Independent Signals in Transmission	>4
Minimum Number of Independent Signals at Reception	>4
Minimum Number of Potential Free Contacts for Repeat Sending/Receiving Signals	>8
MTBF (H)	TP COM (486000 h) TP I/O (632000 h) PS-1 & PS-2 (500000 h)
Number of Commands	SLIM version (up to 24, with 6 TP I/O modules), 19 inch 3U rack version (up to 12 per rack)
Output Contacts	Solid state & Heavy duty 5A (10 contacts)
Nominal Speed Connection (Medium Supplied by Others)	2Mbps
Transmission Time (ms)	< 2,5 ms (digital)
Command Loss Probability	10^{-10}
Unwanted Command Probability	10^{-10}
IEC61850 Standard	Compliant with 2nd edition
Local Management	Front plate TCP/IP; ETH port RJ45 only in DIP.net 19” 3U rack version
Remote Management	TCP/IP; Ethernet 10/100 Mbps RJ45, SNMP V3 in both size formats
Events Recorder	>2000
Cyber Security	RADIUS server integrated in each module/rack
Real Time Clock Synchronization	IRIG-B, NTP, PTP 1588
Built-In Power Supply	SLIM version 24-48 VDC (18-60 VDC), 19 inch 3U rack version (48VDC-250VDC exchanging boards)
External Power Supply Module Voltage Rate (SLIM Version)	PS-1 module: 30-60VDC PS-2 module: 80-370 VDC; 100-240 VAC
Power Supply Voltage Rate (19-inch 3U version)	PS-1 board: 30-160VDC PS-2 board: 180-280 VDC/VAC
Command Input Voltage Programmable Activation	24 – 300 VDC
Command And Alarm Output Voltage/Current Rate	24 – 300 VDC – 250 VAC, 5A carry
Operation Temperature, °C	-25 °C to +55 °C (-13 °F to 131 °F)
Storage/Transport Temperature, °C	-40 °C to +75 °C (-40 °F to 167 °F)
Maximum Relative Humidity at 23°C	90%
Mounting Version Din Rail (Slim Version)	Standard DIN rail (Mountable on 19” Rack using additional U-Support)
Mounting Version 19-Inch 3U	Standard 19-inch 3U rack
Protection Class	SLIM version IP40, 19” 3U Rack version IP30

For more information, visit
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