

MDS ORBIT PowerNet

A Next-Generation Broadband Powerline Communications Solution

MDS™ Orbit with PowerNet is a cutting-edge broadband powerline (BPL) communications solution built on the robust MDS Orbit platform—an industrially hardened networking system designed for demanding environments. Featuring a unified operating system, intuitive device management tools, and a comprehensive networking and cybersecurity framework, the Orbit platform streamlines deployment and reduces learning curves for users.

Thanks to its standardized architecture, users benefit from simplified setup, faster commissioning, and flexible network design options across a wide range of topologies.

Flexible Models for Diverse Needs

The MDS Orbit platform is available in two configurations:

- Multiservice-Connect Router (MCR): Supports BPL with Wide Area Network (WAN) including cellular. It can offer up to 6 ethernet ports, SFP interface and Edge Computing
- Edge-Connect Router (ECR): Compact configuration with 1 Ethernet and 1 serial port

Extend Secure Broadband Over Existing Infrastructure with Inter-operability

The PowerNet interface enhances the Orbit platform by enabling secure, reliable broadband communication for mission-critical applications. Using the IEEE 1901-compliant Nessum wire interface, PowerNet allows operators to repurpose existing infrastructure—such as MV/LV power lines or pilot wires, reducing installation costs, while ensuring interoperability with Nessum compliant devices.

Advanced Networking & Enterprise-Grade Security and Edge

MDS Orbit delivers rich networking capabilities, including integrated routing and switching, tunneling, VPNs, and advanced Quality of Service (QoS). Its enterprise-class security framework ensures robust data protection and safeguards network assets against evolving cyber threats.

Key Benefits

- Increase reliability: provide both Wireless and BPL to ensure permanent connectivity
- Protect network assets and access with enterprise-class security such as firewalling, IPSec VPNs, X.509 certificate management, and RADIUS
- Overcome harsh environments with IEC 61850-3 certification

Applications



Electric Utilities

- Distribution automation
- AMI, Industrial Metering



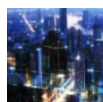
Mining

- Drilling machines control
- Traffic signaling



Industrial Plants

- Moving machines, cranes
- Field bus retrofit



Smart Cities

- Traffic signals control
- Street Lighting control



Industry Leading Reliability

- Support for Nessum wire, IEEE1901:2020
- Built for harsh environments with compliance to IEEE 1613, IEC 61850-3
- Industry leading Mean Time Between Failures (MTBF) of 50 years
- 5-year manufacturer warranty lowers total cost of ownership

Advanced Networking & Security

- Flexible Quality of Service enables simultaneous applications on the same uplink while preserving performance
- Concurrent routing and bridging enable flexibility for a variety of network designs and topologies
- Enterprise-class device with network cyber security functionality and VPNs ensures advanced protection for network assets
- Automatic and fast switch to new Master node
- FIPS 140-2 (Level 2) based design

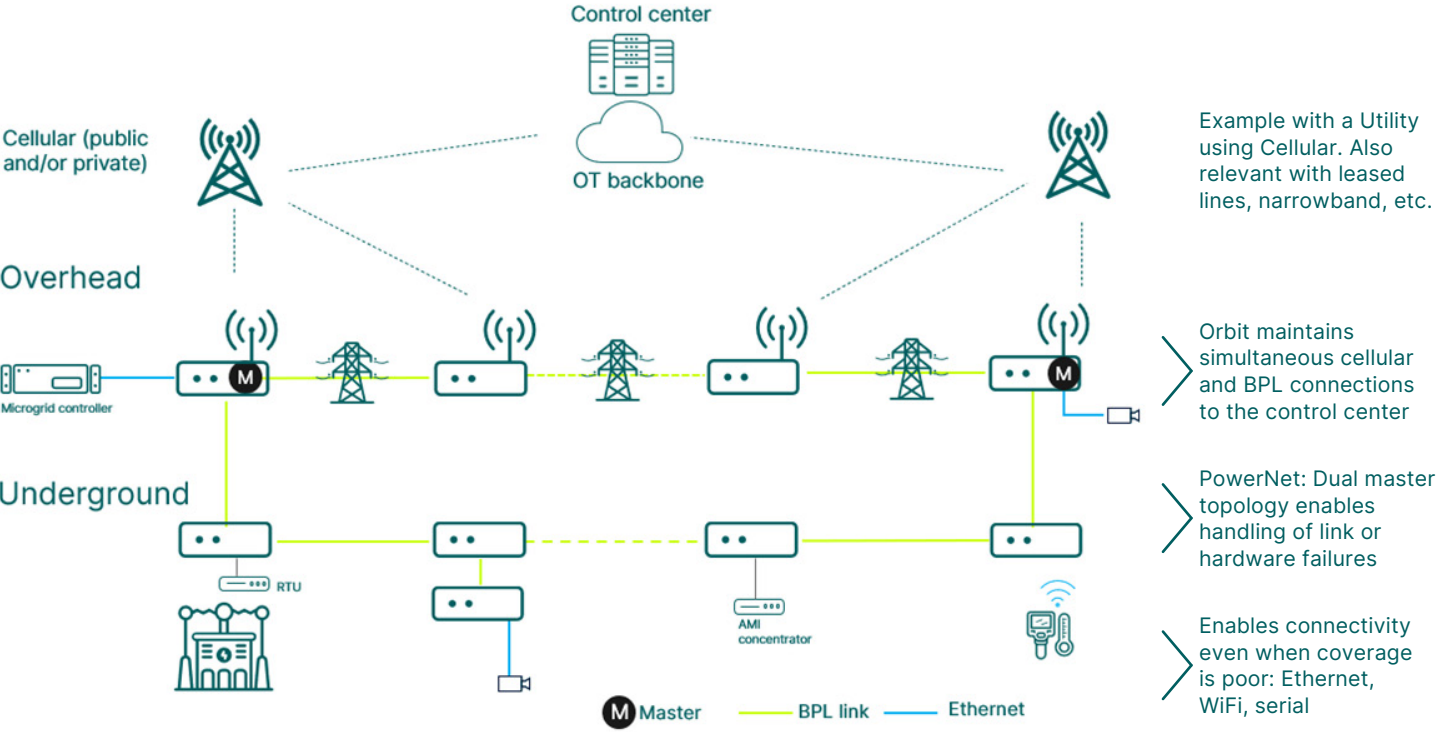
Ease of Use & Compact Design

- Automatic configuration: attachment to the Master node, setting channels and QoS
- Intuitive user interface and configuration wizards simplify complex network configuration tasks resulting in accelerated deployment of advanced networking
- Compact design to fit a large majority of automation cabinets
- Edge Compute fully embedded (MCR) to run applications locally



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Hybrid Connectivity enabled by dual Broadband Powerline and Cellular Radios on MDS Orbit PowerNet:
Example with Electric Utilities



Supported Cellular Radios on MDS Orbit PowerNet

Model/Region	ECR	MCR	Protocol/Frequencies	Fallback Support	Approvals/Certifications	Max Rate down/up Mbps	Dual SIM	GPS
4GD 4G LTE/3G/2G EMEA/LATAM	No	Yes	• LTE Cat-4 • LTE FDD Bands: 1, 2, 3, 4, 5, 7, 8, 12, 13, 18, 19, 20, 25, 26, 28 • LTE TDD Bands: 38, 39, 40, 41 • UMTS/DC-HSPA+: 1, 2, 4, 5, 6, 8, 19 • GSM/GPRS/EDGE Bands: 850/900/1800/1900MHz	2G/3G	CE, GCF, Anatel, RCM, Telstra	150†/50	Yes	Yes

Technical Specification

Networking	Nessum Wire	Electrical & Power Consumption
Routing: Static Routing with Failover, Dynamic routing: OSPFv2, RIPv2, BGPv4	Long haul capability - Flexible Wavelet Channels - Tx Power (adjustable) up to -37 dBm/Hz - Sensitivity < -130 dBm/Hz	Input Voltage 10 to 60 VDC (-48VDC*)
Ethernet IEEE 802.3, 802.1Q/VLANs, IGMP, STP, 64 VLANs		Orbit PowerNet ECR Power Consumption < 10W
Concurrent Bridging & Routing		Orbit PowerNet MCR Consumption < 10 W
Tunneling Layer 2 (Ethernet) and Layer 3 (IP) – GRE, IPsec, Dynamic Multipoint VPN (DMVPN)	Dual signal I/O for: - Resilient schemes - By-pass of signal obstacles - Media diversity	AGENCY APPROVALS / STANDARDS
Tunneling Layer 2 (Ethernet) and Layer 3 (IP) – GRE, IPsec, Dynamic Multipoint VPN (DMVPN)	Security Whitelist authentication	CE marking
Quality of Service 16 egress queues, Priority Queuing, Fair Queuing, Traffic Shaping, Classification based on DSCP, 802.1p and Layer, 2-4 classifiers	Physical Interfaces	IEC/UL/CSA 62368-1
IP Protocols TCP, UDP, ARP, DHCP, ICMP, NTP, FTP, SFTP, TFTP, DNS, configurable, HTTP and HTTPS, SSH	2 x BPL I/O connector on 6 pins connector	IEC 55032
Serial TCP server, Modbus/TCP, Modbus RTU, TCP client, UDP Unicast and Multicast, BSAP, and DNP3	1000BASE-X SFP	IEC 61850-3, IEEE1613
SCADA / Automation Protocols: Modbus RTU, Modbus ASCII, DNP3, Allen-Bradely DF1, BSAP, IEC 101, Modbus TCP, Modbus via TCP, Modbus, UDP, DNP3, IEC 104	10/100 Ethernet RJ45	IEC 61000-4-2/3/4/5/6/8
Dual APN, VRF, Open VPN, FlexVPN, and VPN DPD*	RS-232/RS-485 Serial RJ45 - ECR: 1 Ethernet + 1 Serial - MCR: 2 Ethernet + 1 Serial; OR 1 Ethernet + 2 Serial; OR 4 Ethernet + 2 Serial; OR 2 Ethernet + 2 Serial + 1 SFP OR 6 Ethernet	Warranty
Cyber Security	USB Management : 1 x Mini-USB 2.0 port on MCR and ECR	5-year standard manufacturer warranty
IPSec VPN Server (responder) and Client (initiator)	Antenna Connectors	Wi-Fi
Authentication Public Key, EAP TLS, Pre-Shared, Ike 1-2	ISM: TNC Wi-Fi: RP-SMA Cellular: SMA	IEEE 802.11 b/g/n 2.4 GHz option: 1x1 SISO (single antenna/radio chain) - Scalability up to 2 SSIDs, up to 7 clients/stations - Max transmit power (adjustable): up to 20dBm - Operating modes: Access Point (AP), Station, Station bridging - Security: WPA/WPA2 PSK, Enterprise - Applications: - Local configuration and management using Wi-Fi devices - Station/client connecting to a 2.4GHz AP in outdoor LOS environment - Small-scale 2.4GHz AP operating in outdoor LOS environment
Encryption 3DES, AES 128/192/256, CBC, CTR, CCM, GCM, SHA 256/384/512 HMAC	GPS: SMA fem	IEEE 802.11 a/b/g/n Dual-Band 2.4/5 GHz option: 2x2 MIMO (dual antenna/radio chain) - Scalability up to 2 SSIDs, up to 32+ clients/stations - Max transmit power (adjustable): up to 26dBm (23dBm per antenna/chain) for 2.4GHz and 23dBm (20dBm per antenna/ chain) for 5GHz
Firewall Stateful L3-4 Access Control List, Layer	LEDs PWR, ETH, COM, NIC1, NIC2	GPS
L2 MAC Filtering, NAT, Source NAT (Masquerading), Static NAT, Port Forwarding	Environmental & Mechanical	Available with cellular models
Device Security Secure Boot, Secure Firmware, Digitally Signed Hardware and Software, Magnetometer Tamper Detection	Operating Temp -40° to +70°C (-40° 158°F)	GNSS, GPS, Glonass
Certificate Management X.509, SCEP, PEM, DER, RSA	Storage Temp -40° to +85°C (-40° 185°F)	Maximum 30 channels (16 GPS, 14 GLONASS), simultaneous tracking
User Authentication Local RBAC, AAA/RADIUS	Humidity 95% at 60°C (140°F) non-condensing	NMEA 0183 V3.0
FIPS 140-2 (level 2) based design	Case Die Cast Aluminum	Acquisition Time: Hot start 1s, Warm start 29s, Cold start 32s
Network Management	Mounting: Integrated DIN Rail or Standard Mounting Brackets	Accuracy: Horizontal < 2 m (50%); < 5 m (90%)
Secure device management via HTTP/HTTPS (GUI) and Juniper- style CLI via SSH or local console	No Fans, No Moving Parts	Altitude: < 4 m (50%); < 8 m (90%); Velocity: < 0.2 m/s
Event logging, Syslog over TLS	HALT & HASS Testing	
Iperf throughput diagnostic	ECR Dimensions: 2.1 H x 4.3 W x 4.6 D in 5.4 H x 10.9 W x 11.7 D cm	
Packet capture	ECR Weight 1.45lbs (0.66 Kg)	
NETCONF	MCR Dimensions: 1.75 H x 8.0 W x 4.8 D inches 4.5 H x 20.3 W x 12.2 D cm	
SNMPv1/v2c/v3, MIB-II, Enterprise MIB	MCR Weight 2lbs (0.91 Kg)	
Nessum Wire		
IEEE 1901:2020 Wavelet FDM compliant interface		
Operation mode: Master/Terminal		
Scalable networks using CSMR auto routing protocol ITU-T G.9905: - Up to 1024 nodes - Up to 10 hops		
Max Data rate: - Channel 'x-4': 34 Mbps - Channel 'x-5': 42 Mbps		
Real Time adaptive modulation and FEC per carrier		

* Check with local sales representative for availability.

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