iConverter® GM4-PoE+ and GM4-HPoE Network Interface Devices

Carrier Ethernet 2.0 Certified NIDs with Power over Ethernet

The iConverter GM4 PoE Network Interface Devices (NID) deliver advanced Carrier Ethernet 2.0 services and provide integrated Power over Ethernet (PoE) at the demarcation. GM4 PoE NIDs function as PoE Power Sourcing Equipment in small cell (metro cell) and Wi-Fi applications, where the radio equipment can be powered through the Ethernet UTP cables.

By integrating Carrier Ethernet demarcation and PoE functions into a single device, Service Providers can easily deploy Wi-Fi hot spots and small cells almost anywhere, reduce equipment costs and overall power consumption. This integrated PoE NID speeds time to market and reduces technical risks.

The GM4 PoE NIDs are available in two PoE power levels. GM4-PoE+ and GM4-HPoE models support IEEE 802.3af PoE (15W) and 802.3at PoE+ (30W) on each RJ-45 port. The GM4-HPoE models also provide 60 Watts of High-Power PoE (also called 4 Pair PoE, PoE++, or UPoE) to all RJ-45 ports.

The GM4 PoE NID supports carrier-class Ethernet Service OAM standards. IEEE 802.1ag Connectivity Fault Management (CFM) proactively monitors service availability and provides tools for rapid fault isolation. ITU-T Y.1731 Performance Monitoring provides the ability to monitor key SLA parameters including frame delay, frame delay variation and frame loss. These OAM features provide proactive fault detection and rapid isolation of potential service problems, enabling SLA assurance while reducing Operational costs (OPEX).

The GM4 PoE NID supports ITU-T Y.1564 and RFC 2544 service testing to easily verify the configuration and performance of Ethernet services prior to customer hand off. RFC 2544 provides per flow testing of Key Performance Indicators (KPI), such as throughput, latency, jitter and frame loss up to full wire speed. Y.1564 is a comprehensive Carrier Ethernet testing standard that tests all data flows and service attributes, including multi-flow Information Rate and Traffic Policing. Y.1564 tests all performance attributes simultaneously so testing is run quickly and efficiently, and can detect potential interaction between data flows.

The GM4 supports ITU-T G.8031 Ethernet Linear Protection Switching and G.8032v2 Ethernet Ring Protection Switching with Connectivity Check Messages (CCM) at 3.3ms rate for sub-50ms protection switching. G.8032v2 includes multi-ring protection and sub-ring support.

SFP not included

KEY FEATURES

- Power over Ethernet sourcing of 802.3af (15W), 802.3at (30W) and High-Power PoE (60W)
- MEF Carrier Ethernet 2.0 Network Interface Device
- Integrated IPv4, IPv6, SNMPv1/v2c/v3, SSH, Telnet and IP-less 802.3ah OAM management
- SNMP management via NetOutlook® Network Management software
- Multiple port configurations:
  - 1 or 2 100/1000Mbps SFP Fiber Ports
  - 1 to 4 RJ-45 PoE 10/100/1000 Ports
- Supports dual fiber and single-fiber Gigabit and Fast Ethernet SFP transceivers for standard, CWDM or DWDM wavelengths
- RJ-45 port supports 10/100/1000 and Half/Full-Duplex auto-negotiation and MDI/MDIX auto-crossover
- 10,240 byte Jumbo frames
- Advanced traffic management with service mapping, traffic policing and shaping with Hierarchical Rate Limiting
- IEEE 802.1ag Connectivity Fault Management
- ITU-T Y.1731 End-to-End Performance Monitoring
- RFC 5357 TWAMP responder and initiator
- Zero-Touch Provisioning
- ITU-T Y.1564 Ethernet Service Activation Testing
- IETF RFC 2544 Ethernet Service Activation Testing
- ITU-T G.8262 Sync-E and IEEE 1588v2 Timing
- ITU-T G.8031 and G.8032v2 Ethernet Protection Switching
- IEEE 802.1ax/802.3ad LAG with LACP
- TAA, BAA and NDAA compliant, and Made in the USA
- Commercial (0 to 50ºC), wide (-40º to 60ºC) and extended (-40º to 75º C) temperature ranges

Zero-Touch Provisioning (ZTP) allows providers to achieve efficiencies in service activation that accelerate turn up and reduce the need for onsite technicians. ZTP allows service provisioning to be centralized, standardized and remotely managed.

The integrated management eliminates the cost and space required for external management hardware. The integrated management provides comprehensive remote configuration and performance monitoring.

The GM4 supports IPv4 and IPv6 addressing, IP-Less protocol using the IEEE 802.3ah OAM channel, SNMPv1/v2c/v3, SSH, Telnet and serial console port.

The IP address is user-defined or can be resolved through DHCP. Telnet and serial console management interfaces are supported, and utilize an easy-to-use, menu-driven interface. The serial interface provides local configuration access.

SNMP management is available via Omnitron's NetOutlook® SNMP Network Management Software with an intuitive Graphical User Interface, or third party SNMP software.

The GM4 Small Form Pluggable (SFP) standalone models support a wide variety of Gigabit and Fast Ethernet SFP transceivers in standard, CWDM and DWDM wavelengths.

The RJ-45 port supports 10/100/1000 and Half/Full-Duplex auto-negotiation and Pause control, with both hardware and software manual override controls. The module supports frame sizes up to 10,240 bytes

The GM4-PoE+ and GM4-HPoE are available in 2, 4 and 5 port models, with up to four RJ-45 ports with PoE. They are DC powered, or available with an external AC to DC power adapter. Built-in mounting brackets provide table-top and wall-mounting capability, and can also be rack-mounted using the 19" 1U rack-mounting shelf or DIN-rail mounted using the optional DIN-rail Mounting Clips (8251-0).

ADVANCED FEATURES

Management
IPv4, IPv6, Telnet, SNMPv1, SNMPv2c, SNMPv3, SSH, Serial Console
SNMP management via NetOutlook Network Management software
IP-less management through 802.3ah OAM extensions
MEF 30 and 31 Service OAM Fault Management MIBs
Syslog
Power Over Ethernet
IEEE 802.3af (15W), 802.3at (30W) and HPoE (60W)
Heartbeat signal to verify connectivity to the PD
Traffic Management
IEEE 802.1Q VLAN Tagging
IEEE 802.1ad Q-in-Q VLAN Tagging
Service Multiplexing of up to 256 EVCs
User-configurable Ethertype
All ports configurable as UNI or NNI
Ingress and Egress traffic management
Hierarchical rate limiting with two-level color aware policing
CIR/EIR color aware "two rates, three colors" bandwidth profiles
Port Mirroring
IEEE 802.1p CoS Priority
per Port, VLAN ID, PCP, IPv4/IPv6 (TOS/DiffServe) Priority, MAC address, IP address, TCP Port or L2CP
L2CP Policy Management
L2PT Tunneling to encapsulate STP, VTP, PVST and CDP protocols
RFC 4541 IGMP Snooping
DHCP Relay Option 82
Timing and Synchronization
IEEE 1588v2 Transparent Clock
ITU-T G.8262 Synchronous Ethernet

Service OAM and Testing
IEEE 802.3ah Link OAM with Dying Gasp*
IEEE 802.1ag Connectivity Fault Management with 8 Maintenance Domain levels and 256 Maintenance Associations
IEEE 802.1ag Maintenance Intermediate Points for fault isolation
ITU-T-Y.1731 Performance Monitoring with threshold monitoring and crossing alerts
Advanced classification and filtering of Layer 1, 2, 3 or 4 subscriber traffic as an EVC or CoS flow
RFC 5357 TWAMP IP SLA Performance Monitoring
IETF RFC 2544 (built-in Test-head) with wire-speed, per flow testing of throughput, latency, jitter and loss
ITU-T-Y.1564 Service Testing (built-in Test-head) with multi-flow testing of information rate, latency, jitter and frame loss
Per port and per flow loopback with MAC (Layer 2) swap or IP (Layer 3) swap
Third party in-band loopback support
Zero-Touch Provisioning (DHCP/TFTP)
Portal integration with Cyan Blue Planet, Ocular IP, Orion Solarwinds and Web EMS
Built-in UTP cable tester for troubleshooting to the Customer Equipment
Protection and Redundancy
Port Redundancy (Primary and Backup Link)
IEEE 802.1ax/802.3ad LAG with LACP (1:1 and 1+1)
ITU-T-G.8031 Ethernet Linear Protection with sub-50ms failover
ITU-T-G.8032 Ethernet Ring Protection with sub-50ms failover
IEEE 802.1w Rapid Spanning Tree Protocol
Link Modes
Security and Authentication
TACACS+, RADIUS and 802.1x
Access Control Lists

For non-PoE applications, see iConverter GM4 2/3/5 Port Models.

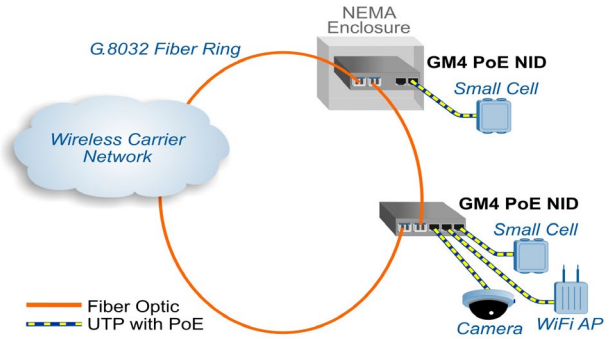
APPLICATION

Metro Ethernet Ring

In the application example, a Service Provider offers metro/ small cell coverage in addition to Wi-Fi hot spot services. The multiport GM4 PoE NIDs provide full PoE power on each RJ-45 port.

GM4 PoE NIDs are available with two SFP fiber ports, and support G.8032 Ethernet Ring Protection Switching to enable resilient ring configurations. An on-board sensing circuit monitors the equipment enclosures for unauthorized tampering.

A GM4 PoE NID and the power supply can be installed in a compact NEMA enclosure for outdoor deployments.



SPECIFICATIONS

Description	***iConverter* GM4-PoE and GM4-HPoE** 10/100/1000BASE-T Copper to 100/1000BASE-X Fiber Network Interface Device with Power over Ethernet	
Standard Compliances	IEEE 802.1Q, 802.1ad, 802.1ax, 802.1p, 802.3, 802.3ad, 802.3ah, 802.1ag, 1588v2, 802.3af (15W), 802.3at (30W) and High-Power PoE (60W) RFC 2819 (RMON), 2863 (IF-MIB), 2131 (DHCP), 2544, 5357 ITU-T G.8031, G.8032, G.8262, Y.1731, Y.1564 MEF Carrier Ethernet 2.0 Certified, MEF 6.2, 9, 10.2, 14, 21, 26.1, 30, 31, 33	
Regulatory Compliances	Safety: EMI: ACT:	UL, cUL, CE, NEBS Level 3, UKCA FCC Class A TAA, BAA, NDAA
Environmental	RoHS, WEEE, REACH	
Port Types	Copper: Fiber: Serial:	10/100/1000BASE-T (RJ-45) 100BASE-X (SFP) 1000BASE-X (SFP) RS-232 (RJ-45)
Cable Types	Copper: Fiber: Serial:	EIA/TIA 568A/B, Cat 5 and higher Multimode: 50/125µm, 62.5/125µm Single-mode: 9/125µm EIA/TIA 568A/B, Cat 3 and higher
AC Power Requirements	AC Adapter:	100 - 240VAC/50 - 60Hz 2.8A @ 120VAC (max)
DC Power Requirements	DC Input:	48 - 57VDC PoE/PoE+ Models: 1 RJ-45 Port (30W), 0.83A @ 48VDC 2 RJ-45 Ports (60W), 1.50A @ 48VDC 3 RJ-45 Ports (90W), 2.13A @ 48VDC 4 RJ-45 Ports (120W), 2.74A @ 48VDC HPoE Models: 1 RJ-45 Port (60W), 1.45A @ 48VDC 2 RJ-45 Ports (120W), 2.70A @ 48VDC 3 RJ-45 Ports (180W), 4.01A @ 48VDC 4 RJ-45 Ports (240W), 5.24A @ 48VDC
Power Input Connector	All models except 8991T-14, 8991T-23: 2.1 mm Barrel Connector or 3-Pin Terminal (isolated) For 8991T-14, 8991T-23 models: DIN-6 Connector or 3-Pin Terminal (isolated)	

Management	IPv4, IPv6, Telnet, SNMPv1, SNMPv2c, SNMPv3, SSH Serial Console	
Frame Size	Up to 10,240 bytes	
Dimensions W x D x H	5" x 7.5" x 1.375" (127 mm x 190.5 mm x 34.93 mm)	
Weight	Module: with Power Adapter:	1.38 lbs. (0.626 kg) 2.50 lbs. (1.13 kg)
Temperature	Commercial: Wide: Extended: Storage:	0 to 50°C -40 to 60°C (-20°C AC cold start) -40 to 75° C (-20°C AC cold start) not supported with Power Adapter -40 to 80°C
Humidity	5 to 95% (non-condensing)	
Altitude	-100m to 4,000m	
MTBF (hrs)	8991S-11, 8991T-11: 8991S-14: 8991T-14: 8991S-22, 8991T-22: 8991S-23: 8991T-23:	77,258 73,708 98,980 75,328 73,918 99,360
Warranty	3 year warranty with 24/7/365 free Technical Support	

ORDERING INFORMATION

Step 1: Choose a Base Part Number (xxxxS-xx-pt)

iConverter GM4-PoE+							
Port Configuration						Model Number	Description
Position 1	Position 2	Position 3	Position 4	Position 5	Position 6		
SFP	-	RJ-45	-	-	-	8991S-11-pt	GM4-PoE+ with 1 SFP Port and 1 PoE+ RJ-45 Port
SFP	-	RJ-45	RJ-45	RJ-45	RJ-45	8991S-14-pt	GM4-PoE+ with 1 SFP Port and 4 PoE+ RJ-45 Ports
SFP	SFP	-	RJ-45	RJ-45	-	8991S-22-pt	GM4-PoE+ with 2 SFP Ports and 2 PoE+ RJ-45 Ports
SFP	SFP	-	RJ-45	RJ-45	RJ-45	8991S-23-pt	GM4-PoE+ with 2 SFP Ports and 3 PoE+ RJ-45 Ports

RJ-45 - Fixed Copper Port, SFP - Small Form Pluggable Transceiver

Contact Omnitron for other options. Order the appropriate Fast or Gigabit SFPs separately. Visit the Omnitron Optical Transceivers web page.

Step 2: Choose a Power Option (xxxxS-xx-pt)

D = Barrel Connector and AC/DC Power Adapter, 100-240VAC, 50-60Hz, with US power cord with integrated mounting brackets
E = Barrel Connector and Universal AC/DC Adapter, 100-240 VAC, 50-60Hz, No Power Cord, with integrated mounting brackets
F = Direct DC input, 3 pin terminal connector, no AC/DC power adapter, with integrated mounting brackets

Step 3: Choose an Operating Temperature Range (xxxxS-xx-pt)

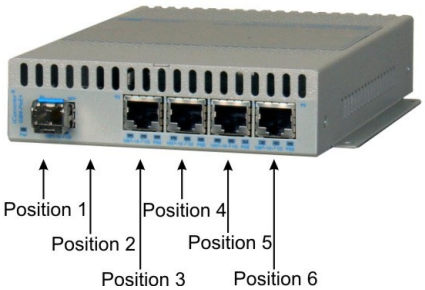
<leave blank> = Commercial temperature (0 to 50°C)
W = Wide temperature (-40 to 60°C) - see AC/DC Derating Table
Z = Wide temperature (-40 to 75°C) - not available for models with AC/DC Adapters

AC/DC Adapter Temperature Derating Total Available Wattage to RJ-45 Ports				
Model	Watts Required	40°C	50°C	60°C
GM4-PoE+ 1 RJ-45 PoE+ Port	30 watts	Full Power	Full Power	Full Power
GM4-PoE+ 2 RJ-45 PoE+ Ports	60 watts	Full Power	Full Power	Full Power
GM4-PoE+ 3 RJ-45 PoE+ Ports	90 watts	Full Power	Full Power	Full Power
GM4-PoE+ 4 RJ-45 PoE+Ports	120 watts	Full Power	Full Power	90 watts

The AC/DC Adapter Temperature derating table is not applicable to models with DC Terminal (see Ordering table for Direct DC power option F). The DC Terminal models will provide full PoE power over the operating temperature range of the module as long as the DC input voltage meets the requirements stated in the specification table on page 3.

GM4-PoE+ Port Configuration

There are six possible connector positions on the front of the GM4. Position 1 and 2 are SFP ports. Position 3, 4, 5 and 6 are RJ-45 ports The placement of the connectors will depend on the model. See ordering table for port configuration.



ACCESSORIES

Model Number	Description
8251-0	DIN Rail Mounting Clip for standalone models with integrated mounting brackets (power options -D, -E, -F)
8260-0	1U Rack Mount Shelf for standalone models (up to 2 modules)

ORDERING INFORMATION

Step 1: Choose a Base Part Number (xxxxT-xx-pt)

iConverter GM4-HPoE							
Port Configuration						Model Number	Description
Position 1	Position 2	Position 3	Position 4	Position 5	Position 6		
SFP	-	RJ-45	-	-	-	8991T-11-pt	GM4-HPoE with 1 SFP Port and 1 PoE+ RJ-45 Port
SFP	-	RJ-45	RJ-45	RJ-45	RJ-45	8991T-14-pt	GM4-HPoE with 1 SFP Port and 4 PoE+ RJ-45 Ports
SFP	SFP	-	RJ-45	RJ-45	-	8991T-22-pt	GM4-HPoE with 2 SFP Ports and 2 PoE+ RJ-45 Ports
SFP	SFP	-	RJ-45	RJ-45	RJ-45	8991T-23-pt	GM4-HPoE with 2 SFP Ports and 3 PoE+ RJ-45 Ports

RJ-45 - Fixed Copper Port, SFP - Small Form Pluggable Transceiver

Contact Omnitron for other options. Order the appropriate Fast or Gigabit SFPs separately. Visit the Omnitron Optical Transceivers web page.

Step 2: Choose a Power Option (xxxxT-xx-pt)

D = Barrel Connector and AC/DC Power Adapter, 100-240VAC, 50-60Hz, with US power cord with integrated mounting brackets
E = Barrel Connector and Universal AC/DC Adapter, 100-240 VAC, 50-60Hz, No Power Cord, with integrated mounting brackets
F = Direct DC input, 3 pin terminal connector, no AC/DC power adapter, with integrated mounting brackets

Step 3: Choose an Operating Temperature Range (xxxxT-xx-pt)

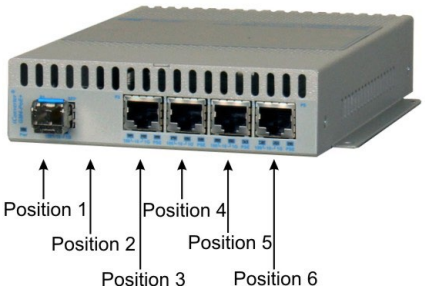
<leave blank> = Commercial temperature (0 to 50°C)
W = Wide temperature (-40 to 60°C) - see AC/DC Derating Table
Z = Wide temperature (-40 to 75°C) - not available for models with AC/DC Adapters

AC/DC Adapter Temperature Derating Total Available Wattage to RJ-45 Ports				
Model	Watts Required	40°C	50°C	60°C
GM4-HPoE 1 RJ-45 HPoE Port	60 watts	Full Power	Full Power	Full Power
GM4-HPoE 2 RJ-45 HPoE Ports	120 watts	Full Power	Full Power	Full Power
GM4-HPoE 3 RJ-45 HPoE Ports	180 watts	Full Power	177 watts	Not Supported
GM4-HPoE 4 RJ-45 HPoE Ports	240 watts	Full Power	177 watts	Not Supported

The AC/DC Adapter Temperature derating table is not applicable to models with DC Terminal (see Ordering table for Direct DC power option F). The DC Terminal models will provide full PoE power over the operating temperature range of the module as long as the DC input voltage meets the requirements stated in the specification table on page 3.

GM4-HPoE Port Configuration

There are six possible connector positions on the front of the GM4. Position 1 and 2 are SFP ports. Position 3, 4, 5 and 6 are RJ-45 ports The placement of the connectors will depend on the model. See ordering table for port configuration.



ACCESSORIES

Model Number	Description
8251-0	DIN Rail Mounting Clip for standalone models with integrated mounting brackets (power options -D, -E, -F)
8260-0	1U Rack Mount Shelf for standalone models (up to 2 modules)