# Omnitron Systems

*OmniConverter®* 10G/M

## Managed
## 6 and 10 Port
## 10Gigabit Ethernet Switch



# Quick Start Guide

## General and Copyright Notice

## Warranty

## Limitation of Warranty

**Environmental Notices**

The equipment covered by this manual must be disposed of or recycled in accordance with the Waste Electrical and Electronic Equipment Directive (WEEE Directive) of the European Community directive 2012/19/EU on waste electrical and electronic equipment (WEEE) which, together with the RoHS Directive 2015/863/EU, for electrical and electronic equipment sold in the EU after July 2019. Such disposal must follow national legislation for IT and Telecommunication equipment in accordance with the WEEE directive: (a) Do not dispose waste equipment with unsorted municipal and household waste. (b) Collect equipment waste separately. (c) Return equipment using collection method agreed with Omnitron.

The equipment is marked with the WEEE symbol shown to indicate that it must be collected separately from other types of waste. In case of small items the symbol may be printed only on the packaging or in the user manual. If you have questions regarding the correct disposal of equipment go to www.omniton-systems.com/support or e-mail to Omnitron at intlinfo@omnitron-systems.com.

**Safety Warnings and Cautions**

ATTENTION: Observe precautions for handling electrostatic discharge sensitive devices.

WARNING:  Potential damage to equipment and personal injury.

WARNING:  Risk of electrical shock.

# OmniConverter® 10G/M
# Quick Start Guide

**Product Overview**

The OmniConverter 10G/M is a managed compact 10Gigabit Ethernet switch that features 1/10G SFP/SFP+ uplink ports and four or eight 10/100/1000 RJ-45 copper user ports.

The mode of operation can be configured using easily accessible DIP-switches or using Web, Telnet, SSH, SNMPv1/v2c/v3 or Serial Console management interfaces. These management interfaces provide access to filtering and security options, such as, broadcast storm prevention, IGMP, IEEE 802.1x, RADIUS, TACACS+ and Access Control Lists.  Email event notification and alarm reporting is provided using Simple Mail Transfer Protocol.

To access the user manuals for the Web Interface, Command Line Interface and Hierarchical Command Line Interface, access the OmniConverter 10G/M product page.

*OmniConverter 10G/M 6 and 10 Port Modules*

**Front Panel**

The front of the 10G/M provides access to the management (serial console), RJ-45 user ports and uplink ports.

**RJ-45 and Uplinks Ports**

The RJ-45 Ethernet user port supports 10BASE-T, 100BASE-TX and 1000BASE-T protocols, auto-negotiation, auto MDI/MDI-X crossover and can be manually forced to a specific speed and duplex mode.

The module supports two 1/10G SFP/SFP+ transceiver uplink ports.

The SFP/SFP+ ports support SERDES 10GBASE-X and 1000BASE-X copper and fiber transceivers, and SGMII 10/100/1000BASE-T copper transceivers.

Port 8 (P8)
Port 6 (P6)
Port 4 (P4)
Port 2 (P2)

Even Ports
Odd Ports

Port 1 (P1)
Port 2 (P2)
Port 3 (P3)
Port 4 (P4)

Serial Port
Uplink Port (F2)
Uplink Port (F1)

Port 1 (P1)
Port 3 (P3)
Port 5 (P5)
Port 7 (P7)

Serial Port
Uplink Port (F2)
Uplink Port (F1)
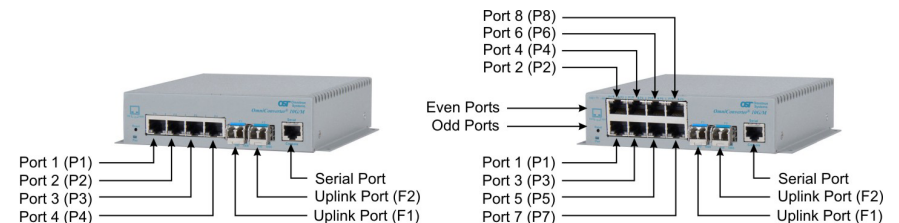
*Front Panel Layout*

**Serial Console Port**

To configure the module using the serial port, attach a DB-9 serial (RS-232) equipped computer with terminal emulation software such as Procomm or Putty

to the serial port on the module using a RJ-45 to DB-9 serial cable (not included). Some computers do not come with DB-9 serial port connectors and may require a USB-to-serial port adapter.

The port is a standard RS-232 asynchronous serial interface. The serial ports is configured for 57,600bps, 1 stop, 8 data, parity none. The serial adapter cable pin-outs are illustrated below.



*Standard RJ-45 to DB-9 serial cable pin-out*

### Reset Button

A reset button is available on the front of the module to restore the module to factory default values. Press and hold the reset button for more than 5 seconds to restore the module to factory default values.

### Installation Procedure

1) Configure DIP-switches

2) Installing the Module

3) Apply Power

4) Connect Cables

5) Verify Operation

### 1) Configure DIP-switches

DIP-switches are located on the side of the module. The DIP-switches are used to configure modes of operation and networking features.



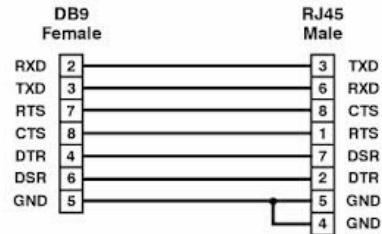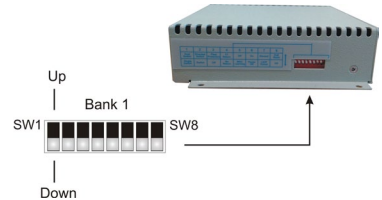*DIP-switch Bank Locations*

The table below provides a description of each DIP-switch position and function.

| Switch | Position | Legend | Function |
|---|---|---|---|
| SW1 | DOWN | Single Switch | Mode of Operation |
| | UP | Dual Switch | |
| SW2 | DOWN | Switch | |
| | UP | Directed Switch | |
| SW3 | DOWN | Off | Uplink Redundancy |
| | UP | Link Protection | |
| SW4 | DOWN | No Return | |
| | UP | F1 Return | |
| SW5 | DOWN | MAC Learning | MAC Learning Enabled (factory default) |
| | UP | Off | MAC Learning Disabled |
| SW6 | DOWN | Off | Pause Disabled (factory default) |
| | UP | Pause | Pause Enabled |
| SW7 | DOWN | L2CP Tunnel | L2CP Tunnel (factory default) |
| | UP | Discard | L2CP Tunnel Discard |
| SW8 | DOWN | OPT1 Off | Reserved |
| | UP | On | |

*DIP-switch Definitions*

### SW1 and SW2: Mode of Operation

The module supports Switch, Directed Switch and Dual Device modes.

The modes are described with MAC learning enabled. When MAC learning is disabled, unicast packets are forwarded to all ports.

| SW1 | SW2 | Function |
|---|---|---|
| DOWN | DOWN | Switch Mode (factory default) |
| DOWN | UP | Directed Switch Mode (AKA Camera Mode) |
| UP | DOWN | Dual Device Mode - Switch Mode |
| UP | UP | Dual Device Mode - Directed Switch Mode |

*Modes of Operation*

### Switch Mode

When configured for Switch Mode (factory default), the module operates as a standard layer 2 switch. Data flow will follow MAC address mapping.

### Directed Switch Mode (AKA Camera Mode)

When configured for Directed Switch Mode, traffic from all the RJ-45 user ports is only forwarded to the uplink port F1, preventing the broadcast traffic from flooding other network ports. The data traffic on the additional uplink port (F2) is also forwarded to port F1. Incoming traffic from F1 follows MAC address mapping.
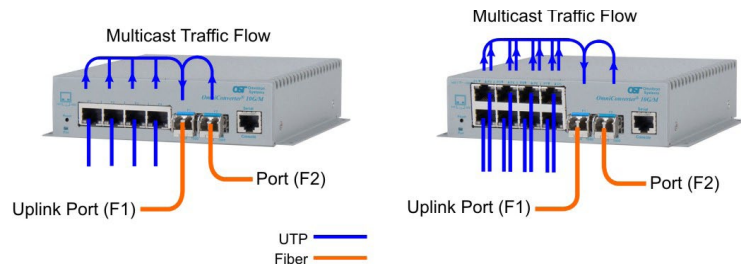
*Directed Switch Mode Dual Uplink Port*

When configured for Directed Switch Mode and Uplink Redundancy (per DIP-switches 3 and 4), traffic is forwarded to both the primary and secondary uplink ports. The secondary port will block all traffic while the primary port is active. When the primary port goes down, the secondary port will be active and all traffic will be forwarded out the secondary port (F2).



*Directed Switch Mode with Uplink Redundancy*

## Dual Device Mode

When configured for Dual Device Mode, the module is configured as two logically independent Layer 2 switches. On models with 4 RJ-45 user ports, Port F1 is associated with ports P1 and P2 and Port F2 is associated with ports P3 and P4. On models with 8 RJ-45 user ports, Port F1 is associated with ports P1 - P4 and Port F2 is associated with ports P5 - P8. Data flow will follow MAC address mapping.



*Dual Device Mode*

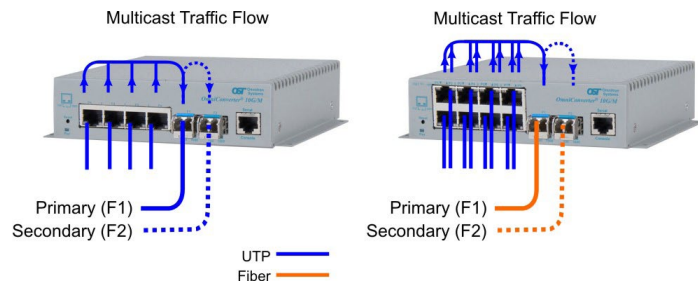When models with 4 RJ-45 user ports are configured for Dual Device Mode and Directed Switch Mode, the traffic from ports P1 and P2 is only forwarded to uplink port F1 and ports P3 and P4 are only forwarded to uplink port F2. When models with 8 RJ-45 user ports are configured for Dual Device Mode and Directed Switch Mode, the traffic from ports P1 - P4 is only forwarded to uplink port F1 and ports P5 - P8 are only forwarded to uplink port F2. This prevents broadcast traffic from flooding other network ports. Incoming traffic from F1 and F2 follows MAC address mapping.
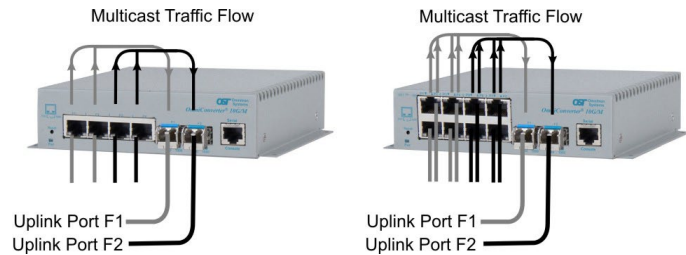


*Dual Device with Directed Switch Mode*

## SW3 and SW4: Uplink Redundancy

The modes are described with MAC learning enabled. When MAC learning is disabled, the module will send data to all ports.

| SW3 | SW4 | Function |
|------|------|----------|
| DOWN | DOWN | Switch Mode (factory default) |
| DOWN | UP | Switch Mode (factory default) |
| UP | DOWN | Redundant Mode - no return to primary (F1) |
| UP | UP | Redundant Mode - return to primary (F1) |

*Uplink Redundancy*

When configured for Uplink Redundant Mode "no return to primary", the uplink ports operate as redundant links. A fault on the primary Port F1, will cause a fail over to the secondary Port F2 within 50msec. Port F1 will become the secondary port once the failure condition has been restored because "no return to primary" has been selected.
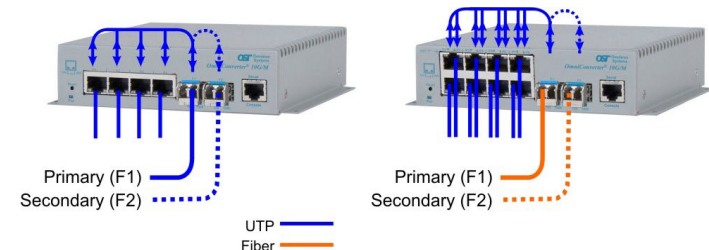


*Redundant Uplink*

When configured for Uplink Redundant Mode "return to primary', a fault on the primary Port F1, will cause a fail over to the secondary Port F2 within 50msec. The module will return to the primary Port F1 after the failure condition has been restored for 6 seconds.

## SW5: MAC Learning - "MAC Learning/Off"

When this DIP-switch is in the DOWN "MAC Learning" position (factory default), all ports on the module will learn the source MAC address of each received packet and store the address so packets destined for the stored addresses can be forwarded to the appropriate port on the module. When the DIP-switch is in the UP "Off" position, learning is turned off and all received unicast packets are forwarded to all ports.

## SW6: Pause - "Pause Off/On"

Setting the DIP-switch to the DOWN "Pause Off" position (factory default) configures the module to advertise no Pause capability on all ports. Setting this DIP-switch to the UP "On" position configures the module to advertise Symmetrical and Asymmetrical Pause capability to all ports.

## SW7: L2CP - "L2CP Tunnel/Discard"

When this DIP-switch is in the DOWN "L2CP Tunnel" position (factory default), all L2CP frames will be tunneled through the module. When this DIP-switch is in the UP "Discard" position, all L2CP frames will be discarded with the exception of the frames listed below.

| Multicast Destination Address | Name | SW7 L2CP DOWN / UP |
|---|---|---|
| 01-80-C2-00-00-00 | Bridge Group Address | Based on RSTP / MSTP |
| 01-80-C2-00-00-01 | IEEE Std 802.3 Full Duplex PAUSE | Based on PAUSE |
| 01-80-C2-00-00-03 | IEEE Std 802.1X PAE Address | Based on AAA 802.1X |
| 01-80-C2-00-00-0B | Reserved for future standardization | Tunnel |
| 01-80-C2-00-00-0C | Reserved for future standardization | Tunnel |
| 01-80-C2-00-00-0D | Provider Bridge GVRP Address | Tunnel |
| 01-80-C2-00-00-0E | IEEE Std 802.1AB LLDP | Based on LLDP |
| 01-80-C2-00-00-0F | Reserved for future standardization | Tunnel |
| 01-80-C2-00-00-10 | All Bridges | Tunnel |
| 01-80-C2-00-00-2X | GARP | Tunnel |
| 01-80-C2-00-00-3X | 802.1ag CFM | Tunnel |

If RSTP/MSTP, PAUSE, AAA 802.1X and LLDP are disabled, the protocols will be TUNNELED. If the protocols are enabled, the module will participant in the protocol.

## SW8:  Reserved

## 2) Installing the Module

### Wall Mounting

The wall mounting height of the module should be less than or equal to 2 meters (6.6 feet) from the floor. Use the four mounting holes on the module to secure the module to the wall. The module can accommodate #6 screws (not included).

Installation of the module should be such that the air flow in the front, back, side and top vents of the switch are not compromised or restricted.

The accessory cables should have their own strain relief and do not pull down on the module.

### Rack Mounting

The module can be rack mounted using the optional Rack Mount Shelf (8260-0). Refer to the Rack Mount Shelf user manual (040-08260-001x) for the proper installation guidelines.

Follow the same guidelines above when rack mounting the module.

### DIN-Rail Mounting

The module can be DIN-rail mounted using the optional DIN-Rail Mounting Clips (8251-1). Refer to the DIN-Rail Mounting Clips user manual (040-08251-001x) for the proper installation guidelines.

## 3) Apply Power

### AC Power

Secure the ground wire to the ground screw. See the figure below for the location of the grounding screws.

Route the power cord through the provided strain relief for additional support and connect the barrel connector at the end of the wire on the AC/DC adapter to the barrel connector on the module. Connect the AC/DC adapter to the AC outlet. Confirm that the module has powered up properly by checking the Power LED located on the front of the switch.
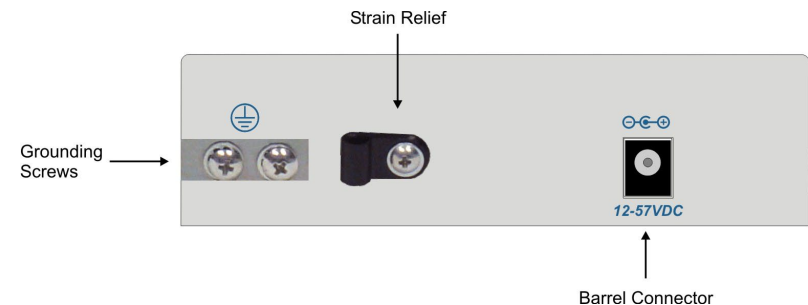


*AC Models Rear View: Barrel Connector for AC/DC Power Adapter*

> **WARNING!!!**
>
> **NEVER ATTEMPT TO OPEN THE CHASSIS OR SERVICE THE POWER SUPPLY. OPENING THE CHASSIS MAY CAUSE SERIOUS INJURY OR DEATH. THERE ARE NO USER REPLACEABLE OR SERVICEABLE PARTS IN THIS UNIT.**

### DC Power

This module is intended for installation in restricted access areas. ("Les matériels sont destinés à être installés dans des EMPLACEMENTS À ACCÈS RESTREINT"). A restricted access area can be accessed only through the use of a special key, or other means of security.

The over current protection for connection with centralized DC shall be provided in the building installation, and shall be a UL listed circuit breaker rated 20 Amps, and installed per the National Electrical Code, ANSI/NFPA-70.

Appropriate overloading protection should be provided on the DC power source outlets utilized.

The 6 Port 10G/M requires +12 to +57VDC inclusive of tolerances( 0.86A @ 12VDC max rated power). The 10 Port 10G/M requires +12 to +57VDC inclusive of

tolerances (0.94A @ 12VDC max rated power). See specification table for specific model requirements.

Appropriate overloading protection should be provided on the DC power source outlets utilized.
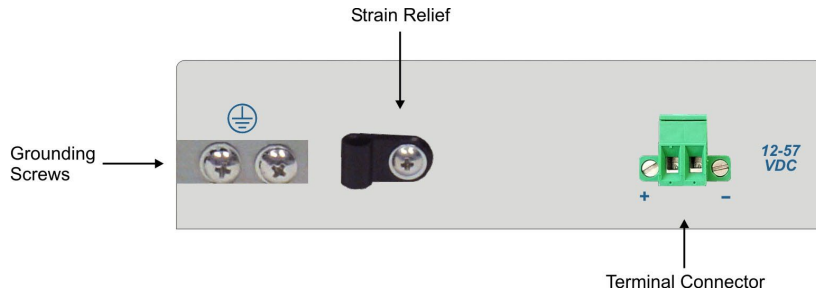


*DC Models Rear View: 2-Pin Terminal for DC Power*

WARNING: Only a DC power source that complies with safety extra low voltage (SELV) requirements can be connected to the DC-input power supply.

**WARNING REGARDING EARTHING GROUND:**
o  This equipment shall be connected to the DC supply system earthing electrode conductor or to a bonding jumper from an earthing terminal bar or bus to which the DC supply system earthing electrode is connected.
o  This equipment shall be located in the same immediate area (such as adjacent cabinets) as any other equipment that has a connection between the earthed conductor of the same DC supply circuit and the earthing conductor, and also the point of earthing of the DC system. The DC system shall not be earthed elsewhere.
o  The DC supply source is to be located within the same premises as this equipment.
o  There shall be no switching or disconnecting devices in the earthed circuit conductor between the DC source and the earthing electrode conductor.

Locate the DC circuit breaker of the external power source, and switch the circuit breaker to the OFF position.

Prepare a power cable using a three conductor insulated wire (not supplied) with 12AWG to 14AWG thickness. Cut the power cable to the length required.

Strip approximately 3/8 of an inch of insulation from the power cable wires.

Connect the ground wire to the grounding screws on the back of the module.

Connect the power cables to the module by fastening the stripped ends to the DC power connector.
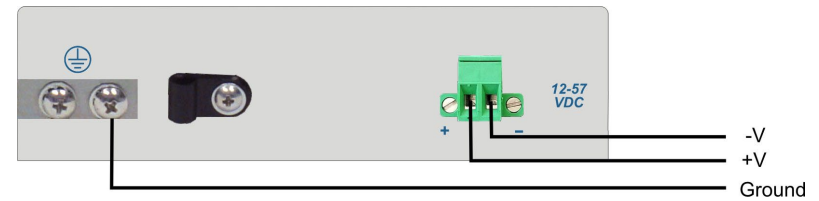


*DC Models Rear View: Power Connections*

**WARNING:  The positive lead of the power source must be connected to the "+" terminal on the module and the negative lead of the power source to the "-" terminal on the module as shown above.**
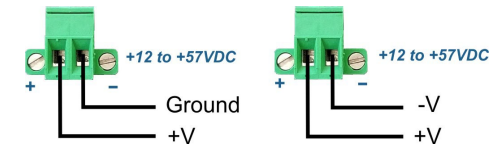


*Power Options*

**WARNING: Note the wire colors used in making the positive, negative and ground connections. Use the same color assignment for the connection at the circuit breaker.**

Connect the power wires to the circuit breaker and switch the circuit breaker ON. If any module are installed, the Power LED will indicate the presence of power.

During the installation, ensure that the ground potentials are maintained throughout the system connections. This includes but not limited to the power source ground and any shielded cabling grounds.

**WARNING!!!**
**NEVER ATTEMPT TO OPEN THE CHASSIS OR SERVICE THE POWER SUPPLY. OPENING THE CHASSIS MAY CAUSE SERIOUS INJURY OR DEATH. THERE ARE NO USER REPLACEABLE OR SERVICEABLE PARTS IN THIS UNIT.**

Make sure to disconnect the power and ground cables before removing the equipment.

## 4) Connect Cables

a.  Insert the SFP/SFP+ transceiver into the SFP receptacle on the front of the module (see the SFP Data Sheet 091-17000-001 for supported Gigabit transceivers or 091-17400-001 for supported 10G transceivers).

    **NOTE: The release latch of the SFP fiber transceiver must be in the closed (up) position before insertion.**

b.  Connect an appropriate multimode or single-mode fiber cable to the fiber port on the front of the module. It is important to ensure that the transmit (TX) is attached to the receive side of the transceiver at the other end and the receive (RX) is attached to the transmit side. When using single-fiber (SF) models, the TX wavelength must match the RX wavelength at the other end and the RX wavelength must match the TX wavelength at the other end.

c.  Connect the Ethernet 10/100/1000 RJ-45 port using a Category 5 or better cable to an external 10BASE-T, 100BASE-TX or 1000BASE-T Ethernet device.

## 5) Verify Operation

Verify the module is operational by viewing the LED indicators.

| Power LED Indicators | | |
|---|---|---|
| Legend | Indicator | Description |
| Pwr | OFF | Unit not powered |
| | Green - ON | Unit powered |
| | Amber - ON | Over temperature condition |
| | Green - Blinking at 1Hz | Indicates reset button has been pressed for more than 5 seconds and the module is ready to be restored to factory default values |

*Power LED Indicators*

| Uplink LED Indicators | | |
|---|---|---|
| Legend | Indicator | Description |
| 1000 (Link) | OFF | Port not linked |
| | Green - ON | Port linked at the speed indicated by the Speed LED |
| | Green - Blinking at 10Hz | Port is transmitting or receiving data |
| | Green - Blinking at 1Hz | Port in redundant secondary mode |
| 10G (Speed) | OFF | Port not linked |
| | Amber - Blinking at 1Hz | Port not linked and receiving remote fault or FEFI |
| | Green - single blink | Port linked at 10M, 100M or 1G |
| | Green - two blinks | Port linked at 2.5G |
| | Green - three blinks | Port linked at 5G |
| | Green - four blinks | Port linked at 10G |

*SFP/Uplink Ports LED Indicators LED Indicators*

| RJ-45 User Ports LED Indicators | | |
|---|---|---|
| Legend | Indicator | Description |
| 100 / 4 Port / 8 Port | OFF | No link |
| | Green - ON | Port linked at 100Mbps |
| | Green - Blinking at 10Hz | Port data activity at 100Mbps |
| | Amber -ON | Port linked at 100Mbps Half-duplex |
| | Amber - Blinking at 10Hz | Port data activity at 100Mbps Half-duplex |
| 1000 / 4 Port / 8 Port | OFF | No link |
| | Green - ON | Port linked at 1000Mbps |
| | Green - Blinking at 10Hz | Port data activity at 1000Mbps |
| | Amber -ON | Port linked at 1000Mbps Half-duplex |
| | Amber - Blinking at 10Hz | Port data activity at 1000Mbps Half-duplex |
| 10 / 4 Port / 8 Port | OFF | No link |
| | Green - ON | Port linked at 10Mbps |
| | Green - Blinking at 10Hz | Port data activity at 10Mbps |
| | Amber -ON | Port linked at 10Mbps Half-duplex |
| | Amber - Blinking at 10Hz | Port data activity at 10Mbps Half-duplex |

*RJ-45 LED Indicators*

## Specifications

| Description | **OmniConverter® 10G/M**<br><br>10/100/1000BASE-T with 1G or 10G Uplinks<br>Managed 6 or 10 Port 10Gigabit Ethernet Switch | |
|---|---|---|
| **Standard Compliances** | IEEE 802.3, IEEE 802.1Q, IEEE 802.1ad, IEEE 802.1ab, IEEE 802.1ax, IEEE 802.1w RSTP/MSTP, RFC 5424, RFC 4541, RFC 2710, IEC 624339-2, SMTP, SMS, SNTP, RADIUS, TACACS+, IEEE 802.1x | |
| **Environmental** | REACH, RoHS and WEEE | |
| **Management** | IPv4 and IPv6 address<br>Web, Telnet, SSH, SNMPv1/v2c/v3<br>In-Band management via Ethernet port<br>Out-of-band management via serial port | |
| **Frame Size** | Up to 10,240 bytes | |
| **Port Types** | Copper: 10/100/1000BASE-T (RJ-45)<br><br>SFP/SFP+: 10GBASE-X Fiber Transceivers<br>10GBASE-T Copper Transceivers<br>1000BASE-X Fiber and Copper Transceivers<br>10/100/1000BASE-T SGMII Copper Transceivers<br><br>Serial: RS-232 (RJ-45) | |
| **Cable Types** | Copper: EIA/TIA 568A/B, Cat 5 UTP and higher<br>Fiber: Multimode: 50/125, 62.5/125μm<br>Single-mode: 9/125μm<br>Serial: Category 3 and higher | |
| **AC Power Requirements (Models with AC/DC Adapters)** | 100 - 240VAC 50/60Hz<br>0.25A max at 115VAC<br>0.12A max at 230VAC | |
| **DC Power Requirements (Models with DC Terminals)** | 4 RJ-45 Ports:<br>+12 to +57VDC; inclusive of tolerance<br>0.86A @ 12VDC<br>0.22A @ 48VDC<br>2 Pin Terminal (non-isolated) | 8 RJ-45 Ports:<br>+12 to +57VDC; inclusive of tolerance<br>0.94A @ 12VDC<br>0.24A @ 48VDC<br>2 Pin Terminal (non-isolated) |
| **Dimensions (W x D x H)** | 6.28" x 5.2" x 1.5" (159.5 mm x 132.1 mm x 38.1 mm) | |
| **Weight** | 4 RJ-45 Ports:<br>Module Only: 1.5 lb. (720 grams)<br>Module with AC/DC Adapter:<br>2.0 lbs. (913 grams) | 8 RJ-45 Ports:<br>Module Only: 1.6 lbs. (748 grams)<br>Module with AC/DC Adapter:<br>2.1 lbs. (941 grams) |
| **Operating Temperature** | Commercial: 0 to 50°C<br>Wide: -40 to 60°C (-20°C AC cold start)<br>Extended: -40 to 75°C (-20°C AC cold start)<br>Storage: -40 to 80°C | |
| **Humidity** | 5 to 95% (non-condensing) | |
| **Altitude** | -100m to 4,000m (operational) | |
| **MTBF (hours)** | Module Only: 290,000<br>AC/DC Adapter: 100,000 | |
| **Warranty** | 5 year product warranty with 24/7/365 free Technical Support<br>2 year AC power adapter warranty | |

| **Regulatory Compliances (*Pending)** | Safety*: | UL 62368-1,<br>UL 60950-1,<br>IEC 62368-1,<br>IEC 60950-1,<br>EN 62368-1,<br>EN 60950-1,<br>CAN/CSA C22.2 No. 62368-1-14,<br>CAN/CSA C22.2 No. 60950-1,<br>CE Mark,<br>UKCA |
|---|---|---|
| | EMC: | EN 55032/24 CE Emissions/Immunity,<br>IEC 61000-6-4 Industrial Emissions,<br>IEC 61000-6-2 Industrial Immunity |
| | EMI: | CISPR 32,<br>FCC 47 Part 15 Subpart B Class A |
| | EMS: | IEC 61000-4-2 ESD: Contact: 6 kV; Air: 8 kV,<br>IEC 61000-4-3 RS: 80 MHz to 1 GHz: 10 V/m,<br>IEC 61000-4-4 EFT: Power: 2 kV; Signal: 1 kV (DC models),<br>IEC 61000-4-4 EFT: Power: 1 kV; Signal: 1 kV (AC models),<br>IEC 61000-4-5 Surge: Power: 2 kV; Signal: 2 kV (DC models),<br>IEC 61000-4-5 Surge: Power: 1 kV Line/Line; 2 kV Line/Gnd;<br>Signal: 2 kV (AC models),<br>IEC 61000-4-6 CS: Signal: 10 V,<br>IEC 61000-4-8 (Magnetic Field) 30A/m,<br>IEC 61000-4-11 (Voltage Dips, interrupts) |
| | IP Rating: | IP20 Protection |
| | ACT: | TAA, BAA, NDAA |

## Customer Support Information

If you encounter problems while installing this product, contact Omnitron Technical Support:

| Phone: | (949) 250-6510 |
|---|---|
| Fax: | (949) 250-6514 |
| Address: | Omnitron Systems Technology, Inc. |
| | 38 Tesla |
| | Irvine, CA 92618, USA |
| Email: | support@omnitron-systems.com |
| URL: | www.omnitron-systems.com |

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