Omnitron Systems

RuggedNet® GL/Si

Unmanaged Industrial Single Pair Ethernet Switch

User Manual

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Warranty

This product is warranted to the original purchaser (Buyer) against defects in material and workmanship for a period of two (2) years from the date of shipment. A five (5) year warranty may be obtained by the original purchaser by registering this product at www.omnitron-systems.com/support within ninety (90) days from the date of shipment. During the warranty period, Omnitron will, at its option, repair or replace a product which is proven to be defective with the same product or with a product with at least the same functionality.

For warranty service, the product must be sent to an Omnitron designated facility, at Buyer's expense. Omnitron will pay the shipping charge to return the product to Buyer's designated US address using Omnitron's standard shipping method.

Limitation of Warranty

The foregoing warranty shall not apply to product malfunctions resulting from improper or inadequate use and/or maintenance of the equipment by Buyer, Buyer-supplied equipment, Buyer-supplied interfacing, unauthorized modifications or tampering with equipment (including removal of equipment cover by personnel not specifically authorized and certified by Omnitron), or misuse, or operating outside the environmental specification of the product (including but not limited to voltage, ambient temperature, radiation, unusual dust, etc.), or improper site preparation or maintenance.

No other warranty is expressed or implied. Omnitron specifically disclaims the implied warranties of merchantability and fitness for any particular purpose.

The remedies provided herein are the Buyer's sole and exclusive remedies. Omnitron shall not be liable for any direct, indirect, special, incidental, or consequential damages, whether based on contract, tort, or any legal theory.

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.

WARNING: Hot surface.

RuggedNet GL/Si
User Manual

Product Overview

The RuggedNet GL/Si is an unmanaged Industrial gigabit Ethernet switch that features copper or fiber uplink ports and four single-pair 10BASE-T1L Ethernet user ports.

The Single Pair Ethernet switch features four IEEE 802.3cg compliant 10BASE-T1L 3-pin terminals or IEC 63171-2 SPE user ports and two SFP or 10/100/1000 RJ-45 uplink ports.

The GL/Si functions can be configured using easily accessible DIP-switches.

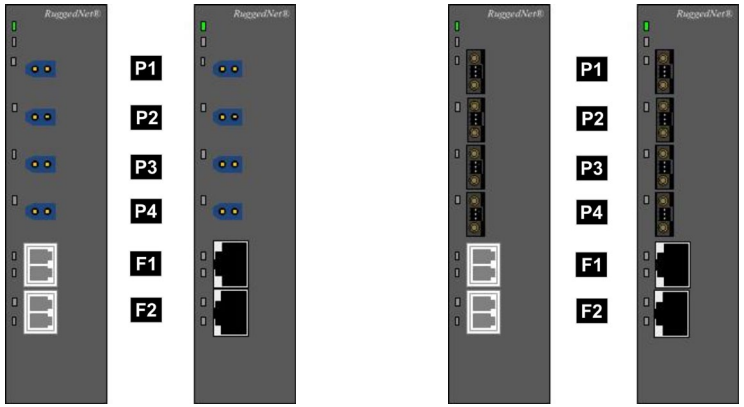
Front Panel

The front of the GL/Si provides access to the RJ-45 or SFP uplink ports and the four single-pair 10BASE-T1L Ethernet copper user ports.

Uplink and Single-Pair Ports

The four IEEE 802.3cg compliant 10BASE-T1L Ethernet ports feature either a 3-pin terminal or an IEC 63171-2 connector, depending on the model number.

The switch features two SFP transceiver uplink ports or two 10/100/1000BASE-T RJ-45 copper uplink ports. The SFP transceiver receptacle port supports 10/100/1000BASE-T and 1000BASE-T copper transceivers and 100Mbps and 1000Mbps standard, CWDM and DWDM fiber transceivers in a variety of distances and fiber types.



Front Panel Layout

Installation Procedure

1) Configure DIP-switches

2) Installing the Module

3) Apply DC Power

4) Connect Cables

5) Verify Operation

1) Configure DIP-switches

DIP-switches are located on the top of the RuggedNet GL/Si. 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	Description
SW1	Mode of Operation
SW2	
SW3	Uplink Redundancy
SW4	
SW5	MAC Learning
SW6 - SW8	Reserved

DIP-switch Definitions

SW1 and SW2: Mode of Operation

The switch 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
LEFT	LEFT	Switch Mode (factory default)
LEFT	RIGHT	Directed Switch Mode
RIGHT	LEFT	Dual Device Mode - Switch Mode
RIGHT	RIGHT	Dual Device Mode - Directed Switch Mode

Modes of Operation

NOTE: Product label may show RESERVED for the RIGHT RIGHT position, however the RIGHT RIGHT position is as indicated in the table above.

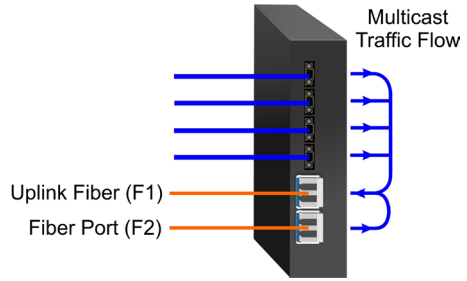
Switch Mode

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

Directed Switch Mode

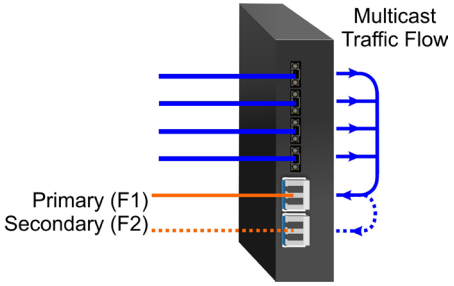
When configured for Directed Switch Mode, traffic from the user ports and uplink port F2 is only forwarded to the uplink port F1, preventing the broadcast traffic from flooding other network ports. Incoming traffic from uplink port F1 is flooded to all user ports and uplink port F2.

The illustrations below show fiber uplink ports. The switch is available with copper uplink ports and operate in the same manner as shown below.



Directed Switch Mode

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).

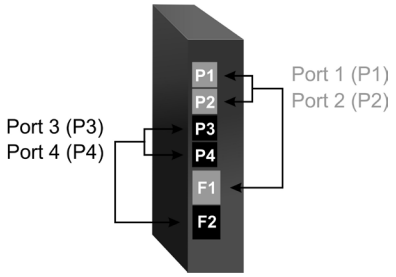


Directed Switch Mode with Uplink Redundancy

Dual Device Mode

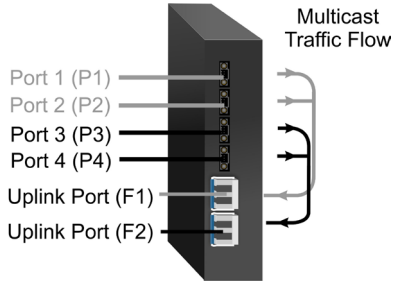
Dual Device Mode is only supported on models with two uplink ports.

When configured for Dual Device Mode, the switch is configured as two logically independent Layer 2 switches. Port F1 is associated with ports P1 and P2 and Port F2 is associated with ports P3 and P4. Data flow will follow MAC address mapping.



Dual Device Mode

When 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. 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

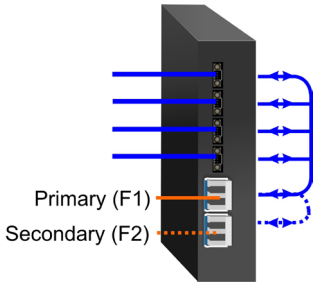
SW3 and SW4: Uplink Redundancy

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

SW3	SW4	Function
LEFT	LEFT	Switch Mode (factory default)
LEFT	RIGHT	Switch Mode (factory default)
RIGHT	LEFT	Uplink Redundancy Mode - no return to primary (F1)
RIGHT	RIGHT	Uplink Redundancy 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 switch will return to the primary Port F1 after the failure condition has been restored.

SW5: MAC Learning - “ON/OFF”

When this DIP-switch is in the LEFT “ON” position (factory default), all ports on the switch 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 switch. When the DIP-switch is in the RIGHT “OFF” position, learning is turned off and all received unicast packets are forwarded to all ports.

SW6, SW7 and SW8: Reserved

These DIP-switches are for future use and must be in the LEFT factory default position.

Pause

Pause frames will be configured to advertise Symmetrical and Asymmetrical Pause capability on all ports.

L2CP

All Layer 2 Control Protocol (L2CP) frames will be tunneled.

2) Installing the Module

The module can be wall or rack mounted using the optional Wall Mount Plate (8260-3). Refer to the Wall Mount Plate user manual (040-08260-301x) for the proper installation guidelines.

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.

3) Apply 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.

The GL/Si requires +12 to +58VDC inclusive of tolerance (0.55A @ 12VDC max rated power). See specification table for specific model requirements.

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

Top View - Location of DC Power and DIP-switches

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:

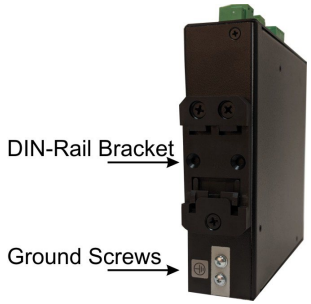
- This equipment shall be connected to the DC supply system earthing electrode conductor or to a bonding jumper from an earthing terminal bar or bus to which the DC supply system earthing electrode is connected.
- This equipment shall be located in the same immediate area (such as adjacent cabinets) 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.
- The DC supply source is to be located within the same premises as this equipment.
- 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.

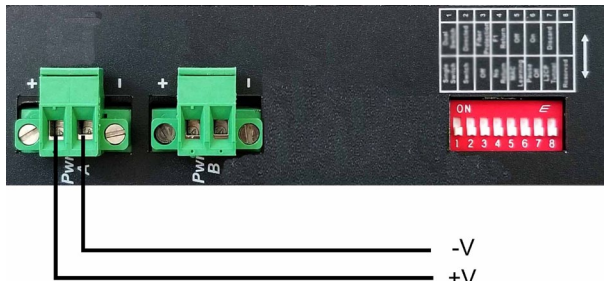
Strip approximately 3/8 of an inch of insulation from the power cable wires.

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

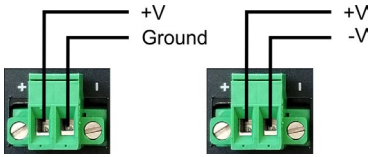


Ground Screw Location

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



Power Connections



Power Options

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.

The power connections on the module are isolated. This provides support of positive or negative power connections.

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 modules are installed, the Power LED(s) 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 both power connectors and the ground cables before removing the equipment.

4) Connect Cables

a. If the switch supports SFP transceivers,insert the SFP fiber transceiver into the SFP receptacle on the front of the switch (see the SFP Data Sheet 091-17000-001 for supported Gigabit or Fast Ethernet transceivers).

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

b. If the switch supports RJ-45 uplink ports, connect the port using a Category 5 or better cable to an external 10/100/1000 Ethernet device.

c. Connect the 3-Pin Terminal or IEC 63171-2 connector via a single-pair Ethernet (SPE) cable to the IEEE 802.3cg device. Cable must meet the SPE cable requirements: IEC 61156-13 (fixed) or IEC 61156-14 (flexible) 18AWG cable or better in order to obtain the maximum distance.

5) Verify Operation

Verify the switch is operational by viewing the LED indicators.

Power LED Indicators		
Legend	**Indicator**	**Description**
Pwr A	OFF	Switch not powered by power supply A
	Green - ON	Switch powered by power supply A
Pwr B	OFF	Switch not powered by power supply B
	Green - ON	Switch powered by power supply B

Power LED Indicators

User Ports LED Indicators		
Legend	**Indicator**	**Description**
Lk/Act	OFF	No link
	Green - ON	Port linked at 10Mbps FDx
	Green - Blinking at 10Hz	Port Tx/Rx data activity at 10Mbps FDx

User Port LED Indicators

Uplink Ports LED Indicators - SFP and Copper Uplink Models		
Legend	**Indicator**	**Description**
100	OFF	No link
	Green - ON	Port linked at 100Mbps FDx
	Green - Blinking at 10Hz	Port Tx/Rx data activity at 100Mbps FDx
	Green - Blinking at 1Hz	Port linked at 100Mbps and in redundant standby mode
	Amber - ON	Port linked at 100Mbps HDx
	Amber - Blinking at 10Hz	Port Tx/Rx data activity at 100Mbps HDx
1000	OFF	No link
	Green - ON	Port linked at 1000Mbps FDx
	Green - Blinking at 10Hz	Port data activity at 1000Mbps FDx
	Green - Blinking at 1Hz	Port linked at 1000Mbps and in redundant standby mode
	Amber - ON	Port linked at 1000Mbps HDx
	Amber - Blinking at 10Hz	Port Tx/Rx data activity at 1000Mbps HDx
100+1000	OFF	No link
	Green - ON	Port linked at 10Mbps FDx
	Green - Blinking at 10Hz	Port Tx/Rx data activity at 10Mbps FDx
	Green - Blinking at 1Hz	Port linked at 10Mbps and in redundant standby mode
	Amber - ON	Port linked at 10Mbps HDx
	Amber - Blinking at 10Hz	Port Tx/Rx data activity at 10Mbps HDx

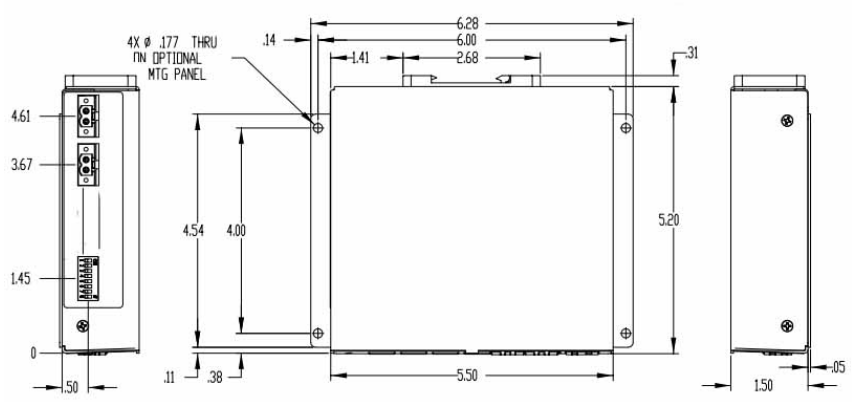
Uplink LED Indicators - SFP and Copper Models

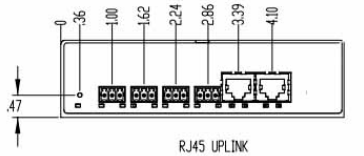
Specifications

Regulatory Compliances (Pending)	Safety:	UL 62368-1, UL 60950-1, IEC 62368-1, IEC 60950-1, EN 62368-1, EN 60950-1, CAN/CSA C22.2 No. 62368-1-14 and No. 60950-1 CE Mark UKCA
	EMC:	EN 55032/24 CE Emissions/Immunity, IEC 61000-6-4 Industrial Emissions, IEC 61000-6-2 Industrial Immunity
	EMI:	CISPR 32, FCC 47 Part 15 Subpart B Class A
	EMS:	IEC 61000-4-2 ESD: Contact: 6 kV; Air: 8 kV, IEC 61000-4-3 RS: 80 MHz to 1 GHz: 10 V/m (on UTP cabling) and 20 V/m (on STP cabling), IEC 61000-4-4 EFT: Power: 2 kV; Signal: 1 kV, IEC 61000-4-5 Surge: Power: 2 kV; Signal: 2 kV, IEC 61000-4-6 CS: Signal: 10 V, IEC 61000-4-8 (Magnetic Field), 30A/m, IEC 61000-4-11 (General Immunity in Industrial Environments)
	IP Rating:	IP40 Protection
	ACT:	TAA, BAA, NDAA

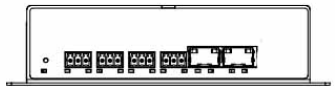
Description	**RuggedNet® GL/Si** 10T/T1L to 100/1000 Fiber or 10/100/1000 Copper Uplinks Unmanaged Industrial Ethernet Switch
Standard Compliances	IEEE 802.3, 802.3cg
Environmental	REACH, RoHS and WEEE
Frame Size	10BASE-T1L: Up to 2,048 bytes RJ-45: Up to 10,240 bytes SFP: 100M - up to 2,048 bytes 1000M - up to 10,240 bytes
Port Types	10BASE-T1L: 3-Pin Terminal or IEC 63171-2 SPE connector RJ-45: 10/100/1000BASE-T SFP: 10/100/1000BASE-T SGMII or 1000BASE-T SERDES Copper Transceiver, 100BASE-X or 1000BASE-X Fiber Transceiver
Cable Types	10BASE-T1L: Single-Pair Ethernet (SPE) cable, IEC 61156-13 (fixed) or IEC 61156-14 (flexible) 18AWG cable or better RJ-45: EIA/TIA 568A/B, Cat 5 UTP and higher Fiber: Multimode: 50/125, 62.5/125µm Single-mode: 9/125µm
DC Power Requirements	+12 to +58VDC; 0.55A @ 12VDC; 2 Pin Terminal (isolated)
Dimensions (W x D x H)	1.5” x 5.5” x 5.5” (38.1 mm x 139.7 mm x 139.7 mm)
Weight	1.70 lb. (772 grams)
Operating Temperature	Extended: -40 to 75°C Storage: -40 to 80°C
Humidity	5 to 95% (non-condensing)
Altitude	-100m to 4,000m (operational)
MTBF (hours)	216,000
Warranty	5 year product warranty with 24/7/365 free Technical Support

Mechanical

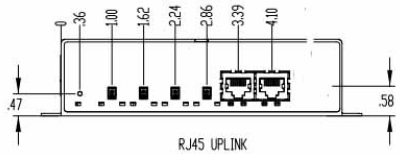




RJ45 UPLINK
CONFIGURATION

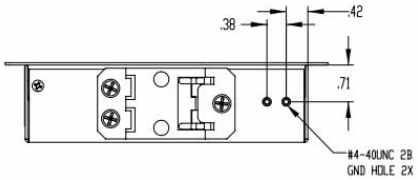


SFP UPLINK
CONFIGURATION



RJ45 UPLINK
CONFIGURATION

SFP UPLINK
CONFIGURATION



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.
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	Irvine, CA 92618, USA
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