ETH-1000-SW-10G

1-Gigabit Ethernet switch with

10-Gigabit optical uplink port

User manual

Rev. E

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Revision history

Current revision of this document is the uppermost in the table below.

Rev.	Repl.	Date	Sign	Change description
E	D	2014-11-03	AD	Chapter 6.1 and 6.1.1 updated.
D	C	2014-06-06	AD	Updated 2 Specifications. Heat warning
C	B	2013-02-20	AD	Updated 2.2 Network/Fiber transport layer
B	A	2012-11-12	OEH	Updated to match the current firmware
A	-	2012-03-09	AJM	First version

Contents

1 Product overview

The ETH-1000-SW-10G is a 5 port Ethernet Switch with a 10G uplink port. The ETH-1000-SW-10G provides a highly integrated solution for aggregating and transporting up 5 Gigabit Ethernet (GbE) signals over an 10G Ethernet or fiber based network. The 5 Gigabit Ethernet ports are aggregated onto a single 10-Gigabit Ethernet (10GbE) network facing port which can be populated with Nevion SFP+ modules to facilitate optical transmission over a range of distances and optical wavelengths.

All Gigabit Ethernet ports can auto-negotiate 10/100/1000 BASE-T (full duplex) signals and the 10-Gigabit Ethernet port can auto-negotiate between Gigabit Ethernet and 10-Gigabit Ethernet signals (full duplex) when interfacing with an Ethernet network.

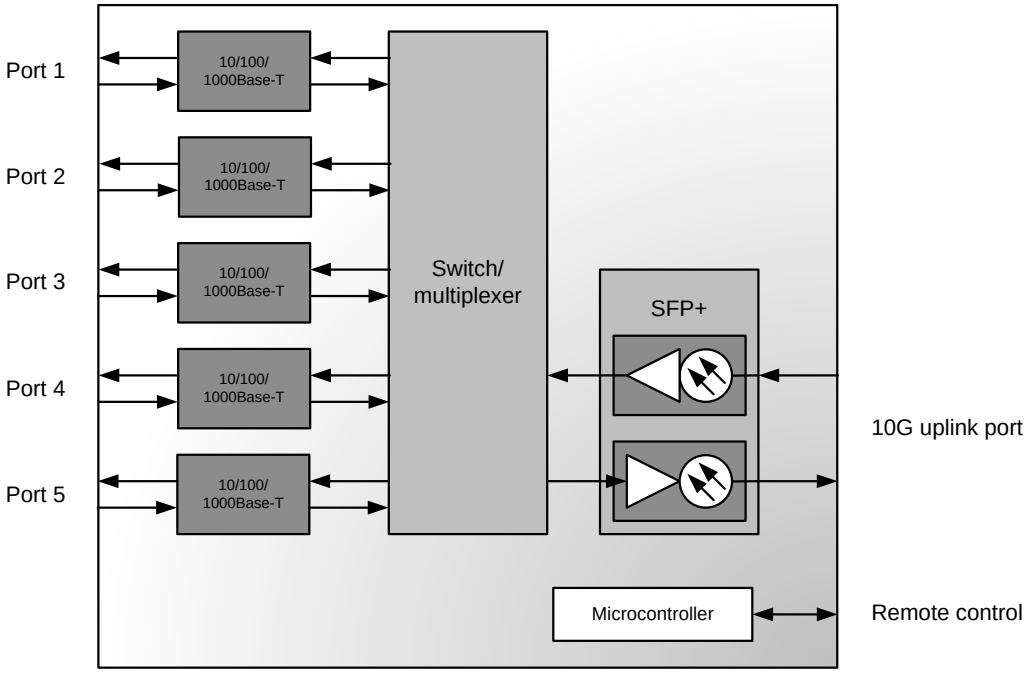

Figure 1 Block diagram of the ETH-1000-SW-10G

2 Specifications

Due to the amount of heat generated from these units, they need to be mounted in a frame with adequate airflow to avoid damage to the unit. On 11107 FR-2RU-10-2 external airflow support like 11131/11132 FR-FAN-1RU are recommended.

2.1 General

Power	+5V DC / 11W
Control	Control system for access to setup and module status with BITE (Built-In Test Equipment)
GPI	1 in, 3 out
Temperature range	0 to +40 °C
Size	2 slot in a Flashlink chassis

2.1 Application Layer Ethernet Ports

Number of ports	5
Connector	RJ45
Format	IEE 802.3, 10BASE-T, 100BASE-T, 1000BASE-T
Speed	Auto sensing, 10/100/1000Mbps
Cables	Auto sensing, MDI/MDI-X

2.2 Network/Fiber Transport Layer

Number of ports	1
Connector	Dual SC/UPC
Wavelength	850nm, 1310nm or CWDM
Optical power	See relevant SFP+ datasheet
Laser type	See relevant SFP+ datasheet
Extinction ratio	See relevant SFP+ datasheet
Transmission circuit fiber	Single mode or Multimode

2.3 Standards

Gigabit Ethernet	IEE 802.3, 10BASE-T, 100BASE-T, 1000BASE-T
10 Gigabit Ethernet	IEE 802.3, 10GBASE-SR, 10GBASE-LR, 10GBASE-ER
«Jumbo» Frames	Up to 10kB packet length supported.
VLAN tags	IEEE_802.1ad VLAN tags pass through unmodified in both the switch and the MUX mode.

3 Operation

3.1 Switch mode

With DIP1 set to OFF, the board works as a normal Ethernet switch, routing traffic between all ports based on MAC addresses. See figure 1 for block diagram.

3.2 Multiplexer mode

With DIP1 set to ON, the board becomes an Ethernet aggregator, through the use of VLAN tags. See figure 2 for block diagram in this mode.

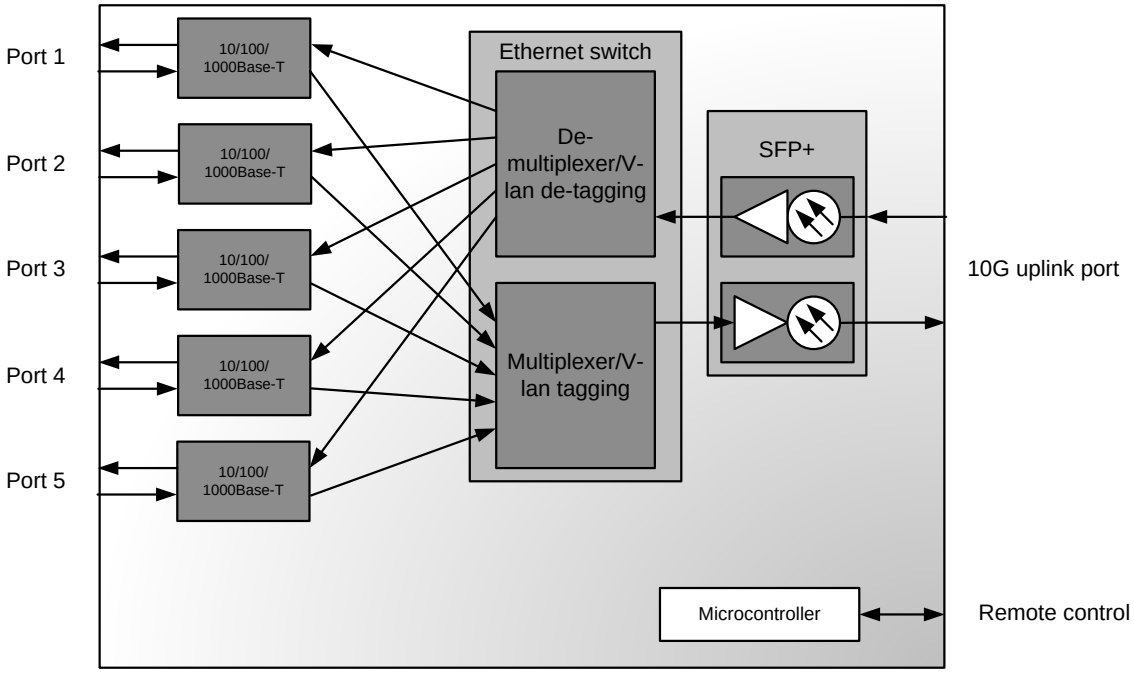

Figure 2 Block diagram of the ETH-1000-SW-10G in MUX mode

Each Ethernet port/stream is VLAN tagged at the input and presented in an aggregated port/stream at the 10G network port. On the incoming 10G network port/stream the VLAN is removed and sent to the corresponding Ethernet port. No traffic from one gigabit port is allowed to enter another gigabit port inside the product. The VLAN tags used are marked as “0x8800” instead of the usual “0x8100” so that existing VLAN tags will pass through unnoticed. There should therefore not be any problem mixing the MUX mode with an existing VLAN setup.

4 Configuration

The correct configuration can either be set with a DIP switch or with the GYDA Control System. The layout of ETH-1000-SW-10G is shown in the drawing below with the DIP switch to the upper left position.

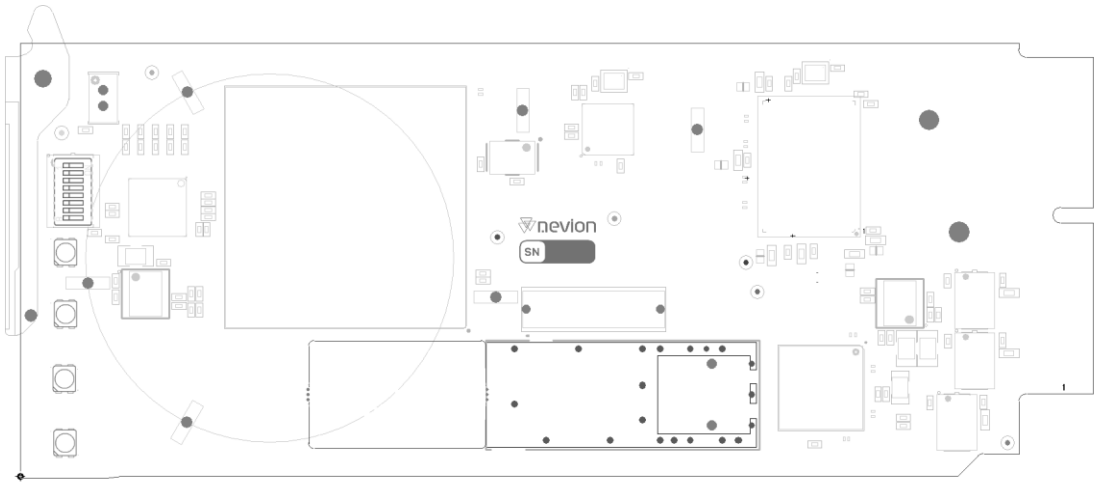

Figure 3 ETH-1000-SW-10G board layout

Table 1: DIP switches

Switch #	Label	Function, DIP = ON	Function, DIP = OFF	Comment
1	M/S	MUX	SWITCH	Ethernet switch or Ethernet aggregator
2-4	LED	See table in chapter 6.2		Used to control LED usage
5	DIP5			To be defined
6	DIP6			To be defined
7	DIP7			To be defined
8	OVR	Override GYDA control. Configuration with DIP switch	GYDA control. Configuration with GYDA	Select configuration from GYDA

All DIP switches are off when pointing towards the release handle.

5 Connections

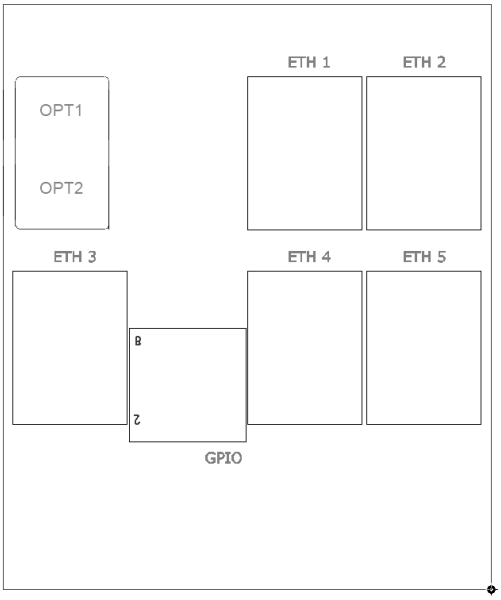

Figure 4 Connector module for ETH-1000-SW-10G

5.1 Mounting the connector module

The details of how the connector module is mounted, is found in the user manual for the sub-rack frame FR-2RU-10-2.

This manual is also available from our web site:

http://www.nevion.com/.

5.2 Terminal ports

Table 2: Terminal ports

Terminal	Function	Supported Format	Mode
OPT1	Optical input	10GBase-XR	Input
OPT2	Bi-directional	10GBase-XR	Output
ETH1 to 5	Electrical Ethernet	10/100/1000Base-T(x)	Bi-directional
GPIO	Open Collector Alarms Laser off input	Wired alarms Configuration	OC Output TTL input

Unused inputs should be terminated to avoid alarms triggered by noise.

6 Module status

The status of the module can be monitored in three ways.

1. GYDA System Controller (optional).

2. GPI at the rear of the sub-rack.

3. LED's at the front of the sub-rack.

Of these three, the GPI and the LED's are mounted on the module itself, whereas the GYDA System Controller is a separate module giving detailed information on the card status.

6.1 GPI ALARM – Module Status Outputs

These outputs can be used for wiring up alarms for third party control systems. The GPI outputs are open collector outputs, sinking to ground when an alarm is triggered. The GPI connector is shown in figures below.

Electrical Maximums for GPI outputs

Max current: 100mA

Max voltage: 30V

> Be careful when connecting cables to the backplane of ETH1000-SW-10G, as the GPI connecter has 5V output. Do not connect the GPI to an Ethernet port on another unit, as this will damage the unit.

6.1.1 GPI connections

ETH-1000-SW-10G module GPI pinning:

Table 3: GPI pinning

Pin #	Signal	Name	Mode
Pin 1	Laser off	Turn off laser.	TTL input
Pin 4	Status	General error status for the module. Closed under normal operation. Open if: Power is not present on module. Firmware is invalid.	Open Collector
Pin 5	10G link	Loss of 10G link.	Open Collector
Pin 6	Laser fail	Laser fail	Open Collector
Pin 7	+5V	+5V pin	+5V
Pin 8	Ground	0V / gnd pin.	0V.

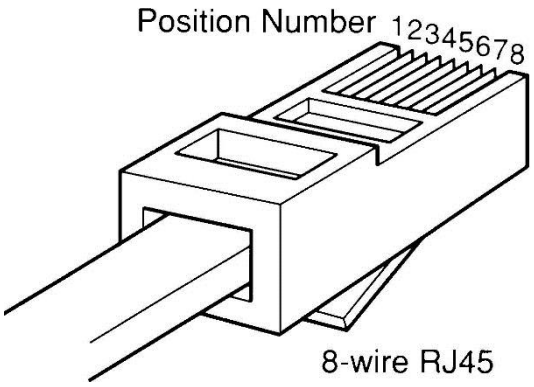

Figure 5 GPI connector

6.2 Front panel – Status monitoring

The status of the module can be easily monitored visually by the LED's at the front of the module. The LEDs are visible through the front panel as shown in the figure below.

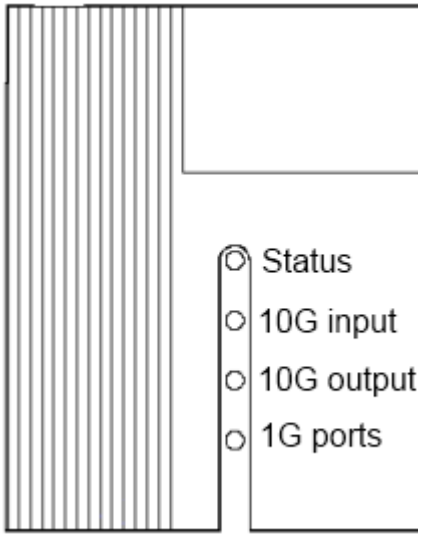

Figure 6: Led positions

The ETH-1000-SW-10G has 4 LED's each showing a status corresponding to the GPI pinning. Three DIPs are used to control what function the LEDs are displaying:

Table 4: Dip switches led control

MODE #	DIP2	DIP3	DIP4	Comment
0	ON	ON	ON	1: Status, 2: PIN, 3: LSR, 4: GbE ports link
1	ON	ON	OFF	Optical level displayed as bar graph
2	ON	OFF	ON	1: Status, 2: PIN, 3: LSR, 4: OPT port activity
3	ON	OFF	OFF	1: Status, 2-4: Ports 3-1 link/activity
4	OFF	ON	ON	1: Status, 2-4: Ports OPT,5,4 link/activity

All DIP switches are off when pointing towards the release handle.

For mode 3 and 4, red led means no link, yellow means link at reduced speed and green means link at full (1G or 10G) speed.

Table 5: LED states and meanings

Diode \ State	Red LED	Yellow LED	Green LED	No light
Status	Module is faulty, or module is initializing.	N/A	Module is OK Module power is OK	Module has no power
10G input	No input signal and no link	Present input signal but no link	Link	No SFP+ present
10G output	Laser fail	Laser off or no link	Link	No SFP+ present
1G ports	No 1G ports with link	1 to 4 ports with link	All ports with link	

General environmental requirements for Nevion equipment

1. The equipment will meet the guaranteed performance specification under the following environmental conditions:
   - Operating room temperature range: 0°C to 45°C
   - Operating relative humidity range: <90% (non-condensing)

2. The equipment will operate without damage under the following environmental conditions:
   - Temperature range: -10°C to 55°C
   - Relative humidity range: <95% (non-condensing)

Product Warranty

The warranty terms and conditions for the product(s) covered by this manual follow the General Sales Conditions by Nevion, which are available on the company web site:

www.nevion.com

Appendix A Materials declaration and recycling information

A.1 Materials declaration

For product sold into China after 1st March 2007, we comply with the “Administrative Measure on the Control of Pollution by Electronic Information Products”. In the first stage of this legislation, content of six hazardous materials has to be declared. The table below shows the required information.

組成名稱 Part Name	Toxic or hazardous substances and elements					
	鉛 Lead (Pb)	汞 Mercury (Hg)	镉 Cadmium (Cd)	六价铬 Hexavalent Chromium (Cr(VI))	多溴联苯 Polybrominated biphenyls (PBB)	多溴二苯醚 Polybrominated diphenyl ethers (PBDE)
ETH1000-SW-10G-C1xxx,10km	O	O	O	O	O	O
O: Indicates that this toxic or hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement in SJ/T11363-2006. X: Indicates that this toxic or hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement in SJ/T11363-2006.						

This is indicated by the product marking:

A.2 Recycling information

Nevion provides assistance to customers and recyclers through our web site http://www.nevion.com/. Please contact Nevion’s Customer Support for assistance with recycling if this site does not show the information you require.

Where it is not possible to return the product to Nevion or its agents for recycling, the following general information may be of assistance:

- Before attempting disassembly, ensure the product is completely disconnected from power and signal connections.
- All major parts are marked or labeled to show their material content.
- Depending on the date of manufacture, this product may contain lead in solder.
- Some circuit boards may contain battery-backed memory devices.