

A decorative graphic consisting of two overlapping, wavy lines of dots. The top line is green and the bottom line is blue. The dots are of varying sizes and are arranged in a pattern that suggests a signal or data flow.

# ETH1000-SW-COM User Manual

Revision: F

2016-05-12

ETH1000-SW-COM is a true IP networking card featuring encapsulation of multiple RS422/RS485/RS232 and GPI over IP together with a multi-port GbE switch with optical uplink.

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## 2 Revision History

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Revision	Replace	Date	Sign	Change description
F	E	2016-05-12	AAA	<b>Chapter 1, Section 3.1, Chapter 4</b> and <b>Table A.2</b> updated. <b>Section 6.10</b> added.
E	D	2015-06-29	AAA	<b>Chapter 4, Section 5.2, Section 6.5</b> and <b>Section 6.7</b> updated. <b>Appendix A</b> added.
D	C	2015-05-05	AAA	<b>Chapter 4, Table 5.1, Table 5.2, Chapter 6, Section 7.2</b> and <b>Chapter 8</b> updated.
C	B	2015-04-08	AAA	<b>Chapter 6</b> updated.
B	A	2015-02-25	AAA	<b>Table 5.2, Section 6.1</b> and <b>Section 6.6</b> updated.
A	-	2015-02-17	AAA	First release.

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## 3 Product overview

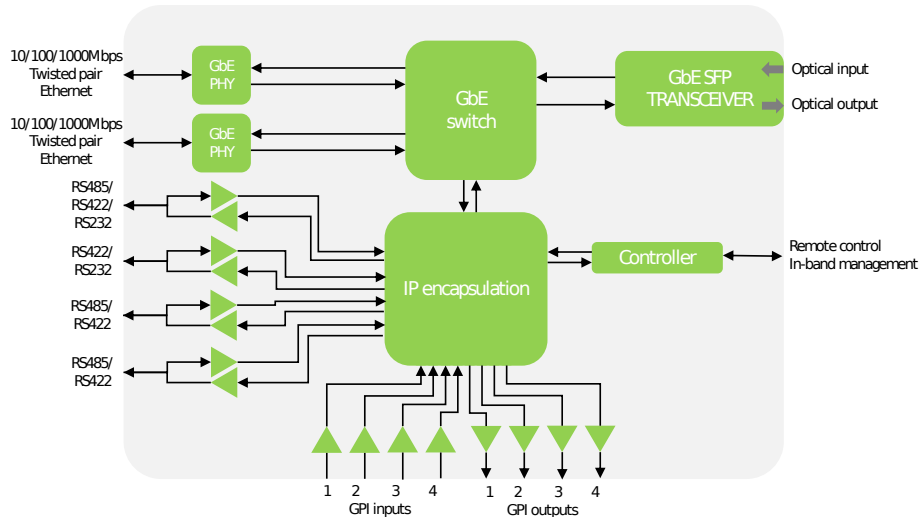


Figure 3.1 ETH1000-SW-COM block diagram

ETH1000-SW-COM provides a compact and powerful solution for transport of device control data for live productions. The IP protocol allows for remote control of multiple devices at different locations, such as cameras located in different arenas. The card can also be used for point-to-point transport of data over dark fiber networks.

The integration with Nevions extensive broadcast centric control surfaces covering configurable hardware panels and web panels makes the product easy to operate in live production applications.

### 3.1 Key features

- 1x optical GbE uplink port
- 2x GbE port
- 4x serial ports for device control
- 4x GPI input and 4x GPI output ports for tally and joystick
- Supports optical and electrical IP network topology
- Built-in GbE switch

## 4 Specifications



**Warning:** When using a CWDM SFP, ETH1000-SW-COM need to be mounted in a frame with adequate airflow to avoid damage. On 11107 FR-2RU-10-2, external airflow support like 11131/11132 FR-FAN-1RU is recommended.

### 4.1 General

<b>User interface</b>	Status LED, Status GPI, configuration DIP switches Web interface and SNMP thru Multicon controller
<b>Temperature range</b>	0°C to +40°C
<b>Supported standards</b>	IEEE802.3i, IEEE802.3u, IEEE802.3ab, IEEE802.3z
<b>Ethernet switch bandwidth</b>	400 Mbits/sec

### 4.2 Optical Ethernet port

<b>No of ports</b>	1
<b>Signal type</b>	1000BASE-X
<b>Connector</b>	Dual SC/UPC
<b>Optical system</b>	Nevion's optical GbE transceiver SFP+ range

### 4.3 Electrical Ethernet port

<b>No of ports</b>	2
<b>Signal type</b>	10BASE-T, 100BASE-TX, 1000BASE-T
<b>Connector</b>	8P8C modular jack (RJ45)

### 4.4 Serial data port

<b>No of ports</b>	4
<b>Signal type</b>	See <a href="#">Table 6.4</a>
<b>Connector</b>	Molex KK 254 5pin
<b>Supported bit rates</b>	4800bps, 9600bps, 19200bps, 38400bps, 57600bps, 115200bps

## 4.5 GPI inputs

<b>No of inputs</b>	4
<b>Signal type</b>	Internal pull-up to 3.3V
<b>Connector</b>	Molex KK 254 5pin

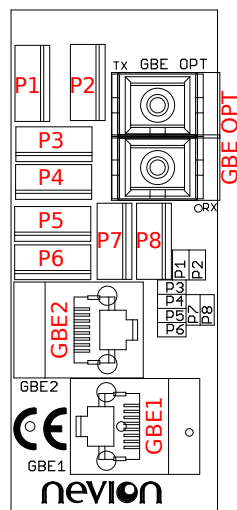
## 4.6 GPI outputs

<b>No of outputs</b>	4
<b>Signal type</b>	Open collector transistor
<b>Maximum voltage</b>	30V
<b>Maximum current</b>	100mA
<b>Connector</b>	Molex KK 254 5pin



# 5 Connector modules

## 5.1 ETH1000-SW-COM-C1

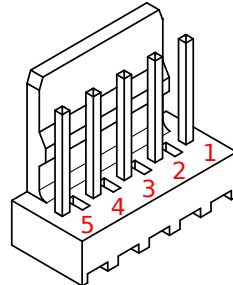


**Figure 5.1** ETH1000-SW-COM-C1 connector module

**Table 5.1** Connectors on ETH1000-SW-COM-C1

Label	Connector	Function	Notes
P1	Molex KK 254 5pin	GPI1	See <a href="#">Table 5.3</a> for pinout.
P2	Molex KK 254 5pin		
P3	Molex KK 254 5pin	GPI2	See <a href="#">Table 5.3</a> for pinout.
P4	Molex KK 254 5pin	Serial port 1	See <a href="#">Table 6.4</a> for supported port modes and <a href="#">Table 5.2</a> for pinout.
P5	Molex KK 254 5pin		
P6	Molex KK 254 5pin	Serial port 2	See <a href="#">Table 6.4</a> for supported port modes and <a href="#">Table 5.2</a> for pinout.
P7	Molex KK 254 5pin	Serial port 3	See <a href="#">Table 6.4</a> for supported port modes and <a href="#">Table 5.2</a> for pinout.
P8	Molex KK 254 5pin	Serial port 4	See <a href="#">Table 6.4</a> for supported port modes and <a href="#">Table 5.2</a> for pinout.
GBE1	8P8C modular jack (RJ45)	Electrical gigabit ethernet	
GBE2	8P8C modular jack (RJ45)	Electrical gigabit ethernet	
GBE OPT	Dual SC/UPC	Optical gigabit ethernet	

## 5.2 Connector pin description.



**Figure 5.2** Molex KK 254 5pin connector pin numbering


**Table 5.2** Serial port pinout

Pin number	Serial port mode			
	RS-422	4-wire RS-485	2-wire RS-485	RS-232
1	RX+	RX+	NC	RX
2	RX-	RX-	NC	NC
3	TX+	TX+	Data+	NC
4	TX-	TX-	Data-	TX
5	GND	GND	GND	GND

**Table 5.3** GPI pinout

Pin number	Function	
	GPI1	GPI2
1	GPI output 2	GPI output 4
2	GPI output 1	GPI output 3
3	GPI input 2	GPI input 4
4	GPI input 1	GPI input 3
5	GND	GND

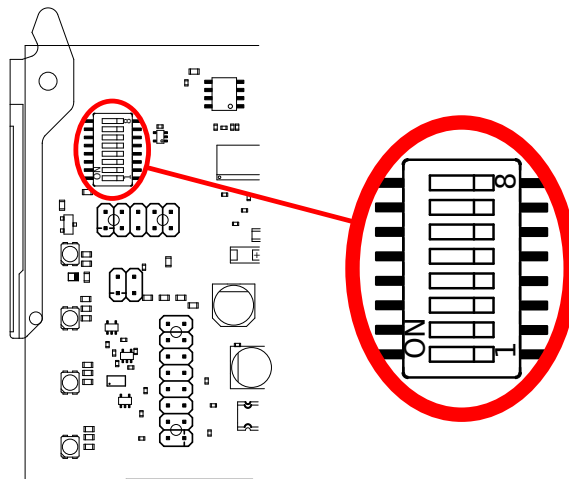
# 6 Configuration

 **Note:** [Appendix A](#) has some quick start guides that might be used when configuring typical systems.

The preferred way to configure ETH1000-SW-COM is by using Multicon GYDA. It is fully supported from Multicon GYDA release 5.0.1 and later. It is possible to configure using only DIP switches as well, but this will limit the functionality.

## 6.1 DIP switches


The DIP switches are located on the upper left corner of the board, see [Figure 6.1](#). [Table 6.1](#) shows an overview of them.



**Figure 6.1** Location of DIP switches

**Table 6.1** Overview of DIP switches

Switch	Function	ON	OFF (default)
8	In-band management control bus mode	Master/controller	Slave/card
5-7	Position in card group, see <a href="#">Table 6.2</a> .		
4			
3	Configuration recovery	Delete all configuration and use factory default.	Use last stored configuration.
2	Image recovery	Boot from factory default image.	Boot from latest image.
1	Multicon GYDA override	Configuration with DIP switches only.	Configuration with GYDA.

 **Note:** Switch 4 to 7 are only used when switch 1 is ON. Switch 2, 3 and 8 are independent of switch 1.

## 6.2 Example with multiple ETH1000-SW-COM cards

Multiple ETH1000-SW-COM cards can be configured to communicate with each other. **Figure 6.2** is showing an example with three locations, each having at least one ETH1000-SW-COM card. The example will be used when explaining different configuration options in this chapter.

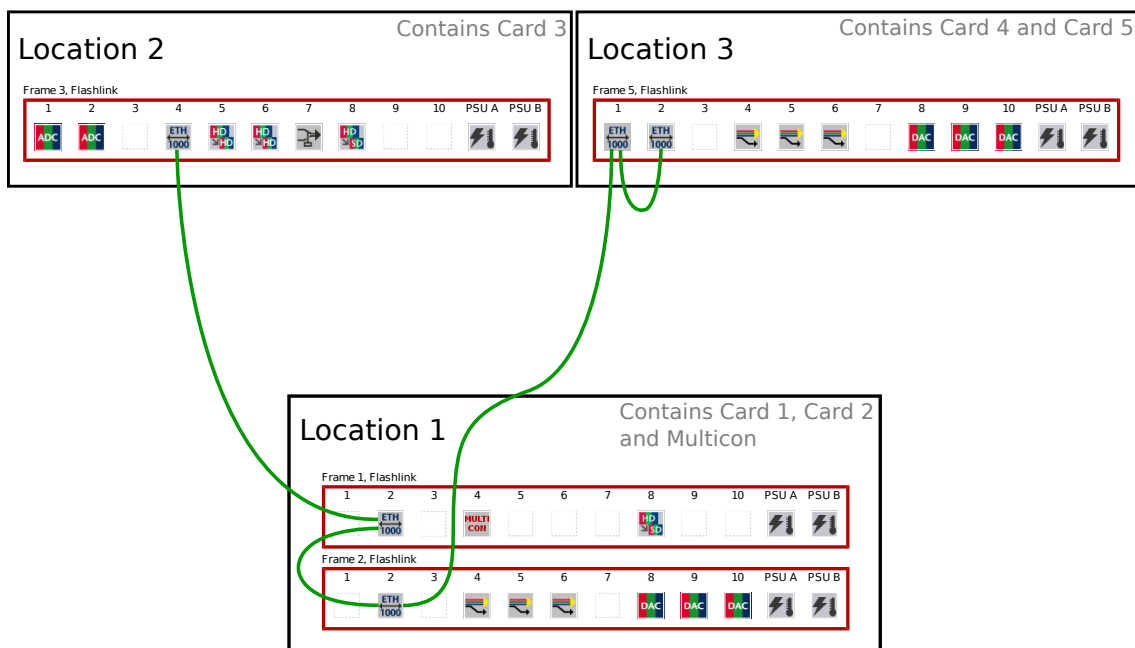


Figure 6.2 Example with multiple ETH1000-SW-COM cards in three locations.

## 6.3 Multicon GYDA override

DIP switch 1 is used to control if Multicon GYDA is used for configuration or if it is done using DIP switches only. When activated (ON) switch 4 to 7 will be used. These switches will be ignored when configured with GYDA.

It is possible to have up to eight cards on the same LAN in this mode. Each card will get a fixed IP address, see **Table 6.2**. Two and two cards will be paired making a “link” between the ports on the back, P1 to P1, P2 to P2 and so on. Card 1 and card 2 will be paired, card 3 and card 4 will be paired, and so on.

The serial ports will be configured as RS422, 115200 baud rate, 8 bits of data, no parity bit and one stop bit.

**Table 6.2** Local IP configuration when in Multicon GYDA override mode

SW7	SW6	SW5	Position in card group	Local IP configuration		
				Address	Netmask	Gateway
0	0	0	Card 1	192.168.1.1	255.255.255.0	192.168.1.254
0	0	1	Card 2	192.168.1.2	255.255.255.0	192.168.1.254
0	1	0	Card 3	192.168.1.3	255.255.255.0	192.168.1.254
0	1	1	Card 4	192.168.1.4	255.255.255.0	192.168.1.254
1	0	0	Card 5	192.168.1.5	255.255.255.0	192.168.1.254
1	0	1	Card 6	192.168.1.6	255.255.255.0	192.168.1.254
1	1	0	Card 7	192.168.1.7	255.255.255.0	192.168.1.254
1	1	1	Card 8	192.168.1.8	255.255.255.0	192.168.1.254

## 6.4 Default configuration

Default local IP configuration is:

Address: **192.168.1.1**

Netmask: **255.255.255.0**

Gateway: **192.168.1.254**

## 6.5 Group of cards

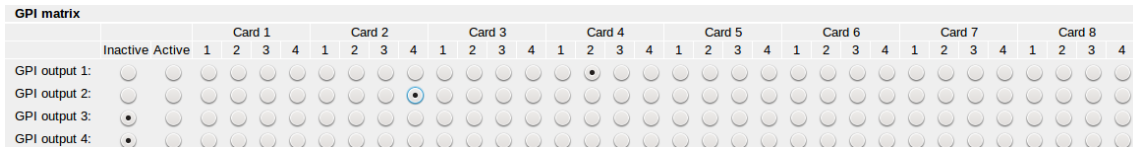
For ETH1000-SW-COM to create IP connections it must know the IP addresses of the other cards. A list of up to eight cards can be configured, including its own local IP address. These cards will form a group of cards.

**Figure 6.3** shows a screenshot of how one of the cards in the example in **Figure 6.2** is configured. The first line is used to set IP settings of the card. The IP address and netmask are using CIDR notation. The second line is telling where the card should be located in the group, in this case “Card 2”. The rest of the lines are IP addresses to the other cards in the group. “Local IP address” is automatically copied to the correct line – depending on the current “Position in card group” setting. In this example it is copied to “Card 2 IP address”.

Local IP address	Mode: <input type="text" value="Static"/>	IP address: <input type="text" value="192.168.10.129"/>	Mask: <input type="text" value="23"/>	Gateway: <input type="text" value="192.168.10.254"/>
Position in card group	<input type="text" value="Card 2"/>			
Card 1 IP address	Mode: <input type="text" value="Static"/>	IP address: <input type="text" value="192.168.10.128"/>		
Card 2 IP address	Mode: <input type="text" value="Fixed"/>	IP address: <input type="text" value="192.168.10.129"/>		
Card 3 IP address	Mode: <input type="text" value="Static"/>	IP address: <input type="text" value="192.168.10.130"/>		
Card 4 IP address	Mode: <input type="text" value="Static"/>	IP address: <input type="text" value="192.168.10.131"/>		
Card 5 IP address	Mode: <input type="text" value="Static"/>	IP address: <input type="text" value="192.168.11.8"/>		
Card 6 IP address	Mode: <input type="text" value="None"/>	IP address: <input type="text" value=""/>		
Card 7 IP address	Mode: <input type="text" value="None"/>	IP address: <input type="text" value=""/>		
Card 8 IP address	Mode: <input type="text" value="None"/>	IP address: <input type="text" value=""/>		

**Figure 6.3** Screenshot showing “group of card” configuration.

The group of cards is used when setting up data links between the cards. **Figure 6.4** shows a screenshot of the GPI matrix on “Card 2”. The inputs of the matrix consists of all the GPI inputs on all cards in the group. “GPI output 1” is switched to “Card 4 - 2”. This will make the output follow “GPI input 2” on the card with IP address 192.168.10.131. “GPI output 2” is switched to “Card 2 - 4”. As the screenshot is taken from “Card 2” this will make the output follow “GPI input 4” on the same card.



**Figure 6.4** Screenshot of the GPI matrix

It is recommended to make the group of card list identical on all the cards. This will make the inputs on the matrices identical which makes it much easier to control.

### 6.6 In-band management

A Multicon GYDA can monitor & control up to 8 local frames via the RS-485 based Flashlink-bus. This means you normally need one Multicon GYDA for each location. With In-band management it is possible to extend the Flashlink-bus over IP. A single Multicon GYDA can then manage both local and remote frames.

In the example in **Figure 6.2**, location 1 has two ETH1000-SW-COM cards and one Multicon GYDA. Location 2 and 3 has one and two ETH1000-SW-COM cards, but no Multicon GYDA. In-band management can be configured to make all the cards on all the locations visible from Multicon GYDA in location 1.

The internal control bus in the frame can only have one master. In location 1 Multicon GYDA must be the master, and all ETH1000-SW-COM cards must be configured as slaves using DIP switch 8. The frames in location 2 and 3 doesn't have a Multicon GYDA and will instead be controlled by Multicon GYDA in location 1. For this to happen, one ETH1000-SW-COM on each location must be configured as master using DIP switch 8. In addition, one of the ETH1000-SW-COM cards in location 1 must be configured to connect to location 2 and 3. This is done on the Multicon GYDA web interface. **Figure 6.5** is showing the In-band management setup on one of the cards in location 1. The other cards in location 1 must have all set to “No”. **Table 6.3** gives a summary of how the cards in the example can be configured.

**Table 6.3** Configuration summary for the example

Card	Location	Local bus master	In-band management
Card 1	Location 1	No (DIP switch 8 OFF)	Configure as in <b>Figure 6.5</b> .
Card 2	Location 1	No (DIP switch 8 OFF)	Configure all to “No”.
Card 3	Location 2	Yes (DIP switch 8 ON)	Not available.
Card 4	Location 3	Yes (DIP switch 8 ON)	Not available.
Card 5	Location 3	No (DIP switch 8 OFF)	Configure all to “No”.

In-band management		
	Connect to	
	No	Yes
Card 1:	<input checked="" type="radio"/>	<input type="radio"/>
Card 2:	<input checked="" type="radio"/>	<input type="radio"/>
Card 3:	<input type="radio"/>	<input checked="" type="radio"/>
Card 4:	<input type="radio"/>	<input checked="" type="radio"/>
Card 5:	<input checked="" type="radio"/>	<input type="radio"/>
Card 6:	<input checked="" type="radio"/>	<input type="radio"/>
Card 7:	<input checked="" type="radio"/>	<input type="radio"/>
Card 8:	<input checked="" type="radio"/>	<input type="radio"/>

**Figure 6.5** Screenshot showing In-band management configuration.



**Warning:** ETH1000-SW-COM doesn't do any address translation. All sub-racks must be configured with a unique frame address even if they are on different locations! See Multicon GYDA manual for more about setting frame address.

### 6.6.1 In-band management alarms

In-band management alarms will be activated if the card is configured to connect to another card, but is unable to establish the connection.

### 6.6.2 Setting local IP configuration on remote card.

Once in-band management is configured and working, the IP settings of both local and remote cards can be changed via the Multicon GYDA web interface.



**Note:** Changing the IP settings may break the in-band management. To avoid this, update the remote cards first, then the cards in the local frame.

When in-band management isn't configured, we have different possibilities. These are described in the sub-chapters below.

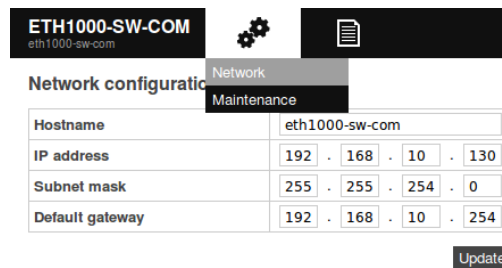
#### 6.6.2.1 Temporary move card to local frame.

Make sure DIP switch 8 is set to slave/card and insert the card in the same frame as Multicon GYDA. Wait for the card to be detected and update local IP configuration. Then remove the card, update DIP switch 8 and insert it in the remote location.

#### 6.6.2.2 Use ETH1000-SW-COM web page

ETH1000-SW-COM has a web server which can be used to configure IP settings using the following steps:

1. Use a computer configured with IP on the same range as the card and start a web browser.
2. Type the IP address of the card in the browsers URL, see [Section 6.4](#) for default IP address.
3. Choose "Network" from the first drop-down menu, see [Figure 6.6](#) for a screenshot.
4. Set the new IP settings and press "Update".



**Figure 6.6** Screenshot showing how to configure local IP settings on own web page.

### 6.6.2.3 Use Multicon GYDA web page

Set the card in remote location and do the following steps:

1. Set IP address of ETH1000-SW-COM in local frame so it can reach the remote card. See [Section 6.4](#) for default IP settings.
2. Add current IP address of remote card to “group of cards” on local card.
3. Configure in-band management on local card to connect to remote card.
4. Wait until Multicon GYDA has detected the remote card.
5. Update local IP configuration on the remote card. This will break in-band management and the frame will then be lost in Multicon GYDA.
6. Reset IP address of local card back to original settings.
7. Update “group of cards” with the new IP address of the remote card.

Remote frame will now be detected again.

### 6.6.3 Multicon GYDA hot-swap procedure

Multicon GYDA will remember the settings on all cards it is controlling. If a card fails, it can be replaced and Multicon GYDA will automatically configure it with the same settings as the old card had.

When replacing ETH1000-SW-COM in a remote location, and new card has a different IP address than the old, the local card will not be able to reach it for in-band management. The IP configuration must be fixed manually as described in [Section 6.6.2](#). If you choose to use the method described in [Section 6.6.2.3](#) please note that step 5 will be done by the hot-swap functionality in Multicon GYDA. You just have to wait for at least two minutes before continuing on step 6.



## 6.7 Serial port mode configuration

The serial ports can be configured to different modes as listed in [Table 6.4](#). This configuration is done from Multicon GYDAs web interface.

**Table 6.4** Supported modes for the serial ports.

Label	Function	Supported modes			
		RS-422	4-wire RS-485	2-wire RS-485	RS-232
P4	Serial port 1	yes	yes	yes	yes
P6	Serial port 2	yes	no	no	yes
P7	Serial port 3	yes	yes	yes	no
P8	Serial port 4	yes	yes	yes	no

## 6.8 Serial port matrix

The data between two serial ports is bi-directional, but when establishing a connection between two cards, one of them has to listen for connections and the other must connect to it.

Each card has its own serial port matrix. To create a link between two cards, the serial port on one card must be connected to the "Listen"-input while the matrix on the other card must be configured to connect.

Many cards will give many matrices, but if configured smart by making the group of cards in the same order on all cards, it is possible to create a single virtual routing table to control them all. For more information on virtual routing tables, see Multicon User Manual and Nevion Configurator.

## 6.9 GPI matrix

The GPI matrix differs from serial port matrix in that it acts more like a traditional matrix where the GPI inputs are used as matrix input and GPI outputs are used as matrix output. An input can be routed to multiple outputs.

## 6.10 Ethernet interface

The electrical Ethernet interfaces are using auto-negotiation to establish link. Which link modes that will be advertised can be configured, see [Table 6.5](#).



**Note:** Ethernet interface configuration is only available when using Multicon 5.1.1 or later.

**Table 6.5** Ethernet interface auto-negotiation modes

Configuration		— Advertised auto-negotiation				
Speed	Duplex	10baseT/Half	10baseT/Full	100baseT/Half	100baseT/Full	1000baseT/Full
Auto	Auto	X	X	X	X	X
Auto	Half	X		X		
Auto	Full		X		X	X
10 Mbps	Auto	X	X			
10 Mbps	Half	X				
10 Mbps	Full		X			
100 Mbps	Auto			X	X	
100 Mbps	Half			X		
100 Mbps	Full				X	
1 Gbps	Auto					X
1 Gbps	Half					
1 Gbps	Full					X

## 6.11 Network configurations

If you want communication between ETH1000-SW-COM cards on different LANs, the firewall needs to be configured. [Table 6.6](#) shows an overview of the IP ports used by ETH1000-SW-COM. You only need to open the ports for the services in use.

**Table 6.6** IP ports in use

Port	Protocol	Direction	Description
80	TCP	From PC to card	Web server
5010	TCP	From slave on control bus to master	In-band management
5500	TCP	Both directions	GPI
5511	TCP	Depends on serial port matrix	Serial port 1
5512	TCP	Depends on serial port matrix	Serial port 2
5513	TCP	Depends on serial port matrix	Serial port 3
5514	TCP	Depends on serial port matrix	Serial port 4
8080	TCP	From PC to card	WebSocket

## 6.12 Set configuration to factory default

Follow the steps below to erase all configuration and go back to factory default:

1. Pull out the card and activate configuration recovery DIP.
2. Insert the card.

3. Wait until lower LED (D4, see **Figure 7.1**) is yellow and the other leds are off.
4. Pull out the card and disable configuration recovery DIP.
5. Insert the card.

### 6.13 Restore to factory default image

If firmware upgrade fails, it is possible to go back to a factory default image. For this, do the following steps:

1. Pull out the card and activate image recovery DIP.
2. Insert the card.
3. Wait until lower LED (D4, see **Figure 7.1**) is yellow and the other leds are off.
4. Pull out the card and disable image recovery DIP.
5. Insert the card.



**Note:** Activating both “Configuration recovery” and “Image recovery” will reset the card to the state it had when shipped from factory.

## 7 Operation

### 7.1 Front panel - status monitoring

There are 4 LEDs on the front side of the card, see [Figure 7.1](#).

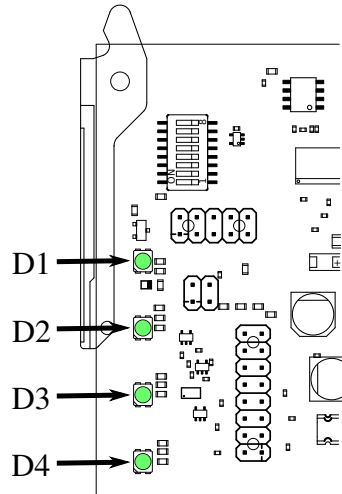


Figure 7.1 Location of the LEDs

[Table 7.1](#) shows what the LEDs are indicating in normal operation. [Table 7.2](#) shows some special modes.

Table 7.1 LED statuses in normal operation

	Red LED	Yellow LED	Green LED	No light
<b>D1 Card status</b>	Card error	Not applicable	Overall status of the card is OK	Card has no power, or is not inserted correctly
<b>D2 Status on GBE1</b>	Link, 10 Mb/s	Link, 100 Mb/s	Link, 1 Gb/s	No link
<b>D3 Status on GBE2</b>	Link, 10 Mb/s	Link, 100 Mb/s	Link, 1 Gb/s	No link
<b>D4 Status on GBE OPT</b>	Not applicable	Not applicable	Link, 1 Gb/s	No link

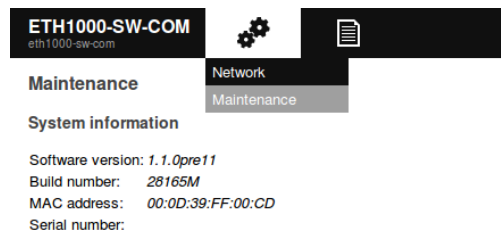
### 7.2 Firmware upgrade

ETH1000-SW-COM can be upgraded as any other Flashlink card using Multicon GYDA. It will send the data over the management bus and will take approximately one hour. During this time, the card will function as normal. When the upgrade is completed, the card will reboot automatically.

ETH1000-SW-COM contains a web server that also can be used for firmware upgrade. If you have a PC with a web browser on the same network as ETH1000-SW-COM, this is a good alternative. The card will work as normal during firmware upgrade and when done, the user must manually


**Table 7.2** Special LED statuses

D1	D2	D3	D4	Description
Red	Off	Off	Off	Card error.
Off	Off	Off	Off	Unable to start bootloader. MicroSD card is missing or does not have the software installed.
Yellow	Yellow	Yellow	Yellow	Same as above.
Yellow	Off	Off	Off	Bootloader is running.
Off	Yellow	Off	Off	Operating system is booting.
Off	Off	Off	Yellow	Operating system is halted.
Blink yellow	Blink yellow	Blink yellow	Blink yellow	“Locate Card” is activated. See Multicon user manual for details.



**Figure 7.2** Screenshot showing firmware upgrade.

ask the card to reboot. This alternative method is much faster than upgrading using Multicon GYDA. Select “Maintenance” from the first drop-down menu, see [Figure 7.2](#) for a screenshot.

 **Note:** Cards with firmware 1.0.0 can't handle big upgrade files. All firmware files from 1.1.0 and later are too big for it. To upgrade these cards, first upgrade to 1.0.1, and then upgrade to the latest firmware.

If firmware upgrade fails, it is possible to go back to factory default image. This is described in [Section 6.13](#).

It is also possible to upgrade firmware by writing a new image on the microSD card. More about this in [Appendix B](#).

## 8 General environmental requirements

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: <90% (non-condensing)

## 9 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:

<http://www.neviON.com>

# Appendix A Quick start guides

## A.1 Quick start: In-band management

<b>Challenge</b>	Multicon GYDA is used to manage all the Flashlink cards on a location. An ETH1000-SW-COM is used to create an ethernet connection to another ETH1000-SW-COM on another location. It isn't any Multicon GYDA on that location. Instead the management bus can be extended to make Multicon GYDA on the first location manage the cards on both locations. This can be done by configuring in-band management on the ETH1000-SW-COM cards.
<b>Goal</b>	Configure the ETH1000-SW-COM cards with in-band management.
<b>Starting point</b>	Both ETH1000-SW-COM has factory default configuration.
<b>Requirements</b>	- Optical or copper cable to establish an ethernet link between the locations. - A computer with WEB browser connected to the same network as Multicon Gyda.

A minimum knowledge of Multicon GYDA web interface is required to complete this guide. See Multicon GYDA manual for more information.

In this guide we assume that monitoring of the system will be done on the location where Multicon GYDA is installed, and we will call this "local location". The location without Multicon GYDA we will call "remote location". This will give us a system as illustrated in [Figure A.1](#).



Figure A.1 In-band management





**Note:** We don't need to have an ethernet connection between Multicon GYDA and ETH1000-SW-COM on local location. The management bus inside the frame will make Multicon GYDA capable of configuring all the cards in the location including ETH1000-SW-COM.

We assume that both ETH1000-SW-COM cards have factory default configuration. [Table A.1](#) shows configuration relevant to in-band management for the cards. If your cards has different or unknown settings, it is possible to get factory default configurations as explained in [Section 6.12](#).

**Table A.1** Settings relevant for inband-management while starting.

Location	IP settings	Local bus master	In-band management
Local	192.168.1.1/24	192.168.1.254 No (DIP switch 8 OFF)	All configured to "No".
Remote	192.168.1.1/24	192.168.1.254 No (DIP switch 8 OFF)	All configured to "No".

The Flashlink cards on both locations can be installed as normal, but when using in-band management some extra attention is needed. On remote location, do the following steps:

1. Set the frames' addresses. Each frame must have unique address for both locations, i. e. no frame on remote location can have the same address as a frame on local location.
2. Make ETH1000-SW-COM master on the frame's local control bus by setting DIP switch 8 to "ON".
3. Connect ETH1000-SW-COM to the optical or copper cable going to the other location.

On local location, do the following steps:

1. Set the frames' unique addresses.
2. Make sure ETH1000-SW-COM isn't master on frame's local control bus, DIP switch 8 must be "OFF".
3. Connect ETH1000-SW-COM to the optical or copper cable going to the other location.
4. Verify that the ethernet link between the two locations is working by checking the LEDs on ETH1000-SW-COM. If not, check the cable.
5. Connect a PC to the same LAN as Multicon GYDA.

Now the hardware should be set up correctly and we have an ethernet link between the locations. On the next steps Multicon GYDA web interface is used:

1. Open a web browser and type the IP address of Multicon GYDA in the URL<sup>1,2</sup>.
2. Verify that all the cards in local location is detected by Multicon GYDA.

<sup>1</sup> Factory default IP address on Multicon GYDA is 192.168.0.10.

<sup>2</sup> NeviON Configurator can be used to detect Multicon GYDA's IP address

3. As seen in **Table A.1**, both ETH1000-SW-COM cards has the same IP address. This must be fixed before in-band management can be configured. On Multicon GYDA web interface, select ETH1000-SW-COM and set “Local IP address” to 192.168.1.2
4. Set “Card 2 IP address” - “Mode” to “Static” and press the save button.
5. Add the IP address on the remote ETH1000-SW-COM, which is still 192.168.1.1, to “Card 2 IP address” - “IP address”.
6. In the “In-band management” matrix, configure it to connect to “Card 2”.

Local IP address	Mode: <input type="text" value="Static"/>	IP address: <input type="text" value="192.168.1.2"/>	Mask: <input type="text" value="24"/>	Gateway: <input type="text" value="192.168.1.254"/>
Position in card group	<input type="text" value="Card 1"/>			
Card 1 IP address	Mode: <input type="text" value="Fixed"/>	IP address: <input type="text" value="192.168.1.2"/>		
Card 2 IP address	Mode: <input type="text" value="Static"/>	IP address: <input type="text" value="192.168.1.1"/>		

**Figure A.2** Screenshot showing current settings on local location.

In-band management	Connect to	
	No	Yes
Card 1:	<input checked="" type="radio"/>	<input type="radio"/>
Card 2:	<input type="radio"/>	<input checked="" type="radio"/>
Card 3:	<input checked="" type="radio"/>	<input type="radio"/>
Card 4:	<input checked="" type="radio"/>	<input type="radio"/>
Card 5:	<input checked="" type="radio"/>	<input type="radio"/>
Card 6:	<input checked="" type="radio"/>	<input type="radio"/>
Card 7:	<input checked="" type="radio"/>	<input type="radio"/>
Card 8:	<input checked="" type="radio"/>	<input type="radio"/>

**Figure A.3** Screenshot showing In-band management configuration on local location.

After pressing the save button, the configuration should look like the screenshots in **Figure A.2** and **Figure A.3**. In-band management should be working and all the Flashlink cards on the remote location should soon be visible in Multicon GYDA web interface.

In-band management is working, but the remote ETH1000-SW-COM still has factory default IP settings, and local ETH1000-SW-COM has an IP address on the same range. If other IP settings are needed, do the following steps on Multicon GYDA web interface:

1. Select the remote ETH1000-SW-COM. Set “Local IP address” to selected IP settings for this card. In our example we are using 10.10.10.2. Press the save button. The two ETH1000-SW-COM cards are now on different IP ranges, and in-band management will be broken, and all cards from remote location will be removed from Multicon GYDA web interface.
2. Select local ETH1000-SW-COM and set “Local IP address” to selected IP settings for this card. In our example we are using 10.10.10.1.
3. Update “Card 2 IP address” - “IP address” with the IP address on the remote card, in our example 10.10.10.2.

After pressing the save button, the configuration on ETH1000-SW-COM in local location should look like the screenshot in **Figure A.4**. In-band management should be working again and Multicon GYDA will be able to control all cards on both locations. **Table A.2** shows the settings on the ETH1000-SW-COM cards after configuration.

<b>Local IP address</b>	Mode: <b>Static</b> ▼	IP address: 10.10.10.1	Mask: 24	Gateway: 10.10.10.254
<b>Position in card group</b>	<b>Card 1</b> ▼			
<b>Card 1 IP address</b>	Mode: <b>Fixed</b> ▼	IP address: 10.10.10.1		
<b>Card 2 IP address</b>	Mode: <b>Static</b> ▼	IP address: 10.10.10.2		

**Figure A.4** Screenshot showing settings on local location.

**Table A.2** Settings on the two ETH1000-SW-COM cards after configuration.

	<b>Location IP settings</b>	<b>Local bus master</b>	<b>In-band management</b>
Local	10.10.10.1/24 10.10.10.254	No (DIP switch 8 OFF)	As in <b>Figure A.3</b>
Remote	10.10.10.2/24 10.10.10.254	Yes (DIP switch 8 ON)	All configured to "No".

While it is not required for in-band management, it is highly recommended to have identical "Group of cards"-lists on all ETH1000-SW-COM cards that is communicating with each other. ETH1000-SW-COM in the local location already has a list. The will get the same list on remote location by doing the following steps:

1. On Multicon GYDA web interface, select the remote ETH1000-SW-COM.
2. Set "Position in card group" to "Card 2" and press save button. This will copy the card's IP address to "Card 2 IP address".
3. Set "Card 1 IP address" - "Mode" to "Static" and press save button.
4. Set "Card 1 IP address" - "IP address" to the IP address of ETH1000-SW-COM in local location. In our example this will be "10.10.10.1". Press save button

**Figure A.5** shows a screenshot of the settings on remote location. Comparing it with **Figure A.4** shows that the two ETH1000-SW-COM cards now have identical "Group of cards"-lists.

<b>Local IP address</b>	Mode: <b>Static</b> ▼	IP address: 10.10.10.2	Mask: 24	Gateway: 10.10.10.254
<b>Position in card group</b>	<b>Card 2</b> ▼			
<b>Card 1 IP address</b>	Mode: <b>Static</b> ▼	IP address: 10.10.10.1		
<b>Card 2 IP address</b>	Mode: <b>Fixed</b> ▼	IP address: 10.10.10.2		

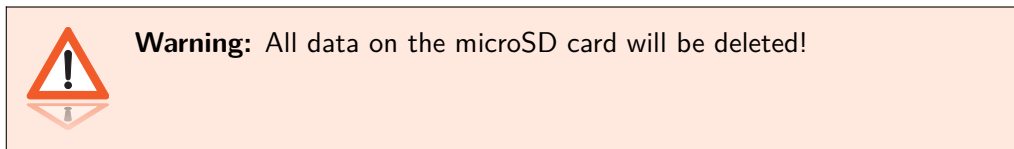
**Figure A.5** Screenshot showing settings on remote location.

## Appendix B Prepare a microSD card to be used on ETH1000-SW-COM

Firmware upgrade is normally done live without having to pull out the card and take out the microSD card. In some situation, like when a microSD card fails, creating a new microSD card for ETH1000-SW-COM is needed.

Most microSD cards are supported. It must be at least 4GB.

After the microSD card is prepared for ETH1000-SW-COM, all configuration settings will be set to its default values. The new active image on the microSD card will be the new “factory default” image, see [Section 6.13](#) for more info.



An image file is needed. It is compressed with zip and will have a .zip extension on the filename.

### B.1 Prepare microSD card in Linux

Download the image file and insert the microSD card.

Some Linux distributions have tools to auto-mount detected disks. Make sure the microSD card is not mounted before continuing.

Run the following command:

```
unzip -p <filename> | dd bs=64K of=<microsd device file>
```

### B.2 Prepare microSD card in Windows

Many programs exist that are capable of writing a raw disk image to a microSD card. We recommend “Win32 Disk Imager” that can be downloaded from <http://win32diskimager.sourceforge.net>.

First step is to unzip the downloaded file. This will give you a new file with .img extension. Use this file and follow the instructions of your selected program.

## Appendix C Materials declaration and recycling information

### C.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.

Part Name	Toxic or hazardous substances and elements					
	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent Chromium (Cr(VI))	Polybrominated biphenyls (PBB)	Polybrominated diphenyl ethers (PBDE)
ETH1000-SW-COM	O	O	O	O	O	O
ETH1000-SW-COM-SFP	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:



### C.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.

