User Manual
ETH-LLAN

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Document Revision

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1	03.12.2015	First issue	JON	THL	JON

Table of Contents

Technical Specification

1.1 Interfaces

1.1.1 10/100Base-T Ethernet

Standard:	IEEE-802.3, VLAN IEEE-802.1Q, QoS IEEE-802.1P
Standard if POE	IEEE 802.3af (15.4W) or IEEE 802.3at (40.0W)
Data Rate	10/100Base-T, Full/Half Duplex
Protocols	Data, Telnet, SNMP, WEB
Signal Level	Ethernet
MDI / MDI-X auto crossover	Supported
Auto Negotiation	Supported
Connector Type	RJ45, 8 pin

1.1.2 SHDSL Line Interface

Specification	ITU-T G.991.2-G.shdsl, ITU-T G.991.2-G.shdsl.bis
Line Code	TC-PAM16/32, Extended: TC-PAM4/8/64/128
Impedance	135Ω
Transmit Power	13.5 (Annex A) or 14.5 (Annex B) dBm @ 135Ω
Number of Pairs	1 or 2
Bit Rate	192 to 5704kbit/s, Extended: 128 to 15232kbit/s
Connector Type	Phoenix Mini Combicom 4 pin: MC 1,5/4-GF-3,5
Overvoltage Protection	ITU-T Rec. K.20/K.21

1.1.3 Local Craft Terminal (USB) Interface

Specification	USB V2.0 full and low speed
Data Rate	12Mbit/s
Protocol	Master/Slave, Uses the USB communication device class (CDC) drivers to take advantage of the installed PC RS-232 software to talk over the USB
Connector Type	USB Type Mini-B female connector

1.2 Power Supply

1.2.1 ETH-LLAN

Specification	ETSI ETS 300 132-2
-12V Models	
Input Voltage	9-18VDC
Connector Type	Phoenix Combicom 3 pin: MSTB 2,5/ 3-GF-5,08(male)
-24V Models	
Input Voltage	18-72VDC
Connector Type	Phoenix Combicom 3 pin: MSTB 2,5/ 3-GF-5,08(male)
-230V Models	
Input Voltage	85-264VAC, 120-370VDC, 47-63Hz
Connector Type	Phoenix Combicom 3 pin: MSTB 2,5/ 3-GF-5,08(male)
Power Consumption (All DSL links up, Ethernet on)	Max 5.3W

1.3 Environment

1.3.1 Climatic Conditions

Storage:	ETS 300 019-1-1 Class 1.2	(-25°C … +55°C)
Transportation:	ETS 300 019-1-2 Class 2.3	(-40°C … +70°C)
Operation:	ETS 300 019-1-3 Class 3.2	(-5°C … +45°C)

Higher Operation Temperature range available on request (-25°C … +80°C)

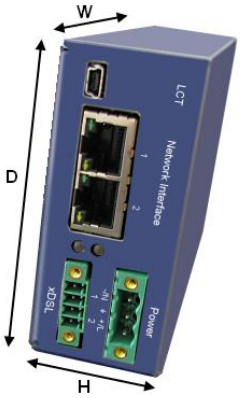
1.3.2 EMC and Safety Standards

EN 300386 V1.4.1:2008	EN 61000-4-2/A2:2001
EN 50121-4:2006	EN 61000-4-3:2006
EN 60950-1:2006	EN 61000-4-4:2004
EN 55022:2006, Class B	EN 61000-4-5:2006
EN 55024/A2:2003	EN 61000-4-6:2007
	EN 61000-4-6/A1:2001

1.4 Physical Dimensions and Weight

1.4.1 ETH-LLAN

Dimension:
143(W)x87(D)x37(H) mm
153(W)x87(D)x37(H) mm with Clip



Weight < 0.5kg in Metal DIN-Rail Enclosure

1.1. Environment

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1.1.2. EMC and Safety Standards

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EN 55022:2006, Class B	EN 61000-4-5:2006
EN 55024/A2:2003	EN 61000-4-6:2007
	EN 61000-4-6/A1:2001

1.2. Choice of cable

The ETH-LLAN device allows symmetrical data transmission at speeds up to 15Mbps over a single pair of copper. In addition, it supports DSL channel bonding for up to 2 copper pairs in order to achieve speeds to 30.4Mbps.

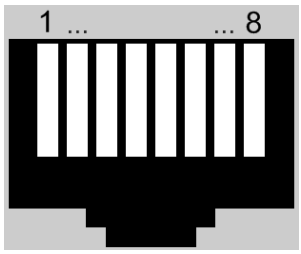
Twisted copper pairs must be used for the SHDSL interface. The maximum range between two points is 3km. In the below table are estimates of dataspeed versus wire diameter over a distance of 3000m.

Diameter	Speed
0.4 mm	4325 kbit/s
0.6 mm	5504 kbit/s
0.8 mm	6784 kbit/s
All above values is for a simple twisted, unshielded cable.	

1.3. Connector Description

1.3.1. **10/100Mbps Ethernet Connector (P5-P12)**

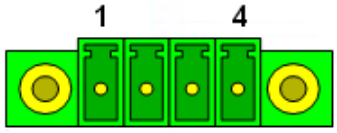
Type – RJ-45 (female), 8 pins.



Pin No.	Description
1	Tx+ (transmit data)
2	Tx- (transmit data)
3	Rx+ (receive data)
4	NC (not used)
5	NC (not used)
6	Rx- (receive data)
7	NC (not used)
8	NC (not used)

1.3.2. **SHDSL Line Card &DINrail xDSL Connector**

Type – Phoenix Mini Combicom MC 1,5/4-GF-3,5 (female), 4 pins.

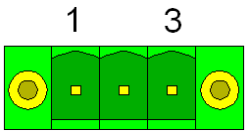


Pin No.	Description
1	SHDSL interface A
2	SHDSL interface A
3	SHDSL interface B
4	SHDSL interface B

Matching Type for the cable: MC1,5/4-STF-3,5
For AWG 16-28, Screw
Area 0.08–1.5 mm^2 or Diameter 0.32-1.4 mm

1.3.3. **DC power connector**

Type – Phoenix Combicom MSTB 2,5/ 3-GF-5,08(male), 3 pins..



Pin No.	Description
1	-PWR Negative power terminal or
2	FPE, GND (Functional Protective Earth / GND)
3	+PWR Positive power terminal or

Matching Type for cable: FKCT 2,5/ 3-STF-5.08
For AWG 12-24
Area 0.2–2.5 mm^2 or Diameter 0.5-1.75 mm

1.3.4. **Local Craft Terminal (USB) Connector (LCT)**

Type – USB Type Mini-B (female, receptacle), 5 pins.

Pin No.	Signal	Description
1	VCC	+5V
2	D-	Data -
3	D+	Data +
4	NC	
5	GND	SGND

2. Quick installation guide

2.1. Setting up a two-station network

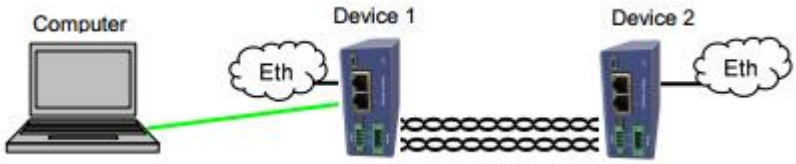
- This section explains how to set up a two way network, for two GMSplus to communicate with each other over Ethernet.

2.1.1. **Enter a ETH-LLAN device**

- You can use the Monitor (Local Craft Terminal, USB) interface with Hyper Terminal (or any other terminal program) or you can address the device with Telnet through the Ethernet interface.
- Monitor (LCT, USB) Interface:
  - Configure the COM port: Bits per second:**9600**, Data bits: **8**, Parity: **None**, Stop bits: **1**, Flow control: **None**
  - Press <**ENTER**>.
- Telnet through Ethernet Interface:
  - Type in command line <Telnet **192.168.0.235**> and press <**ENTER**>. This is the default Ethernet Address for ETH-LLAN devices.
- After successful connection the main menu of the device will be displayed.

2.1.2. **Configure the ETH-LLAN device**

- A first installation example with the most important commands and points to care about is shown below.
- In this case we just want to have an Ethernet transmission between the two devices over 2 SHDSL copper pairs with a speed of 11.4Mbit/s. The pairs should aggregate (bundle) the data traffic and in case of any SHDSL pair failure, the remaining pairs should continue to work.



- Connect to device 1 with the Monitor (LCT, USB) or Telnet interface.
- Type the command from the table below, in the same order as they are listed

Type following commands	Description
3 <↵>	Go to Configuration Management (CM)
<DEFAULT EVERYTHING> <↵>	Set everything to default configuration
<MASTER ON 1> <↵>	Configure SHDSL 1 as MASTER
<MASTER ON 2> <↵>	Configure SHDSL 2 as MASTER
<PAYLOAD WAN 1> <↵>	Configure Ethernet over SHDSL 1
<PAYLOAD WAN 2> <↵>	Configure Ethernet over SHDSL 2
<NET> <↵>	Go to NET menu
<SETIP 10.0.2.200> <↵>	Set the IP-address of the device
<NETMASK 255.0.0.0> <↵>	Set the subnet mask
<GATEWAY 10.0.0.101> <↵>	Set the default gateway
<M> <↵>	Go to Configuration Management (CM)
<M> <↵>	Go to Main Menu
2 <↵>	Go to Fault and maintenance management (FMM)
<APPLY ALL> <↵>	Apply all configurations (written in the running config.)
<CONFIRM> <↵>	Confirm all configurations (written in the startup config.)

- In Menu Configuration Management (CM) you can type <CONFIG> to see the following picture:

```
CO_CM>CONFIG
--------------------------------------------------------------------------------
Running Line Configuration
--------------------------------------------------------------------------------
xDSL                DSL1            DSL2
 Mode             : Master(HTU-C)   Master(HTU-C)
 Extended rates   : OFF             OFF
 Line coding      : PAM32           PAM32
 Baserate         : 89              89
 Annex            : B               B
 Payload          : WAN             WAN
 Clock source     : Int             Int
 GS compatible    : OFF
 NM threshold     : OFF
 LA threshold     : OFF
--------------------------------------------------------------------------------
CO_CM>
```

- Connect to device 2 with the Monitor (LCT, USB) or Telnet interface
- Type the command from the table below, in the same order as they are listed

Type following commands	Description
3 <↵>	Go to Configuration Management (CM)
<DEFAULT EVERYTHING> <↵>	Set everything to default configuration
<MASTER OFF 1> <↵>	Configure SHDSL 1 as SLAVE
<MASTER OFF 2> <↵>	Configure SHDSL 2 as SLAVE
<PAYLOAD WAN 1> <↵>	Configure Ethernet over SHDSL 1
<PAYLOAD WAN 2> <↵>	Configure Ethernet over SHDSL 2
<NET> <↵>	Go to NET menu
<SETIP 10.0.2.201> <↵>	Set the IP-address of the device
<NETMASK 255.0.0.0> <↵>	Set the subnet mask
<GATEWAY 10.0.0.101> <↵>	Set the default gateway
<M> <↵>	Go to Configuration Management (CM)
<M> <↵>	Go to Main Menu
2 <↵>	Go to Fault and maintenance management (FMM)
<APPLY ALL> <↵>	Apply all configurations (written in the running config.)
<CONFIRM> <↵>	Confirm all configurations (written in the startup config.)

- In Menu Configuration Management (CM) you can type <CONFIG> to see the following picture:

```
CP_CM>CONFIG
--------------------------------------------------------------------------------
Running Line Configuration
--------------------------------------------------------------------------------
xDSL                DSL1          DSL2
 Mode             : Slave(HTU-R)  Slave(HTU-R)
 Extended rates   : OFF           OFF
 Line coding      : PAM32         PAM32
 Baserate         : 89            89
 Annex            : B             B
 Payload          : WAN           WAN
 Clock source     : Int           Int
 GS compatible    : OFF
 NM threshold     : OFF
 LA threshold     : OFF
--------------------------------------------------------------------------------
CP_CM>
```

- The idea is the following: the default settings help any device to be in an initial state, then the MASTER/SLAVE mode is enabled on the modem, then the transmit data is configured, then the network settings are configured (IP address, default subnet mask and default gateway) and finally, these settings are applied and are then written in the EEPROM.
- **ATTENTION** DON'T FORGET TO WRITE/SAVE THE CONFIGURATION IN THE STARTUP CONFIGURATION WITH THE FOLLOWING COMMANDS:
  - 2 <↵> Go to Fault and maintenance management (FMM)
  - <APPLY ALL> <↵> Apply all configurations (written in the running config.)
  - <CONFIRM> <↵> Confirm all configurations (written in the startup config)