

Zakład Produkcyjny TEL-KA

Ethernet over EUROCOM converter box

User Manual

Warszawa 2012-13



• General Information

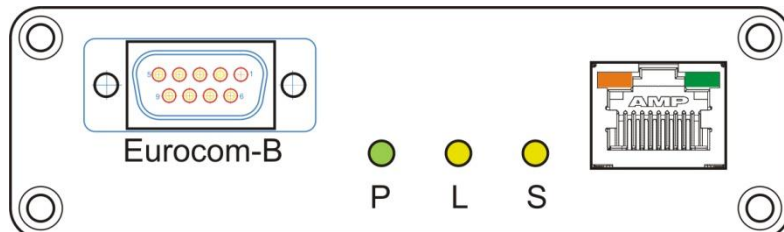
The EthernetOverEurocomconverter box allows to connect two equipments with Ethernet interface using with Eurocom B/C or STANAG 4210 link. The equipment is designed to transmit Ethernet packet over Eurocom-based links, creating bridged connection. Optionally imperfect Ethernet MAC filtering may be activated on Ethernet receiver. The converter supports Eurocom B or C interface as well as Stanag 4210 interface with the throughput range 256-4096 kbit/s. Configurable Forward Error Correction protocol, based on convolution code is implemented on the Eurocom link.

The EUROCOM B/C – Ethernet converter specification:

1. Eurocom interface
 - B or C type, as per EUROCOM D/1 1986, depending on board variant
 - Optionally STANAG 4210 interface
 - Socket: D-SUB-9, female type
2. Binary throughput:
 - Configurable 256/384/512/768/1024/1536/2048/3072/4096 kbit/s
 - Clock accuracy 25ppm
3. Ethernet interface
 - 100BaseTX
 - 10BaseT fallback
 - RJ-45 socket
 - Flow control based on MAC PAUSE packets
4. Forward Error Correction
 - Configurable in range $\frac{1}{2}$, $\frac{2}{3}$, $\frac{3}{4}$, $\frac{5}{6}$, $\frac{7}{8}$,
5. Configurable in CLI mode.
 - Telnet protocol on Ethernet interface
 - Optional RS-232 interface
 - Optional USB interface
6. Power supply (options):
 - +24VDC (+12...+30V), 0.5A, non-isolated, '-' connected to boards earth and case, PSU socket 5.5/2.1mm
 - -48VDC (-36...-72V), isolated, using external adaptor
 - AC 85...240VAC, 47...63Hz, isolated, using external adaptor

7. Power consumption <7 W
8. Box size: 103mm • 125mm • 34mm
9. Board size: 100mm • 120mm • 16mm (with +24VDC power supply)
10. Working temperatures: -20° +50°C (for DC power supply only)

Front panel layout



Front panel contains:

- EUROCOM (DSUB-9 connector) interface
- Ethernet (RJ-45 connector) interface
- 'Power' status indicator (P)
- Eurocom/Stanag line status indicator (L)
- FEC status indicator (S)

Rear panel layout

Rear panel contains:

- Power supply socket
- Optional RS-232 (DSUB-9 connector) interface
- Optional USB interface

Connector layout

1. Ethernet interface connector RJ-45 (8P8C)

Pin	Direction	Function
1	output from converter	Transmitted Data – wire A
2	output from converter	Transmitted Data – wire B
3	input to converter	Received Data – wire A
4	not used	
5	not used	
6	input to converter	Received Data – wire B
7	GND	Shield - ground
8	GND	Shield - ground

2. Eurocom B interface, connector DSUB-9 female (front panel)

No	Pin	Signal Name Eurocom-B	Signal Name Eurocom-C	Direction	RL-xxx TDM connector	AN/GRC-xxx Eurocom In/Out
1	1	Transmit Clock A		Output from converter	L	F
2	6	Transmit Clock B			M	E
3	2	Transmit Data A	Transmit Data A		H	H
4	7	Transmit Data B	Transmit Data B		G	G
5	3	Receive Clock A		Input to converter	J	S
6	8	Receive Clock B			K	R
7	4	Receive Data A	Receive Data A		F	T
8	9	Receive Data B	Receive Data B		E	J
9	5	GND		Chassis	V	V

1. RL-xxx : Ericsson/Konsberg
2. AN/GRC-xxx : Marconi/Ultra

3. Optional RS-232 interface, connector DSUB-9 female (rear panel)

Pin	Function	Direction
2	Received data	From converter
3	Transmitted data	To converter
5	Ground	
4	RTS (used only during firmware update)	To converter
7	DTR (used only during firmware update)	To converter

- **Power options**

Converter box is powered by +12..+30VDC (non-isolated). The equipment is resistant to incorrect power connection, if the voltage is below 35V. Socket is PSU 5.5/2.5mm.

- **Status indicators**

1. Local line status indicator (L)

Local line status indicator (L) shows the state of received Eurocom signal .

The following colors are used:

blank	- clock absent
red	- clock frequency differs from settings
blinking red/green	- clock present, waiting for start conditions (1 Hz) emergency mode, the default IP address 192.168.0.250 is forced (5 Hz)
blinking red	- clock present, data absent (1Hz, Eurocom-B mode)
blinking red	- fault: FPGA not loaded (5 Hz)
green	- converters transmits data from Eurocom interface to Ethernet network

2. FEC indicator (S)

Remote line status indicator (S) shows the state of received signal from remote sender. The following colors are used:

blank	- framing and FEC not used
red	- lack of framing,
blinking red	- lack of settings (1Hz) or fault of the Ethernet controller (5 Hz)
green	- converters transmits data from Ethernet interface to Eurocom interface, steady state

• Configuration

1. Modes of operation

The converter offers two modes of operation:

• Raw mode

In the raw mode the received packet from the Euthernet interface are transmitted through Eurocom link using HDLC protocol. No error correction is provided. A standard 32 bit error detection check sum is used.

• Forward Error correction mode

In the FEC mode a redundant data are transmitted with the user data. The redundancy allows the receiver correct a limited number of transmission errors.

2. Imperfect MAC address filtering

The converter has optional ability to filter out received Ethernet fames by analyzing the Ethernet destination address in the frame. The filtering based on hash function on destination address. Up to 37 different allowed addresses may be stored in non-volatile memory. The filtering is imperfect

so sometimes frames with different destination address are accepted.

3. How to set up

The parameters of the Ethernet port and the transmission parameters must be fill in to set up the converter. Ethernet port parameters and a transmission parameters are stored in the non-volatile memory. After power-up the last configuration is restored. Parameters can be read from the non-volatile memory, edited in the temporary memory, saved from the temporary memory to the non-volatile memory and activated using Command Line Interface (CLI) on Ethernet port or optionally RS-232 or USB ports.

- **Using CLI on the Ethernet port**

Connect the device to terminal through the Ethernet cable. Use any character terminal program (e.g.PUTTY) with following remote client parameters: IP aa.bb.cc.dd, port 23. The device is delivered with the following IP parameters:

- IP address: 192.168.00.yy where yy are the last two digits of the serial number,
- IP mask: 255.255.255.0
- MAC address: 02:pp:pp:pp:xx:yy, where pp:pp:pp – random six hexadecimal digits, where xx are the first two digits of the serial number, yy are the last two digits of this number.

- **Using CLI on the serial port (option)**

Connect the device to terminal through the serial interface. Set the following parameters of the interface:

- baud rate – 57600 bit/s
- character format – 8N2 (8 bit, 2 stop bits, no parity)
- flow control – none
- kind on terminal – ansi/VT100.

- **Using CLI on the USB port (option)**

Connect the device to the computer using standard USB cable. The device is visible as the subsequent 'USB serial port'.

- **CLI terminal**

As the terminal, PC with a serial/USB/Ethernet interface and an appropriate program such as HyperTerminal (under WindowsXP OS) or Putty (version 0.60 or higher) can be used. Then turn on the equipment and follow the instructions on the screen. After about 10 second the device is ready to work with the last set configuration.

4. Main menu

After successful establishment telnet connection the *help* information are displayed. The command 'help' displays the following information:

```

=====
LPC Ethernet to Eurocom Adapter Mar  8 2013 09:24:10
-- TL047.2      I2C MEM = 256B [37 x 6 + 32]   FPGA loader status =  0

FPGA version = 1
FPGA variant = 8

```

```

===== HELP =====
SET          - set particular parameter, use 'HELP SET'
DISP        - display configuration or status, use 'HELP DISP'
DIAG        - diagnostic commands, use 'HELP DIAG'
QUIT        - close telnet session

```

Particular commands 'help set', 'help disp' and 'help diags' display details of the command's format:

```

help set
SET
  ETH
    MAC      - set own MAC address [aa:bb:cc:dd:ee:ff]
    MODE     - set Ethernet port mode (auto, 10fd, 10hd, 100fd, 100hd)
    FILTR    - set MAC address filtering (on/off/0/1)
    MACF <n> [aa:bb:cc:dd:ee:ff] - set n-th filtr address
    MACF CLR <n>                               - clr n-th filtr address
    MACF CLR ALL                               - clr all filtr addresses
  IP4
    ADDR     - set own IPv4 address
    MASK     - set own IPv4 mask
    GATW     - set own IPv4 gateway address
  D1
    BRATE    - Clock Frequency (256,384,512,768,1024,1536,2048,4096, AUTO)
    IFACE    - physical interface (B,C,S)
    FEC      - forward error correction settings
      MODE   - mode of operation (RAW,FRAMING, 1/2, 2/3, 3/4, 5/6, 7/8)
      TBACK  - trace back path length ([<mode>] <length>)
      BLEN   - decoded block length ([<mode>] <length>)
    POL     - Eurocom B clock polarization settings
      TX     - Eurocom B transmit clock polarization setting [0/N,1/I]
      RX     - Eurocom B receive clock polarization setting [0/N,1/I]

```

```

help disp
DISP
  ETH      - display ethernet port settings
  STATE    - display ethernet port state
  REGS     - display ethernet port MAC registers
  PHY      - display ethernet port MAC physical transceiver registers
  IP4      - display IPv4 settings
  ARP      - display ARP table
  TCP      - display TCP connections
  D1       - display D1 port settings
  STATE    - display D1 port state
  FEC      - display D1 port FEC settings
  SETTINGS - display current transmission settings

```

```

help diag
DIAG
  TRACE x   - trace level
  GVERSION  - FPGA version n
  PEREAD 0/1 - periodical read of status(off/on)
  SSP       - display SSP status
  CNT       - display statistics counters
  CLRCNT    - clear statistics counters
  QUIT      - close telnet sessions
  PEREAD    - periodic read on/off
  TLETH <n> - set TraceLevelof ETH frames to <n> [n is hex number]
  CLOSETCP <n> - close TCP connection <n>
  QUIT      - close telnet session
  DISPTELNET - display telnet session state
  SETTINGS  - display current transmission settings

```

I2CMEM	- display the content of non-volatile memory
STATUS	- display current status informations
FPGA	- display FPGA status or CRC or load image (use HELP DIAG FPGA)

5. Command syntax

Command contains from one to four key words plus optional parameter (mainly in the 'set' command).

6. Main commands

- **SET**
This command is used to change main parameters of the converter ('SET ETH...', 'SET IP4 ...' or 'SET D1...').
- **DISP**
This command is used to display current converter settings, the current state or profiles (including saved in the non-volatile memory)
- **DIAG**
This command is used to display diagnostic information

7. Ethernet port configuration

The command 'set eth ...' is used to change of the Ethernet port parameters:

- **SET ETH MAC xx:xx:xx:xx:xx:xx**
This command is used to set the new MAC address. The new address is in use after next power on. 'xx' takes value from hexadecimal number set.
- **SET ETH MODE <mode>**
This command is used to set the Ethernet port mode. As <mode> the following parameters can be used:
 - auto - auto mode (default and recommended),
 - 10fd - 10Mbit/s, full duplex
 - 10hd - 10Mbit/s, half duplex
 - 100fd - 100Mbit/s, full duplex
 - 100hd - 100Mbit/s, half duplex

The new parameters will be used after reboot or power on.

- **SET ETH FILTR <on/off>**
This command switch on or off the imperfect destination address filtering mode.
- **SET ETH MACF <n> [xx:xx:xx:xx:xx:xx]**
This command add the MAC address on position <n> to the set of allowed destination addresses.
- **SET ETH MACF CLR <n>**

This command remove the allowed destination address from position <n>

- **SET ETH MACF CLR ALL**

This command clear the set of allowed destination addresses. If the filter is switched on and the set was cleared all received frames are discarded.

8. IP parameters configuration

The command 'set IP4 ...' is used to change IPv4 port parameters:

- **SET IP4 ADDR aa.bb.cc.dd**
- **SET IP4 MASK aa.bb.cc.dd**
- **SET IP4 GATW aa.bb.cc.dd**

This commands allow change of converter IPv4 parameters: address, mask and default gateway address, respectively. 'aa', 'bb', 'cc' or 'dd' take values from 0 to 255. The new parameters will be used after reboot or power on.

9. Eurocom/Stanag interface configuration:

SET D1 BRATE <r>

The above command sets up the throughput of the Eurocom interface to the value of <r>. Possible values of <r> are 256, 384, 512, 768, 1024, 1536, 2048, 3072, 4096 [kbit/s], *AUTO*. *AUTO* option is supported on the Eurocom-B interface only. If *AUTO* is selected the transmitted clock frequency is chosen according to measured received clock frequency.

SET D1 IFACE <i>

The above command sets up the physical layer interface standard. Possible values of <i> are **B** for Eurocom-B, **C** for Eurocom-C or **S** for Stanag4210. Not all options may be available depending on the boards version. From version TL047.3 all standards are supported.

SET D1 FEC MODE <mode>

The above command sets up the FEC operating mode. Possible options are: RAW, FRAMING, 1/2, 2/3, 3/4, 5/6, 7/8.

SET D1 FEC TBACK <n>

The above command sets up the 'trace back depth' parameter in the FEC operating mode. This parameter is set separately for each FEC ratio. Recommended value is 64

SET D1 FEC BLEN <n>

The above command sets up the 'block length' parameter in the FEC operating mode. This parameter is set separately for each FEC ratio. The recommended values are in range 16..64. The eight time of 'block length' must be greater then 'trace back depth'.

SET D1 POL TX <n>

The above command sets up the FEC operating mode. Possible values are:

SET D1 POL TX <n>

The above command sets up the FEC operating mode. Possible values are:

10. Command group DISP

Commands which starts with word 'DISP' are used to display of settings or states of the converter and to display profile settings from temporary or non-volatile memory. The following commands are available:

DISP ETH	- display the Ethernet port MAC address
DISP ETH STATE	- display the Ethernet port state (diagnostic)
DISP ETH REGS	- display internal MAC registers
DISP ETH PHY	- display registers of the physical layer transceiver
DISP ETH FILTR	- display imperfect MAC filter settings
DISP IP4	- display IPv4 settings (address, mask, gateway)
DISP IP4 ARP	- display ARP table
DISP IP4 TCP	- display information of TCP connections.
DISP D1	- display current settings of the Eurocom interface
DISP D1 STATE	- display state of the Eurocom interface
DISP SETTINGS	- display current settings

11. Command group DIAG

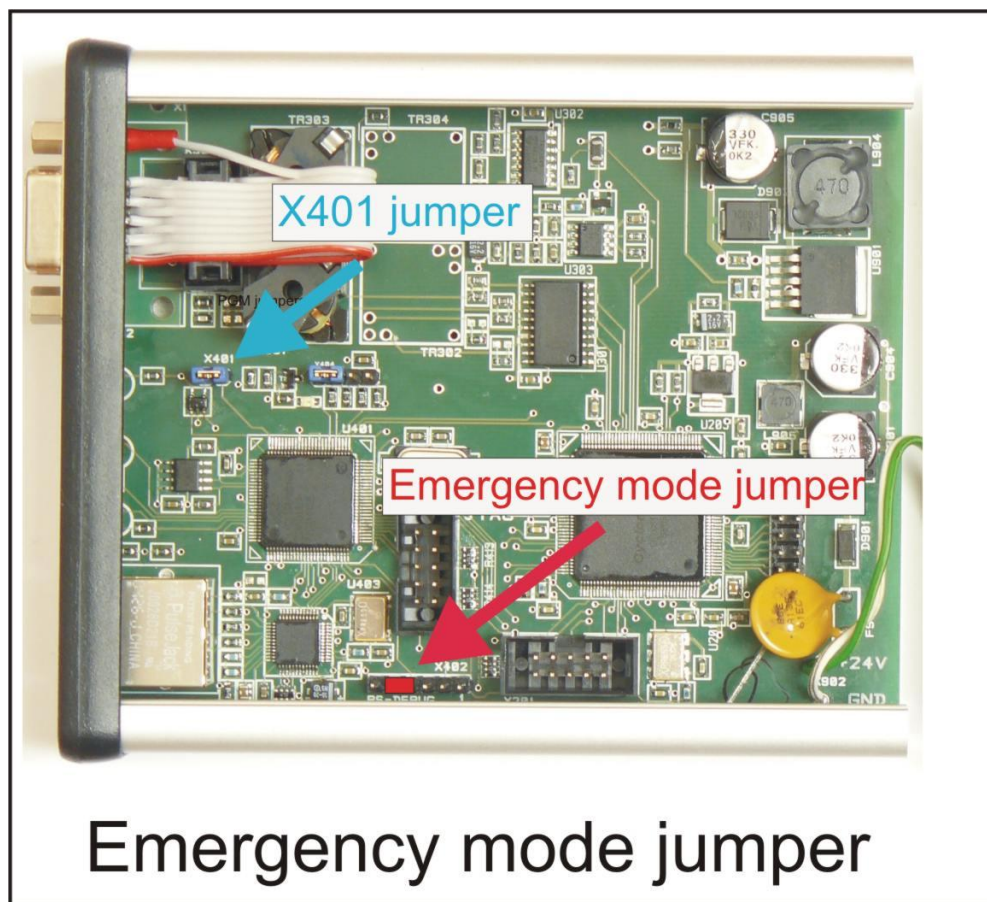
Commands which starts with word 'DIAG' are used to diagnostic purpose only. Do not use it, except the following:

QUIT - close current telnet session.

- **Emergency mode**

In the case of loss the IP address it is possible to force known IP address. To force the converter to *emergency mode* unplug the power, open the housing, set the jumper according to the following picture (or short indicated pins in other way) and power on. The connection between pins is tested during start-up only. The X401 jumper may be removed and temporary used to short indicated pins.

The emergency mode is indicated by the 'L' indicator, which flashes red/green with frequency 5 Hz. During the *emergency mode* the IP address is set to 192.168.0.250. The content of the non-volatile memory remains unchanged and may be edited.



- **Converter board removal**
 1. Plug off power supply cable
 2. Unscrew four screws holding rear panel
 3. Unscrew four screws holding front panel
 4. Disconnect flat cable from board
 5. Pull out converter board in rear panel direction
- **Firmware upgrade**

Follow the instruction that came with new version of firmware