Zakład Produkcyjny TEL-KA

EUROCOM over Ethernet converter box

User Manual

Warszawa 2012-2020

- **General Information**

The Eurocom over Ethernet converter box allows to extend a connection between two equipments with the Eurocom B/C interfaces through Ethernet link. The equipment is designed to transmit Eurocom data over Ethernet-based or IP-based links, creating bridged connection. The converter supports the Eurocom B/C or Stanag 4206 interface (depending on version) with the throughput range 256-2048 kbit/s. The converter offers three modes of operation, based respectively on Ethernet frames, UDP/IP packets and TCP/IP connection.

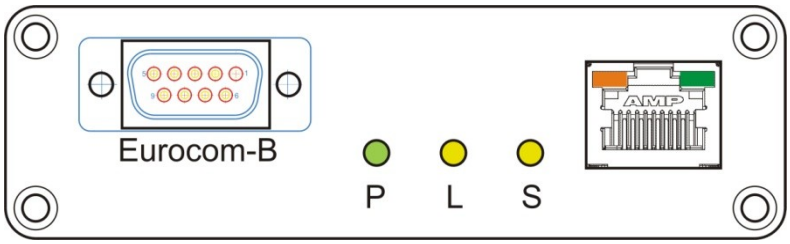
The EUROCOM B/C – Ethernet converter specification:

1. Eurocom interface
   - B or C type, as per EUROCOM D/1 1986,
   - STANAG 4206 interface
   - Socket: D-SUB-9, female type
2. Binary throughput:
   - Configurable 256/512/1024/2048 kbit/s
   - Adaptive clock range 200ppm
3. Ethernet interface
   - 100BaseTX
   - 10BaseT fallback (not recommended)
   - RJ-45 socket
   - Flow control based on MAC PAUSE packets
4. Operation modes
   - Short-delay raw mode, based on dedicated Ethernet frames.
   - Short-delay UDP mode, based on UDP packets
   - Long-delay UDP-LD mode,, based on separate transmission of signalling messages and traffic channels .
   - Long-delay TCP mode, based on separate transmission of signalling messages and traffic channels (trunk-group or loop-group mode).
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 <5 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)
- Local line status indicator (L)
- Remote line 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 STANAG-4210	Direction	RL-xxx TDM connector	AN/GRC-xxx Eurocom In/Out
1	1	Transmit Clock A	Not used	Output from converter	L	F
2	6	Transmit Clock B	Not used		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	Not used	Input to converter	J	S
6	8	Receive Clock B	Not used		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	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 (state of the Eurocom to Ethernet path). The following signaling is used:

short flash per sec	- clock and data absent (Eurocom-B)/data absent
two flashes/sec	- data absent, (Eurocom-B only)
three flashes/sec	- clock absent, (Eurocom-B only)
blank	- clock absent
blinking red	- received clock frequency differs from settings (1Hz)
flashes green/red	- ARP not resolved, lack of framing (TCP mode).
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 green	- clock present, delay before start (1 Hz)
flashes green	- lack of TCP connection (TCP mode)
green	- converters transmits data from Eurocom interface to Ethernet network
blinking red	- fault: FPGA not loaded (5 Hz)

     Details of the Eurocom to Ethernet path state are also available using 'disp state' command from telnet session.

  2. Remote line status indicator (S)
     Remote line status indicator (S) shows the state of received signal from remote sender (state of the Eurocom to Ethernet path). The following colors and blinking patterns are used:

one short flash / sec	- lack of TCP connection with remote converter (TCP mode only)
two short flash / sec	- lack of received signal from Ethernet interface
red	- received bit rate differs from settings
blinking red	- lack of settings (1Hz) or fault of the Ethernet controller (5 Hz)
blinking green	- converters transmits data from Ethernet interface to Eurocom interface, converter gathers information about the clock frequency
green	- converters transmits data from Ethernet interface to Eurocom interface, steady state

     Details of the Eurocom to Ethernet path state are also available using 'disp

state’ command from telnet session.

- **Configuration**

1. **Modes of operations**
   The converter offers three modes of operation:

   - **Raw mode**
     In the raw mode the data from the Eurocom input is transmitted through Ethernet network as dedicated Ethernet frames with configurable custom 'ethertype' and configurable size. The frame payload contains a raw block of data. The raw block of data is transmitted with a 8 byte header. The header consist of information of selected mode, Eurocom port configuration and sequence number. Ethernet frames may be optionally tagged with VLAN number and COS ('class of service') value. This kind of transmission is useful in a Local Area Network, when the delay between converters is limited to a few milliseconds. The transmission is transparent to any data stream.

   - **UDP mode**
     In the UDP mode the raw blocks of input data with the headers are transmitted as UDP-IP packet. Similarly to the raw mode, Ethernet frames may be optionally tagged with VLAN number and 'class of service' value. This kind of transmission is useful in short-delay IP-based networks, when the delay between converters is limited to a few milliseconds. The transmission is transparent to any data stream.

     LDUDP mode
     In the LDUDP mode signaling messages from separated signaling channel are extracted from the input traffic and transmitted separately using LD (long delay) protocol. Regardless the raw blocks of input data are transmitted as UDP-IP packet, similarly as in UDP mode. The data header is extended with space for LD protocol data. The link layer protocol and signaling channel block protocol on the Eurocom interface are terminated on the converter. On second (remote) side the received signaling messages are injected into signaling channel in the slot #1. Suitable framing pattern in slot #0 is generated locally, depending on local configuration. This kind of transmission is useful when the delay over the IP-based network is relatively large. As opposed to raw and UDP modes, this kind of operation requires appropriate data stream structure in framing and signaling channel slots.

- **TCP mode**
  In the TCP mode signaling messages from separated signaling channel are extracted from the input traffic and transmitted separately using TCP/IP protocol. Regardless the raw blocks of input data are transmitted as UDP-IP packet, identically as in UDP mode. The link layer protocol and signaling channel block protocol on the Eurocom interface are terminated on the converter. On second (remote) side the received signaling messages are injected into signaling channel in the slot #1. Suitable framing pattern in slot #0 is generated locally, depending on local configuration. This kind of transmission is useful when the delay over the IP-based network is relatively large. As opposed to raw and UDP modes, this kind of operation requires appropriate data stream structure in framing and signaling channel slots.

2. How to set up

A set of transmission parameters is called ‘profile’. The parameters of the Ethernet port and the transmission profile must be set to set up befor usage of the converter. The set of parameters Ethernet port parameters and a number of profiles are stored in the non-volatile memory. After power-up the last configuration is restored.

- **Profile**
  The profile contains the mode of operation and set of parameters, appropriate for selected mode of operation. Some parameters, like block size or COS-tag, are common to all modes. Another, like remote IP address, are used only in some modes. Profiles can be read from the non-volatile memory to a temporary 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. Up to seven different profiles can be stored in the non-volatile memory. After power up the active profile is used to set up the converter. The active profile number may be changed using CLI commands: *SET PROFILE* or *COMMIT*.

- **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 port 23. The device is delivered with the following IP parameters:

  - IP address: 192.168.xx.yy where xx:*yy* is formed from the serial number. Serial number consists of six digit. The serial number consist

of six digits YYSSSS, where YY means year and SSSS - sequence number. 'yy' is the remainder of division SSSS by 256 and xx is equal to the sum of product of 10 and YY plus result of division number SSSS by 256. For example unit with serial number 140005 has an initial IP address 192.168.140.5 and unit with the serial number 140700 has a serial number 192.168.142.188

- IP mask: 255.255.255.0
- MAC address: 02:pp:pp:xx:yy:zz, where pp:pp – random four hexadecimal digits, *xx:yy:zz* are the digits of the serial number in the hexadecimal form (e.g 140001 = 02:22:e1).

- **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. The temporary memory is filled with the *n*-th profile , used in the last 'COMMIT *n*' or 'SET PROFILE *n*' commands.

3. **Help information**
   After successful establishment telnet connection on Ethernet port the *help* information are displayed. The command 'help' displays the following information:

```
=================================================================
=================================================================
 LPC 23xx Eurocom Over Ethernet Adapter Jan  1 2013 09:16:51
 -- TL047.2     I2C MEM  = 256B [7 x 32 + 19]

FPGA version = 2
FPGA variant = 4

 =============== HELP ============================================
```

```
SET         - set particular parameter, use 'HELP SET'
CLEAR       - clear particular parameter, use 'HELP CLEAR'
DISP        - display configuration or status, use 'HELP DISP'
SAVE <n>    - save current profile to bank <n>
LOAD <n>    - load current profile from bank <n>
COMMIT <n>  - commit profile <n> (make changes active)
DIAG        - diagnostic commands
QUIT        - close telnet session
```

Particular commands 'help set','help clear', '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)
          IP4
            ADDR   - set own IPv4 address
            MASK   - set own IPv4 mask
            GATW   - set own IPv4 gateway address
          PROFILE  - set active profile number [0..6]
          MODE
            RAW    - raw mode
              DEFAULT - with default parameters
            UDP    - udp mode
              DEFAULT - with default parameters
            TCP    - tcp mode
              DEFAULT - with default parameters
            LDUDP  - ld udp mode
              DEFAULT - with default parameters
          D1
            BRATE  - TxClock Frequency (256,512,1024,2048,RxF,RxC)
            CHRATE - channel rate (16,32) [TCP mode only]
            GOBACK - go-back (4,6) [TCP mode only]
            FRAME  - framing mode (E/S) [TCP mode only]
            IFACE  - physical interface (B,C,S)
            POL    - Eurocom B clock polarization settings TX/RX
              TX   - Eurocom B transmit clock polarization setting [0/N,1/I]
              RX   - Eurocom B receive clock polarization setting [0/N,1/I]
            SRC    - source of transmit clock [T,L,I,O TCP mode only]
          RAW
            ETYPE  - MAC Ethernet Type
          RAW/UDP/TCP/LDUDP
            DA     - MAC destination address [aa:bb:cc:dd:ee:ff]
            COS    - MAC 802.1q CoS tag
            VLAN   - MAC 802.1q VLAN tag
            WSIZE  - Receive buffer size in us [250/500/1000/2000/4000...64000]
            PSIZE  - Transmitter packet size in us [250/500/1000/2000/4000...64000]
          UDP/TCP/LDUDP
            IP4
              ADDR - destination IPv4 addr
              TOS  - Type of Service
              TTL  - Time to live
            UDP
              LOC  - local (source) IPv4 UDP port
              REM  - remote (destination) IPv4 UDP port
              SRC  - local (source) IPv4 UDP port
              DEST - remote (destination) IPv4 UDP port
            LDUDP
              T1 <n>  - T1 timer value
              WTX <n> - Tx window width
              WRX <n> - Tx window width
          TCP
            TCP
              PORT - server IPv4 port
              S    - server mode
              C    - client mode
              TOUT - connection timeout (time[s])
```

```
help clear
        CLEAR
          JITTER   - clear jitter statistic
```

```
DIAG
  TRACE <x>                - trace level
  TRACE MSG ON/OFF         - D1 signaling channel trace on/off
  TRACE TCP <x>            - set trace level of Ethernet frames to x
  TRACE D1 <x>             - set trace mask of D1 messages/events to x
  TRACE RXBRATE ON/OFF     - RTP receiver tracking ON/OFF
  TRACE TXBRATE ON/OFF     - RTP transmitter tracking ON/OFF
  TRACE UIP ON/OFF         - set uIP error tracking ON/OFF
  GVERSION                 - FPGA version n
  PEREAD ON/OFF            - periodical read of status ON/OFF
  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 a number]
  CLOSETCP <n>             - close TCP connection <n>
  QUIT                     - close telnet session
  DISPTELNET               - display telnet session state
  R_FPGA                   - display read FPGA registers
  SETTINGS                 - display current transmission settings
  ETHLOOP <n>              - set/clr/display loop on ETH interface
  RXBRATE ON/OFF           - RTP receiver tracking ON/OFF
  TXBRATE ON/OFF           - RTP transmitter tracking ON/OFF
  I2CMEM                   - display the content of non-volatile memory
  STATE                    - diaplay current state informations
  FPGA                     - display FPGA status or CRC or load image
  LOOP D1 ON/OFF           - set loop on D1 interface
  LOOP SSP ON/OFF          - set loop on SSP interface
  LOOP ETH ON/OFF          - set loop on ETH interface
  UIP                      - show uIP statistics
  TP                       - show/set FPGA TP sel register
  TCP                      - show TCP protocol state details
  LD                       - show LD protocol state details
```

4. Command syntax

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

5. Main commands

- **SET**
  This command is used to change main parameters of the converter ('SET PROFILE...', 'SET ETH ...' or 'SET IP4...') or to edit the profile stored in the temporary memory.
- **CLEAR**
  This command is used to clear some statistics.
- **DISP**
  This command is used to display current converter settings, the current state or profiles (including saved in the non-volatile memory)
- **SAVE <n>**
  This command in used to save edited profile from temporary memory to non-volatile memory as profile <n>. The profile number <n> should be in the range from 0 to 6. If the profile number is omitted, the profile from the temporary memory is saved using the active profile number.
- **LOAD <n>**
  This command is used to load the stored profile of the number <n>

from the non-volatile memory to the temporary memory. The profile number <n> should be in the range from 0 to 6.

- **COMMIT <n>**
  This command in used to set up the equipment with the profile <n> from the non-volatile memory. The profile number <n> should be in the range from 0 to 6. The active profile number is set to <n>.
  If profile number is omitted, the profile form the temporary memory is used to set up the converter without any change in the active profile number. After next power-up the active profile will be committed.
- **DIAG**
  This command is used to display diagnostic information

6. **Setting the active profile number**
   The active profile number is set using the following command
   SET PROFILE <n>
   The new active profile number <n> must be in the range from 0 to 5. Only the active profile number is changed. **To change configuration of the converter use 'COMMIT' command.**

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.

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. **The Profile editor**
   The profile editor allows to change profile parameters stored in the temporary memory. The temporary memory can be filled with parameters, read from non-volatile memory (command '*LOAD*'). Edited profile may be saved in memory (command '*SAVE*'). Profile from non-volatile memory can be used to set up the equipment (command 'COMMIT').

10. **Creating a new profile**
    In the first step use the command 'set mode...' to set desirable mode of operation. It is recommended to use the command 'set mode ..' with the option 'default' to set all parameters to default values. Then set the remainder parameters to required values. In the end save the new profile to non-volatile memory (command 'SAVE') and if necessary put it as current configuration using 'COMMIT' command.

11. **Editing existing profile**
    In the first step fill the temporary memory with the existing profile using 'LOAD' command. Then change the parameters to requested values. In the end save the new profile to non-volatile memory (command 'SAVE') and if necessary put it as current configuration using 'COMMIT' command. It is recommended to use ‘SAVE n’ and ‘COMMIT <n>’ commands.

12. **Profile for the raw mode**
    In the first step use the command to set profile to raw mode:

    SET MODE RAW (to set mode only)
    or
    SET MODE RAW DEFAULT (to set mode with default parameters)

    Next set the destination MAC address of the remote converter using the following command:

    SET RAW DA xx:xx:xx:xx:xx:xx

    Default value of destination address is ff:ff:ff:ff:ff:ff and the address **must be** changed before starting transmission.

    Then set the parameters of the Eurocom interface:

    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, 512, 1024, 2048 [kbit/s], AUTO, LOOP. *AUTO* and *LOOP* options are supported on the Eurocom-B interface only. If *AUTO* is selected the transmitted clock frequency is chosen according to measured received clock frequency. If LOOP option is chosen, the transmitter clock is taken from the receiver.

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 board's version.

SET D1 POL TX <n>

The above command sets up the polarity of the transmitter clock line (usable in the Eurocom/B mode only) Possible values are 0 or 1:

SET D1 POL TX <n>

The above command sets up the polarity of the receiver clock line (usable in the Eurocom/B mode only) Possible values are 0 or 1:

In the next steps verify the remaining parameters and if necessary set them using the following commands:

SET RAW ETYPE xxxx

The above command sets up the "Ethernet Type" value of transmited and received Ethernet frames. The hexadecimal value 'xxxx' consists of four hexadecimal digits. The default value for the RAW mode is 0x86d8.

SET RAW COS x

The above command set up the value of CoS tag (class of service) in the optional 802.1q tag of sent Ethernet frames. The value of 'x' should be in the range from 0 to 7, according to IEEE 802.1q networking standard. The default value is 5. If VLAN value is equal to zero, sent frames remain untagged.

SET RAW VLAN x

The above command set up the value of VLAN number (Virtual LAN) in

the optional 802.1q tag of sent Ethernet frames. The value of 'x' should be in the range from 0 to 4095, according to IEEE 802.1q networking standard. The default value of VLAN is 0. If VLAN values is equal to zero, sent frames remain untagged.

SET RAW PSIZE n

The above command sets up the size of the block of data. Integer value 'n' is denominated in microsecond and should be in range from 250µs to 64000µs. The real size of the block is rounded up to the next value which give the packet size equal to integer power of two bytes. Recommended values are 250 / 500 / 1000 / 2000 / ... /64000. The default value is 500 [µs].

SET RAW WSIZE n

The above command sets up the size of the receiver buffer [jitter buffer]. Integer value 'n' is denominated in microsecond and should be in range from 250µs to 64000µs. The real size of the buffer is rounded up to the next value which give the packet size equal to integer power of two bytes. Recommended values are 250 / 500 / 1000 / 2000 / ... /64000. The receive buffer size should be at least twice the length of the transmitted block. The middle delay on receiving side is equal to half of 'wsize'. The default value is 1000 [µs].

13. Profile for the UDP mode

In the first step use the command to set profile to UDP mode:

SET MODE UDP (to set mode only)
or
SET MODE UDP DEFAULT (to set mode with default parameters)

Next set the destination IPv4 address of the remote converter using the following command:

SET UDP IP4 ADDR xx.xx.xx.xx

Default value of destination address is 255.255.255.255 and the address must be changed before starting of transmission.

Then set the parameters of the Eurocom interface:

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, 512, 1024, 2048 [kbit/s].

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 board's version.

In the next steps verify the remaining parameters and if necessary set them using the following commands:

SET UDP DA xx:xx:xx:xx:xx:xx

The above command set up the MAC address of the destination converter to avoid of use the ARP protocol. Default value of destination address is ff:ff:ff:ff:ff:ff and this address forces use of the ARP (Address Resolution Protocol) to find out the destination MAC address.

SET UDP COS x

The above command set the value of CoS tag (class of service) in the optional 802.1q tag of sent Ethernet frames. The value of 'x' should be in the range from 0 to 7, according to IEEE 802.1q networking standard. The default value is 5. If both CoS and VLAN values are equal to zero, sent frames remain untagged.

SET UDP VLAN x

The above command sets the value of VLAN number (Virtual LAN) in the optional 802.1q tag of sent Ethernet frames. The value of 'x' should be in the range from 0 to 4095, according to IEEE 802.1q networking standard. The default value of VLAN is 0. If both CoS and VLAN values are equal to zero, sent frames remain untagged.

SET UDP PSIZE n

The above command sets up the size of the block of data. Integer value 'n' is denominated in microsecond and should be in range from 250µs to 64000µs. The real size of the block is rounded up to the next value which give the packet size equal to integer power of two bytes. Recommended

values are 250 / 500 / 1000 / 2000 / ... /64000. The default value is 500 [µs].

SET UDP WSIZE n

The above command sets up the size of the received buffer [jitter buffer]. Integer value 'n' is denominated in microsecond and should be in range from 250µs to 64000µs. The real size of the buffer is rounded up to the next value which give the packet size equal to integer power of two bytes. Recommended values are 250 / 500 / 1000 / 2000 / ... /64000. The received buffer size should be at least twice the length of the transmitted block. The middle delay on receiving side is equal to half of 'wsize'. The default value is 1000 [µs].

SET UDP IP4 TOS <x>

The above command sets up the value of ToS code (Type of Service / DSCP code) in the IPv4 header of sent Ethernet frames. The hexadecimal value of <x> should be in the range from 0 to 0x3f, according to RFC2474 standard.

SET UDP IP4 TTL <x>

The above command sets up the value of TTL code (time-to-live / hop limit) in the IPv4 header of sent Ethernet frames. The value of <x> should be in the range from 0 to 255, the default value is 63.

SET UDP UDP LOC <x>
SET UDP UDP SRC <x>

The above command sets up the number of sending (source) port in the UDP header. The value of <x> should be in the range from 1 to 65535, the default value is 3126.

SET UDP UDP REM <x>
SET UDP UDP DEST <x>

The above command sets up the number of sending port in the UDP header. The value of <x> should be in the range from 1 to 65535, the default value is 3126.

14. Profile for the LD UDP mode

In the first step use the command to set profile to LD UDP mode:

SET MODE LDUDP (to set mode only)
or
SET MODE LDUDP DEFAULT (to set mode with default parameters)

Next set the destination IPv4 address of the remote converter and the mode of the LD UDP protocol using following commands:

SET LDUDP IP4 ADDR xxx.xxx.xxx.xxx

Default value of destination address is ff.ff.ff.ff and the address have to be changed before starting of transmission.

Then set the basic parameters of the Eurocom interface:

SET D1 CHRATE <c>

The above command sets up the throughput of a single traffic channel on the Eurocom interface to the value of <c>. Possible values of <c> are 16 or 32 [kbit/s]. The default value is 16 kbit/s.

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, 512, 1024, 2048 [kbit/s].

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.

SET D1 GOBACK <g>

The above command sets up the 'go-back' parameter of the link layer protocol of the channel #1 on the Eurocom interface to the value of <g>. Possible values of <r> are 4 or 6. The standard value is 6.

SET D1 FRAME <f>

The above command sets up the framing mode of the slot #0 on the

Eurocom interface to the value of <f>. Possible values of <f> are **E** (for the **E**urocom framing mode) or **S** (for the **S**tanag4207 framing mode). The standard value is E (Eurocom).

In the next steps verify the remaining parameters and if necessary set them using the following commands:

SET LDUDP DA xx:xx:xx:xx:xx:xx

The above command sets up the MAC address of the destination converter to avoid of use the ARP protocol. Default value of destination address is ff:ff:ff:ff:ff:ff and this address forces use of the ARP (Address Resolution Protocol) to find out the destination MAC address.

SET LDUDP COS x

The above command sets the value of CoS tag (class of service) in the optional 802.1q tag of sent Ethernet frames. The value of 'x' should be in the range from 0 to 7, according to IEEE 802.1q networking standard. The default value is 5. If both CoS and VLAN values are equal to zero, sent frames remain untagged.

SET LDUDP VLAN x

The above command sets the value of VLAN number (Virtual LAN) in the optional 802.1q tag of sent Ethernet frames. The value of 'x' should be in the range from 0 to 4095, according to IEEE 802.1q networking standard. The default value of VLAN is 0. If both CoS and VLAN values are equal to zero, sent frames remain untagged.

SET LDUDP PSIZE n

The above command sets up the size of the block of data. Integer value 'n' is denominated in microsecond and should be in range from 250µs to 64000µs. The real size of the block is rounded up to the next value which give the packet size equal to integer power of two bytes. Recommended values are 250 / 500 / 1000 / 2000 / ... /64000. The default value is 2000 [µs].

SET LDUDP WSIZE n

The above command sets up the size of the receive buffer [jitter buffer]. Integer value 'n' is denominated in microsecond and should be in range

from 250µs to 64000µs. The real size of the buffer is rounded up to the next value which give the packet size equal to integer power of two bytes. Recommended values are 250 / 500 / 1000 / 2000 / ... /64000. The receive buffer size should be at least twice the length of the transmitted block. The middle delay on receiving side is equal to half of 'wsize'. The default value is 4000 [µs].

SET LDUDP UDP LOC <x>
SET LDUDP UDP SRC <x>

The above command sets up the number of sending (source) port in the UDP header. The value of <x> should be in the range from 1 to 65535, the default value is 3126.

SET LDUDP UDP REM <x>
SET LDUDP UDP DEST <x>

The above command sets up the number of sending port in the UDP header. The value of <x> should be in the range from 1 to 65535, the default value is 3126.

SET LDUDP T1 <x>
SET LDUDP T3 <x>

The above commands set the values of timers T1 and T3 (in ms), used in LD protocol. Recommended values are 200 and 5000 (ms).

SET LDUDP WTX <x>
SET LDUDP WRX <x>

The above commands set the sizes of transmitters and receive windows respectively. Recommended value is 32

15. Profile for the TCP mode

In the first step use the command to set profile to TCP mode:

SET MODE TCP (to set mode only)
or
SET MODE TCP DEFAULT (to set mode with default parameters)

Next set the destination IPv4 address of the remote converter and the mode of the TCP protocol using following commands:

SET TCP IP4 ADDR 255.255.255.255

Default value of destination address is ff.ff.ff.ff and the address must be changed before starting of transmission.

SET TCP TCP <x>

The above command sets up the mode of TCP protocol to 'server' if <x> is 'S' or to 'client' if <x> is 'C'. The default value of <x> is 'S'.

Then set the basic parameters of the Eurocom interface:

SET D1 CHRATE <c>

The above command sets up the throughput of a single traffic channel on the Eurocom interface to the value of <c>. Possible values of <c> are 16 or 32 [kbit/s]. The default value is 16 kbit/s.

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, 512, 1024, 2048 [kbit/s].

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.

SET D1 GOBACK <g>

The above command sets up the 'go-back' parameter of the link layer protocol of the channel #1 on the Eurocom interface to the value of <g>. Possible values of <r> are 4 or 6. The standard value is 6.

SET D1 FRAME <f>

The above command sets up the framing mode of the slot #0 on the Eurocom interface to the value of <f>. Possible values of <f> are **E** (for the **E**urocom framing mode) or **S** (for the **S**tanag4207 framing mode). The standard value is E (Eurocom).

In the next steps verify the remaining parameters and if necessary set them using the following commands:

SET TCP DA xx:xx:xx:xx:xx:xx

The above command sets up the MAC address of the destination converter to avoid of use the ARP protocol. Default value of destination address is ff:ff:ff:ff:ff:ff and this address forces use of the ARP (Address Resolution Protocol) to find out the destination MAC address.

SET TCP COS x

The above command sets the value of CoS tag (class of service) in the optional 802.1q tag of sent Ethernet frames. The value of 'x' should be in the range from 0 to 7, according to IEEE 802.1q networking standard. The default value is 5. If both CoS and VLAN values are equal to zero, sent frames remain untagged.

SET TCP VLAN x

The above command sets the value of VLAN number (Virtual LAN) in the optional 802.1q tag of sent Ethernet frames. The value of 'x' should be in the range from 0 to 4095, according to IEEE 802.1q networking standard. The default value of VLAN is 0. If both CoS and VLAN values are equal to zero, sent frames remain untagged.

SET TCP PSIZE n

The above command sets up the size of the block of data. Integer value 'n' is denominated in microsecond and should be in range from 250µs to 64000µs. The real size of the block is rounded up to the next value which give the packet size equal to integer power of two bytes. Recommended values are 250 / 500 / 1000 / 2000 / ... /64000. The default value is 500 [µs].

SET TCP WSIZE n

The above command sets up the size of the receive buffer [jitter buffer]. Integer value 'n' is denominated in microsecond and should be in range from 250µs to 64000µs. The real size of the buffer is rounded up to the next value which give the packet size equal to integer power of two bytes. Recommended values are 250 / 500 / 1000 / 2000 / ... /64000. The receive buffer size should be at least twice the length of the transmitted block. The

middle delay on receiving side is equal to half of 'wsize'. The default value is 1000 [μs].

SET TCP IP4 TOS <x>

The above command sets up the value of ToS code (Type of Service / DSCP code) in the IPv4 header of sent UDP Ethernet frames. The hexadecimal value of <x> should be in the range from 0 to 0x3f, according to RFC2474 standard.

SET TCP IP4 TTL <x>

The above command sets up the value of TTL code (time-to-live / hop limit) in the IPv4 header of sent Ethernet frames. The value of <x> should be in the range from 0 to 255, the default value is 63.

SET TCP UDP LOC <x>
SET TCP UDP SRC <x>

The above command sets up the number of sending (source) port in the UDP header. The value of <x> should be in the range from 1 to 65535, the default value is 3126.

SET TCP UDP REM <x>
SET TCP UDP DEST <x>

The above command sets up the number of sending port in the UDP header. The value of <x> should be in the range from 1 to 65535, the default value is 3126.

SET TCP TCP PORT <x>

The above command sets up the number of the server port for the TCP protocol, which is used for signaling messages. The value of <x> should be in the range from 1 to 65535, the default value is 3121.

16. 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 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

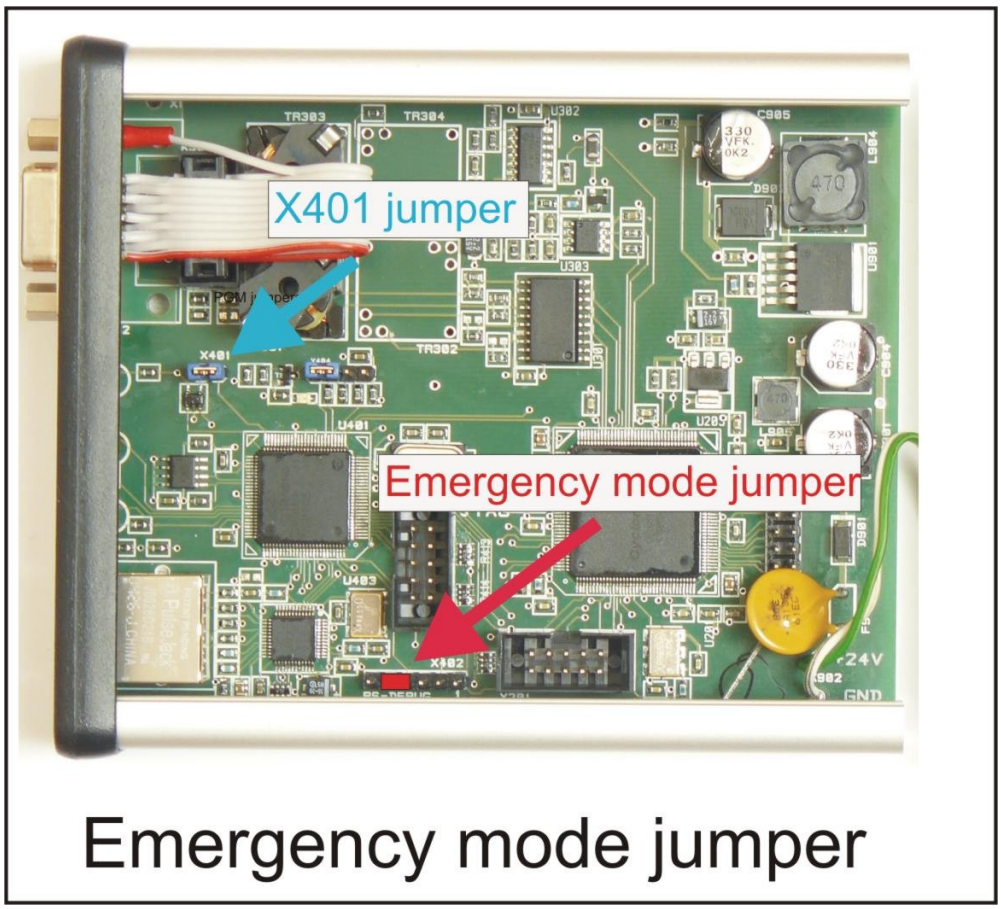
DISP PROFILE - display profile from the temporary memory
DISP PROFILE <n> - display profile read from the temporary memory
DISP SETTINGS - display current settings
DISP STATE - display current state

17. **Command group DIAG**

Commands which starts with word 'DIAG' are used to diagnostic purpose only. Do not use it, except the following:
DIAG QUIT - close current telnet session.
DIAG TRACE MSG ON - in LD and TCP modes signaling messages will be displayed

- **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 temporary used to short indicates 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 two upper screws holding front panel
  4. Pull out the upper part of the cover in the rear panel direction
  5. Disconnect flat cable from board
  6. Pull out converter board in rear panel direction

- **Firmware upgrade**

  Follow the instruction that come with new version of firmware.