

Zakład Produkcyjny TEL-KA

**EUROCOM / E1 mux
converter box**

User Manual

Warszawa 2010-14

1. General Information

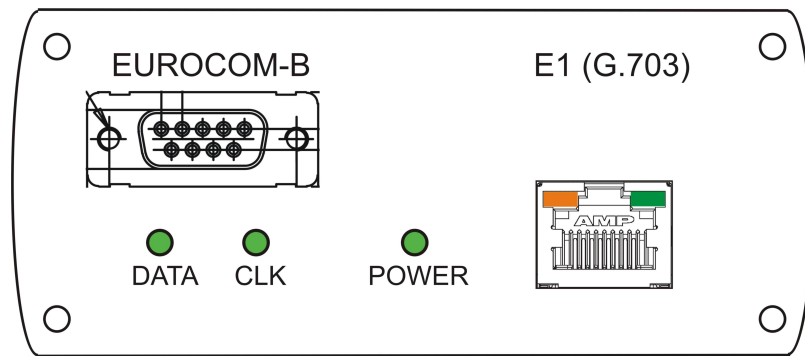
The Eurocom B/E1 Mux interface converter box allows to connect any equipment with Eurocom B interface to any equipment with E1 interface.

The EUROCOM B / E1 converter specification:

1. Binary throughput on E1 side: 2048 kbps \pm 100ppm
2. Binary throughput on Eurocom side: 256/512/1024/2048kbps \pm 100ppm
3. Modes of operation:
 - Raw data converter (2048 kbps only)
 - Multiplier mode with automatic throughput selection
 - Multiplexer mode
4. E1 interface:
 - G.703/120 Ω , balanced electrical parameters (ITU G.703, chapter 9)
 - RJ-45 socket (1,2-Rx, 4,5-Tx, 6,7-GND)
5. Eurocom interface:
 - B type, as per EUROCOM D/1 1986 IB6 (pages IB6-1 .. IB6-5)
 - connector: D-SUB 9 female-type
6. RS-232 interface (configuration/firmware update)
 - Baud rate 57,6 kbps, character format 8N2
 - connector: D-SUB 9 female-type
7. Power supply (available options):
 - DC +12V..+30, < 2W, non-isolated, '-' connected to board's earth and GND line of E1 interface, PSU socket 5.5/2.5mm
 - -48VDC (-36..-72VDC), isolated, MC 1,5/3-G-3.81 socket.
 - AC 85...240VAC, 47...63Hz, IEC60320-C14 socket
8. Power consumption < 1W
9. Box size: 106mm • 175mm • 46mm

2. Front panel layout

Front panel contains:



- EUROCOM (DSUB-9 connector) interface
- E1 (RJ-45 connector) interface
- 'Power' status indicator (LED)
- Received 'DATA' and 'CLK' signals indicators (LEDs) for EUROCOM interface.
- Received E1 signal indicator (green LED on E1 connector)
- Received E1 G.704 frame synchronization status indicator (orange LED on E1 connector)

3. Rear panel layout

Rear panel contains:

- Power supply socket (depending on power supply version)
- RS-232 (DSUB-9 connector) interface

4. Connector layout

1. Interface E1 connector RJ-45

| Pin | Direction | Function |
|-----|-----------------------|---------------------------|
| 1 | input to converter | Received Data – wire A |
| 2 | input to converter | Received Data – wire B |
| 3 | not used | |
| 4 | output from converter | Transmitted Data – wire A |

| | | |
|---|-----------------------|---------------------------|
| 5 | output from converter | Transmitted Data – wire B |
| 6 | not used | |
| 7 | GND | Shield - ground |
| 8 | GND | Shield - ground |

2. Eurocom B interface, connector DSUB-9/15 female (front panel)

| No | DB 9 | DB 15 | Signal Name Eurocom B | Direction | RL-xxx TDM connector | AN/GRC-xxx Eurocom In/Out |
|-------|------|-------------|-----------------------|-----------------------|----------------------|---------------------------|
| 1 | 1 | 4 | Transmit Clock A | Output from converter | L | F |
| 2 | 6 | 12 | Transmit Clock B | | M | E |
| 3 | 2 | 1 | Transmit Data A | | H | H |
| 4 | 7 | 9 | Transmit Data B | | G | G |
| 5 | 3 | 7 | Receive Clock A | Input to converter | J | S |
| 6 | 8 | 15 | Receive Clock B | | K | R |
| 7 | 4 | 3 | Receive Data A | | F | T |
| 8 | 9 | 11 | Receive Data B | | E | J |
| 9, 10 | 5 | 2,6 8,14 | GND | Chassis | V | V |

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

3. 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 |

5. Power options

- DC 24V option
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.
- DC 48V option
Converter box is powered by -36..-72VDC (isolated). The equipment is resistant to incorrect power connection, if the voltage is below 100V. Socket is MC 1,5/3-G-3.81.
- AC option
Converter box is powered by 85...240VAC, 47...63Hz, socket IEC60320-C14

6. Configuration

1. Modes of operation

The converter offers three modes of operation:

- **Simple converter mode**
Simple interface converter 2048kbps only
- **Multiplier mode**
In this mode each bit received from Eurocom interface is transmitted 8, 4, or 2 by interface E1. In the direction from Eurocom interface to the E1 interface the degree of multiplication is determined automatically based on measurement Eurocom interface received clock frequency. In the opposite direction the equipment automatically recognized degree of multiplication on E1 interface and retrieve the original binary stream on Eurocom interface
- **Multiplexer mode**
For 2048kbps it works just like simple raw-data converter. For lessee throughput, G.704 framing is generated on E1 interface and raw data from Eurocom side are placed in predetermined timeslots (and vice-versa). The byte integrity is not maintained (in the case of connecting two E1 nodes through Eurocom link with throughput 256/512 or 1024 kbps).

2. How to set up

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)

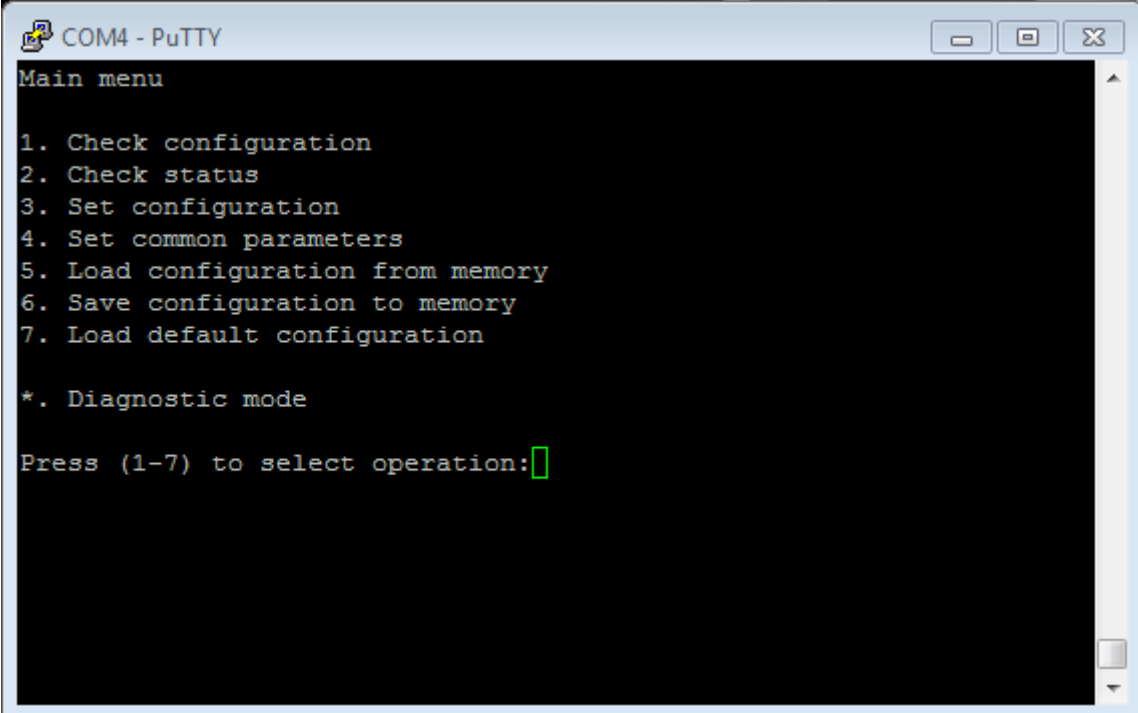
flow control – none

kind on terminal – ansi/VT100

As the terminal can be used PC with a serial interface and an appropriate program such as Hyperterminal (under WindowsXP) or Putty (version 0.60 or higher). 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.

3. Main menu

After power up the following screen appears:



```
COM4 - PuTTY
Main menu
1. Check configuration
2. Check status
3. Set configuration
4. Set common parameters
5. Load configuration from memory
6. Save configuration to memory
7. Load default configuration
*. Diagnostic mode
Press (1-7) to select operation: [ ]
```

The following options are available:

Check configuration – display current configuration

Check status – display current status

Set configuration – select this option to change current configuration

Set common parameters – set common parameters like PLL bandwidth

Load configuration from memory – use this option to restore previously saved configuration

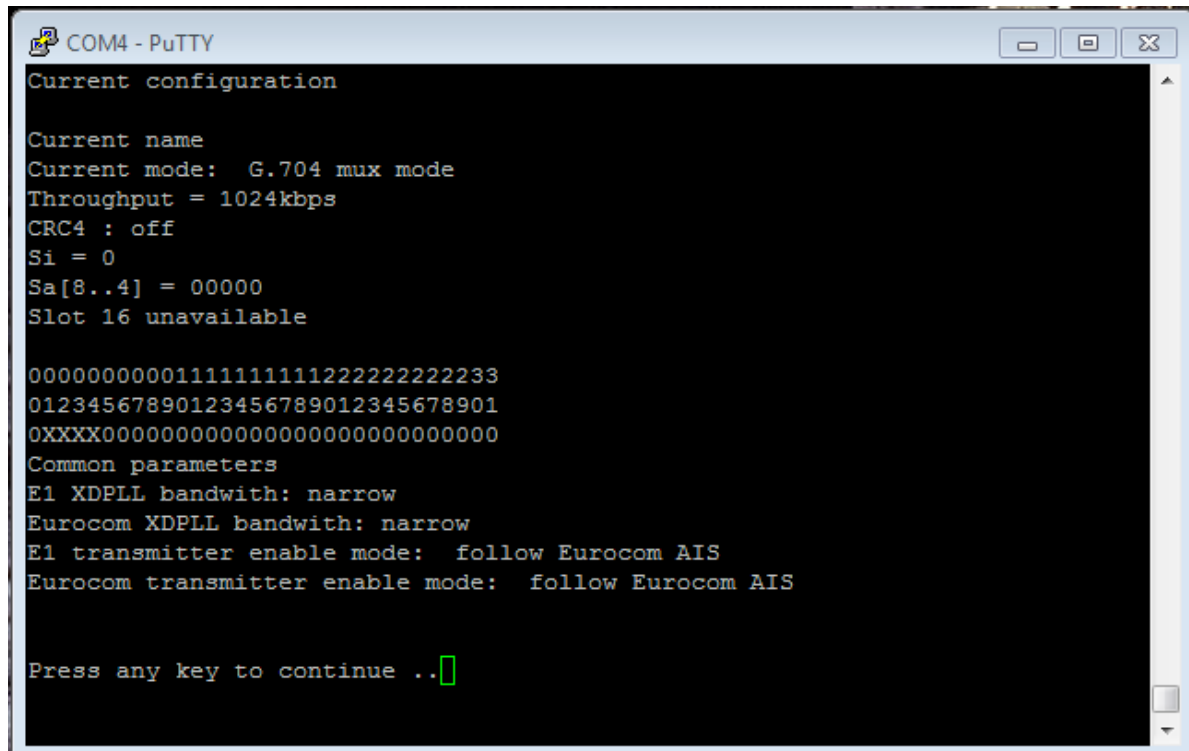
Save configuration to memory – use this option to write current configuration to non-volatile memory. 64 different configuration identified by name and number are possible.

Load default configuration – use this option to load one from fixed configuration examples.

* – entry into debug mode, do not use.

4. Check configuration menu (1)

After pressing key '1' the screen containing current configuration appears. The following figures show examples of configurations (2048kbps raw data and G.704 mode)



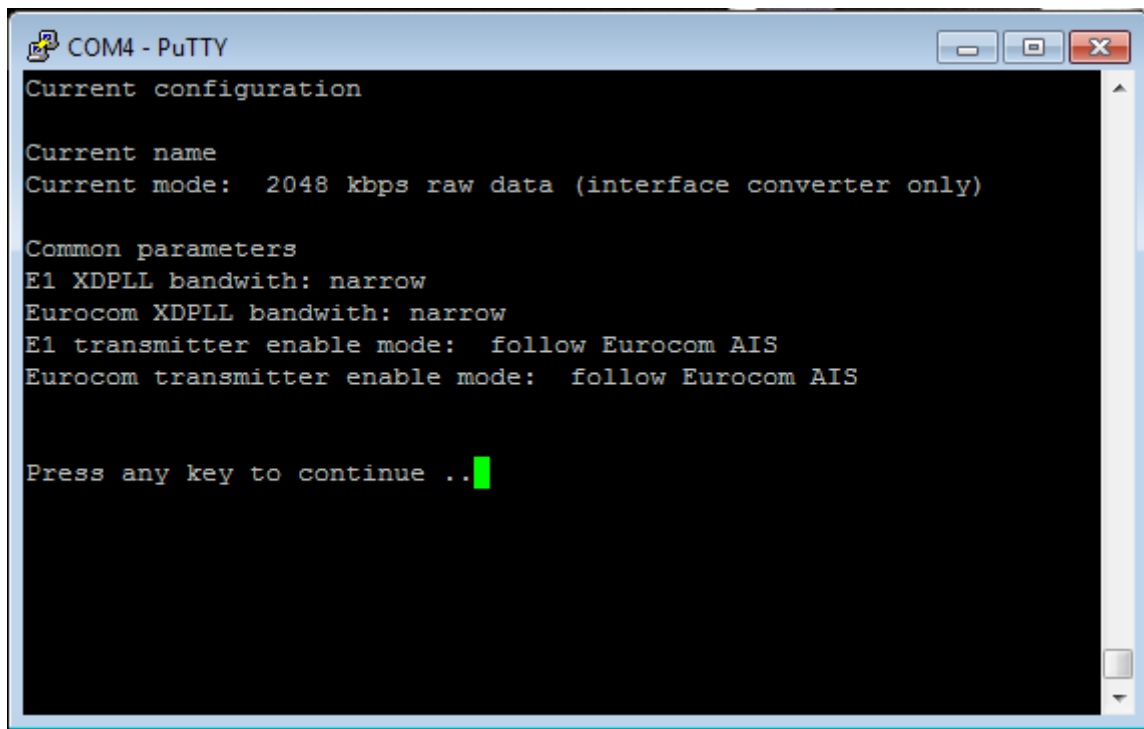
```
COM4 - PuTTY
Current configuration

Current name
Current mode: G.704 mux mode
Throughput = 1024kbps
CRC4 : off
Si = 0
Sa[8..4] = 00000
Slot 16 unavailable

000000000011111111222222222233
01234567890123456789012345678901
OXXXX0000000000000000000000000000

Common parameters
E1 XDPLL bandwith: narrow
Eurocom XDPLL bandwith: narrow
E1 transmitter enable mode: follow Eurocom AIS
Eurocom transmitter enable mode: follow Eurocom AIS

Press any key to continue ..
```



```
COM4 - PuTTY
Current configuration

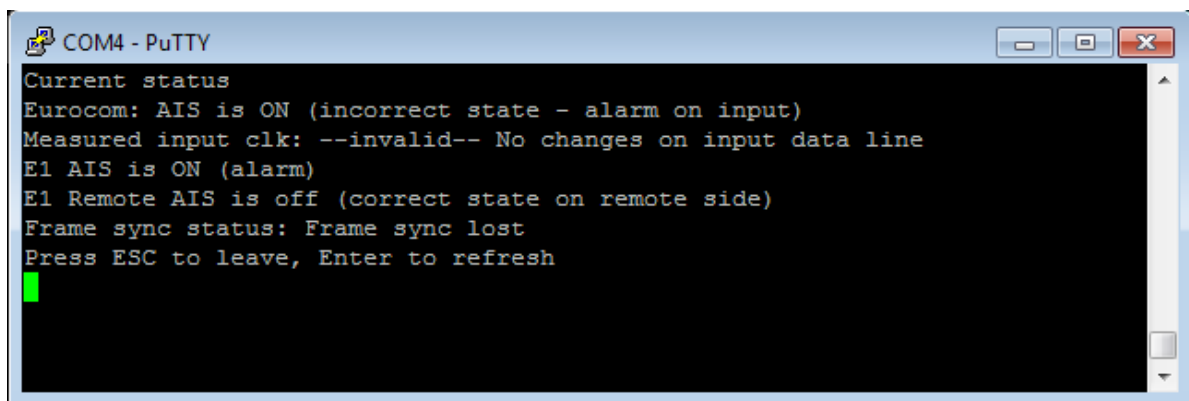
Current name
Current mode: 2048 kbps raw data (interface converter only)

Common parameters
E1 XDPLL bandwith: narrow
Eurocom XDPLL bandwith: narrow
E1 transmitter enable mode: follow Eurocom AIS
Eurocom transmitter enable mode: follow Eurocom AIS

Press any key to continue ..
```

5. Check status menu

After pressing key '2' the following screen appears:

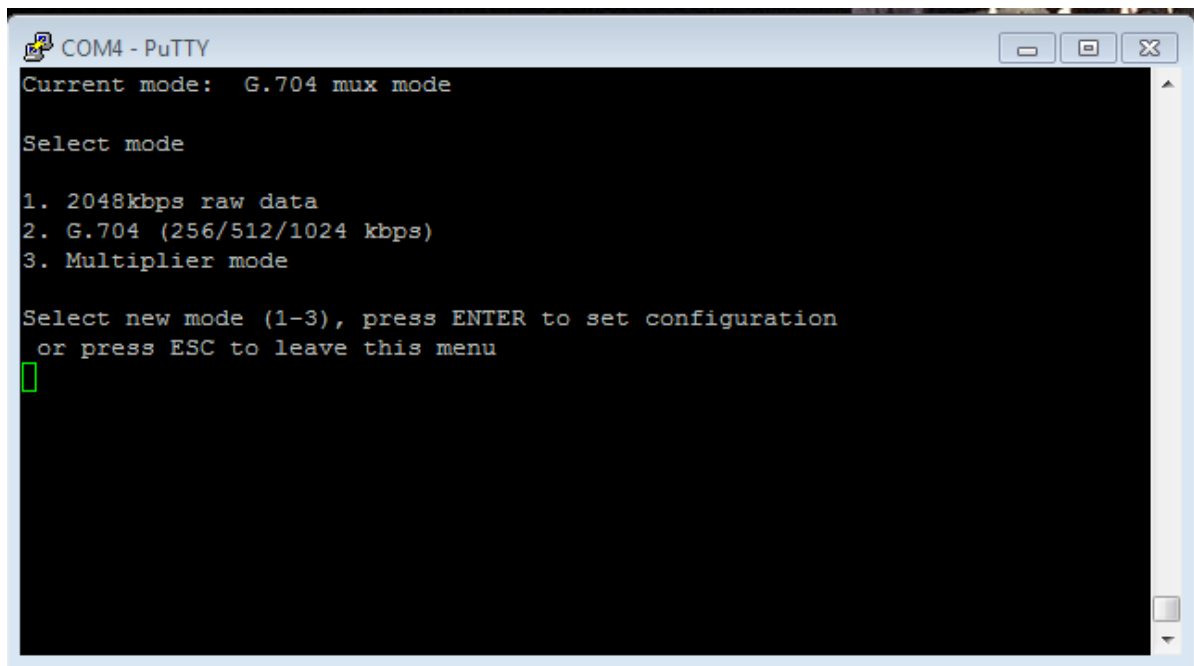


```
COM4 - PuTTY
Current status
Eurocom: AIS is ON (incorrect state - alarm on input)
Measured input clk: --invalid-- No changes on input data line
E1 AIS is ON (alarm)
E1 Remote AIS is off (correct state on remote side)
Frame sync status: Frame sync lost
Press ESC to leave, Enter to refresh
```

Above screen contains information about AIS (Alarm Indication Signal) on both Eurocom and E1 inputs, measured Eurocom input clock frequency and E1 framing synchronization status (in G.704 mode only). Pressing *Enter* refresh the screen.

6. Select configuration menu

New configuration is entered by pressing key 3. After pressing this key in the main menu the following screen appears:



```
COM4 - PuTTY
Current mode: G.704 mux mode

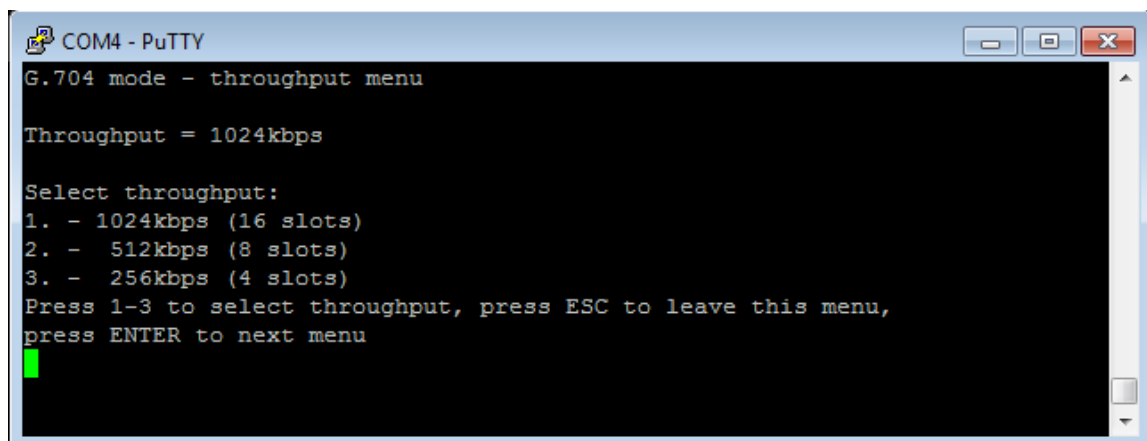
Select mode

1. 2048kbps raw data
2. G.704 (256/512/1024 kbps)
3. Multiplier mode

Select new mode (1-3), press ENTER to set configuration
or press ESC to leave this menu
█
```

On the top of the screen the current mode is displayed. By pressing keys '1', '2' or '3' the new configuration may be introduced. The selection is confirmed by pressing Enter. The next screen depends on selected configuration.

- 2048kbps raw data mode
For this mode there is only one screen.
- G.704 mode
The next screen allows throughput selection:

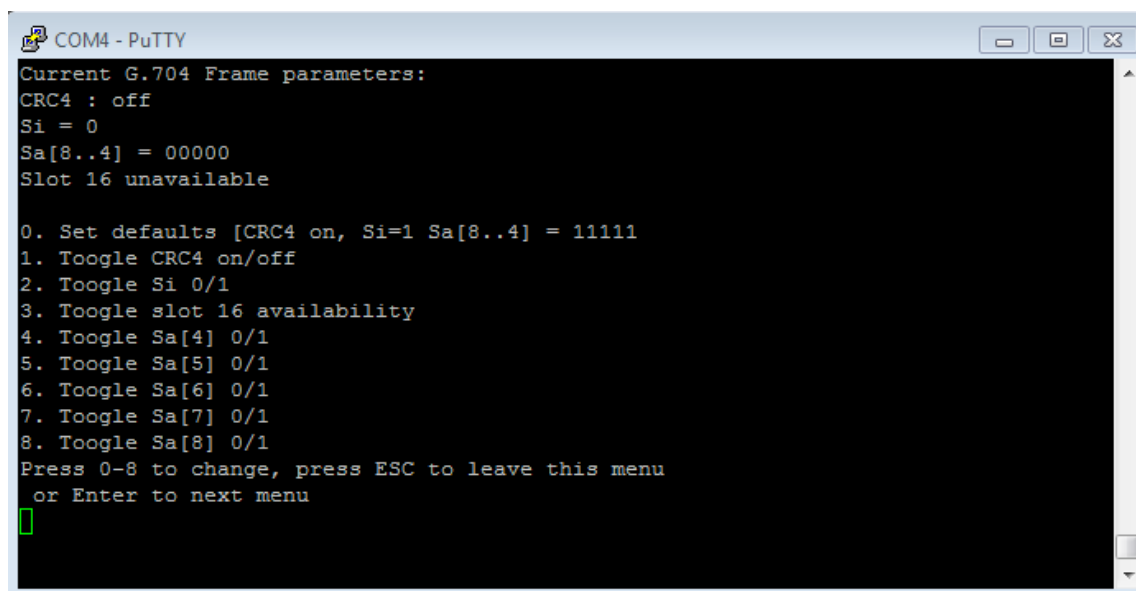


```
COM4 - PuTTY
G.704 mode - throughput menu

Throughput = 1024kbps

Select throughput:
1. - 1024kbps (16 slots)
2. - 512kbps (8 slots)
3. - 256kbps (4 slots)
Press 1-3 to select throughput, press ESC to leave this menu,
press ENTER to next menu
█
```

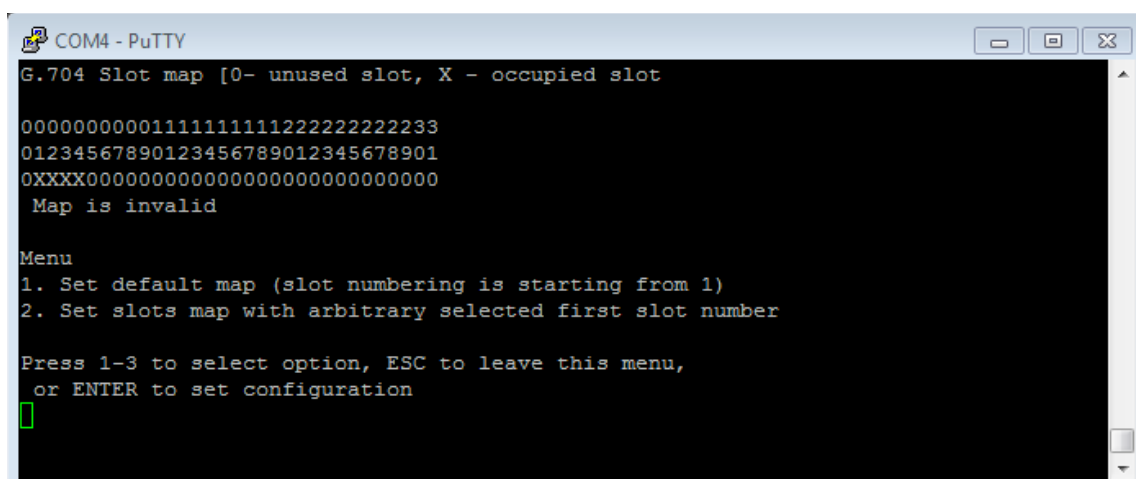
On the top of the screen the current throughput is displayed. By pressing keys '1', '2' or '3' the new throughput may be introduced. The selection is confirmed by pressing Enter. Then the next screen with G.704 frame parameters is displayed:



```
COM4 - PuTTY
Current G.704 Frame parameters:
CRC4 : off
Si = 0
Sa[8..4] = 00000
Slot 16 unavailable

0. Set defaults [CRC4 on, Si=1 Sa[8..4] = 11111
1. Toogle CRC4 on/off
2. Toogle Si 0/1
3. Toogle slot 16 availability
4. Toogle Sa[4] 0/1
5. Toogle Sa[5] 0/1
6. Toogle Sa[6] 0/1
7. Toogle Sa[7] 0/1
8. Toogle Sa[8] 0/1
Press 0-8 to change, press ESC to leave this menu
or Enter to next menu
█
```

On the top of the screen current frame parameters are displayed. By pressing keys '1' ... '8' the indicated bits may be changed. The selection is confirmed by pressing Enter. In the next step the slot maps is selected:



```
COM4 - PuTTY
G.704 Slot map [0- unused slot, X - occupied slot

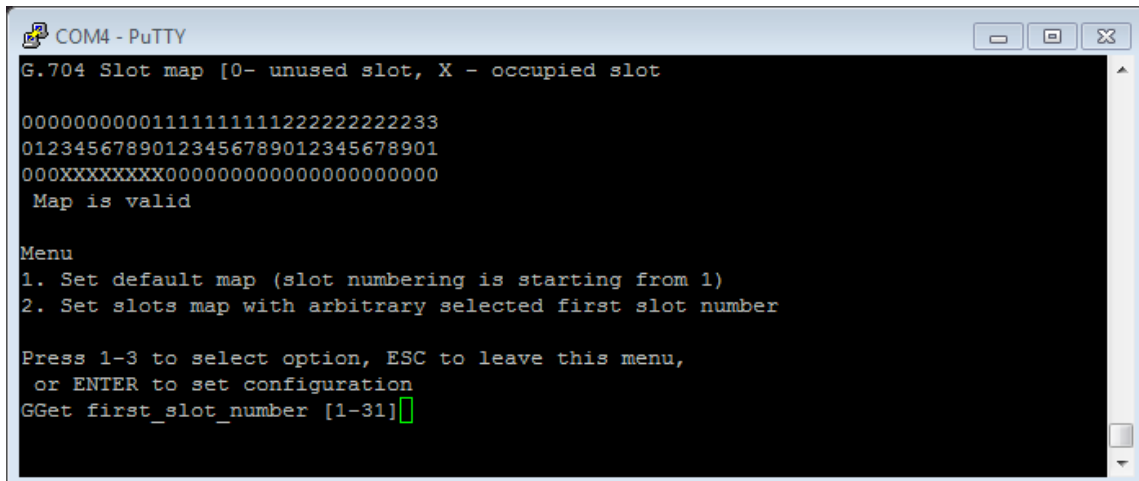
00000000001111111111222222222233
01234567890123456789012345678901
OXXXX0000000000000000000000000000
Map is invalid

Menu
1. Set default map (slot numbering is starting from 1)
2. Set slots map with arbitrary selected first slot number

Press 1-3 to select option, ESC to leave this menu,
or ENTER to set configuration
█
```

The current occupied slots map is displayed on the top (occupied slots are marked by X). By pressing key '1' and next the Enter the default map is selected. Pressing key '2' allows arbitrary slot origin selection. Enter the first slot number and confirm the selection by pressing Enter.

- Multiplier mode



```
COM4 - PuTTY
G.704 Slot map [0- unused slot, X - occupied slot

00000000001111111111222222222233
01234567890123456789012345678901
000XXXXXXXXX00000000000000000000
Map is valid

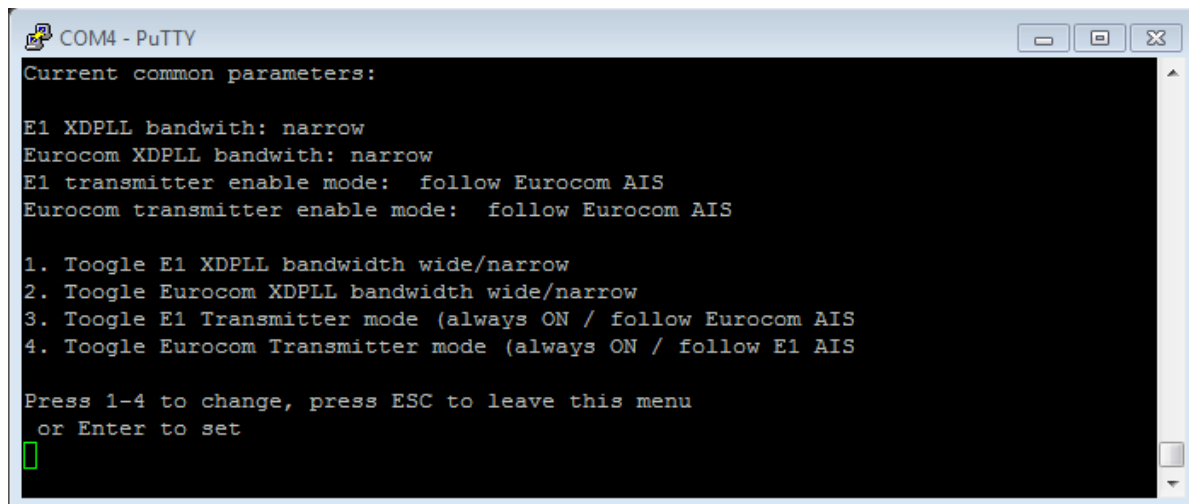
Menu
1. Set default map (slot numbering is starting from 1)
2. Set slots map with arbitrary selected first slot number

Press 1-3 to select option, ESC to leave this menu,
or ENTER to set configuration
GGet first_slot_number [1-31]
```

For this mode is only one screen.

7. Set Common Parameters menu

After pressing key '4' the following screen appears:



```
COM4 - PuTTY
Current common parameters:

E1 XDPLL bandwith: narrow
Eurocom XDPLL bandwith: narrow
E1 transmitter enable mode: follow Eurocom AIS
Eurocom transmitter enable mode: follow Eurocom AIS

1. Toogle E1 XDPLL bandwidth wide/narrow
2. Toogle Eurocom XDPLL bandwidth wide/narrow
3. Toogle E1 Transmitter mode (always ON / follow Eurocom AIS
4. Toogle Eurocom Transmitter mode (always ON / follow E1 AIS

Press 1-4 to change, press ESC to leave this menu
or Enter to set
```

It is possible to change the following parameters:

- wide/narrow bandwidth of PLL's
- transmitters enable mode

Last parameters are important only in certain modes

8. Load configuration from memory menu

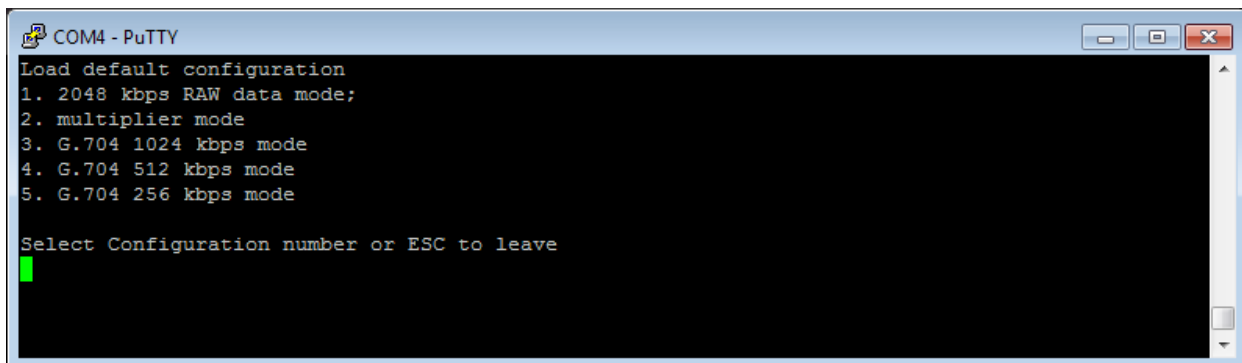
This option allows loading the previously saved configuration from the non volatile memory.

9. Save configuration to memory menu

It is possible to save current configuration in the nonvolatile memory for later use.

10. Load defaults configuration menu

The set of typical configuration is prepared:

A screenshot of a PuTTY terminal window titled 'COM4 - PuTTY'. The terminal displays a menu for loading default configurations. The menu items are: 1. 2048 kbps RAW data mode; 2. multiplier mode; 3. G.704 1024 kbps mode; 4. G.704 512 kbps mode; 5. G.704 256 kbps mode. Below the menu, it says 'Select Configuration number or ESC to leave' with a green cursor on the first line.

```
COM4 - PuTTY
Load default configuration
1. 2048 kbps RAW data mode;
2. multiplier mode
3. G.704 1024 kbps mode
4. G.704 512 kbps mode
5. G.704 256 kbps mode

Select Configuration number or ESC to leave
█
```

By pressing one of the keys '1' ... '5' the one of typical configuration is introduced.

11. 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

12. Firmware upgrade

Follow the instruction that came with new version of firmware