

# **INSTALLATION MANUAL**

6609-2211









CE Approved

Isolation

Galvanic

Transient Protection

**Balanced** Transmission



Industrial Ethernet adapter - Serial Server (TCP)



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# I. Introduction

The ED-10 TCP is an Industrial Ethernet Adapter acting as a serial server. The type of serial interface is selectable between RS-232 and RS-422/485. The Ethernet interface is IOBASE-T and TCP/IP Protocols are implemented for network communication.

The ED-10 TCP provides a remote serial interface for a computer connected through a TCP/IP network.

To complete the connection to the ED-10 TCP additional software need to be used in the computer. Different solutions are possible, e.g.:

I. Telnet to the ED-10 TCP. All keystrokes are transferred to the remote serial interface.

Any characters received at the remote serial interface are transferred to the computer screen.

2. A COM port redirector software can be used to create up to 256 virtual COM ports.

> This software will redirect data, originally sent to a

local COM port, to the remote serial interface of the ED-10 TCP. No change of computer application software is then necessary.

3. Customer written software can be used to directly access the network interface (socket compliant) of the ED-10 TCP.

A sample written in C++ can be found on the CD "\Software\Sample.sample.zip"





ED-10 TCP Virtual COM ports connection

The ED-10 TCP is ideal for use in the industrial environment.

It is housed in the Westermo DIN rail box and has a wide range power input, isolated interfaces and enhanced surge/transient protection.

The ED-10 TCP is approved for Industrial EMC Immunity and Emission .

The ED-10 TCP uses the TCP/IP Internet Protocol Suit (TCP/IP) to transfer data over the network.

TCP/IP is a set of protocols that enables communication across local and wide area networks and includes protocols such as TCP, UDP, IP, ARP, RARP, ICMP. Although not all these protocols are needed for a network data transfer.

The ED-10 TCP uses TCP for remote configuration (configuration mode) and for the serial server application.

The ED-10 TCP can be configured both remotely over the TCP/IP network and locally via the RS-232 interface, making the unit very flexible.

Local or remote configuration is achieved either by using the ED-Tool Windows, software or by using a terminal programme (e.g. HyperTerminal for local configuration or Telnet for remote configuration).

A DIP switch setting also allows the unit to be reset to factory default, if required.

# 2. Safety



#### General:

Before using this unit, read the manual completely and comply with information on the unit, and make sure that you understand it fully. Check that your application does not exceed the safe operating specifications for this unit.



#### Before installation, maintenance or modification work:

Prevent damage to internal electronics from electrostatic discharges (ESD) by discharging your body to a grounding point (e.g. use of wrist strap).

#### Installation:



This unit is constructed for professional system use. It should be located in a restricted access area, such as locked cabinet which can only be accessed by service personnel.

Sound installation practice, as defined by applicable local codes or regulations, shall be followed in every instance in which such practice is applicable.

This unit is defined as class III equipment and shall be separated from hazardous voltage by double or reinforced insulation.

All interfaces must only be connected to SELV or TNV-1 circuits.

# 3. Specification

#### **Network Interface**

Data rate Mechanical

#### Serial Interface I

Data rate Data format

Control signals\* Termination\*\* Mechanical

#### **Serial Interface 2**

Data rate Data format Mechanical

#### **Power Interface**

Rated voltage Rated current Rated frequency Mechanical

#### Isolation\*\*\*

Power Interface to all other Interfaces Network Interface to serial interface 10BASE-T. IEEE std 802.3, 2000 Edition. 10 Mbit/s, half duplex. RJ-45 Modular Jack (ISO/IEC 8877:1992), Unshielded or shielded (UTP/STP).

#### RS-232 or RS-422/485 300–115 200 bit/s Full, half duplex or simplex. 7–8 Data Bits, Odd, Even or None Parity Bit, 1–2 Stop Bits (2 stop bits when no parity only) RTS, CTS, DSR, DCD, DTR Termination and fail safe, on or off RS-232: 9-pin female D-sub. RS-422/485: Screw Terminal.

RS-232 (used for local configuration only) 19 200 Bit/s 8 Data Bits, No Parity Bit, 1 Stop Bit 9-pin female D-sub.

10–60 V DC, polarity independent / 12–30 V AC. 350 mA, max @ 10 V DC input. 48–62 Hz Screw Terminal.

Functional and safety

4.2 kV DC, 3 kV RMS @ 50 Hz.

2.1 kV DC, 1.5 kV RMS @ 50 Hz.

#### **Enhanced Transient/Surge Protection**

Power Interface	±4 kV, EN 61 000-4-5:1995 Class 4
Network Interface	±2 kV, EN 61 000-4-5:1995 Class 3
Serial Interface**	±2 kV, EN 61 000-4-5:1995 Class 3
Serial Interface*	±0.5 kV, EN 61 000-4-5:1995 Class 1

#### Application

Latency (minimum)	Serial to Network: 4 ms
	Network to Serial: 10 ms
Throughput (maximum)	115 kbit/s (1.44 MB data)
Network protocols	TCP, IP, ARP, ICMP (Ping), Telnet

\* RS-232 only.

\*\* RS-422/485 only.

\*\*\* Test voltage applied for 60 sec.

Configuration	Remotely over Network or locally at serial interface. Windows based PC-programme or simple terminal programme.
Indicators (LED)	TD, RD, CTS, RTS, PWR, TD, RD, CONFIG, NET
Environment	5–50°C 5–95% REL non condensing
Dimension	55x100x128 mm (WxHxD)
Weight	0.35 kg
Mounting	On 35 mm DIN-rail
Approvals	CE

# 4. Maintenance

No maintenance is required, as long as the unit is used within the specified conditions.

# 5. Installation

# 5.1 Mounting / Removal



Prevent damage to internal electronics from electrostatic discharges (ESD) by discharging your body to a grounding point (e.g. use of wrist strap).

Prevent access to hazardous voltages by disconnecting the unit from AC/DC mains supply and all other electrical connections.

## Mounting

This unit should be mounted on 35 mm DIN-rail which is horizontally mounted on a wall or cabinet backplate.

This unit uses convection cooling. To avoid obstructions to the airflow around the unit, use the following spacing rules. Recommended spacing 25 mm (1.0 inch) above/below and 10 mm (0.4 inches) left/right the unit.



Snap on mounting (figure)



## Removal

Press down the black support at the back of the unit using a screwdriver, see figure.







# 5.2 Connections

CHI is used for the serial/network conversion. Type of interface (RS-232 or RS-422/485) connected must also be set at DIP switch SI. (*Ref. section 4.2*) CH2 is used for local configuration.

CH1 and CH2 are not galvanic isolated.

Please use a RS-232 isolator (e.g. Westermo MD-52) if earth voltage differences are suspected. An isolator, on permanently connected CH2, is required to maintain the enhanced transient/surge protection.





Pin	Signal Name*		Dina etia n**	Description	
Number	Description	V.24	RS-232C	Direction	Description
I	DCD	109	CF	Out	TCP connection established
2	RD	104	BB	Out	Received Data
3	TD	103	BA	In	Transmitted Data
4	DTR	108.2	CD	In	DTR, close TCP connection
5	SG	102	AB	In/out	Signal Ground
6	DSR	107	СС	Out	DSR, ED-10 TCP ready
7	RTS	105	CA	In	Request to Send
8	CTS***	106	СВ	Out	Clear to Send
9	RI	125	CE	_	Ring Indicator, not connected

## CHI: RS-232 Connections (D-sub connector), DCE

\* Functionality might differ from standard, see chapter 6.3

\*\* Direction relative ED-10 TCP.

\*\*\* Follows DSR (CTS will be deactivated as required by flow control)

RS-232 cable must not exceed 15 m



# CHI: RS-422/485 Connections (Upper left screw terminal)

Terminal	Signal Na	ame*		
Number	Marked on ED-10 TCP	According to Standard	Direction**	Description
1	SG	-	-	Not connected
2	T–	В	Out/In	RS-422/485 4-wire Transmitter / RS-485 2-wire T– and R–
3	T+	A	Out/In	RS-422/485 4-wire Transmitter / RS-485 2-wire T+ and R+
4	R–	B′	In	RS-422/485 4-wire Receiver
5	R+	A'	In	RS-422/485 4-wire Receiver

\* Numbered right to left (front view).

\*\* Direction relative ED-10 TCP.

Twisted pair cable is recommended

# 5.2.1 RS-422/485 general advice



2-wire termination

#### Termination recommendations

The RS-422/485 line must be terminated. The receiver of master and receiver of final bus slave shall be terminated.

RS-422/485 connection pins can be differently named. For some brands the T+ corresponds to A, but other brands might use some other naming convention.

If a unit does not work it can help to swap A and B.



Twisted pair cable is recommended



### CH2: RS-232 Connections (D-sub connector), DCE

CHI and CH2 are not galvanic isolated.

Please use a RS-232 isolator (e.g. MD-52) if earth voltage differences are suspected. An isolator on permanently connected CH2, is required to maintain the enhanced transient/surge protection of CH1.

Pin	Signal Name*		Direction**	Description	
Number	Description	V.24	RS-232C	Direction	Description
I	DCD	109	CF	-	Data Carrier Detect, not connected
2	RD	104	BB	Out	Received Data
3	TD	103	BA	In	Transmitted Data
4	DTR	108.2	CD	-	Data Terminal Ready, not connected
5	SG	102	AB	In/out	Signal Ground
6	DSR	107	СС	-	Data Set Ready, not connected
7	RTS	105	CA	In	Request to Send, not used
8	CTS	106	СВ	Out	Clear to Send, not used
9	RI	125	CE	_	Ring Indicator, not connected

\* Functionality might differ from standard, see chapter 7.3

\*\* Direction relative ED-10 TCP.

RS-232 cable must not exceed 15 m

# Ethernet 10Base-T Connection (RJ-45 connector), straight function MDI (no crossover)

Contact	Signal Name	Direction*	Description	876
1	TD+	Out	Transmitted Data	3
2	TD-	Out	Transmitted Data	î L
3	RD+	In	Received Data	
4			Not connected	
5			Not connected	
6	RD-	In	Received Data	
7			Not connected	
8			Not connected	
			1	1

\* Direction relative ED-10 TCP.

CAT 5 cable is recommended.

Unshielded (UTP) or shielded (STP) connector might be used.

# 5.3 Configuration

# 5.3.1 DIP switch settings

DIP-switches used to configure the modem are accessable under the lid on top/front of the unit.



# Warning!

Prevent damage to internal electronics from electrostatic discharges (ESD) by discharging your body to a grounding point (e.g. use of wrist strap), before the lid on top of the modem is removed.



# Warning! Do not open connected equipment.

Prevent access to hazardous voltages by disconnecting the unit from AC/DC mains supply and all others electrical connections.

**NOTE!** When configuration via DIP-switches, the settings of DIP-switches configure the unit only after a power reset. A setting configured by any other method during normal operation, override the DIP-switch setting. However, at power up, the DIP-switch settings have precedence over the setting configured by any other method.







## 5.3.2 LED's

CHI: TD	Transmitted Data (incoming serial data):
LED off	• RS-232 TD = 1, Mark (< -3V) / RS-422/485 = 1, Mark (R+ < R-) /
	Not connected.
LED on	• RS-232 TD = 0, Space (> 3V) / RS-422/485 = 0, Space (R+ > R).
CHI: RD	Received Data (outgoing serial data):
LED off	• RS-232 RD = 1, Mark (< -3V) / RS-422/485 = 1, Mark (T+ < T-).
LED on	• RS-232 RD = 0, Space (> 3V) / RS-422/485 = 0, Space (T+ > T–).
CHI: RTS	Request To Send:
LED off	• RS-232 RTS = Off (< -3V)
LED on	• RS-232 RTS = On (> 3V)
СНІ: СТЅ	Clear To Send:
LED off	<ul> <li>RS-232 CTS = Off (&lt; -3V) / RS-422/485 transmitting.</li> </ul>
LED on	• RS-232 CTS = On (> 3V) / RS-422/485 receiving.
PWR	Power:
LED off	<ul> <li>No internal power (external power not connected).</li> </ul>
LED on	• Power OK.
CH2: TD	Transmitted Data (incoming serial data):
LED off	• RS-232 TD = 1, Mark (< -3V).
LED on	• RS-232 TD = 0, Space (> 3V).
CH2: RD	Received Data (outgoing serial data):
LED off	• RS-232 RD = 1, Mark (< -3V).
LED on	• RS-232 RD = 0, Space (> 3V).
CONFIG	ED-10 TCP working mode:
LED on	Configuration mode.
LED off	• Application mode (or during start up of config. mode).
NET	Indication of network status:
LED off	• Link Test failed (no network).
LED on	• Link Test passed.
LED flashing	• Data on Network (traffic).

#### 5.4 Installation of ED-Tool

This section describes the installation of ED-Tool.

#### **System Requirements:**

To install and run the ED-Tool program following requirements are needed.

Minimum:

- 386, 486 or Pentium, Processor-based personal computer
- Microsoft, Windows, 95/98/Me, Windows NT 3.51/4.0, or Windows 2000, Windows XP, compatible OS.
- 16 MB of RAM for Windows 95/98/Me systems
- 24 MB of RAM for Windows NT systems
- 32 MB of RAM for Windows 2000/XP systems
- CD-ROM drive
- 8 MB of space on hard drive
- Serial and/or Ethernet network connections
- Internet Explorer 5.0 or higher

#### Recommended:

- Pentium processor-based personal computer
- 32 MB of RAM

#### Installation:

Remove any previous versions of ED-Tool before installation.

To install ED-Tool

- Insert the ED-Tool CD-ROM into the CD-ROM drive
- Locate the 'setup.exe' file on the ED-Tool CD-ROM.
- Run the 'setup.exe' and follow the instructions.

# 6. Functional description

The ED-10 TCP can be in either configuration (config) mode or in application (app) mode. Normally the ED-10 TCP is in app mode, where the serial server is enabled and all configuration settings are readable.

Change of configuration parameters are done in ED-10 TCP config mode.

Configurable parameters are listed in chapter 7.3.



#### **Application mode**

In application mode the ED-10 TCP act as a serial server. After reboot it awaits a remote client to make a TCP connection. When the connection is established all data received at the network interface will be immediately transmitted at the serial interface CH1. Data received from the serial interface CH1 is buffered into a data frame according to the packing algorithm. Each frame is then transmitted at the network interface to the remote client. Please note that the TCP protocol allows network packets to be split or clumped together, hence override the packing algorithm. The default packing algorithm shall normally remain unchanged.

When a TCP connection is closed the ED-10 TCP can be set to optionally (mode 2) transmit a TCP RST message to the client.

The TCP connection is closed by the remote client, any network error or by CHI DTR (if DTR control, mode I, is activated).

In DTR control mode no connections will be established as long as DTR is de-activated.

ED-10 TCP can be configured to accept one specific or all remote client IP addresses.

If all remote clients are accepted an established connection will be closed by a new connection request. This will allow a redundant SCADA controller to "overtake" an already established connection. The ED-10 TCP network performance can be optimized for minimum delays or minimum network loading. By default it is optimized for minimum delays, which is the recommended setting under normal conditions. But for transfer of large amount of continuous data at high serial data rate it is recommended to use mode 4 which is optimized for maximum throughput and minimum network loading.

Server status information is always available, locally at serial CH2 or remotely by a telnet connection to port 23.

The packing algorithm can be configured to transmit data immediately or buffer data until a transmit requirement is fulfilled. The transmit requirement depend on received data at serial interface CHI and can be:

- I. An end of frame character is received.
- 2. An end of frame delay has elapsed since last received character.
- 3. A maximum number of bytes have been received.

The serial server and remote clients are identified by IP address and protocol number.

#### **Configuration mode**

Local or remote configuration is managed by either a terminal programme or by ED-Tool. ED-Tool is a Windows based setup programme, which provides easy configuration. Configuration is also possible by using terminal programmes (e.g. HyperTerminal for local configuration or Telnet for remote configuration). A hardware switch ensures restore of default settings.

Config mode will be entered; automatically by ED-Tool, manually by terminal programme or when power is switched on with restore default setting switch set.

First time configure: ED-10 TCP is shipped with IP-address 10.0.0.10.

Please make sure that 10.0.0.10 is compliant to your network, before ED-10 TCP is connected. Otherwise use serial interface to locally set a valid IP address.

A valid IP address must be compliant with the network in use and not chosen arbitrarily, ask your network administrator when in doubt.

# 7. Configuration

# 7.1 Configuration by ED-Tool

ED-Tool is intended to be used with a number of products.

This section describes ED-Tool program start and configuration of the ED-10 TCP using the ED-Tool program.

Before read, write or reboot can be made, Select type of connection.

- Network
- Serial com port must be selected from menu 'Tools Serial Port'
- When reading configuration from attached unit the type specific (ED-10 TCP) property tab will automatically selected and the field 'Type' in the Staus bar shows the identity (ED-10 TCP) of the attached unit.
- When writing configuration to attached unit the valid type specific (ED-10 TCP) property tab shall be selected and none of the parameter fields shall be left empty.

### **Program Start:**

To start ED-Tool

- Locate ED-Tool under Program on the Windows Start Menu.
- Click on the ED-Tool icon
- Or locate the ED-Tool icon on the desktop

After the ED-Tool has been successful opened the user is presented with an empty configuration screen. The user can now get an existing configuration by reading the configuration from an ED-10 TCP or by opening a configuration file stored on the system. Or the user can set all configuration parameters by hand.

To configure an ED-10 TCP the user must set all parameters. After the parameters are set the user can write the configuration to the ED-10 TCP.

Typical configuration procedures:

- Read configuration from an ED-10 TCP
- Change some parameters
- Write configuration to the ED-10 TCP
- Reboot
- Done

or

- Read configuration from a file
- (Change some parameters)
- Write configuration to the ED-10 TCP
- Reboot
- Done

or

- Select the ED-10 TCP property tab
- Set parameters
- Write configuration to the ED-10 TCP
- Reboot
- Done

or

- Select the ED-10 TCP property tab
- Set parameters
- Save configuration to a file
- Done

### **ED-Tool commands**

This section describes the ED-Tool commands to be used together with the product ED-10 TCP.

The commands can be executed by a click on a button or by a menu option. The commands are described by there use.

ED-Tool Connect Serial Network	Read Config.	Write Config Lo Beeboot Ga	configurable parameters [c cal IP etmask	eneral] · User · Password · Mode	
ED-10 UDP E Channel 1 – Serial Inte Data Rate Data Bits Parity Stop Bits Flow Cont	rol TCP ED-12	Packing Algorthm End of Frame Char End of Frame Delay [r Max n.o. Char. in Fran Transmit End Of Fram	ms] F ne F e Char <b>Y</b>	Network Interface .ocal Port Remote IP Remote Port Remote IP List	· · · ·
Flow Cont		Iransmit End Of Fram	e Char		

Reads configuration parameters from attached ED-10 TCP.



## ED-10 TCP must be re-booted before any new configuration is activated.



1

Re-boots ED-10 TCP.

ED-10 TCP property tab including type specific (ED-10 TCP) parameters



4

General parameters.



Exits ED-Tool.

#### 7.2 Configuration by terminal

ED-10 TCP internal commands must be used to configure by terminal program.

#### **TYPE** command

Configuration parameter values can be read by using the 'type' command. E.g. 'type chip.set,,' will list the chip.set file.

The 'type' command will list configuration parameters and their values, regardless of the ED-10 TCP operating mode.

The parameters/values are stored in two pairs of configuration files; chip.set,-ini, factory.set, -ini. See chapter 6.3.

Values used at reboot are stored in the chip.set, -ini files.

Please note, the configuration files also contain parameters that can not be changed.

#### **COPY** and **REBOOT** commands

The 'copy' and 'reboot' commands are used to change ED-10 TCP working mode. The contents in ED-10 TCP internal file 'autoexec.bat' decides the mode ED-10 TCP will enter after a reboot.

The 'copy' command is used to copy the ED-10 TCP internal files 'app.bat' or 'config.bat' to 'autoexec.bat', e.g. 'copy config.bat autoexec.bat,'.

Reboot is achieved by either the 'reboot' command or by switching the power off and on.

#### **EXIT** command

To change configuration parameter values the ED-10 TCP must be in config mode. When in config mode a value change is requested by a [parameter] [value] pair input, e.g. 'datarate 19 200,...'.

When all requested changes have been input the 'exit' command must be used to store the changes into the configuration files. The 'exit' command also copies app.bat to autoexec.bat ensuring application mode is entered when ED-10 TCP is rebooted.

#### EXAMPLE I

Example of how to force the ED-10 TCP into config. mode, change some parameters and then reboot into application mode with the changed parameters:

Text in terminal window Explanation 'ED-10 TCP APPLICATION MODE' . . copy config.bat autoexec.bat ED-10 TCP reboots into config mode. reboot↓ 'ED-10 TCP CONFIGURATION MODE' Request a data rate of 19 200 bit/s >datarate 19200↓ ok Request local IP address to be >localip 192.168.12.12↓ 192.168.12.12 ok Request 9000 as local protocol port >localport 9000↓ ok >exit↓ Establish the requested changes. Updates configuration files and ensures application mode after a reboot. . . . . . . . . Copied app.bat to autoexec.bat Parameters successfully altered! reboot to start ED-10 TCP Application (Type 'reboot' or power off/on). ok Reboot the ED-10 TCP. >reboot 'ED-10 TCP APPLICATION MODE' . .

### **EXAMPLE 2**

Below follows an example of how to list the current configuration (the type command can be executed regardless of ED-10 TCP working mode). Parameters that can be altered, their allowed values and in which file they appear can be found in chapter 6.3 Configurable parameters.

### 7.2.1 Local configuration

Remove any device connected to serial interface CHI and connect to ED-10 TCP serial interface CH2: RS-232 at 19 200 bit/s, no parity, 1 stop bit and no flow control.

#### 7.2.2 Remote configuration

Start Telnet and connect to the ED-10 TCP, using the valid IP-address, (default '10.0.0.10') username, (default 'ed10') and password (default 'ed10') as setup at initial configuration. The Telnet connection will be broken at reboot. A repeated login is required after each reboot.

## 7.3 Configurable parameters

Configurable parameters are summarised in the following tables. A more detailed description follows. Parameter names and valus are case sensitive.

Serial interface						
Parameter	Parameter name accepted	Allowed values	Apperance in .ini files	Apperance in .set files	Remarks	
Data rate in bits per second, bit/s	DATARATE dataRate, datarate baude, BAUDE, bps	300–115 200		DATARATE		
Number of data bits	DATABITS dataBits, databits	7 or 8		DATABITS		
None, even or odd parity	PARITY parity	0, 1 or 2 no, none, odd, even		PARITY	0=none, I=odd 2=even	
Number of stop bits	STOPBITS stopBits, stopbits	l or 2		STOPBITS	Two stop bits only when no parity is selected.	
Flow control ON or OFF.	FLOWCONTROL flowControl flowcontrol	0 or 1, NO, no, NONE, none HW, hw		FLOWCONTROL	0=NO, I=HW	

Packing algorithm						
Parameter	Parameter name accepted	Allowed values	Apperance in .ini files	Apperance in .set files	Remarks	
End of Frame Character ASCII value	EOFCHARACTER eofChar, eofchar eofcharacter	0–256		EOFCHARACTER	256 = No EoF Character. (EoF charac- ter not used).	
End of Frame Delay in ms	EOFDELAY eofDelay, eofdelay	0–2 550		EOFDELAY	0 = No EoF Delay ( <b>EoF Delay not used</b> ).	
Maximum num- ber of bytes in Frame	MAXBYTEFRAME maxByteFrame maxbyteframe	1–1 500		MAXBYTEFRAME	This parameter might be override by TCP	
Send End of Frame Character	EOFCHARSEND eofCharSend eofcharsend	0 or l		EOFCHARSEND	0 will remove the EoF Character before data is sent over network.	

Network interface						
Parameter	Parameter name accepted	Allowed values	Apperance in .ini files	Apperance in .set files	Remarks	
Local IP Address	ADDRESS localIPStr, LOCALIP localip, localIP	1.0.0.0 - 126.0.0.0 128.1.0.0 - 191.255.0.0 192.0.1.0 - 223.255.255.0 224.0.0.0 - 255.255.255.254	[IP] ADDRESS		IP addr. in dotted decimal notation	
Gateway IP Address	GATEWAY gatewayIPStr gateway		[IP] GATEWAY			
Subnet Mask	NETMASK subnetMaskStr netmask		[IP] NETMASK		Dotted decimal notation	
Local Protocol Port	LOCALPORT localPort, localport	I - 20, 22, 24 - 79 8I - 65535		LOCALPORT	The protocol port used in application mode. 21, 23, 80	
Remote IP Address	REMOTEIP remotelPStr remotelP, remoteip	Above IP addresses and broadcast addr.		REMOTEIP	255.255.255.255 = All IP accepted.	
Remote Protcol Port	REMOTEPORT remotePort remoteport	I - 65535		REMOTEPORT	Ignored, not used	
Telnet User Name	USER, user telnetUser	Any name up to 19 characters long (no spaces)	[TELNET] USER0 USER1		User name for remote configuration.	
Telnet Password	PASSWORD password telnetPassword	Any word up to 19 characters long (no spaces)	[TELNET] PASSWORD0 PASSWORD1		Password for remote configuration	
Mode	MODE, mode	0, 1, 2, 3, 4		MODE	0=> Default. I=> DTR Control 2=> RST at TCP-close 4=> Min. network loading.	

## **Port Type (only by switches)**

The port type is manually selected, between RS-232 or RS-422/485, by DIP-switches. The RS-232 port is physically a 9 pin D-sub connector and RS-422/485 is a screw terminal block.

Port type RS-422/485 uses a transceiver supporting both RS-422 and RS-485.

2- or 4-wire (half or full duplex) is manually selected by DIP-switches.

The transceiver is automatically switched between transmit and receive mode by incoming network data packets.

Default port type is RS-232.

#### 7.3.1. Serial interface

#### Data Rate

The data rate can be set from 300 bit/s to 115.2 kbit/s. Default is 19 200 bit/s.

#### Data Bits

Seven (7) or eight (8) data bits can be selected. Default is eight data bits.

#### Parity

No, odd or even parity can be selected. Default is no parity.

#### Stop Bits

Two (2) stop bits can be set if no parity is selected. Default is one (1) stop bit.

#### Flow Control

Flow control can be chosen between none or hardware. Hardware flow control is managed by the CTS and RTS signal. CTS is switched off (<-3 V) when the ED-10 TCP serial receive buffer is near full. The buffer size is 10 kB. Serial data from ED-10 TCP will be transmitted if the RTS is on (>3 V).

Flow control is ignored for port type RS-422/485.

Default, flow control is switched off (none) and the CTS will follow DSR.

#### Termination and Failsafe (Only by switches)

Termination and fail-safe is used for port type RS-422/485 and can be manually switched on or off. Switch pair S1:7,8 is used in 2-wire mode. In 4-wire mode switch pairs S1:5,6 are used.

Default is termination and failsafe switched off, i.e. all switch pairs off.

#### 7.3.2. Packing algorithm

#### End of frame character, EoF Char

ASCII code of character indicating end of frame (0-255). The serial data buffered will be sent over network when this character 0 - 255 is detected (e.g. 13 for Carriage return). 256 will deactivate this function.

Allowed values are 0 - 256.

Default is 256, i.e. deactivated.

#### End of Frame Delay

The time, after last received character, ED-10 TCP delays until the buffered data frame is sent over network. Allowed values are 0-2550 ms, 1-9 in 1 ms step and 10-2550 in 10 ms step. The value will be rounded to the nearest lower step (e.g. 128 => 120 ms, 132 => 130 ms).

#### The value zero (0) deactivates this function, i.e. wait until other criteria is true.

Default value is 20 ms.

If EoF delay is used with low data rates, it should be set to at least one character time.

#### Note.

Latency has to be added to calculate total delay of data.

#### Maximum number of bytes/characters in frame

The maximum number of bytes that will be buffered in the data frame. When the data frame is full the data will be transmitted over network.

Allowed values are 1–1500 bytes. Values above 255 are approximate.

Default is 1000 bytes.

TCP might override this setting.

#### Transmit end of frame character

Include end of frame character in Network data packet. Allowed alternatives are yes or no. Default is yes.

#### 7.3.3. Network interface

#### Local IP address\*

Local IP address is used as the first part of local end point identity, in both application and configuration mode. Do not use Network ID or Broadcast address. Default is 10.0.0.10.

### Local Protocol Port\*

The protocol port is the second part of a end point identity. This local TCP port is used only in application mode. The remote client (computer) must address this local port to establish a TCP connection.

Allowed values are 1–20, 22, 24–79, 81 - 65535 (>1024 recommended). Port 23 shall be used for configuration and status information. Port 21 and 80 can not be used. Please observe that ports 1–1024 are "well-known ports", hence commonly used by other programs (e.g. FTP, Telnet, NETBIOS, mail etc). "well-known ports" should normally not be used by ED-10 TCP. All "well-known" ports can be found at http://www.iana.org/assignments/port-numbers Default is 9000.

#### Remote IP address\*

Required IP address of remote client (computer). The ED-10 TCP will only accept connections (clients) with the Remote IP address. Remote IP address 255.255.255.255 will force the ED-10 TCP to accept any (all) connections.

An established connection will be closed by a new connection request, if the Remote IP address is set to 255.255.255.255.

If the Remote IP not are equal to 255.255.255.255 an established connection will remain established and any new connection requests will be refused. Default is 255.255.255.255.

### **Remote Protocol Port**

The remote protocol port is not used, hence ignored.

#### Netmask\*

The Netmask is used for Subnet addressing. Default is 255.255.255.0.

<sup>\*</sup> The IP address must be compliant to the attached network. Ask the network administrator when in doubt.

#### **Gateway IP address\***

The Gateway IP address is used for indirect delivery of network packets when the Remote IP address is not a part of the Network of Local IP address. When the remote client address is at a different network the packet is sent to the gateway IP address, which must belong to a router (gateway).

The router will then forward the network packet to its destination (remote client address). The Local IP address and the Netmask define the network extent.

The Gateway IP address must be on the same net as the local IP, otherwise 0.0.0.0 is used.

Default is 10.0.0.10.

#### Telnet user name

User name for remote configuration and status information over network (telnet login). Default is ed10.

#### **Telnet password**

Password for remote configuration and status information over network (telnet login). Default is ed10.

#### 7.3.4. Mode

The ED-10 TCP can be set into four different modes; Default (0), DTR Control (1), RST at TCP close (2) and Min. network loading (4).

By default the serial DTR control signal is ignored. But in mode 1 (DTR control) the ED-10 TCP will await activation of DTR (control signal at CH1: RS-232) before it accept remote clients and establish a connection. An established connection will further be closed by de-activation of DTR.

In mode 2 a RST (reset) message is transmitted at the network interface when a connection is closed. By default there is no RST added to the normal close handshaking. Mode 4 is only recommended for transfer of large amount of continuous data at high serial data rate. This mode 4 is optimized for maximum throughput and minimum network loading.

By default the ED-10 TCP network performance is optimized for minimum delays.

#### 7.3.5. MAC address

The MAC address of the unit can be found on the product label "00 30 56 F" + last 5 digits on IC2 see figure in section 4.2 Switch settings on page 11. Example: Label on IC2 "SC12 RTOS 0092C2" this will give the unit MAC address "00 30 56 F0 92 C2" The MAC address can also be find out with the DOS command "ARP –a". (Perform the "PING" command with the ED-10 local IP address before the ARP command.)

<sup>\*</sup> The IP address must be compliant to the attached network. Ask the network administrator when in doubt.

# 8. Application examples

This application can be achieved using one of the methods described in section 1.



For solution 2	<ul> <li>You will find an example of a COM port redirector software on the enclosed CD – "\Software\Tactical software\Software".</li> <li>This is a 30 days free evaluation copy.</li> <li>To purchase a full licence please contact Westermo.</li> <li>For setup of the redirector software "Serial/IP" read the QuickStart and the UserGuide that can be found in the directory "\Software\Tactical software\Manual" on the enclosed CD.</li> </ul>
For solution 3	The software must be written to directly access the network inter- face (socket compliant) of the ED-10 TCP. A sample written in C++ can be found on the CD "\Software\Sample\sample.zip"



Westermo Teleindustri AB • SE-640 40 Stora Sundby, Sweden Phone +46 16 42 80 00 Fax +46 16 42 80 01 E-mail: info@westermo.se Westermo Web site: www.westermo.com

#### **Subsidiaries**

Westermo Data Communications Ltd Unit 14 Talisman Business Centre • Duncan Road Park Gate, Southampton • SO31 7GA Phone: +44(0)1489 580 585 • Fax.:+44(0)1489 580586 E-Mail: sales@westermo.co.uk

Westermo Data Communications GmbH Goethestraße 67, 68753 Waghäusel Tel.: +49(0)7254-95400-0 • Fax.:+49(0)7254-95400-9 E-Mail: info@westermo.de Westermo Data Communications S.A.R.L. 9 Chemin de Chilly 91160 CHAMPLAN Tél : +33 1 69 10 21 00 • Fax : +33 1 69 10 21 01 E-mail : infos@westermo.fr

Westermo Teleindustri AB have distributors in several countries, contact us for further information.