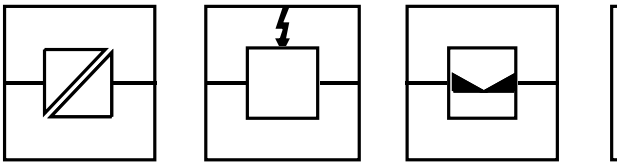
ED-10
UDP

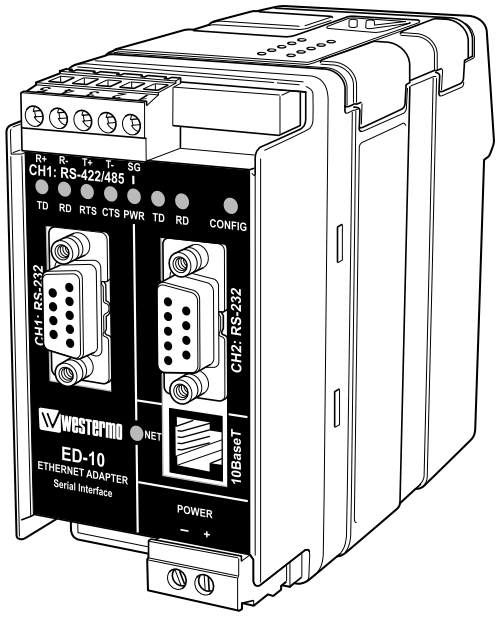
# INSTALLATION MANUAL

**6609-2203**





Galvanic Isolation | Transient Protection | Balanced Transmission | CE Approved




***Industrial Ethernet adapter***

westermo®
www.westermo.com

# Contents

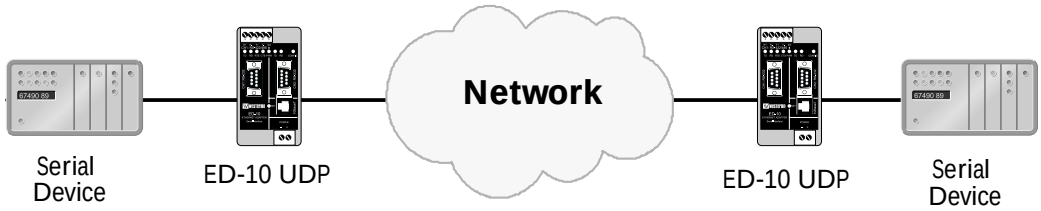
# 1. Introduction

The ED-10 UDP is an Industrial Ethernet adapter with a serial interface. The type of serial interface is selectable between RS-232 and RS-422/485. The Ethernet interface is 10BASE-T and TCP/IP Protocols are implemented for network communication.

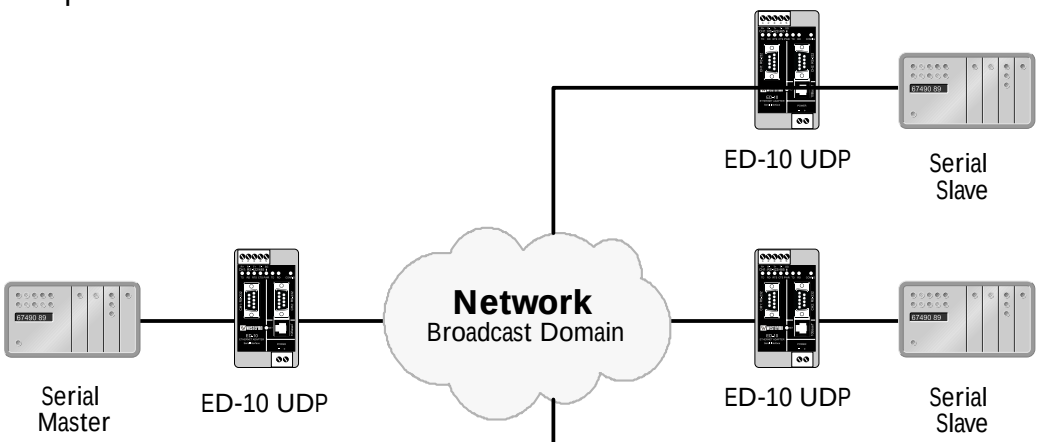
Two ED-10 UDP can be used to provide a serial point to point link over a TCP/IP network. Each ED-10 UDP passes data from its serial interface to the serial interface of the other unit. This enables long distance serial communication using pre-existing networks.

It is also possible to communicate one to many (e.g. master to slaves), by using a broadcast address.

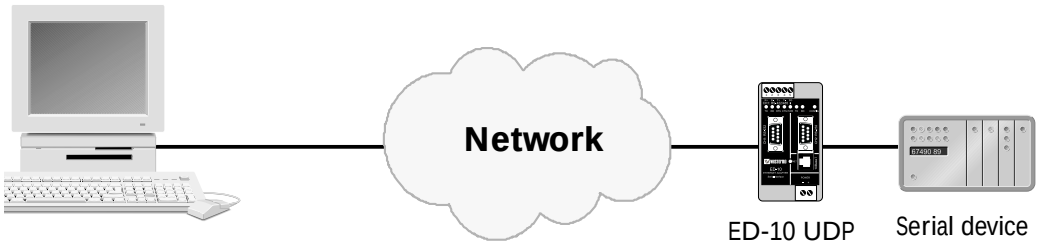
If the customer writes his own PC application software, the network interface of ED-10 UDP can be directly accessed. A software example can be downloaded from the Westermo web site (www.westermo.com). This example demonstrates how a PC sends network data directly to the ED-10 UDP. Source code, in C, is included.




ED-10 UDP point to point connection




ED-10 UDP one to many connection




ED-10 UDP directly accessed by a PC application

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

The ED-10 UDP 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 (LAN and WAN) 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 UDP uses TCP for remote configuration (configuration mode) and UDP for transmitting the serial data over network.

The ED-10 UDP 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** | *10BASE-T. IEEE std 802.3, 2000 Edition.* |
| Data rate | 10 Mbit/s, half duplex. |
| Mechanical | RJ-45 Modular Jack (ISO/IEC 8877:1992), Unshielded or shielded (UTP/STP). |
| **Serial Interface 1** | *RS-232 or RS-422/485* |
| Data rate | 300–115 200 bit/s Full, half duplex or simplex. |
| Data format | 7–8 Data Bits, Odd, Even or None Parity Bit, 1–2 Stop Bits (2 stop bits when no parity only) |
| Control signals* | RTS, CTS, DSR |
| Termination** | Termination and fail safe, on or off |
| Mechanical | RS-232: 9-pin female D-sub. RS-422/485: Screw Terminal. |
| **Serial Interface 2** | *RS-232 (used for local configuration only)* |
| Data rate | 19 200 Bit/s |
| Data format | 8 Data Bits, No Parity Bit, 1 Stop Bit |
| Mechanical | 9-pin female D-sub. |
| **Power Interface** | |
| Rated voltage | 10–60 V DC, polarity independent / 12–30 V AC. |
| Rated current | 350 mA, max @ 10 V DC input. |
| Rated frequency | 48–62 Hz |
| Mechanical | Screw Terminal. |
| **Isolation*** ** | |
| Power Interface to all other Interfaces | 4.2 kV DC, 3 kV RMS @ 50 Hz. |
| Network Interface to serial interface | 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: 3 ms Network to Serial: 9 ms |
| Throughput (maximum) | 57.6 kbit/s (1.44 MB data) |
| Network protocols | UDP, IP, ARP, ICMP (Ping) |

* 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<br>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

**Before mounting or removing the unit:**

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

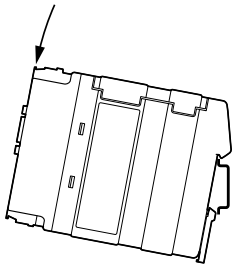
Prevent access to hazardous voltages by disconnecting the unit from AC/DC mains supply and all other electrical connections.

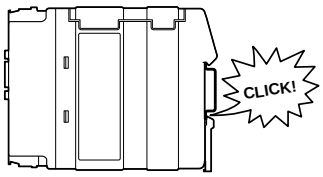
### Mounting

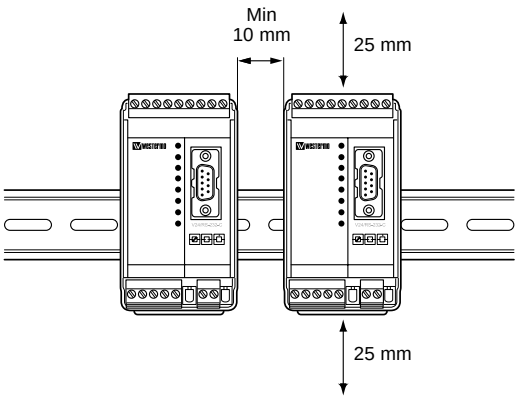
This unit should be mounted on 35 mm DIN-rail which is horizontally mounted on a wall or cabinet backplate.

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)

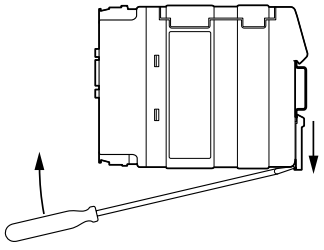


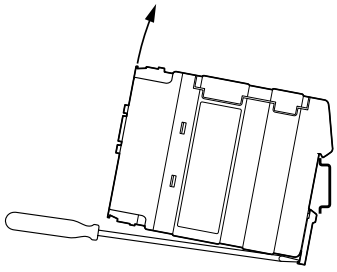



### Removal

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

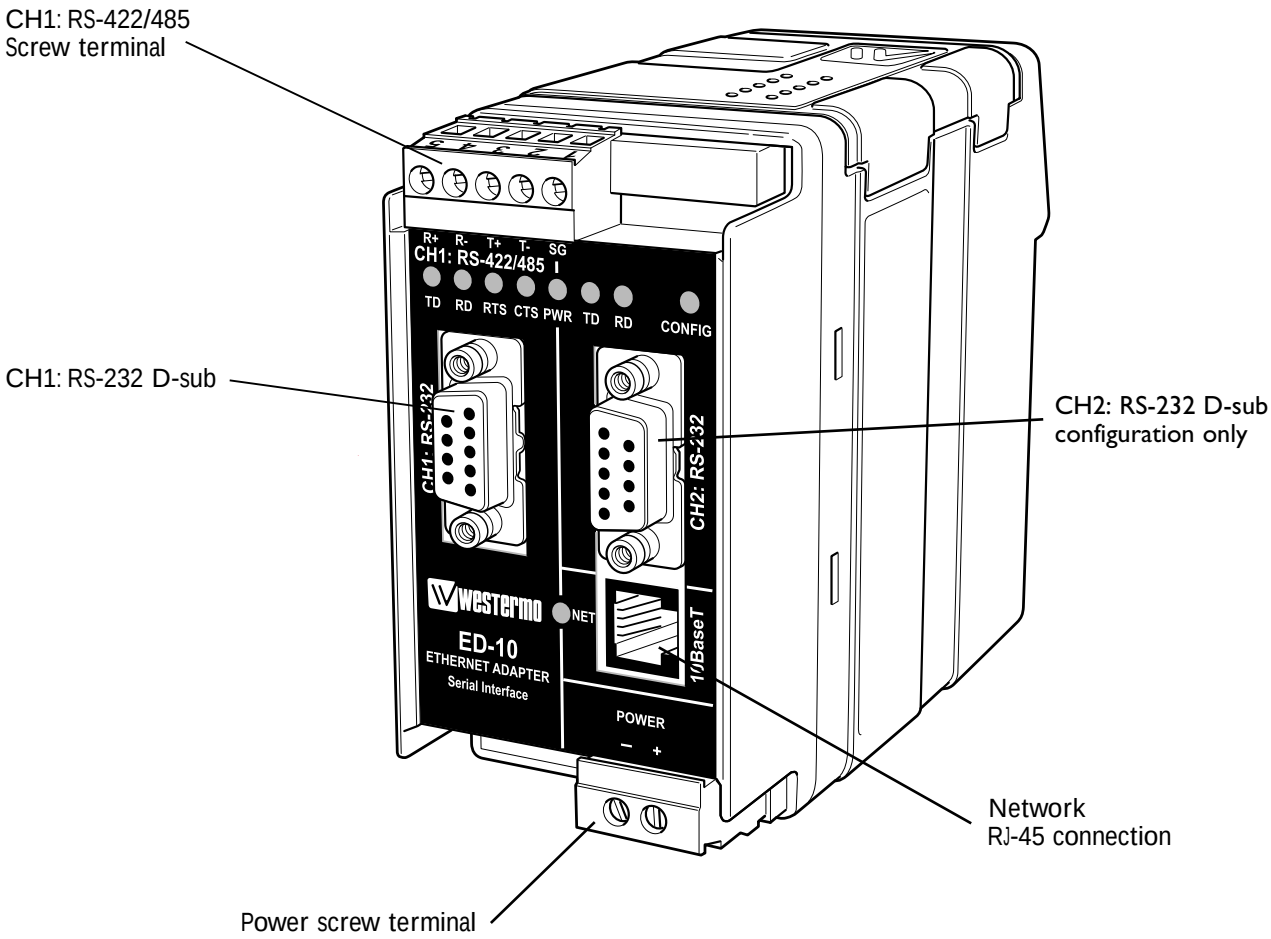


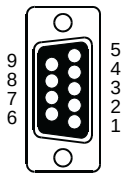


## 5.2 Connections

CH1 is used for the serial/network conversion.
Type of interface (RS-232 or RS-422/485) connected must also be set at DIP switch S1. *(Ref. section 5.3.1)*
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.






## CH1: RS-232 Connections (D-sub connector), DCE

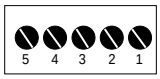
| Pin Number | Signal Name* | | Direction** | Description |
|---|---|---|---|---|
| | Description | V.24 | RS-232C | |
| 1 | DCD*** | 109 | CF | Out | Data Carrier Detect |
| 2 | RD | 104 | BB | Out | Received Data |
| 3 | TD | 103 | BA | In | Transmitted Data |
| 4 | DTR | 108.2 | CD | In | Data Terminal Ready |
| 5 | SG | 102 | AB | In/out | Signal Ground |
| 6 | DSR | 107 | CC | Out | DSR, ED-10 UDP ready |
| 7 | RTS | 105 | CA | In | Request to Send |
| 8 | CTS*** | 106 | CB | Out | Clear to Send |
| 9 | RI | 125 | CE | – | Ring Indicator, not connected |

* Functionality might differ from standard, *see chapter 7.3*

** Direction relative ED-10 UDP.

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

RS-232 cable must not exceed 15 m



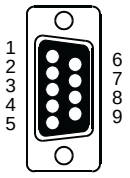

## CH1: RS-422/485 Connections (Upper left screw terminal)

| Terminal Number | Signal Name* | | Direction** | Description |
|---|---|---|---|---|
| | Marked on ED-10 UDP | According to Standard | | |
| 1 | SG | – | – | Not connected |
| 2 | T– | B | 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 UDP.

Twisted pair cable is recommended




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

CH1 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 Number | Signal Name* | | | Direction** | Description |
|---|---|---|---|---|---|
| | Description | V.24 | RS-232C | | |
| 1 | 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 | CC | – | Data Set Ready, not connected |
| 7 | RTS | 105 | CA | In | Request to Send, not used |
| 8 | CTS | 106 | CB | Out | Clear to Send, not used |
| 9 | RI | 125 | CE | – | Ring Indicator, not connected |

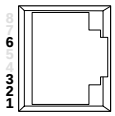
* Functionality might differ from standard, see chapter 7.3

** Direction relative ED-10 UDP.

RS-232 cable must not exceed 15 m

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

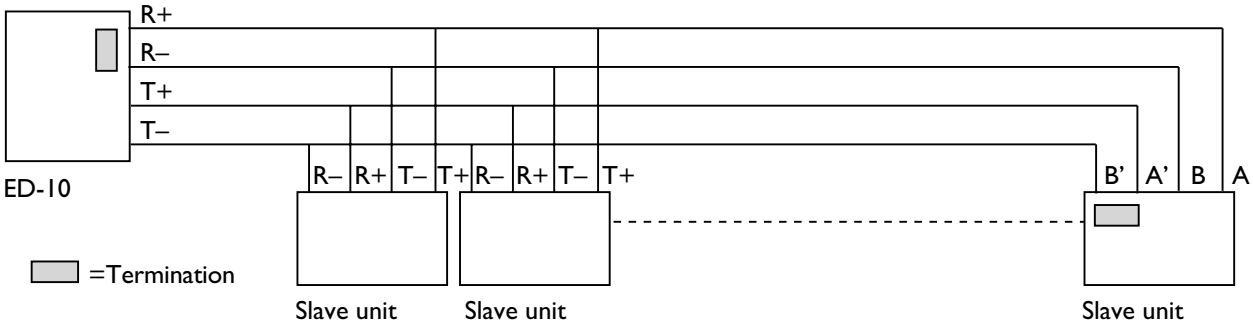
| Contact | Signal Name | Direction* | Description |
|---|---|---|---|
| 1 | TD+ | Out | Transmitted Data |
| 2 | TD– | Out | Transmitted Data |
| 3 | RD+ | In | Received Data |
| 4 | | | Not connected |
| 5 | | | Not connected |
| 6 | RD– | In | Received Data |
| 7 | | | Not connected |
| 8 | | | Not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



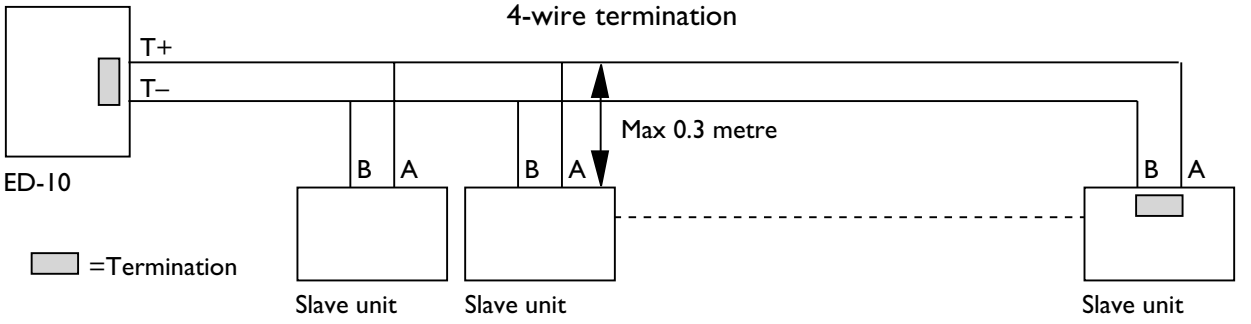

* Direction relative ED-10 UDP.

CAT 5 cable is recommended.
Unshielded (UTP) or shielded (STP) connector might be used.

## 5.2.1 RS-422/485 general advice




4-wire termination




2-wire termination

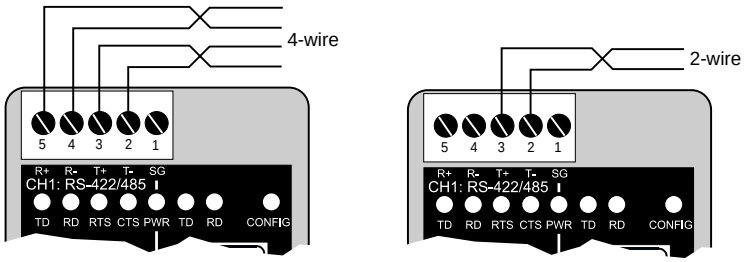
### Termination recommendations

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



## 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.

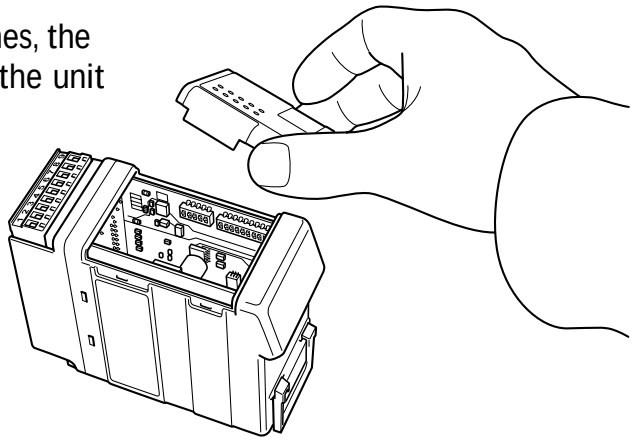
**Warning!**

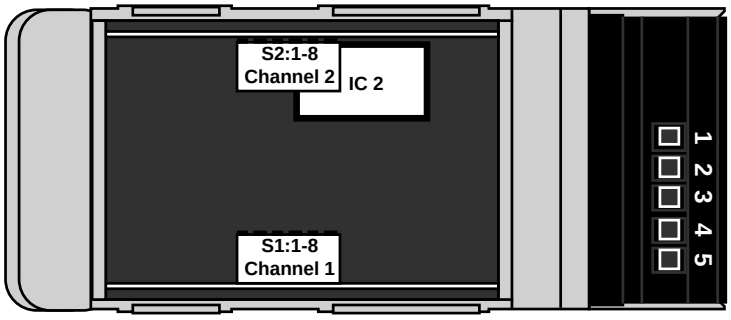
Prevent damage to internal electronics from electrostatic discharges (ESD) by discharging your body to a grounding point (e.g. use of wrist strap), before the lid on top of the modem is removed.

**Warning! Do not open connected equipment.**

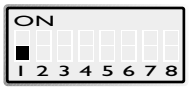
Prevent access to hazardous voltages by disconnecting the unit from AC/DC mains supply and all others electrical connections.

**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.

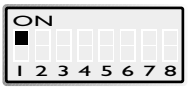





## Restore default settings Channel 2

S2 

Normally in this position

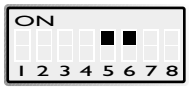
S2 

Restore default settings.
Procedure:
Set and reboot, then reset and reboot.

## Termination and fail safe (4-wire) Channel 1

S1 

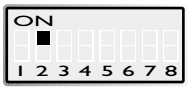
Termination and fail safe off

S1 

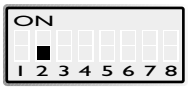
100 Ω termination between R+ and R–
Terminal open interpreted as Mark (1)

*Not used with RS-232*

## Port type Channel 1

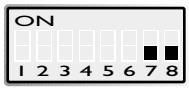
S1 

RS-422/485

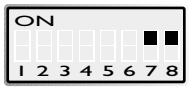
S1 

RS-232

## Termination and fail safe (2-wire) Channel 1

S1 

Termination and fail safe off

S1 

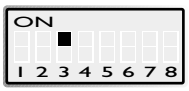
100 Ω termination between T+ and T–
Terminal open interpreted as Mark (1)

*Not used with RS-232*

## 2- or 4-wire Channel 1

S1 

4-wire, RS-422

S1 

2-wire, RS-485

*Not used with RS-232*

## Factory settings

S1 

Channel 1

S2 

Channel 2

### 5.3.2 LED's

| | |
|---|---|
| **CH1: 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). |
| **CH1: 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–). |
| **CH1: RTS** | Request To Send: |
| LED off | • RS-232 RTS = Off (< –3V) |
| LED on | • RS-232 RTS = On (> 3V) |
| **CH1: CTS** | Clear To Send: |
| LED off | • RS-232 CTS = Off (< –3V) / RS-422/485 transmitting. |
| LED on | • RS-232 CTS = On (> 3V) / RS-422/485 receiving. |
| **PWR** | Power: |
| LED off | • No internal power (external power not connected). |
| 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 UDP 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:

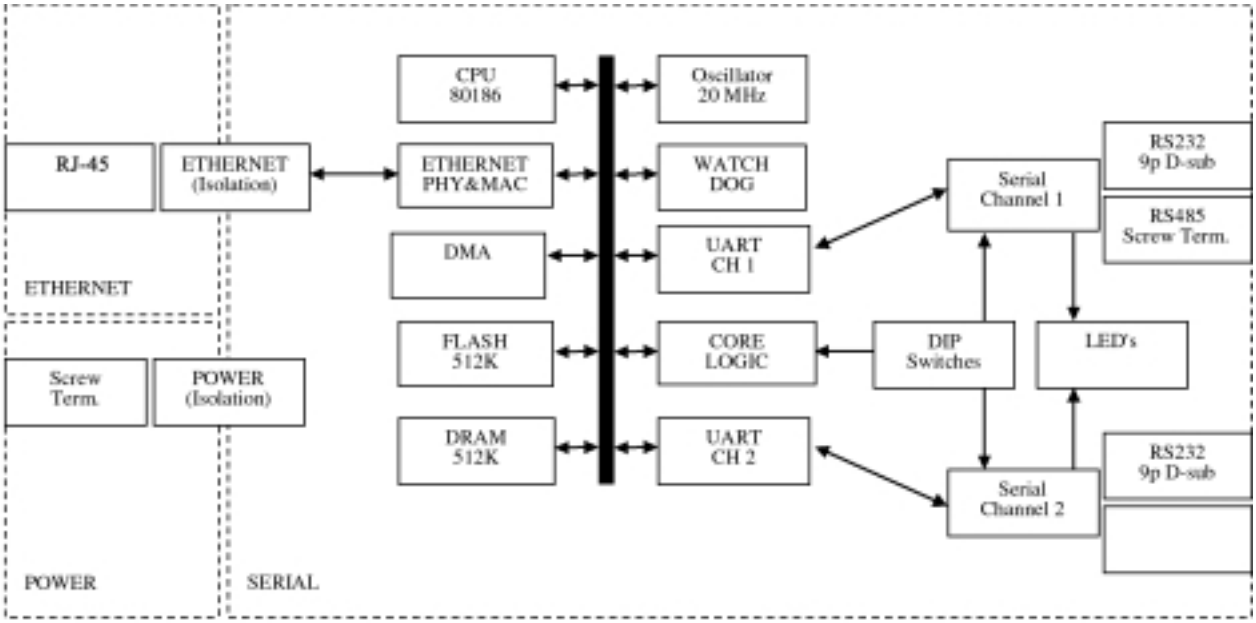
Remove any previous versions of ED-Tool before installation.

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 UDP can be in either configuration (config) mode or in application (app) mode.
Normally the ED-10 UDP 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 UDP config mode.
Configurable parameters are listed in chapter 7.3.



Hardware topology

**Application mode**
In application mode the ED-10 UDP transfers data between the serial interface (CH1) and the network interface (10BaseT).
At the network interface data are received as datagrams (network packets). Each received network packet is immediately transmitted at serial interface CH1.
Data received at the serial interface CH1 are buffered into a data frame according to the packing algorithm. Each frame is then transmitted as a datagram at the network interface.

The packing algorithm can be configured to transmit data immediately or to buffer data until a transmit requirement is fulfilled. The transmit occasion then depends on received data at serial interface CH1.

1. 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.

In a point to point connection the end points are defined by theirs IP addresses and protocol port numbers. One of the points local identity must be used as remote identity at the other point, i.e. there must be a "cross-relation" between the two point's identities.

In a one to many connection the "master" ED-10 UDP shall use a broadcast address as the remote point identity. Both limited and directed broadcasts are supported. Another possibility is to use the Remote IP List in the "master" unit to address up to 128 specific IP addresses and ports.

By the mode parameter it is possible to accept network data from only one remote IP address, all other data are rejected.
The mode parameter can also be set so that the remote identity follows the "last calling". Network data from the ED-10 UDP will then be sent to the host who most lately sent network data to the ED-10 UDP.

**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 or manually by terminal programme.

First time configure: ED-10 UDP 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 UDP 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 UDP 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 UDP) property tab will automatically selected and the field 'Type' in the Staus bar shows the identity (ED-10 UDP) of the attached unit.
- When writing configuration to attached unit the valid type specific (ED-10 UDP) 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 UDP 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 UDP the user must set all parameters. After the parameters are set the user can write the configuration to the ED-10 UDP.

Typical configuration procedures:

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

or

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

or

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

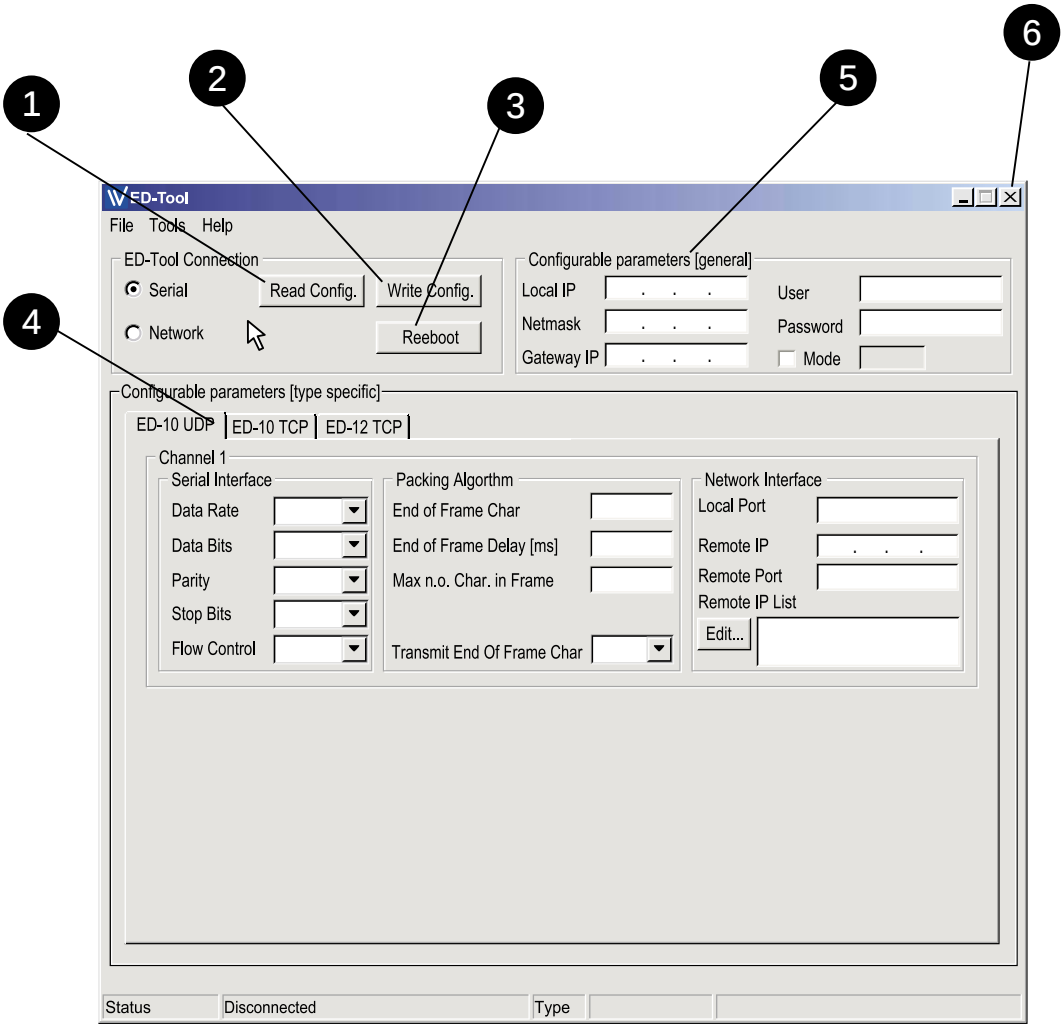
or

- Select the ED-10 UDP 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 UDP.

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




1 Reads configuration parameters from attached ED-10 UDP.

2 Writes configuration parameters to attached ED-10 UDP.

**ED-10 UDP must be rebooted before any new configuration is activated.**

3 Reboots ED-10 UDP.

4 ED-10 UDP property tab including type specific (ED-10 UDP) parameters

5 General parameters.

6 Exits ED-Tool.

## 7.2 Configuration by terminal

ED-10 UDP 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 UDP operating mode.
The parameters/values are stored in two pairs of configuration files; chip.set,-ini, factory.set, -ini. See chapter 7.3.
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 UDP working mode. The contents in ED-10 UDP internal file 'autoexec.bat' decides the mode ED-10 UDP will enter after a reboot.
The 'copy' command is used to copy the ED-10 UDP 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 UDP 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 UDP is rebooted.

**EXAMPLE 1**

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

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

**EXAMPLE 2**

Below follows an example of how to list the current configuration (the type command can be executed regardless of ED-10 UDP working mode). Parameters that can be altered, their allowed values and in which file they appear can be found in chapter 7.3 Configurable parameters.

***Text in terminal window***

```
type chip.set↵
.
.
.
REMOTEIP= 168.192.12.12
REMOTEPORT= 9000
.
.
.

type chip.ini↵
.
.
.
[IP]
ADDRESS=168.192.12.10
NETMASK=255.255.255.0
GATEWAY=168.192.12.1
.
.
.
```

### 7.2.1 Local configuration

Remove any device connected to serial interface CH1 and connect to ED-10 UDP 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 UDP, 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, 1=odd 2=even |
| Number of stop bits | STOPBITS stopBits, stopbits | 1 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, 1=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 character not used). |
| End of Frame Delay in ms | EOFDELAY eofDelay, eofdelay | 0–2 550 | | EOFDELAY | 0 = No EoF Delay (**EoF Delay not used**). |
| Maximum number of bytes in Frame | MAXBYTEFRAME maxByteFrame maxbyteframe | 1–1 500 | | MAXBYTEFRAME | Max. N.o. bytes > network MTU will result in fragmentation. |
| Send End of Frame Character | EOFCHARSEND eofCharSend eofcharsend | 0 or 1 | | 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<br>localIPStr,<br>LOCALIP<br>localip, localIP | 1.0.0.0 - 126.0.0.0<br>128.1.0.0 -<br>191.255.0.0<br>192.0.1.0 -<br>223.255.255.0223.25 | [IP]<br>ADDRESS | | IP Addr. in dotted decimal notation |
| Gateway<br>IP Address | GATEWAY<br>gatewayIPStr<br>gateway | | [IP]<br>GATEWAY | | |
| Subnet Mask | NETMASK<br>subnetMaskStr<br>netmask | | [IP]<br>NETMASK | | Dotted decimal notation |
| Local Protocol Port | LOCALPORT<br>localPort,<br>localport | 1 - 65535 | | LOCALPORT | The protocol port used in application mode. |
| Remote<br>IP Address | REMOTEIP<br>remoteIPStr<br>remoteIP,<br>remoteip | Above IP addresses and broadcast addr. | | REMOTEIP | |
| Remote<br>Protcol Port | REMOTEPORT<br>remotePort<br>remoteport | 1025 - 8000<br>8002 - 65535 | | REMOTEPORT | |
| Telnet User Name | USER, user<br>telnetUser | Any name up to 19 characters long (no spaces) | [TELNET]<br>USER0<br>USER1 | | User name for remote configuration. |
| Telnet Password | PASSWORD<br>password<br>telnetPassword | Any word up to 19 characters long (no spaces) | [TELNET]<br>PASSWORD0<br>PASSWORD1 | | Password for remote configuration |
| Mode | Mode, mode | 0, 1, 2 | | MODE | 0=> Default.<br>1=> Accept only one remote.<br>2=> Remote = Last calling. |

## 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 failsafe is used for port type RS-422/485 and manually can be 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 deactivates 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 UDP 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.***

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.
Default value is 20 ms.

**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.

**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 UDP port is used only in application mode. Networks datagrammes addressed to this this port will be transmitted at serial interface CH1.
Allowed values are 1–65535 (>1024 recommended). 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 UDP. All "well-known" ports can be found at *http://www.iana.org/assignments/port-numbers*
Default is 9000.

**Remote IP address***
Remote IP address is used as the first part of the remote end point identity.
If the Remote IP address is set to 255.255.255.255 then this unit will broadcast e.g. one to many application.
Any received data at serial interface CH1 will be echoed back, as long as default settings remain unchanged.
Default is 10.0.0.10

**Remote Protocol Port**
The remote protocol port is the second part of the remote end point identity.
This port is used only in application mode.
Allowed values are 1–65535 (>1024 recommended).
Default is 9000.

**Remote IP List**
The Remote IP List let the user specify a list including up to 128 IP addresses and ports.
This is usefull in a master-slave relationship between units where some of the slaves exists in a different network i.e the UDP datagram must be sent through a Gateway.
Default the Remote IP List is empty i.e. not used.

- Remote IP* Remote IP address is used as the first part of the remote end point identity. If the Remote IP address is set to 255.255.255.255 then this unit will broadcast e.g. one to many application.
  Any received data at serial interface CH1 will be echoed back, as long as default settings remain unchanged.
  Default there are no entries.
- Remote Port The remote protocol port is the second part of the remote end point identity. This port is used only in application mode.
  Allowed values are 1–65535 (>1024 recommended).
  Default there are no entries.

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

* 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

Mode 0: Is the default mode.

Mode 1: Accept data only from Remote IP.
This allows the user to control if network data from all or only from one remote IP shall be transmitted at serial interface CH1.

Mode 2: Remote host (IP address and port number) is latest calling.
The destination of received serial data sent to network is by default the remote IP and remote port. In Mode 2 the remote IP and port is replaced by IP and port of the latest calling host (if any).

Default is 0..

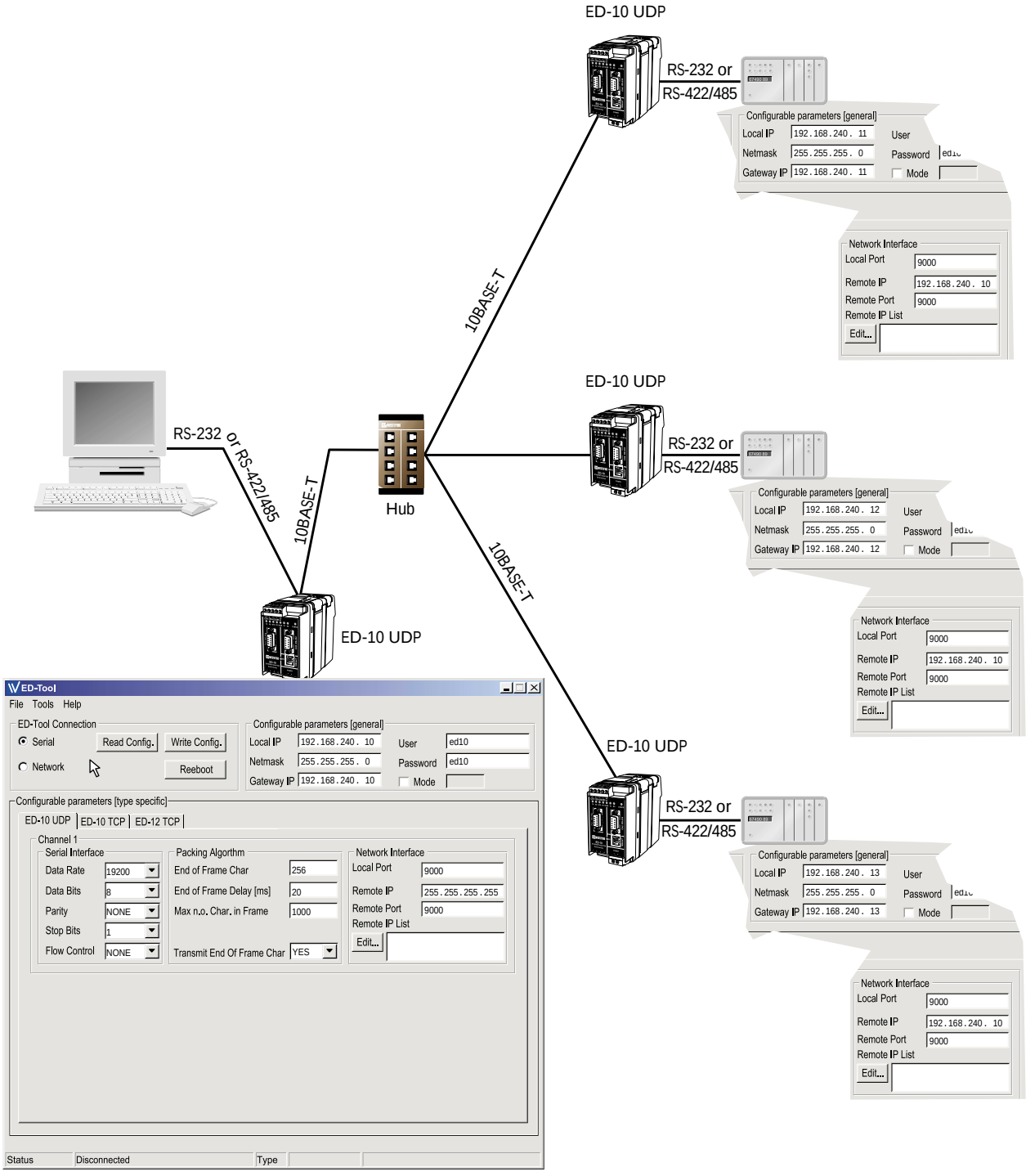
### 7.3.5 MAC address

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.)

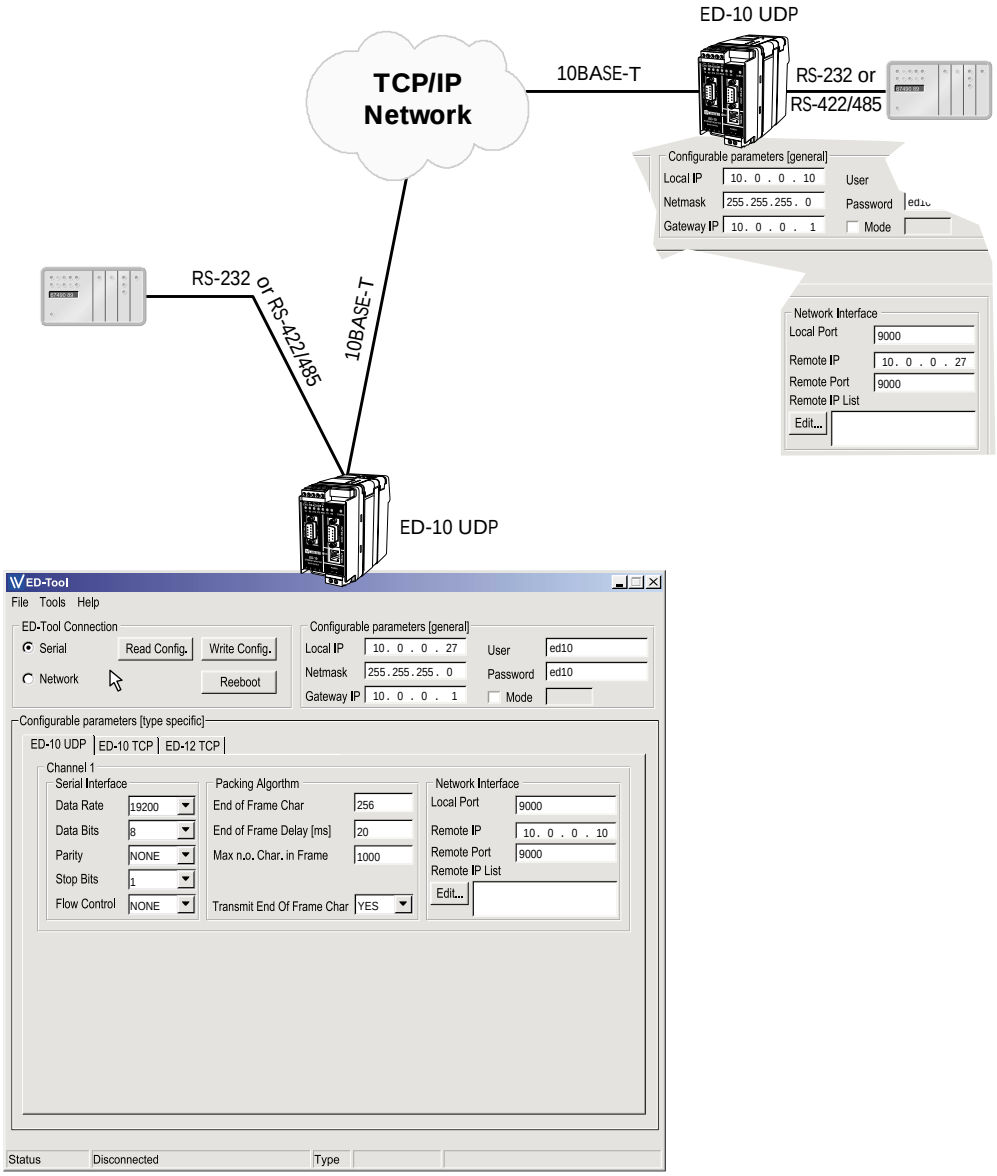
* The IP address must be compliant to the attached network. Ask the network administrator when in doubt.

# 8. Application examples

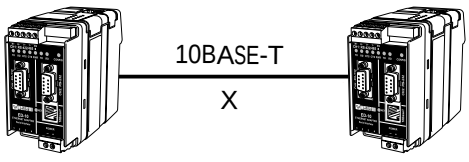
ED-10 UDP one to many connection



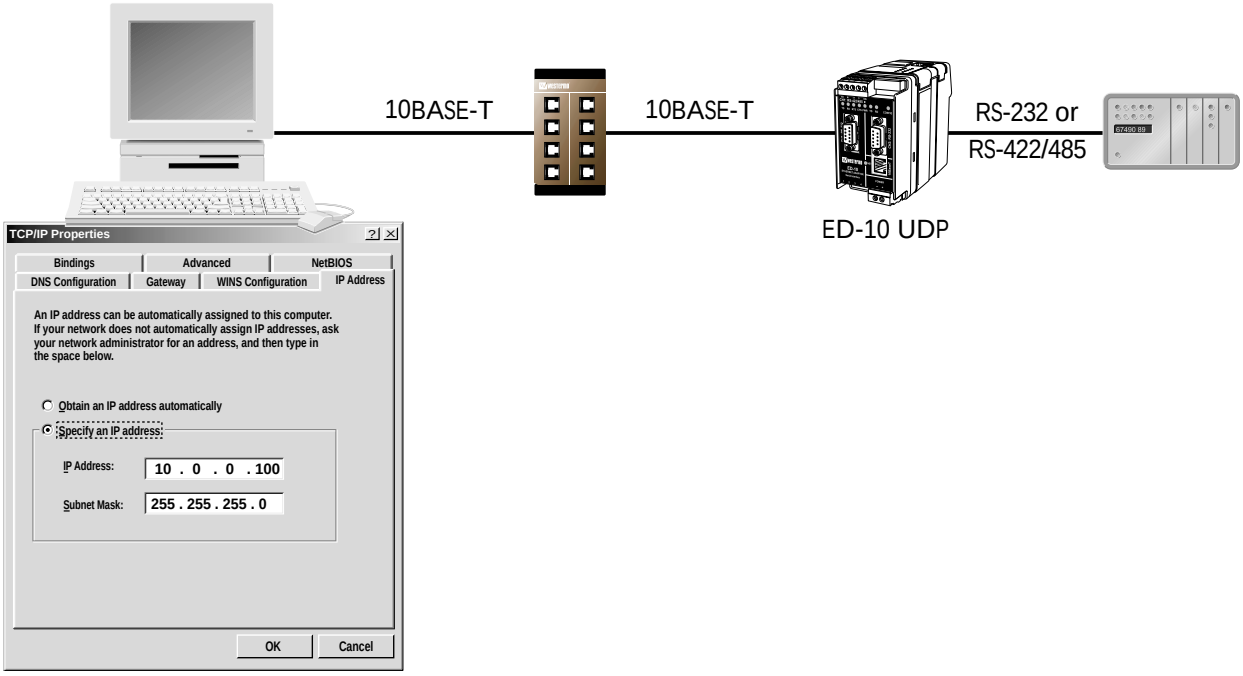
## ED-10 UDP point to point connection over TCP/IP network




## ED-10 UDP point to point connection, directly connected

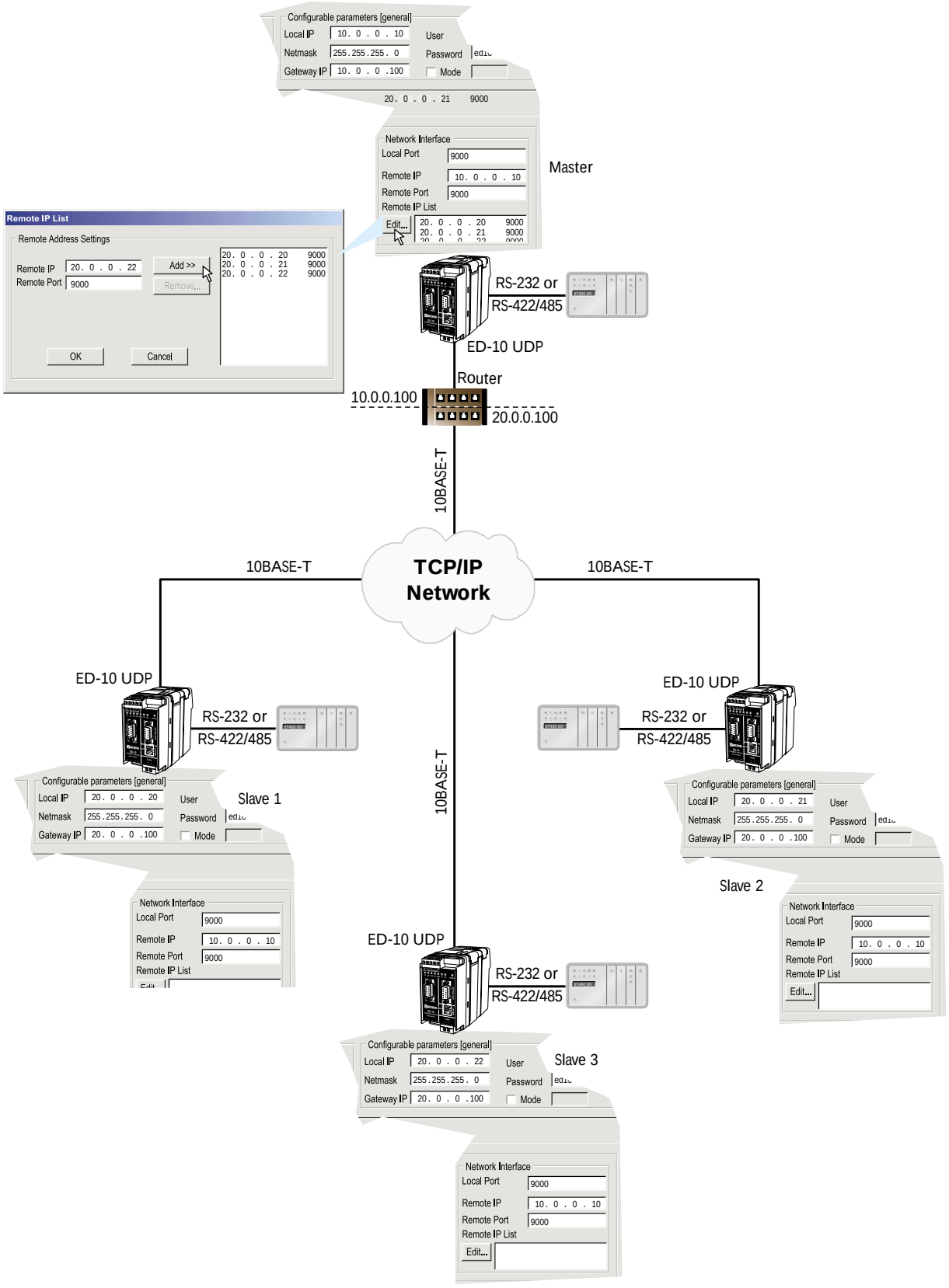



A 10BASE-T crossover cable must be used if the ED-10's are directly connected




ED-10 UDP directly accessed by an PC-application.

Communication one to many (e.g master/slave) between different networks through gateway using the Remote IP List in the unit. The Remote IP List could include up to 128 IP addresses and ports.



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