PortStore

RS-232/485 - Ethernet converter + serial buffer

TCP/IP Server + Email (SMTP system messages)

EN 900 341a

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PortStore

RS-232/485 - CDR/SMDR PBX accounting data buffer

Converter of the RS-232/485 serial line to Ethernet and back at TCP/IP protocols and UDP/IP with 2048 kB of a flash memory for data storage from the serial port for the case of the inaccessibility of the TCP connection. If the buffer memory is full, the device sends an email.

Software for retrieving data from a buffer available. Built-in Virtual Serial Port support.

Basic features

- **One RS-232** or **RS-485** serial port accessible via Ethernet (TCP/IP or UCP/IP)
- The serial port incoming data are stored to a **2048kB buffer memory**. When a TCP connection is established the data is sent as a "RAW TCP stream" data flow.
- The device can send an email, when the buffer memory is full, or when there has been a power failure

- The PortStore can be used for **storing RS-232 incoming data** as well as for **remote serial port access** over Ethernet network.
- Remote port can be controlled by a **Virtual driver for Windows** such as **COM 5** (driver for Windows 2000/XP is free) compatible with RFC2217.

- 3 ways of the device's configuration:
  - Locally over RS232 (serial terminal);
  - TCP/IP terminal access at TCP port 99;
  - Using simple Windows program (UDP Broadcast).

- Data **safety** solved with:
  - Predefined range of IP addresses and ports which have granted access to the device.
  - TCP connection can be authorized with 128 bit signature with TEA algorithm.

- Versatility of the **serial interface.** Communication speed adjustable in the range of 300..115.200 Bd, Handshake (CTS/RTS, Xon/Xoff, none).

- **Programming libraries** for the MS Visual Basic, Delphi, Borland C++, JAVA, PHP and other routines

- "**PS Eye**" software for regular buffer reading available. It can work as an "NT service" under Windows NT technology. Available as an executable file or as a source code (Borland C++).

Technical parameters

Serial port RS-232	
+ Data bits	7 or 8 or 9
+ Stop bits, Parity	1 or 2, None / Odd / Even / Mark / Space parity
+ Baud rates	50..115.2 kBd – entire range, step = 50 Bd
+ Data flow control	Xon/Xoff, CTS/RTS, None
+ Interface	1x DB9M (RxD,TxD,RTS,CTS,GND)
+ Used RS-232 signals	RxD,TxD,RTS,CTS, (DTR output – defined voltage level only)
+ Remote RS-232 parameters settings	RFC2217 with using NVT over TCP/IP stream if NVT enabled
+ Virtual Serial Port SW	HW VSP available for OS: Windows 98, 2000, XP, NT 4.0
Buffer memory	
+ RS-232 Buffer memory	2 048 kB Flash for incoming serial data
+ Buffer overflow signaling	**Network**: Email alert when 75% and 90% buffer capacity full **RS-232**: HW or SW handshake if buffer is full
+ Buffer type	Linear FIFO data space
+ Buffer data readout format	RAW binary TCP/IP stream
Serial port RS-485	
+ Termination	None, for longer lines external termination required
+ Isolation	RS-485 line not galvanic isolated to the device's power supply
Ethernet port	
+ Interface	RJ45 (10BASE-T) – 10 Mbit or 10/100 Mbit network compatible only!
+ Compatibility	Ethernet: Version 2.0/IEEE 802.3
+ Supported protocols	IP: ARP, UDP, TCP + NVT (Network Virtual Terminal)
+ Supported TCP/IP modes	TCP Server only, SMTP client
+ TCP connection close timeout	timeout 50s (with enabled NVT – can be prolonged by ACK/NOP)
Environment	
+ Temperature range	**Operating**: +5 .. 50 °C **Storage:** -10 to 85 °C
+ Humidity (non-condensing)	5 to 95 %
Physical parameters	
+ Power supply requirements	8-24V / Max. current consumption 200 mA DC - barrel (coaxial) power connector, GND on the shield
+ Dimensions	28 x 105 x 135 [mm] (H x W x D)
+ Weight	395 g
Functional parameters	
Device SETUP configuration options	- **RS-232 Setup** over any RS-232 terminal with DIP1=ON Independent settings:9600 Bd, 8N1, No handshaking - **TCP/IP Setup** - using any telnet terminal on the TCP/IP 99 port - **Hercules SETUP** utility via UDP (basic network parameters only)
Diagnostic LEDs	- Power (green) - Link & Activity (yellow)

Connectors description

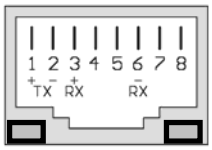
RS-232 and RS-485 serial interfaces are connected to the Cannon DB9M connector. You can switch between them using DIP3 (only one can be active at a time).

Signalization:

Power - green ……. External power supply
LINK - yellow……. LINK & Ethernet Activity

Connector wiring

Ethernet :



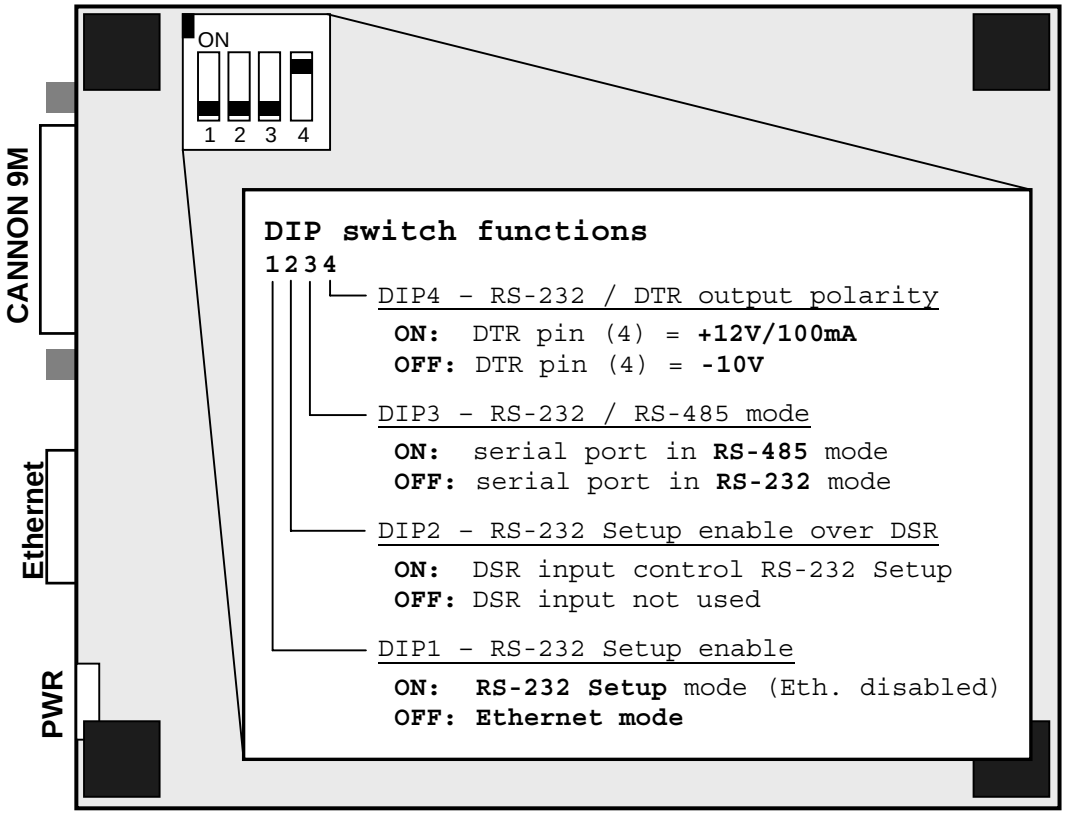
Power LINK

Power supply:

DC 8..20V / max. 0.3 A

PortStore Port	
Pin	Signal
1 <>	„A" RS485
2 <- IN	RxD
3 -> OUT	TxD
4 ->	DTR
5 --	GND
6 <- IN	DSR
7 -> OUT	RTS
8 <- IN	CTS
9 <>	„B" RS485
Cannon 9 - Male	

Standard IBM PC RS-232 Port	
Pin	Signal
1 <-	CD CD
2 <-	RxD
3 ->	TxD
4 ->	DTR
5 --	GND
6 <-	DSR
7 ->	RTS
8 <-	CTS
9 <-	RI
Cannon 9 - Male	



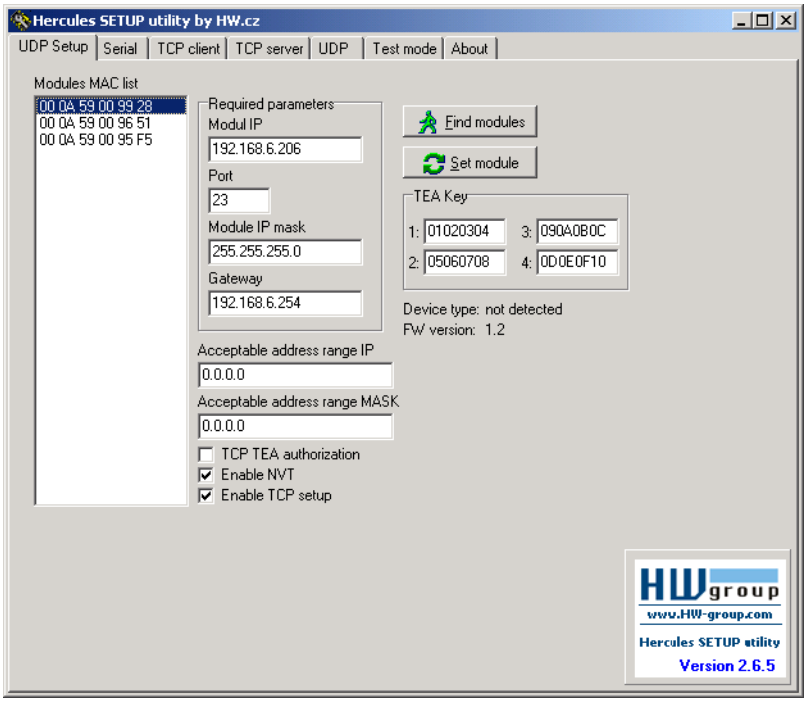
Typical configuration DIP4 .. DIP1
1001 RS-232 Setup Ethernet disabled, device parameters can be set up in RS-232 terminal (9600 8N1).
0011 Ethernet / RS-485 Converter enabled, serial line in RS-485 mode with no termination.
0001 Ethernet / RS-232 Converter enabled, serial line in RS-232 mode. DTR output signalizes enabled device and can be used as a power source for another RS-232 device..

Quick SETUP

In this chapter you will be shown the way of configuration within 5 minutes. If you experience any problems, please, read the following chapter which describes the setup process step-by-step.

Cable connection

- Connect the delivered power adaptor.
- Set **DIP1** - **DIP4** into the **OFF** position.
- Connect PortStore into the Ethernet 10/100 Mbit network.
- Plug the connector of the power adaptor into Portstore's power connector.
- The green **Power** indicator will light up.
- The **LINK** indicator will light up and go down as the data transfer to the Ethernet fluctuates (Activity signalization).



IP address configuration

- Run the application „HerculesSetup.exe" which can be found in the root directory of the delivered CD or at www.HWgroup.cz
- In the „UDP Setup" bookmark click on „Find modules" and in the left column the MAC address of the device should appear. Click on the MAC address and set the required parameters (at least IP address, Mask and Gateway).
- Make sure you have the "Enable TCP Setup" field checked and by clicking the "Set module" save these parameters to the device.
- Now that you have set the IP address and other device's parameters it is possible to work on.

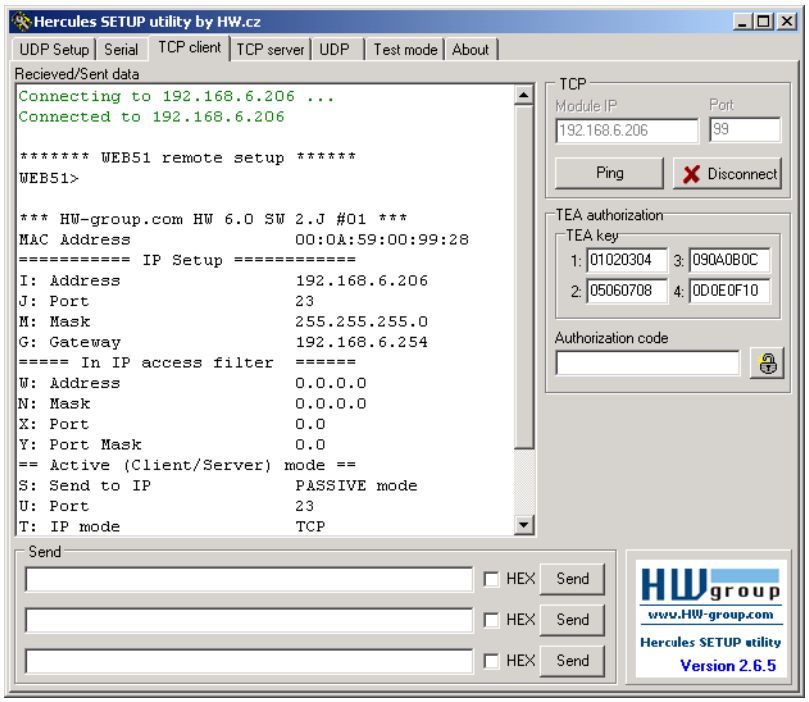
Did you not find the MAC address of the device in the list?

If the LINK indicator did not light up or the device does not respond see the following possibilities.

- Does your Ethernet network support 10 Mbit devices?
- Is the proper TP cable used (TP Patch cable for the connection to the switch crossed for PC connection).
- Check the DIP settings (DIP1,2,3 = OFF, DIP4=ON).
- Are you using crossed TP cable directly from your notebook to the device? Please disable DHCP and define any fixed IP address (IP=192.168.6.4, MASK=255.255.255.0 for example). Without DHCP server isn't declared DHCP network setting.
- Check your power adaptor and if the Power indicator lights.

Configuration using TCP Setup

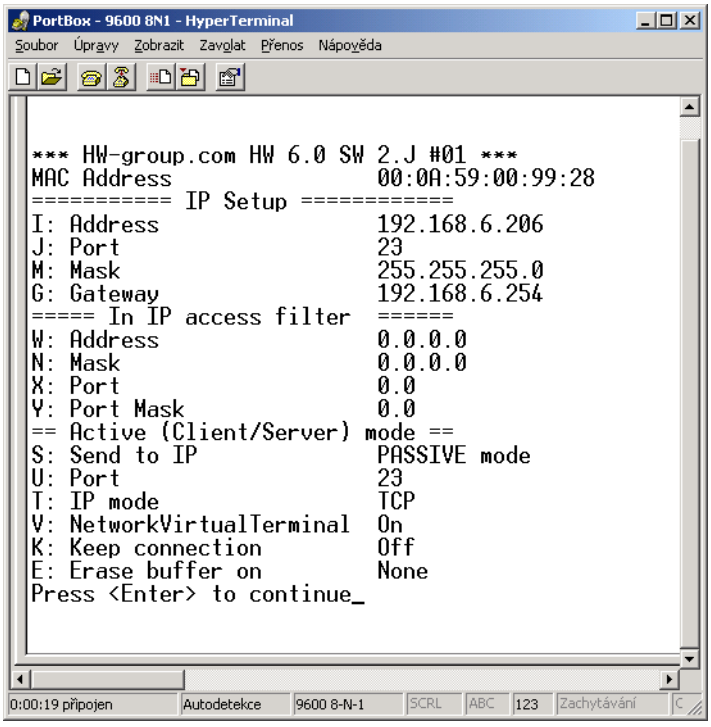
- Switch to the „**TCP Client**“ bookmark and insert the configured IP address. As a **TCP port number** insert the port number **99.**
- Click on the “Connect” button and the prompt **“WEB51>”** will appear in the list on the left. Click into this field and press ENTER. Actual parameter configuration will be written up in the window.
- Configuration of parameters itself is called by typing the letter of the corresponding option and its value. (e.g. „**I192.168.6.8**“ for an IP configuration of the device’s address). Information on commands can be displayed by execution of the sequence: command + question mark and <Enter> – „**I? <Enter>**“. All settings are detailed further in the text.
- After setting the parameters call the R command for **Reboot** and then click the “**Disconnect**“ button.



Configuration using RS-232 terminal

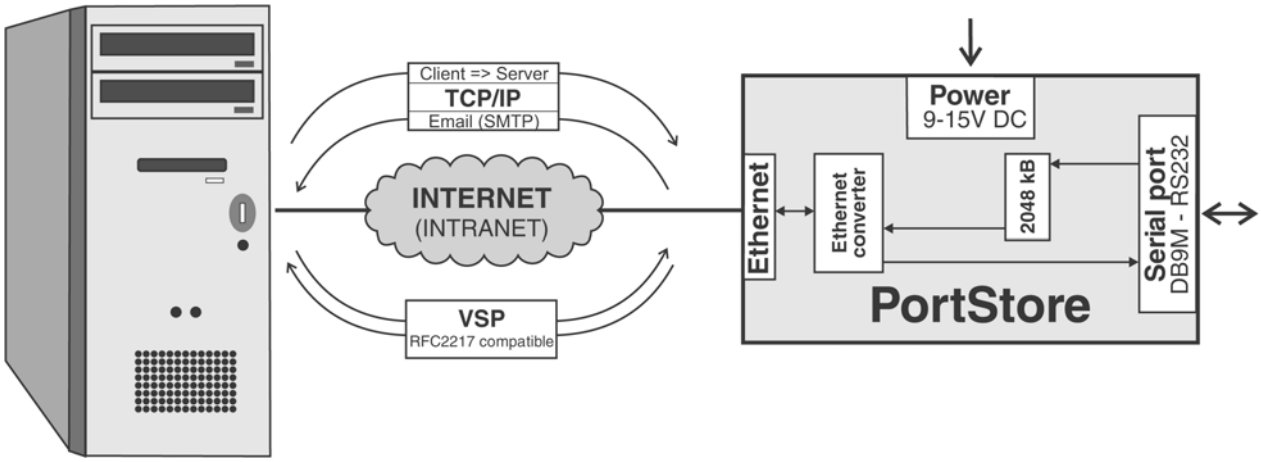
If you don’t have Windows or our Hercules program at hand, you can configure the device from any RS-232 terminal.

- Switch off the power supply (disconnect the power adaptor plug).
- Set **DIP1 = ON**, **DIP2 = OFF**, **DIP3 = OFF**, **DIP4 = ON,**
- Connect the cable to the RS-232 (Port 1) via supplied **LapLink** cable for PC.
- Open your favorite terminal program (e.g. HyperTerminal), set the required serial port and choose parameters **9600 8N1**.
- Connect the power adaptor to the PortStore’s power connector.
- The green **Power** indicator will light up.
- If the serial cable and the terminal program work, a text menu for converter’s configuration should be seen on the display.
- Continue forth as previously described.
- If you wish to use the buffer for incoming data on the serial port, it’s necessary to initialize the buffer.
- After setting device’s parameters, switch off the device and set **DIP1 = OFF** to disable RS-232 Setup mode.



System topology

Here you can see the typical PortStore connection and the basic network protocols.



- **TCP/IP Server mode** [Client -> Server]
  PortStore waits as a TCP server until any side (PC or server) opens a TCP connection. When the connection is established, the internal buffered data are sent and then the device allows communication as a standard "terminal server".

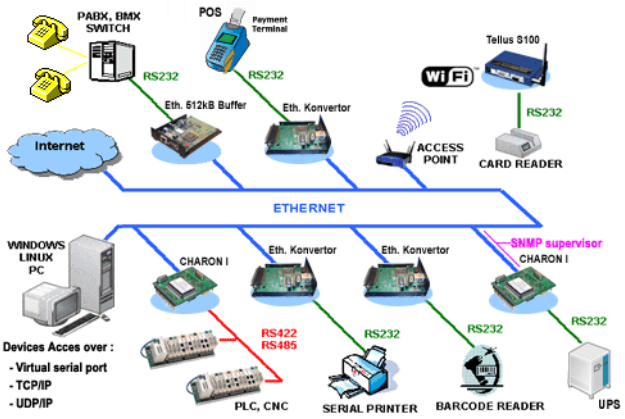
  While waiting to the TCP connection, the buffer is watched and emails are sent when the buffer is 75% full and then when the buffer is 90% full. The emails are sent to a preset email address, which can be configured in the setup together with the email subject.

- **VSP** (Virtual Serial Port)
  You have a **HW Virtual Serial Port** software which creates a virtual COM port under Windows OS so that the device acts like it's connected directly to your PC, though it's a virtual remote port. If the buffer is enabled and the TCP connection is not available, the data is stored into the internal buffer memory. For the full function it's advantageous to enable NVT (**Network Virtual Terminal**), so the port would be RFC2217 compatible.

HW VSP - Virtual Serial Port

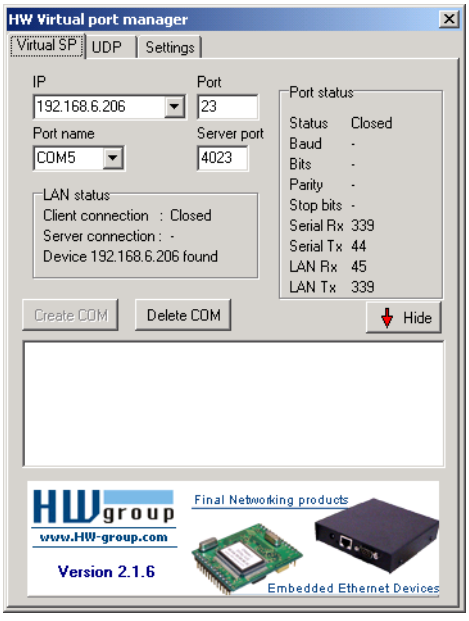
Virtual driver of the serial port for Windows is a software instrument that adds a virtual serial port (e.g. COM5) to the operating system and redirects data from this port to other hardware port. Nowadays the virtual port is mainly used for connection of the RS-232 serial port via USB or Ethernet network.

- Runs under Windows 2000 and Win XP.
- If the device supports RFC 2217 (NVT) you can set parameters of the remote serial port (baud rate, parity, stop bits).
- Debugging is eased by the possibility of a recording the communication into a LOG file.
- It is possible to create more Virtual Serial Ports on a single computer (COM5, COM6, COM7...) by running VSP.EXE via command line.



Using HW VSP with the PortStore

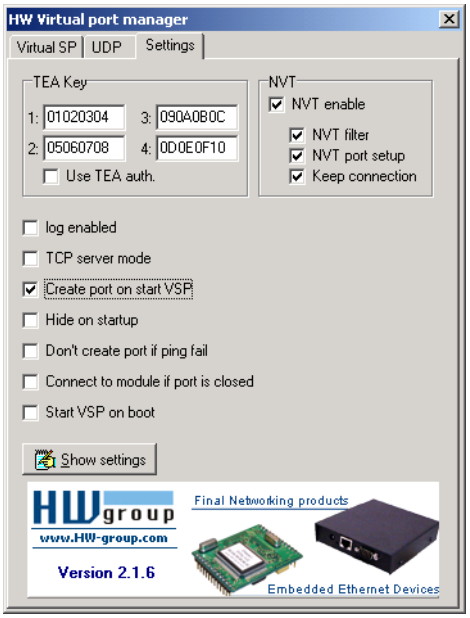
- Install HW VSP (directory „**HW_VirtualSerialPort**“ on our CD).
- Check that NVT is enabled (on the **UDP Setup** tab from **Hercules** utility). If not, enable NVT and save the configuration.
- Run HW VSP and search for the PortStore in the „**UDP**“ bookmark. Choose the MAC address of the device and click on the „Use this IP“ button. Switch to the „**Virtual SP**“ bookmark. The IP and Port should be already set.
  This searching via UDP Broadcast works only on a local network. If you have the PortStore installed somewhere behind the router or similar component you have to set the IP address and Port manually in the “Virtual SP” tab.
- Choose the serial port you want to create (COM1 – COM20) and click the “Create COM” button. The frame “LAN status” will show whether the device has been found and if correct, the virtual serial port is created.
- As you run any application which opens selected virtual port (here it’s COM5) the HW VSP will link up with PortStore, set the remote port according to the opened serial port (speed, parity, number of bits, handshake) and starts to transfer data. Some applications have problems with serial port numbers higher than COM4 but you can use the original Hyperterminal from Windows, Serial tab from the Hercules setup utility or Slovene program “Terminal.exe”. These programs are located in the “utils” directory of our CD.



HW VSP settings

TEA Key frame

You can use the TEA algorithm to secure the TCP/IP access (you must set the same TEA key on both sides of the communication).



NVT frame

Enables the RFC2217 detection of our remote ports. Do not forget to turn on NVT support on the remote device.

- **NVT filter** – filters NVT commands from the data flow.
- **NVT port setup** – sends commands to the remote port according to the VSP settings in your PC. If your terminal program (e.g. HyperTerminal) changes data transfer speed to 19.200 Bd and this function is enabled, the VSP driver sends NVT command (according to RFC2217) to change the remote TCP/IP port's speed as well.

- **Keep Connection** – keeps the TCP/IP connection opened even after 50 seconds of inactivity.

HW VSP parameters

- **log. enabled**
  VSP driver creates file "**C:\serialport.log**" for logging all activity of the virtual serial port.

- **TCP server mode**
  Activates VSP as a TCP/IP server. Driver then behaves as a TCP Client/Server = side which first receives any data switches to the role of a client and opens the connection.

  TCP server's port, which is used as input can be configured in main „**Virtual SP**" tab and we recommend using numbers higher than 1025.

- **Create port on start VSP**
  If checked all virtual port will be created automatically on startup of VSP. If you need to create virtual ports on Windows startup it's necessary to check the box "Start VSP on boot".

- **Hide on startup**
  Hides VSP to system tray. Icon can be then found next to the clock.

- **Don't create port if ping fails**
  IP address of the device is tested before creating virtual port. If testing fails the port is not created.

- **Connect to module if port is closed**
  When checked, you can loose data incoming from remote device, if the virtual serial port isn't used by some application.

- **Start VSP on boot**
  Adds a path to VSP into register RUN (HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows\CurrentVersion\run) in Windows. VSP is then run on Windows startup.

HW VSP – command line parameters

HW VSP can be also started through specific parameters from command line. This way more virtual serial ports can be created at once. Precise description of parameters can be found at www.HWgroup.cz

Example: `CharonVirtualCom.exe -R -i192.168.6.21:23 -c5 -S0 -N1 -Nf -Np -H1`

PortStore setup –configuration parameters description

Detailed description of particular parameters of the device and list of possible parameters follows.

Factory defaults

Standard configuration, listed here, can be whenever restored by option "D0" or "D1" from setup, which can be activated as:

- **TCP Setup** on TCP port 99 (if enabled), you need to restart the device after any change.
- **RS-232 Setup**, which enables using DIP1 and works over RS-232 (9600 8N1).

```
*** HW-group.com HW 5.1 SW 2.L #01 ***
***        PortStore (2MB)         ***
=========== IP Setup ============
I: Address                 192.168.6.51
J: Port                    23
M: Mask                    255.255.255.0
G: Gateway                 192.168.6.254
===== In IP access filter  ======
W: Address                 0.0.0.0
N: Mask                    0.0.0.0
====== Out IP Setup =======
S: SMTP server IP          SMTP disabled
U: SMTP Port               25
V: NetworkVirtualTerminal  Off
K: Keep connection         Off
E: Erase buffer on         None
====== Flash Buffer Setup =======
&F: Flash buffer           On
====== e-mail Setup =======
&G: System Name:           PortStore@company.com
=== Power Fail e-mail
&U: To e-mail address      ResponsiblePerson@company.com
&X: e-mail Subject         PortStore Power-Up init
=== Buffer Full e-mail
&V: To e-mail address      ResponsiblePerson@company.com
&Y: e-mail Subject         PortStore buffer almost FULL
=== Buffer Overflow e-mail
&W: To e-mail address      ResponsibleChief@company.com
&Z: e-mail Subject         PortStore buffer TOTAL FULL!
Press <Enter> to continue
========= Serial Setup ==========
&B: Speed                  9600
&D: Data bits              8
&P: Parity                 NONE
&S: Stop bits              1
&C: Flow Control           NONE
&R: RS485/RS422 control    RTS = On [+8V]
&H: Tx Control             Tx FULL duplex
&O: Buffer SpaceCompresion Off
======== Security Setup =========
%A: TCP autorisation       Off
%K: TEA key 0:01:02:03:04 1:05:06:07:08 2:09:0A:0B:0C 3:0D:0E:0F:10
%S: TCP/IP setup           On
============  Other  ============
D: Load/Save Settings from/to Flash
F: Erase & Init Flash Buffer
R: Reboot

WEB51>
```

Network parameters

MAC Address 00:0A:59:00:95:6C

MAC address is a unique network device address in the Ethernet and it is always factory-preset. You can find it on the label inside the device. Using this address, the devices can be distinguished for example in the UDP mode of the configuration program. The address respects restoring of the default configuration with the „**D0**“ command.

I: Address 192.168.6.15

Configuration of the device's IP address.

J: Port 23

Configuration of the device's communication port – range: 1 .. 19.999.

Port 99 is used for TCP configuration, if supported by the version and enabled in the setup.

M: Mask 255.255.255.0

Configuration of the IP mask for the local network. All IP addresses outside the area delimited by the device's own IP address and this mask will be accessed via the Gateway.

IP address, Mask and Gateway description:

Ethernet device communicates:

- **On local network segment**
  You don't need a Gateway, but IP addresses of both devices must be in the range allowed by the Mask setting. If you set the Mask to 255.255.255.0 the IP addresses may differ only in the last byte.
- **Outside local network – using Gateway** (which must be in the range allowed by Mask parameter).

You can also restrict the IP address range using the "**In IP Setup**“ commands. We recommend keeping this parameter on 0.0.0.0. for debugging.

G: Gateway 192.168.6.254

Address of the gateway that provides access to outside networks, as defined by the IP address and the mask.

====== In IP Setup ======

W: Address 0.0.0.0

IP address of a network or computer that is allowed to communicate with the device. This value must result from multiplying the remote IP address and the restriction mask (option N), otherwise the device does not react.

(**IP requesting access** AND **N**) = **W**

If this condition is valid, you can access the device (AND is binary multiplication).

N: Mask 0.0.0.0

This mask restricts addresses that can communicate with the device. Security can be greatly enhanced by setting a fixed address or a suitable restrictive mask that disallow communication with unauthorized parties.

TCP parameters

====== Out IP Setup ======

S: SMTP server IP 192.168.6.254

U: SMTP Port 23

If the „S“ setting differs from 0.0.0.0, the device is in the TCP Server + SMTP email client mode. Under the predefined conditions, three emails are sent:

- There has been a **power failure**. After the power has been restored, PortStore will notify the supervisor on the preset email address that the device has been restarted. The **&U** and **&X** parameters are used.
- If more then **75%** of the buffer is full, the first email with a predefined subject is sent **(&V** and **&Y**).
- If more then **92%** of the buffer is full, the first email with a predefined subject is sent (**&W** and **&Z**).

V: NetworkVirtualTerminal Off

Network Virtual Terminal allows the interpreting of the Telnet protocol sequences including certain RFC2217 extensions, enabling on-the-fly changes of serial port parameters (speed, parity, ...). Detailed NVT description can be found on our website in the support and download page.
If you don't want to use NVT, set your client to RAW TCP stream communication mode.

0: Off (NVT disabled)
1: On (NVT enabled)

Note: *You can enable NVT support independent on the RS-232 Setup with using UDP Setup, tab in the Hercules utility. Check the „Enable NVT“ checkbox.*

K: Keep connection Off

This option allows keeping the connection alive with sending NOP commands, because TCP automatically closes the connection after 50 seconds of inactivity. NVT must be enabled for this parameter to work.

0: no keep connection (prefered)
1: keep connection

E: Erase buffer on Open connection

Option for clearing the internal Device buffer whenever a connection is established or closed. This option is useful e.g. if your device periodically says "I'm alive" and you don't want to waste time retrieving these notifications from the buffer.

0: none
1: Close TCP/IP connection
2: Open TCP/IP connection
3: Open & Close TCP/IP connection

&F: Flash buffer On

Activates/deactivates the 2048 kB buffer memory. When the buffer memory is turned off, you are working directly with the serial port, using only the 32 kB RAM in the device.

1: On
0: Off

Recommendation

When installing the device or in case of any problems, use the „**F: Erase & Init Flash Buffer**“ command after enabling the buffer memory support.

Sent emails parameters

&G: System Name: PortStore@company.com

Portstore's reply addres, which mut be filled for the email software to process the emails. Portstore cannot accept or process these emails.

=== Power Fail e-mail

&U: To e-mail address ResponsiblePerson@company.com
&X: e-mail Subject PortStore Power-Up init

Email addres and subject definition for message, which is sent in case of any power failure..

=== Buffer Full e-mail

&V: To e-mail address ResponsiblePerson@company.com
&Y: e-mail Subject PortStore buffer almost FULL

Email addres and subject definition for message, which is sent in when the buffer is 75% full (75% from 2 048 kb = circa 1536 kb).

=== Buffer Overflow e-mail

&W: To e-mail address ResponsibleChief@company.com
&Z: e-mail Subject PortStore buffer TOTAL FULL!

Email addres and subject definition for message, which is sent in when the buffer is circa 90% full (87.5% from 2 048 kb = cca 1792 kb).

Serial port parameters

====== Serial Setup ======

&B: Speed 9600

Configuration of the communication speed for the serial line, range 50..115.200 Bd, step 50 Bd. To set 9600 Bd enter: „&B9600“.

&D: Data bits 8

Number of data bits for the serial transfer, this must correspond with the stop bit and parity settings.

7: 7 bits
8: 8 bits – use „&D8“.

&P: Parity NONE

Parity of the serial asynchronous communication.

N: none / **O: odd** / **E: even** /
M: mark / **S: space**

&S: Stop bits 2

Number of stop bits for the RS-232 serial line. This respects the rule of 9 bits (max. 10 bits). If you set 7N1, setup will correct this to 7N2, as well as 8E2 will be corrected to 8E1.

&C: Flow Control NONE

Serial data flow control, if you use data flow control and the input buffer is full, handshake will signalize that the device can no longer accept data.

1: none – no control, RTS viz. &R.
2: RTS/CTS – RTS/CTS pin control
3: Xon/Xoff – SW flow control.

&R: RS485/RS422 control On [+8V]

Defines idle level of the output RTS pin. Important for devices powered from RTS or for add-on RS485 Devices that use RTS to switch direction. Especially for the internal RS485 module, the "**HW echo**" option should be on. This means that the receiver reads the data back from RS485 and generates hardware echo from the actual RS485 bus.

0: RTS = On [+8V] (recomended for RS-232 or RS-485 mode)
1: RTS = Off [-8V]
2: TxRTS HW echo ON (recomended for **RS-485 debug only!**)
3: TXRTS HW ECHO OFF (**RS-485**)

&H: Tx Control Tx FULL duplex

When HALF duplex is activated, the Device assumes unidirectional medium connected to the serial line (e.g. RS485) and won't start transmitting data while receiving.

0: FULL duplex (RS-232)
1: HALF duplex (RS-485)

&O: Buffer SpaceCompresion Off

To increase the buffer capacity you can active a so call „space compression“. This will replace the „space“ characters with index and count, so this will be effective if your data contains many spaces.

This compression will not affect any data transfers, the data is still transferred uncompressed.

Other parameters

===== Security Setup ======

%A: TCP autorisation Off

Activates TEA authorization - requested from the remote side after the connection is established.

0: TEA authorisation **Off**
1: TEA authorisation **On**

Note: *You can enable TCP TEA autorisation independent on the RS-232 Setup with using UDP Setup, tab in the Hercules utility. Check the „TCP TEA autorization“ checkbox.*

%K: TEA key 0:01:02:03:04 1:05:06:07:08 2:09:0A:0B:0C 3:0D:0E:0F:10

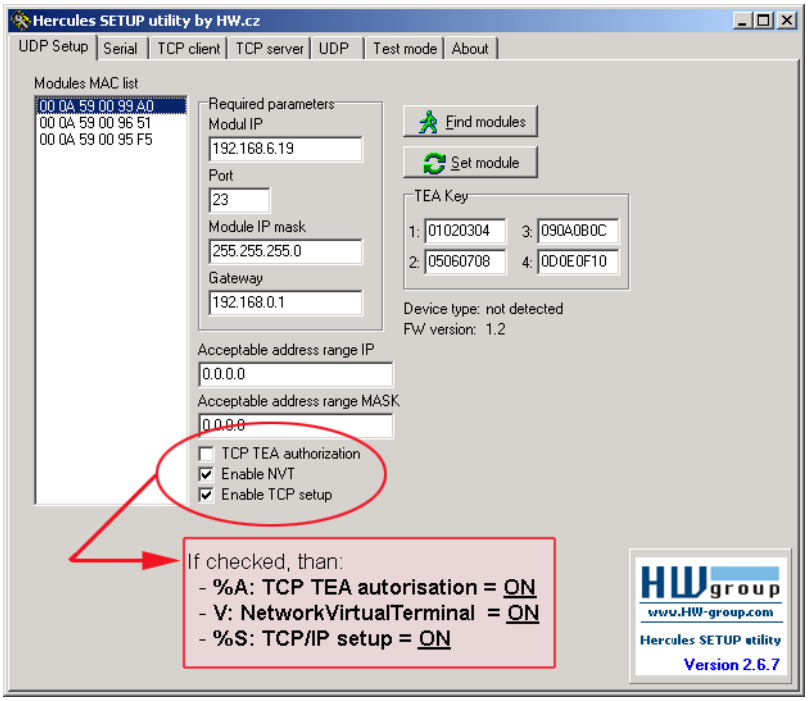
To set the TEA key use the "%K" option. Set 16 bytes in quadruples using four hexadecimal values separated with colons. The first string defines 0-3rd quadruple of bytes. So, to set the last 4 bytes to the displayed value, use “**%K 3:0D:0E:0F:10**“.

%S: TCP/IP setup On

Allows or denies the remote configuration using TCP setup on port 99. This command works only in the **RS-232 Setup** mode.

0: TCP Setup disabled
1: TCP Setup enabled
(TCP server on the port 99)

You can enable TCP Setup independent on the RS-232 Setup with using UDP Setup, tab in the Hercules utility. Check the „Enable TCP setup“ checkbox.



========= Other =========

F: Erase & Init Flash Buffer

Initializes the FLASH buffer. If you are installing a new device, do not forget to initialize the buffer using this command.

D: Load/Save Settings from/to Flash

Saves the current settings to memory or restores saved settings.

0: Reloads settings from **position 1**
1: Reloads settings from **position 2**
2: Stores settings to **position 1**
3: Stores settings to **position 2**

R: Reboot

Software reset. Recommended when changing TCP Setup parameters.

Configuration of the device - FAQ

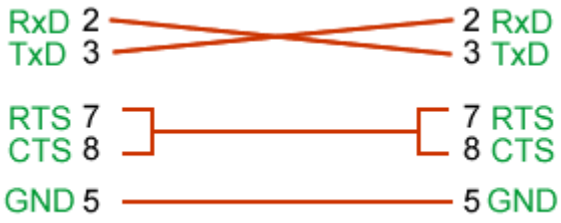
- **Ethernet has stopped working but the LINK LED is lit.**
  Check if the device isn't in the "RS-232 Setup" mode, which is turned on by setting **DIP1** = ON? If the device is in this mode the Ethernet part does not respond. Set the jumper to DIP1 = OFF and reboot the device by disconnecting of the power supply for at least 3 seconds.

- **The RS-485 communication does not work**
  Check if you have connected the **Termination resistors** (120 – 470 ohms) to the line or connector. If you are using a RS485 conversion, set the configuration to **&R3** and do not forget to turn the HALF DUPLEX on with setting **&H1**.

- **I need to power another RS-232 device**
  If you do not need to regulate the data flow (HW handshake) and at the same time need a supply voltage for the device on serial port (up to 5-10 mA) power your application from the RTS output (pin 7 on RS-232 connector). Voltage of circa +8V to +12V can be activated on this pin by **&R0** option in the reset mode (&R: RS485/RS422 control).

- **I have problems with HW handshake**

  Some of the RS-232 cables sold as "LapLink" cables do not support HW handshaking (for connection see picture) when the buffer is full. If you need the HW handshake in your application, make sure your cable does not have pins 7 and 8 connected like shown on the picture. To use HW handshake properly, pins 7 and 8 must be cross-connected like pins 2,3.

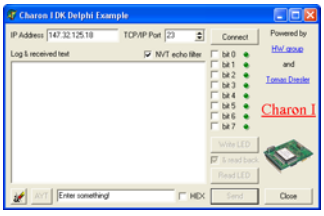


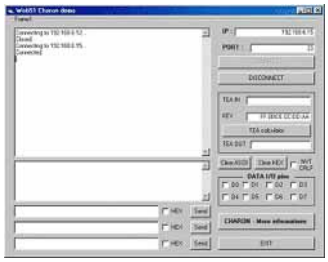
„Wrong" RS-232 cable wiring.

Free application software

Use supplied free software for configuration or as an inspiration for driver writing. Detailed description of free routines, TEA coding and our NVT implementation can be found on our webpage.

- **Borland C++**
  Delphi Charon 1 – communication and NVT example **-** (TCP Client).
  Delphi TCP/IP logger/server example - (TCP Server).
- **Delphi**
  TCP/IP and NVT communication example (TCP Client).
- **JAVA**
  TCP/IP – NVT communication example (TCP Client).
- **PHP**
  TCP/IP – NVT communication example (TCP Client).
- **Visual Basic** –TCP/IP and NVT (TCP Client) communication example.





PortStore in practice

Some practical advices as well as typical application descriptions.

Application hints

2048 kB buffer

Don't forget to enable the cache memory "&F1" after buffer configuration and then initialize it by "F" command. Without this only the 32kB internal RAM is active.

Security

For increasing the security of data transfer in TCP mode it's possible to authorize both sides on establishing any TCP/IP connection via TEA 128 algorithm with symmetric signature. The configured password of both sides then won't go through the network. This option is possible only for TCP/IP connection. UDP mode is designed only for local networks. Detailed description of TEA can be found in the handbook "**Programming of Ethernet Applications**" on our website.

Network Virtual Terminal

Learn how to use Network Virtual Terminal in your application. Basically the NVT is a system on which TELNET protocol works. It's simple and transparent way of handing down the setup information which is compatible with all sorts of RFC and above all with **RFC2217** for remote control of serial port.

Using RFC2217 in examples

- **Setting and changing the serial port speed**
  Using simple binary sequences which are sent in the TCP/IP data flow:

  FF FA 2C 01 00 00 00 00 FF F0 (Hex) asks for the actual serial port speed.

  FF FA 2C 01 00 00 25 80 FF F0 (Hex) sets serial port speed to 9600 bauds.
  (25 80 hex = 9600 decadical).

- **Remote device identification**
  With sending the „**FF F6**" (Hex) sequence you ask for the „Are You There" device identification where the device returns its identification including the firmware version and serial number (MAC address).

Extension of the connection timeout

Since the device supports only one connection at the moment it's necessary to secure the timeout for this connection. Standard limit after which the connection is terminated in case of no data flow is 50s. It is possible to enable option „**K: Keep connection**" which, in 10-second intervals, sends the NOP command into the open NVT connection.

Typical applications

The typical application of the PortStore device is a remote access to a RS-232/RS-485 technology. In case there is no TCP connection available the device stores the incoming serial port data to the internal **Flash 2.048kB buffer memory**.

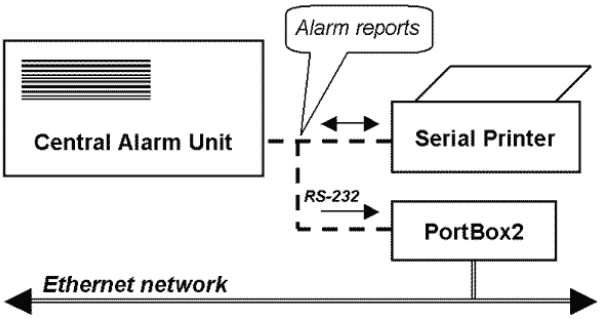
Application examples

- **PBX systems** – collecting pricing data from PBX
  A phone branch exchange can commonly provide pricing information data, which needs to be analyzed using a special software. The PBX sends the data to the RS-232 serial port, but mostly does not have enough buffer memory to store the data in case the receiving device is not working.

  PortStore then receives this data on the RS-232 serial line, stores it in the internal buffer memory, so it can be occasionally downloaded via Ethernet using a special software. In many cases, the server downloading data is in the company's central office and the branches are spread all over the country, connected only using Ethernet network. The buffer capacity is enough to hold 35 000 typical lines.

- **Serial printer data storage**
  The security central writes all the security information on the serial printer, so the data can be archived. This printer must of course be maintained by authorized personnel and the data is not available in electronic format.

  PortStore can store this data in its internal Flash memory, so the data can be downloaded from the company's office. The buffer capacity is enough to hold 35 000 typical lines.



- Card readers, RFID
- Exchange displays
- Security alarms
- Attendance systems
- UPS control and logging
- Data recording
- CNC machines
- Bar code readers

Basic types of communication

A brief description of basic terms. Detailed version with dictionary of abbreviations (and more) can be found on our website in the Support and download section.

TCP server (Passive mode)

After turning the device on, it awaits client's connection. When the client is connected the data are sent from Ethernet to serial line and vice versa. If the client isn't connected and there is data incoming from the serial line, they are saved into cache memory (it's size can be configured) and sent as soon as the connection is created (if you haven't chose the function from SETUP for clearing the buffer after client's connection).

TCP client (Active mode)

The device behaves similarly to the previous case (keeps the server function) but if any data from serial line are transmitted, it has preconfigured the IP address of the opposite side and tries to establish a connection as a client and transfer the data.
If it doesn't succeed the data are stored to the buffer memory and transferred with next created connection no matter what the role of the device is (client or server).

UDP

Data from Ethernet are sent to the preset address and if they come from the serial line RS232, a packet is created and sent to the configured IP address. At UDP the response from other side is not tested, the application itself should be secured from loosing data. Advantage is a little shorter response time which can be practically used especially for RS-485 lines.

NVT (Network Virtual Terminal)

When using TCP/IP communication the functions of the converter can be extended via NVT by RFC2217 with controlling dataflow which can for example change the speed of a remote serial port, control inputs and outputs or delete the buffer. These controlling commands are added to the data flow and introduced by prefix figure "FF" whose appearance in the data flow has to be handled by duplication. Detailed description of the NVT can be found in the handbook "**Programming of Ethernet Applications**" (which also describes supplied free routines for communication) or in a separate article on our website.

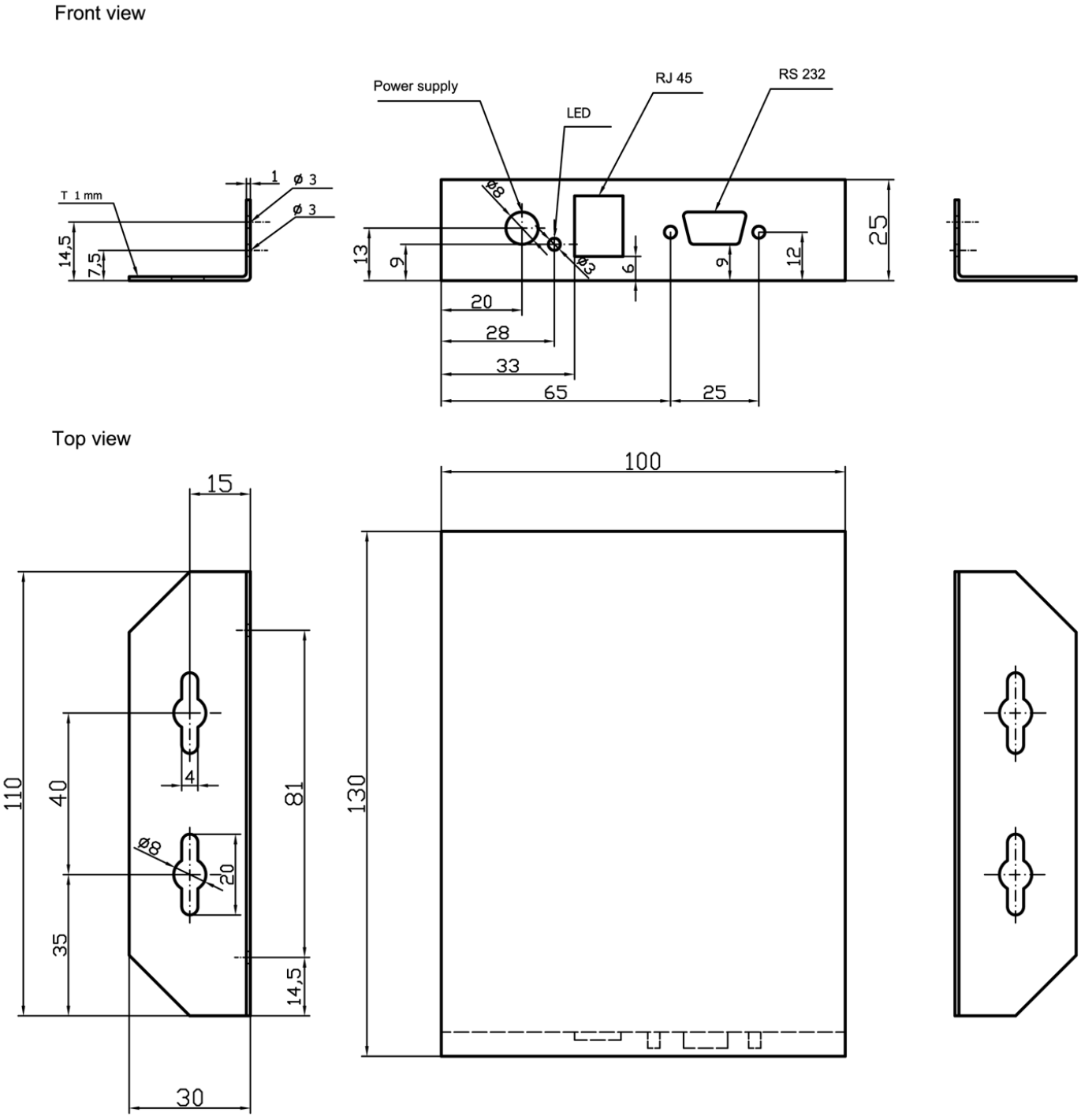
VSP (Virtual Serial Port)

The device is in TCP Server mode and the PC acts as a TCP Client. You have a HW Virtual Serial Port software which creates a virtual COM port under Windows OS, so that the device acts like it's connected directly to your PC, though it's a virtual remote port.
If the buffer is enabled and the TCP connection is not available, the data are stored into the internal buffer memory and sent when a TCP connection is established.

If you are using any kind of channel (for example GPRS), it is more useful to initiate a connection on the device's side, so you pay only for transmitted packets. The device can be configured as a TCP Client/Server and the HW VSP can be switched to the TCP Server mode. The connection is then initialized when there is any data coming to the serial port.

Mechanical parameters

Sturdy metal enclosure intended for wall attachment (side L-plates available), setting on a flat surface or installation to a DIN molding (see ordering number).



Optional accessories for mechanical attachment

- **L** – Rubber stands and **2 metal L-plates** for wall attachment
- **D** – Rubber stands and removable **mounting** for a **DIN molding** which is to be attached from below, in the middle of the plate, next to the slot for a DIP1 – DIP4 jumper setting.

Ordering number

OID (Ordering ID)	Products
600 035	**PortStore** PortStore unit, without any accessory
600 036	**PortStore set** Recommended starting set contains: - PortStore [600035] - EU [600080] or USA [600081] or UK [600082] Power adaptor - DB9 LapLink cable 2m [600063] - Manual, CD

Related accessory

- **2x "L-iron"** size "**B**" for wall mounting [**600 024**]
- **DIN Rail** box set for mounting on DIN molding [**600 025**]
- **DB9 Prolong cable 2m** [**900 806**]
  Extension cable Canon 9 – connected 1:1, length 2 m.
- **DB9 LapLink cable 2m** [**600 063**]
  Communication cable RS-232 LapLink for PC connection.
- **Wall Plug Power Adaptor**
  - **Euro version** - [**600 080**]
  - **US version** - [**600 081**]
  - **UK version** - [**600 082**]
  - **Euro Cable plug** version (no power cable included) - [**600 079**]

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