Introduction
This application note describes the procedure for establishing communication between a PC and remote Jetter controllers via dial-up connection.

Since on the controller end an Ethernet network is used, this procedure applies only to controllers belonging to the Jetcontrol series.

In case you wish to use a serial port on the controller end or use a controller belonging to the NANO or DELTA series, please refer to application note # 033.

In case you wish to establish connection with a MIKRO or PASE-E controller, please refer to application note # 010.

Important Notes
We tried to generate a documentation of the configuration steps that is as complete as possible. For more information, please refer to the documentation provided with your modem or ISDN terminal adapter, and your router.

Note on Safety
No safety-critical works such as commissioning of axes may be carried out using the modem connection.

Operating Behavior and EMC
When selecting a modem or ISDN terminal adapter, make sure that it is suitable for the intended application.

Commercially available modem types usually do not meet the requirements for industrial use, especially as regards electromagnetic compatibility (EMC)!
The person selecting the equipment has to make sure that all requirements are met.
Electrical Connections

Overview

The following devices are suited as modem / ISDN terminal adapter:
- Westermo TD-32
- Westermo TD-33
- Westermo ID-90

The following device is suited as router:
- Westermo ED-20

Connecting Cable between PC and Modem / ISDN Terminal Adapter

A commercially available serial modem cable delivered with the modem can be used.

Wiring Diagram

```
<table>
<thead>
<tr>
<th>Modem</th>
<th>9-pin</th>
<th>25-pin</th>
<th>PC</th>
<th>9-pin</th>
<th>25-pin</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3</td>
<td>TXD</td>
<td>2</td>
<td></td>
<td>TXD</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>RXD</td>
<td>3</td>
<td></td>
<td>RXD</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>SG</td>
<td>7</td>
<td></td>
<td>SG</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>RTS</td>
<td>4</td>
<td></td>
<td>RTS</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>CTS</td>
<td>5</td>
<td></td>
<td>CTS</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>DSR</td>
<td>6</td>
<td></td>
<td>DSR</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>DTR</td>
<td>20</td>
<td></td>
<td>DTR</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>DCD</td>
<td>8</td>
<td></td>
<td>DCD</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>RI</td>
<td>22</td>
<td></td>
<td>RI</td>
</tr>
</tbody>
</table>
```

Fig. 2
Connecting Cable between Modem / ISDN Terminal Adapter and Router

For connecting the modem with the router a special cable is required. Here, the transmitting (TxD) and receiving (RxD) wires are crossed. Both ends of the line are equipped with a SUB-D male connector.

Wiring Diagram

<table>
<thead>
<tr>
<th>Modem</th>
<th>Router</th>
</tr>
</thead>
<tbody>
<tr>
<td>9-pin male connector</td>
<td>9-pin male connector</td>
</tr>
<tr>
<td>DCD</td>
<td>1</td>
</tr>
<tr>
<td>RxD</td>
<td>2</td>
</tr>
<tr>
<td>TxD</td>
<td>3</td>
</tr>
<tr>
<td>DTR</td>
<td>4</td>
</tr>
<tr>
<td>SG</td>
<td>5</td>
</tr>
<tr>
<td>RTS</td>
<td>7</td>
</tr>
<tr>
<td>CTS</td>
<td>8</td>
</tr>
</tbody>
</table>

Fig. 3

Connecting Cable between Router and Switch

Here, a commercially available Ethernet cable (CAT5) with a maximum length of 100 m can be used.

Connecting Cable between Switch and Controller

Here, a commercially available Ethernet cable (CAT5) with a maximum length of 100 m can be used.
Configuration for this Application Note

The example given in this application note uses the following network addresses:

<table>
<thead>
<tr>
<th>Network 192.168.4.xxx</th>
<th>Network 192.168.10.yyy</th>
</tr>
</thead>
<tbody>
<tr>
<td>PC 192.168.4.77</td>
<td>PPP Network Interface</td>
</tr>
<tr>
<td>Modem / ISDN Adapter</td>
<td>Local IP: 192.168.4.xyz</td>
</tr>
<tr>
<td>Telephone network</td>
<td>Remote Address: 192.168.4.77</td>
</tr>
<tr>
<td>Router</td>
<td>Ethernet Interface</td>
</tr>
<tr>
<td>ED-20</td>
<td>Local IP Address: 192.168.10.100</td>
</tr>
<tr>
<td>Switch</td>
<td></td>
</tr>
<tr>
<td>Controller 192.168.10.189</td>
<td></td>
</tr>
<tr>
<td>Controller 192.168.10.189</td>
<td></td>
</tr>
</tbody>
</table>

Note: The IP addresses shown here are only examples. They are only to illustrate the functional principle.

Configuring the Controller

In the controller, the IP address assigned to the router has to be entered as gateway into the file “/System/cfgvar.ini”.

For our example, the following line has to be entered:

```
IP_DefGateway = 192.168.10.100
```

For more information on the file “/System/cfgvar.ini” refer to the controller manual.
Configuring the Router

Preparing the ED-20 configuration
Connect the ED-20 to the serial port of your PC using a standard serial cable. Be sure to use on the ED-20 end the port labeled “CH2”. [The ED-20 can also be configured via Ethernet interface. For more information refer to the manual]

Install the ED tool from the CD that comes with the ED-20.

Configuring the ED-20 from the PC
Launch the ED tool.

Important: First, you have to set the port to which the serial cable coming from the ED-20 is connected. This is made in the menu item “Tools / Serial COM Port” (see Fig. 5).

![Fig. 5](image)

Activate in “ED-20 Connection” the radio button “Serial” and click “Read Config” to load the default settings (see Fig. 6).
ED-20 Configuration Parameters
If there is no detailed description on some items, make ALL the settings shown in the illustrations.

Set in the list box *Data Rate* a data rate which is supported by the modem used. The modem has to be set to this data rate, as well.
The settings for the configuration in our example are shown in the following table:

<table>
<thead>
<tr>
<th>Modem Model</th>
<th>TD-32</th>
<th>TD-33</th>
<th>ID-90</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data Rate</td>
<td>57600</td>
<td>115200</td>
<td>57600</td>
</tr>
</tbody>
</table>

A flow control (handshake) is not necessarily useful for a peer-to-peer connection.
### Tab Modem Settings (Fig. 7)

![Modem Settings Table]

**Fig. 7**

The command line parameters to be entered under "Command" into the group Modem Init depend on the modem model. For more information, please, refer to exemplary configurations for the models TD-32 and TD-33 in chapter “Configuring the Modem”.

**Important**

**Basicly, the following applies:**
- Calls must not automatically be accepted by the modem.
  - AT command: S0=0;
- The DTR signal shall be ignored.
  - AT command: &D0;
- For more information refer to the modem manual.
Tab Network Settings (Fig. 8)

Settings in the section “Login” (1.)
Set in the list box Authentication “PAP”. Enter a user name and a password. For security reasons, enter a user name and a password which are hard to guess. Once you have finished set-up, you are allowed to access the ED-20 (thus, the controller connected to it) via telephone only if you enter the correct user name and password!

Settings in the section “PPP Network Interface” (2.)
Enter the local IP address (of ED-20) for accessing the ED-20 from PC into the field Local IP. Enter the IP address of your PC into the field Remote Address. As Subnet Mask enter 255.255.255.0.

Settings in the section “Ethernet Interface” (3.)
Set in the field Local IP Address the IP address for accessing the ED-20 from the controller.

This „Local IP Address“ has to be made known as gateway to the controllers in the file „cfgvar.ini“. Otherwise, communication with controllers will not be possible.

As Subnet Mask enter 255.255.255.0 as well.

It is mandatory that the three IP addresses “Local IP”, “Remote Address” from section PPP Network Interface, as well as “Local IP Address” from section Ethernet Interface vary!
Tab **Brouter Settings**  
Here, set **Brouter Mode** to OFF.

Tab **Firewall Settings**  
Here, set **Firewall Mode** to OFF.

**Completing the Configuration**

To complete the configuration click “Write Config” (1.), and then “Reboot” (2.). (Fig. 9).

---

Fig. 9

Congratulations! Configuration of your ED-20 router is completed.
Configuring the Modem
Connect the modem to the serial port of your PC using a standard serial cable.
Note: When configuring the two modems, identical settings should be used.
A terminal program is required for configuring modems.

Configuring the Terminal Program
Launch the program “HyperTerminal” from the menu “Start / Programs / Communications” or “Start / Programs / Accessories / Communications”.

Enter a name for the new connection, e.g. “Jetter” (Fig. 10). Next, click OK.
Now, select the serial port for connecting the PC with the modem (Fig 11). Next, click OK.

![Fig. 11](image)

In the next window, make the settings shown in Fig. 12.

![Fig. 12](image)

The data rate settings made here must correspond to the settings of the modem (in our configuration TD-33) (see chapter “ED-20 Configuration Parameters”).

Next, click OK.
Now, a dialog opens as shown in Fig. 13.

If you enter the command “AT” and hit the enter key, the modem shall answer with “OK”. Otherwise, check your setup and the modem configuration based on the descriptions given in this application note.

Once your modem returns “OK”, you may proceed with the configuration.

**Exemplary configuration**

We proceed from the assumption that your modem is new or has been configured with the default settings specified in the manual.

**Modem WESTERMO TD-33**

**Hardware Configuration**

For this modem model configuration via DIP switches is not required.

**Software Configuration**

For configuring the modem, please use the program “HyperTerminal” as described above. The following configuration is necessary:

<table>
<thead>
<tr>
<th>Modem command</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>AT&amp;F</td>
<td>Load factory default settings</td>
</tr>
<tr>
<td>ATX3</td>
<td>Ignore dial tone (for extensions)</td>
</tr>
<tr>
<td>AT&amp;W</td>
<td>Save the current configuration to the non-volatile memory of the modem</td>
</tr>
</tbody>
</table>
If you enter the command AT&V0, the following information should be displayed (Fig. 14: The information shown in section “ACTIVE PROFILE” is important).

```
OK
at&v0
ACTIVE PROFILE:
B0 E1 L1 N1 N0 Q1 T V1 W1 X3 Y0 CC1 GD0 G0 G0 G0 R0 Q5 RY1 RS0 RT5 RX0 RY1
S09:002 S01:006 S02:043 S03:013 S04:010 S05:008 S06:004 S07:050 S08:002 S09:006
S95:000
STORED PROFILE 0:
B0 E1 L1 N1 N0 Q1 T V1 W1 X3 Y0 CC1 GD0 G0 G0 G0 R0 Q5 RY1 RS0 RT5 RX0
```

Fig. 14

If the configuration of your modem should differ from the configuration shown in Fig. 14 (all parameters are default settings, except for “X3”), consult the manual that came with your modem, and reconfigure the modem.

Now, the modem configuration is completed.

Notes on configuration of the ED-20 tool for the TD-33 modem:

Enter in tab “Modem Settings” in group “Modem AT Commands” in subgroup “Modem Init” into the field “Command” the following parameter: AT&D0S0=0&W

For more information, please, refer to the corresponding manuals (router and modem) as well as to chapter “Configuring the Router” of this application note.

ISDN Modem WESTERMO ID-90

**Hardware Configuration**

This type of modem is in parts configured through DIP switches located within the modem. Once you have remove the lid of the ID-90, set the DIP switches according to the following list:

- SW2: Set DIP-slider 4 to ON
- SW4: Set DIP-slider 7 to ON
- SW5: Set DIP-slider 8 to ON
- Set all other DIP-sliters to OFF

**Software Configuration**

For configuring the modem, please use the program “HyperTerminal” as described above. The following configuration is necessary:

<table>
<thead>
<tr>
<th>Modem command</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>AT&amp;D0</td>
<td>The DTR signal shall be ignored.</td>
</tr>
<tr>
<td>ATS0=1</td>
<td>Auto answer OFF</td>
</tr>
<tr>
<td>AT&amp;W</td>
<td>Save the current configuration to the non-volatile memory of the modem</td>
</tr>
</tbody>
</table>

If you enter the command AT&V0, the following information should be displayed (Fig. 15: The information shown in section “ACTIVE PROFILE” is important.).
If the configuration of your modem should differ from the configuration shown in Fig. 15 (all parameters are default settings, except for “&D0” and “S00:000”), consult the manual that came with your modem, and reconfigure the modem.

Now, the modem configuration is completed.

Notes on configuration of the ED-20 tool for the ID-90 modem:

Enter in tab “Modem Settings” in section “Modem AT Commands” in subsection “Modem Init” into the field “Command” the following parameter: AT&D0S0=0&W

For more information, please, refer to the corresponding manuals (router and modem) as well as to chapter “Configuring the Router” of this application note.

Configuring the PC

On the PC side the functions provided by the Windows „dial-up network“ are used. These functions are also used for Internet connections. The TCP/IP protocol should be associated with the dial-up adapter.

For more information refer to the Windows help.

The simplest configuration option

Setting up a permanent local IP address (MS Windows 98)

If a router (ED-20) is used, a permanent local IP address is required.

Go to “Start/Settings/Control Panel” and select the option “Network” (Fig. 16).
If your PC is equipped with a network adapter, click in the upper list box (1.) on “TCP/IP -> <Network adapter name>” (2.).

If your PC is not equipped with a network adapter or if you are not allowed to assign a permanent local IP address, click on “TCP/IP -> Dial-Up Adapter” (3.).

Next, click “Properties”.

---

Fig. 16

View of the Network Configuration in Microsoft Windows XP.
In the tab “IP Address” (Fig. 17) click “Specify an IP address” and assign a permanent IP address to your PC (if this has not been done before).

**Important**

It is mandatory that the “Remote Address” specified during router configuration (see “Configuring the Router”) and the permanent local IP address assigned to the PC are identical.

As *Subnet Mask* select 255.255.255.0.

Next, click OK.

**Note:** Now, you have assigned a permanent local IP address to your PC. For more information on this topic refer to the Windows help or consult your network administrator.
Setting-Up the Modem

Go to “Start/Settings/Control Panel” (see Fig. 18) and select the option “Modems” (1.).

If the modem has not been installed yet, follow the instructions and let Windows automatically detect your modem.

If another modem has already been installed and is connected to your PC, then click “Add” (see Fig. 18) and let Windows automatically detect your modem.

Should the other modem not be connected to the PC, remove it from the Control Panel. To do so, select the modem in the display and click “Remove” (The modem has to be removed to enable automatic detection. Otherwise, the modem will not be detected).

Now, you can initiate automatic detection by Windows as described above by clicking “Add”.

If Windows does not detect your modem properly or under a wrong name, select a standard modem with a data rate that corresponds to your modem. Such a standard modem will suffice for our purposes.

Note: For more information refer to the Windows help.

Now, your modem has been set-up successfully and is ready for establishing a dial-up connection.
Making a new Dial-up Connection
Go to „Start/Programs/Accessories/Communications/Dial-up Networking“. Doubleclick “Make New Connection”.

![Fig. 19](image1)
Enter a name for the new connection, e.g. “Jetter”. Select the previously installed modem. Click “Next”.

![Fig. 20](image2)
Enter the area code and phone number, as well as the country code for the modem you want to call. Click “Next”, then „Finish“.
Configuring a Dial-up Connection
Click the newly created dial-up connection with the right mouse button and select “Properties” from the shortcut menu.

**Fig. 21**

**Tab „General“**
If “Area Code” and “Dial Properties” will not be used (thus, for internal connections), uncheck the corresponding box.

**Tab „Server Types“**

**Fig. 22**

Make the settings shown in Fig. 22! Next, click OK.

Now, you have successfully created and configured a new dial-up connection for accessing your ED-20 router.
Establishing and clearing down a connection

Connecting to the dial-up network ...
Double-click the symbol of the newly created dial-up connection.

![Connect To dialog box]

Fig. 23

Now, enter here the user name and password you have specified during ED-20 configuration.

If necessary, change the phone number of the modem you want to call.

Now, click “Connect” and wait until the small symbol appears in the task bar next to the clock or a status message signals that the connection has been established.
... ... and open a setup window in JetSym.
Now, you can open a setup window in JetSym and access the controller.

Fig. 24
Appendix: Additional Examples of Networking

Example 1

The router is the link between network 192.168.4.xxx and 192.168.10.yyy. The router itself, however, is located in network 192.168.7.zzz.

Advantages:

**Clear layout:** Establishing a third network besides the in-house and the controller network offers you the option to integrate all routers or similar devices which might be used.

**Addressing:** Moving router-like devices into a separate network makes more IP addresses available to the in-house network.
Example 2

With this configuration, two IP addresses should be assigned to the PC. The first IP address is used in the Intranet (192.168.4.xxx) and should, therefore, be assigned to the network adapter (or to the TCP/IP protocol associated with it). The second IP address is for addressing devices in an independent network 192.168.7.xxx, e.g. the router to be addressed in our example. Since the connection will be established via modem, you should assign the second IP address to the dial-up adapter (or to the TCP/IP protocol associated with it).

In this case, the second IP address must be permanently assigned to your dial-up connection, too. This can be done under "<Dial-Up Connection>/Properties/Server Types/TCP/IP Settings/Specify an IP address".

Note: For more information, please, contact your network administrator.

Benefits
This configuration has the same benefits as the configuration in example 1. In addition, the in-house network is better isolated from the telephone network which can result in increased security if properly configured.

Disadvantage
Configuration is more complicated and may cause problems.