How do you integrate an HMI operator panel into a local network?

basic operator panel with WinCC flexible on windows xp

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Caution
The functions and solutions described in this article confine themselves to the realization of the automation task predominantly. Please take into account furthermore that corresponding protective measures have to be taken up in the context of Industrial Security when connecting your equipment to other parts of the plant, the enterprise network or the Internet. Further information can be found under the Content-ID 50203404.

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Question

How do you integrate an HMI operator panel into a local network?

Answer

The instructions and notes listed in this document provide a detailed answer to this question.

Table of content

1 Set up a network connection

## 1.1 Assigning a fixed IP address in Microsoft Windows XP

- Open the Control Panel via "Start > Control Panel".
- Open the "Network Connections" folder in the Control Panel.
- If you select "LAN Connection", a dialog window opens in which you can configure this LAN connection.
- When you click the "Properties" button, another window opens.
- Select the "Internet Protocol (TCP/IP)" and click "Properties" to open the properties for this protocol. Another dialog window opens.
- Select "Use the following IP address". You can now assign a separate IP address for the PC.
  The following network settings have been applied in this example:

IP address: 192.168.0.1

Subnet mask: 255.255.255.0

Figure 1-1
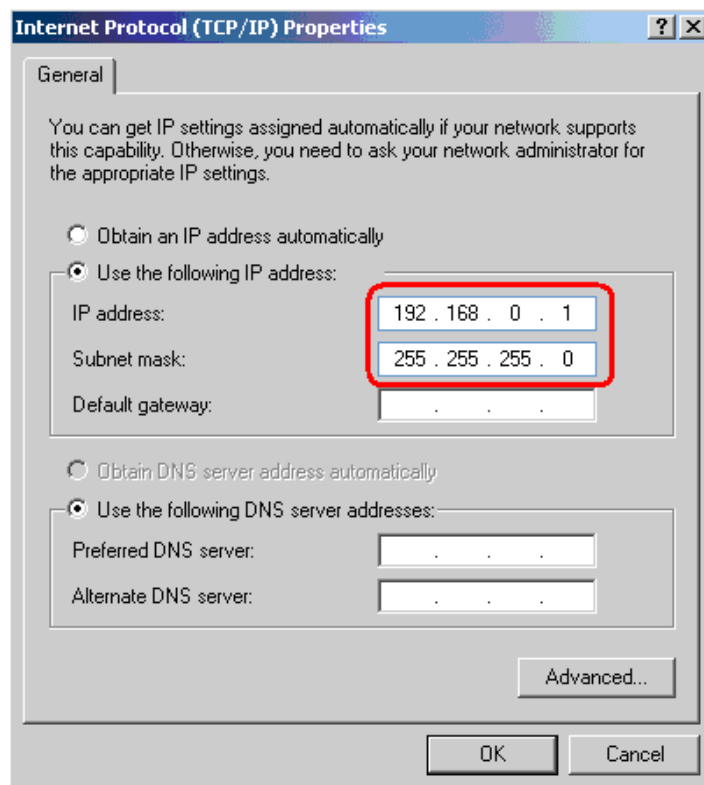
- When you click the "Advanced..." button, another window opens.
- In the new window you select the "WINS" folder. Make sure that "Standard" is check marked under "NetBIOS Setting".

This concludes the settings for assigning the IP address and making the NetBIOS setting on the PC.

1.2 Network configuration on the operator panel

- Open the "Control Panel" on the operator panel.
- Open the "Communications" menu in the Control Panel or the "System" menu in Windows CE 5.0.
  - In the "Device name" input box, you enter the computer name of the operator panel, "MP377test", for example.
  - In the "Device description" input box, you enter a description of the operator panel if required.
  - Confirm the entries with "OK". The dialog closes.
- Open the "Network ID" menu in the Control Panel.
  - Enter the user name in the "User name" input box.
  - Enter your password in the "Password" input box.
  - Enter the domain name in the "Domain name" input box.
  - Confirm the entries with "OK". The dialog closes.

| NOTE | The "PROFINET IO" menu is available in addition in the Control Panel in Windows CE 5.0. The device name for PROFINET IO does **not** correspond to the device name in Windows CE. |

- Open the "Network" menu in the Control Panel or the "Network&Dial up Connections" menu in Windows CE 5.0.
- Select the driver for the network card, which is being used, in the "Adapters" tab.
  In this example, use the "Onboard LAN Ethernet Driver".
  If you use an external Ethernet card, select
  "NE2000 Compatible Ethernet Driver" here.
- Click the "Properties" button.
  Click "Specify an IP address" in the "IP Address" tab.
  You can now assign an IP address to the panel.

| NOTE | The IP address must be in the same "IP band" as the PC with which the panel has to communicate later on. |

The figures below illustrate the network settings in Windows CE 5.0. The settings appear identical in a SIMATIC HMI panel with Windows CE 3.0.

The following network settings have been applied on the panel in this example

IP address: 192.168.0.2   (PC setting: 192.168.0.1)

Subnet mask: 255.255.255.0   (PC setting: 255.255.255.0)

Figure 1-2
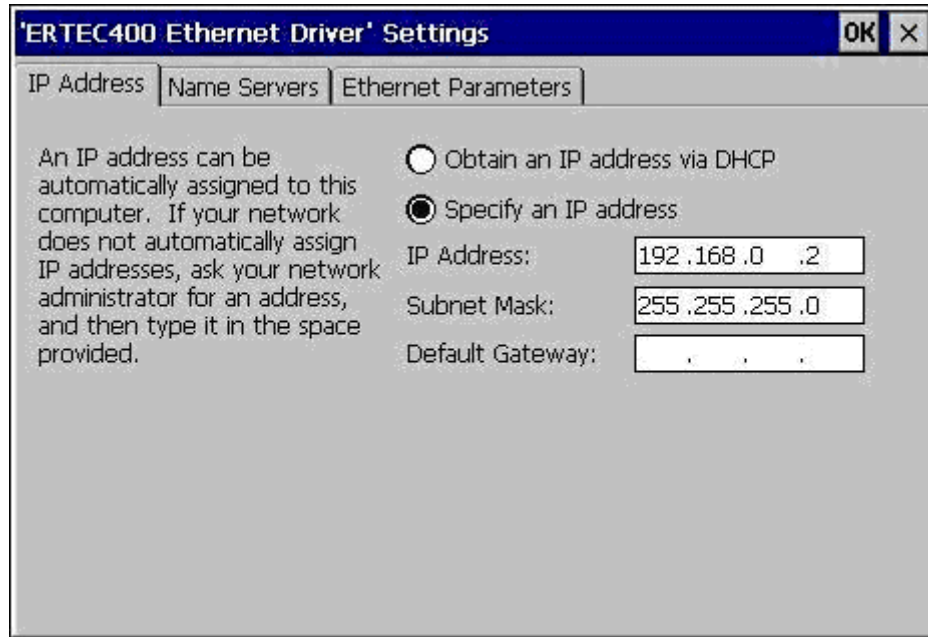
Note on using routers

Note that routers have a standard IP address. This standard IP address is manufacturer-specific and must not be duplicated in an existing network. In this case you change IP addresses of the other nodes beforehand or you change the standard IP address of the router before you operate it in the network. IP addresses must be unique.

NOTE
> To be able to access a network folder from the operator panel, you must specify the IP address of the DNS server on the operator panel. For this, you configure the "Primary DNS" with the computer's IP address in the operator panel's "Ethernet Settings", in the "Name Servers" tab.

- Click "OK" to confirm all entries until you return to the Control Panel.

NOTE
> A message appears indicating that the entries will not take effect until the panel is rebooted (restarted). Acknowledge the message with "OK".

- Perform a restart via the menu "OP > Device > Reboot", for example.

Notes on defining the speed and mode of the Ethernet interface

The connection between the two connection partners functions best with one of the combinations below.

- Automatic recognition for both connection partners.
- Same connection speed and same mode for both connection partners.

The table below gives an overview of the possible combinations between two connection partners.

Table 1-1

Connection partner 1	Connection partner 2	Result
Autonegotiation	Autonegotiation	Connection partners 1 and 2 set themselves to 100 Mbps, full-duplex connection works reliably.
100 Mbps, half-duplex	100 Mbps, half-duplex	Half-duplex, late collisions.
100 Mbps, half-duplex	100 Mbps, full-duplex	Duplex mismatch, many errors, no performance.
100 Mbps, half-duplex	Autonegotiation	Connection partner 2 sets itself to 100 Mbps, half-duplex. Connection works reliably.
100 Mbps, full-duplex	100 Mbps, full-duplex	Connection works reliably.
100 Mbps, full-duplex	100 Mbps, half-duplex	Connection works very reliably.
100 Mbps, full-duplex	Autonegotiation	Connection partner 2 sets itself to 100 Mbps, half-duplex. Duplex mismatch, many errors, no performance.
100 Mbps, half-duplex or full-duplex	10 Mbps, half-duplex or full-duplex	Speed mismatch, no connection.

This completes the network settings on the panel.

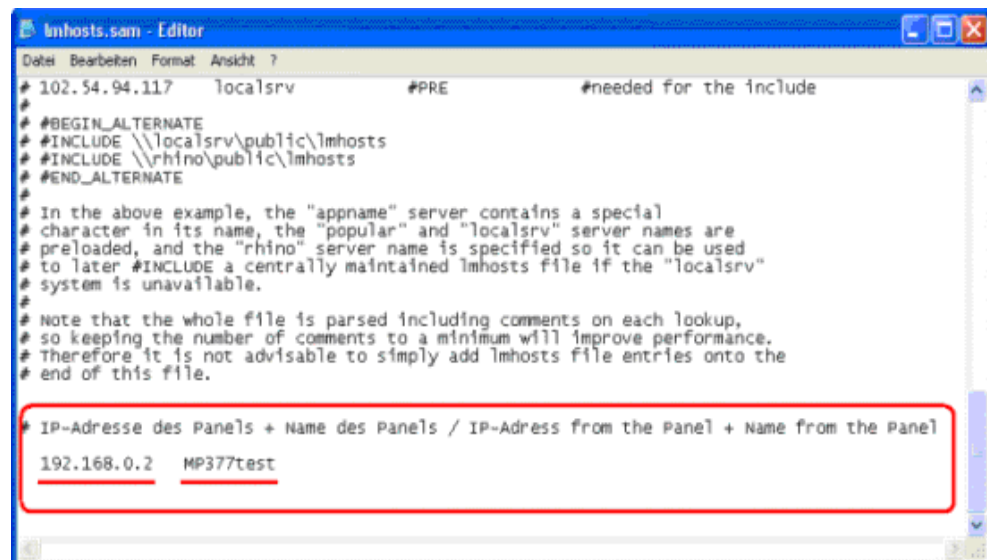## 1.3   More settings on the PC

If the panel is to be reached from the PC via "name resolution", then you must make the following settings in the lmhosts file.

Adapt the lmhosts file

- Open the LMHOSTS file (using Notepad or WordPad, for example).You can find the lmhosts file in **C:\WINNT\System32\drivers\etc**.
- Enter the IP address and name of the panel in the lmhosts file. In this example "**192.168.0.2 MP377test**".

This entry ensures that the PC can exactly assign the operator panel uniquely in the network environment on the basis of the IP address and name of the operator panel.

Figure 1-3

This completes the network settings on the PC.

| NOTE | The lmhosts file is often available as lmhosts.sam, where ".sam" stands for sample. In order for Windows to be able to take the file into account you must change the ".sam" ending. Otherwise Windows ignores the file. |

1.4   Test the network connection

In order to test the physical network connection, execute the "ping" command on the PC. Open the MS-DOS prompt on the **PC** via
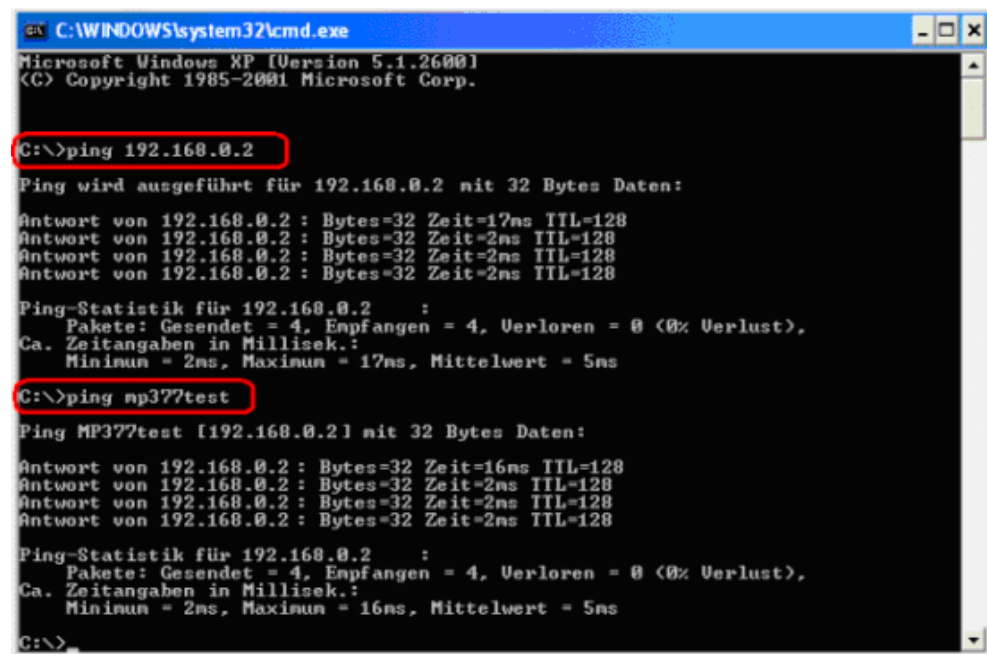
"START > Run.... > (entry) CMD".

Enter the following command line at the DOS prompt and press ENTER to confirm this: "**ping 192.168.0.2**" (ping "IP address of the operator panel").

Alternatively, you can also specify the name of the operator panel.

In this example it would be "**ping MP377test**". This ensures that the operator panel can be contacted either via its IP address or its "name resolution".

Figure 1-4

This completes the testing of the network settings on the PC.

2 Enable sharing

Enable sharing for a folder or drive on the PC

Perform the following steps to enable sharing of a folder or drive on a PC.

- Open the Windows Explorer.

- Select a folder or drive for data exchange between the panel and the PC.

- Open the folder/drive properties by "right-click > Properties".

- Switch to the "Sharing" tab.

- Enable "Share this folder" and enter a unique identifier for the folder at "Share name". In this example it is "Archive".

- In addition, you can add a comment about sharing.

- Switch to the "Permissions" tab within the "Sharing" tab. Select the appropriate options here. In this example "Full access; Change; Read;" have been selected for authorizations under "Permissions".

Figure 2-1
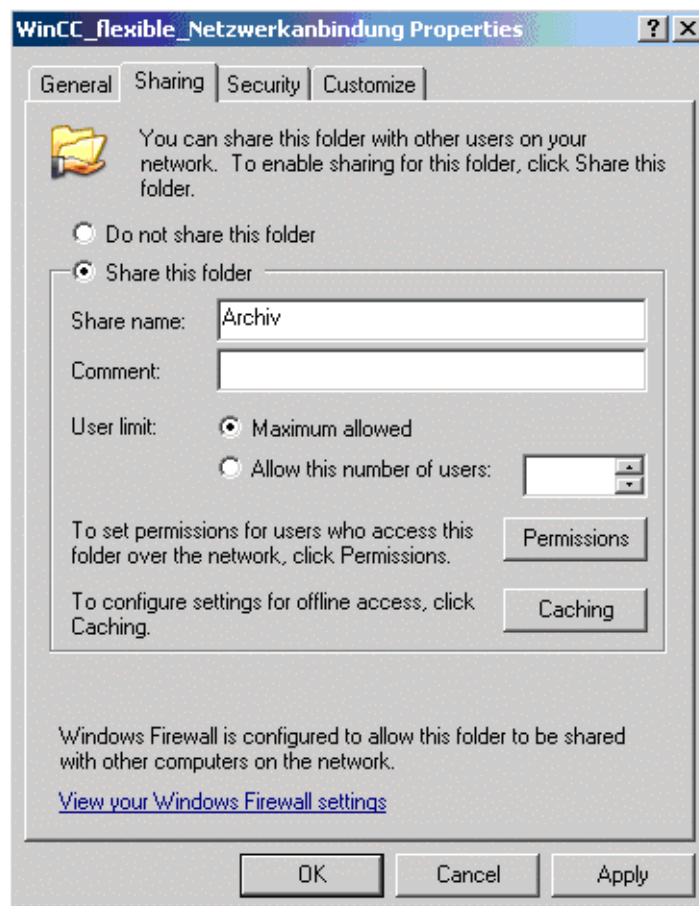
This completes the settings for sharing a folder/drive.

3 Save a tag archive

Save a tag archive on a PC via a local network

NOTE | In order to save a tag archive to a PC via a network, the PC (on which the file is saved) has to be contacted via a "name resolution".
=> **\\computername\sharename**

To ensure that the "name resolution" functions, the settings have to be defined as in chapter 1. "Perform a **network connection setup**".

The name of the PC on which the tag archive is to be saved can be called up via "START > Control Panel > System" / "**Computer Name**" tab. The name of the computer in this example is "**ADASCS3**".

This means that the complete name for saving the tag archive in this example is composed as follows.
=> **\\ADASCS3\Archiv**

Figure 3-1
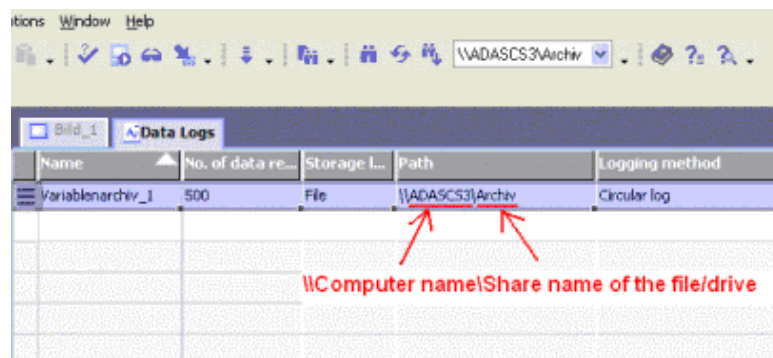
NOTE | The following call would be incorrect!
=> **\\169.254.247.160\Archiv**

This completes the settings for defining the path for the tag archive.