

3.4 Network operation with HMI Embedded (SW 6.2 and higher)

This function is an option.

The PCU hardware has its own network card and can be integrated in an existing network. If the appropriate option is set, additional horizontal keys are integrated in the Program Manager of the machine and program standard applications; these softkeys symbolize a linked drive or a local drive.

References: /BH/ Operator Components Manual

Precondition:

The Network Manager must be installed on the PC to be connected, see Section "Network Manager on the server".

Possible connections

The number of possible connections between the HMI embedded system and different servers or local drives is limited to four.

3.4.1 Network configuration data

Drive machine data

You need to set the following display machine data for authorizing input of configuration data:

MD 9509: MM_USER_CLASS_DIRECTORY_CHG (value 0 ... 7)

The following machine data are available for authorizing the use of the drives that are set up:

MD 9510 MM_USER_CLASS_DIRECTORY1_P
MD 9511 MM_USER_CLASS_DIRECTORY2_P
MD 9512 MM_USER_CLASS_DIRECTORY3_P
MD 9513 MM_USER_CLASS_DIRECTORY4_P
(value 0...7)

TCP/IP protocol

The only protocol supported for configuration within the network startup masks is TCP/IP.

Section "Examples: Network Configuration" describes two possible configuration options:

1. A small self-contained network whose sole purpose is to network the PCU with one or more servers.
2. A large company network.

In the first example, both the HMI Embedded configuration and the Windows configuration are explained in detail. The second example provides an explanation of the HMI Embedded system configuration only, as the company network is already in existence and the company has network administrators to perform the Windows tasks.

3.4.2 HMI system settings

The following settings must be made to set up a small self-contained network:

1. IP addresses:

For each computer you must select an IP address that is unique within the network. For purely private networks, RFC 1597 makes provisions for three address ranges so that there are no conflicts while using the Internet at the same time:

10.0.0.0	>	10.255.255.255	(Class A network)
172.16.0.0	>	172.31.255.255	(Class B network)
192.168.0.0	>	192.168.255.255	(Class C network)

The IP addresses for small networks should be selected from these ranges.

2. Subnet mask:

You need to select a subnet mask that is unique within the entire network.

3. Computer name:

The computer name is optional, as it is only a symbolic identifier and can be replaced by the IP address at any time.

4. User name/password:

The user name and password are used to protect communication between the HMI Embedded system and the associated Network Manager on the server. If you assign a user name and a password, you need to specify them in the Network Manager as well. This means that the HMI embedded system will be recognized as an authorized user. If you don't assign a user name and password, the system enters a standard user (PCU20_USER) and standard password so that the Network Manager can decide whether the request comes from an authorized user or not and refuse it if appropriate.

See Section: User Management

5. Monitoring time (timeout)

Set a timeout in seconds so that the connection setup attempts between the HMI Embedded system and the server can be canceled. This timeout is set to a default value (30); please only change this setting if problems occur (valid setting range 10 – 300 seconds).

3.4.3 Examples: Network configuration

HMI Embedded system and one server

The simplest type of small network is to connect an HMI embedded system to an external computer.



Important

As no "hub" is used, you will need a special twisted-pair cable for the point-to-point connection.

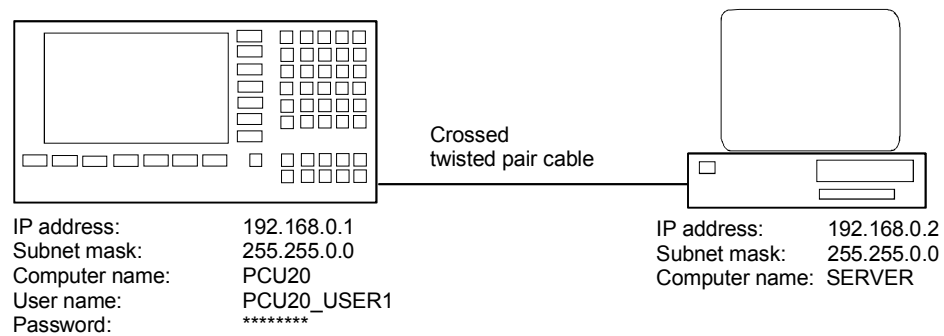


Fig. 3-4 Example: One HMI system / one server

Three HMI Embedded systems and two servers

Also, several external computers can be linked with several HMI embedded systems to form a network, e.g. 3 HMI embedded systems and 2 external computers:

In this configuration the HMI embedded systems cannot access each other's drives.

As a hub is available in this configuration, standard twisted-pair cables are used.

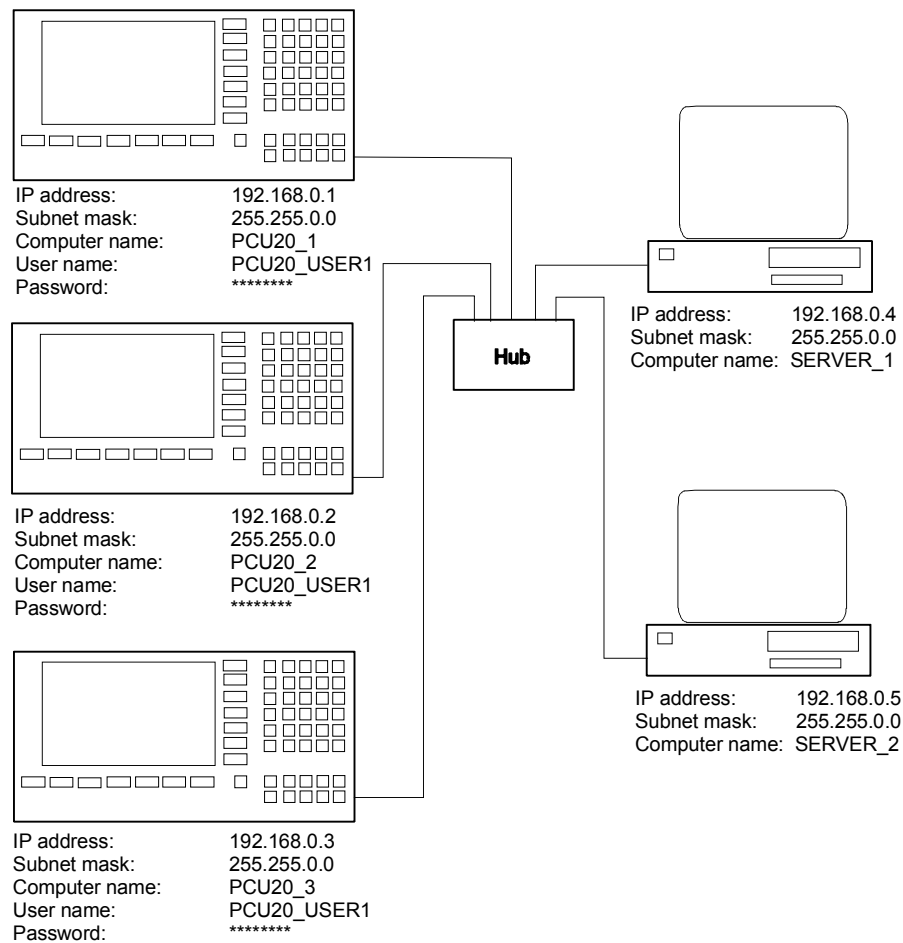


Fig. 3-5 Example: Three HMI systems / two servers

As in this case the same user name was chosen for all three HMI Embedded systems, the same password must be entered on each system too. You can also, however, enter a different user on each HMI embedded system. The respective users must then be entered in the Network Manager on the servers whose drives are to be displayed.

Company network

A fixed IP address is used to address the company network. You will need to ask your administrator for an IP address for each PCU. The computer name is also provided by the network administrator and corresponds to the IP address that is set. Further, it is necessary to have the correct subnet mask for the network and a default gateway (router). If you intend to use a DNS server, you will also need its IP address and the DNS domain. The data must be entered in the "Startup" operating area under "Logical drives" "Network configuration".

You can select any user name you want, as long as it is known within the Network Manager so that a secure connection can be established.

3.4.4 Procedure for HMI system

After you have set the machine data, perform a Power On.

A new softkey "Logical drives" is displayed under "Start-up" which gives you access to the following submenus:

- Connections
- Netw. Config.
- Server Name
- File Types

Network configuration

The network is switched off when the HMI Embedded system starts for the first time.

There are three options:

HMI boot without network

- A network is not started when the HMI embedded system is booted, therefore no network drives are available. This setting is the default setting at initial system startup. After the first start, the user can specify network data if required.

HMI boot with network:

- At each start, the HMI embedded system is connected to the network and all network connections are set up.

HMI boot with network if confirmed:

- When the HMI Embedded is booted, a prompt is displayed asking whether to start with or without network. If you don't make a selection within 10 seconds, the system is started without a network connection.

If you want to set up the network, you first need to set "HMI boot:" to either "With network" or "With network after confirmation"; this way the remaining fields can be edited and you can enter the following settings:

Startup	Kanal X	JOG	
Channel reset			
Network configuration			
HMI booting: <input checked="" type="checkbox"/> with network without confirmat			
Log:	<input checked="" type="checkbox"/> TCP / IP	Cnpt. name: PCU20	
DHCP:	<input checked="" type="checkbox"/> No	User: PCU20_USER	
IP address:	192 168 0 1	Password:	
Subnet mask:	255 255 0 0	Confirm	
Gateway:		MAC address: 01 34 67 9A CD FF	
DNS 1:			
DNS 2:			
DNS 3:			
DNS domain:			
Monit.time:	30		
Save			
^Select system boot via Select			
Connections	Netw. config.	Server names	File types

Fig. 3-6 Configuring the network

The remaining fields must not be filled in as this small network does not have a DNS server or a default gateway.

Connections

Network connections can be defined or configured in the screen displayed below. The logical drives can either refer to a network connection or to an internal drive, i.e. a disk drive, an ATA card etc.

With internal drives you need to enter the drive letter and the required path if necessary:

- Diskette drive: A:
- ATA card: C:\TEMP

With external drives (network connections) you need to specify the full network path (\\Computer name\Sharename\Path name); the path name is optional:
\\R4711\Workpieces\Templates
\\R4812\Workpieces

The softkey designation consists of two columns so that you can enter a text for each line of the softkey.

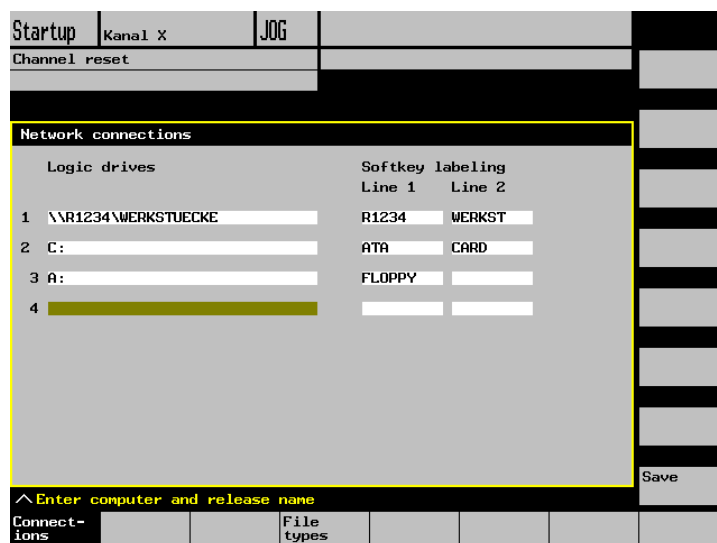


Fig. 3-7 Network connections: Logical drives

The names you specify must be available on the network computer. \\R1234 refers to the network computer in our example. The share name WORKPIECES must be specified on any hard disk drive on this computer.

Server names

In order to assign symbolic names to the computers, the relevant stations to be addressed within the network must be entered so that their names can be resolved:

Example

Server name:

192.168.0.20 R2345

192.168.0.21 R2346

With these settings computers R2345 and R2346 can be addressed by means of their symbolic names.

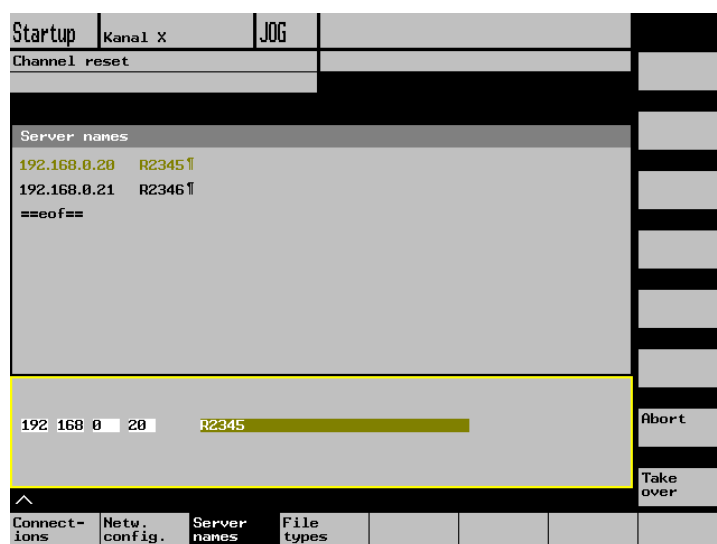


Fig. 3-8 Server names

Operation:

The first entry in the line is the IP address. The second entry is the computer name. The data already specified appears in the upper section of the screen. By selecting softkeys "New" and "Edit" you can go to the lower half of the screen where you can edit entries.

You can change back to the upper section by pressing the "Cancel" softkey (data is not saved) or the "Save" softkey (data is saved).

Data types

File types must be set up as required. These types are evaluated and displayed by the PCU.

The Program Manager will use the file extensions to filter which files to display and which to hide. This filter function can be set as follows:

If softkeys "New" or "Edit" are selected, then like with the dialog box "Enter server name", you change to the lower section of the screen and make additional entries or edit existing ones. To exit, press "Cancel" (without changes) or "Save" (with changes).

3.4.5 Accepting network data

After changing the configuration data, you must restart the system for the changes to take effect in the HMI embedded system and the new login process to be performed. You can edit all screens, connections, Netw. Config., server names and file types in succession. After completing your inputs and activating the "Save" softkey, a prompt is displayed asking whether you want to accept the data and restart the system. You can only exit this dialog box by clicking "OK" or "Cancel".

3.4.6 Settings in Windows NT/2000/XP

A network card must already be installed and operational within Windows NT/2000/XP. Then you can install the TCP/IP protocol if it is not yet installed.

Install the TCP/IP protocol

For installation, go to "Start/Settings/Control Panel/Network/Protocols":

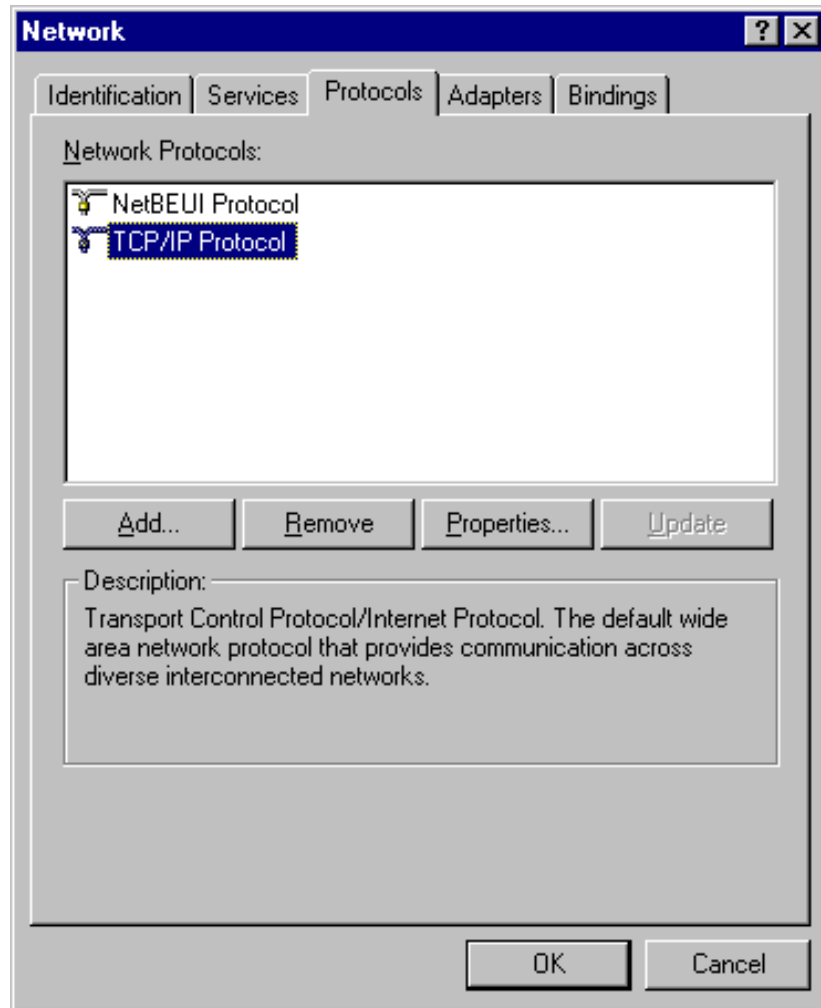


Fig. 3-9 Installing the TCP/IP protocol

To install the TCP/IP protocol click "Add...".

Configure the TCP/IP protocol

After it is installed, you can select the TCP/IP protocol.
You can configure the TCP/IP connection by clicking "Properties":

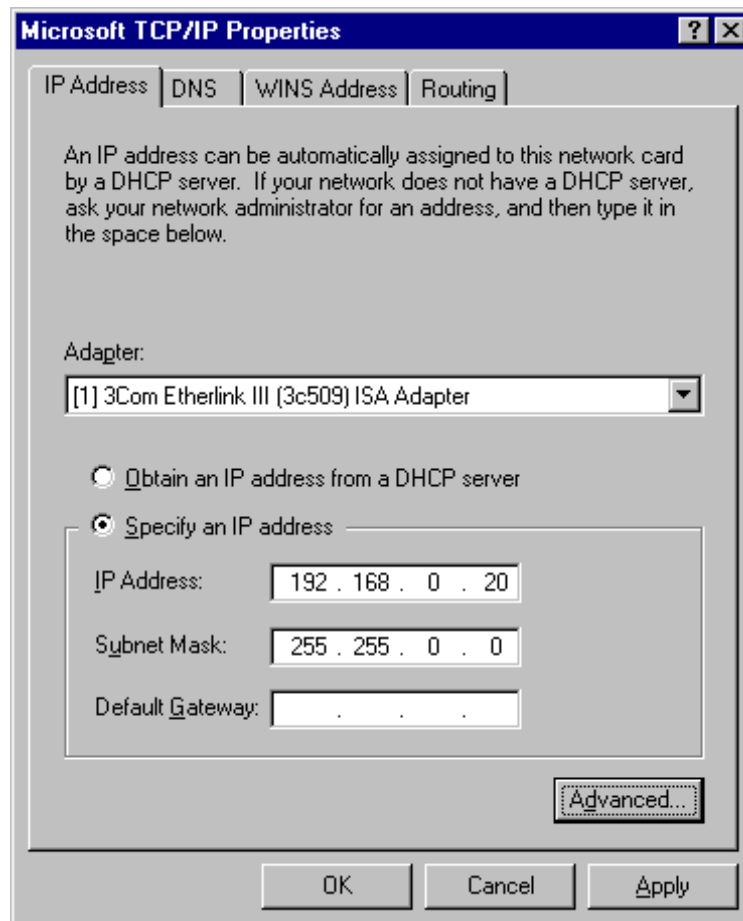


Fig. 3-10 Configuring the TCP/IP protocol

If several computers are to be integrated into the network, each computer must have a unique IP address. The subnet mask must be the same throughout the entire network. Other entries are not necessary.

Assigning computer name

The computer name is insignificant for the communication between the server and the HMI embedded system, as the assignment of the symbolic name to the IP address takes place within the HMI embedded system. Several servers are integrated in the network, the symbolic computer name facilitates communication between these computers.

If you want, you can assign a computer name. To do this, go to "Start/Settings/Control Panel/Network/identification":

Example:

Computer name: SERVER_1

Workgroup: GROUP1

Network Manager

If user names and passwords were allocated for the HMI Embedded systems, you need to enter them in the Network Manager for the addressed server in each case: See Section "Network Manager on the server"

3.4.7 Settings in Windows 95/98/ME

A network card must already be installed and operational under Windows 95/98/ME. Then you can install the TCP/IP protocol. To install the protocol, go to "Start/Settings/Control Panel/Network". The installed network components are displayed when you click "Configuration".

Configure TCP/IP protocol

Select the TCP/IP connection, click "Properties" to carry out the configuration: Select "IP address" under "Properties for TCP/IP". The screen "Define IP address" appears. Enter the values for the IP Address and Subnet mask. With small networks you do not need to make any more entries in the screens.

Assigning computer name

The computer name is insignificant for the communication between the server and the HMI embedded system, as the assignment of the symbolic name to the IP address takes place within the HMI embedded system. Several servers are integrated in the network, the symbolic computer name facilitates communication between these computers.

To assign the name, go to "Start/Settings/Control Panel/Network/identification":

Example:

Computer name: SERVER_1
Workgroup: GROUP1

Network Manager

If user names and passwords were allocated for the HMI Embedded systems, you need to enter them in the Network Manager for the addressed server in each case: See Section "Network Manager on the server".

3.5 Network Manager on the server

The Network Manager program must be installed, configured and started on every computer which must share directories for the PCU.

The Network Manager is the PCU's communication partner in network operation. The Network Manager is shipped with the software CD "HMI Embedded for PCU". The program is stored in directory \sw_6_3\tools\net_serv and is installed by running the Setup program.

The Network Manager is available for the operating systems Windows 95/98/ME and Windows NT/2000/XP.

The PCU and HMI Embedded Network Manager communicate with one another via TCP/IP sockets.

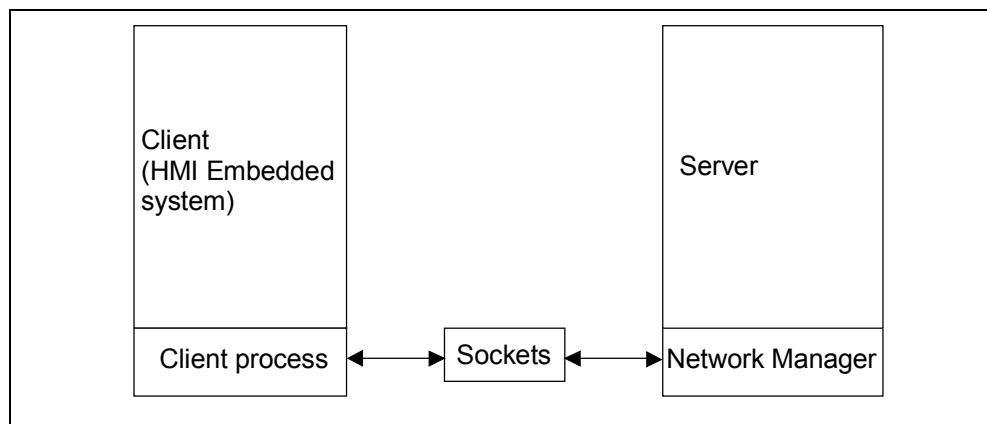


Fig. 3-11 Client/server connection

For the connection to be secure, a password and user name must be set on the client and on the server. These are defined on the client as part of the network startup process.

Any users who need access to the server must be registered in the Network Manager with their name and password.

If no user names have been defined, the system uses a standard user name (PCU20_USER).

3.5.1 Installing/removing the Network Manager

Installation

The HMI Embedded Network Manager is installed by running the "setup.exe" program. You can specify the following within this installation routine:

- Installation path on the hard disk.
- Folder within the program folder of the Start menu.
- Automatic start of Network Manager every time the operating system starts.
- Network Manager is started immediately after installation.

Removal

To remove the HMI Embedded Network Manager, select:
"/Start/Settings/Control Panel/Add/Remove Programs", select the HMI Embedded Network Manager and click the "Add/Remove" button.

3.5.2 Operating the Network Manager

Start the Manager

Start the Network Manager by selecting "Start/Programs/<name chosen during installation>/HMI Embedded Network Manager".
When you start the Network Manager, an icon is displayed in the status line of the taskbar (Windows) to signal that the manager is active on this particular computer.

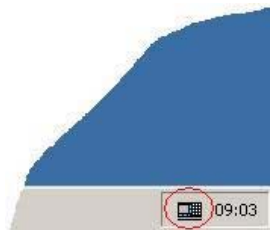


Fig. 3-12 Icon, Network Manager active on computer

Right-click the icon to open the shortcut menu which contains the following entries:

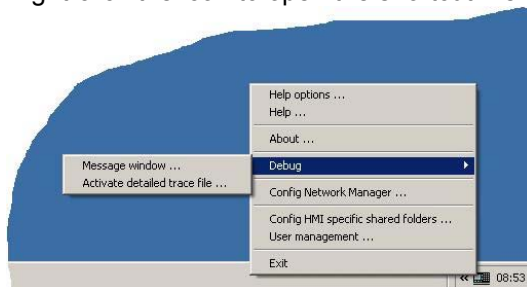


Fig. 3-13 Menu selection

Help options...:	Language setting in HTML Help: English or German
Help...:	Displays the main Help menu for the Network Manager
About...:	Displays the software version of the Network Manager.
Debug	Menu option "Debug" opens another submenu and gives access to debugging functions if, for example, a link cannot be setup between the Network Manager and the PCU. The debugging functions are safeguarded by the system or manufacturer password and may be accessed by authorized persons <u>only</u> .

You must not activate this option when the computer is connected to the network as it greatly impairs the speed of the network connection.

Message Window...	In this dialog box you can check the status of the current connection.
Activate detailed trace file...	Activates a trace file. The icon in the status line changes.

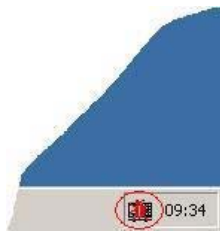


Fig. 3-14 Icon, trace file active

Config Network Manager...	Available only in Windows NT/2000/XP: Switches between a connection with Login and a permanent connection, see Section Configuration.
Config HMI specific folders...:	Creates HMI-specific shared folders which can be used only in communication between a PCU and the Network Manager, see Section Configuration.
User Management...	Creates a list of user names and associated passwords, see Section User Management
Exit	Closes the Network Manager.

3.5.3 Configuration

Depending on the operating system used, the Network Manager can be operated in two different connection modes.

1. Applies to Windows 95/98/ME and Windows NT/2000/XP.
The connection to one or more PCUs exists only as long as the Network Manager is running. This variant requires a login process.
2. Applies only to Windows NT/2000/XP.
The connection exists the whole time the operating system is running. This permanent connection is operative independently of the current user.

Permanent connection (Windows NT/2000/XP)

Click the Network Manager icon with the right mouse button, select the "Config Network Manager..." menu option.
Select connection variant "Permanent Connection (Service)" and confirm with "OK". The following window appears:

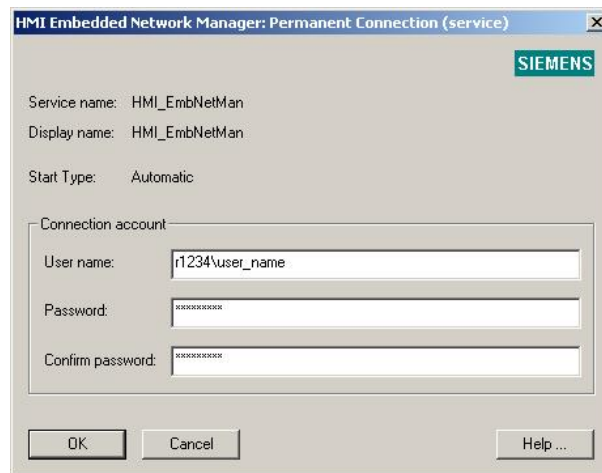


Fig. 3-15 Permanent connection

The status data of the Network Manager are displayed in the upper part of the window.

The following data must be entered in the lower part of the screen:

- Computer or domain name followed by the user name,
- User's password,
- Password confirmation.

The user name need not correspond to the current user, but the "permanent connection" must be authorized to access the directories of the entered user, see Section "User management".

Note

Setting up or clearing a permanent connection can take several seconds.

3.5.4 User management

To ensure secure and reliable communication a user with associated password must be entered on every PCU. To grant this PCU access to shared directories on the server, this user must also be entered with his password in the user list of the Network Manager.

Simple network

Each PCU is shipped with a standard user name "PCU20_USER"; this name is also entered in each Network Manager as soon as it is installed. However, this user name should be used only in a simple point-to-point connection because the data on the server can be accessed within a larger network and secure communication between the PCU and the server cannot be guaranteed if the standard user name is used.

Large network

If you wish to share selected directories with a particular PCU, you must assign appropriate rights to the relevant PCU user in the Network Manager.

Display and edit the user list

Click the HMI Embedded Network Manager icon with the right mouse button. When you select menu option "User management", a list of entered users is displayed. If you double-click the icon with the left mouse button, the "User Management" dialog box is also displayed.

You have the following options within the "User management..." dialog:

- New: Sets up a new user.

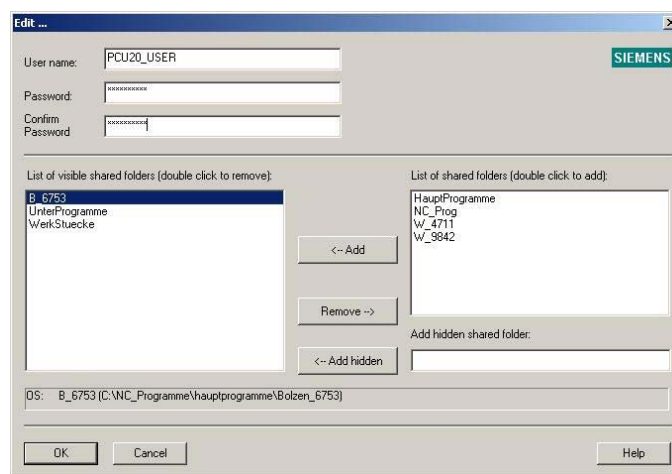


Fig. 3-16

In the top section of the screen, enter the user name (max. 40 characters) and its password (max. 40 characters). Repeat the password in the "Confirm Password" field.

In the central area you assign access (operating system shares and HMI-specific shares) to the shared drives on the server computer of the relevant user.

The left-hand field (List of visible shared folders) contains all folders to which the user can be granted access.

The right-hand field (List of shared folders) contains all shared folders to which the Windows user who started the Network Manager has access and all HMI-specific shared folders that have been set up within the Network Manager.

By clicking "<- Add" you can add a folder selected in the right-hand field to the left-hand list and thus make it accessible.

By selecting "-> Remove" you can delete a visible folder (on the left-hand side) again.

You can enter hidden shared folders manually in the "Add hidden shared folder" field and click "<- Add hidden" to add them to the left-hand list.

The currently selected folder (and its path) is displayed at the bottom of the screen.

If no directory path is displayed with Windows NT/2000/XP, this indicates that the current user does not possess the appropriate access rights.

This information is always displayed with Windows 95/98/ME as these systems do not feature an access rights administration function.

Abbreviation at beginning of status line:

- OS: Operating system share
- HMI: HMI-specific share

"OK": Saves your settings and closes the dialog box.

"Cancel": Discards your settings and closes the dialog box.

"Help": Calls the help function.

- Edit: In this box you can edit an existing user which you have selected. The "Edit..." dialog operates on the same principle as the "New..." dialog.
- Delete: This dialog deletes an existing user which you have selected. A safety prompt is displayed which you must acknowledge with "YES" if you really want to delete the user. To cancel the delete operation, select "NO".

3.5.5 Folder sharing for a PCU

1. Creating an operating system share:
If a folder on the server is to be visible from a PCU, it must be enabled as a "shared" folder under Windows. These shared folders can also be used by other computers in the network.
To enable a folder for sharing, click it in the Windows Explorer with the right mouse button:
 - In the shortcut menu, select option "Sharing...".
 - Select "Share As" and
 - enter a share name.
2. Configuring HMI-specific shared folders:
HMI-specific shared folders are for accessing operations from the PCU to servers connected to the computer on which the Network Manager is installed. When you select menu option "Config HMI specific shared folders..." the following dialog appears:

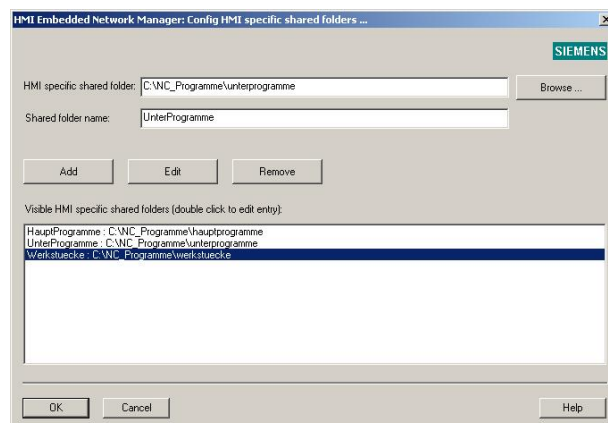


Fig. 3-17

Edit field "HMI specific shared folder":

Enter the local folder path which must be visible from the connected PCU.

A selection of folder paths will be displayed under "Browse...":

Select the appropriate path and click "OK" to enter it in the edit field.

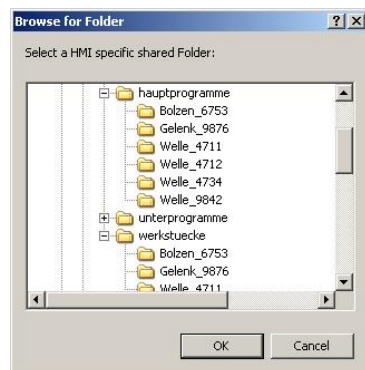


Fig. 3-18

Edit field "Shared folder name":

Assign a share name. This can be 40 characters long in total and must begin with a letter.

Do not use any name that has already been assigned as an operating system share name.

You can use the following characters:

- Upper-case/lower-case letters,
- numbers,
- underscore (" _ ")
- hyphen (" - ").

"Add": Add HMI-specific shared folders to the list field, system checks the name. It will be rejected if it has already been assigned as an operating system share name.

"Edit": Dialog for editing entries already contained in the list.

"Remove": Entries are deleted.

3.5.6 Online help

Various windows contain the "Help..." button via which you can call the online help. The help file is available in both English and German. Click the "Help options..." button to switch between the two languages.

Precondition

The following programs must be installed on the system:

- Microsoft Internet Explorer 4.0 or higher,
- Microsoft Help HTML Viewer

If the Help HTML Viewer is not available on your computer, the "hhupd.exe" installation routine is started to install the viewer.

The Help HTML Viewer is integrated as standard in Windows NT/2000/XP and must not be installed again.

3.5.7 Troubleshooting

There is an error in communication between the PCU and the HMI Embedded Network Manager. Check the ports.

Remedy

1. The following ports must be available:

- pcu20_ftp1 6743/tcp
- pcu20_ftp2 6744/tcp
- pcu20_ftp3 6745/tcp
- pcu20_ftp4 6746/tcp
- pcu20_ftp5 6747/tcp
- pcu20_ftp6 6748/tcp
- pcu20_ftp7 6749/tcp
- pcu20_ftp8 6750/tcp
- pcu20_ftp9 6751/tcp
- pcu20_ftp10 6752/tcp
- pcu20_ftp11 6753/tcp
- pcu20_ftp12 6754/tcp
- pcu20_ftp13 6755/tcp
- pcu20_ftp14 6756/tcp
- pcu20_ftp15 6757/tcp

If necessary, these ports are entered in the "services" file every time the HMI Embedded Network Manager is started. If a port is already being used by another program, the program must be uninstalled so that the port can be made available to the Network Manager.

2. Check the software versions

You must use the correct Network Manager software version in each case for the HMI Embedded software version installed.