



User Manual
netLINK NL 50-MPI
Installation, Operation and Hardware Description

Hilscher Gesellschaft für Systemautomation mbH

www.hilscher.com

DOC080604UM05EN | Revision 5 | English | 2011-09 | Released | Public

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1 Introduction

1.1 About the User Manual

This user manual contains a description for the netLINK NL 50-MPI with an integrated netX 50 communication controller. This device is a successor of the netLINK NL-MPI.

This user manual contains information for commissioning and use of the device.

1.1.1 List of Revisions

Index	Date	Chapter	Revisions
4	2009-06-07	1.1.2	Hardware revision 4 added
		1.1.3	Firmware V2.004 added
		1.1.4	Reference on SyCon Software added
		3.3, 4.2	PROFIBUS interface is isolated from hardware revision 4
		8.3	Name of Pin 2 and 5 for the hardware revision
		10.1	PROFIBUS interface is isolated from hardware revision 4
5	2011-09-13	1.1.3	Section <i>Reference on Firmware</i> updated
		3.3	Section <i>Preconditions</i> for NL 50-MPI Operation: Windows® Vista and Windows® 7 added, DVD
		5.1	Section <i>Installing Software from DVD</i> updated
		7.2	Section <i>Failure in 10 MBit/s Half Duplex Mode and Workaround</i> added
		13.1	Section <i>Disposal of Waste Electronic Equipment</i> added

Table 1: List of Revisions

1.1.2 Reference on Hardware

Hardware	Revision
NL 50-MPI	Rev 2, Rev 3, Rev 4

Table 2: Reference on Hardware

1.1.3 Reference on Firmware

Firmware	Version
nl50mpi.e50	2.000
	2.004
	2.145

Table 3: Reference on Firmware

1.1.4 Reference on SyCon Software

Software	Version
SyCon	2.950 (Installation)

Table 4: Reference on SyCon Software

1.1.5 Conventions in this Manual

Operating Instructions, a result of an operation step or notes are marked as follows:

Operating Instructions:

➤ <instruction>

or

1. <instruction>

2. <instruction>

Results:

↻ <result>

Notes:



Note: <note>

1.2 Contents of the Product DVD

The Product DVD for the netLINK contains:

- Documentation
- STEP 7[®] Driver IBHNet
- System Configurator SyCon
- Hilscher IP driver

1.2.1 Directory Structure of the DVD

All manuals on this DVD are delivered in the Adobe Acrobat[®] Reader format (PDF).

Directory Name	Description
API	Files for the configuration and communication interface (API) of the netLINK
Documentation	Documentation in the Acrobat [®] Reader Format (PDF)
EDS	Files needed from SyCon during installation.
Firmware	Loadable Firmware
fscommand	Installation support routines used during the installation process
IBHnet	IBH driver setup program.
Sycon	System Configurator SyCon (configuration program). Setup program.
TcpUdpIpDriver	Setup program for the Hilscher IP Driver

Table 5: Directory Structure of the DVD

1.2.2 Overview of relevant Documentation

The following documentation overview gives information, for which items you can find further information in which manual.

Documentation for Users

Manual	Contents	Document name
netLINK NL 50-MPI	Installation, Operation and Hardware Description	netLINK NL 50-MPI UM xx EN.pdf (this document)
SyCon	Description of the configuration software SyCon	SyCon_netLINK_en.pdf
IBHNet	Describes the installation and configuration of the IBH driver for the use of the NL 50-MPI device as PG Interface with Simatic® STEP® 7. The netLINK NL 50-MPI device is designated as IBH Link S7++.	IBHNet_Manual.pdf This description was created by IBHsoftec Gesellschaft für Automatisierungstechnik mbH .

Table 6: Documentations for netLINK 50-MPI for users

For the configuration of the NL 50-MPI device the configuration software SyCon or the IBH driver can be used.

Documentation for Developers

Manual	Contents	Document name
IP Driver	Description of the Hilscher IP driver	Drv_Ip.pdf
netIdent	Description of the Hilscher netIdent protocol	netIdent_Protocol_API_en.pdf
MPI Protocol Interface Manual for netLink	Description of the netLINK MPI protocol interface	netLINK_MPI_Protocol_API_en.pdf
FDL Protocol Interface Manual for netLink	Description of the netLINK FDL protocol interface	netLINK_FDL_Protocol_API_en.pdf

Table 7: Documentations for netLINK 50-MPI for developers

1.3 Legal Notes

1.3.1 Copyright

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1.3.6 Registered Trademarks

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Acrobat® is a registered trademark of Adobe Systems, Inc in the USA and further countries.

Pentium® is a registered trademark of Intel Corporation in the USA and further countries.

S7, S7-300, S7-400 and MPI are registered trademarks of Siemens AG, Berlin and Munich.

1.4 Licenses

The NL 50-MPI device contains a license for the use with the IBH driver.

2 Safety

2.1 Safety notes

The user manual, accompanying texts and the documentation were created for the use of the products by qualified experts. When using the products, all safety notes and applicable regulations must be observed. Technical knowledge is required. The user must comply with legal provisions.

2.2 Intended Use

The netLINK NL 50-MPI may only be used as a part of a communication system as described in this manual. It has been designed exclusively for use in connection with the S7-300 und S7-400 PLCs manufactured by Siemens AG.

The device may not be opened or be used when the housing has been removed.

2.3 Personnel Qualification

The NL 50-MPI is used as a part of a system which must fulfill safety and accident precaution regulations depending on the respective conditions of use. The user of the system is exclusively responsible for the fulfillment of those regulations.

Therefore the system to which the NL 50 MPI belongs may only be used by personnel who has been informed and educated about all relevant regulations.

2.4 Labeling of Safety Instructions

The safety instructions are pinpointed particularly. The instructions are highlighted with a specific safety symbol, a warning triangle and a signal word according to the degree of endangerment. Inside the note the danger is exactly named. Instructions to a property damage message do not contain a warning triangle.




Symbol	Sort of Warning or Principle
	Safety symbol for the warning to personal injury
	Warning of danger by electrical current
	Warning of damages by electrostatic discharge

Table 8: Safety Symbols and Sort of Warning or Principle

2.4.1.1 Signal Words

Signal Word	Meaning
DANGER	indicates a direct hazard with high risk, which will have as consequence death or grievous bodily harm if it isn't avoided. The use of this signal word shall be restricted to extremely hazard. Remark: The signal word may not be used in case of danger of pure property damages.
WARNING	indicates a possible hazard with medium risk, which will have as consequence death or (grievous) bodily harm if it isn't avoided. Remark: The signal word may not be used in case of danger of pure property damages.
CAUTION	indicates a minor hazard with medium risk, which could have as consequence simple battery if it isn't avoided.
Note	Indicates an important note in the manual.

Table 9: Signal Words

2.4.1.2 Signal Words USA

Signal Word	Meaning
DANGER	Indicates a Hazardous Situation Which, if not Avoided, will Result in Death or Serious Injury.
WARNING	Indicates a Hazardous Situation Which, if not Avoided, could Result in Death or Serious Injury.
CAUTION	Indicates a Hazardous Situation Which, if not Avoided, may Result in Minor or Moderate Injury.
NOTICE	Indicates a Property Damage Message.
Note	Indicates an Important Note in the Manual.

Table 10: Signal Words according to ANSI

2.5 Safety Instructions

This manual contains instructions which must be observed to ensure your own personal safety and to avoid damage to devices of your system.

2.5.1 Electrical Current



CAUTION!

Device Destruction!

- Use only 18..30 V for power supply to operate the device.
Operation with more than 30 V power supply voltage will lead to destruction of the device.
-

2.5.2 Electrostatic Discharge

Adhere to the necessary safety precautions for components that are vulnerable with electrostatic discharge (EN 61340-5-1 und EN 61340-5-2 as well as IEC 61340-5-1 und IEC 61340-5-2).



CAUTION!

Electrostatic Discharge

This equipment is sensitive to electrostatic discharge, which cause internal damage and affect normal operation. Follow guidelines when you handle this equipment:

- Touch a grounded object to discharge potential static.
 - Do not touch connectors or pins.
 - Do not touch circuit components inside the equipment.
 - When not in use, store the equipment in appropriate static-safe packaging.
-

2.6 Safety Instructions USA

This manual contains instructions which must be observed to ensure your own personal safety and to avoid damage to devices.

2.6.1 Electrical Current



NOTICE

Device Destruction!

- Use only 18..30 V for power supply to operate the device.
Operation with more than 30 V power supply voltage will lead to destruction of the device.

2.6.2 Electrostatic Discharge

Adhere to the necessary safety precautions for components that are vulnerable with electrostatic discharge (EN 61340-5-1 und EN 61340-5-2 as well as IEC 61340-5-1 und IEC 61340-5-2).



NOTICE

Electrostatic Discharge

This equipment is sensitive to electrostatic discharge, which cause internal damage and affect normal operation. Follow guidelines when you handle this equipment:

- Touch a grounded object to discharge potential static.
- Do not touch connectors or pins.
- Do not touch circuit components inside the equipment.
- When not in use, store the equipment in appropriate static-safe packaging.

3 Description and Requirements

3.1 Description

The netLINK NL 50-MPI device described in this user manual is an Ethernet Gateway based on netX technology. This device is a successor of the netLINK-MPI (NL-MPI) which was based on an EC1 controller circuit.

The device is designed to provide compatibility to the netLINK-MPI with respect to the communication and configuration interfaces. It is built into a DSub housing. It consists of a PROFIBUS Master together with a 10/100 MBit/s Ethernet interface and thus represents a complete gateway, which can detect via Auto Detection whether it is connected to a network with a transmission rate of 10 or 100 MBit/s.

Because of its structure in the DSub housing, it can be plugged directly on to the Fieldbus connection of an MPI capable device and connects this, using an external Ethernet cable to the next Ethernet switch, hub or device.

The power supply is provided directly by the netLINK MPI-Interface or externally.

The Configuration (set IP-Address, PROFIBUS parameter etc.) is carried out via the Ethernet. For this purpose either

- the configuration software SyCon or alternatively
- the IBH driver

can be used.

A diagnostic channel to the NL 50-MPI is established via TCP/IP, which operates through a predefined port parallel to the user data transmission. The configuration is saved in the NL 50-MPI in a FLASH memory and is therefore also available after a power reset.

The NL 50-MPI device can be used as PG Interface with Simatic® STEP® 7 when the IBH driver is used. The configuration of the NL 50-MPI device with SyCon is not necessary in this use case, because the configuration can be done with the IBH driver. The description of the installation and configuration of the IBH driver is described in the document IBHNet_Manual.pdf on the DVD.

3.2 System Requirements

For a reasonable application of the NL 50-MPI, a suitable power supply is required. Power supply is possible either internally via the MPI respectively the PROFIBUS interface of the S7 PLC or externally via the Mini-Combicon socket right beside the Ethernet socket.

The voltage to be applied must be in the range between 18 V und 30 V.

3.3 Preconditions for NL 50-MPI Operation

The following preconditions must be met in order to operate the NL 50-MPI device successfully:

1. A suitable power supply as described above is required.



Device Destruction!

- The reference potential of the power supply is galvanically connected with the reference potential of the PROFIBUS for hardware revision 2 and 3 of the device. From this it follows that the power supply must be potential free!



NOTICE

Device Destruction!

- The reference potential of the power supply is galvanically connected with the reference potential of the PROFIBUS for hardware revision 2 and 3 of the device. From this it follows that the power supply must be potential free!

With hardware revision 4 of the NL 50-MPI device the power supply of the device and the PROFIBUS interface is connected via optocoupler and hence galvanically separated.

2. The device must have been configured correctly using the system configurator SyConND.

The necessary system requirements for the application of the system configurator SyConND are:

1. PC with 586-, Pentium® processor or higher
2. Windows® 2000, Windows® XP, Windows® Vista (32-Bit), Windows® 7 (32-Bit) or Windows® 7 (64-Bit)
3. Free space on hard disk: 30-80 MByte
4. DVD ROM drive
5. RAM: min. 16 MByte
6. Graphics resolution: min 800 x 600 pixels
7. Keyboard and mouse for input and operation

3.4 Compatibility of the netLINK NL 50-MPI to the NL-MPI

The netLINK NL 50-MPI is compatible to the netLINK NL-MPI with respect to the following details:

- The communication functionality for user data exchange is compatible.
- The configurations of both device are compatible.

With respect to the diagnostic functions there is only a partial compatibility.

4 Getting Started

4.1 Mount

The NL 50-MPI is slipped and screwed on a S7 MPI / PROFIBUS interface or another compatible device with the MPI / PROFIBUS interface of the NL 50-MPI.

4.2 Power Supply

The power supply of the NL 50-MPI can be performed by directly plugging the device onto a PLC. Alternatively to the direct power supply method by the PLC there is the possibility for external power supply with a voltage of 24 V using the Mini-Combicon connector.



CAUTION!

Device Destruction!

- The reference potential of the power supply is galvanically connected with the reference potential of the PROFIBUS for hardware revision 2 and 3 of the device. From this it follows that the power supply must be potential free!



NOTICE

Device Destruction!

- The reference potential of the power supply is galvanically connected with the reference potential of the PROFIBUS for hardware revision 2 and 3 of the device. From this it follows that the power supply must be potential free!

With hardware revision 4 of the NL 50-MPI device the power supply of the device and the PROFIBUS interface is connected via optocoupler and hence galvanically separated.

4.3 Ethernet Connection

The Ethernet connector of the NL 50-MPI is connected to a switch, hub or Ethernet end device by an Ethernet cable.

The NL 50-MPI operates its Ethernet interface in the Auto-crossover mode. Thus for the connection with Ethernet devices both crossover cables and patch cables are applicable.

5 Installing Software

5.1 Installing Software from DVD

To install the software:

- Close all application programs on the system!
- Insert the DVD in the local DVD ROM drive.
- The installation routine will start automatically (Auto start feature enabled). Otherwise change to the root directory of the DVD and start the EXE file (Auto start feature disabled).



Note: Administrator privileges are required on Windows® 2000/Windows® XP/Windows® Vista/Windows® 7 systems for installation!

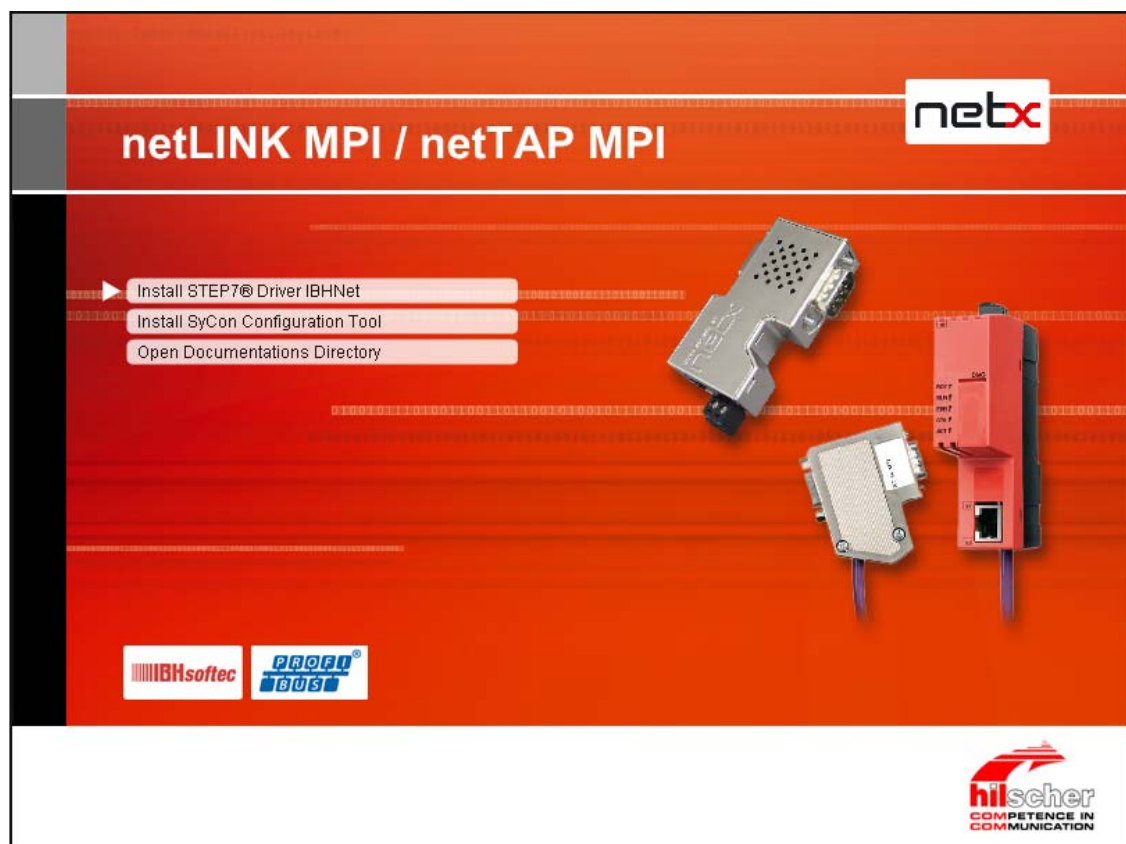


Figure 1: Menu of the DVD autostart

The menu offers for installation the following:

- Install STEP 7® Driver IBHNet
- Install SyCon Configuration Tool (the Hilscher IP Driver can be installed during the installation of SyCon).
- Open Documentations Directory

To configure the netLINK NL 50-MPI device you can use either the IBHnet driver or SyCon.

For the system configurator SyCon no license is required as the basic version already contains all functions necessary for the operation of the netLINK NL 50-MPI.

5.2 Install IP Driver

Some application programs use the Hilscher IP Driver to communicate with the netLINK NL 50-MPI device.

The installation program for the Hilscher IP driver is on the DVD in the **TcpUdpIpDriver** folder.

- Start on the DVD in the folder **TcpUdpIpDriver** the **setup.exe**.
- At the first screen, you simply have to click at the **Next** button in order to proceed.

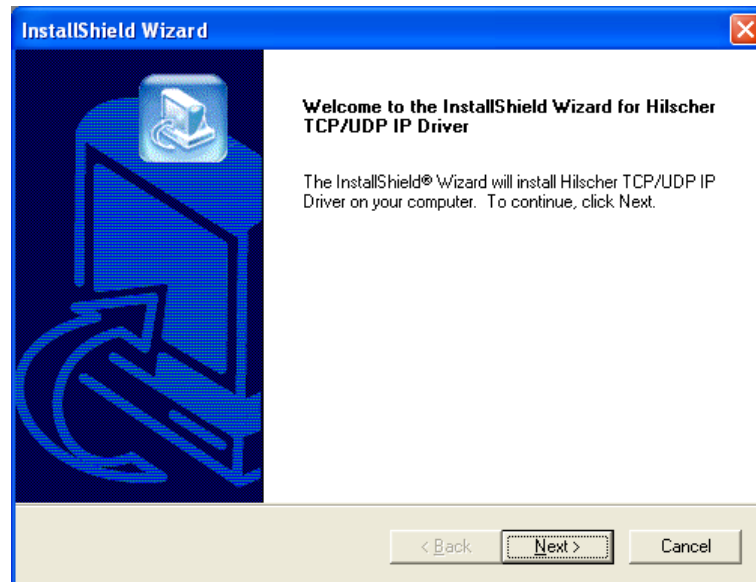


Figure 2: Install IP Driver (1)

- Then some information about the IP driver is displayed on the screen. You should read this text carefully!
- At the next screen, you are asked to specify the storage location for the Hilscher IP Driver. You may choose the proposed standard location or choose another one after clicking the **Browse** button. Then click the **Next** button again in order to proceed.

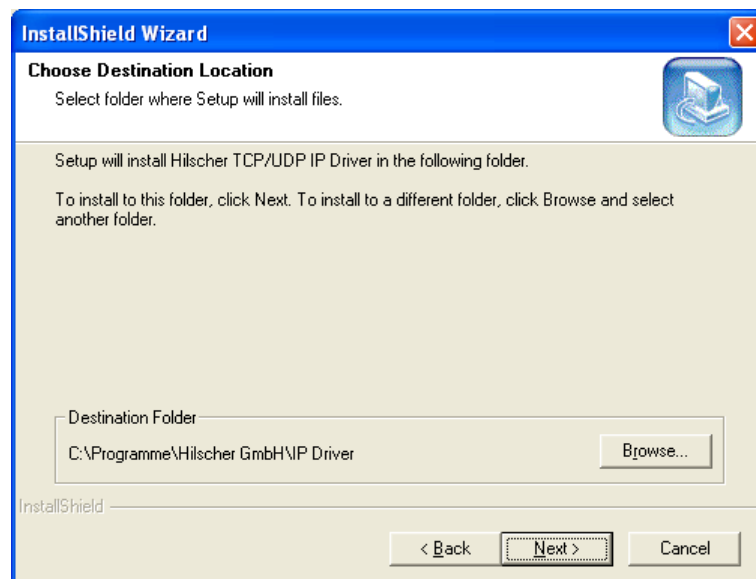


Figure 3: Install IP Driver (2)

- After that, you will reach the final screen indicating that the installation process has been completed.

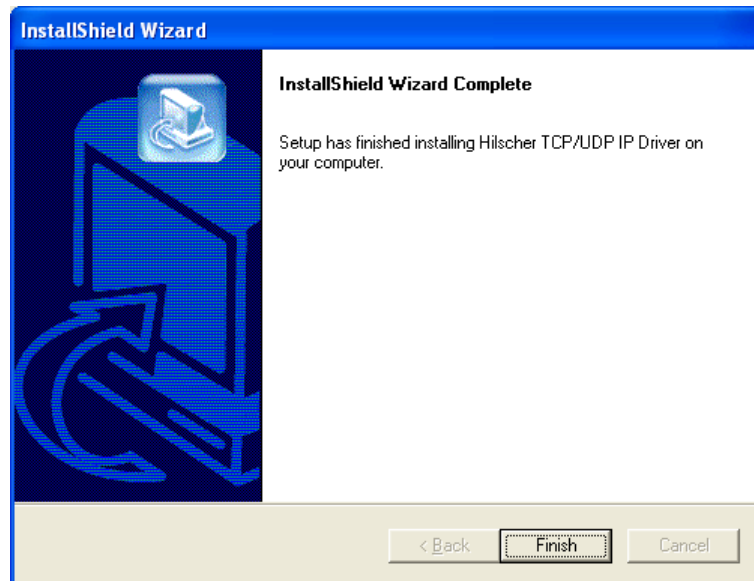


Figure 4: Install IP Driver (3)

- After the installation the driver has to be configured correctly, i.e. the IP address and the port number of the NL 50-MPI need to be specified as described in the next section of this document.

6 Configuration

6.1 Configuration of the IP Driver

- Start the configuration program of the Hilscher IP Driver with **Start > Programs > Hilscher IP Driver > IP Driver Setup**. The GUI of the Hilscher IP Driver Setup program will appear then:

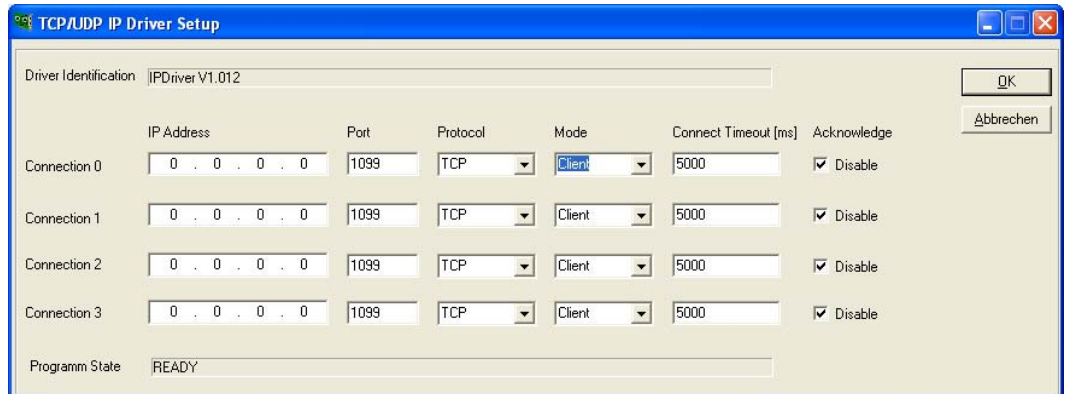


Figure 5: GUI of the Hilscher IP Driver Setup

- Enter the configured IP address of the NL 50-MPI in the field **IP Address** and the Port number in the field **Port**.
- The following settings are necessary:

Field	Required action
Port	Set the port to 1099 .
Protocol	Set the protocol to TCP .
Mode	Set the mode to Client .

Table 11: Configuring IP Driver

- **Connect Timeout (ms):**
In client mode this field holds the time period the driver tries to establish a connection with the selected device.



Note: A too small time out value can prevent correct connection establishment to the device.



Note: If this configuration shall be changed later again, the program **IpDrvSetup.exe** and also the programs which use the driver need to be restarted.



Note: If the PC is behind a Firewall, then port 1099 has to be unblocked. For this, contact your network administrator.

6.2 Creating and downloading the Configuration

6.2.1 Overview



Note: The configuration of the NL 50-MPI is done via TCP/IP.

To create and to download the configuration of the NL 50-MPI device, proceed as follows:

1. Start the System configurator SyCon:
 - Therefore select **Start > Programs > SyCon System Configurator > SyCon.**

2. Open a new project:
 - Therefore select **File > New** or **File > New > netLINK.**

3. Enter the NL50-MPI device to the project:
 - Select the menu **Insert > Device.**
 - In the window **Insert Device** under **Available devices** select the device **NL50-MPI.**
 - Select the button **Add.**
 - Select the button **OK.**

4. Setting the IP address and the PROFIBUS parameters:
 - Select the menu **Settings > netLINK Parameter** or double click to the NL50-MPI device symbol.
 - ↻ The parameter window is displayed.
 - Set the IP address (if necessary also the Net Mask and the gateway address).

A description of these parameters is included in the section *IP Address* on page 38.

- Set the PROFIBUS parameters (especially the station address and the bus parameters).

A description of the PROFIBUS parameters are in the section *PROFIBUS Parameter* on page 40.

5. Connecting the System configurator SyCon with the NL 50-MPI device:
 - Select the menu **Settings > Device Assignment**.
 - Select in the window **Driver Select** the driver **CIF TCP/IP Driver**.
 - Click to the **OK** button.
 - ↻ The window **Device Assignment ODM TCP/IP Drive** is displayed.
 - Click to the **netIdent Rescan** button.
 - ↻ The local Ethernet network is scanned for devices. The detected devices are displayed under **Board Selection**.
 - In the list **Board Selection** mark the check box for NL 50-MPI device.
 - ↻ A connection from the System configurator SyCon to the NL 50-MPI device has been established
 - Select the button **OK**.
 - ↻ The window **Device Assignment ODM TCP/IP Drive** is closed,

6. Downloading the configuration to the device:
 - Select the menu **Online > Download**.
 - ↻ The safety question is displayed, if the download should be executed.
 - Select the button **Yes**.
 - ↻ The configuration is downloaded to the device.

7. Take over the configuration - therefore make a reset to the device:
 - Select the menu **Online > Firmware/Reset**.
 - ↻ The window **Firmware/Reset** is displayed.
 - Select the button **Reset**.
 - ↻ The safety question is displayed, if the reset shall be executed.
 - Select the button **Yes**.
 - ↻ The reset is executed. By this the configuration is taken over.

8. Saving the SyCon project:
 - Select the menu **File > Save under**.
 - ↻ The window **Save under** is displayed.
 - Enter the file name for the project.
 - Select the button **OK**.
 - ↻ The project is saved.

6.2.2 Description of the single Steps

Step 1:

The System configurator **SyCon**:

- Therefore select **Start > Programs > SyCon System Configurator > SyCon**.

Step 2:

Open a new project:

- Therefore select **File > New** or **File > New > netLINK**.
- An empty project file (configuration file) is created and is displayed.

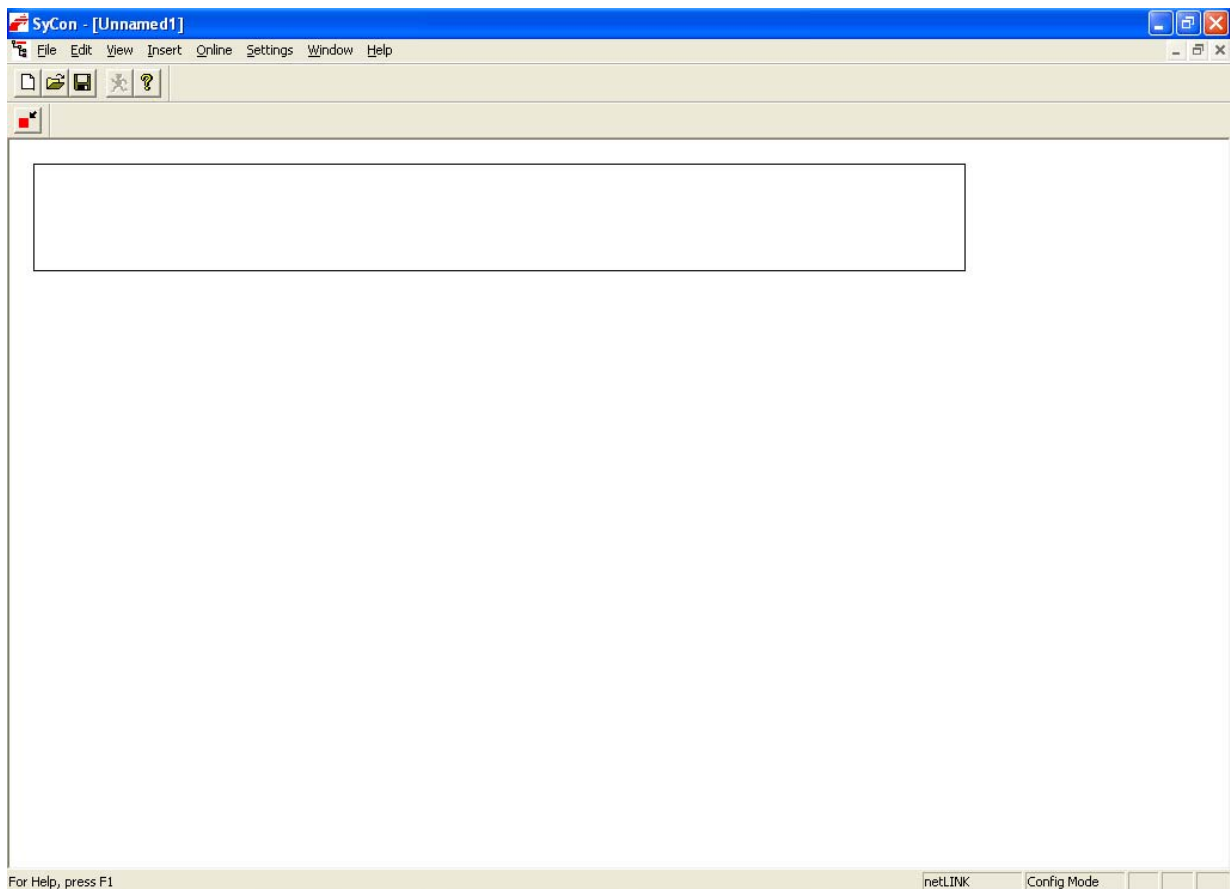


Figure 6: System configurator SyCon - Open a new project

Step 3:

Enter the NL50-MPI device to the project::

- Select the menu **Insert > Device**.
- The window **Insert Device** is displayed.

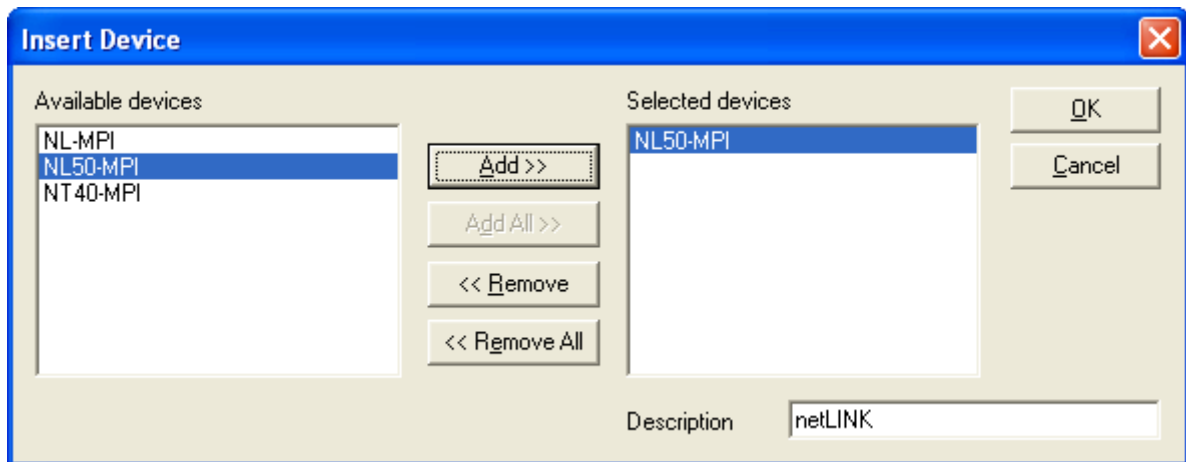


Figure 7: Insert Device

- Under **Available devices** select the device **NL50-MPI**.
- Select the button **Add**.
- Select the button **OK**.
- The NL50-MPI device is displayed in the SyCon project or the configuration file.

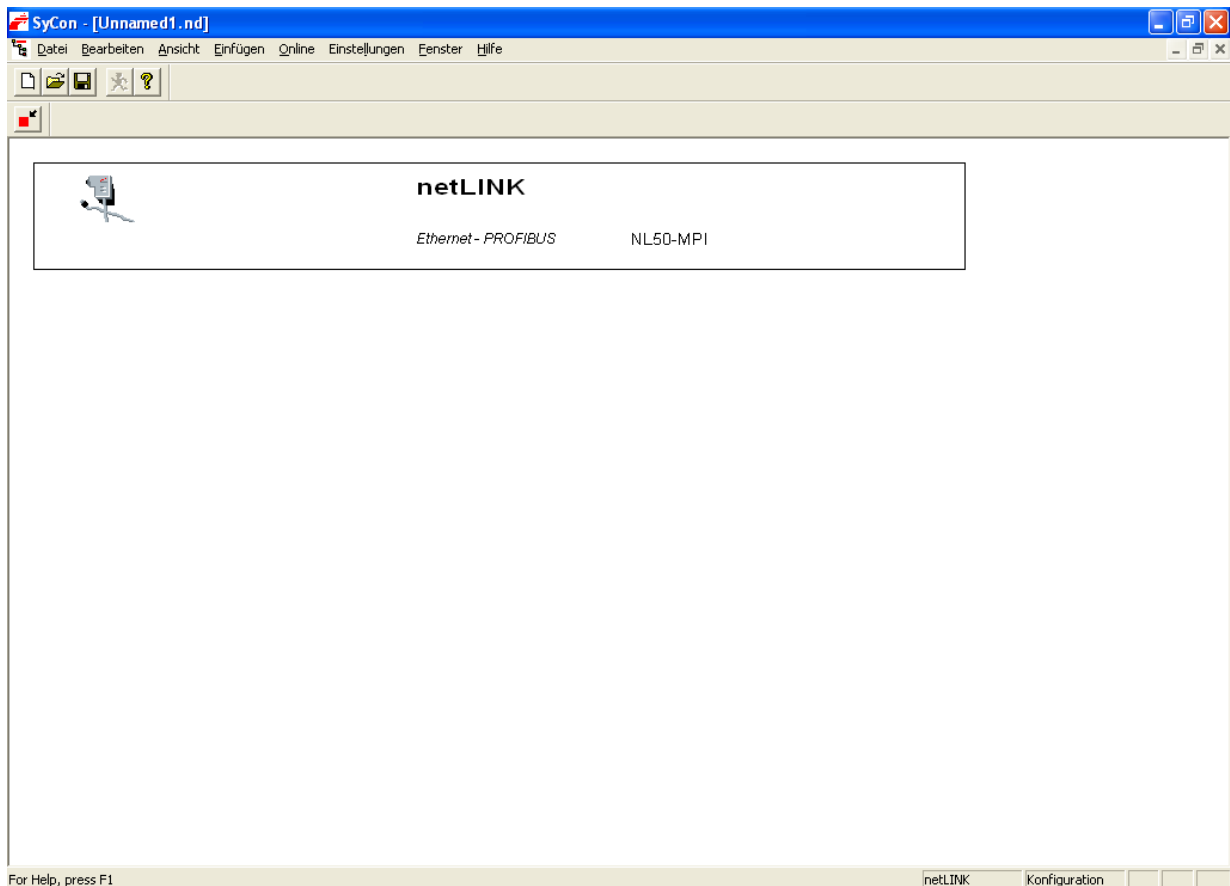


Figure 8: System configurator SyCon – The NL50-MPI device is displayed in the project

Step 4:

Set IP address and PROFIBUS parameters:

- Select the menu **Settings > netLINK Parameter** or double click to the NL50-MPI device symbol.
- The parameter window is displayed.

Step 4A:

- Set the IP address (if necessary also the Net Mask and the gateway address).

A description of these parameters is included in the section *IP Address* on page 38.

IP Address	
Description	netLINK
DHCP	<input type="checkbox"/>
BOOTP	<input type="checkbox"/>
IP address	192 . 168 . 30 . 199
Net mask	255 . 255 . 255 . 0
Gateway	0 . 0 . 0 . 0

Figure 9: Set the IP address

Step 4B:

- The Ethernet parameters are detected automatically by the device.

A description of the Ethernet parameters are in the section *Ethernet Parameter* on page 39.

Ethernet	
Description	netLINK
Auto detect	<input checked="" type="checkbox"/>
Interface	Twisted Pair
Auto negotiation	<input checked="" type="checkbox"/>
Duplex mode	Half
Speed	10 MBit/s

Figure 10: The Ethernet parameters are detected automatically by the device

Step 4C:

- Set the PROFIBUS parameters (especially the station address and the bus parameters).

A description of the PROFIBUS parameters are in the section *PROFIBUS Parameter* on page 40.

The screenshot shows a configuration window titled "PROFIBUS". It contains several input fields and dropdown menus for setting parameters. The "Description" field contains "netLINK". The "Station Address" field contains "1". The "Bus profile" dropdown is set to "MPI". The "Baud rate" dropdown is set to "187.5 kBaud". Other parameters include Slot Time (415 tBit), Min. Station Delay of Responders (60 tBit), Max. Station Delay of Responders (400 tBit), Quiet Time (1 tBit), and Setup Time (1 tBit). On the right side, there are two tables of parameters: one for Tid1 (60 tBit) and Tid2 (400 tBit), and another for Target Rotation Time (10000 tBit), Target Rotation Time (53.3333 ms), GAP Actualization Factor (20), Max Retry Limit (2), and Highest Station Address (31).

Figure 11: Set the PROFIBUS parameters

- Select the button **OK**.
- The parameter window is closed.

Step 5:

Connecting the System configurator SyCon with the NL 50-MPI device:

Therefore:

- A.) Select the driver **CIF TCP/IP Driver**.
- B.) Scan for the NL 50-MPI device.
- C.) If necessary, change and assign the IP address manually.
- D.) Connect the System configurator SyCon with the NL 50-MPI device.

Proceed as follows:

Step 5A: Select the driver **CIF TCP/IP Driver**:

- Select the menu **Settings > Device Assignment**.
- The **Driver Select** window is displayed.



Figure 12: Window Driver Select

- Select in the window **Driver Select** the driver **CIF TCP/IP Driver**.
- Click to the **OK** button.
- The window **Device Assignment ODM TCP/IP Drive** is displayed.

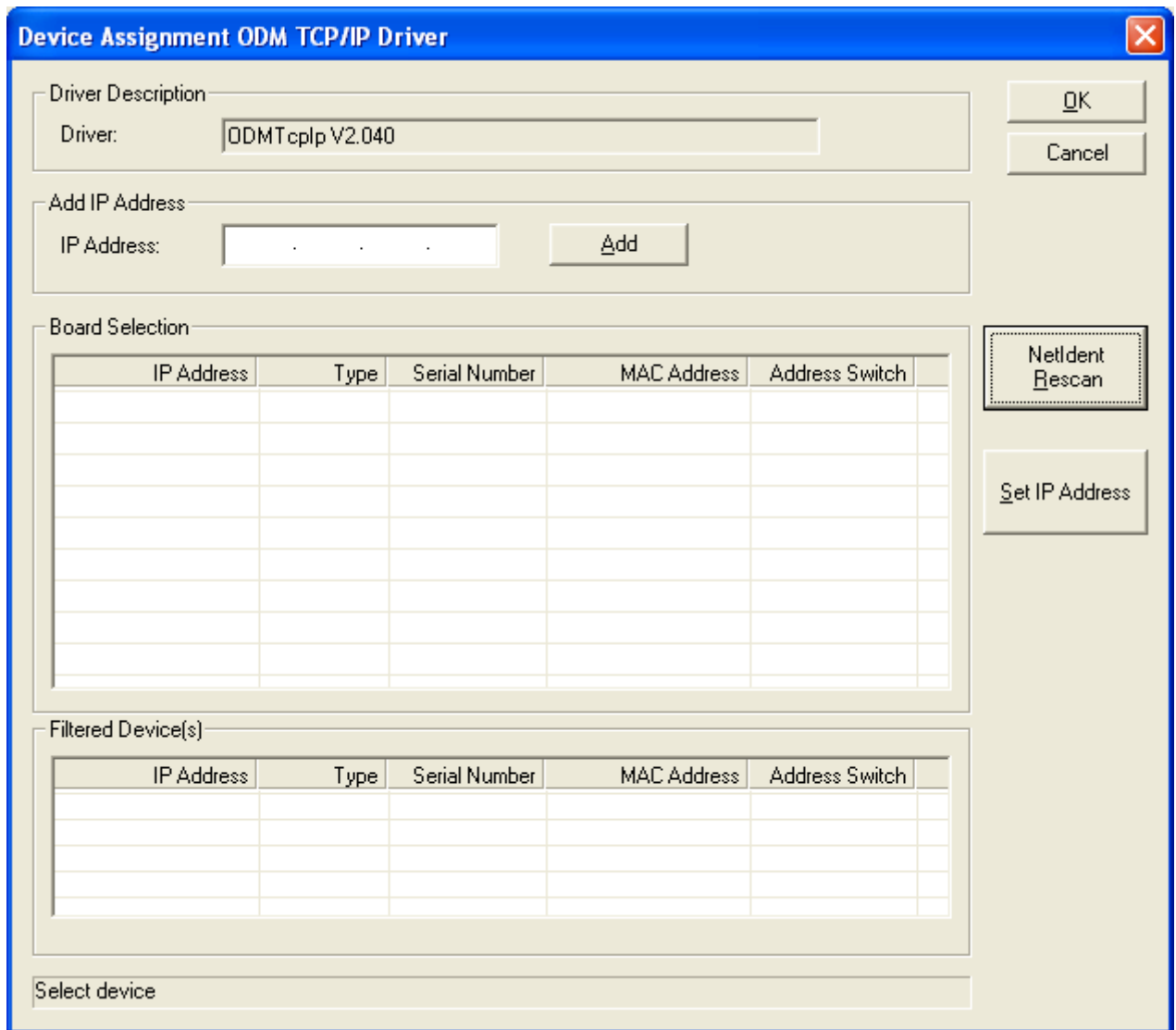


Figure 13: Window Device Assignment ODM TCP/IP Drive

Step 5B: Scan for the NL 50-MPI device:

- In the window **Device Assignment ODM TCP/IP Drive** click to the **netIdent Rescan** button.
- The local Ethernet network is scanned for devices. The detected devices are displayed under **Board Selection**.

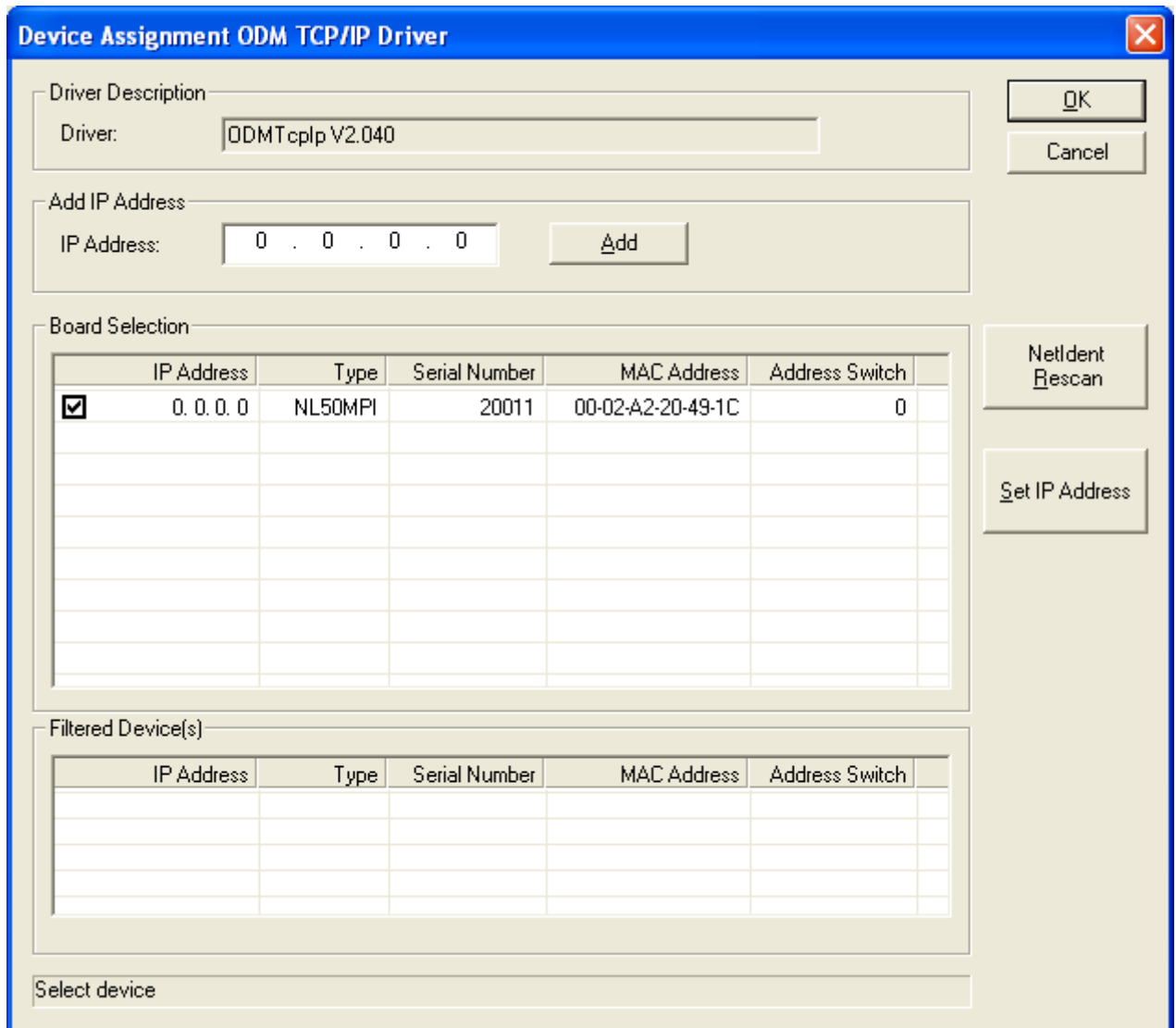


Figure 14: Window Device Assignment ODM TCP/IP Drive – The detected device is displayed

- If one or more devices were found, they are displayed in the list **Board Selection** with their MAC-ID. If the device already has an IP address this is shown in the field **IP Address**.

Step 5C: If necessary, change and assign the IP address manually.

If the shown IP address is 0.0.0.0 or the IP address shall be changed, an IP address has to be assigned to the device.

- In the window **Device Assignment ODM TCP/IP Drive** in the list **Board Selection** mark the check box for NL 50-MPI device.
- Select the button **Set IP Address**.
- The window **Configure IP Address** is displayed.

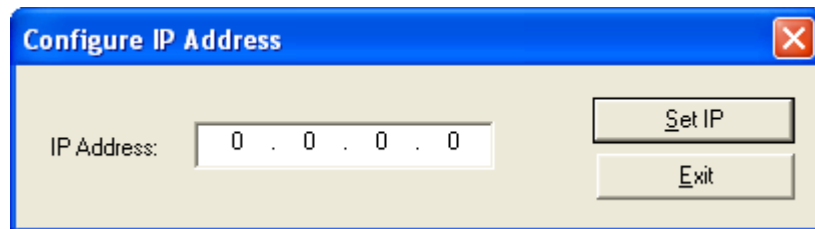


Figure 15: Window Configure IP Address

- Enter a valid IP address.

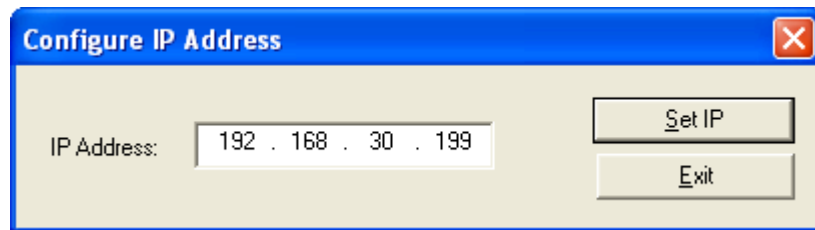


Figure 16: Window Configure IP Address – Set the IP address



Note: With **Set IP** only a temporarily IP address is set in the device. To set a permanent IP address a configuration download has to be done.



Note: When the IP address set in this step 5C and the IP address entered in step 4A are different, then the IP address of step 4A is used from the device after a download of the configuration and a reset.

- Select the button **Set IP**.
- The IP address is assigned to the device.
- The hint window **Setting IP address successful!** is displayed.

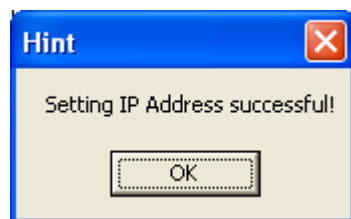


Figure 17: Hint – Setting IP address successful!

- In the hint window click to the button **OK**.
- Select in the window **Configure IP Address** the button **Exit**.
- The window **Configure IP Address** is closed.

Step 5D: Connect the System configurator SyCon with the NL 50-MPI device:

- In the window **Device Assignment ODM TCP/IP Drive** in the list **Board Selection** mark the check box for NL 50-MPI device.
- A connection from the System configurator SyCon to the NL 50-MPI device has been established.

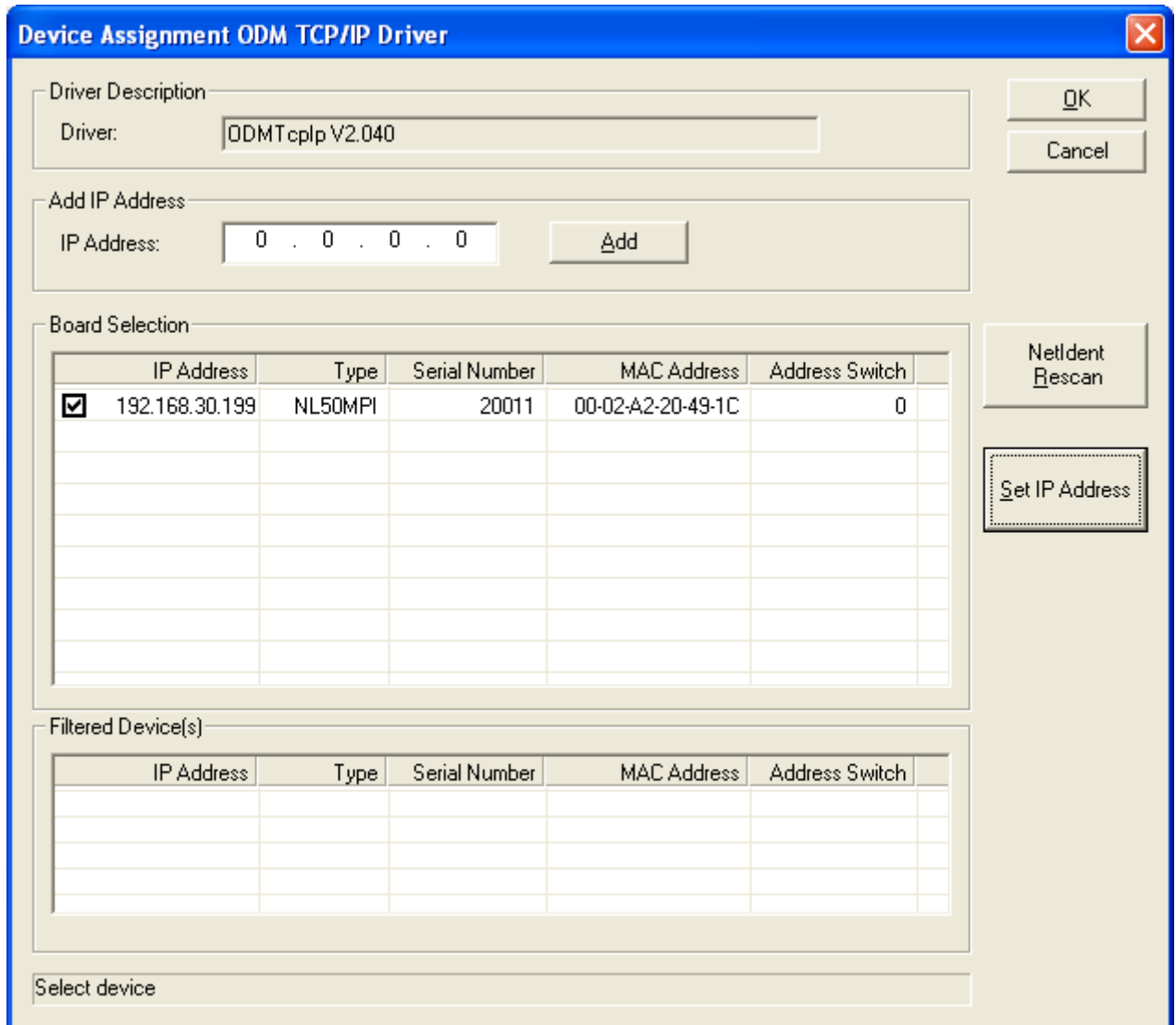


Figure 18: Window Device Assignment ODM TCP/IP Drive – A connection has been established.

- Select the button **OK**.
- The window **Device Assignment ODM TCP/IP Drive** is closed.

Step 6:

Download the configuration to the device:

- Select in the System configurator **SyCon** the menu **Online > Download**.

⇒ The safety question is displayed, if the download should be executed.

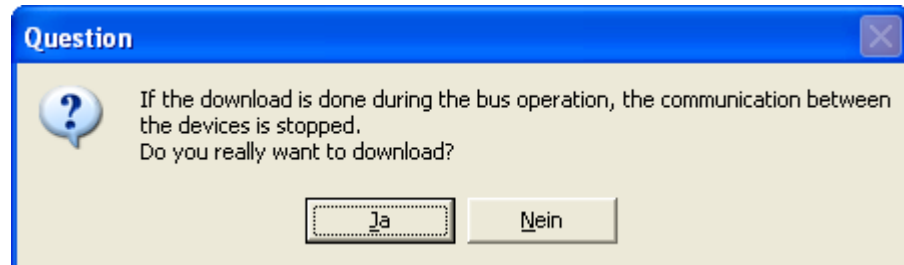


Figure 19: Question – Do you really want to download?

If the download must not be executed:

- Select the button **No**.
- ⇒ The download is not executed.

If the download must be executed:

- Select the button **Yes**.
- ⇒ The download is executed. During the download the progress bar **Data Base Download** is displayed.

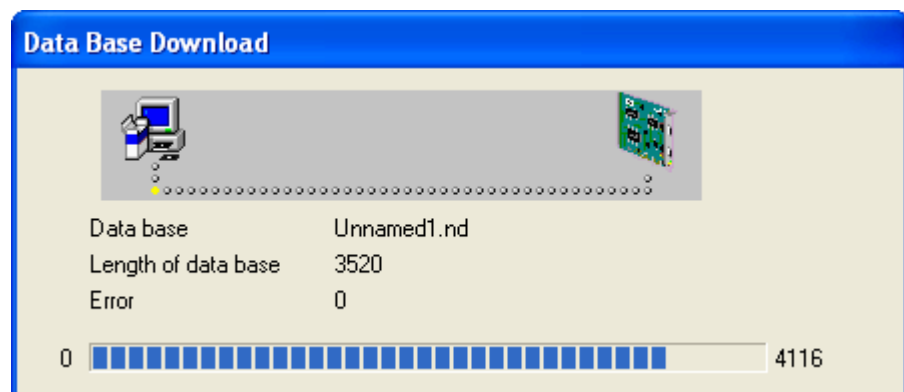


Figure 20: Progress Bar Data Base Download

⇒ The configuration is downloaded to the device.

Step 7:

Take over the configuration - therefore make a reset to the device:

- Select in the System configurator **SyCon** the menu **Online > Firmware/Reset**.

⇒ The window **Firmware/Reset** is displayed.

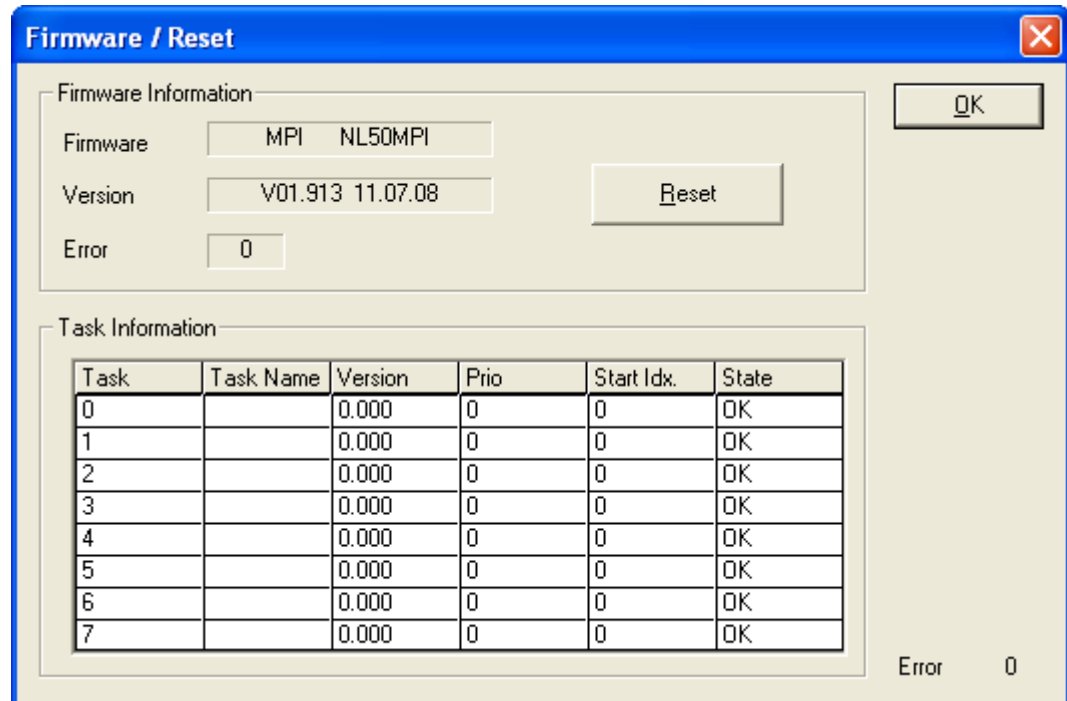


Figure 21: Window Firmware/Reset

- Select the button **Reset**.

⇒ The safety question is displayed, if the reset shall be executed.

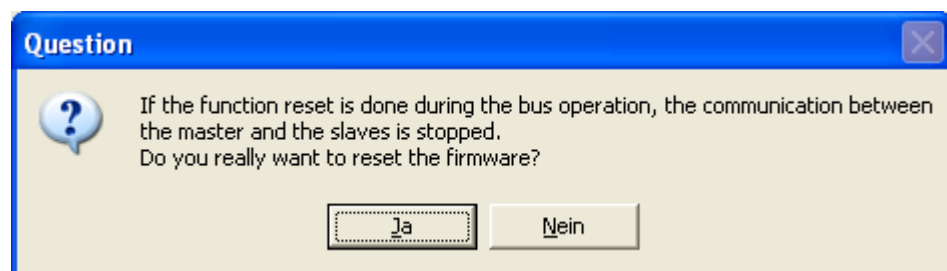


Figure 22: Question – Do you really want to reset the firmware?

If the reset must not be executed:

- Select the button **No**.

⇒ The reset is not executed.

If the reset must be executed:

- Select the button **Yes**.

⇒ The reset is executed. Thereby the configuration is taken over.

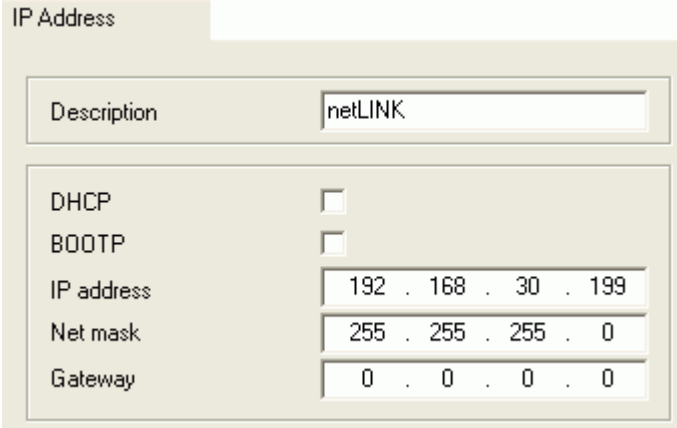
Step 8:

Saving the project:

- Select the menu **File > Save under**.
- ⇒ The window **Save under** is displayed.
- Enter the file name for the project.
- Select the button **OK**.
- ⇒ The project is saved.

6.3 Description of the Parameter

6.3.1 IP Address



IP Address	
Description	netLINK
DHCP	<input type="checkbox"/>
BOOTP	<input type="checkbox"/>
IP address	192 . 168 . 30 . 199
Net mask	255 . 255 . 255 . 0
Gateway	0 . 0 . 0 . 0

Figure 23: Settings > NetLink Parameter > IP Address

Description:

The description of the device is shown in SyCon as the name of the device. The description is changeable in this field.

The handing over of the IP parameters (IP address, Net mask, Gateway) can result in three ways.

1. DHCP:

The device gets the IP parameters from a DHCP server.

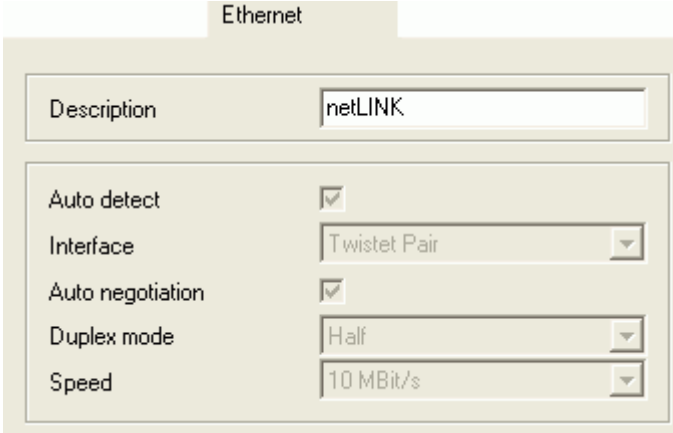
2. BOOTP:

The device gets the IP parameters from a BOOTP server.

3. IP address, Net mask and Gateway:

The IP parameters can be entered in this fields. If more than one configuration way is activated (for example DHCP and manually entered IP parameters), the device tries to process the different configuration way one after the other. As soon as it got an IP configuration in one of this ways, the device starts with this parameters.

6.3.2 Ethernet Parameter



Description	netLINK
Auto detect	<input checked="" type="checkbox"/>
Interface	Twisted Pair
Auto negotiation	<input checked="" type="checkbox"/>
Duplex mode	Half
Speed	10 MBit/s

Figure 24: Settings > NetLink Parameter > Ethernet

Description:

The description of the device is shown in SyCon as the name of the device. The description is changeable in this field.

Auto detect:

This option is set. An automatic detection of the Ethernet interface is done by the device.

Interface:

Is detected automatically.

Auto negotiation:

Auto negotiation means, that in case of two connected devices the devices detect the hardware and the features (for example Half- or Full Duplex, 10 or 100 Mbits and so on) of the other device. This option is preselected.

Duplex mode:

Duplex mode of the Ethernet interface. Is detected automatically.

Speed:

Transmission speed of the data in MBits/s: 10 MBits/s and 100 MBits/s. Is detected automatically.

6.3.3 PROFIBUS Parameter

PROFIBUS

Description:

Station Address:

Bus profile: MPI

Baud rate: 187.5 kBaud

Slot Time: tBit

Min. Station Delay of Responders: tBit

Max. Station Delay of Responders: tBit

Quiet Time: tBit

Setup Time: tBit

Tid1: tBit

Tid2: tBit

Target Rotation Time: tBit

Target Rotation Time: ms

GAP Actualization Factor:

Max Retry Limit:

Highest Station Address:

Figure 25: Settings > NetLink Parameter > PROFIBUS



Note: Wrong configured PROFIBUS Parameters can lead to communication failures.

The busparameters and their meaning:

- Station Address

The Station Address of the NetLink

- Baudrate

Transmission speed: Number of bits per second.

Baudrate	Bit Time (t _{Bit})
9,6 kBaud	104,2 us
19,2 kBaud	52,1 us
93,75 kBaud	10,7 us
187,5 kBaud	5,3 us
500 kBaud	2 us
1,5 Mbaud	666,7 ns
3 Mbaud	333,3 ns
6 Mbaud	166,7 ns
12 Mbaud	83,3 ns

Table 12: Baud rates and Bit times

- Minimum Station Delay of Responders (min T_{SDR})

This is the shortest time period that must elapse before a remote recipient (Responder) may send an acknowledgement of a received query telegram. The shortest time period between receipt of the last Bit of a telegram to the sending of the first Bit of a following telegram.

Value range: 1.. 65535
- Maximum Station Delay of Responders (max T_{SDR})

This is the longest time period that must elapse before a Sender (Requestor) may send a further query telegram. Greatest time period between receipt of the last Bit of a telegram to the sending of the first Bit of a following telegram.

The Sender (Requestor, Master) must wait at least for this time period after the sending of an unacknowledged telegram (e.g. Broadcast only) before a new telegram is sent.

Value range: 1.. 65535
- Slot Time (T_{SL})

'Wait for receipt' – monitoring time of the Senders (Requestor) of telegram for the acknowledgement of the recipient (Responder). After expiration, a retry occurs in accordance with the value of 'Max. telegram retries'.

Value range: 52.. 65535
- Quiet Time (T_{QUI})

This is the time delay that occurs for modulators (Modulator-trip time) and Repeaters (Repeater-switch time) for the change over from sending to receiving.

Value range: 0.. 255
- Setup Time (T_{SET})

Minimum period “reaction time” between the receipt of an acknowledgement to the sending of a new query telegram (Reaction) by the Sender (Requestor).

Value range: 1.. 255
- Target Rotation Time (T_{TR})

Pre-set nominal Token cycling time within the Sender authorization (Token) will cycle around the ring. How much time the Master still has available for sending data telegrams to the Slaves is dependent on the difference between the nominal and the actual token cycling time.

Value range: 1.. 16.777.215

- GAP Update Factor (G)
Factor for determining after how many Token cycles an added participant is accepted into the Token ring. After expiry of the time period $G \cdot T_{TR}$, the Station searches to see whether a further participant wishes to be accepted into the logical ring.
Value range: 1.. 100
- Max number of telegram retries (Max_Retry_Limit)
Maximum number of repeats in order to reach a Station.
Value range: 1.. 8
- Highest Station Address (HSA)
Station address of the highest active (Master) Station.
Value range: 2.. 126

The device NL50-MPI supports the automatic baudrate detection.



Note: The automatic detection of the PROFIBUS baudrate can only be used, when additionally to the netLINK NL 50-MPI another PROFIBUS Master is available on the PROFIBUS network.



Note: The automatic detection of the PROFIBUS baudrate can only be used, when the control unit sends the PROFIBUS parameters via a broadcast telegram on the PROFIBUS network.



Note: A download of the configuration has to be done to activate these setting in the device.



Note: The device uses the new configuration/the new parameters after a reset.

To set the automatic baudrate detection, select in the list of **Bus profile** the setting PROFIBUS and then select in the list **Baud rate** the setting AutoBaud.

PROFIBUS

Description: <input type="text" value="netLINK"/>	
Station Address: <input type="text" value="1"/>	
Bus profile: <input type="text" value="PROFIBUS"/>	Tid1: 37 tBit
Baud rate: <input type="text" value="AutoBaud"/>	Tid2: 150 tBit
Slot Time: <input type="text" value="300"/> tBit	Target Rotation Time: <input type="text" value="2021"/> tBit
Min. Station Delay of Responders: <input type="text" value="11"/> tBit	Target Rotation Time: <input type="text" value="1.#INF"/> ms
Max. Station Delay of Responders: <input type="text" value="150"/> tBit	GAP Actualization Factor: <input type="text" value="10"/>
Quiet Time: <input type="text" value="0"/> tBit	Max Retry Limit: <input type="text" value="1"/>
Setup Time: <input type="text" value="1"/> tBit	Highest Station Address: <input type="text" value="124"/>

Figure 26: Settings > NetLink Parameter > PROFIBUS > Autobaud

6.4 Firmware Update – Firmware Download

The section describes how to do a Firmware Update.

Step A:

- Start the System Configurator SyCon with **Start > Programs > SyCon System Configurator > SyCon**

Step B:

- Open an existing project/configuration file with the menu **File > Open**. The extension is *.nd.

or

- Create a configuration as it is described in steps 2, 3 and 4 in section *Creating and downloading the Configuration* from page 24.

Step C:

- With the menu **Settings > Device Assignment** create a connection to the device. This is describes in detail in Step 5 in section *Creating and downloading the Configuration* from page 24.

Step D:

- Select the menu **Online > Firmware Download**.
- A safety question is displayed.

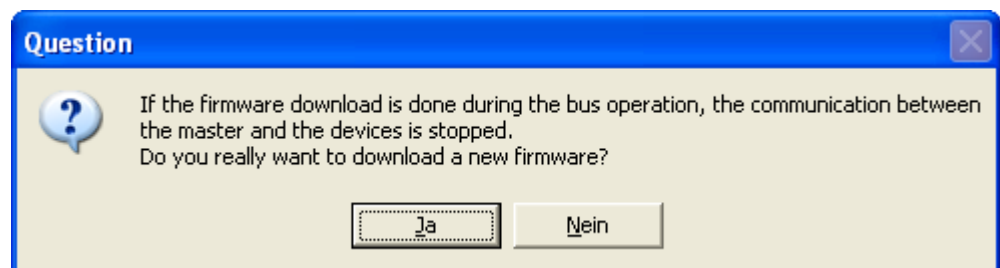


Figure 27: Question – Do you really want to download?

If the download must not be executed:

- Select the button **No**.
- The download is not executed.

If the download must be executed:

- Select the button **Yes**.
- The window **Firmware Copy/Download** is displayed.

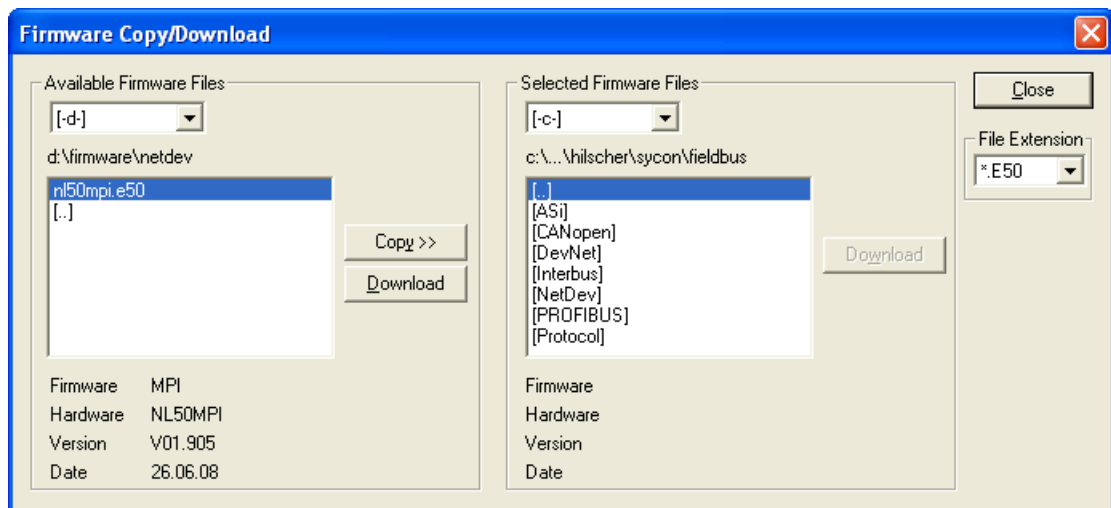


Figure 28: Window Firmware Copy/Download

- Select in **Available Firmware Files** section the directory that contains the firmware file, e. g. on the DVD. The firmware filename is nl50mpi.e50.
- Press the button **Download** in **Available Firmware Files** section.
- A safety question is displayed.

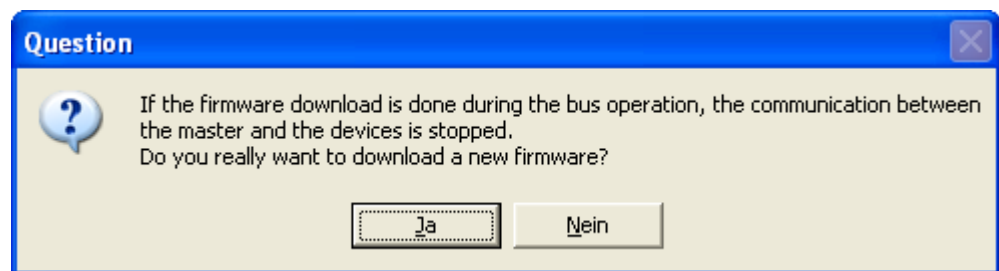


Figure 29: Question – Do you really want to download the firmware?

If the download must not be executed:

- Select the button **No**.
- The download is not executed.

If the download must be executed:

- Select the button **Yes**.
- The download is executed. During the download the progress bar **Data Base Download** is displayed.

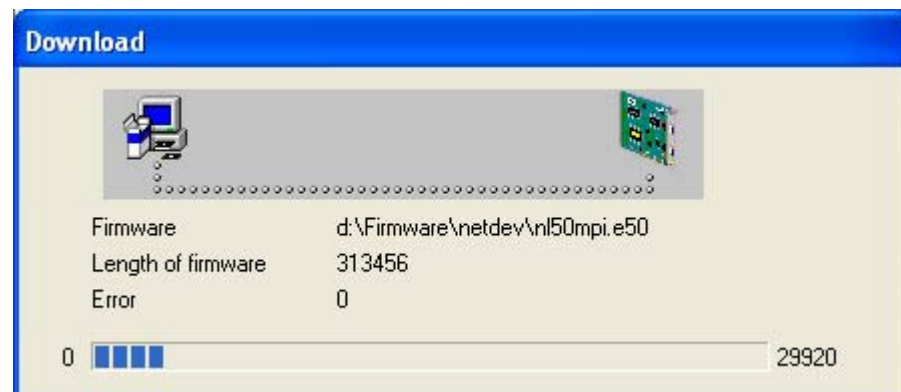


Figure 30: Progress Bar Data Base Download

- After the firmware download was finished, press in the window **Firmware Copy/Download** the button **Close**.

Step E:

- Load with the menu **Online > Download** the configuration into the NL50-MPI device. This is describes in Step 6 in section *Creating and downloading the Configuration* from page 24.

Step F:

- The device uses the new firmware or the new configuration/new parameters after a reset. This is describes in Step 7 in section *Creating and downloading the Configuration* from page 24.

7 Troubleshooting

7.1 Hints on how to solve Problems

General

- Check, if the following preconditions for NL 50-MPI operation are fulfilled:
 1. A suitable power supply must be available (internally from the S7 PLC or externally via the Combicon connector).
 2. The configuration must have been performed correctly using the system configurator SyConND.
 3. The IP driver must have been installed correctly.

Further information to this is in section *Preconditions for NL 50-MPI Operation* on page 17.

LNK-LED

- With the Ethernet link status LED (LNK) of the NL 50-MPI it can be examined whether a connection to the Ethernet exists. If the LED is off, no connection exists. If the LED is on, the device has a connection to the Ethernet.

ACT-LED

- With the Status-LED ACT of the NL 50-MPI it can be examined whether communication takes place.

Cable

- Make sure that the cable is connected to the hub/ switch on the Ethernet side and that the serial inter-face is connected to the S7.

Configuration

- Check, whether the NL 50-MPI is configured according to the description given in section *Creating and downloading the Configuration* on page 24 of this document.

Diagnostic using the System Configurator SyCon

- Read out the data with the menu **Online > Message Monitor**.

You can find more information about the Message Monitor and its functions you find in the operating manual *SyConND/ System Configurator netDEVICE*.

Ethernet-TCP/IP Interface

- Check the network settings of your PC.

With the ping command in MS-DOS Prompt you can easily check if a connection via TCP/IP to the NL 50-MPI is possible. Open the MS-DOS Prompt and enter ping 192.168.10.190 (the IP address has to be the same as set in the NL 50-MPI) and press the Return key. Could a connection be established then the answer is displayed by the following text Reply from 192.168.10.190...

Otherwise a connection timeout is displayed.

7.2 Failure in 10 MBit/s Half Duplex Mode and Workaround

Affected Hardware

Hardware with the communication controller netX 50, netX 100 or netX 500; netX/Internal PHYs.

When can this Failure occur?

When using standard Ethernet communication with 10 MBit/s half duplex mode, the PHY gets stuck in case of network collisions. Then no further network communication is possible. Only device power cycling allows Ethernet communication again.

This problem can only occur with Ethernet TCP/UDP IP, EtherNet/IP or Modbus TCP protocols when using hubs at 10 MBit/s. The issue described above is not applicable for protocols which use 100 MBit/s or full duplex mode.

Solution / Workaround:

Do not use 10 MBit/s-only hubs. Use either switches or 10/100 MBit/s Dual Speed hubs, to make sure the netX Ethernet ports are connected with 100 MBit/s or in full duplex mode.

This erratum is fixed with all components of the 'Y' charge (9 digit charge number shows 'Y' at position 5 (nnnnYnnnn)).

Reference

"Summary of 10BT problem on EthernetPHY",
RenesasElectronics Europe, April 27, 2010

8 Device Drawings and Connections

8.1 Device Drawing NL 50-MPI

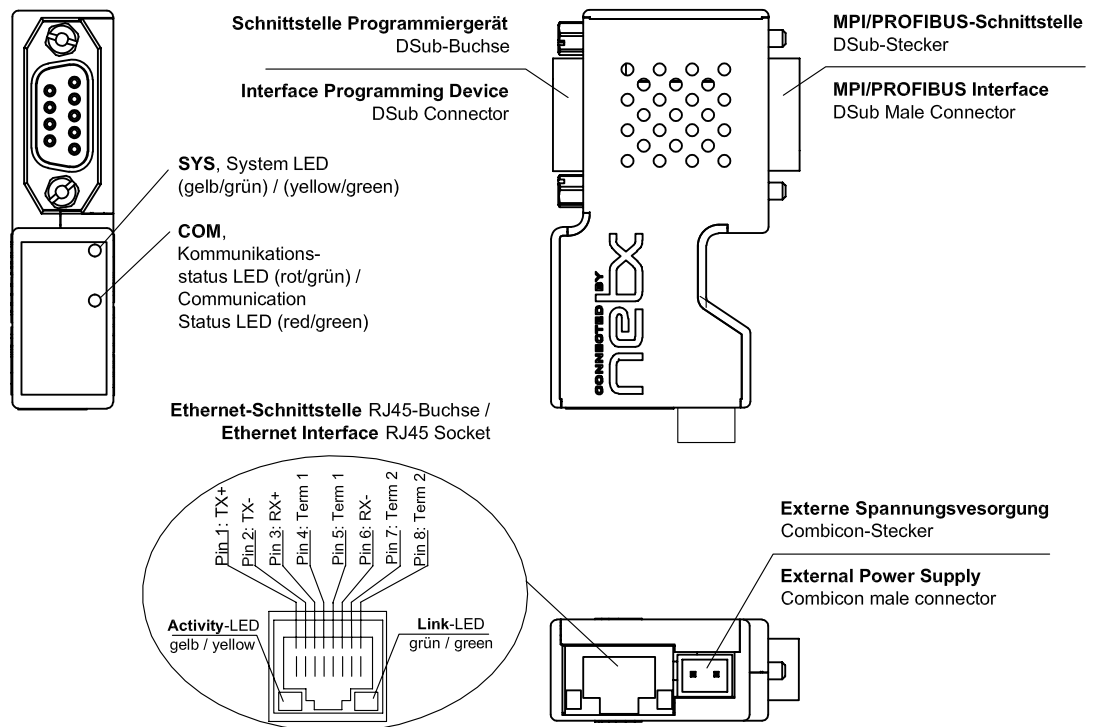


Figure 31: Device Drawing NL 50-MPI

The pins of the PROFIBUS/MPI interface are connected through 1:1 to the programming device interface.

8.2 Ethernet Interface

For the Ethernet interface use RJ45 plugs and twisted pair cable of category 5 (CAT5) or higher, which consists of 4 twisted cores and has a maximum transmission rate of 100 MBit/s (CAT5).

8.2.1 Ethernet pinning at the RJ45 Socket



Note: The device supports the Auto Crossover function. Due to this fact RX and TX can be switched. The following figure shows the RJ45 standard pinning.

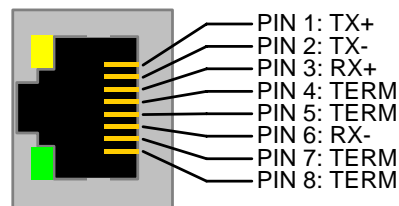


Figure 32: Ethernet pinning at the RJ45 Socket

Pin	Signal	Meaning
1	TX+	Transmit Data +
2	TX-	Transmit Data -
3	RX+	Receive Data +
4	Term 1	Connected to each other and terminated to PE through RC circuit*
5	Term 1	
6	RX-	Receive Data -
7	Term 2	Connected to each other and terminated to PE through RC circuit*
8	Term 2	
* Bob Smith Termination		

Table 13: Ethernet pinning at the RJ45 Socket

8.2.2 Ethernet Connection Data

Medium	2 x 2 Twisted-Pair copper cable, CAT5 (100 MBit/s)
Length of cable	max. 100 m
Transmission rate	10 MBit/s / 100 MBit/s

Table 14: Ethernet Connection Data

8.3 PROFIBUS Interface

8.3.1 DSub Connector (9-Pin, Male and Female)

The DSub plug (male connector) for putting onto the S7 PLC (or another MPI-capable device) and the DSub socket (female connector) for connecting a programming device internally have a 1 to 1-connection as can be seen in the table below:

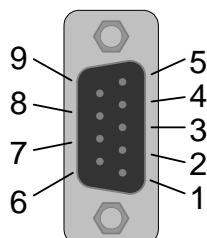


Figure 33: PROFIBUS Interface (DSub female connector, 9 pin)

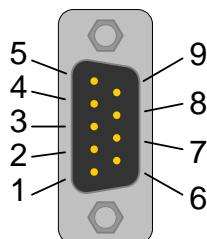


Figure 34: PROFIBUS Interface (DSub male connector, 9 pin)

Connection with DSub female connector	Connection with DSub male connector	Signal	Meaning
1	1	-	unused, is only connected through
2	2	DGND GND	Reference potential (for hardware revision 2 and 3) Ground (for VS) (for hardware revision 4)
3	3	RxD/TxD-P	Receive / Send Data-P respectively connection B plug
4	4	-	unused, is only connected through
5	5	DGND ISOGND	Reference potential (for hardware revision 2 and 3) Reference potential (PROFIBUS) (for hardware revision 4)
6	6	-	unused, is only connected through
7	7	VS	Positive power supply (24 V)
8	8	RxD/TxD-N	Receive / Send Data-N respectively connection A plug
9	9	-	unused, is only connected through
Housing		shield	shield

Table 15: PROFIBUS-MPI- Interfaces (DSub female and male connector, 9 pin)

8.4 External Power Supply

8.4.1 Mini-Combicon Male Connector

The netLINK NL 50-MPI device can be operated by a DC external power supply from 24V (18V – 30V).



Device Destruction!

- When using an external power supply, the potential of this power supply is DC coupled to that of the PROFIBUS. Consequently, the power supply must be potential free!



NOTICE

Device Destruction!

- When using an external power supply, the potential of this power supply is DC coupled to that of the PROFIBUS. Consequently, the power supply must be potential free!

- Plug the DC power supply into the power jack located at the top side of the device.

Pin	Description
1	Ground
2	24V (18 - 30 V DC)

Table 16: External Power Supply, (Mini-Combicon male Connector, 2 pin),

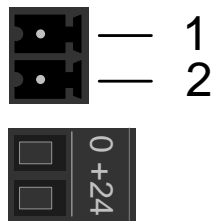


Figure 35: External Power Supply (Mini-Combicon male Connector, 2 pin),

9 LED

LED	Name	Meaning
System Status	SYS	System status
Communication Status	COM	Communication status
RJ45	LNK	Link (Ethernet link status)
	ACT	Activity (Ethernet activity status)

Table 17: Names and Meaning of LED














LED	Display color	Display state	Meaning
SYS	Duo LED yellow/green		
	 (green)	On	Firmware started.
	 (yellow)	On	This state is allowed for a short time only. Stays this LED with permanent yellow on, the a hardware defect is possible.
	 (yellow/ green)	Blinking yellow/green	Bootloader active. This state is allowed for a short time only.
	 (off)	Off	Missing power supply or a hardware error occurred.
COM	Duo LED red/green		
	 (green)	On	Status The device currently holds the PROFIBUS token and is able to transfer telegrams of data.
	 (green)	Blinking (regularly) 5 Hz	Status The device is configured to be a part of the PROFIBUS ring, but it must share the PROFIBUS token with other PROFIBUS-Master devices present on the PROFIBUS ring.
	 (green)	Blinking (regularly) 0.5 Hz	Status Automatic baudrate detection is running
	 (red)	On	Error Communication error at the PROFIBUS.
	 (off)	Off	Status/Error The device has not been integrated into the PROFIBUS ring, i.e. it has not been configured correctly or has a wrong configuration or has not received the PROFIBUS token.
LNK	LED green beside Ethernet socket		
	 (green)	On	The device is currently connected to the Ethernet.
	 (off)	Off	The device is currently not connected to the Ethernet.
ACT	LED yellow beside Ethernet socket		
	 (yellow)	On	The device currently sends or receives Ethernet-Frames.
	 (off)	Off	The device does currently not send and receive any Ethernet-Frames.

Table 18: Meaning of LED-Signals

LED-Display Status netLINK NL 50-MPI:

Display Status	Description
On	The display is lighted permanently.
Off	The display is not lighted at all.
Blinking	The display is switched on and off in phases, At regular blinking with a frequency of 5 Hz: <i>On</i> for a duration of 100 ms followed by <i>Off</i> for a duration of 100 ms.

Table 19: Display Status

10 Technical Data

10.1 Technical Data of the netLINK NL 50-MPI

NL 50-MPI	Parameter	Value
Communication controller	Type	netX 50
Memory	RAM	8 MB SDRAM
	FLASH	4 MB serial Flash, contains boot loader, firmware and configuration
PROFIBUS-MPI communication	Type	Client
	Data transport	PROFIBUS FDL telegrams
	Number of connections	max. 32 MPI connections at a time
	Access to	Data block, Bit memory, Peripheral data, Counter, Timer, State of OP-Mode
Ethernet communication	Data transport	TCP/IP
	Number of connections	max. 16 TCP connections at a time
	RFC 1006	Supported
PROFIBUS interface	Transmission rate	9,6 kBit/s to 12 MBit/s
	Interface type	RS-485, non-isolated (for revision 2 und 3 of the device) isolated (for revision 4 of the device)
	Connector	D-Sub plug (9-pin male connector)
	Automatic Baud rate detection	supported
Ethernet interface	Transmission rate	10/100 MBit/s
	Interface type	10 BASE-T/100 BASE-TX, isolated
	Connector	RJ45 socket
	Auto-Negotiation	supported
	Auto-Crossover	supported
Interface for programming tool	Connector	DSub-socket (9-pin female connector) Note: There is a 1:1-connection to the corresponding pins of PROFIBUS-interface
Display	LED Display	SYS System Status COM Communication status ACT Ethernet activity status LNK Ethernet link status

Table 20: Technical Data NL 50-MPI (Part 1)

NL 50-MPI	Parameter	Value
Power supply	Voltage	18 – 30 V DC
	Typical current at 18 V	72 mA
	Typical current at 24 V	57 mA
	Typical current at 30 V	48 mA
	Connector for power supply from PLC	via DSub-plug (9-pin male connector)
	Connector for external power supply	Mini-Combicon socket 3,81 mm 2-pin
Electrical immunity to interference	Electrostatic discharge (ESD) according to IEC/EN 61000-4-2:1995	10 kV Air discharge method, Criterion A 4 kV Contact discharge method, Criterion B
	Fast transient interferences (Burst), zone B, according to IEC/EN 61000-4-4:1995	2 kV Power supply connectors DC, Criterion B 1 kV Communication and data lines, Criterion A
	Surge voltage, zone B, according to IEC/EN 61000-4-5:1995	1 kV CM, 0,5 kV DM Power supply connectors DC, Criterion B 1 kV CM Communication and data lines, Criterion B
Environmental conditions	Temperature range	0 ... + 55 °C
	Humidity range	0 ... 85 % relative humidity (not condensing)
Device	Dimensions (L x W x H)	74,3 x 40,6 x 16,7 mm
	Weight	appr. 40 g
	Mounting / Installation	directly at MPI interface
	Protection Class	IP 20
	RoHS	Yes
	UL	in preparation
CE Sign	CE Sign	Yes
	Emission	CISPR 11 Class A
	Immunity	EN 61131-2:2003
Configuration	Software	SYCON.net or IBH driver

Table 21: Technical Data NL 50-MPI (Part 2)

11 RFC 1006

RFC 1006 is a standard for communication over TCP/IP that is supported by the netLINK NL 50-MPI. Via RFC 1006 the S7 communication protocol is transferred. The S7 communication protocols transparently for the netLINK.

Application:

PC-based visualization systems can be coupled by the netLINK to an S7 in order to read and write data.

RFC 1006 provides a point-to-point connection from the PC to the automation device.

The RFC 1006 uses a rack and a slot number for addressing. These are directly converted to the MPI address.

In order to access MPI address 2 you need to use the value 0 for the rack number and 2 for the slot number on the side of RFC 1006, for precise assignment see the table below. Some visualization software needs the TSAP. The assignment is listed in the following table.

MPI	Rack	Slot	TSAP
0	0	0	0200
1	0	1	0201
2	0	2	0202
...
31	0	31	021F
32	1	0	0220
33	1	1	0221
...
63	1	31	023F
64	2	0	0240
65	2	1	0241
...
95	2	31	025F
96	3	0	0260
97	3	1	0261
...
126	3	30	027E

Table 22: Relation of MPI Address to Rack and Slot Number and TSAP

12 Error Numbers

12.1 TCP/IP Error Numbers

Error Number	Description
10013	Permission denied
10024	Too many open sockets.
10048	Address already in use
10049	Cannot assign requested address.
10050	Network is down
10051	Network is unreachable
10052	Network dropped connection on reset
10053	Software caused connection abort. An established connection was aborted by the software in your host machine, possibly due to a data transmission time-out or protocol error.
10054	Connection reset by peer
10055	No buffer space available
10056	Socket is already connected
10057	Socket is not connected.
10058	Cannot send after socket shutdown
10060	Connection timed out
10061	Connection refused
10065	No route to host
10092	Winsock.dll version out of range

Table 23: TCP/IP Error Numbers – Standard Win32 Socket API Error Numbers

12.2 netIdent Error Numbers

Error Number	Description
0x8004c701	Unknown Device Error
0x8004c702	Request Pending
0x8004c703	Set IP time exceeded
0x8004c704	IP address invalid
0x8004c705	Returned IP address invalid
0x8004c706	Answer from wrong device
0x8004c707	Wrong OP code received
0x8004c708	NetIdent Timeout

Table 24: netIdent Error Numbers

12.3 PROFIBUS-FDL Error Numbers

Error Number	Description
0 (00H)	CON_OK Positive acknowledgement: Transmission of data from the sending (local) station completed.
1 (01H)	CON_UE Negative acknowledgement: Remote-User/FDL interface error.
2 (02H)	CON_RR Negative acknowledgement: No remote resources available.
3 (03H)	CON_RS Negative acknowledgement: No Service or no remote address at remote SAP activated.
4 (04H)	CON_RA Negative acknowledgement: Access-point blocked.
8 (08H)	CON_DL Positive acknowledgement for sent data (L_SDU), reply data with low priority available.
9 (09H)	CON_NR Positive acknowledgement for sent data, negative acknowledgement for reply data, as not available to the remote FDL controller.
10 (0AH)	CON_DH Positive acknowledgement for sent data (L_SDU), reply data with high priority available.
12 (0CH)	CON_RDL Negative acknowledgement for sent data (L_SDU), resource of the remote FDL controller not available or not sufficient, reply data with low priority available.
13 (0DH)	CON_RDH Negative acknowledgement for sent data (L_SDU), resource of the remote FDL controller not available or not sufficient, reply data with high priority available.
16 (10H)	CON_LS Service at local SAP or local SAP not activated.
17 (11H)	CON_NA No reaction (acknowledgement/response) from remote station.
18 (12H)	CON_DS Local FDL/PHY not in token ring.
19 (13H)	CON_NO Negative acknowledgement: Not ok (different meanings dependent on service). No reply data transmitted.
20 (14H)	CON_LR Resource of the local FDL controller not available or not sufficient.
21 (15H)	CON_IV Invalid parameter in request - illegal parameters in the request header or - local station is passive or - destination station is own station address
23 (17H)	CON_NM Notice.
24 (18H)	CON_NC Reaction from only one station.
25 (19H)	CON_NP No plausible reaction from remote station.
26 (1AH)	CON_NL Local configurator variable is set.
27 (1BH)	CON_RD Reply data available.

Error Number	Description
32 (20H)	CON_LO Low prior response data are sent at this SRD.
33 (21H)	CON_HI High prior response data are sent at this SRD.
34 (22H)	CON_NO_DATA No data are sent at this SRD.

Table 25: PROFIBUS-FDL Error Numbers

12.4 PROFIBUS-MPI Error Numbers

Error Number	Description
48 (30H)	CON_TO Timeout, the request message was accepted but no indication is sent back by the remote station. MPI protocol error, or station not present.
57 (39H)	CON_SE Sequence fault, internal state machine error. Remote station does not react like awaited or a reconnection was retried while connection is already open or device has no SAPs left to open connection channel
133 (85H)	REJ_IV Specified offset address out of limits or not known in the remote station. Check msg.data_adr if present or offset parameter in request message
134 (86H)	REJ_PDU Wrong PDU coding in the MPI response of the remote station.
135 (87H)	REJ_OP Specified length to write or to read results in an access outside the limits. Check msg.data_cnt length in request message.
136 (88H)	REJ_HW Specified address not defined in the remote station. Check msg.data_request message
137 (89H)	REJ_MODE MPI remote station not in the right operational mode. Bring S7 into RUN-P Mode.

Table 26: PROFIBUS-MPI Error Numbers

13 Appendix

13.1 Disposal of Waste Electronic Equipment

Important note from the European Directive 2002/96/EG Waste Electrical and Electronic Equipment (WEEE):



Waste Electronic Equipment

- This product must not be treated as household waste.
 - You must dispose the device at a designated waste electronic equipment collecting point.
-

Waste electronic equipment may not be disposed of with household waste. As a consumer you are legally obliged to dispose all Waste electronic equipment professionally, as to the public collection.

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