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LinMot[®]



MC-Link with ProfiNet Interface

User Manual

This document applies to the following controllers:
B8050-ML-PN

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1 System overview

The LinMot ProfiNet-ML controllers have the following functionalities:

| Device Property | Value / Remark |
|----------------------------|----------------|
| Minimal ProfiNetcycle time | 2 ms |

ProfiNet is the open real-time Ethernet network originally developed by Siemens. The LinMot act as Slave in this network and is implemented with the standard ASIC TPS 1 from Renesas.

For further information on the ProfiNet fieldbus please visit:

<http://www.ProfiNet.org/>

1.1 References

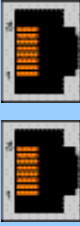
All user manuals are distributed with the LinMot-Talk configuration software the newest version can be downloaded from the LinMot homepage under the download section.

| Ref | Title | Source |
|-----|---|--|
| 1 | User Manual Motion Control SW | www.linmot.com |
| 2 | LinMot Drive Configuration over Fieldbus Interfaces SG4 | www.linmot.com |
| 3 | Usermanual_MC_Link_with_ProfiNet_SG5.pdf | www.linmot.com |

2 Connecting to the ProfiNet Network

2.1 Pin Assignment of the Connectors X17-X18

The Ethernet connectors are standard RJ45 female connectors with a pin assignment as defined by EIA/TIA T568B:

| X17 – X18 | | RealTime Ethernet Connector | |
|---|--|-----------------------------|-----------------------|
|  | Pin | Wire color code | Assignment 100BASE-TX |
| | 1 | WHT/ORG | Rx+ |
| | 2 | ORG | Rx- |
| | 3 | WHT/GRN | Tx+ |
| | 4 | BLU | - |
| | 5 | WHT/BLU | - |
| | 6 | GRN | Tx- |
| | 7 | WHT/BRN | - |
| | 8 | BRN | - |
| case | - | - | |
| RJ-45 | Use standard patch cables (twisted pair, S/UTP, AWG26) for wiring. This type of cable is usually referred to as a "Cat5e-Cable". | | |

X17 is the ProfiNet input and X18 the ProfiNet Output Connector.

3 Setup in the PLC

In the following steps the integration of a LinMot ProfiNet controller in the PLC is described. In the example a Siemens master PLC is used.

3.1 Adding the GSDML to the Hardware Catalogue

The LinMot controller is described with *.gsdml device description file distributed with the LinMot-Talk software.

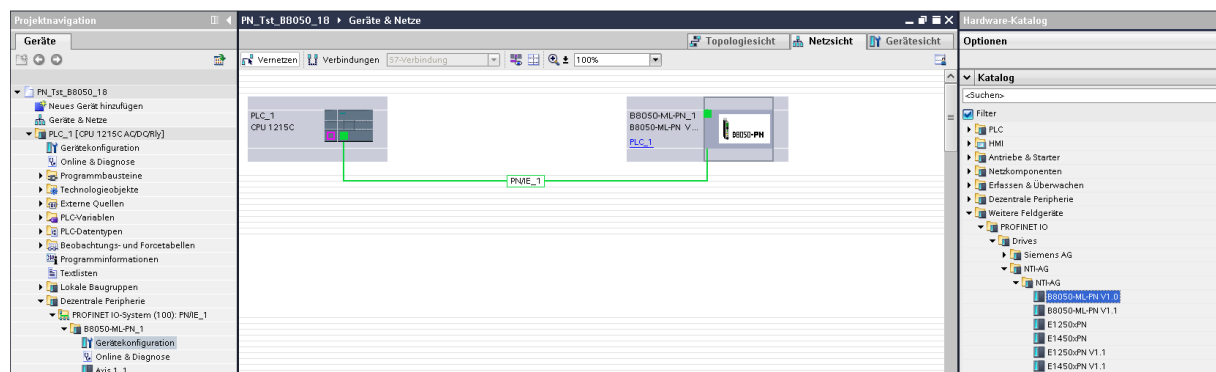
Copy this file to PLC so it can access it.

Example Source path of ProfiNet Device description file:

```
C:\Program Files (x86)\LinMot\LinMot-Talk 5.1 Build
20121010\Firmware\Interfaces\ProfiNet_ML\GSDML\GSDML-V2.2-NTI-ML-PN_IO-V1.0-
20130206.xml
```

3.2 Adding the B8050-ML-PN V1.x ProfiNet slave device

With drag and drop the B8050-ML-PN device could be added from the HW catalogue to the desired Profinet network:



Add the B8050-ML-PN V1.x ProfiNet slave devices to the ProfiNet

4 ProfiNet Parameters

4.1 Parameters

The ProfiNet Interface has an additional parameter tree branch (Parameters → ProfiNet), which can be configured with the distributed LinMot-Talk software.

With these parameters, the ProfiNet interface can be enabled or disabled.

The LinMot-Talk software can be downloaded from <http://www.linmot.com> under the section download\software and manuals\Servo Drives\.

ProfiNet Dis-/Enable

With the Dis-/Enable parameter the LinMot bus module can be run without the Ethernet ProfiNet interface going online. So in a first step the system can be configured and run without any bus connection.

| ProfiNet\ Dis-/Enable | |
|------------------------------|---|
| Disable | Bus Module runs without ProfiNet. |
| Enable | Bus Module runs with ProfiNet connection. |



IMPORTANT: If the ProfiNet interface is disabled, the integrated ProfiNet-ASIC rests in reset state! No messages will be sent to other devices connected to the ProfiNet-Network via the BM8050-PN Bus Module.

5 Realtime IO Data Mapping

For each axis a container of data is exchanged, which allows to control the axis and even to configure it over the exchanged real time data.

5.1 IO Data Mapping of each Axis

With this real time IO configuration, an additional configuration module is mapped into the IO data communication. The functionality of this module is the same for all the different fieldbus interfaces. For this reason, the functionality is described in documentation [2] "Controller Configuration over Fieldbus".

5.1.1 Output Data Mapping of one axis

In this real time IO mapping the 16 bit control word, the 16 bit motion command header and the motion command parameters are exchanged. The size of this mapping is 32 bytes or **16 words** for each configured axis.

| Output Data Mapping of one Axis | | |
|---------------------------------|-------------------------------------|--|
| Byte Offset | Description | Size / Type |
| 00h | MC SW ControlWord | Uint16 / Bit coded |
| 02h | MC SW MotionCommandHeader | Uint16 / 12Bit Command 4Bit count nibble |
| 04h | MC SW MotionCommandPar Bytes 00..03 | Uint32 / Command specific |
| 08h | MC SW MotionCommandPar Bytes 04..07 | Uint32 / Command specific |
| 0Ch | MC SW MotionCommandPar Bytes 08..11 | Uint32 / Command specific |
| 10h | MC SW MotionCommandPar Bytes 12..15 | Uint32 / Command specific |
| 14h | MC SW MotionCommandPar Bytes 16..19 | Uint32 / Command specific |
| 18h | Cfg Module Control Word | Uint16 |
| 1Ah | Cfg Module Index/.. | Uint16 |
| 1Ch | Cfg Module Value/.. | Uint32/Sint32 |

5.1.2 Input Data Mapping of one axis

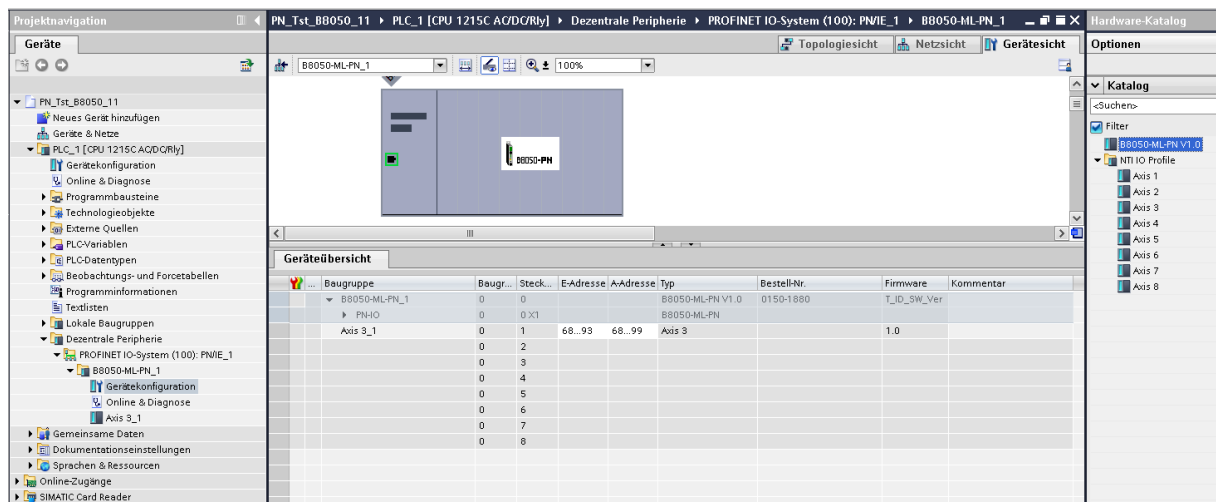
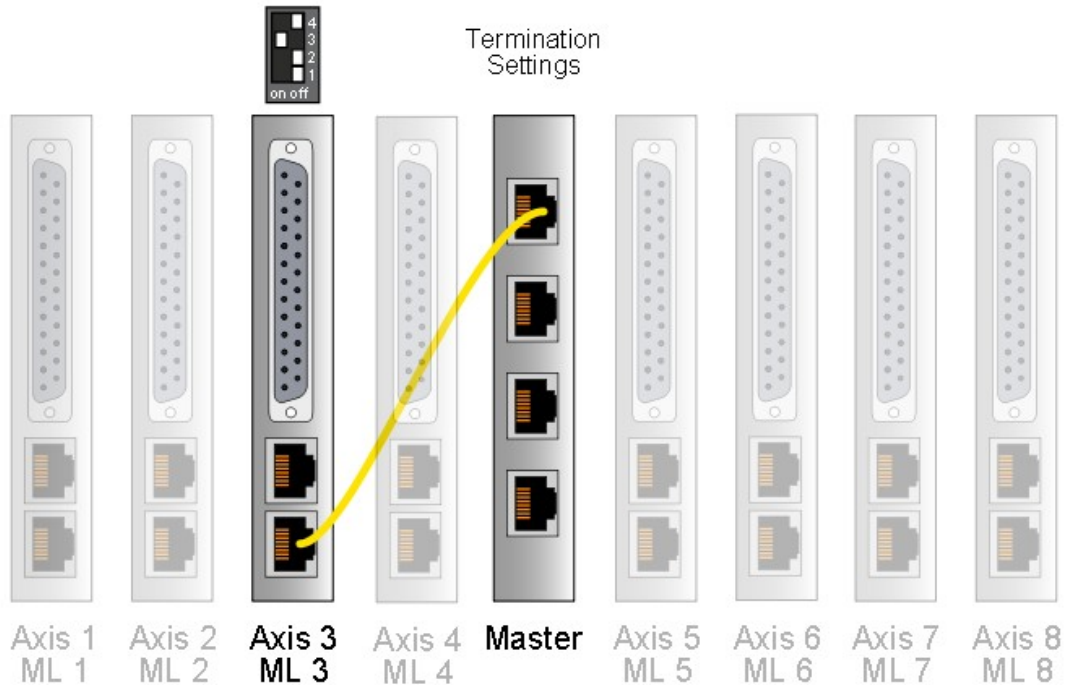
In this real time IO mapping the StateVar for the main state machine and several other helpful data are exchanged. The size of this mapping is 26 bytes or **13 words** for each configured axis.

| Input Data Mapping of one Axis | | |
|--------------------------------|------------------------|--------------------------------|
| Byte Offset | Description | Size / Type |
| 00h | MC SW StateVar | Uint16 / coded state depending |
| 02h | MC SW StatusWord | Uint16 / Bit coded |
| 04h | MC SW WarnWord | Uint16 / Bit coded |
| 06h | MC SW DemandPosition | Int32 / Position [100nm] |
| 0Ah | MC SW ActualPosition | Int32 / Position [100nm] |
| 0Eh | MC SW DemandCurrent | Int32 / Current [1mA] |
| 12h | Cfg Module Status Word | Uint16 |
| 14h | Cfg Module Index/.. | Uint16 |
| 16h | Cfg Module Value/.. | Uint32/Sint32 |

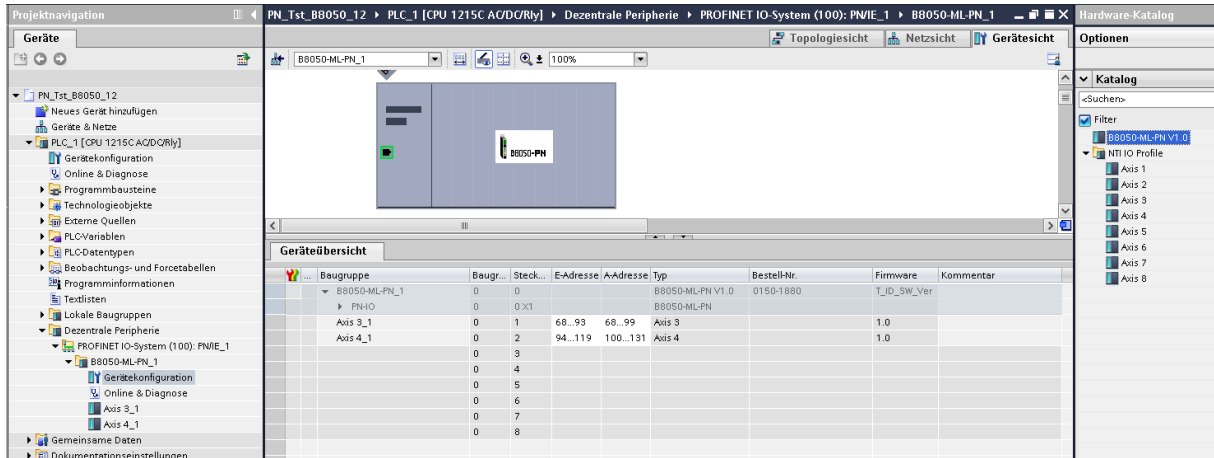
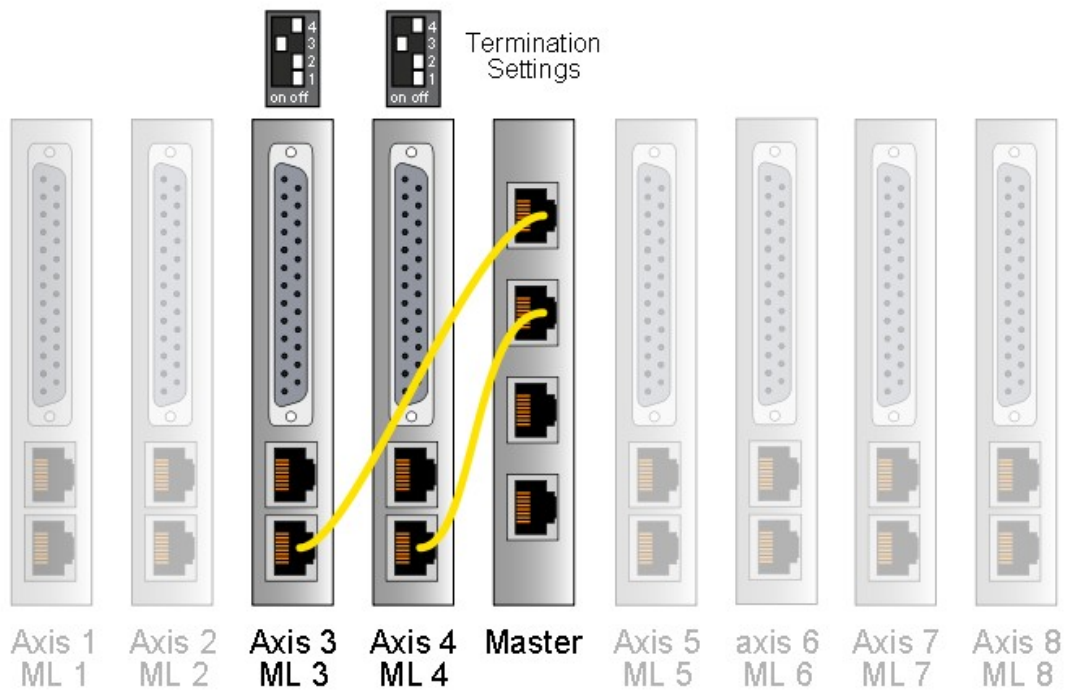
The use of the Control word and Motion Command interface is described in [1]. The real time configuration module is described in [2].

5.2 PLC Setup with different numbers of Axis

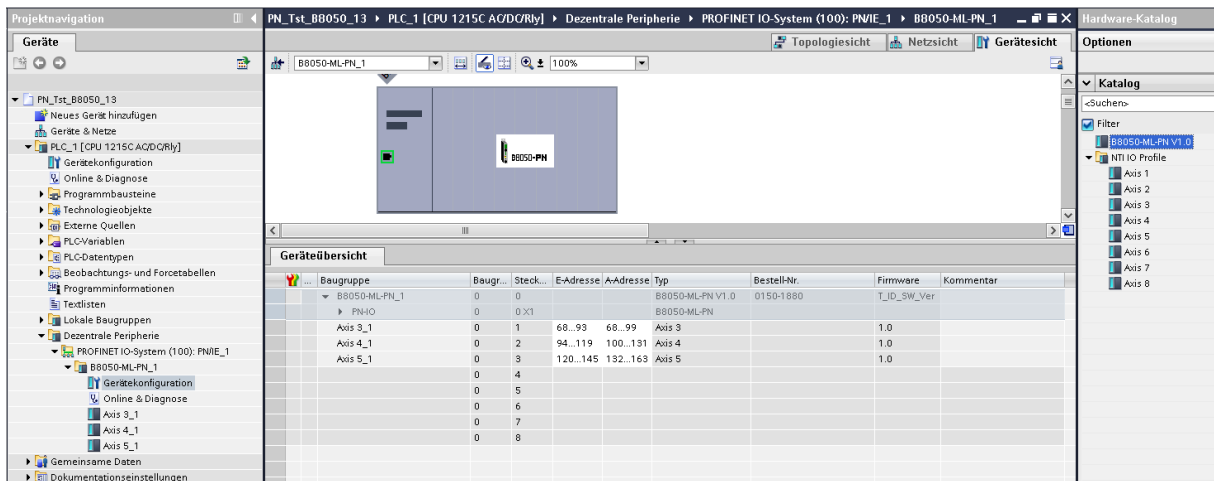
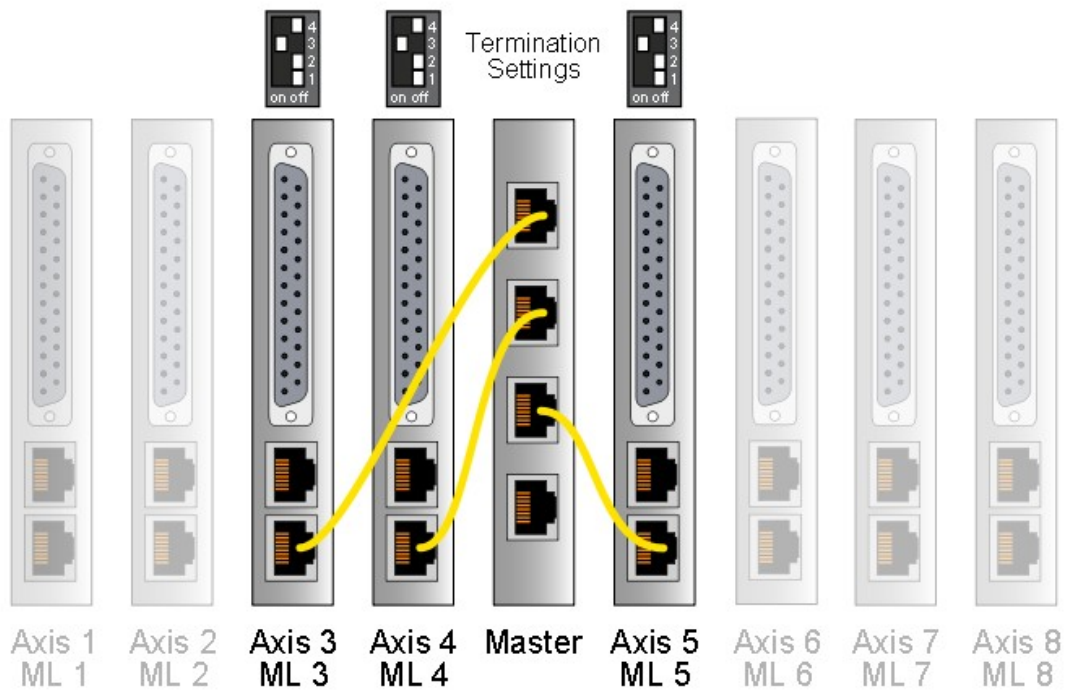
5.2.1 PLC Setup with 1 Axis



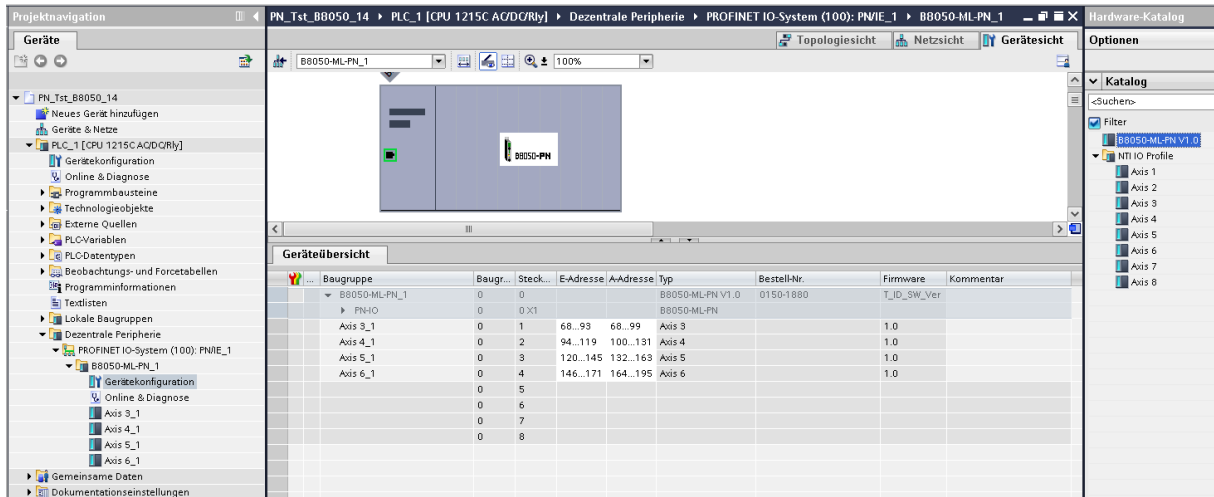
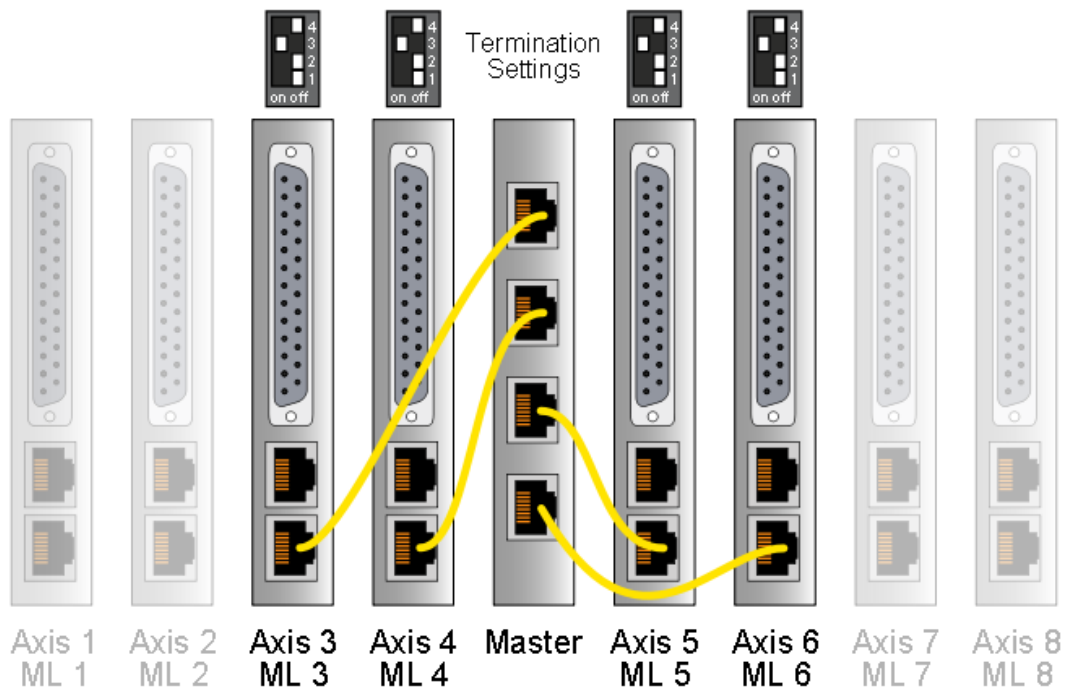
5.2.2 PLC Setup with 2 Axis



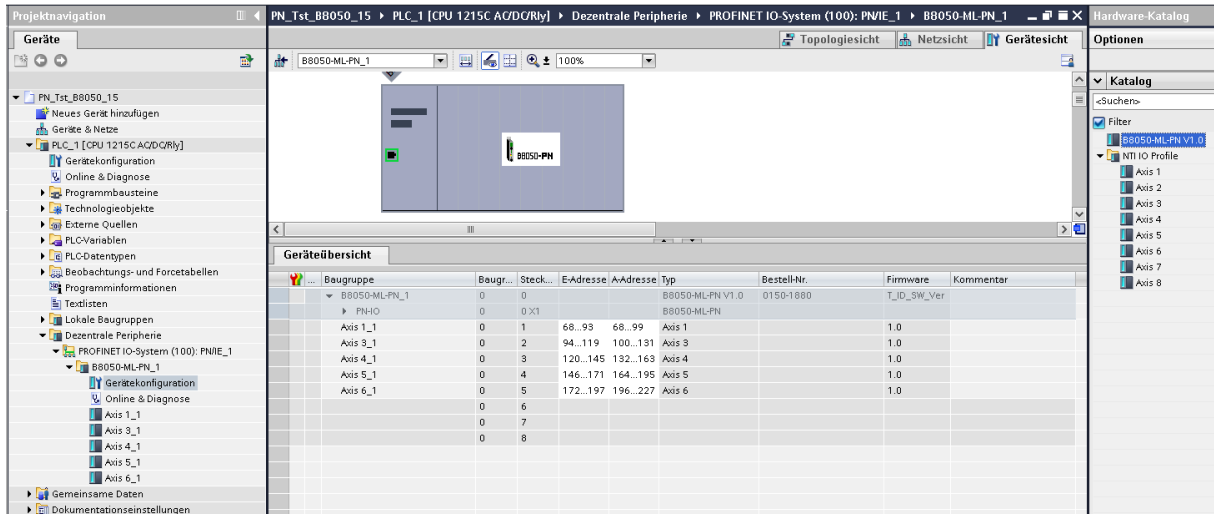
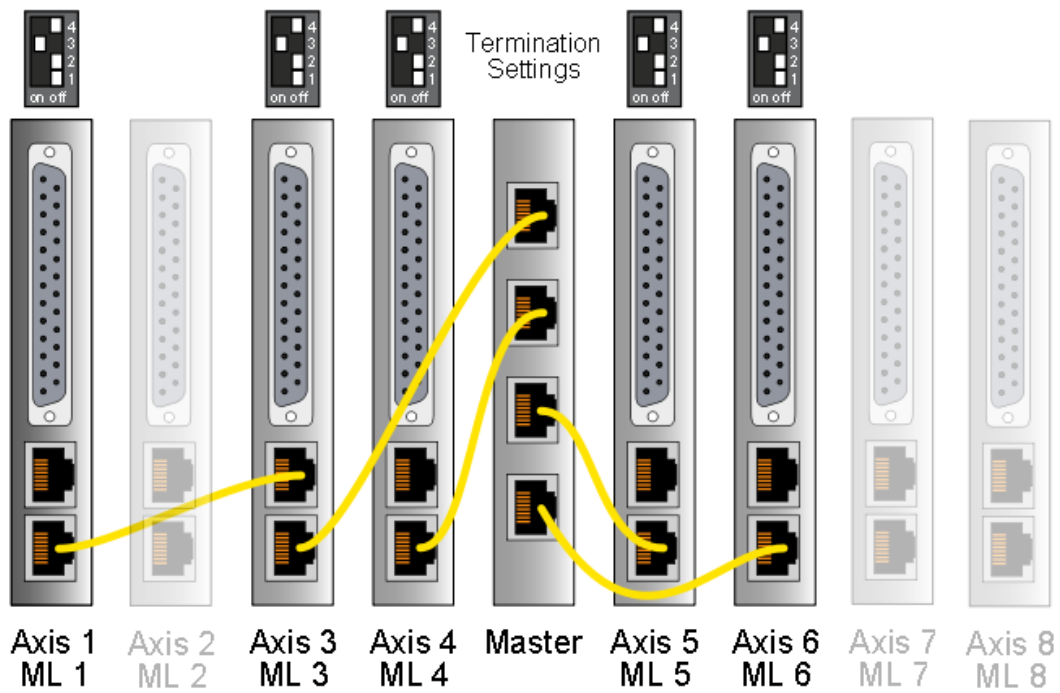
5.2.3 PLC Setup with 3 Axis



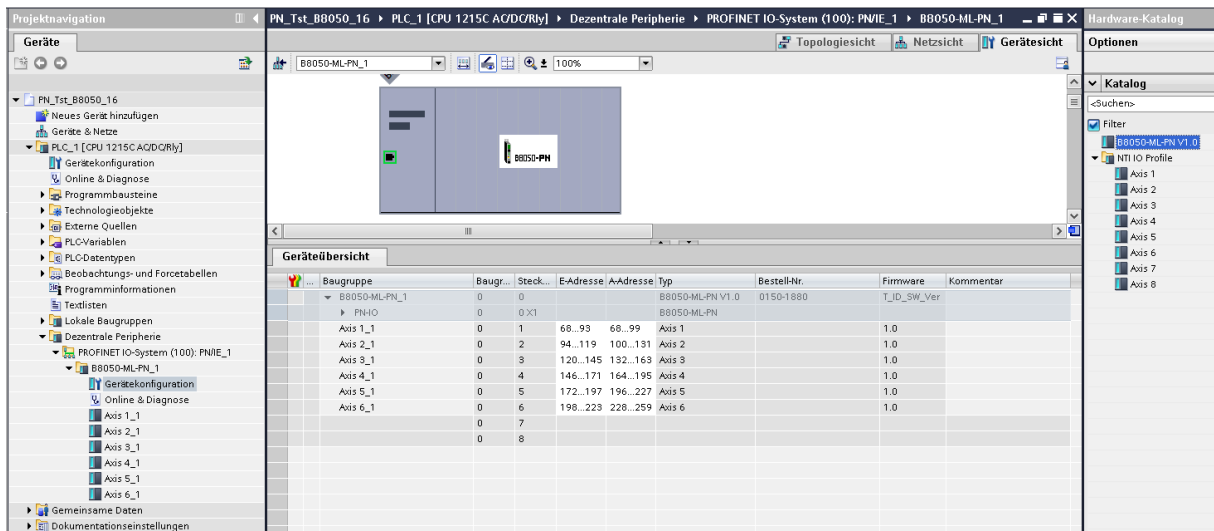
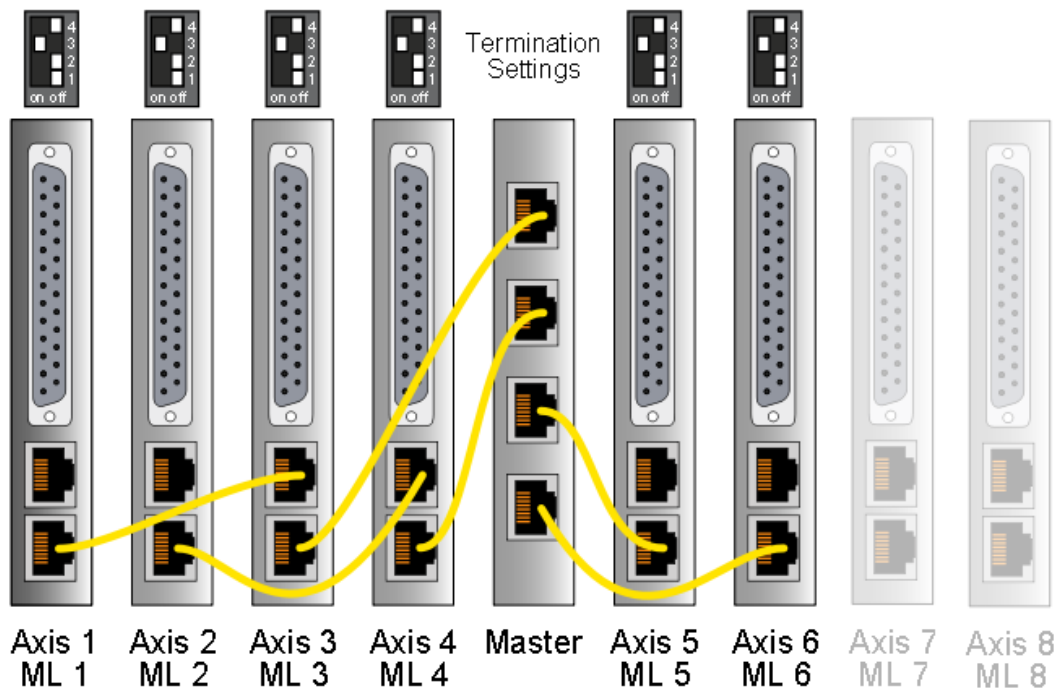
5.2.4 PLC Setup with 4 Axis



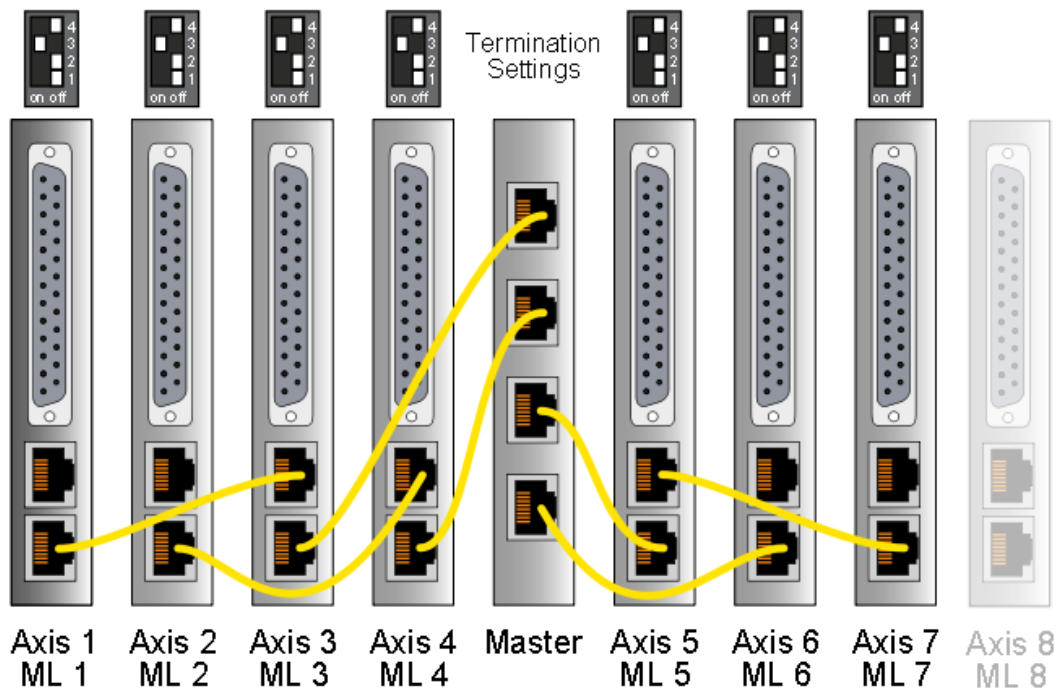
5.2.5 PLC Setup with 5 Axis



5.2.6 PLC Setup with 6 Axis



5.2.7 PLC Setup with 7 Axis



Projektnavigation PN_Tst_B0050_17 > PLC_1 [CPU 1215C AC/DC/Rly] > Dezentrale Peripherie > PROFINET IO-System (100): PNIE_1 > B0050-ML-PN_1

Hardware-Katalog

Geräte

Geräteübersicht

| Baugruppe | Baugr... | Steck... | E-Adresse | A-Adresse | Typ | Bestell-Nr. | Firmware | Kommentar |
|---------------|----------|----------|-----------|-----------|------------------|-------------|-------------|-----------|
| B0050-ML-PN_1 | 0 | 0 | | | B0050-ML-PN V1.0 | 0150-1880 | T_ID_SW_Ver | |
| PN-IO | 0 | 0 x1 | | | B0050-ML-PN | | | |
| Axis 1_1 | 0 | 1 | 60...99 | 68...99 | Axis 1 | | 1.0 | |
| Axis 2_1 | 0 | 2 | 94...119 | 100...131 | Axis 2 | | 1.0 | |
| Axis 3_1 | 0 | 3 | 120...145 | 132...163 | Axis 3 | | 1.0 | |
| Axis 4_1 | 0 | 4 | 146...171 | 164...195 | Axis 4 | | 1.0 | |
| Axis 5_1 | 0 | 5 | 172...197 | 196...227 | Axis 5 | | 1.0 | |
| Axis 6_1 | 0 | 6 | 198...223 | 228...259 | Axis 6 | | 1.0 | |
| Axis 7_1 | 0 | 7 | 224...249 | 260...291 | Axis 7 | | 1.0 | |
| | 0 | 8 | | | | | | |

Options

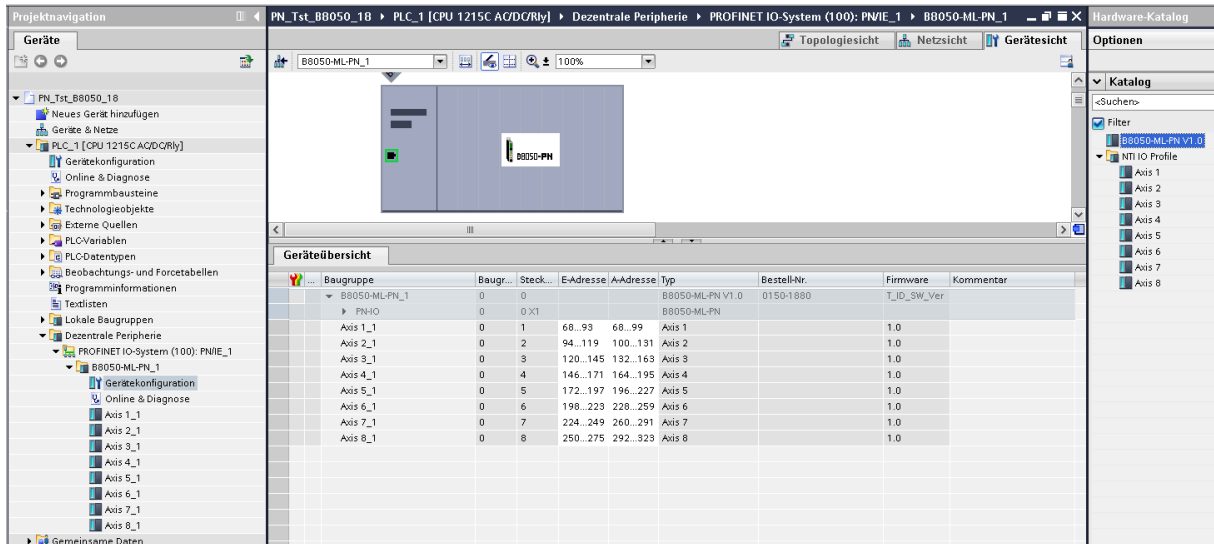
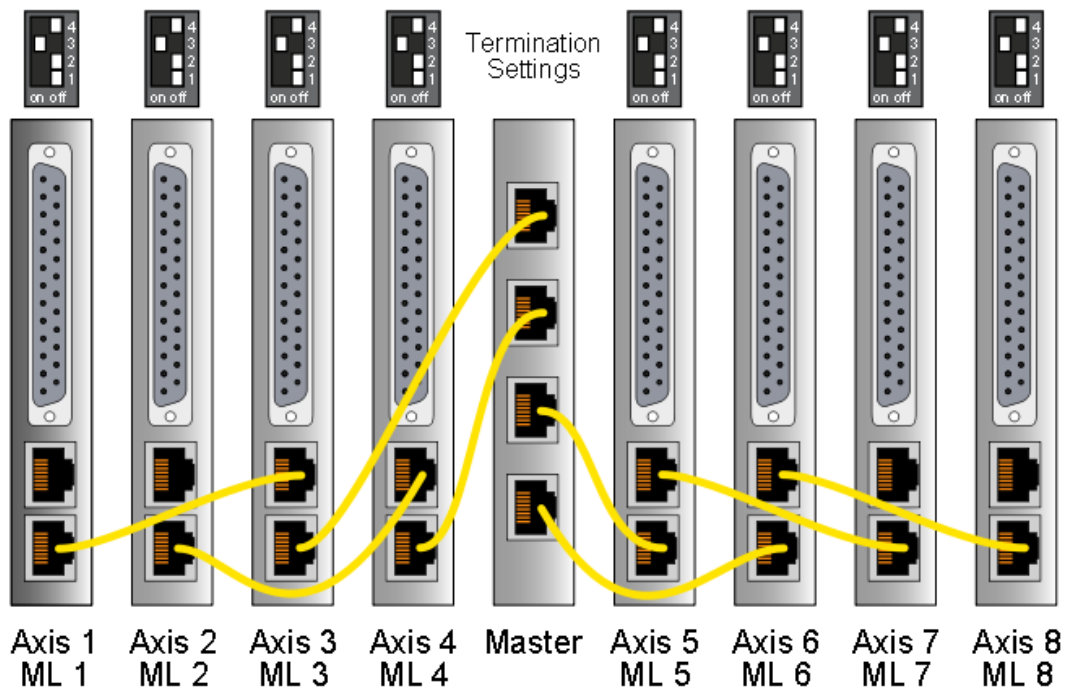
Katalog

Filter

B0050-ML-PN V1.0

- NT IO Profile
- Axis 1
- Axis 2
- Axis 3
- Axis 4
- Axis 5
- Axis 6
- Axis 7
- Axis 8

5.2.8 PLC Setup with 8 Axis



6 Contact Addresses

SWITZERLAND

NTI AG / LinMot
Haerdlistr. 15
CH-8957 Spreitenbach

Sales and Administration: +41-(0)56-419 91 91
office@linmot.com

Tech. Support: +41-(0)56-544 71 00
support@linmot.com

Tech. Support (Skype) : [skype:support.linmot](https://www.skype.com/contact/linmot)

Fax: +41-(0)56-419 91 92
Web: <http://www.linmot.com>

USA

LinMot, Inc.
204 E Morrissey Dr.
Elkhorn, WI 53121

Sales and Administration: 877-546-3270
262-743-2555

Tech. Support: 877-804-0718
262-743-1284

Fax: 800-463-8708
262-723-6688

E-Mail: us-sales@linmot.com
Web: <http://www.linmot-usa.com>

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