

Series XC50, XC55 and XC75

Digital displays

with PROFINET IO RT interface

Quick start for TIA Portal

Operating instructions

Table of contents

1 Contact	3
2 Legal note	4
3 Concept and applications	5
Structure	5
4 Data connection	6
Separation of the data connection between PROFINET and Ethernet	6
PROFINET and Ethernet via one cable	6
5 Quick-Start	7
Step 1: Open project	7
Step 2: Install GSDML file of the display and add display	8
Step 3: Switch to project view and add device	8
Step 4: Establish connection to the display	8
Step 5: Add sub-module to the display and define address range	9
Step 6: Assign the display a PROFINET device name	10
Step 7: Define text	11
Step 8: Load hardware configuration and program into the control system	11
6 Example SCL	12
SCL 1: Define data block R_TRIG_DB	12
SCL 2: Define data type for the texts	12
SCL 3: Define function	13
SCL 4: Importing SCL code into the TIA Portal	15
SCL 5: Define output variables	15
SCL 6: Loading the program onto the PLC	16
7 Display messages	18

1 Contact

www.siebert-group.com

GERMANY

Siebert Industrieelektronik GmbH
Siebertstrasse, D-66571 Eppelborn
P.O. Box 11 30, D-66565 Eppelborn
Phone +49 (0)6806 980-0, Fax +49 (0)6806 980-999
email: info.de@siebert-group.com

AUSTRIA

Siebert Österreich GmbH
Simmeringer Hauptstrasse 24, A-1110 Wien
Phone +43 (0)1 890 63 86-0, Fax +43 (0)1 890 63 86-99
email: info.at@siebert-group.com

FRANCE

Siebert France Sarl
4 rue de l'Abbé Louis Verdet, F-57200 Sarreguemines
P.O. Box 90 334, F-57203 Sarreguemines Cédex
Phone +33 (0)3 87 98 63 68, Fax +33 (0)3 87 98 63 94
email: info.fr@siebert-group.com

ITALY

Siebert Italia Srl
Via Galileo Galilei 2A, I-39100 Bolzano (BZ)
Phone +39 (0)471 053753 Fax +39 (0)471 053754
email info.it@siebert-group.com

THE NETHERLANDS

Siebert Nederland B.V.
Jadedreef 26, NL-7828 BH Emmen
Phone +31 (0)591-633444, Fax +31 (0)591-633125
email: info.nl@siebert-group.com

SWITZERLAND

Siebert AG
Bützbergstrasse 2, CH-4912 Aarwangen
Phone +41 (0)62 922 18 70, Fax +41 (0)62 922 33 37
email: info.ch@siebert-group.com

2 Legal note

© Siebert Industrieelektronik GmbH

This operation manual has been prepared with the utmost care. However, we do not accept any liability for possible errors. We always appreciate your suggestions for improvement, corrections, comments and proposals. Please contact us: editing@siebert-group.com

Siebert[®], LRD[®] and XC-Board[®] are registered trademarks of Siebert Industrieelektronik GmbH. All other product names mentioned herein may be trademarks or registered trademarks of their respective owners.

We reserve the right to make alterations to the technical data and delivery options without notice. - All rights reserved, including the rights of translation. No part of this document may in any form or by any means (print, photocopy, microfilm or any other process) be reproduced or by using electronic systems be processed, copied or distributed without our written permission.

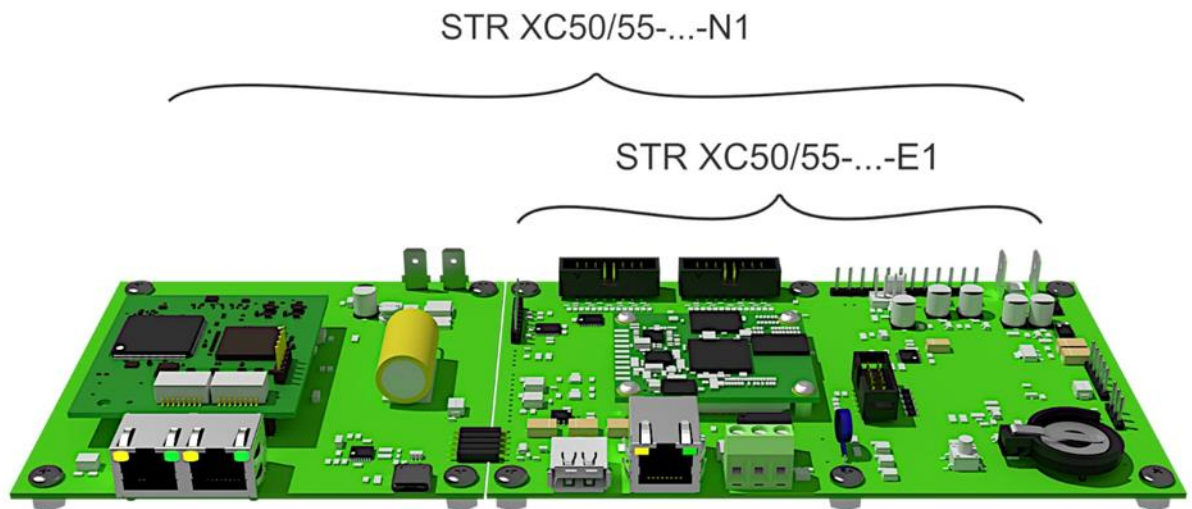
3 Concept and applications

With the N1 extension module, the displays of the XC50, XC55 and XC75 series become PROFINET-RT-capable.

These instructions supplement the operating instructions for the standard displays and describe the extended range of functions of the displays with built-in expansion module compared to the standard version, which is still available in unchanged form.

Structure

The expansion module N1 with PROFINET interface is located on the left of the control computer in the display. It has two RJ45 sockets.



The RJ45 socket on the XC50/XC55-...-E1 control computer is used for Ethernet connection for parameterization and operation using the integrated web server. This functionality corresponds to the standard range of functions described in a separate operating manual. In addition, the display can be controlled via this socket with JSON data strings or the PLC Connector.

The RJ double socket is used for PROFINET control. The interface is Class-C capable and can therefore be used as a switch for line wiring of PROFINET devices.

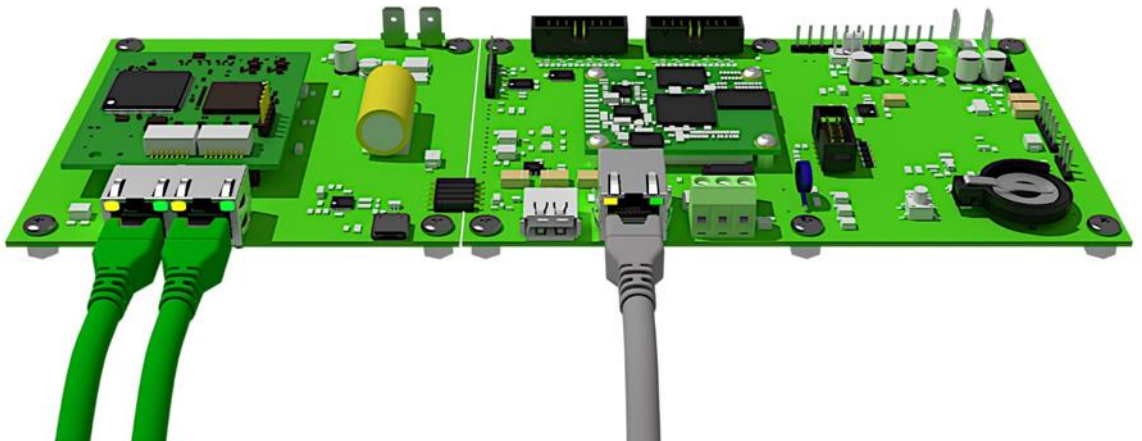
Data is exchanged between the PROFINET extension module N1 and the control computer XC50/XC55-...-E1 via an internal bus system. The coupling between the PROFINET modules in the TIA Portal and the layout elements of the display takes place via a naming convention, which is explained later.

4 Data connection

Separation of the data connection between PROFINET and Ethernet

By cabling PROFINET -N1 and Ethernet -E1 separately, the display can be operated completely independently of each other via the respective interface. This means that the display can also be controlled via physically separate networks. In this configuration, up to three network cables are fed into the display: one for PROFINET (or two for PROFINET line wiring) and one for PROFINET -E1.

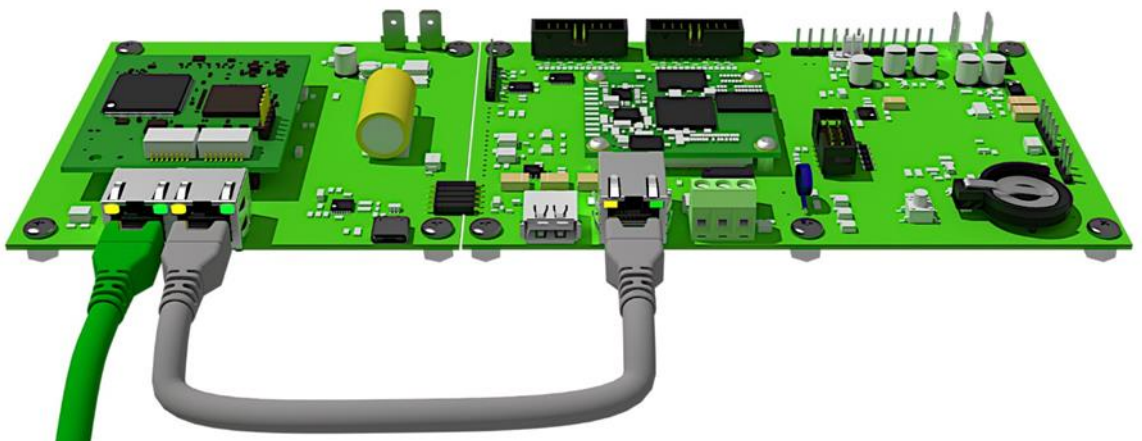
Via the Ethernet connection, the display is parameterized and the layout is configured. Once these settings have been completed, the Ethernet connection can be disconnected from the network. The information to be displayed is received via PROFINET.



PROFINET and Ethernet via one cable

The internal switch on the PROFINET extension module enables Ethernet data to be forwarded to the XC50/XC55-...-E1 control computer via the data supply line to the PROFINET module. This reduces the wiring effort and the website of the display remains accessible.

Because one cable is now used, PROFINET and Ethernet are no longer physically separated.



5 Quick-Start

This Quick Start applies to all alphanumeric displays of the XC50-...-N1, XC55-...-N1 and XC75-...-N1 series with firmware from V1.0.12 and device ID 0x0050. The firmware of a device can be checked in advance, e.g. with the PRONETA Basic software from SIEMENS:

Hersteller-ID	Geräte-ID	Firmwareversion	Hersteller-Name	Bestellnummer
0x0161	0x0050	V1.0.12	Siebert Industrieelektronik GmbH	XC50_55_75-...-N1

The display is put into operation by following the steps below. The display then shows the values sent via PROFINET.

The screenshots were created with the hardware and software listed in the following table. The illustrations may differ for other engineering frameworks.

Display	XC50-096.032-...-N1
Engineering-Framework	Siemens TIA Portal V17, Update 4
SPS	Siemens S7-1214C DC/DC/Rly, V4.4, 6ES7 214-1HG40-0XB0
Operating system	Microsoft Windows 10 Professional, 64 Bit

The Quick Start describes the parameterization of the display. Operation of the TIA Portal is a prerequisite.

The devices are delivered without PROFINET names.

The sample project from this Quick Start is available for download on the website www.siebert-group.com.

Step 1: Open project

Open a new project in the engineering framework and define the CPU. The Siemens S7-1214C DC/DC/Rly with version 4.4 was used to create this Quick Start.



Set the settings for the IP address, name, protection level, etc..

Step 2: Install GSDML file of the display and add display

Install the GSDML file "GSDML-V2.43-Siebert-XC50_55_75-XX-..." of the display. You can find this on the data carrier included in the scope of delivery or on www.siebert-group.com. After installation, the display is listed in the hardware catalog.

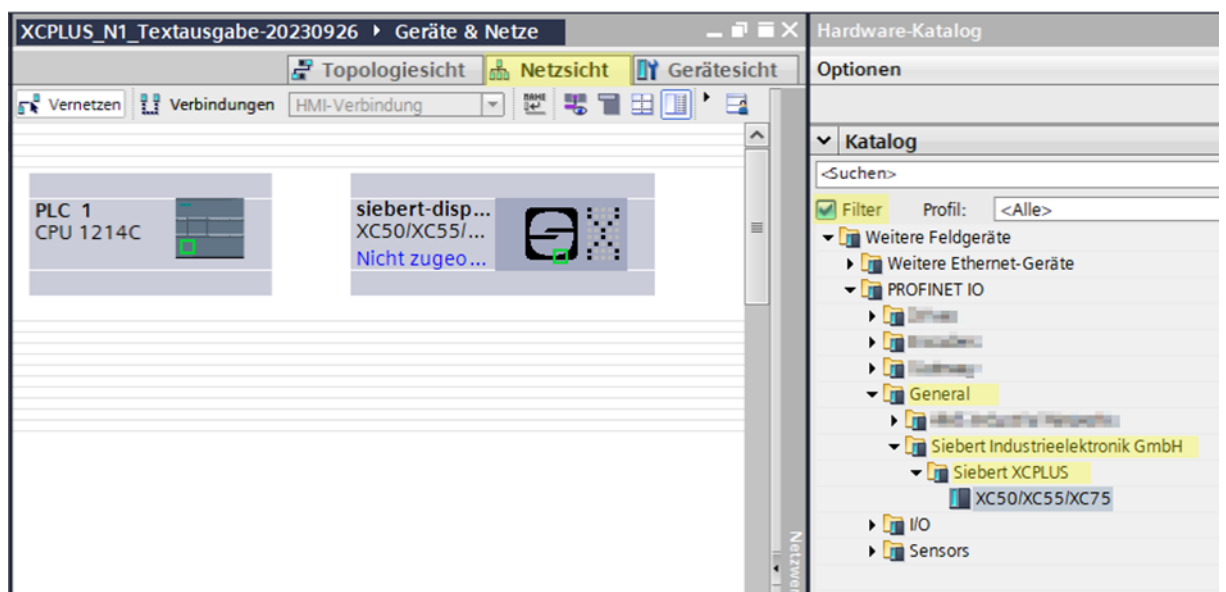
In the device catalog, activate the checkbox 'Filter' and navigate to:

'General / Siebert Industrieelektronik GmbH / Siebert SX102/SX202/SX302'.

Step 3: Switch to project view and add device

Switch to 'Devices & networks / Network view'.

Drag the 'XC50/XC55/XC75' head module from the catalog to the 'Devices & networks / Network view' area.



Step 4: Establish connection to the display

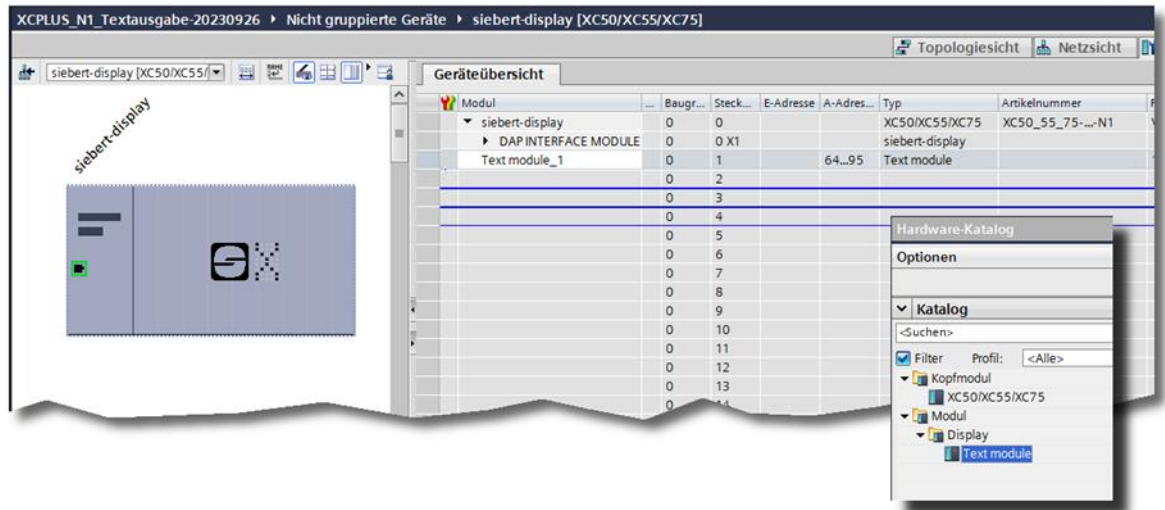
Ordnen Sie in der Netzansicht die Anzeige der gewünschten Steuerung zu. Danach wird die PROFINET-Verbindung als gestrichelte grüne Linie angezeigt.



Step 5: Add sub-module to the display and define address range

In the network view, assign the display to the desired control. The PROFINET connection is then displayed as a dashed green line.

This specifies that the display expects the values to be displayed as an ASCII string. The module occupies 32 bytes in the IO area (in this example, addresses 64 to 95).

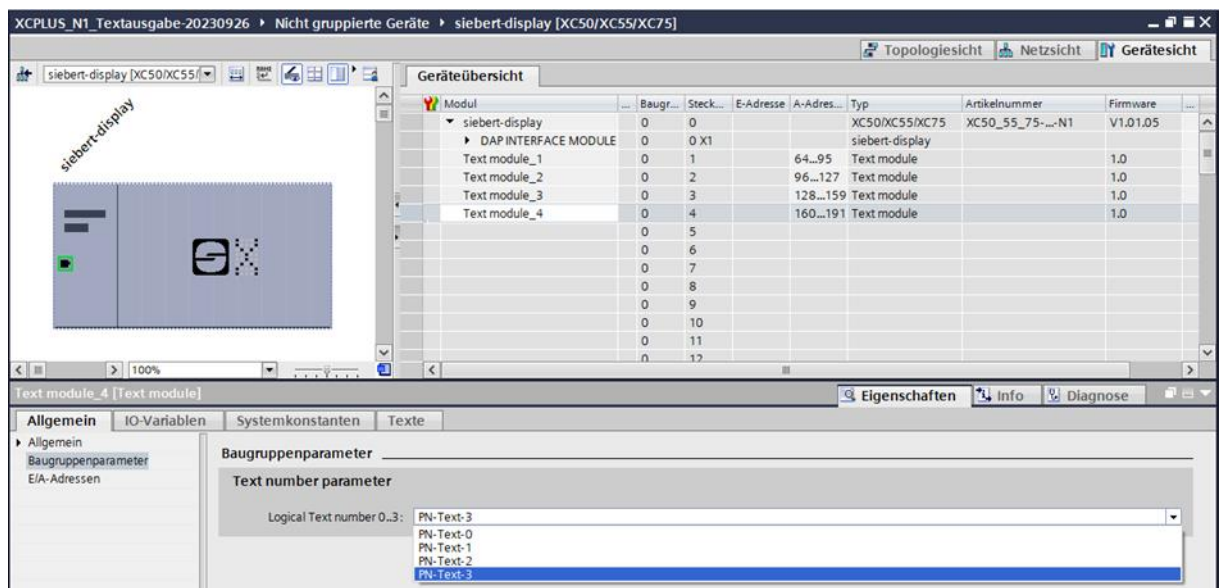


You can change the name specified by the TIA Portal individually.

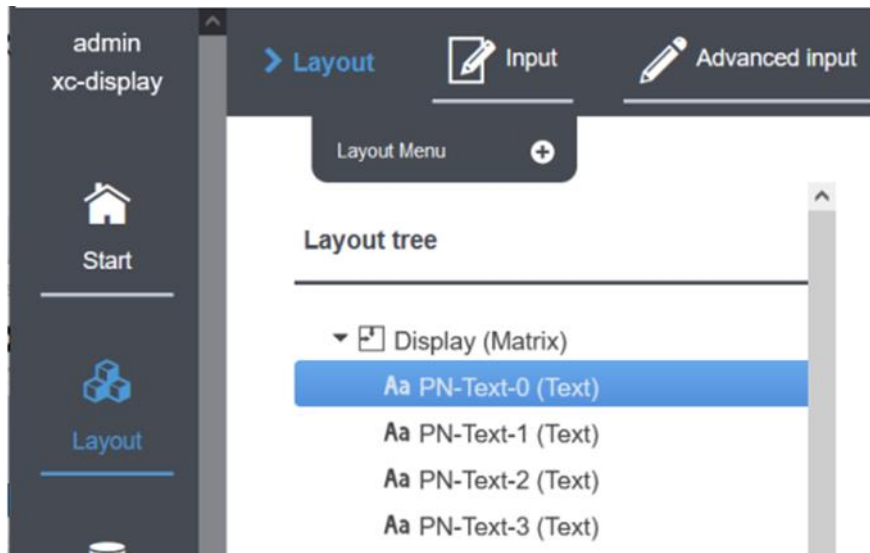
A maximum of four 'Text modules' can be added.

The content of the PROFINET text modules is assigned to the layout elements PN-Text-0, PN-Text-1, PN-Text-2 and PN-Text-3 of the XC50, XC55 and XC75 displays. To do this, the initialization parameter 'Logical Text number' must be set for each module.

ATTENTION: Each 'Text module' added must be uniquely assigned to a 'Logical text number'. If a 'Logical Text number' is used more than once, this will result in an error message when the program is started.



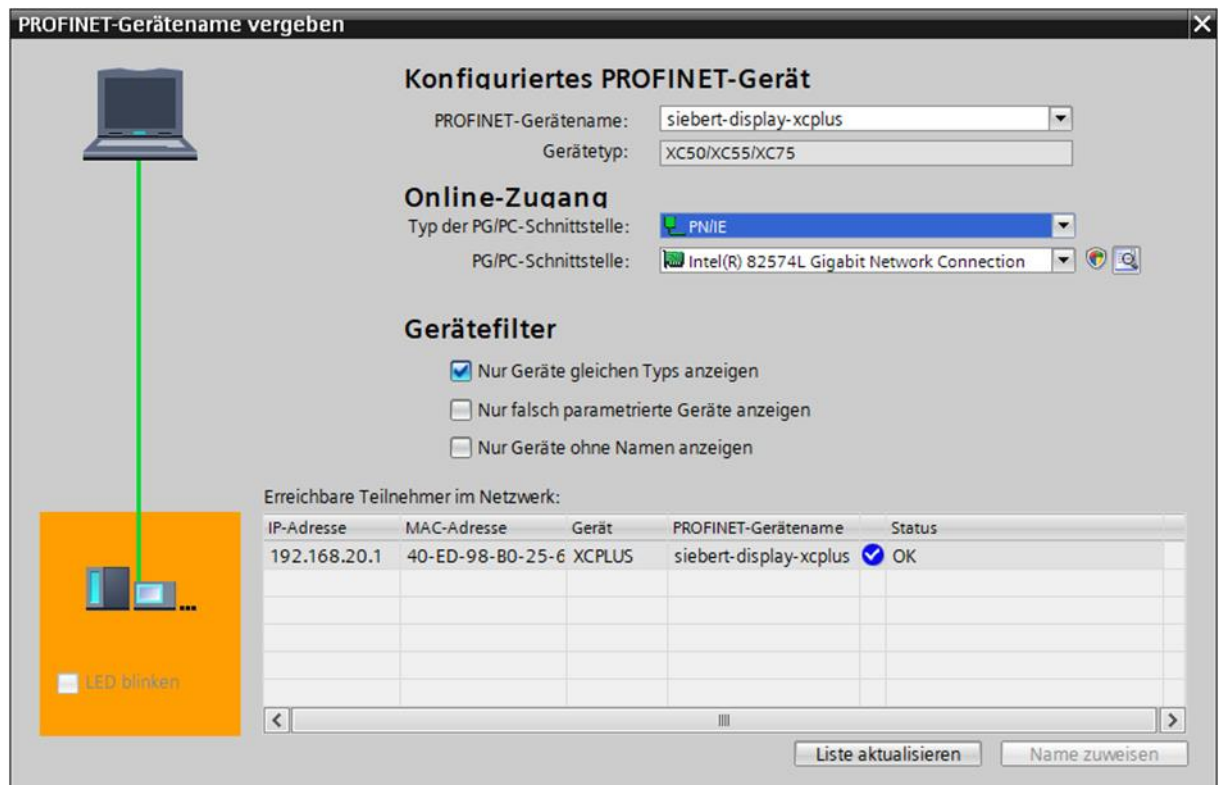
ATTENTION: A text element with the same name must be defined in the display layout for each 'Text module' added. The data is sent from the PLC via PROFINET to the text modules and from there on to the text elements in the layout of the display. If the text elements are not present in the layout, the texts cannot be shown on the display.



Step 6: Assign the display a PROFINET device name

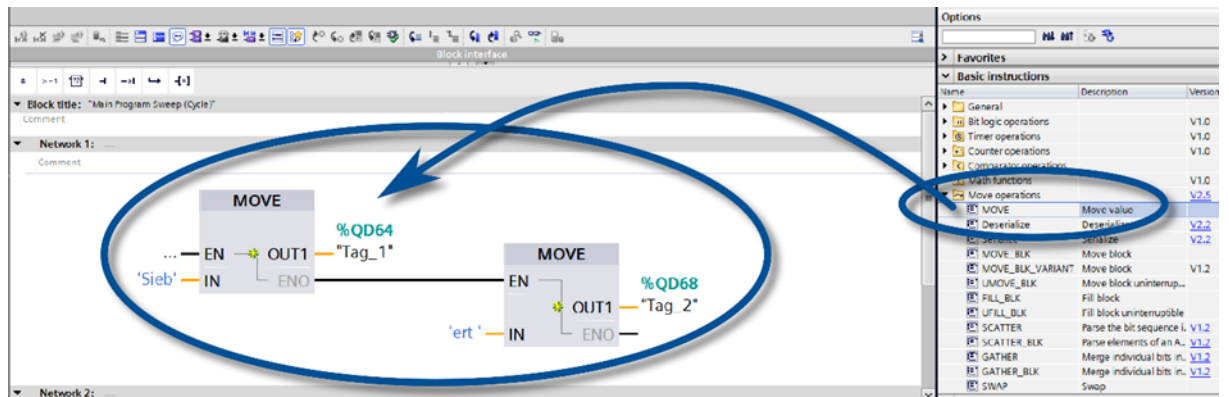
Now assign an IP address and a device name to the display. To do this, for example, call up the context menu of the Siebert display in the device view and click on 'Assign device name'.

After the data has been successfully transferred to the display, the configuration is displayed in the engineering tool as follows.



Step 7: Define text

To send a value to display, you can, for example, create a function chart with 'MOVE' instructions. In the following screenshot, the text 'Siebert' is sent. Two 'MOVE' blocks are required for this.



A more extensive example using SCL is described in the following chapter.

Step 8: Load hardware configuration and program into the control system

After switching on the display, the preset layout is displayed.

As soon as the configuration and the program module are loaded into the control, the control connects to the display via PROFINET and the display shows the text 'Siebert' on the layout element 'PN-Text-0'.

6 Example SCL

As an alternative to using the Move blocks, the display can, for example, also be written in SCL.

This changes step 7 of the Quickstart.

You can copy the following SCL program parts from this document, save them as a text file on your computer and import them into your project using the 'External sources / Add new external file' option.

SCL 1: Define data block R_TRIG_DB

This data block is used to call the actual program once per second.

```
DATA_BLOCK "R_TRIG_DB"
{InstructionName := 'R_TRIG';
 LibVersion := '1.0';
 S7_Optimized_Access := 'TRUE' }
AUTHOR : Siebert
FAMILY : BIT
NAME : R_TRIG
VERSION : 1.0
NON_RETAIN
R_TRIG

BEGIN
END_DATA_BLOCK
```

SCL 2: Define data type for the texts

The output data can be easily assigned via the custom data type.

```
TYPE "XC50_55_75_Texte"
VERSION : 1.1
STRUCT
Text : Array[0..31] of Byte;
END_STRUCT;

END_TYPE
```

SCL 3: Define function

The auxiliary variables are first defined in the SCL_Test function. Then, controlled via R_TRIG_DB, the four texts are calculated once per second. Each text consists of a counter that changes every second and a fixed part that identifies the text.

Each text must be terminated with a zero byte. Without this null byte, parts of longer texts sent earlier may still be displayed.

```
FUNCTION "SCL_Test" : Void
TITLE = Strings für XC50 XC55 und XC75
{ S7_Optimized_Access := 'TRUE' }
VERSION : 1.1

VAR_TEMP
    chrcnt : UInt;
    cnt : Byte;
    str5bytes : String[5];
    Text_0 : String[30];
    Text_1 : String[30];
    Text_2 : String[30];
    Text_3 : String[30];
    Trig_1Hz : Bool;
END_VAR

BEGIN

    "R_TRIG_DB" ( CLK := "Clock_1Hz",
                 Q   => #Trig_1Hz );

    IF (#Trig_1Hz = true)
    THEN
        "counterwert" := "counterwert" + 1;

        // The PLC variable countervalue, which is automatically increment,
        // is of type Word. For the individual digits of the XC50 Bytes are
        // required, hence the conversion function INT_TO_BYTE.

        #cnt := INT_TO_BYTE("counterwert");
        #str5bytes := INT_TO_STRING(#cnt);
    END_IF
END_FUNCTION
```

```
// Terminate text with $00

#Text_0 := CONCAT(IN1 := #str5bytes, IN2 := ' T0$00');
#Text_1 := CONCAT(IN1 := #str5bytes, IN2 := ' T1$00');
#Text_2 := CONCAT(IN1 := #str5bytes, IN2 := ' T2$00');
#Text_3 := CONCAT(IN1 := #str5bytes, IN2 := ' T3$00');

Strg_TO_Chars(Strg := #Text_0,
              pChars := 0,
              Cnt => #chrcnt,
              Chars := "xc50_t0".Text);

Strg_TO_Chars(Strg := #Text_1,
              pChars := 0,
              Cnt => #chrcnt,
              Chars := "xc50_t1".Text);

Strg_TO_Chars(Strg := #Text_2,
              pChars := 0,
              Cnt => #chrcnt,
              Chars := "xc50_t2".Text);

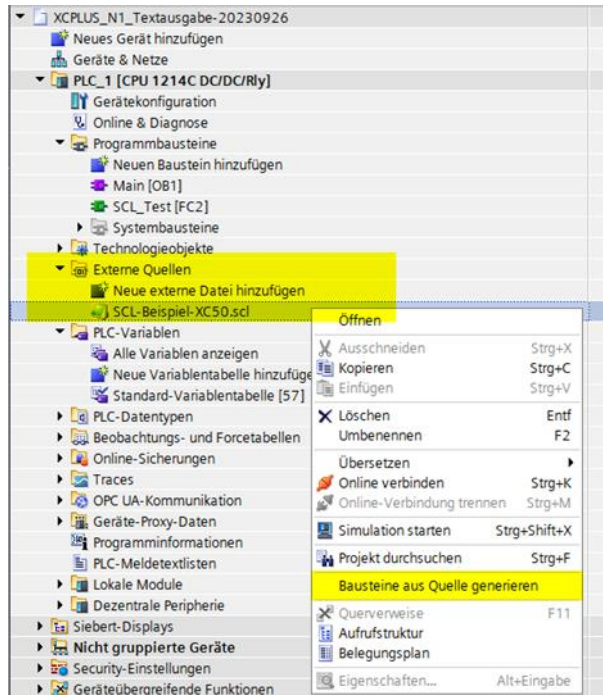
Strg_TO_Chars(Strg := #Text_3,
              pChars := 0,
              Cnt => #chrcnt,
              Chars := "xc50_t3".Text);

END_IF;
END_FUNCTION
```

SCL 4: Importing SCL code into the TIA Portal

In the TIA Portal, you can open the Windows file selection under 'External sources' by double-clicking on 'Add new external source' and import the text file SCL-Example-XC50.scl, which consists of the code parts SCL 1 to SCL 3.

Afterwards, the item 'Generate blocks from source' can be called up in the context menu.



SCL 5: Define output variables

In the SCL file with the function calls `Strg_TO_Chars` the variables are described.

"xc50_t0".Text

"xc50_t1".Text

"xc50_t2".Text

"xc50_t3".Text

These variables must now also be defined in the standard variable table. Due to the initially defined data type 'XC50_55_75_Texte' the 32 bytes are created automatically. The start address must be %Qnn.0.

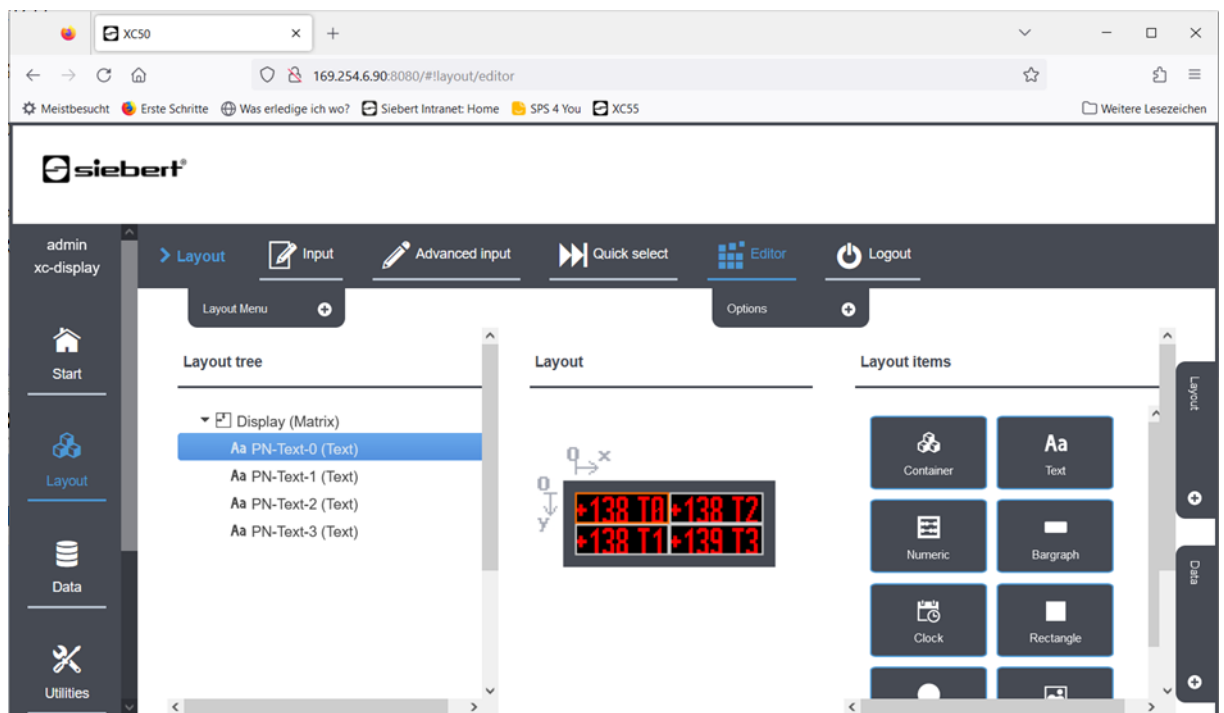
xc50_t0	"XC50_55_75_Texte"	%Q64.0	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
xc50_t1	"XC50_55_75_Texte"	%Q96.0	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
xc50_t2	"XC50_55_75_Texte"	%Q128.0	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
xc50_t3	"XC50_55_75_Texte"	%Q160.0	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

SCL 6: Loading the program onto the PLC

After compiling and uploading to the controller, the display should show the following information. The numbers change once per second and the texts T0, T1, T2 and T3 are constant and show which text it is.



A layout consisting of four text elements with the appropriate names is defined on the display on delivery.



The position, size, font, color, scrolling text and all other properties of the text elements are defined via the display web page in the layout editor. They cannot be changed via PROFINET.

The text elements must be located at the top level. Elements in containers or pages cannot be accessed via PROFINET.

The display is updated internally once per second. It is also possible to specify a text via the website. However, this is overwritten by the content of the PROFINET variables after one second at the latest.

It is also possible to send the data more quickly via PROFINET. In this case, not all texts are displayed, but only exactly the data that is actually current at the time of the second-by-second query.

The layout can also contain any other layout elements, e.g. images, additional texts, date and time. These are either updated automatically by the display, e.g. date, time, temperature, or must be updated by the user either via the website, via JSON or one of the other options.

7 Display messages

The data traffic via PROFINET is indicated with status LEDs on both RJ45 sockets.
The meaning is the same for both ports.

LED green	LED yellow	Meaning
off	off	<ul style="list-style-type: none">▪ no power supply▪ no network connection
on	ons	<ul style="list-style-type: none">▪ network connection exists
on	flashing	<ul style="list-style-type: none">▪ initialization phase▪ application relation is set up
on	on	<ul style="list-style-type: none">▪ application relation is established

If the connection can not be established or faults occur during operation the display shown the error messages. Possible causes are IP problems due to incorrect network parameters, multiple device names, command of undefined properties or other fieldbus errors.