

Series XC50/XC55

Appendix to the operating instructions software version 3.1 and higher

- PLC connection S7-1x00 with web server
- PLC connection S7-3xx with web server

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2 Legal note

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3 Introduction

With the PLC Connector expansion, the displays of the XC50/XC55 series offer you an easy way to automatically retrieve and display the application data of a Siemens PLC. For this purpose, the PLC must have a web server that provides the desired data in the form of an XML file. This XML file is called up cyclically by the XC50/XC55 display and its content is displayed on the display.

Scope and necessary knowledge

This instruction applies to Siebert displays of the XC50/XC55 series from software version 3.1. For newer versions of the XC50/XC55 software the screenshots may differ from this instruction, but the described procedures are valid analogously.

The general properties of the XC50 and XC55 displays, in particular the underlying data model and the safety instructions, are documented in detail in the operating instructions. Their knowledge is presupposed.

Furthermore, knowledge of PLC programming is required.

Supported PLC

Basically your PLC must have a web server and be able to provide the file required by the display.

E.g.: the following controls are suitable:

- Siemens S7 1x family
- Siemens S7 3 xx family with web server version V3.2 or higher

Supported engineering tools

The engineering tool depends on the PLC used.

- TIA Portal 15 for PLCs of the S7 1x00 family
- STEP 7 for PLCs of the S7 3xx family

In this manual, the procedure is described using examples for both options.

If you use a different engineering tool, you must carry out the necessary steps analogously. However, Siebert cannot provide specific support in these cases.

Transmission protocol

The data transport always takes place via the http or https protocol. You have to enter the access data to the PLC on the web side of the display.

Query interval

The query interval is defined by the displays of the XC50/XC55 series and can be set between one second and 30 seconds. You can set the interval with a slider on the web page 'Data – PLC settings'.

4 Typical applications

In each case, you define a layout on the display. First, the properties are selected that are to be commanded later by the PLC and the necessary data is exported. In the exported XML template file, the link between the layout elements of the display and the variable names of the PLC is defined. In addition, a corresponding data block is exported which you can use in the TIA Portal.

Using pre-defined variable names in the PLC

If a S7 1x00 CPU is used, the data block exported from the display can be imported into the Engineering Tool. In this case, the variable names in the PLC are specified by the display.

If a S7 3xx CPU is used the data block must be created manually in the STEP 7 software. In this case, the variable names must correspond to the specifications in the XML template file.

In the PLC you use the variable names exported from the display.

Using user-defined variable names in the PLC

You can easily use your own variable names in the PLC. In this case, you must open the XML template file exported from the display in a text editor and manually adjust the corresponding placeholders before you import the XML file into your controller.

Multiple displays with identical layout

Create your application for a display. If the application works, the existing layout can be uploaded to other displays and then be activated. After that the access data to your PLC will be entered on these displays.

Multiple displays with different layouts and same variable names

A major advantage of object-oriented data model of the display is the separation of layout and data. If different layouts are used on different displays and the names of the layout elements are left the same for all displays, then there is no need to make any changes on the PLC.

All displays request the same data from the PLC and display it according to their respective layout.

Multiple displays with different layouts and different variables

To do this, you can export the required data for each display in the PLC settings and load it into the controller as an individual DB. Thus in the control there is an individual DB for each display.

Additional operation via the web site

It is possible to command elements of the display by the PLC and to set the same elements or other elements via the web site.

If an element is commanded by both, the PLC as well as the web site then the last access is always valid.

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5 Quick Start and general procedure

Quick Start

The following Quick Start is divided into four parts:

Quick Start part 1:

Configuration of the display and creation of the files for the controller. This part is independent from the specific PLC or the engineering tool.

Quick Start part 2a: Configuration of the control and the web server in the TIA portal. Here you find all information needed for the PLCs 1x00 and the TIA portal.

Quick Start part 2b: Configuration of the control and the web server with STEP 7 Here you find all information needed for the PLCs 3xx and STEP 7.

Quick Start part 3: Troubleshooting hints

General procedure

First, a layout is defined on the display. Each element of this layout has a unique name and a type. The name can be used later to address each element individually. The type defines how the sent data is to be interpreted. The possible elements and their properties are described in the operating instructions for the XC0/XC55 displays.

In this manual the layout 'PLC-Example' is used. This layout can be downloaded from the web site <u>www.siebert-group.com</u>. All following screenshots refer to this example.

The 'Data – PLC web page' of the display contains the settings for the PLC connector. In the first step check the connection data to the PLC and saved them. This information is then permanently stored on the display.

In the second step the element properties are defined which are used by the PLC. The 'Export tool' is called up to select the elements. Thereafter a new web page opens where all elements of the layout are arranged in a tree structure. Select the desired elements in this tree structure and save your selection.

The display then generates a Zip file containing a PLC data block and an XML file.

Import the DB (data block) and the XML file into your control. In the DB, the corresponding variables are defined for all values that are to be displayed on the display. The XML file defines the template for the XML file generated by the PLC with the values to be displayed.

Activate the PLS's own web server of the control.

Create a new user on the PLC for communication with the display. Later, this user is used to access the PLC from the display. The user name and password must match the information you previously set on the display under 'Display-IP-Addr – Data – PLC settings'.

Then the web server of the PLC takes over the desired data cyclically from the controller and makes them available on its website.

The displays of the XC50/XC55 series log on automatically as users to the PLC web server. After successful authentication, the displays cyclically request the desired data from the PLC web server and display it on the display.

6 Quick Start Part 1: Configuration of the display and creating the files for the controller

Download of the PLC-Example files from the Siebert web page

All files required for this quick start are available on the Siebert website <u>www.siebert-group.com</u> in the download area of the XC50/55 displays.

The file 'PLC-Connector-Example.Zip' contains the following files:

- the Zip file PLS-Example.Zip with the example layout. This file must be loaded into the display.
- this manual
- a sample project for the TIA portal, see Quick Start part 2a.
- a samle project for STEP 7, see Quick Start part 2b.

Save the file 'PLC-Connector-Example.Zip' in an appropriate place on your PC and extract the contents into the directory PLC-Connector-Example.

The example layout has the size 32x16 pixel. You can use it for all Siebert displays of the XC50/XC55 series.

Upload of the example layout to the display

Call the website of the display.

Go to 'Utilities – File manager' and click the Upload button to upload the Zip-file 'PLC-Example.Zip' to the display.

This file contains all data necessary for this quick start.

Selection of the layout on the display

After uploading the Zip file you will find the 'Layout – Quick Select' the Layout 'PLC- Example' on the website. Activate this layout by clicking on it and confirm the security prompt. The active layout is marked in color:



This example layout consists of a text filed named 'txt1' and a numeric field named 'num1'. From the PLC, the text content and the color are to be commanded in the text field. With the numeric field the numeric value and also the Color are to be commanded.

The assignment between the elements on the display and the variables in the controller is done via a DB and a XML file. In both cases, these are human-readable ASCII files that can be opened and edited in any text editor.

Both files must match with the active layout on the display.



Entering the connection data on the website of the display

On the 'Data – PLC settings' web page enter the IP address of the controller, the access data and the transfer modes to the web server. The same access data must be entered into the web server of the controller.

| admin xc-display | Data PLC settings Ucgout |
|---------------------|---|
| | PLC connection settings |
| Start | Enable PLC connection |
| & | PLC IP address 192.168.20.22 |
| Layout | Use HTTPS |
| | Application name SiebertDisplay |
| Data | XML file name display.xml |
| × | Source URI (auto generated) http://192.168.20.22/awp/SiebertDisplay/display.xml |
| Utilities | Username (if needed) siebert |
| ļi! | Password (if needed) |
| Functions | Refresh interval (sec.) 1 sec. |

Note: The name you assign in the <XML file name> field is later used in the PLC as the name of the data block via which the data is provided for the display.

Selection of the elements for PLC configuration export

Call up also on the website 'Data – PLC settings', the 'Export tool'. On the following page you can select the elements to be filled in by the PLC.

In this example these are the content and the color of the text field 'txt1' and the numeric value and the color of the numeric field 'num1'.

Recommendation: here only select the elements and properties that are really to be controlled by the PLC. This avoids unnecessarily large files and unnecessary variables on the PLC.

| PLC | configuration exp | ort | | |
|---------|---------------------|---------|---------------|---|
| Open La | yout | | | |
| Layou | ts ~ | | | |
| PLC-E | Example | | | |
| | ID / Attribute name | • Туре | PLC data type | |
| | txt1 | SText | | |
| | alignment | String | String | ~ |
| | autoscroll | Boolean | Bool | ~ |
| | background | String | String | ~ |
| | ▶ blink | Object | | |
| | | | String | ~ |
| | ▶ font | Object | | |
| | scroll | Object | | |
| | | | String | ~ |
| | | | | |
| | | | | |

By clicking on the Export Button the required files are created and saved under the name 'html.zip' on the PC. The two human readable files display.db and display.xml are stored in this zip file. The file name is taken from the field 'XML file name' of the web page 'Data – PLC settings'.

| p 🔢 | linuidant group.) | ical paper 1/1 | محضور الدار 10 | ●\html.zip\ |
|---------------|-------------------|----------------|----------------|------------------|
| Name | Size | Packed Size | CRC | Modified |
| 🔮 display.xml | 422 | 199 | 72A7B67D | 2019-11-12 14:19 |
| 🗟 display.db | 296 | 168 | FE0082B1 | 2019-11-12 14:19 |



Content of the XML file

The XML file is required by the web server of the controller as a template into which the contents of the variables are transferred during operation. The keywords in this file are specified by the display and are described in the XC50/XC55 operating instructions.

In this example the XML file has the following structure:

```
<?xml version="1.0" encoding="UTF-8"?><siebert-display>
  <meta>
   <request>setData</request>
   <version>1</version>
 </meta>
  <data>
   <SText id="txt1">
      <text>:="display".txt1.text:</text>
      <color>:="display".txt1.color:</color>
   </SText>
    <SNumeric id="num1">
      <value>:="display".num1.value:</value>
      <color>:="display".num1.color:</color>
   </SNumeric>
  </data>
</siebert-display>
```

The parts between the colons, p.e.: :="display".txt1.text: , are placeholders for the variables which are later filled by the PLC with the current values.

Content of the DB-file

With the DB the controller can transmit the contents of certain variables to the web server. Together with the XML file that serves as a template, the Web server generates a new XML file with data for the display. As soon as the data in the controller changes, the XML file is automatically updated with the data for the display.

In this example the DB has the following structure and defines the variables in the controller:

```
DATA_BLOCK "display"
{ S7_Optimized_Access := 'TRUE' }
VERSION : 0.1
NON_RETAIN
VAR
    "txt1" : Struct
    "text" : String;
    "color" : String;
    END_STRUCT;
    "num1" : Struct
        "value" : Int;
        "color" : String;
    END_STRUCT;
    END_STRUCT;
    END_STRUCT;
    END_STRUCT;
    END_STRUCT;
    END_STRUCT;
    END_VAR
```

7 Quick Start part 2a: Configuration of the controller and the web server in TIA portal

You can download the TIA Portal project, which was used for the following screenshots, from our website.

With the PLC, the following steps must be carried out:

Switching on the web server and creating users

Activate the web server of the PLC.

Then enter the user name, the password and transmission modes in the web server of the PLC.

This information must match the settings entered on the website of the display.

| PLC_1 [CPU 1513-1 PN] | | <u>s</u> | Properties 11 Inf | o 🗓 Diagnostics 💿 🗖 🗖 🤟 |
|---|----------------------------|--------------|--|-------------------------|
| General IO tags Sys | tem constants Texts | | | |
| ✓ General Project information | Web server | | | |
| Catalog information Identification & Maintenance | General | | | |
| PROFINET interface [X1] Startup Cycle Communication load | | Activate web | server on this module a only with HTTPS | |
| System and clock memory System diagnostics | Automatic update | | | |
| Web server General Automatic update | Update int | Enable autor | natic update s | |
| User management Watch tables | User management | | | |
| Entry page | Name | Access level | Password | |
| Overview of interfaces | Everybody | Minimum | | |
| Display | siebert | Restricted | ****** | |
| User interface languages | <add new="" user=""></add> | | | |
| Time of day Protection & Security | | | | |



Define user rights

Select the marked checkbox to allow the user, in this case the XC50/XC55 display, to request data from the web server of the controller.

| | | The user is authorized to | |
|--|----------------------------|----------------------------------|-------------|
| | | query diagnostics | |
| PLC_1 [CPU 1513-1 PN] | | 🔲 read tags | Diagnostics |
| General IO tags Sys | tem constants Texts | write tags | |
| ▼ General | Wahaanar | read tag status | ^ |
| Project information | Web server | write tag status | |
| Catalog information | General | acknowledge alarms | |
| Identification & Maintenance | | appen user-defined web pages | |
| PROFINET interface [X1] | | write in user-defined web pages | |
| Startup | | | |
| Cycle | | | |
| System and clock memory | | | |
| System diagnostics | Automatic update | change operating mode | |
| General | | flash LEDs | |
| ▼ Web server | | erform a firmware update | |
| General | Undate inte | change system parameters | |
| Automatic update | opute me | change application parameters | |
| User management | Us or management | create a backup of the PLC | |
| Watch tables | | restore the PLC by a backup file | |
| User-defined pages | | perform changes as F-Admin | |
| Entry page | Name | | |
| Overview of interfaces | Everybody | × × | |
| Display | siebert | Restricted 👻 ********* | |
| User interface languages | <add new="" user=""></add> | | |
| Time of day | | | |
| Protection & Security | | | |

Load DB and XML files into the controller

Load the DB and XML file, created by the display into the controller.

Important: Ensure that you enter .xml in the <Advanced / Field with dynamic content> field.

| PLC_1 [CPU 1 | 513-1 PN] | | | | | Properties | 🔄 Info | Diagnostics | ▋▋▼ |
|--------------------------|----------------|-----|-----------------|-----------------|--------|--------------------------------|----------|-------------|-----|
| General | IO tags | Sys | tem constants | Texts |] | | | | |
| ✓ General Project inf | ormation | | User-defined pa | ages | | | | | |
| Catalog in | formation | | | | | | | | |
| Identificat | ion & Maintena | nce | | HTML dire | ctory: | Z:\VM-Share\Bilder BAL\html(1) | | | |
| PROFINET interest | erface [X1] | _ | D | efault HTML p | bage: | index.html | | | |
| Startup | | _ | 4 | Application n | ame: | SiebertDisplay | | | |
| Cycle Communicat | ion load | | | St | atus: | | | | |
| System and o | clock memory | | | | | Generate blocks Delete blocks | | | |
| ▼ System diagr | nostics | | | | | | <u> </u> | | |
| General | | | Advanced | | | | | | |
| ▼ Web server | | | | | | | | | |
| General | | | | | | | | | |
| Automatic | : update | 4 | Files with | dynamic cor | itent: | .htm;.htm <mark>l;.xml</mark> | | | _ |
| User man | agement | | | Web DB nur | nber: | 333 | | | |
| Watch tab | les | - | Fragment | DB start nur | nber: | 334 | 1 | | |
| User-defin | ed pages | | ringinent | o o o contentor | | • | 1 | | |
| Entry page | 2 | | | | | | | | |

Copy the contents of the html.zip file that you exported from the display in the first step into the directory that you specified in the <User-defined pages / HTML directory> field in the dialog above.

This directory must then contain the two files display.xml and display.db if you followed the Quick Start example.



Now import the display.db file into the engineering tool and create the data block.

This applies analogously if you have assigned a different name for the XML file on the display web page in the PLC settings.

Generate Web server modules

By clicking on the button 'Create blocks' the files are analyzed by the controller. If successful, the status DB generated is shown.

| PLC_1 [CPU 1 | 513-1 PN] | | 🔍 Properties | 🗓 Info | Diagnostics | |
|----------------------------------|-------------------|---|--------------------------------|--------|--------------------|---|
| General | IO tags S | ystem constants Texts | | | | |
| ✓ General | | | | | | |
| Project info | ormation | User-defined pages | | | | |
| Catalog in | formation | | | | | |
| Identificat | ion & Maintenance | HTML directory: | Z:\VM-Share\Bilder BAL\html(1) | | | |
| PROFINET interest | erface [X1] | Default HTML page: | index.html | | | |
| Startup | | Application parma | SiebertDicelay | | | _ |
| Cycle | | Application name: | Siebertoispiay | | | |
| Communicat | ion load | Status: | DB generated | | | |
| System and o | lock memory | | Generate blocks | | Delete blocks | |
| System diagr | nostics | | | | | |
| General | | > Advanced | | | | |
| ▼ Web server | | | | | | |
| General | | - | | | | |
| Automatic | update | Files with dynamic content: | .htm;.html;.xml | | | |
| User mana | agement | Web DB number: | 333 | | | |
| Watch tab | les | Fragment DB start number: | 334 | 1 | | |
| User-defin | ed pages | | • | | | |
| Entry page | | | | | | |

Cyclical call of the website

| i_Example | PLC_1 [CPU 1214C D | C/DC/Rly] • Program b | olocks 🕨 Main [OB1] | _ • • × | Instructio | ons | | |
|---------------------------------|----------------------------|-----------------------|---------------------|--------------------|------------|---------------------|------------------------|---------------|
| | | | | | Options | | | |
| ાં 👻 દેન દેન | 0 4 2 3 5 5 3 | 1 = 📲 t 🖼 🖃 😰 | (~ 6 년 원 🕹 🕻 | l _≡ * 📑 | www | Tie Lee | S 2 | |
| | | Block interface | | | > Favori | ites | | |
| | | | | | > Basic | instructions | | |
| | | | | | > Exten | ded instructions | | |
| Block title | a: *Main Program Sweep (Cy | :le)* | | | > Techn | ology | | _ |
| comment | | | | | ✓ Comm | unication | | |
| Network | rk 1: | | | | Name | | Description | Version |
| Commen | nt. | | | |) 🔁 S7 c | ommunication | | V1.3 |
| | | | | | + 🛅 Ope | n user communicati | | <u>V6.0</u> |
| | v | ANAN | | | VEB | Server | | V1.1 |
| | EN | ENO | | | 🖝 V | ww | Synchronizing user-def | <u>V1.1</u> 💌 |
| | YOB333 | CITO SAN | 1000 | |) 🗋 Othe | ers | | |
| | "DB 333" | DET MAL TAC | 11 | |) Com | munication processo | | |
| | ICIRC_DB | RE [_VAL] 109 | | | > Telet | Service | | V1.9 |



Providing data for the display

Open the generated DB.

All defined variables are displayed there and can be sent from the DB to the controller. The web server on the controller then updates its output file. With the next cyclical request of the control data by the display the new data is read and shown on the display.

Important: The display checks the received data. The illustration on the display is only updated if the data is error-free. Pay particular attention that valid values are entered for the colors: 'red', 'green', 'blue', 'orange', 'yellow', 'black', 'white', 'cyan'.

| SP | s_) | (C5) | D | PLC_1 [CPU 1513-1 | IPN] → Program b | locks 🕨 displa | y [DB1] | | | | _ I | |
|--|-----|------|----|-------------------|------------------|----------------|---------------|--------|--------------|-------|------------|------|
| | | | | | | | | | | | | |
| 学 👻 🔩 🛃 🛅 Keep actual values 🔒 Snapshot 🍕 🧠 Copy snapshots to start values 🔹 🥵 🎽 | | | | | | | | | | | | |
| | dis | pla | у | | | | | | | | | |
| | | Nar | me | | Data type | Start value | Monitor value | Retain | Accessible f | Writa | Visible in | Setp |
| 1 | - | • | St | atic | | | | | | | | |
| 2 | -0 | • | • | txt1 | Struct | | | | | | | |
| 3 | - | | • | text | String | 'Welcome' | 'Welcome' | | | | | |
| 4 | -0 | | • | color | String | 'green' | 'green' | | | | | |
| 5 | - | • | • | num1 | Struct | | | | | | | |
| 6 | -0 | | • | value | Int | 1234 | 1234 | | | | | |
| 7 | - | | • | color | String 🔳 | 'red' | 'red' | | | | | |
| | | | | | | | | | | | | |
| | | _ | | | | | | | | | _ | |
| | < | | | | | 111 | | | | | | > |

Function control

As the data provided by the web server are available as a XML file, simple control is possible. Therefore you have to login with a browser directly on the web server of the PLC.

With the URL <IP Adresse>/awp/SiebertDisplay/display.xml you can check the content of the xml file. This file should have exactly the same structure as the XML template file. But instead of the references to the variables in the controller the current values are entered in this file.



8 Quick Start part 2b: Configuration of the controller and web server with STEP 7

If you use a PLC S3xx, the programming is done with the STEP 7 software. Please follow the following steps:

Creating the layout is described in part 1 of the Quick Start and is prerequisite here.

Check the web server of the CPU

In order to use the PLC connector with a S7-3xx or S7-4xx, it must be ensured, that the controllers on one hand have a web server and on the other hand also can process used-defined HTML pages.

First check this prerequisite in the configuration of the hardware of the PLC. Therefore double-click on the control's icon in the hardware configuration. In the dialogue 'Properties' a tab 'Web' must appear and in the area 'Automatic Update' the check box 'Activate' must be selectable.

| Properties - CPU 315-2 PN/DP | - (R0/S2) | | | | X | |
|--|--|---|---|--|---|--|
| Cycle/Clock Memory Reten General Diagnostics/Clock | tive Memory Startup Protection | ve Memory Interrupts Time-of-Day Startup Synchro Protection Communica | | Time-of-Day Interrupts C Synchronous Cycle Inter Communication | | |
| ✓ Enable Web server on this ✓ Generate and download ↓ Languages to be Loaded or Select up to 2 languages: ☐ German (Germany) ☐ English (United States) | s module √eb server conf the CPU | | low access only v matic Update Activate ! Nay Classes of the 01 ▼ 02 ▼ 01 ▼ 05 ▼ 02 ▼ 06 ▼ 02 ▼ 05 ▼ | Message | erval: 1 s 1 12 V 16 1 12 1 | |
| User list: User Rights siebert Call user-defined pag | ges | | | Cancel | A <u>d</u> d Edįt Delete Help | |

Using files exported from the display

Copy the XML file exported by the display in a directory named 'html'. The also exported ".db" file is not required with STEP 7.

| 🔶 🔶 👻 🕇 📙 🛛 🖿 | iteati x orvey.Exablert.group.local x | papped > DPU_M > | gallmann i langi i | html |
|---------------|---------------------------------------|------------------|--------------------|------|
| A | Name | Date modified | Туре | Size |
| Perkton | 🚳 display.db | 12/11/2019 14:19 | Data Base File | 1 KB |
| L Downloads | 👜 display.xml | 12/11/2019 14:19 | XML Document | 1 KB |



Create a new STEP 7 project

Start the STEP7 manager V5.6, create a new project and configure the controller in the hardware configuration according to the following figure:

| HW Config - [SIMATIC 300(1) (Configuration) example_plc_connector] | |
|---|--|
| | |
| Image: CPU 315-2 PN/DP Image: CPU 315-2 PN/DP XT Image: CPU 315-2 PN/DP XZ Image: CPU 315-2 PN/DP <td< td=""><td>Properties - CPU 315-2 PN/DP - (R0/S2) Cycle/Clock Memoy Retentive Memoy Interrupts Time-of-Day Interrupts Cycle Interrupts General Statup Synchronous (2) Web Tensble Web server on this module Allow access only via HTTPS Generate and download Web server configuration Languages to be Loaded on the CPU Activate Update Generate (Librard Status) 1 s</td></td<> | Properties - CPU 315-2 PN/DP - (R0/S2) Cycle/Clock Memoy Retentive Memoy Interrupts Time-of-Day Interrupts Cycle Interrupts General Statup Synchronous (2) Web Tensble Web server on this module Allow access only via HTTPS Generate and download Web server configuration Languages to be Loaded on the CPU Activate Update Generate (Librard Status) 1 s |
| Edit User Entry and Password | Deplay Classes of the Messages Image: Classes of the Messages |

Enter the user name and the defined password on the website of the 'Data – PLC settings' of the display and save the information with the save ok Button.

| admin xc-display | > Data PLC settings | |
|---------------------|--|-----------|
| | PLC connection settings | - |
| Start | Enable PLC connection | |
| ŵ | PLC IP address 192.168.20.22 | |
| Layout | Use HTTPS | |
| 8 | Application name SiebertDisplay | |
| Data | XML file name display.xml | |
| × | Source URI (auto generated) http://192.168.20.22/awp/SiebertDisplay/display.xm | <u>ıl</u> |
| Utilities | Username (if needed) siebert | |
| <u>lii</u> | Password (if needed) | |
| Functions | Refresh interval (sec.) 1 sec. | |



Create data block

Create a data block. The name of the data block must be identical with the name of the XML file name.

| SIMATIC Manager - [example_p | lc_connector C:\Prog | ram Files (x86) | \Siemens\ | Step7 | \S7Proj\exampl_2] | |
|------------------------------|----------------------|-----------------|-----------|----------|--------------------|------------------|
| File Edit Insert PLC Vie | w Options Window | Help | | 43 | | - 8 × |
| D 🛩 👫 🛲 🕺 🖿 💼 | 🚵 🛛 🗢 🖕 📜 | - ::: 🎹 🗈 | < No | Filter > | <u> </u> | 7 🔡 🎯 🖷 E |
| ⊡ 🗃 example_plc_connector | Object name | Symbolic n | Creat | Si | Туре | Version (Header) |
| E- SIMATIC 300(1) | 🚵 Systemdaten | | | | SDB | |
| ⊡ | 🕀 OB1 | | FBD | 64 | Organization Block | 0.1 |
| Erist S7-Programm(1) | 🖬 DB300 | display | DB | 806 | Data Block | 0.1 |
| Bausteine | | | | | | |

Now enter the variable names in the data block. The names and types must correspond exactly with the place holders in the XML file.

| ddreas Name | Type | Initial value | PLC- | zample | | | |
|-----------------|-------------|---------------|------|---------------------|----------|---------------|-------|
| 0.0 | STRUCT | | 1 | | | | |
| +0.0 5#51 | STRUCT | | | ID / Attribute name | * Туре | PLC data type | |
| 40.0 text | STRING[254] | 'Serie XC5x' | | ▼ num1 | SNumeric | | |
| +256.0 color | STRING[254] | 'green | | | | | |
| =512.0 | XND, EDD | | | alignment | String | String | ~ |
| +512.0 numl | STRUCT | 1000 | | es des estell | Reelean | Beel | |
| 42.0 color | 101 | ineller' | | autoscroli | Boolean | DUUI | v |
| -258.0 | KND BAR | 11111 | | background | String | String | ~ |
| =770.0 | RND_STRUCT | | | blick | Object | | |
| | | | | color | String | String | ~ |
| F1 to get Help. | | | | decimalPlan | Rula | - and - | men / |
| | | | ~ | + scroll | ागुहरा | | |
| | | | | suffix | String | String | × |
| | | | | vAlignment | String | String | ~ |
| | | | | | | Int | ~ |
| | | | | visible | Boolean | Bool | |

Create the SFC99

Activate the web server via the SFC99.

| 🗱 LAD/STL/FBD - [OB1 example_plc_connector\SIMATIC 300(1)\CPU 315-2 PN/DP] |
|--|
| 🖙 File Edit Insert PLC Debug View Options Window Help 📃 🖅 🗙 |
| 🗅 🚅 🆫 📕 🎒 👗 🛍 🛍 🗠 여 🕼 🎰 🔽 🏪 😚 |
| !«»! 🗖 🖪 🔛 籠 籠 🗷 된 🗉 앱 🗉 🔟 🛏 🕂 😯 |
| OB1 : "Main Program Sweep (Cycle)" |
| Comment: |
| Hetwork 1: Title: |
| SFC99 |
| EN RET_VAL _MW100 |
| DB333 CTRL_DB ENO |
| • |
| Press F1 to get Help. |

After that, the following blocks should be present in your project:

| SIMATIC Manager - [example_p] | lc_connector C:\Progr w Options Window | am Files (x Help | 86)\Siemens' | .Step7 Filter > | \S7Proj\exampl_2] | |
|-------------------------------|--|--------------------------------|---------------------------------|--------------------|--|---|
| example_plc_connector | Object name Systemdaten OB1 DB300 SP SFC39 | Symbolic display WWW | n Creat FBD DB STL | Si 64 806 | Type SDB Organization Block Data Block System function | Version (Header) 0.1 0.1 1.0 |
| Press F1 to get Help. | | | | | | Intel(R) PR(// |



Start Web2PLC

Call up the context menu by a right mouse click in the object field and start the program S7-Web2PLC.

| 🎝 SIMATIC Manager - [example_] | plc_connector C:\Program Fi | les (x86)\Siemens | \Step7\S7Proj\e | (ampl_2] | | |
|---|-----------------------------|-------------------|----------------------|----------|---------------------------|------------|
| 🎒 File Edit Insert PLC Vie | w Options Window Help | | | | Cut | Ctrl+X |
| 🗅 🗃 🚼 🛲 🕹 🛍 🛍 | 🚵 😨 🐾 💁 🤃 🗄 | 🏥 主 🛛 < No | Filter > | - 🛂 | Сору | Ctrl+C |
| 🖃 🎒 example_plc_connector | Object name Symbol | olic n Creat | Si Type | | Paste | Ctrl+V |
| E- SIMATIC 300(1) E- SIMATIC 300(1) E- SIMATIC 300(1) | Systemdaten OB1 | FBD | SDB 64 Organizati | on Block | Delete | Del |
| S7-Programm(1) | DB300 displa | y DB | 806 Data Bloc | k | Insert New Object | • |
| Bausteine | SFC99 WWV | V STL | System fur | nction | PLC | • |
| | | | | - 11 | Rewire | |
| | | | | - 11 | Compare Blocks | |
| | | | | - 11 | Reference Data | • |
| | | | | - 1 | Check Block Consistency | |
| | | | | - 11 | Print | • |
| | | | | - 1 | Object Properties | Alt+Return |
| | | | | - 1 | Special Object Properties | • |
| | | | | - 1 | Block Privacy | |
| | | | | | S7-Web2PLC | |
| | | | | | 43 | |

Create a new Web2PLC project

| | Neues Projekt | Ctrl+N | |
|---|--|------------------|---|
| | Projekt öffnen Projekt speichern Projekt speichern unter Projekt schließen | Ctrl+O Ctrl+S | example_plc_connector SIMATIC 300(1);CPU 315-2 PN/DP\S7-Programm(1 |
| | Projekteinstellungen ändern Projekte verwalten | Ctrl+E | e Querverweise |
| / | Detaillierte Ausgaben Letztes Projekt automatisch öffnen Generieren nach Neuladen Überprüfen der DB-Nutzung | | anzeigen |
| | Sprache | + | |
| | Bisherige Projekte | | |
| | Beenden | ALT+F4 | |
| | | | |

Export the DB data from the S7 project

| S7-Web2PLC - test | |
|---|--------------------------|
| Datei Extras Hilfe | |
| Symbole Filter Projektname: example_plc_connector exportieren Filter S7-Programmpfad: SIMATIC 300(1)\CPU 315-2 PN/D | P\S7-Programm(1 |
| Symbole DB-Quelle DB-Quelle anzeigen DB-Quelle DB-Quelle | Querverweise anzeigen |
| Protokoll: D Fehler, 0 Warnungen Die Projekteinstellungen wurden gesichert in C:\Program Files (x86)\Siemens\Step7\S7Proj\e mass Beginn des Exportierens der Symbole aus example_plc_connector\SIMATIC 300(1)\CPU 315-2 mass Beenden des Exportierens der Symbole 0 Variable in Symboltabelle gefunden 1 Variable in Sausteinen gefunden Symbole wurden erfolgreich exportiert Die Symboltabelle ungen wurden erfolgreich gespeichert in config.w2p Die reue Konfiguration wurde nerfolgreich geladen | xampl_2\Web2PLC\t |
| < III | • |
| Fertig | |

| S7-Web2PLC - test | |
|---|--|
| Datei Extras Hilfe | |
| STEP 7-Projekt | Symbole |
| Symbole exportieren Filte | □ STRUCT "display" [DB300] □ STRUCT tot1 □ STRUG[254] text □ STRUNC[254] color |
| Web-Projekt | □- STRUCT num1 □- INT value □- STRING[254] color |
| Protokoll: Die Projekteinstellungen wu mes Beginn des Exportierens DB300 essenden des Exportieren O Variable in Sawsteinen ge Symbolabelle unden erfolgreich Die Symboldefinitionen wurd Die Symboldefinitionen wurd Die neue Konfiguration wurd | |
| | Variable: "display" Absolute Adresse: DB300.DBB0 |
| | Filter: |
| | OKAbbrechenHilfe |
| Fertig | |

Adjust project settings

In the following dialogue 'Project settings' enter the data matching the layout:

- HTML directory location
- The file to be displayed on the start HTML page: select the XML file that you exported from the display. Note: change the data filter to '*.*'.
- Under application name, enter the same name as you defined on the display's web page.

| at | ei Extras Hilfe | | - | | | |
|----|--|--------|-----|-----------------------|--|----------|
| | Neues Projekt | Ctrl+N | | | | |
| | Projekt speichern | Ctrl+S | exa | mple_plc_connector | | |
| | Projekt speichern unter | | SIN | Projekteinstellungen | | 9 |
| | Projekt schließen | | | | | |
| | Projekteinstellungen ändern | Ctrl+E | | Aligemein Parser ST | EP 7 ENUM-Typen | |
| | Projekte verwalten | | е | | C\Program Files (x86)\Siemens\Step7\S7Proj | |
| | Detaillierte Ausgaben | | BN | Projektverzeichnis: | \exampl_2\Web2PLC\test | |
| | Letztes Projekt automatisch öffnen | | Н | | | |
| | Überprüfen der DR-Nutzung | | Н | HTML-Verzeichnis: | C:\Users\Admin\Desktop\html | 1 |
| | Coursela | | Tes | | | |
| | Sprache | , | nne | | displayxml | |
| | 1 dfasdf | | | Start-HTML-Seite: | | <u></u> |
| _ | Beenden | ALT+F4 | | | | |
| ľ | une neue kontiguration wurde ertoigreich g | aladen | | Applikationsname: | SiebertDisplay | |
| l | | | | | | |
| l | | | | | | |
| l | | | | | | |
| l | | | | | | |
| | | | | ОК | Abbrechen | Hilfe |
| | | | ļ | | | |
| 1 | • | 111 | | | 4 | |

BAL XC50/XC55 PLC Connector 3.2

Now switch to the 'Parser tab'.

Important:

In line 'Data types with AWP instructions:' add type ".xml".

Remove type ".xml" in line 'Data types without AWP instructions'.

| S7-Web2PLC - test | |
|---|---|
| Datei Extras Hilfe | |
| Neues Projekt Ctrl+N Projekt öffnen Ctrl+O Projekt speichern Ctrl+S Projekt speichern unter Projekt schließen | example_plc_connector |
| Projekteinstellungen ändern Ctrl+E Projekte verwalten Detaillierte Ausgaben Letztes Projekt automatisch öffnen Generieren nach Neuladen ✓ Uberprüfen der D8-Nutzung | Dateitilter Dateitilter Dateitilter Dateitilter Dateitilter Dateitypen mit AWP-Anweisungen: ifmi: htm:xml Dateitypen ohne AWP-Anweisungen: ipg:.jeg:.git.js:.css:.png:.bmp:.ico |
| Sprache 1 1 dfasdf Beenden ALT+F4 Die neue Konfiguration wurde erfolgreich geladen | Unterstützung für Sprachen Sprachen: Vorzeichnisse mit Sprachuntersfützung: Verzeichnisse ohne Sprachunterstützung: |
| ۲ III | OK Abbrechen Hille |
| licitig | |



Translating the DB source and loading of the Web project on the CPU

The web project may now be loaded to the CPU if no errors were found in the translation.

| Datei Extras Hilfe |
|---|
| |
| STEP 7-Projekt |
| Symbole Filter Projektname: example_plc_connector exportieren Filtern S7-Programmpfad: SIMATIC 300(1)\CPU 315-2 PN/DP\S7-Programm(1) |
| Web-Projekt |
| Symbole anzeigen DB-Quelle generieren DB-Quelle übersetzen Auf CPU laden Querverweise anzeigen |
| Protokoll: 🔽 0 Fehler, 0 Warnungen |
| <pre>=== Beginne Ubersetzung der generierten D8-Quellen Projekt : C:\Program Files (x86)\Siemens\Step7\S7Proj\exampl_2\Web2PLC\test\config.w STEP 7-Projekt :: example_plc_connector S7-Programm :: example_plc_connector\SIMATIC 300(1)\CPU 315-2 PN/DP\S7-Programm(1) STEP 7-Projektverzeichnis :: C:\Program Files (x86)\Siemens\Step7\S7Proj\exampl_2 Zeitpunkt des Ubersetzung : 25.11.2013 14:1213 Zeitpunkt des Symbolexports : 25.11.2013 14:1212</pre> |
| Dateien von C:\Users\Admin\Desktop\html 07.11.2019 11:30:29 [display.xml] 25.11.2019 14:23:39 [_erumdefs.htm] |
| Fragmente Fragment display : Größe=626 DB334.8 text unlinked auto [display.xml] Fragment _erumdefs : Größe=90 DB334.634 text unlinked auto [_erumdefs.htm] Fragment :erum : Größe=10 DB334.724 binary unlinked auto [:erum] |
| INFO: O Sprachen, max O sprachspezifische Fragmente, insgesamt 3 Fragmente Benötigte DBs: DB 333 446 Bytes (Web-DB) DB 334 734 Bytes 1 Fragment-DBs, 734 Bytes, insgesamt 1180 Bytes |
| Verbinden mit STEP 7-Projekt 'example_plc_connector' Ubersetzen von 'SIMATIC 300(1)\CPU 315-2 PN/DP\S7-Programm(1)' Ubersetzen erfolgreich, 2 DBs wurden erzeugt === Ubersetzung beendet |
| |
| Fertig |

Load complete project into the CPU

| SIMATIC Manager - [example_p B Datei Bearbeiten Einfügen | Ic_connector C:\Pro Zielsystem Ansich | gram Files (xé t Extras F | 86)\Siemens' enster Hilf | \Step7 | \S7Proj\exampl_2] | | B X |
|---|--|------------------------------|-----------------------------|---------|-----------------------|------------|--------|
| 🗅 🚅 🚼 🛲 👗 🖻 💼 | 💼 🗢 🔓 🖕 | - 18 m | 🖭 🛛 < Kei | n Fiter | > • ¥ | 1 🐮 🎯 | ¶a E |
| example_pic_connector | Objektname | Symbolise. | Erstell | Gr | Тур | Version (H | eader) |
| E- SIMATIC 300(1) | 🚔 Systemdaten | | | | SDB | | |
| B- CPU 315-2 PN/DP | G 081 | | FUP | 64 | Organisationsbaustein | 0.1 | |
| E-[57] S7-Programm(1) | C D8300 | display | DB | 806 | Datenbaustein | 0.1 | |
| Bauteine | D8333 | | DB | 482 | Datenbaustein | 1.0 | |
| - Dauxene | DB334 | | DB | 770 | Datenbaustein | 1.0 | |
| | SFC99 | www | AWL | | Systemfunktion | 1.0 | |
| | ۰ III | | | | | | , |
| Drücken Sie F1, um Hilfe zu erhalter | ۱. | | | | | Intel(R) | PRC // |



Control over the web site of the display

On the web site check 'Data – PLC Settings' in the area 'PLC connection status' the messages from the display.

- siebert'

| admin XC55-Produktion | > Data | Input | Advanced input | PLC settings | U Logout |
|--------------------------|--------|-------------------|-----------------------|--------------|----------|
| | Exp | ort tool | | | |
| Start | XML a | and DB export too | ы | | |
| ŵ | | | | | |
| Layout | PLO | connecti | ion status | | |
|) Data | Last v | alid data from PL | C received 0 sec. ago | | |
| | Data s | successfully proc | essed | | |

By clicking on the link in the line 'Source URI (auto generated)' the XML file provided by the PLC opens.

| admin XC55-Produktion | > Data | Input | Advanced input | PLC settings | |
|--------------------------|--------|--------------------|---------------------------|---------------------------|---------|
| | | | | | |
| Start | Sourc | e URI (auto genera | ited) http://192.168.20.2 | 2/awp/SiebertDisplay/disp | lay xml |
| | Usern | name (if needed) | siebert | | |
| GCG Layout | Passv | word (if needed) | ••••• | | |
| | Refre | sh interval (sec.) | 1 sec. | | |

On the now displayed web site the variable contents of PLC can be seen. The IDs contain the names of the layout elements of the display.



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9 Quick Start part 3: Hints and troubleshooting

The XC50/XC55 displays show the result of the last access to the PLC data in the lower section of the 'Data – PLC Settings'. The error messages can be grouped together in several groups.

- HTTP status messages of the web server.
 These messages are standardized by HTTP. Their meaning can be looked up in the Internet.
- Messages for the evaluation of transmitted data These messages are generated be the XC50/XC55 display. In these cases the connection to the PLC was successful and the messages refer to the evaluation of received data.

General notes

To each attribute that you export, you must also assign a variable in the PLC.

For this reason, only select those attributes with the 'PLC configuration export' that you really want to command from the PLC. By doing so, you reduce your programming effort to the absolutely necessary.

When importing the data into the PLC, no standard values can be imported. Therefore assign meaningful values to each variable used.

Http Code messages

In case of error messages that can be tracked back to the web server, the reported HTTP code is displayed. A typical example of an error code for a typing error of the IP address is for example:





Protocol messages

| Last valid data from PLC received x sec. ago Data successfully processed | The connection was successful, the XML was evaluated without errors. |
|---|---|
| <pre>timeout('time out',)</pre> | The connection of the web server of the PLC fails. Possible error causes: |
| | The PLC is not switched on The IP addresses do not match Username or password is incorrect |
| BadStatusLine(''',) | The XML file was read. An error occured during evaluation of the file. |
| | P.e.: Unknown names if the names of the layout elements of the display do not match the variable names of the PLC. |
| Could not set shortcut value.: Neither color name nor hex value #rrggbb given | An element with the property color was passed a wrong value, e.g. an empty string because no color was defined yet. |

Control of the XML file

Check if the xml file is read by the PLC by clicking on the link on the display web page <Data / PLC settings>.

Check also if the xml file has the correct form. Especially the placeholders <:="name"....:> must be replaced by meaningful values. If this is not the case, then possibly the entry .xml was forgotten in the settings of the web server.

Special characters in the XML file

The coding of the special characters of the XML file follows the rules of the W3C.

If you want to display the following characters, they must be encoded in the XML file as follows:

| Character | Description | symbolic | Hex number | Decimal number |
|-----------|---|----------|------------|----------------|
| н | Quotes up | " | " | " |
| & | Ampersand charcaters & (commercial and) | & | & | & |
| < | Opening angle brackests | < | < | < |
| > | Closing angle brackets | > | > | > |
| 1 | Apostrophe, single quotation mark up | ' | ' | ' |

In these cases use the data type 'WString' in the PLC.

Please note that the illustration of the XML file depends on the web browser used. If in doubt, you can save the XML file from the web browser locally on your system and check the content with a text editor.



For example, if you want to display the text "<Hello>" in blue color in the filed 'txt1' of the example layout, the corresponding entry in the XML file must look like this:



Date and time

Give the date or time as simple strings since the special data types for date and time in the PLC do not always work.



Character sets

When commanding character sets, use only the font names defined on the display. You can find these names on the 'Data – Advanced Input – Properties':

| Font | Aryana7Regular | V |
|------------|-----------------------------------|---|
| Alignment | Aryana14Bold Aryana14Condensed | |
| | Aryana14Regular | |
| | Aryana30Regular | |
| | Aryana7Bold | |
| Blink | Aryana7Regular | |
| Blinkspeed | Metric14Regular | |
| Scrollable | Metric7Regular | |

The properties 'font.size' and 'font.spacingFactor' that can be selected during 'PLC configuration export' are currently without function.

10 Operate several displays on one PLC

The operation of several displays on one PLC is possible without any problems.

All displays have the same layout and should show the same data

In this case it is enough to perform the steps described in the Quick Start for a display.

If the communication with one display works, export the layout of this display, import it on the remaining displays and select it there as the current layout.

In the last step, the communication data to the PLC must be entered on the remaining displays. Since all displays query the same PLC, the data can be taken over from the first display.

The displays are to show different data

In this case, perform the steps from the Quick Start for each display in turn.

Important: The XML file must have a different name on each display. Only then can you assign a separate data block to each display on the PLC.

Since the exported data are always summarized in the file html.zip it is useful to rename this file after the export.

All data exported in this way must be copied to the directory that you specify in the PLC when configuring the web server.

After importing the various DBs into the PLC and compiling the project, the PLC can generate a separate XML file for each display with the data you defined and the displays can read and display it.

11 Technical data

All technical data such as order numbers, dimensions, power consumption, drawings of housings, temperature range, etc. can be found in the document PSP XC50_XC55.pdf entitled "Series XC50/XC55 LED Matrix Displays" in the download area of the Siebert homepage: www.siebert-group.com