PLANNING AND INTEGRATION INFORMATION

LB8106*
Integration in Siemens SIMATIC PCS 7

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Contents

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1 Introduction

This document describes how to integrate the GSE file of the LB Remote I/O System into Siemens SIMATIC PCS 7 and how to make the I/O data usable in the functional diagrams.

This document provides system-related information that is not included in the manual of the device itself.

Software and Hardware Revisions

Product Name	Revision
Siemens SIMATIC PCS 7	
CFC library PFLBFB	
Com unit LB8106*	FW 6.27
GSE file CGV61711.gse	V 1.11

The PFLBFB library enables easy connection of Pepperl+Fuchs remote I/O modules to SIMATIC PCS 7 via PROFIBUS. The library contains PCS 7 compliant function blocks, CFC driver modules, and the documentation. Furthermore, a support hotline is available.

The PFLBFB library is not part of the default library of the SIMATIC PCS 7 station. To purchase the library for the LB/FB remote I/O system, contact Siemens AG in Karlsruhe.

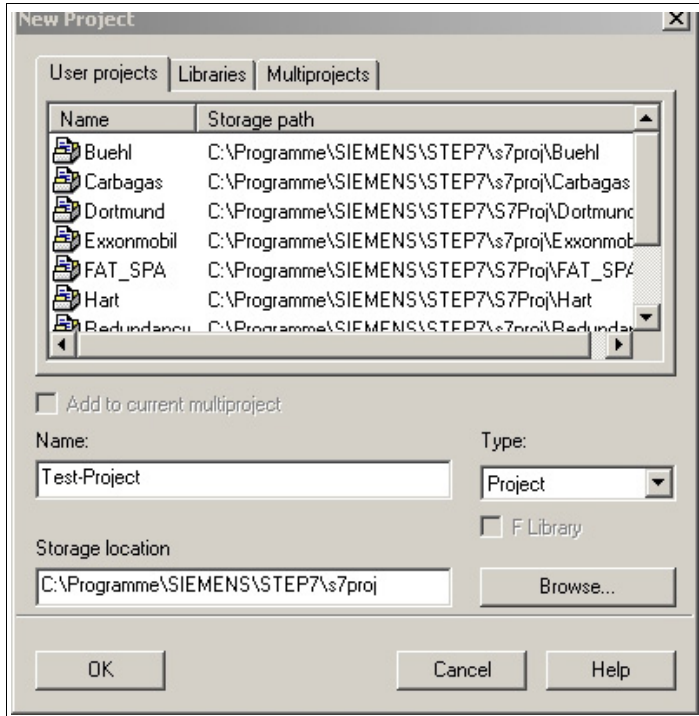| Contact:	Roland Heid Siemensallee 84 76187 Karlsruhe Germany
Phone:	+49 (721) 595 6380
Fax:	+49 (721) 595 6383
E-Mail:	function.blocks.industry@siemens.com

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2 Setup a New Project

▶ Create a New Project in SIMATIC Manager

1. Open the **SIMATIC Manager**.
2. Choose **File > New Project**.

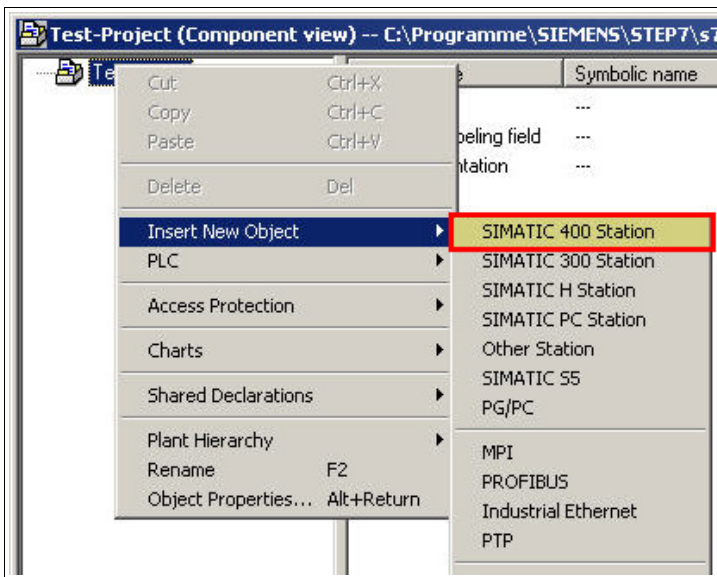   ↳ The **New Project** window opens.

3. Enter a name for the new project in the **Name** field.
4. Select **Project** from the **Type** drop-down list.
5. To close the window, click **OK**.

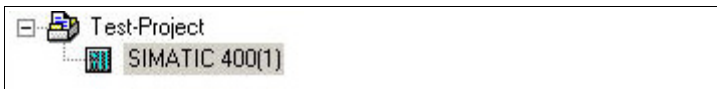   ↳ The project window for the new project is displayed.

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► **Setup the Components of the SIMATIC Station**

1. Right-click the project root in the component view and choose **Insert New Object > SIMATIC 400 Station**.

↳ A placeholder for the SIMATIC 400 station is added to the project.

2. Select the placeholder for the SIMATIC 400 station in the project tree.

3. Double-click **Hardware** in the right window pane.

↳ The **HW Config** window opens.

4. The components of the SIMATIC station can be found in the component catalog on the right side of the **HW Config** window. If the catalog is not displayed automatically, click **Display Catalog** in the menu bar of the **HW Config** window.

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5. Recreate the components of the SIMATIC station in the **HW Config** window. To do so, drag the components from the catalog to the workspace starting with the rack.

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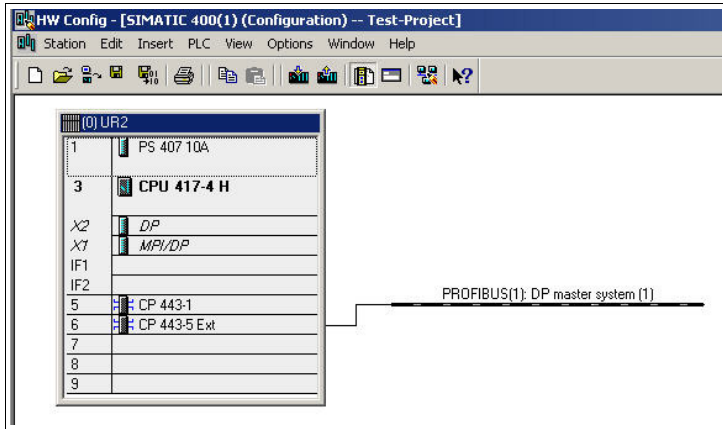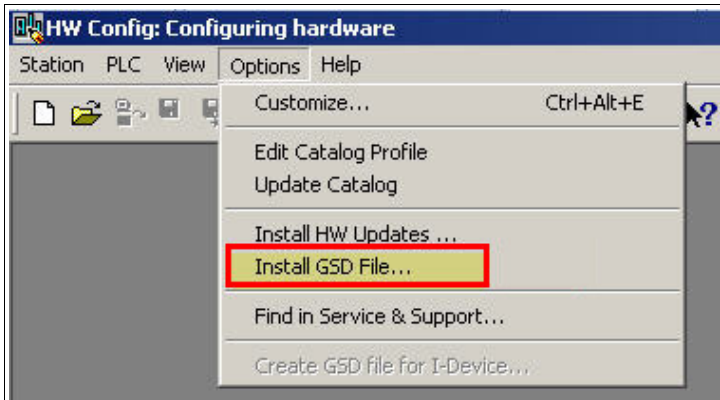
3 Install GSE File

The first step in order to integrate a PROFIBUS slave into a PROFIBUS master system is the integration of the GSE file of the slave into the engineering system of the master application.
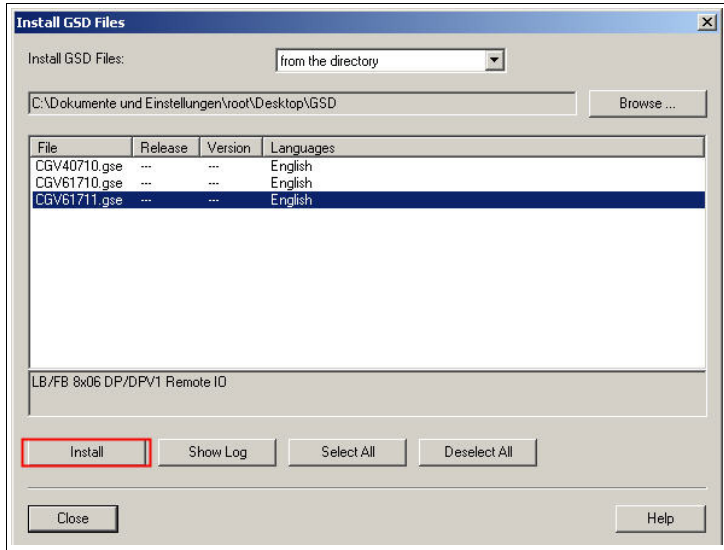
▶ Install GSE File

1. Open the **HW Config** window.
   If a SIMATIC station is already opened in the workspace, choose **Station > Close** to close all open stations before you continue.
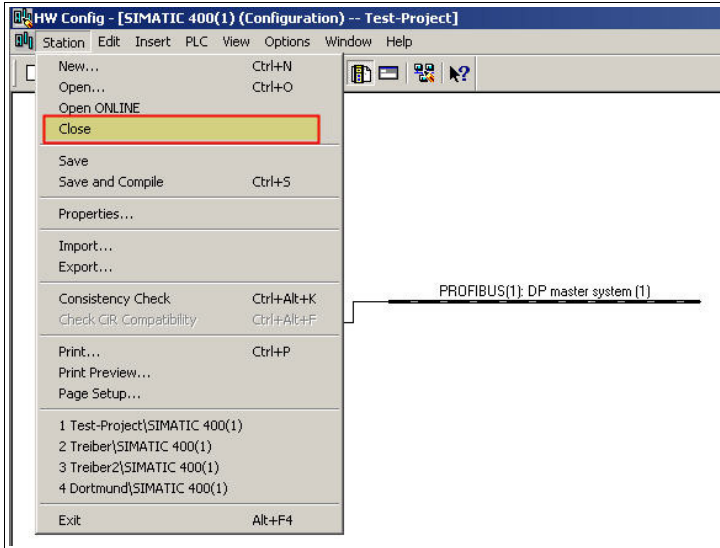

2. Choose **Options > Install GSD File**.

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3. Select **from the directory** in the **Install GSD Files** drop-down list.

4. Click **Browse** and select the directory in which the GSE file is located.

    ↳ All GSE files from the selected folder are displayed in the **Install GSD Files** window.

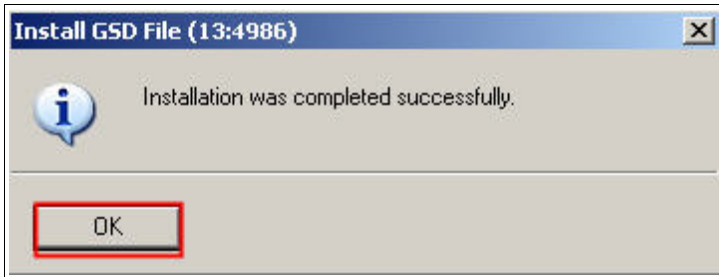5. Select the `CGV61711.gse` GSE file and click **Install**.

↳ The system notifies you that the installation of the GSE file cannot be undone.

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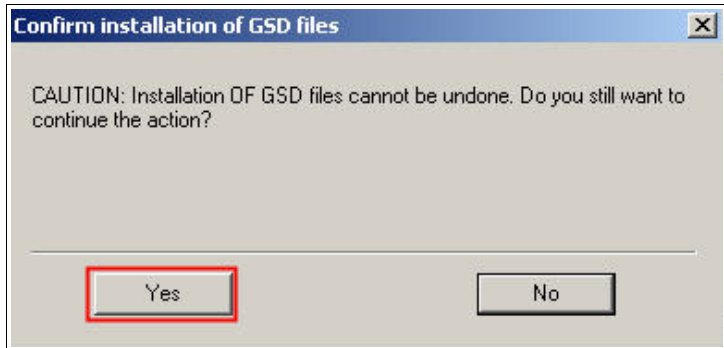
6. Click **Yes** to continue with the installation of the GSE file.

↳ The installation of the GSE file has been completed. Click **OK** to close the notification window.

7. After the installation of the GSE file has been completed, you can reopen the SIMATIC station you closed before the installation. To do so, choose **Station** and select the corresponding SIMATIC station.

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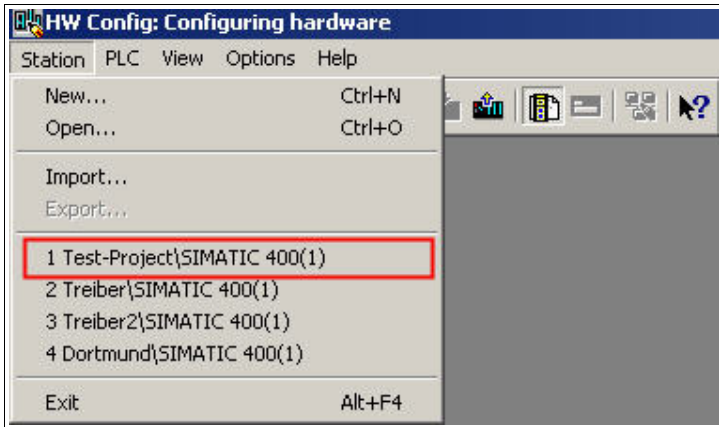
4 Configuration of the PROFIBUS Slave
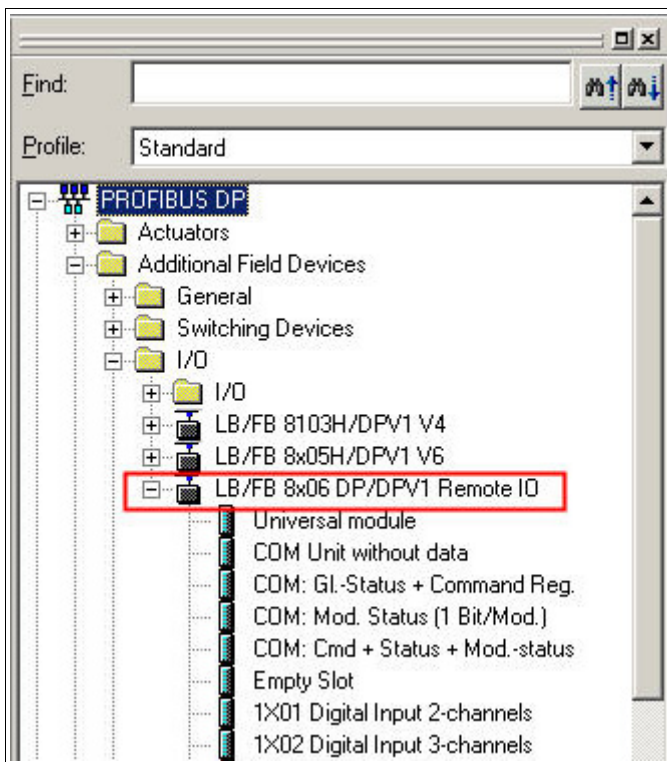
4.1 Add Remote I/O Station to the Network

Note!

The PROFIBUS address of the remote I/O station must be set using a third party tool. For example, you can use the RIO Admin Tool to set the address via the service bus using a USB to RS485 converter, or you can use the T+H PROFIBUS CommDTM to set the address via PROFIBUS using xEPI.
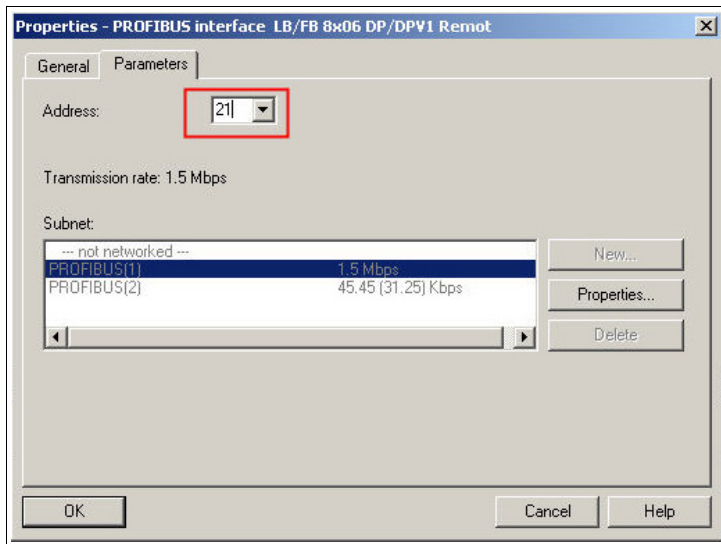
▶ Add Remote I/O Station as a PROFIBUS Slave

1. To locate the remote I/O station, expand the component catalog on the right side of the **HW Config** window.

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2. To add a remote I/O station to the bus line, drag the **LB/FB 8x06 DP/DPV1 Remote IO** entry on the PROFIBUS bus line in the area on the left.

↳ The **Properties** window opens.

3. Select the PROFIBUS address of the remote I/O station from the **Address** drop-down list and click OK.

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4.2 Add Components of the Remote I/O Station

After you have added the remote I/O station to the PROFIBUS bus line, you can recreate the components of the remote I/O station by adding the corresponding remote I/O modules to the remote I/O station.

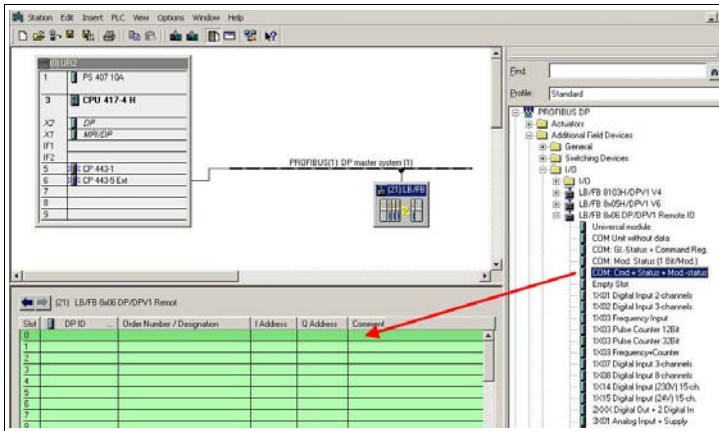▶ Add Remote I/O Modules of the Remote I/O Station

1. Select the remote I/O station in the **HW Config** window.

   ↳ The table on the bottom of the screen displays the components of the remote I/O station.

2. To locate the remote I/O modules, expand the component catalog on the right side of the **HW Config** window.

3. To recreate the components of the remote I/O station, drag and drop the corresponding remote I/O modules from the component catalog on the right side of the of the **HW Config** window to the table at the bottom of the **HW Config** window.

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4. Start with the **COM: Cmd + Status + Mod.-status** com unit that includes command, global status, and status register information. This diagnostic data is required for the CFC drivers.

5. Drag and drop the remaining remote I/O modules from the component catalog on the right side of the of the **HW Config** window to the table at the bottom of the **HW Config** window until you recreated all components of the remote I/O station.

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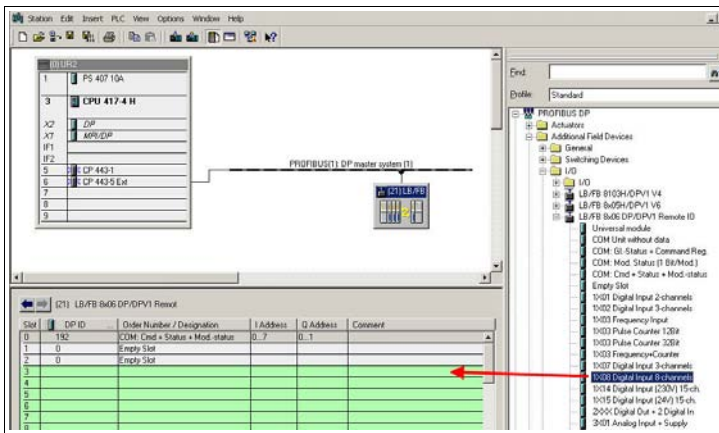
Note!

Note the following guidelines when setting up the structure of the remote I/O modules:

- All GSE-based configurations use single width modules. Thus, double width modules that occupy two slots must be configured like a single width module, followed by an empty slot. Note that the last slot must not be an empty slot. If the last remote I/O module is a double width module, it is configured like a single width module and the following empty slot is omitted.

- The configuration must start with the com unit, no matter if it is used with or without diagnostic data.

- On LB backplanes that contain a second slot for a redundant com unit, slots 1 and 2 must be configured as empty slots and the numbering of the remote I/O modules starts with slot 3. For example, the redundant base backplane LB9022A provides 22 slots for remote I/O modules, numbered from 3 to 24.

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4.3 Configure the Remote I/O Modules

After the remote I/O modules have been added to the remote I/O station, the input and output addresses of each remote I/O module must be configured.

▶ Configure the Remote I/O Modules

1. Select the remote I/O station in the **HW Config** window.

   ↳ The table on the bottom of the screen displays the components of the remote I/O station including their input and output addresses.

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2. To configure the address, double-click the table entry of the remote I/O module that you want to configure.

    ↳ The **Properties** window opens.

3. Depending on the type of the remote I/O module, you can define output address, input address, or both on the **Address / ID** tab.
    Note that for remote I/O modules that process output and input data at the same time, the CFC drivers require the same start address for output and input, for example, for LB2* digital outputs with positioning feedback.

4. To edit the device-specific parameters, select the **Parameter Assignment** tab.
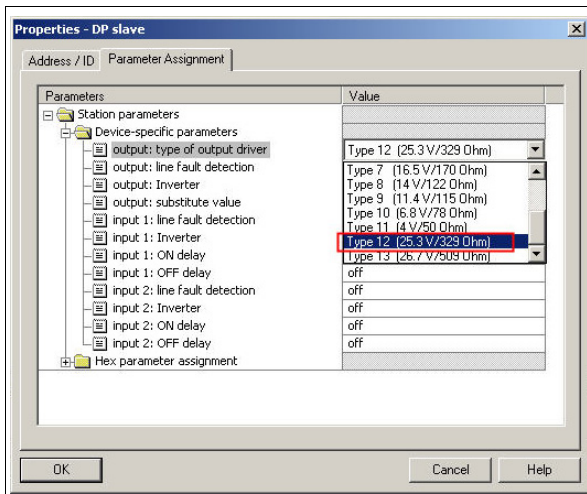
5. Specify the exact module version for all remote I/O modules that are available in different versions, for example, for LB2* digital outputs with positioning feedback or LB6*1* digital outputs.

6. Click **OK** to confirm the selected parameters.

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5   Download Hardware Data to CPU

After the remote I/O station has been added to the PROFIBUS bus line and after all remote I/O modules have been configured, the hardware configuration must be downloaded to the CPU of the SIMATIC station.
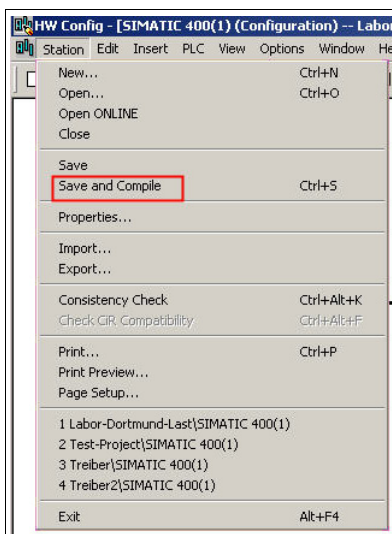
Note!

Note that the CPU will be stopped for the download process. After the download has been completed, the CPU must be restarted.
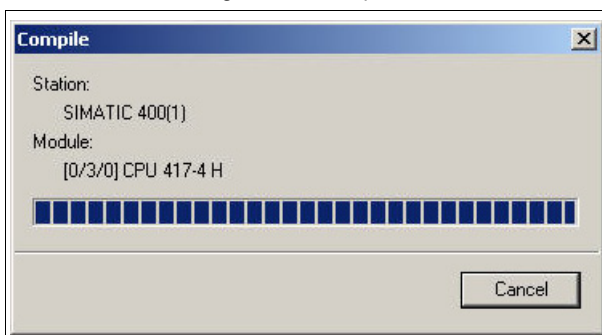
▶ Download Hardware Data to CPU

1. To translate the hardware configuration into a machine readable format, choose **Station > Save and Compile** in the **HW Config** window.


↳ The hardware configuration is compiled.

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2. Download the compiled data to the CPU of the SIMATIC station. The download can be performed in different ways, for example, via Ethernet or MPI (Multi Point Interface). In this case, the download is performed via Ethernet.
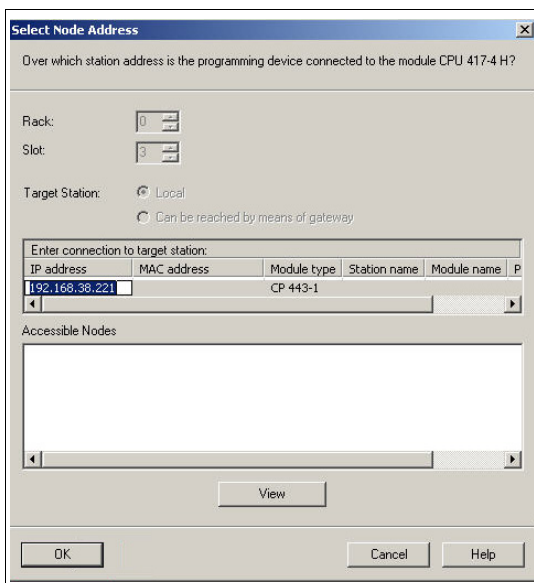
   To download the compiled data to the CPU, click **Download** in the menu bar or choose **PLC > Download**.
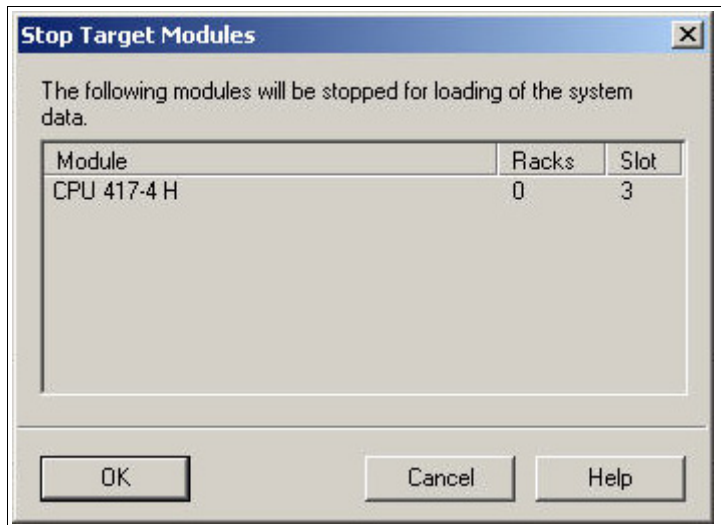
   ↳ The **Select Target Module** window opens.
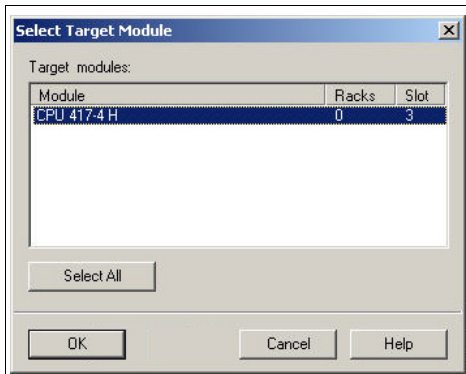
3. Select the module to which you want to download the configuration data and click **OK**.

   ↳ The **Select Node Address** window opens.
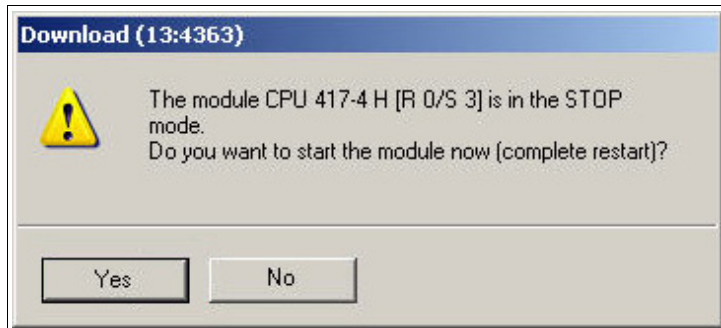
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4. If required, enter the IP address of the Ethernet card in the SIMATIC rack and click **OK**.

   ↳ The **Stop Target Modules** window opens.

5. To confirm that the selected module will be stopped for the download process, click **OK**.

   ↳ The module is stopped and the **Download** window opens.

6. To restart the module, click **Yes**.

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6 Online Diagnostics

Note!

Diagnostic information is available in **ONLINE** mode only.

Access Diagnostic Data

1. To switch from **Configuration** mode to **ONLINE** mode, click the toggle
button in the menu bar of the **HW Config** window.
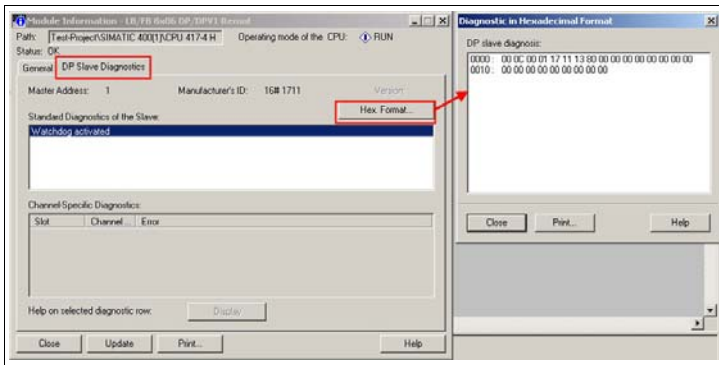
↳ You are now in **ONLINE** mode.

2. Double-click the remote I/O station in the **HW Config** window.

3. To access basic diagnostic information of the remote I/O station, select the
DP Slave Diagnostics tab.

↳ The latest diagnostic information is displayed.
Note that this window contains only information that could be interpreted by
SIMATIC using the information from the GSE file.
If required, click **Update** to update the diagnostic information.

4. To access additional diagnostic information that could not be interpreted
using the information from the GSE file, click **Hex.Format...** on the **DP Slave
Diagnostics** tab.
For more information on how to interpret the diagnostic information in
hexadecimal format, see chapter 9.

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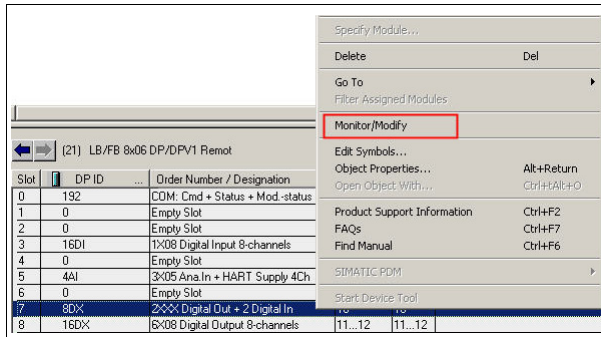
7   Monitor/Modify Raw Data

If required, you can monitor or modify the PROFIBUS data directly from the PROFIBUS interface, without having the data adjusted by the SIMATIC station.

▶ Monitor/Modify PROFIBUS Data

1. Select the remote I/O station in the **HW Config** window.

    ↳ The table on the bottom of the screen displays the components of the remote I/O station including their input and output addresses.

2. Right-click the component from which you want to monitor or modify the raw data and choose **Monitor/Modify** from the context menu.

↳ The **Monitor/Modify** window for the address range of the selected component opens.

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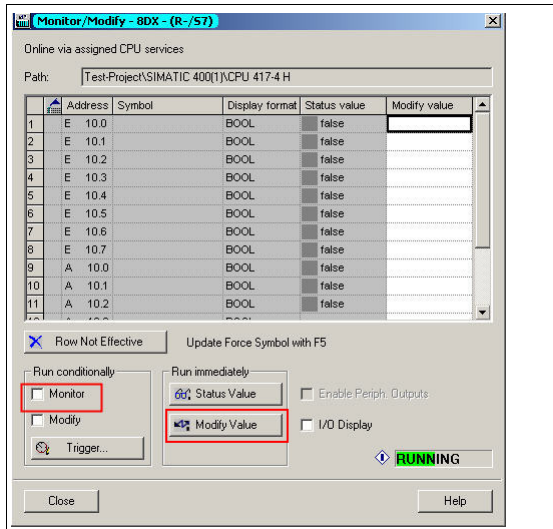
3. To display the input respectively output data, activate the **Monitor** check box in the **Run conditionally** area.

   ↳ The entries for each address will be updated automatically.

4. To modify an output value, enter the new value in the corresponding line of the **Modify Value** column and click **Modify Value**.

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8 Programming the PLC

There are several different programming languages for programming the PLC:

- Statement List (STL) also referred to as Instruction List (IL)
- Ladder Logic (LAD)
- Function Block Diagram (FBD)

The following chapters describe how to program the PLC using Continuous Function Charts (CFC) that are based on the Function Block Diagram (FBD) language.
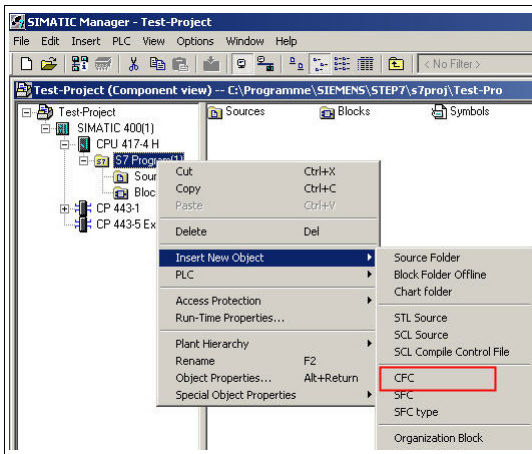
Note!

The CFC functionality is available as a SIMATIC Step 7 package.

8.1 Add Chart

To program the PLC using Continuous Function Charts (CFC), you must first add a Chart Object to the S7 Program.
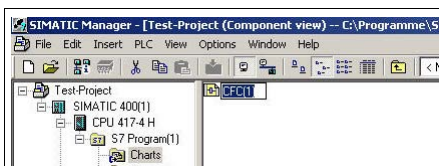
Add CFC Object

1. Right-click the **S7 Program** folder in the **SIMATIC Manager** and choose **Insert New Object > CFC**.

↳ A new chart is added to the **Charts** subfolder of the **S7 Program** folder.

2. Enter a name for the chart.

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8.2   Add Library

The PFLBFB library enables easy connection of Pepperl+Fuchs remote I/O modules to SIMATIC PCS 7 via PROFIBUS. The library contains PCS 7 compliant function blocks, CFC driver modules, and the documentation. Furthermore, a support hotline is available.

The PFLBFB library is not part of the default library of the SIMATIC PCS 7 station. To purchase the library for the LB/FB remote I/O system, contact Siemens AG in Karlsruhe.

| Contact:	Roland Heid Siemensallee 84 76187 Karlsruhe Germany
Phone:	+49 (721) 595 6380
Fax:	+49 (721) 595 6383
E-Mail:	function.blocks.industry@siemens.com

Note!

The screenshots in the following sections are based on version 4.1 of the CEAG_RED library, which is an older version of the PFLBFB library. We recommend that you use the PFLBFB library.
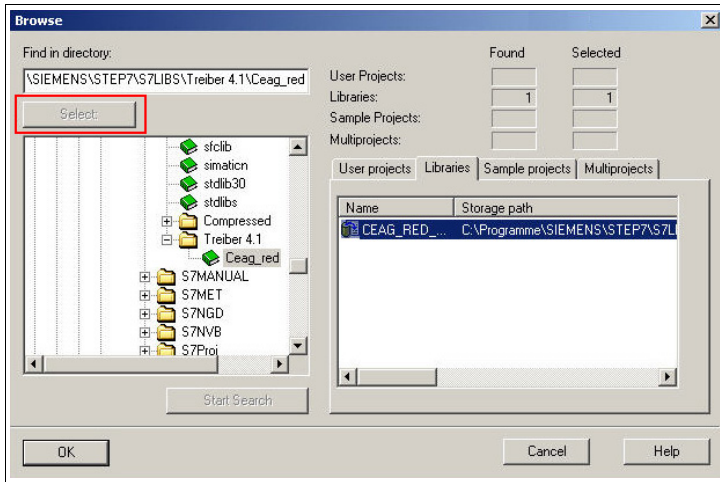
### Add Library for LB/FB Remote I/O System

1. Save the library to a local directory on your computer.
2. Choose **File > Open...** in the **SIMATIC Manager**.
3. To open a library, select the **Libraries** tab and click **Browse...**

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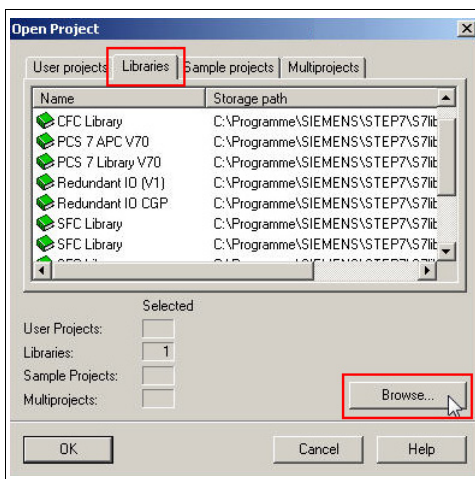
4. Enter the path of the directory that contains the library for the LB/FB remote I/O system in the **Find in directory** field and click **Select**.

5. Click **Start Search**, select the library on the **Libraries** tab and click **OK**.

↳ The selected library opens in a separate window.

6. Select all blocks of the library and drag them into the **Blocks** subfolder of the **S7 Program** folder.

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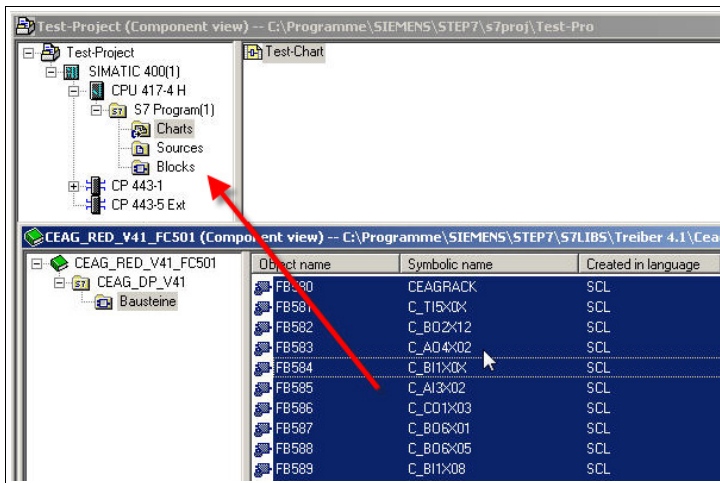
8.3 Configure Charts

After you have added the function blocks from the library to the S7 Program, you can configure the Continuous Function Chart (CFC) using the CFC editor.
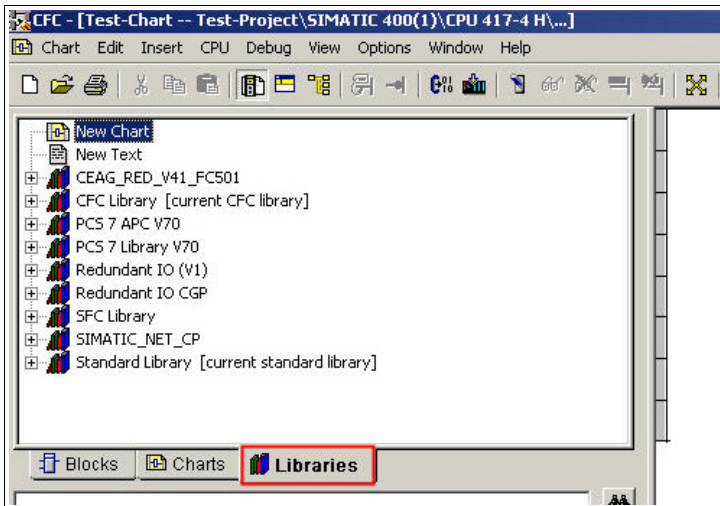
▶ Configure Chart using the CFC Editor

1. Open the **Charts** subfolder of the **S7 Program** folder in the **SIMATIC Manager**.

2. To open the CFC editor, right-click the chart you created before and choose **Open Object**.
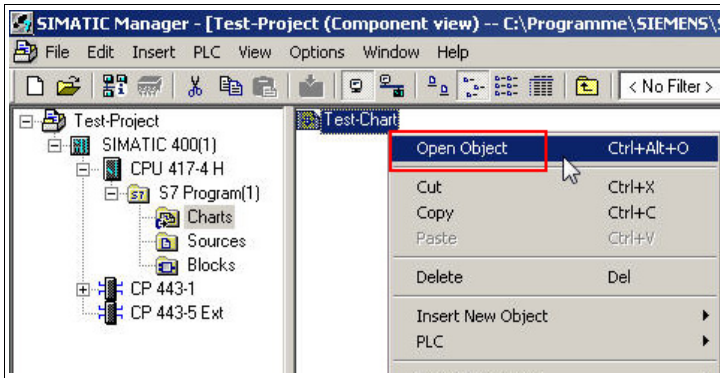

↳ The **CFC** window opens.

3. Select the **Libraries** tab on the left side of the **CFC** window.

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4. Expand the library for the LB/FB remote I/O system in the library tree. In this example it is the `CEAG_RED_V41_FC501` library.

5. Drag the `CEAGRACK` function block from the library into the chart area on the right. This function block represents the remote I/O station with the com unit.
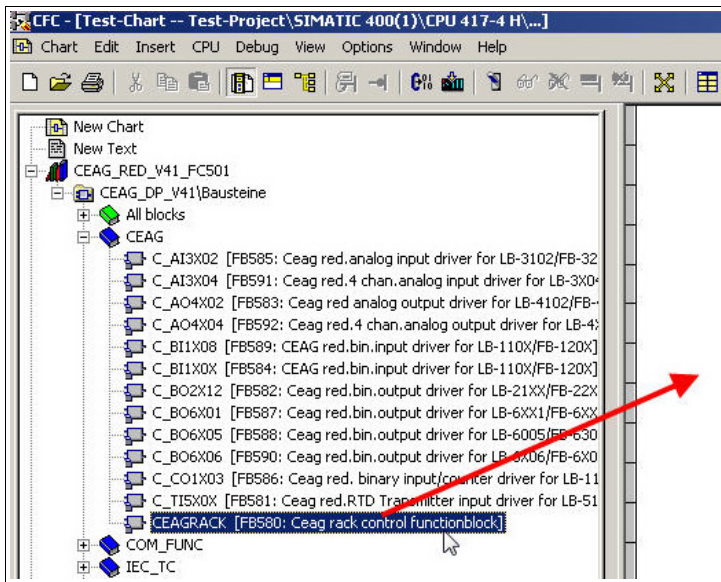
6. Set the subnet ID (number of the DP master system) and the rack number (PROFIBUS address) for the `CEAGRACK` function block.
   Note that you can find this information in the **HW Config** window.
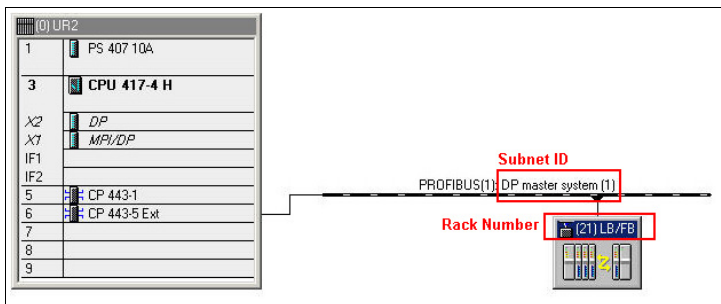

7. Proceed with the function blocks for the remaining I/O modules that are contained in the remote I/O station.
   For example, drag the `C_BO2X12` function block from the library into the chart area on the right. This function block represents LB2* digital outputs with positioning feedback.
   Watch the distance between the function blocks in the chart area. The restricted areas around each block are highlighted while moving the block in the chart area.

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8. Set the module number (slot number) for the `C_BO2X12` function block. Note that you can find this information in the table that displays the components of the remote I/O station on the bottom of the **HW Config** window.

9. Drag the `CONNECT` field of the `CEAGRACK` function block to the `RACK_CON` field of the `C_BO2X12` function block. This connects the `CEAGRACK` function block to the `C_BO2X12` function block.
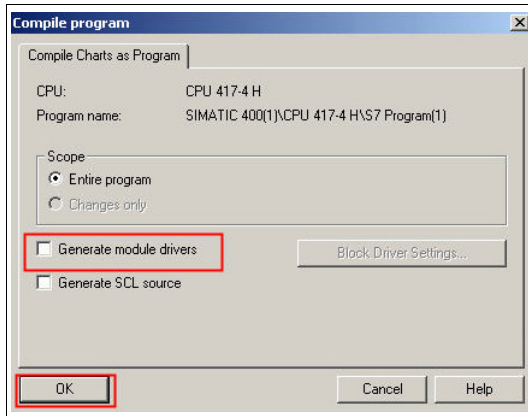
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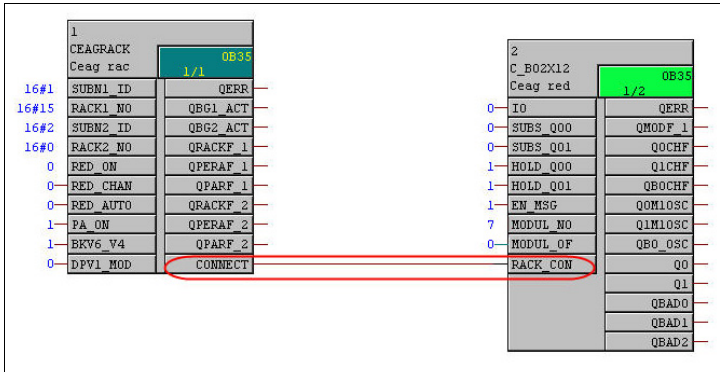
8.4 Compile Charts

To translate the Continuous Function Chart (CFC) into a machine readable format, the CFC must be compiled before it can be processed by the CPU.

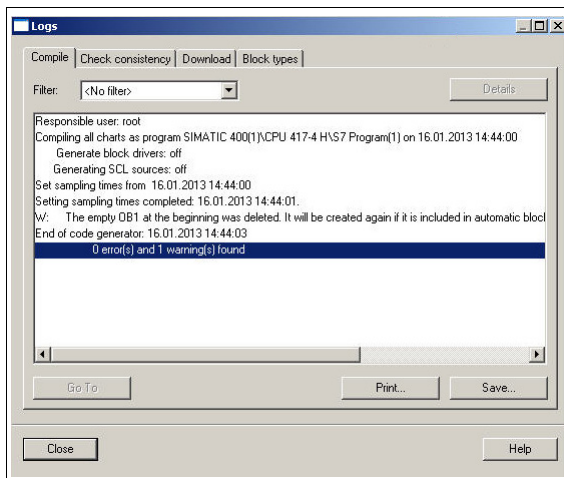### Compile Charts as Program

1. Click **Compile** in the menu bar of the CFC editor.

   ↳ The **Compile program** window opens.

2. Disable the **Generate module drivers** check box and click **OK**.

   ↳ The compilation process starts. After the compilation has been completed, the **Logs** window opens.

3. Check the compilation log for errors.

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8.5 Download Program to CPU

If the program has been compiled without errors, you can download the program to the CPU of the SIMATIC station.
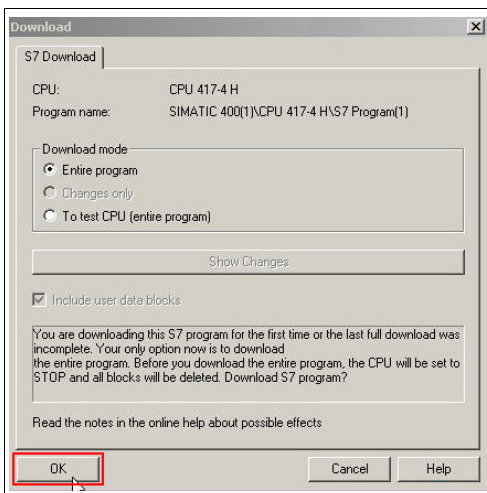
Note!

If you download the entire program, the CPU will be stopped for the download process. After the download has been completed, the CPU must be restarted.
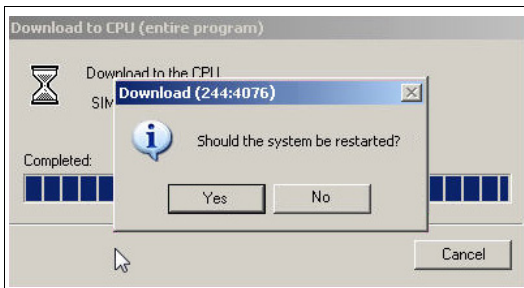
Download Program to CPU

1. Click **Download** ▣ in the menu bar of the CFC editor.

   ↳ The **Download** window opens.

2. To start the download process, click **OK**.

   ↳ The **Download to CPU** window opens.

3. To restart the CPU after the download has been completed, click **Yes**.

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8.6   Test Signals

Once the program has been downloaded to the CPU you can switch to test mode and check the signals directly in the CFC editor.

Note!

Information on signals is available in **ONLINE** mode only.

Test Signals in CFC Editor

1. To switch the CFC editor to **ONLINE** mode, click **Test Mode** [icon] in the menu bar of the CFC editor.

2. To visualize the signals of a function block, right-click the function block and choose **Watch On** or select the function block and click **Watch On** [icon] in the menu bar of the CFC editor.

   ↳ The chart area displays the signals for the selected function block, in this example the `C_BO2X12` function block.

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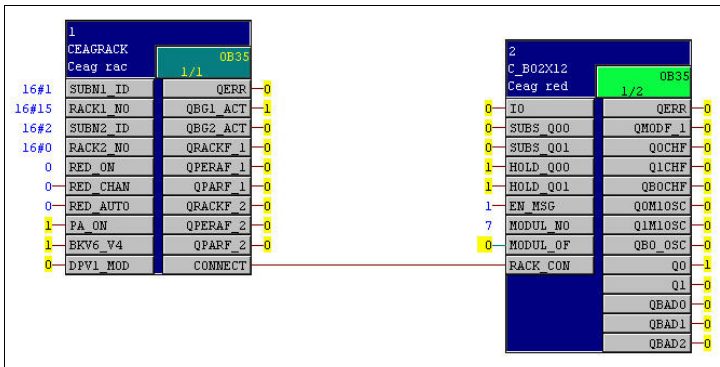
9   Appendix

Diagnostic Information

Hexadecimal Format	Description
0000 : 00 0C 00 01 17 11 13 80 00 00 00 00 00 00 00 00 0010 : 00 00 00 00 00 00 00 00 00 00	PROFIBUS Standard Diagnostics
0000 : 00 0C 00 01 17 11 13 80 00 00 00 00 00 00 00 00 0010 : 00 00 00 00 00 00 00 00 00 00	Master Address
0000 : 00 0C 00 01 17 11 13 80 00 00 00 00 00 00 00 00 0010 : 00 00 00 00 00 00 00 00 00 00	PROFIBUS ID
0000 : 00 0C 00 01 17 11 13 80 00 00 00 00 00 00 00 00 0010 : 00 00 00 00 00 00 00 00 00 00	Length of device-specific diagnostics incl. header byte
0000 : 00 0C 00 01 17 11 13 80 00 00 00 00 00 00 00 00 0010 : 00 00 00 00 00 00 00 00 00 00	Global status register of active com unit
0000 : 00 0C 00 01 17 11 13 80 00 00 00 00 00 00 00 00 0010 : 00 00 00 00 00 00 00 00 00 00	Standard PROFIBUS diagnostics of passive com unit
0000 : 00 0C 00 01 17 11 13 80 00 00 00 00 00 00 00 00 0010 : 00 00 00 00 00 00 00 00 00 00	Global status register of passive com unit
0000 : 00 0C 00 01 17 11 13 80 00 00 00 00 00 00 00 00 0010 : 00 00 00 00 00 00 00 00 00 00	Additional 12 bytes of device-specific diagnostics

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Device-Specific Diagnostics

Channel-Specific Diagnostics

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