Signal Transfer from SIPLUS CMS4000 X-Tools to the SIMATIC PCS 7 Maintenance Station via TCP/IP

SIPLUS CMS4000 X-Tools

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Table of Contents

1 Introduction

1.1 Application Target

The target of this application example lies in the demonstration of signal transfer from SIPLUS CMS4000 X-Tools to the SIMATIC PCS 7 Maintenance Station process control system via TCP/IP on the basis of a simulation.

The SIPLUS CMS system facilitates the monitoring of analog and binary signals as well as numerical bus data. The SIPLUS CMS is able to evaluate the connected components' maintenance requirements on the basis of these signals. The evaluations are integrated in the PCS 7 Maintenance Station to ensure integrated, central and uniform diagnostics.

1.2 Prerequisites

The following user prerequisites and system requirements have to be met for the application example's utilization:

For SIPLUS CMS X-Tools:

- Knowledge of X-Tools Professional
- Licenses for X-Tools Professional
- System requirements
  - PC with Windows XP Professional 32-bit, Service Pack 3, or
  - Microsoft Hotfix 958347
  - Microsoft Hotfix 951531
- PC with Windows Server 2003 R2 32-bit Enterprise Edition, Service Pack 2
  - Microsoft Hotfix 951531
- CPU ≥ 1.2 GHz or multi-core CPU
- RAM ≥ 512 MB (2 GB recommended)

For SIMATIC PCS 7:

- Knowledge of PCS 7
- Components of the PCS 7 system subject to licensing (version 7.1 SP1):
  - PCS 7 Maintenance Station
  - PCS 7 PDM
- System requirements
  - The conditions of SIMATIC PCS 7 (version 7.1 SP1) are applicable

1.3 Differentiation

The application example does not comprise a ready program for the analysis of damage cases. It merely demonstrates the transfer of simulated diagnostics signals from SIPLUS CMS4000 X-Tools to SIMATIC PCS 7.

In this example, 8 binary and 4 analog signals can be transferred between SIPLUS CMS X-Tools and the PCS 7 Maintenance Station via TCP communication. The transferred signals are further processed in PCS 7via the ASSETMON block.

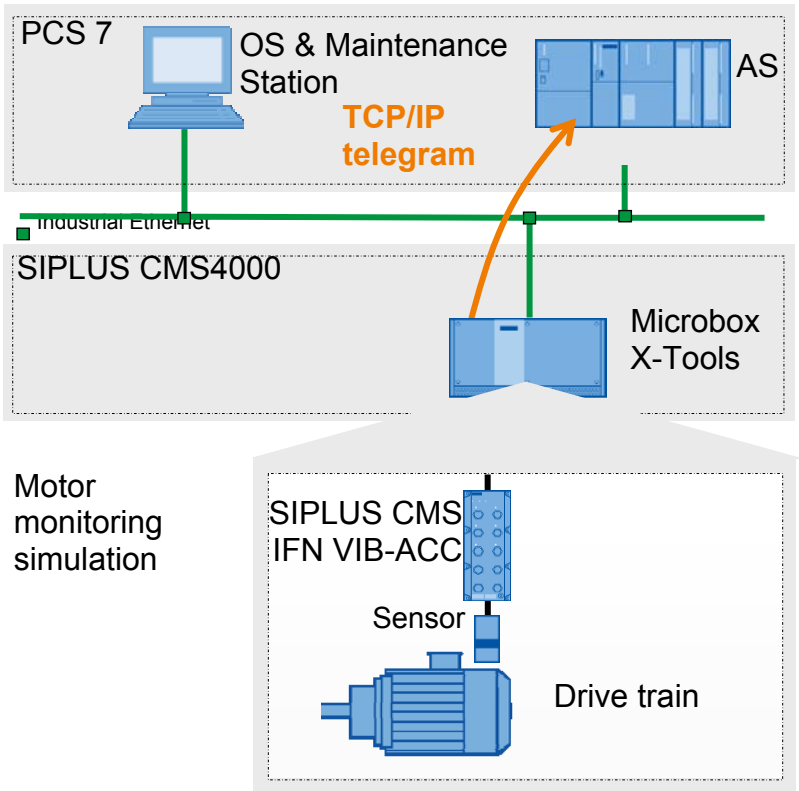
2 SIPLUS CMS4000 X-Tools

2.1 Application Example

Layout

Communication with the SIMATIC PCS 7 process control system is realized via TCP/IP. An "Analyzing Model" in X-Tools is required for data output via TCP.

Figure 2-1: System component layout



Application

The application example described here simulates the data exchange between SIPLUS CMS X-Tools and the SIMATIC PCS 7 Maintenance Station. 8 binary values and 1 analog value are transferred in this example. Simulation of the diagnostics values (8 x binary) and the used process value (1 x analog) is generated in a separate analyzing model.

The actual monitoring and diagnostics of a motor requires a further analyzing model, which is not described herein.

2.2 Scope of Supply

The following data are included in the application example's scope of supply:

- SIPLUS CMS X-Tools: PCS 7 Location.zip
- SIMATIC PCS 7: SiPlsCMS.zip

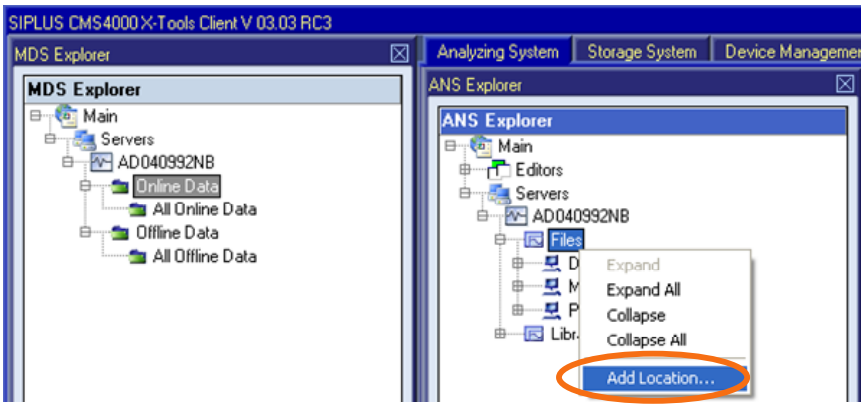
2.3 Realization

"PCS 7 Location" first has to be integrated in X-Tools to allow for the application example's testing.

Integration of "PCS 7 Location"

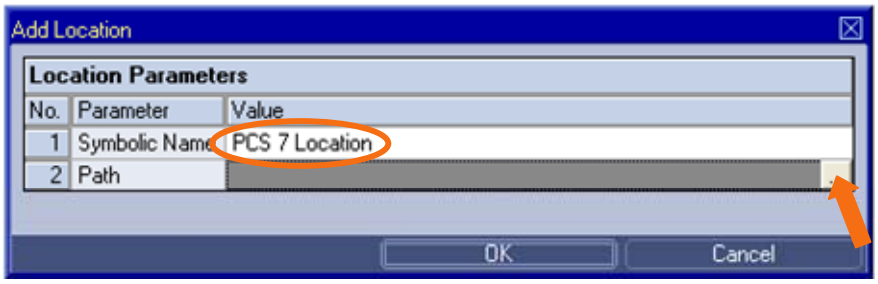
- To integrate a location in X-Tools, "Files" and "Add Location" has to be selected in the "ANS Explorer" via a right mouse-click (compare figure 2-2).

Figure 2-2: ANS Explorer



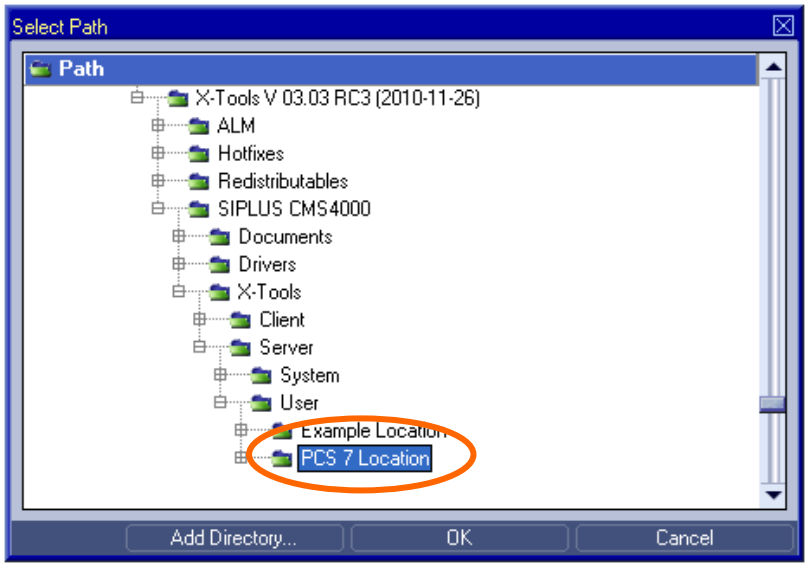
- Next, select a symbolic name and click "…" (see figure 2-3).

Figure 2-3: Add Location



- Now, select the respective path via "PCS 7 Location" (compare figure 2-4).

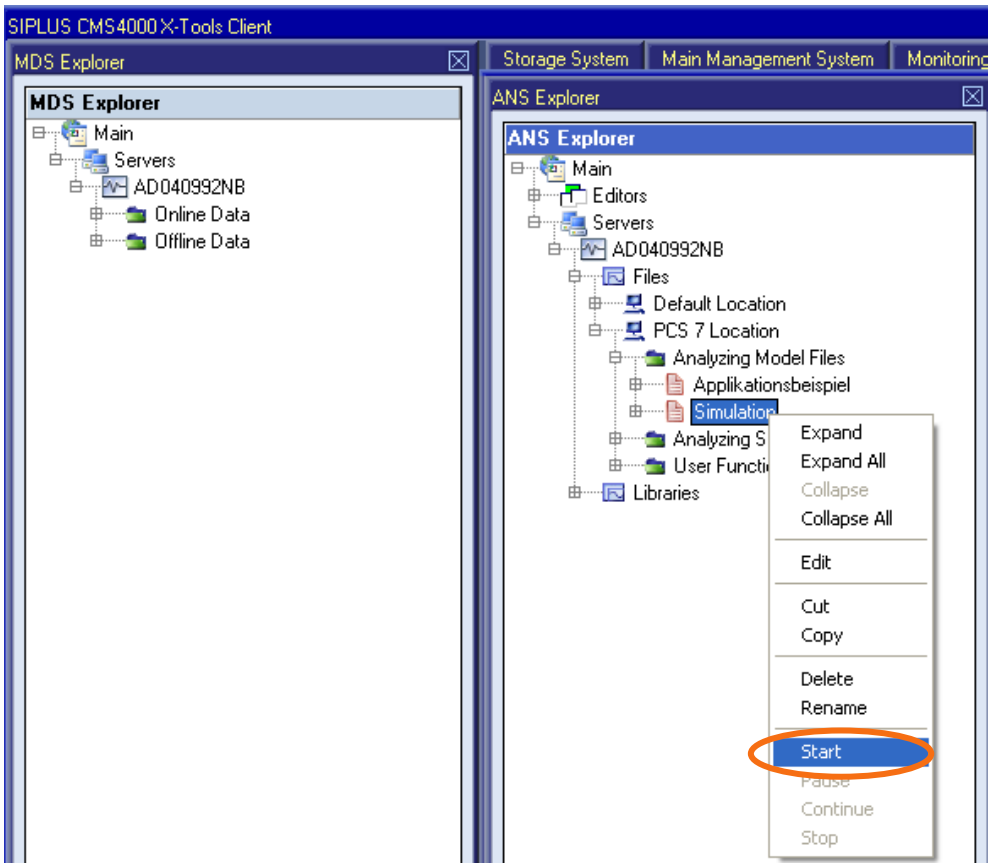
Figure 2-4: Select Path



Start-up of analyzing models

- Start-up of the individual analyzing models is initiated via a right mouse-click on the analyzing model and selection of "Start" (see figure 2-5), after which the icon's color changes from red to green.

Figure 2-5: Analyzing Model Start

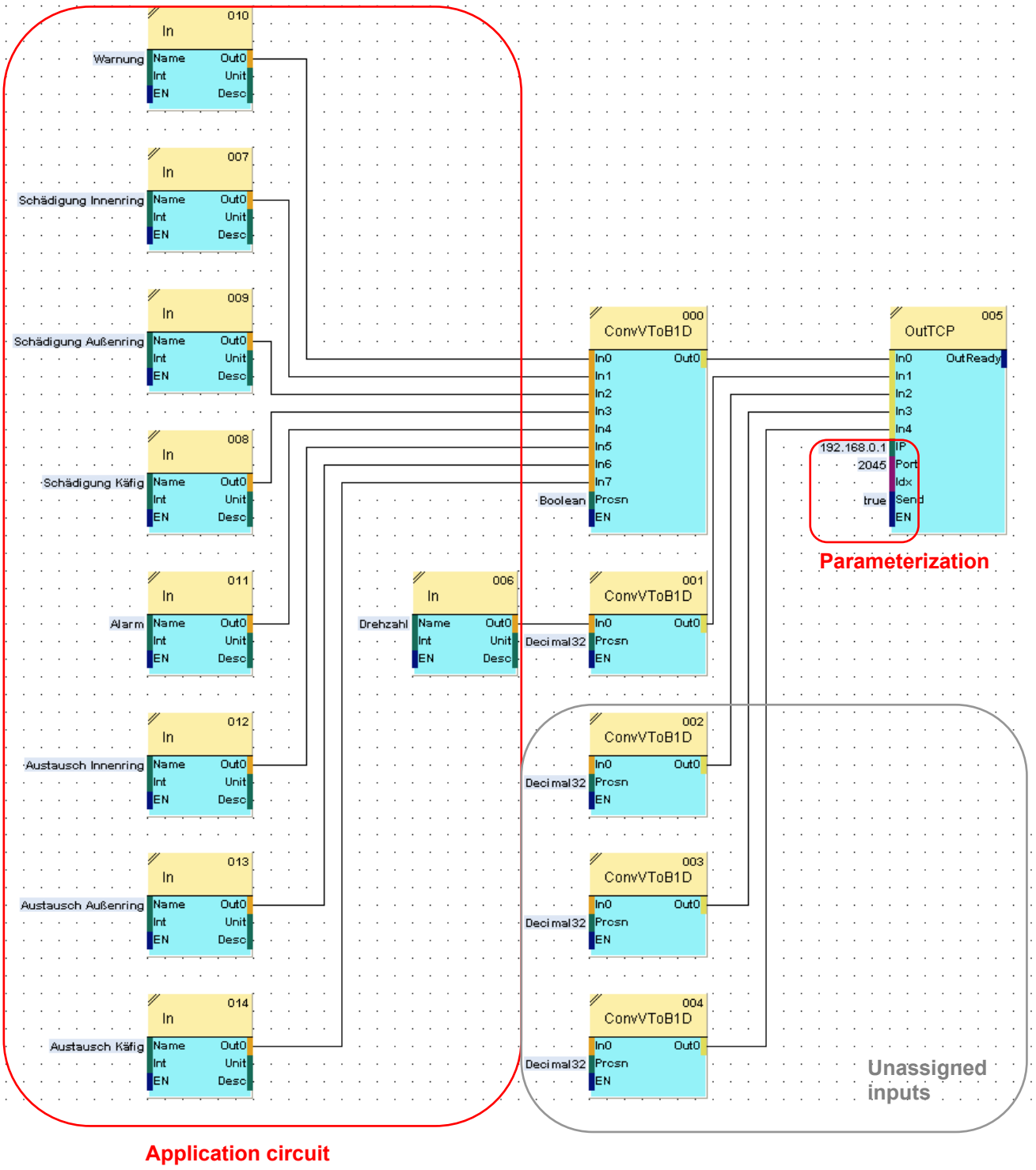


The "Simulation" analyzing model is required for generation of the application example's input data. With this model, the 8 binary inputs (warning, 3 x damage, alarm, 3 x replacement) and 1 analog input (speed) are generated.

2.4 Description of the "Application Example" X-Tools Analyzing Model

Figure 2-6 shows the "Application Example" analyzing model with the maximum number of assignable inputs (8 x binary, 4 x analog). This analyzing model transfers all input signals from SIPLUS CMS4000 X-Tools to the SIMATIC PCS 7 Maintenance Station via TCP/IP communication.

Figure 2-6: X-Tool Analyzing Model



The combination of 1 ConvVToB1D with 8 Booleans and 4 ConvVToB1D with 1 Decimal32 or Integer32 each is mandatory in this sequence in order to support compilation of the respective send user data.

The OutTCP block's maximum configuration consists of 8 binary and 4 analog signals. In the application example (compare figure 2-6), already all 8 binary inputs

and 1 analog input are assigned. The 3 remaining analog inputs can also be assigned.

Note The OutTCP block is only contained in "X-Tools Professional".

Application circuit:

The application circuit was realized for 8 binary inputs assigned to diagnostics monitoring and for 1 analog input (speed).

- Damage inner ring: Indicates damage of the inner ring
- Damage outer ring: Indicates damage of the outer ring
- Damage cage: Indicates damage of the cage
- Replacement inner ring: Indicates necessity of inner ring replacement
- Replacement outer ring: Indicates necessity of outer ring replacement
- Replacement cage: Indicates necessity of cage replacement
- Warning: Indicates impending component damage (e.g. inner ring)
- Alarm: Indicates necessity of component replacement (e.g. inner ring)
- Speed : Analog value; also indicates whether the motor is still in operation (>0: motor running)

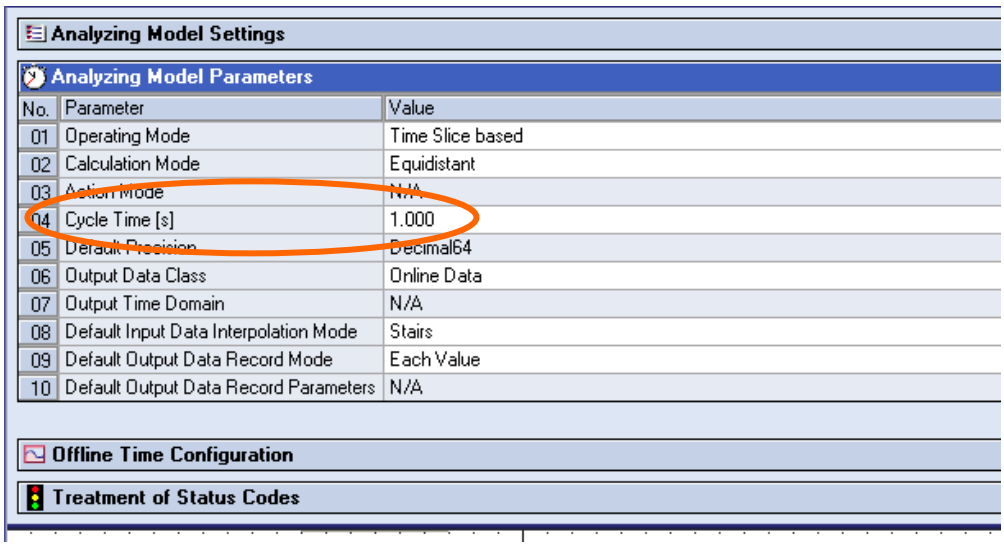
Parameterization of the "OutTCP" block:

- IP and port are specified in the S7 control's settings in NetPro.
- When setting "send = true", a TCP telegram is transmitted with every model cycle.

CAUTION **Observe the model's cycle time!**

The cycle time specifies the number of telegrams per time period. In figure 2-7 for example, a telegram with current values is transmitted every second.

Figure 2-7: Cycle Time Setting



Analyzing Model Settings

Analyzing Model Parameters

No.	Parameter	Value
01	Operating Mode	Time Slice based
02	Calculation Mode	Equidistant
03	Action Mode	N/A
04	Cycle Time [s]	1.000
05	Default Precision	Decimal64
06	Output Data Class	Online Data
07	Output Time Domain	N/A
08	Default Input Data Interpolation Mode	Stairs
09	Default Output Data Record Mode	Each Value
10	Default Output Data Record Parameters	N/A

Offline Time Configuration

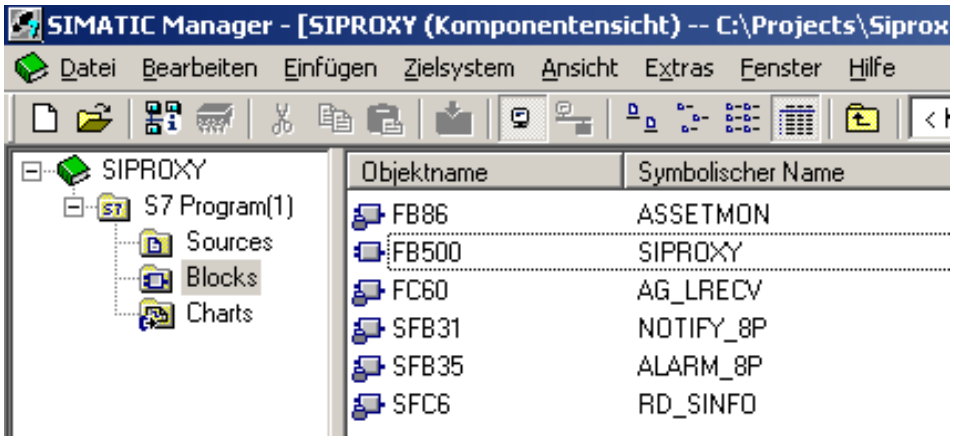
Treatment of Status Codes

3 PCS 7 Configuration Instructions

3.1 Prerequisites

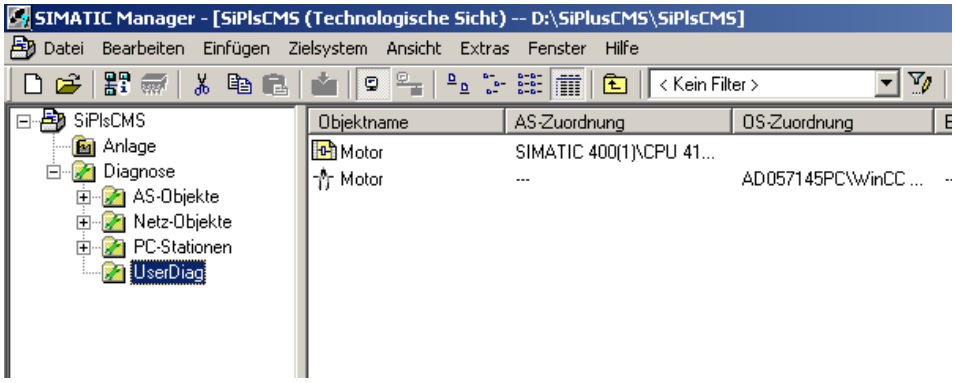
The SIPROXY block available in the SIPROXY library is used for the reception and processing of data provided by the OutTCP block. The ASSETMON block from the PCS 7 library is used for the diagnostics data's transfer to the PCS 7 Maintenance Station.

Figure 3-1: SIPROXY Library



Use of the ASSETMON block in the PCS 7 Maintenance Station requires the creation of a user diagnostics structure.

Figure 3-2: User Diagnostics Structure



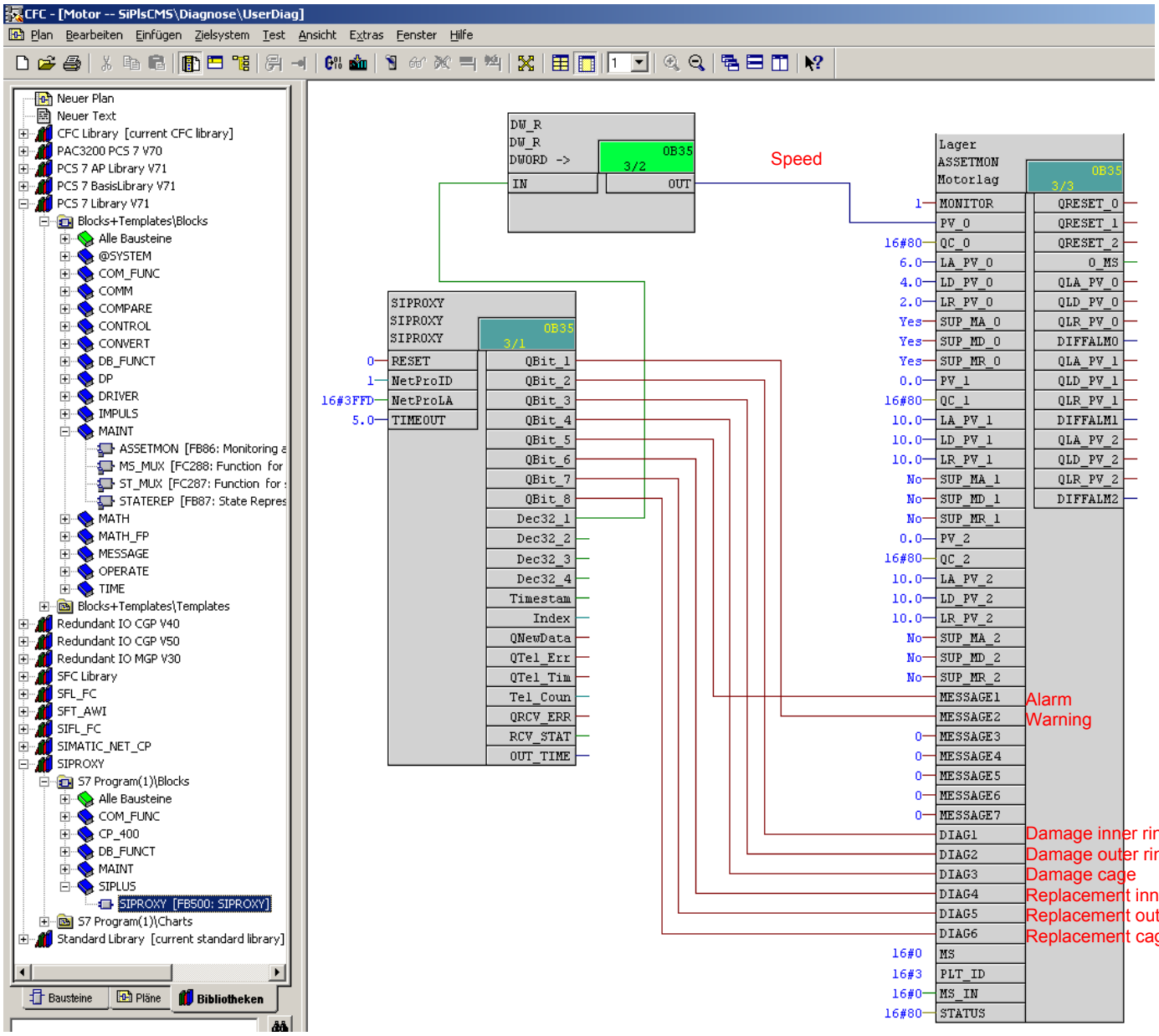
Information on the ASSETMON block and on creation of the user diagnostics structure is available in the manuals *PCS 7 – Manual for Library* and *PCS 7 – Configuration Manual Operator Station*.

3.2 AS Program Creation

The SIPROXY and the ASSETMON block are integrated in a CFC plan in the user diagnostics structure. Also the CFC template from the SIPROXY library can be used as template.

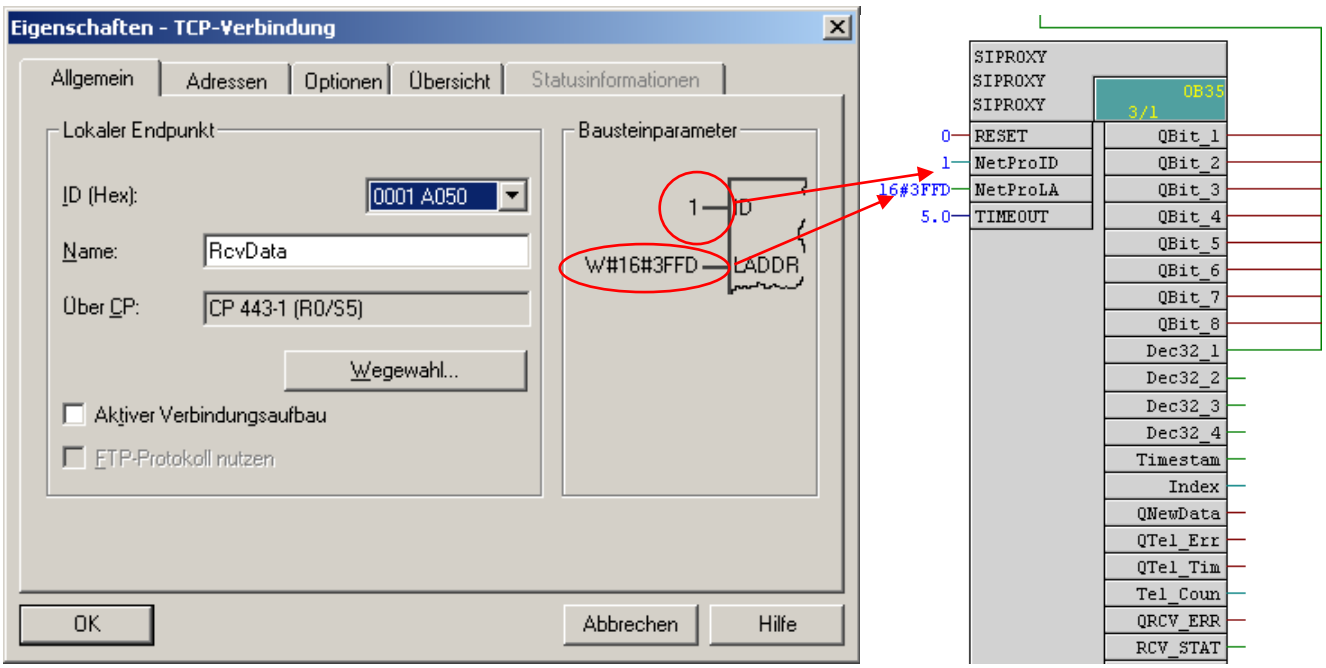
The signal outputs of the SIPROXY block are interconnected with the signaling and diagnostics inputs of the ASSETMON block in accordance with figure 3-3.

Figure 3-3: Block in the CFC Plan



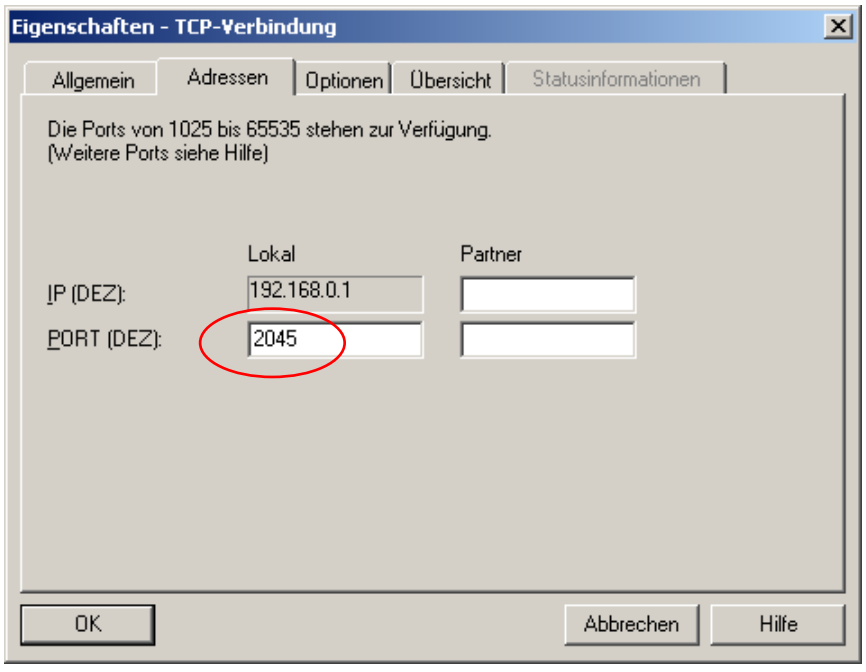
The input NetProID and the input NetProLADDR of the SIPROXY block are parameterized with the block ID or block address of the TCP connection. The block ID and block address are specified in the TCP connection's properties in NetPro (see figure 3-4).

Figure 3-4: SIPROXY Block Parameterization



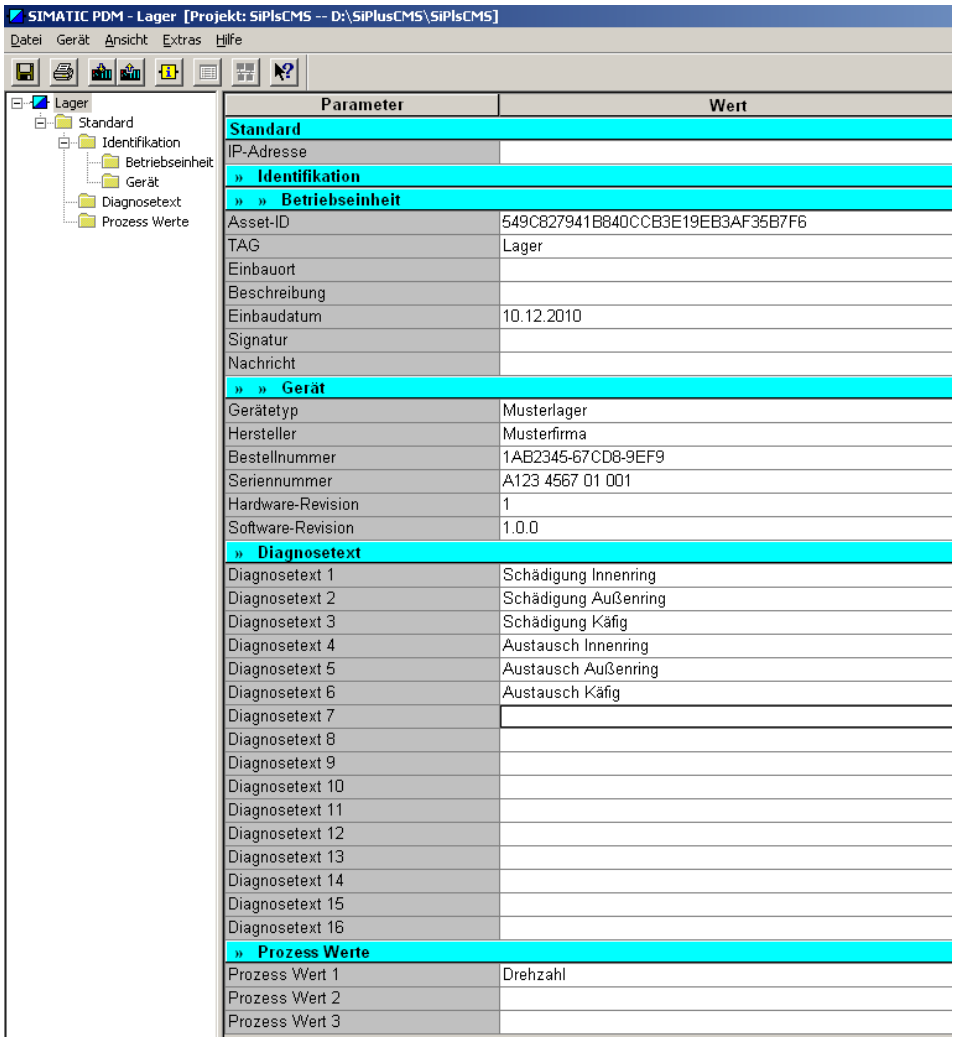
In NetPro, the TCP connection to an unspecified station should be selected. The TCP connection's port in NetPro has to correspond to the port used in X-Tools (see figure 3-5).

Figure 3-5: TCP Connection Parameterization in NetPro



The PDM-TAG belonging to the ASSETMON block is parameterized as shown in figure 3-6.

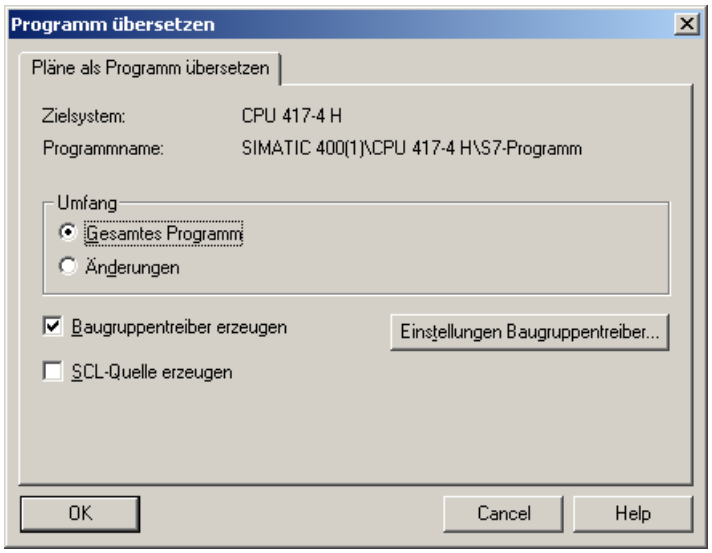
Figure 3-6: PDM Parameterization Mask



Parameter	Wert
Standard	
IP-Adresse	
» Identifikation	
» » Betriebseinheit	
Asset-ID	549C827941B840CCB3E19EB3AF35B7F6
TAG	Lager
Einbauort	
Beschreibung	
Einbaudatum	10.12.2010
Signatur	
Nachricht	
» » Gerät	
Gerätetyp	Musterlager
Hersteller	Musterfirma
Bestellnummer	1AB2345-67CD8-9EF9
Seriennummer	A123 4567 01 001
Hardware-Revision	1
Software-Revision	1.0.0
» Diagnosetext	
Diagnosetext 1	Schädigung Innenring
Diagnosetext 2	Schädigung Außenring
Diagnosetext 3	Schädigung Käfig
Diagnosetext 4	Austausch Innenring
Diagnosetext 5	Austausch Außenring
Diagnosetext 6	Austausch Käfig
Diagnosetext 7	
Diagnosetext 8	
Diagnosetext 9	
Diagnosetext 10	
Diagnosetext 11	
Diagnosetext 12	
Diagnosetext 13	
Diagnosetext 14	
Diagnosetext 15	
Diagnosetext 16	
» Prozess Werte	
Prozess Wert 1	Drehzahl
Prozess Wert 2	
Prozess Wert 3	

Subsequently, the AS program is compiled in the CFC.

Figure 3-7: Program Compilation



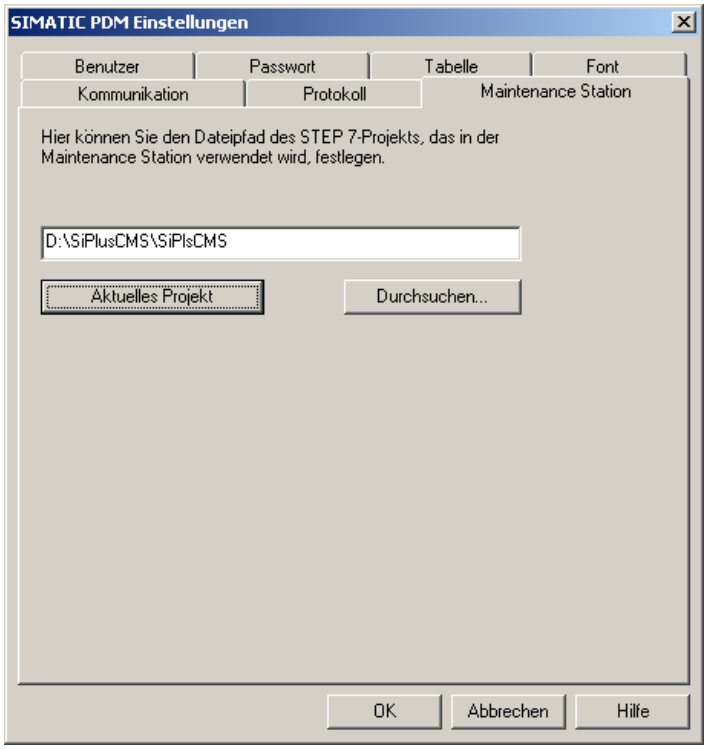
Creation of the AS program is completed upon compilation.

3.3 Connection to the PCS 7 Maintenance Station

Following the AS program's creation, connection of the ASSETMON block to the PCS 7 Maintenance Station can be realized.

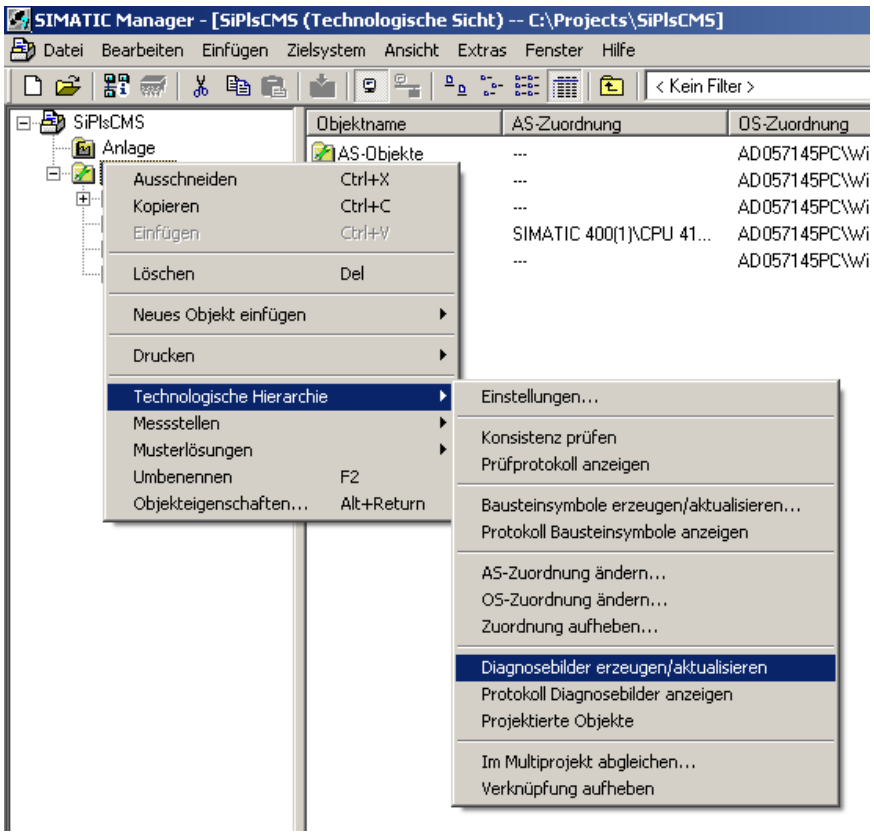
For this purpose, the STEP 7 project used in the Maintenance Station is specified in SIMATIC PDM under "Settings" in the "Maintenance Station" tab. In this application example, the current project is used (see figure 3-8).

Figure 3-8: SIMATIC PDM Settings



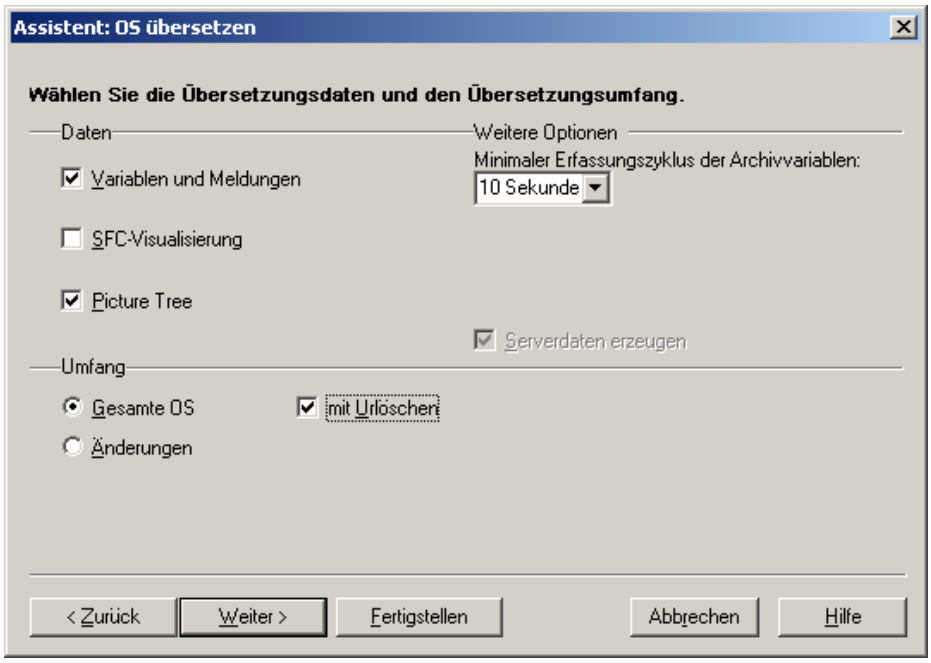
In the SIMATIC Manger, the function "Generate/Update Diagnostics Images" is called up in the technological view via selection of a technological folder in the "Technological Hierarchy" menu (see figure 3-9).

Figure 3-9: Generate/Update Diagnostics Images



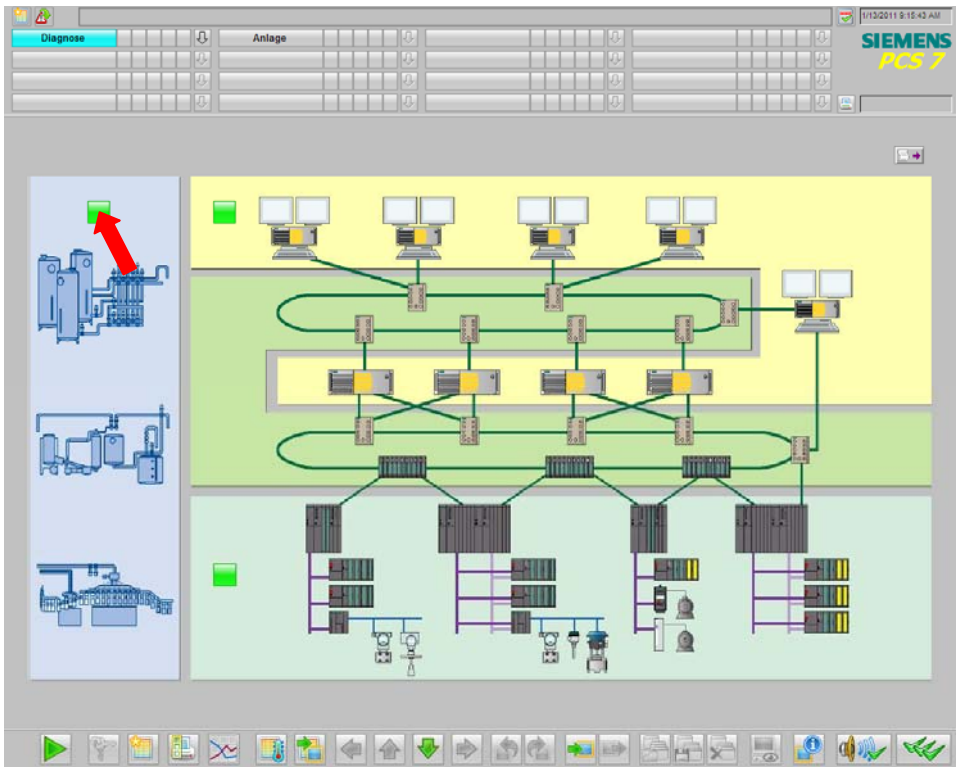
Subsequently, the OS is compiled.

Figure 3-10: OS Compilation



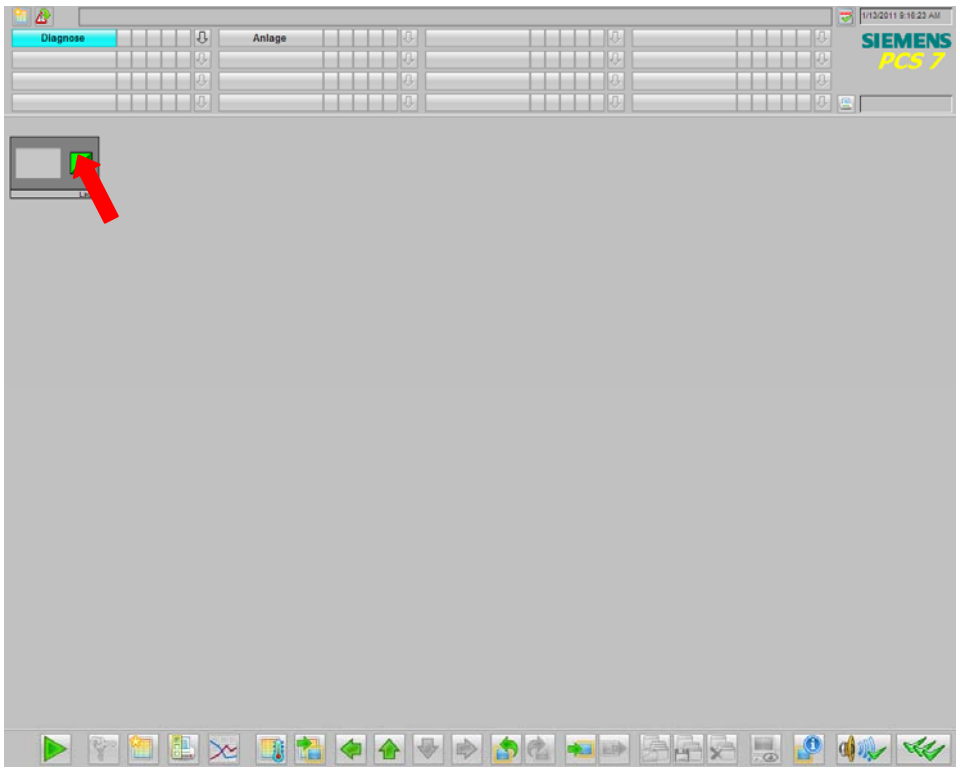
Connection of the ASSETMON block to the PCS 7 Maintenance Station is completed upon compilation.

Figure 3-11: PCS 7 Maintenance Station



The ASSETMON block (see figure 3-12) is opened via a click on the button (see figure 3-11, red arrow). A green button indicates "good state", a yellow button indicates "warning" and a red button indicates "alarm".

Figure 3-12: Symbol of the ASSETMON Block



The standard view of the ASSETMON block is opened via a click on the button (see figure 3-12, red arrow).

Figure 3-13: Standard View of the ASSETMON Block

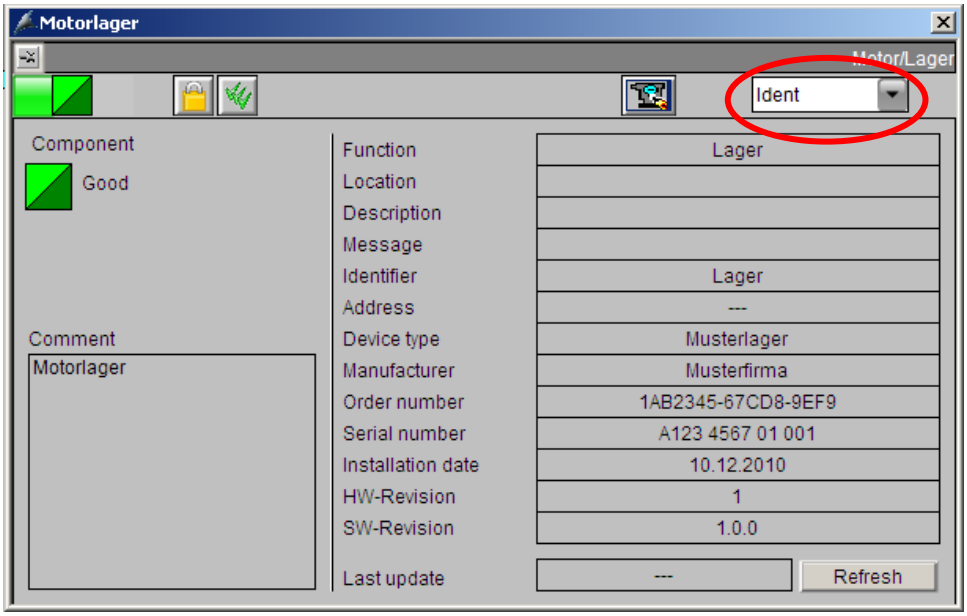
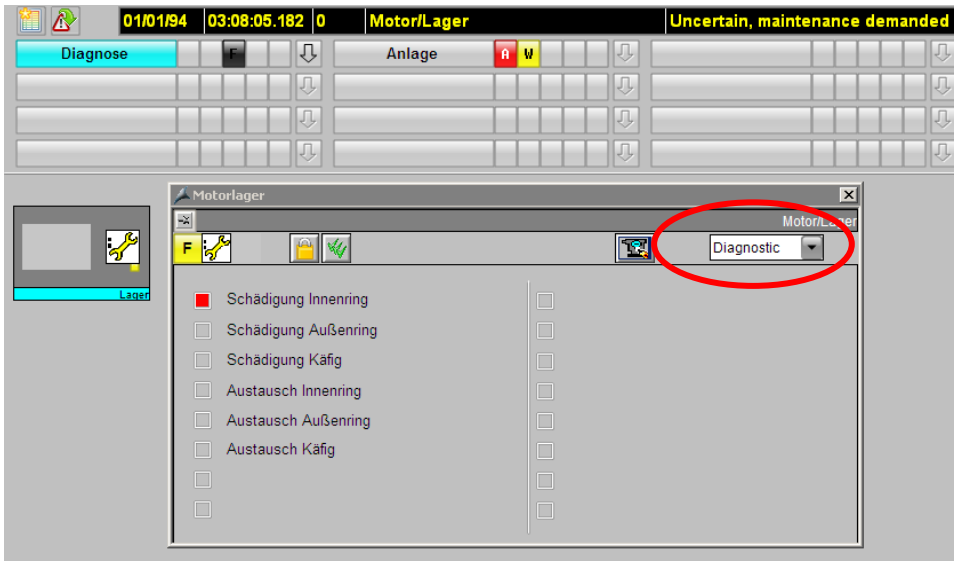
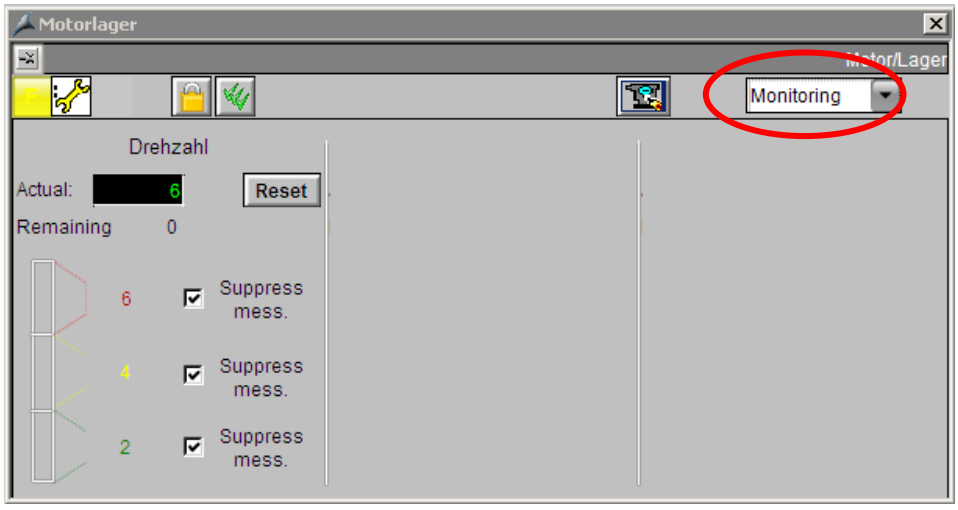


Figure 3-14: Diagnostics View of the ASSETMON Block



The diagnostics view indicates which components are damaged and any required component replacement.

Figure 3-15: Monitoring View of the ASSETMON Block



4 Annex

4.1 References

This list is by no means complete and merely reflects a selection of suitable literature.

Table 4-1

	Subject field	Title
[1]	PCS 7	PCS 7 – Manual for Library http://support.automation.siemens.com/WW/view/de/36201733
[2]	PCS 7	PCS 7 – Configuration Manual Operator Station http://support.automation.siemens.com/WW/view/de/36194551
[3]	SIPLUS CMS4000 X-Tools	SIPLUS CMS4000 X-Tools – User Manual http://support.automation.siemens.com/WW/view/de/40862689

5 History

Table 5-1

Version	Date	Modification
V 1.0	01/28/2011	First edition
V 1.1	03/30/2011	New layout