PROFINET IO

SIMATIC MV440 Code Reading System

FAQ · February 2010

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Question

How do you configure the SIMATIC MV440 code reading system as PROFINET IO device on the PROFINET IO system of a SIMATIC S7-300?

Answer

Follow the instructions and notes listed in this document for a detailed answer to the above question.

Contents

1 Introduction

The reading device is an optical code reader designed specially for the recognition and evaluation of a wide range of machine-readable codes in industrial production.

The list of readable codes includes all standard matrix codes and barcodes that can be reliably recognized.

The SIMATIC MV440 device family was designed with special focus on the following:

- Robustness
- Reliability
- Simple operability

The principal functions of the code reading device are the reading of codes and the measuring of code quality. Application of the SIMATIC MV440 product family covers practically all sectors of industrial production. Applications range from recognition of immobile parts to recognition of fast-moving parts on a conveyor system.

The SIMATIC MV440 code reading system has the following integrated communication interfaces:

- Ethernet 10/100 Mbit/s for TCP/IP and PROFINET IO
- 1 trigger input and 1 flash output
- MOBY-ASM
- RS232 with TxD and RxD
- 4 parameterizable digital I/Os

The code reading devices are extremely easy to commission and operate. In most cases, parameters are set automatically. If adjustment is necessary, you can set the parameters using the integrated web server via an Internet browser without prior installation of software.

Figure 1-1

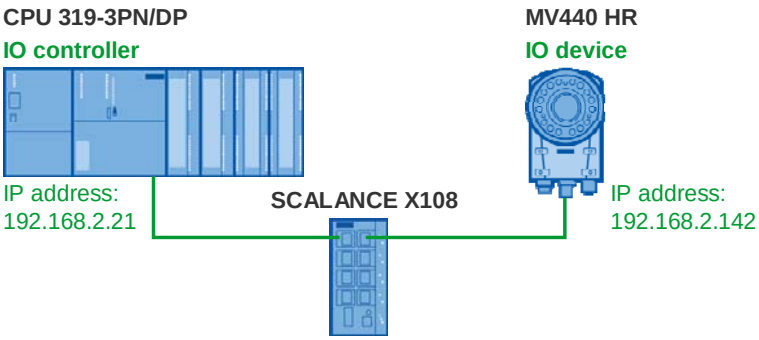
2 Configuration in STEP 7

In this example, we incorporate the SIMATIC MV440 HR code reading system as PROFINET IO device in the PROFINET IO system of a SIMATIC S7-300.

A CPU319-3PN/DP is used as PROFINET IO controller.

Figure Figure 2-1 shows the device configuration

Figure 2-1



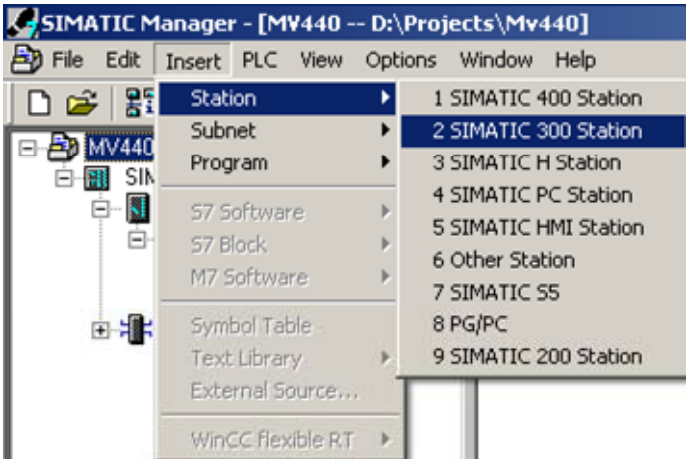
All you need for the connection are the software resources and information on the CD supplied with the SIMATIC MV440 code reading system.

Proceed to configure following the instructions below.

Insert station

In the SIMATIC Manager, create a new project and via the menu `Insert` → `Station` → `SIMATIC 300 Station` insert a new object "SIMATIC 300 Station".

Figure 2-2

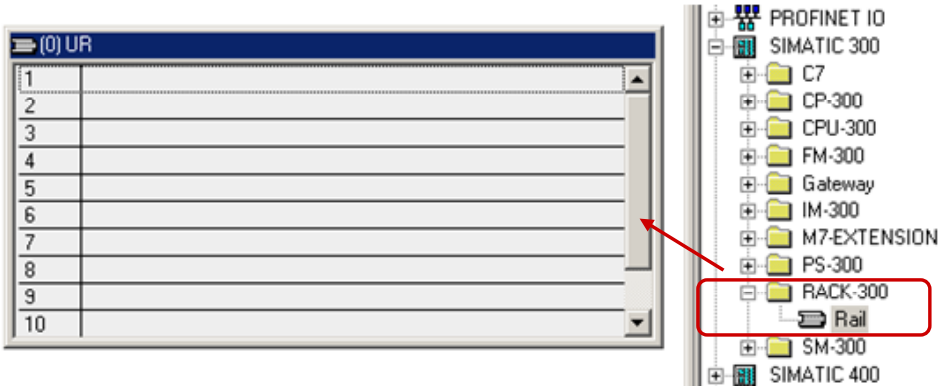


Configure SIMATIC 300 Station

Open the hardware configuration of the SIMATIC 300 station.

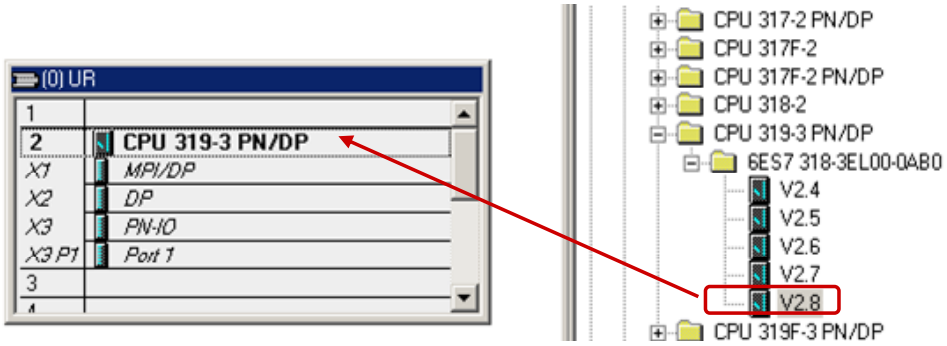
In the hardware catalog, under SIMATIC 300 → RACK 300, select the rail and drag-and-drop this into the hardware configuration.

Figure 2-3



In the hardware catalog, select the CPU used and drag-and-drop this to slot 2 in the rack. A CPU 319-3PN/DP is used in this example.

Figure 2-4



Alternatively, you can use the following CPUs.

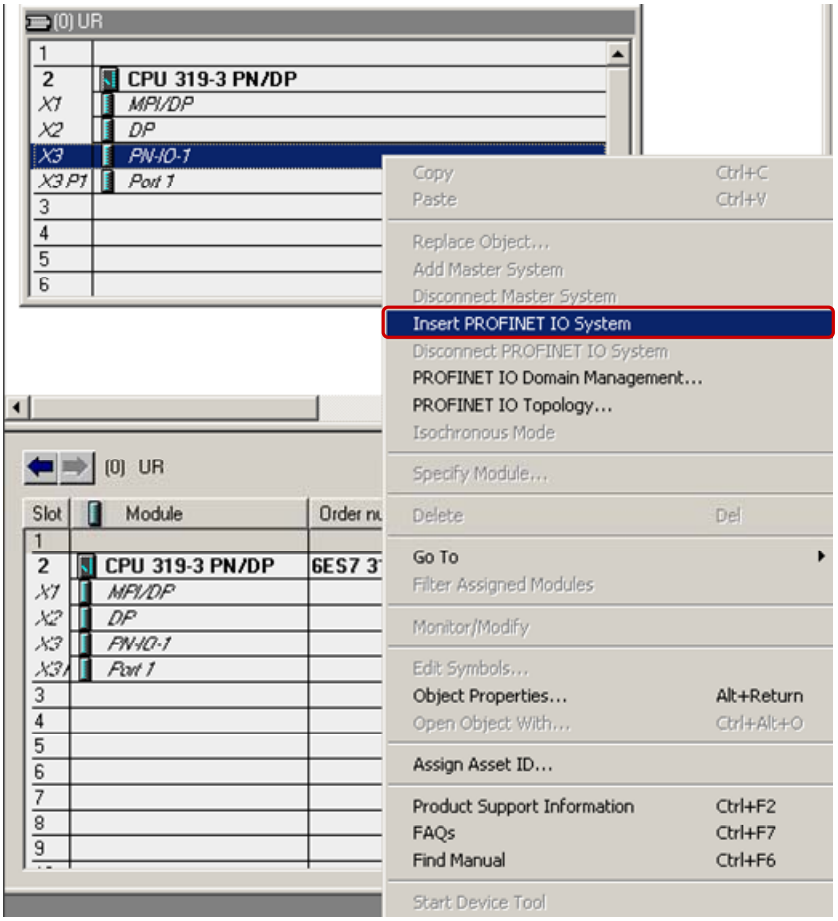
Table 2-1

CPU	MLFB	Firmware version
CPU 315-2PN/DP	6ES7 315-2EH13-0AB0	V2.5
	6ES7 315-2EH14-0AB0	V3.1
CPU 315F-2PN/DP	6ES7 315-2FH13-0AB0	V2.5
	6ES7 315-2FJ14-0AB0	V3.1
CPU 317-2PN/DP	6ES7 317-2EK13-0AB0	V2.5
	6ES7 317-2EK14-0AB0	V3.1
CPU 317F-2PN/DP	6ES7 317-2FK13-0AB0	V2.5
	6ES7 317-2FK14-0AB0	V3.1
CPU 319F-2PN/DP	6ES7 318-3FL00-0AB0	V2.5

Insert PROFINET IO system

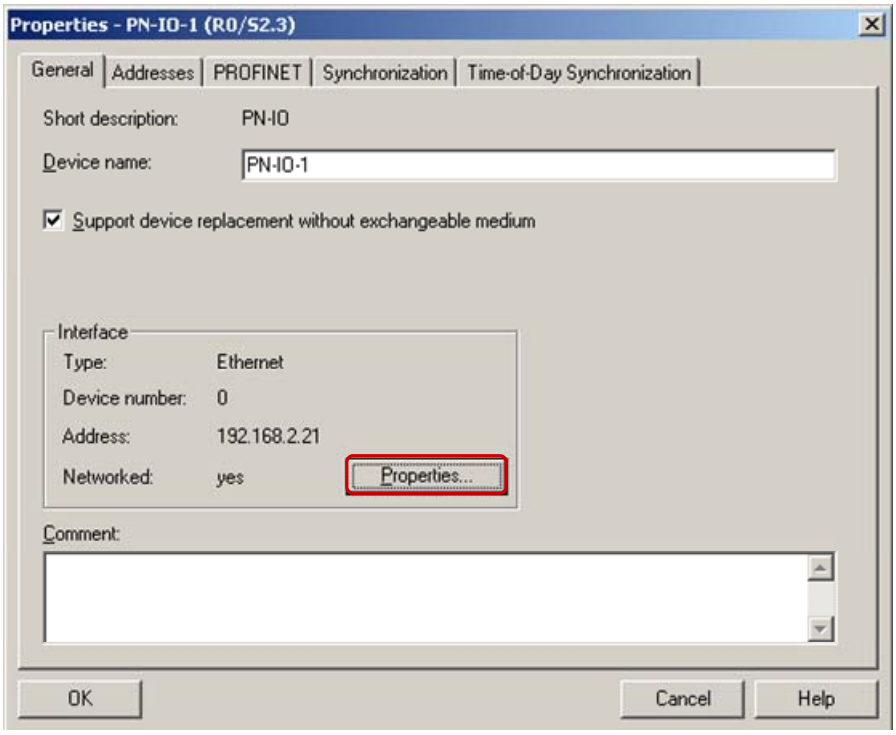
Right-click on the PROFINET interface of the CPU 319-3PN/DP and select the menu item `Insert PROFINET IO System`. The Properties dialog of the PROFINET interface opens.

Figure 2-5



In the Properties dialog of the PROFINET interface, click on the "Properties" button.

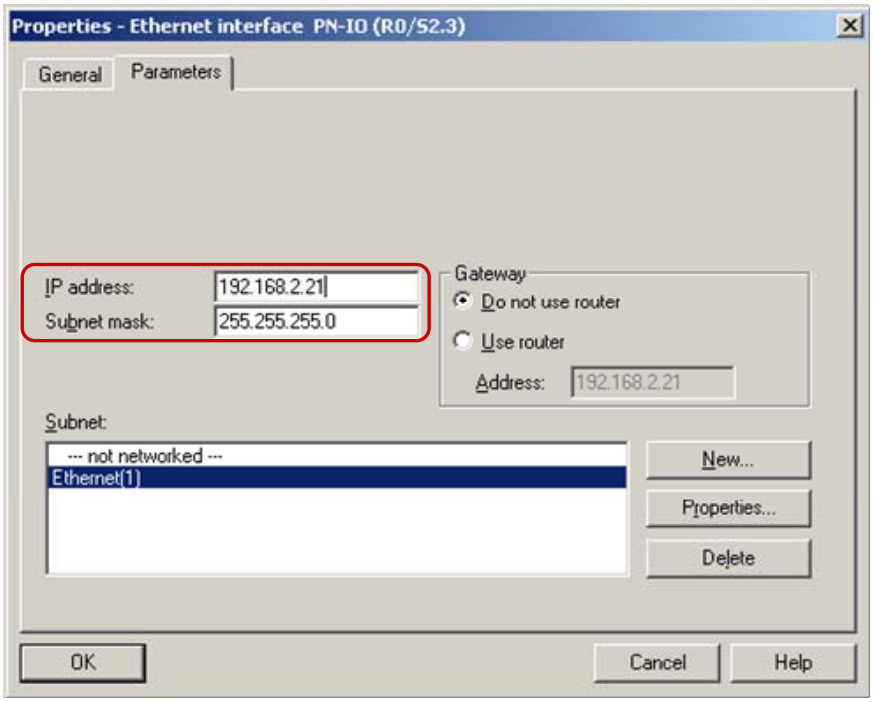
Figure 2-6



Enter the IP address of the CPU 319-3PN/DP and assign a subnet to the CPU 319-3PN/DP. Click on the "New" button to insert a new subnet.

Confirm the settings with "OK".

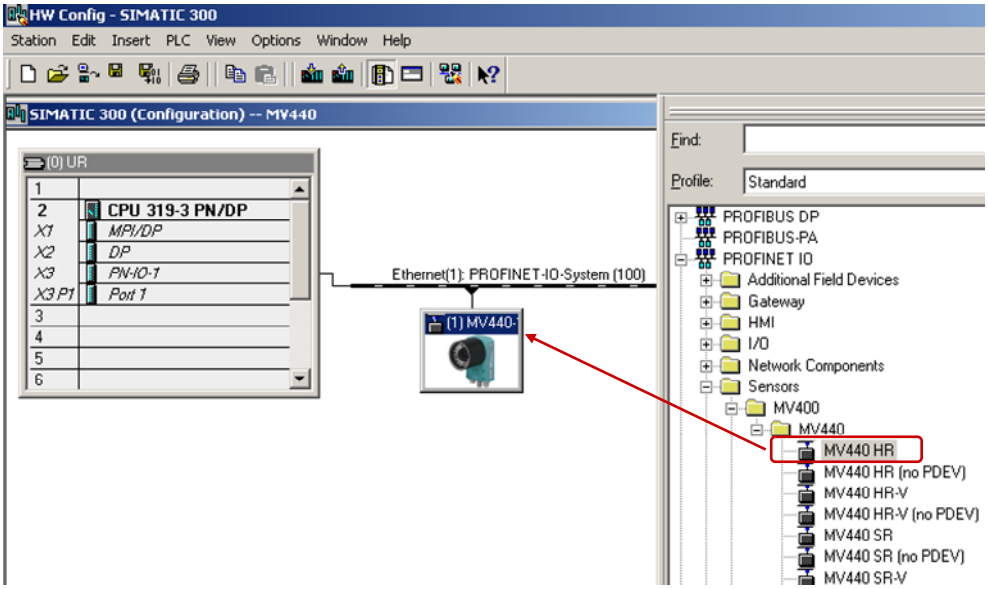
Figure 2-7



Insert SIMATIC MV440 as PROFINET IO device

In the hardware catalog, under `PROFINET IO` → `Sensors` → `MV400` → `MV440`, select the code reading system used and drag-and-drop it into the PROFINET IO system of the CPU319-3PN/DP. The SIMATIC MV440 HR code reading system is used in this example.

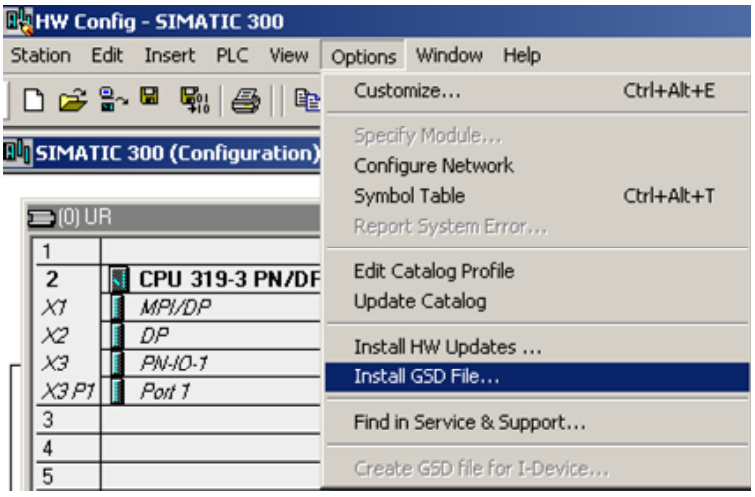
Figure 2-8



Install GSD file of the MV400 code reading system

If the code reading system of the SIMATIC MV440 device family is not in the hardware catalog, install the GSD file via the menu `Options` → `Install GSD file`.... The "Install GSD Files" dialog opens.

Figure 2-9



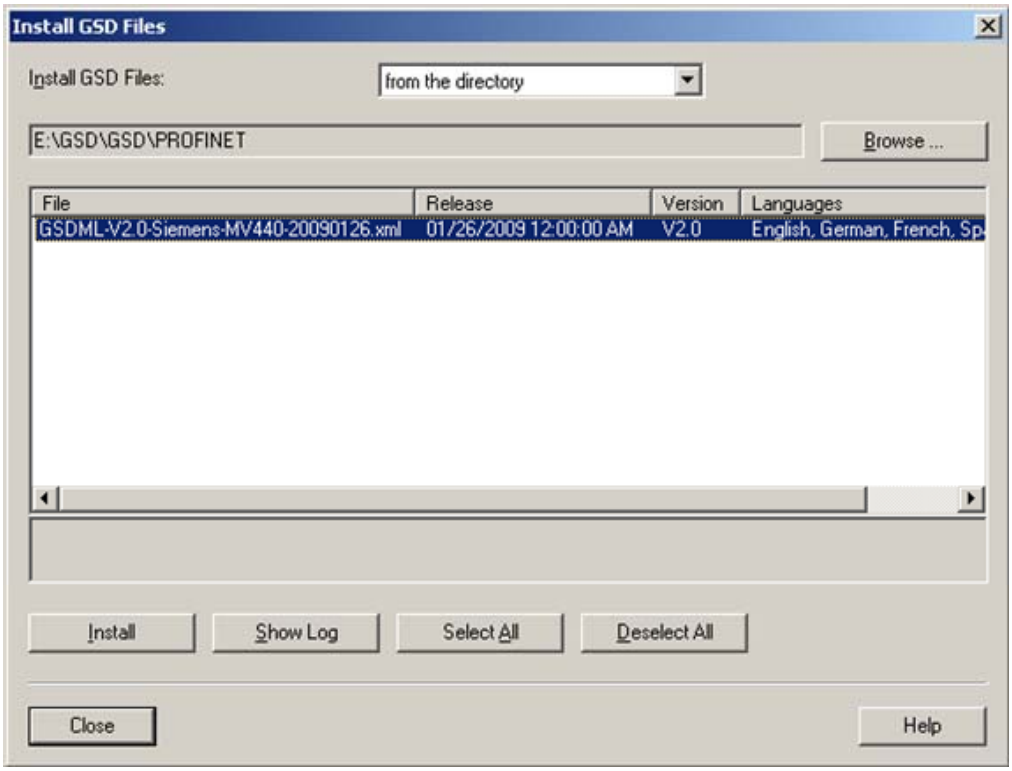
In the "Install GSD Files" dialog, click on the "Browse..." button. Select the directory in which the GSD file of the SIMATIC MV440 code reading system is stored.

Then the GSD file of the SIMATIC MV440 device family is displayed in the "Install GSD Files" dialog.

Select the GSD file and click on the "Install" button.

Upon completion of GSD file installation, click on the "Close" button to close the "Install GSD Files" dialog.

Figure 2-10



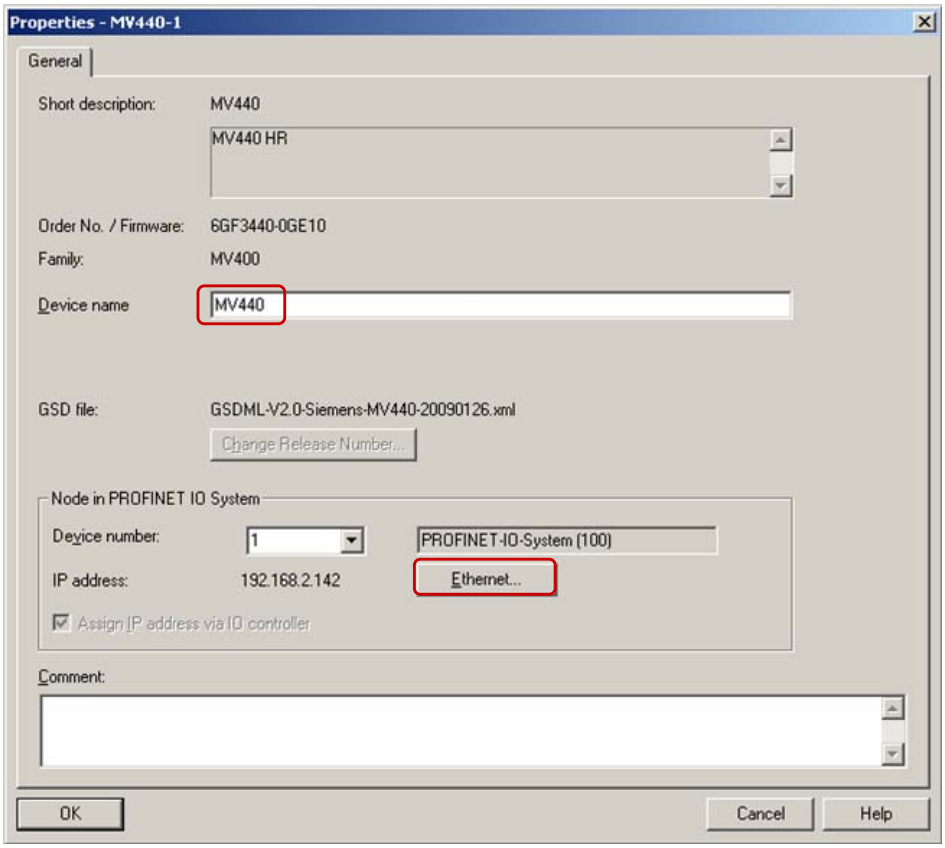
Note The GSD file is in the "VS130-2 Mode" directory on the CD included in the delivery package of the SIMATIC MV440 code reading system.

Define IP address and device name of the SIMATIC MV440 code reading system

In the hardware configuration, double-click on the SIMATIC MV440 code reading system. The Properties dialog of the SIMATIC MV440 code reading system opens.

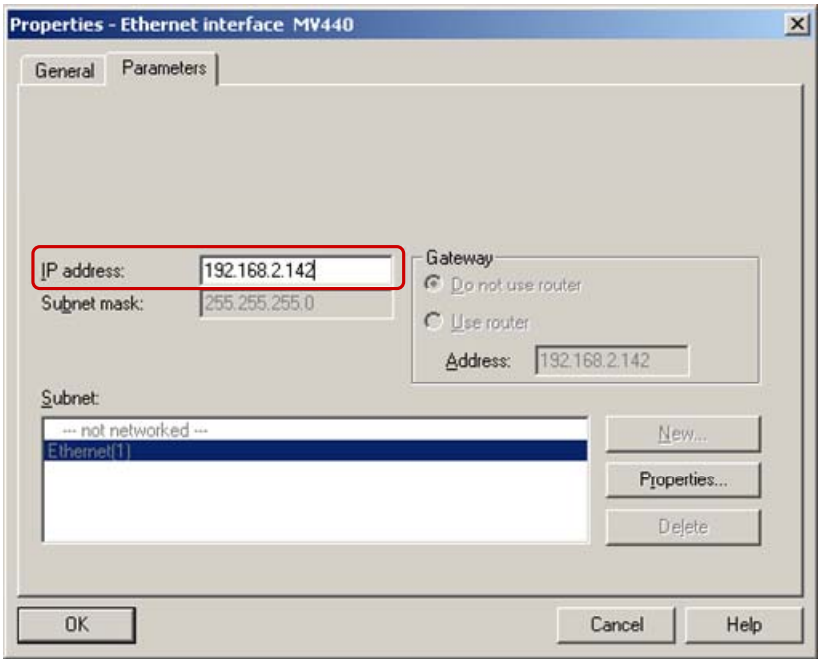
In the Properties dialog of the SIMATIC MV440 code reading system, you enter the device name of the MV440. The device name "MV440" is used in this example. Click on the "Ethernet..." button.

Figure 2-11



Enter the IP address of the SIMATIC MV440 code reading system.

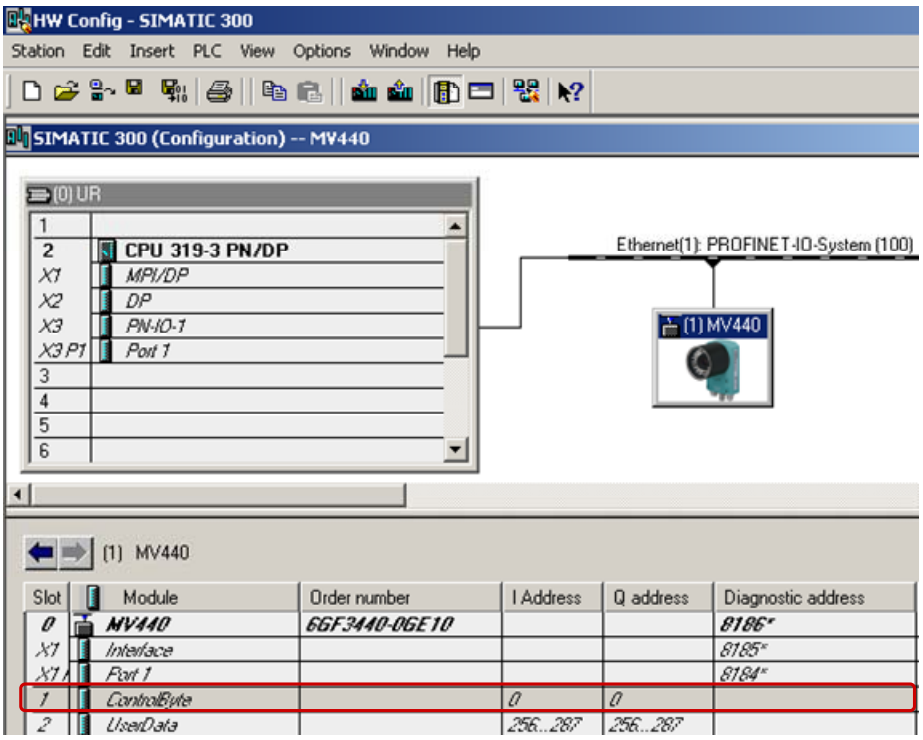
Figure 2-12



Define input and output addresses of control byte

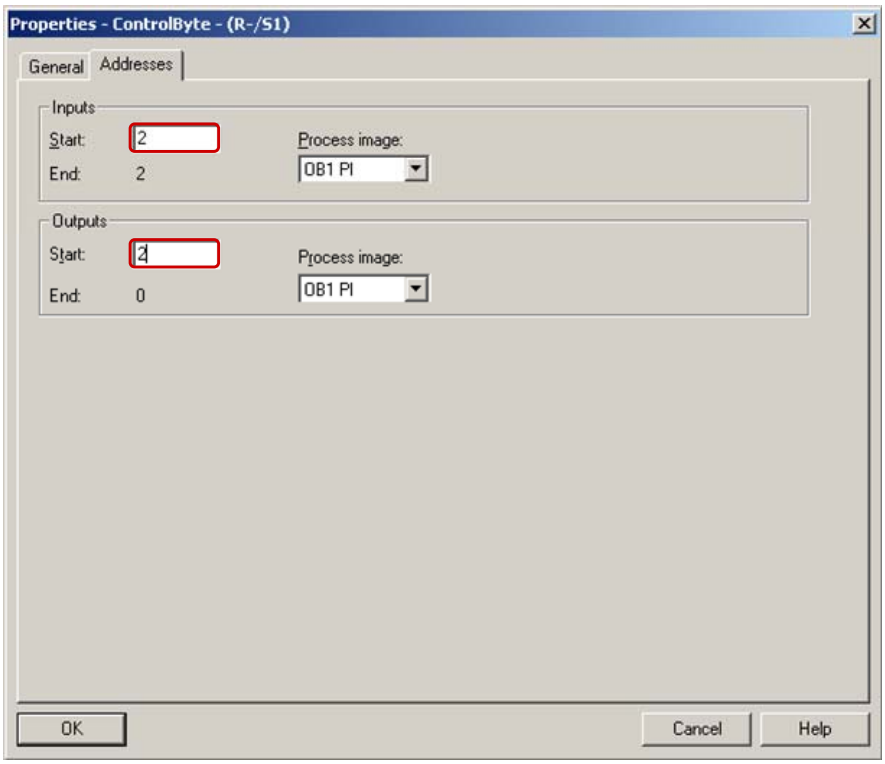
Mark the SIMATIC MV440 code reading system and in the slot table double-click on Slot 1 where the input and output addresses of the control byte of the SIMATIC MV440 code reading system are defined. The Properties dialog of the control byte opens.

Figure 2-13



In the Properties dialog of the control byte, you switch to the "Addresses" tab. Enter "**2**" under Input address and Output address for "**Control Byte**".

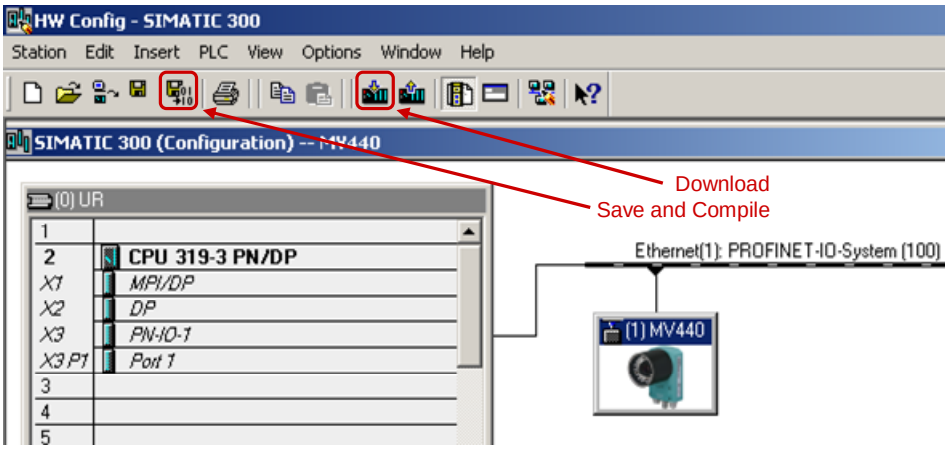
Figure 2-14



Save, compile and download hardware configuration

Save and compile the hardware configuration of the CPU 319-3PN/DP. Then download the configuration into the CPU 319-3PN/DP.

Figure 2-15



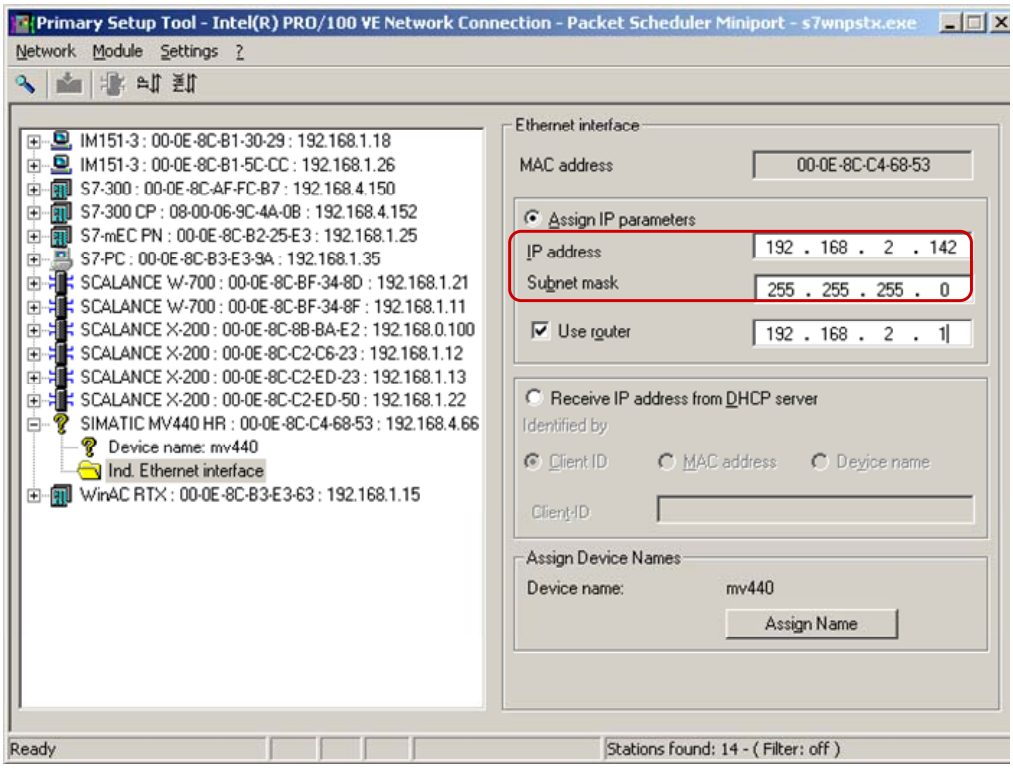
3 Setup of the SIMATIC MV440 Code Reading System

Assign IP address

Using the Primary Setup Tool, you can identify the MAC address and IP address of the SIMATIC MV440 code reading system in the Industrial Ethernet network.

If you have not yet commissioned the SIMATIC MV440 code reading system, then use the Primary Setup Tool to assign it an IP address. The IP address 192.168.2.142 is assigned to the SIMATIC MV44 code reading system in this example.

Figure 3-1



Note

More information on commissioning the SIMATIC MV440 code reading system is available in the manual. The manual is available for downloading at this link:

http://support.automation.siemens.com/WW/view/en/35126583

Web-Based Management

You set up the SIMATIC MV440 code reading system via the Web-Based Management.

In the web browser, e.g. Internet Explorer, you enter the IP address 192.168.2.142 of the SIMATIC MV440 code reading system to open the Web-Based Management. The home page is displayed (see Figure 3-2). Click on the menu item "Setup" to switch to Setup mode.

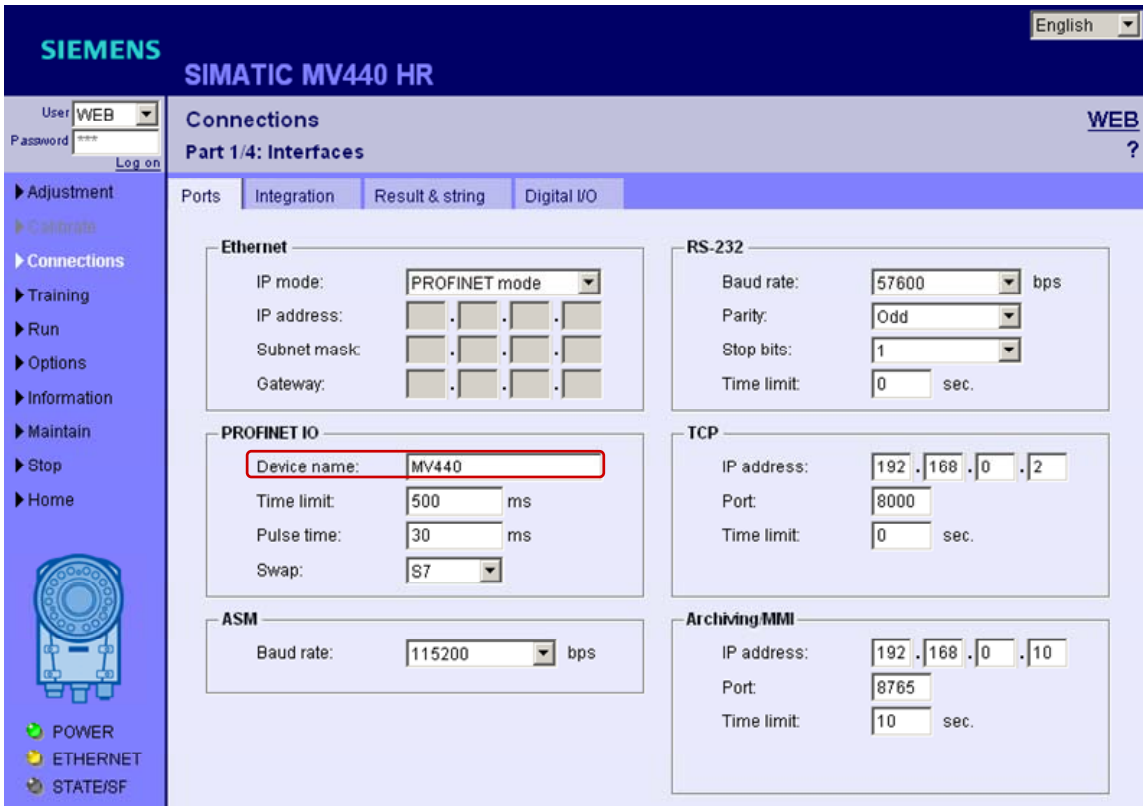
Figure 3-2

In Setup mode, you click on the menu item "Connections".

Select the "Ports" tab and under Ethernet you select the IP mode "PROFINET Mode".

Enter the device name "MV440" under PROFINET IO. The device name must match the device name of the MV440 in hardware configuration (see Figure 2-11).

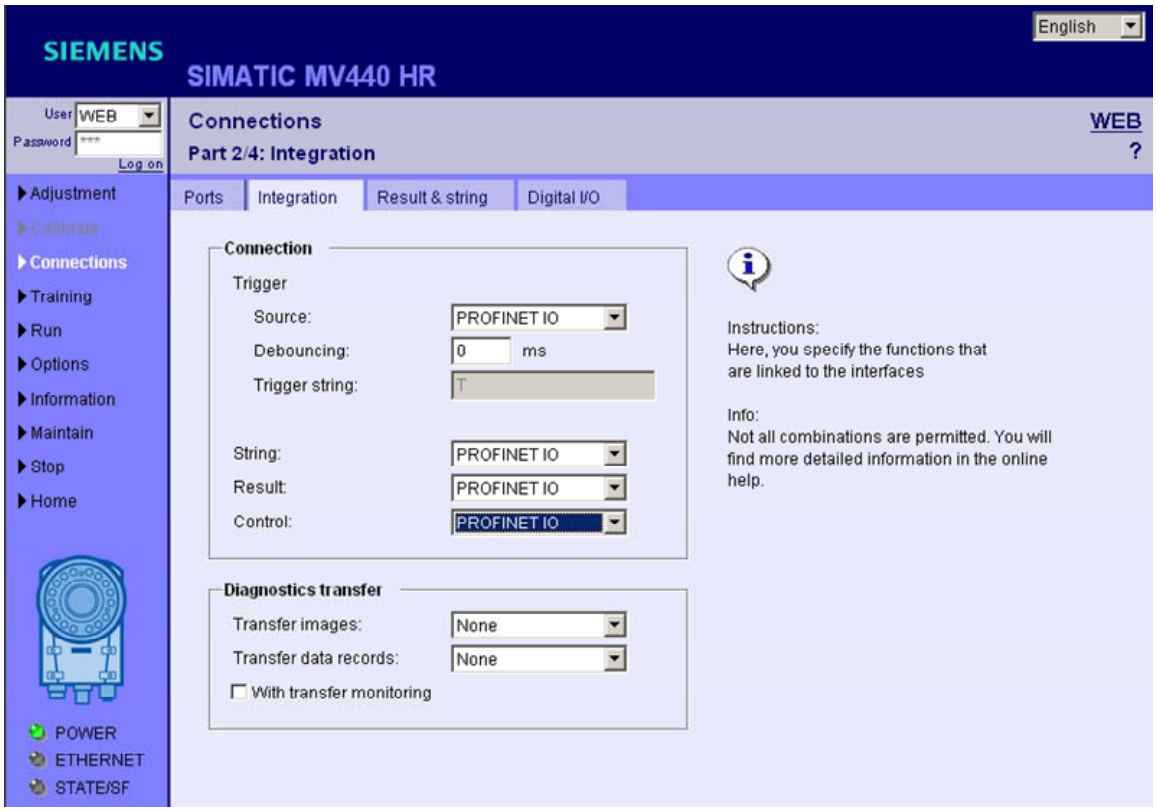
Figure 3-3



Select the "Integration" tab and then select "PROFINET IO" as source for the Trigger under Connection.

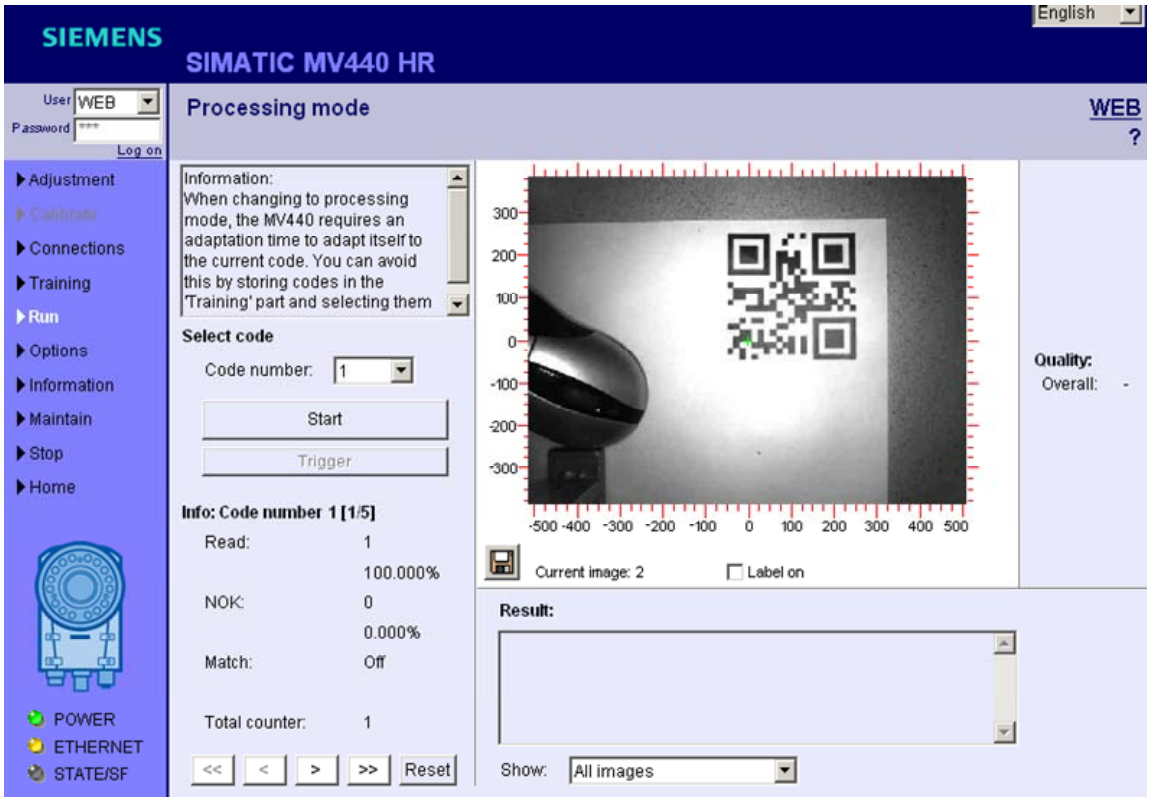
Also under Connection, likewise select "PROFINET IO" for String, Result and Control.

Figure 3-4



In Setup mode, you double-click on the menu item "Run". In Run mode you click on the "Start" button to start evaluation.

Figure 3-5

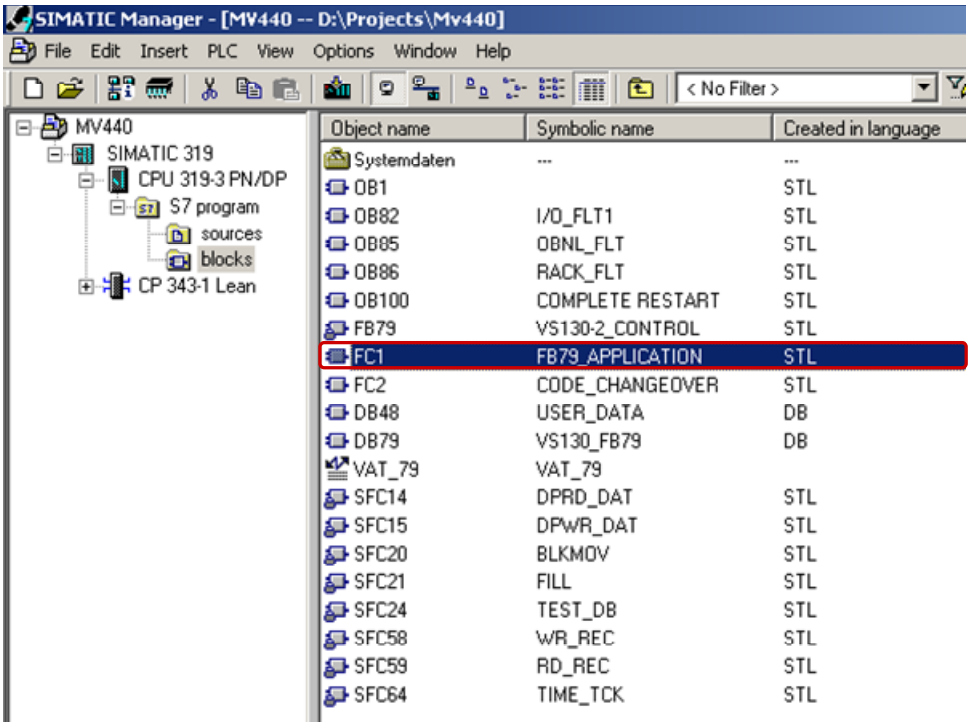

SIEMENS
SIMATIC MV440 HR
English
User WEB
Password ***
Log on
Processing mode
WEB
?
Adjustment
Calibrate
Connections
Training
Run
Options
Information
Maintain
Stop
Home
POWER
ETHERNET
STATE/SF
Information:
When changing to processing mode, the MV440 requires an adaptation time to adapt itself to the current code. You can avoid this by storing codes in the 'Training' part and selecting them
Select code
Code number: 1
Start
Trigger
Info: Code number 1 [1/5]
Read: 1
100.000%
NOK: 0
0.000%
Match: Off
Total counter: 1
<< < > >> Reset
300
200
100
0
-100
-200
-300
-500 -400 -300 -200 -100 0 100 200 300 400 500
Current image: 2
Label on
Quality:
Overall: -
Result:
Show: All images

4 S7 Program

The sample program "Example.zip" is located in the "VS130-2 Mode" directory on the CD included in the delivery package of the SIMATIC MV440 code reading system. Dearchive the sample program "Example.zip" in the SIMATIC Manager.

Copy the blocks of the dearchived sample program "Example.zip" into the S7 program of the CPU 319-3PN/DP. Double-click on the block FC1 "FB79_APPLICATION" to open and change it.

Figure 4-1



In FC1 "FB79_APPLICATION", you call the function block FB79 "VS130-2_CONTROL".

For the input parameters LADDR_CONTROL and LADDR_STATUS, you specify the input and output addresses of the control byte you configured in the hardware configuration (see Figure 2-11). In this example, the following input and output addresses are used for the control byte: 2 (dec) = 2 (hex).

For the input parameters LADDR_SEND and LADDR_RECV, you specify the input and output addresses of the user data you configured in the hardware configuration (see Figure 2-11). In this example, the following input and output addresses are used for the user data: 256 (dec) = 100 (hex).

Figure 4-2

```
// Call FB79
      CALL  "VS130-2_CONTROL" , "VS130_FB79"
       LADDR_STEUER:=W#16#2                  //Addresses from hardware configuration
       LADDR_STATUS:=W#16#2
       LADDR_SEND  :=W#16#100
       LADDR_RECV  :=W#16#100
       COMMAND     :="VS130_FB79".COMMAND
       PARAM1      :=
       RESET       :="VS130_FB79".RESET //Reset errors
       RECV        :=P#DB48.DBX0.0 BYTE 500    //Area for recieve user data
       ACTIVE      :=
       DONE        :=
       ERROR       :=
       ERRCODE     :=
       STATE       :=
       CODE_OUT    :=
       LENGTH      :=
```

I/O address control byte 2 (dez) = 2 (hex)

I/O adresse user data 256 (dez) = 100 (hex)

Comment out the following program code (see Figure 4-4). Save the changes made in FC1 "FB79_APPLICATION".

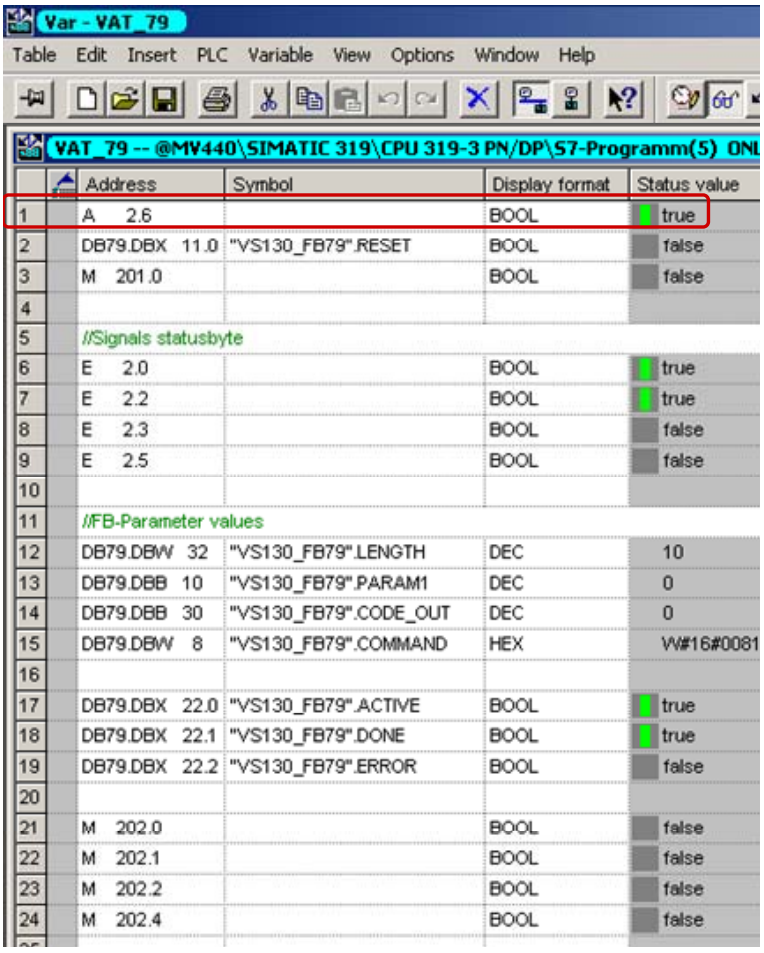
Figure 4-3

```
//*** Evaluation of the interface signals

      UN    E      2.0                  //VS130-2 error or restart
      =     M    201.1                  //VS130-2 error

      U     E      2.2                  //This signal starts a machine e.g.
      =     M    201.2                  //Process release


//*** Start of the evaluation

//  U     E     10.0                   //Start the evaluation
//    =     A      2.6                   //and set the trigger signal

//*** Reset FB in case of error

      U     M    201.0                  //Reset FB79-Errors
      U     "VS130_FB79".ERROR
      S     "VS130_FB79".RESET

//*** VS130 Reset

      U     M    201.3                  //VS130 Reset
      =     A      2.7                  //VS130 Reset
```

Download the S7 program into the CPU 319-3PN/DP.

In the S7 program, double-click on the variables table "VAT_79" to open it and set output A2.6=true.

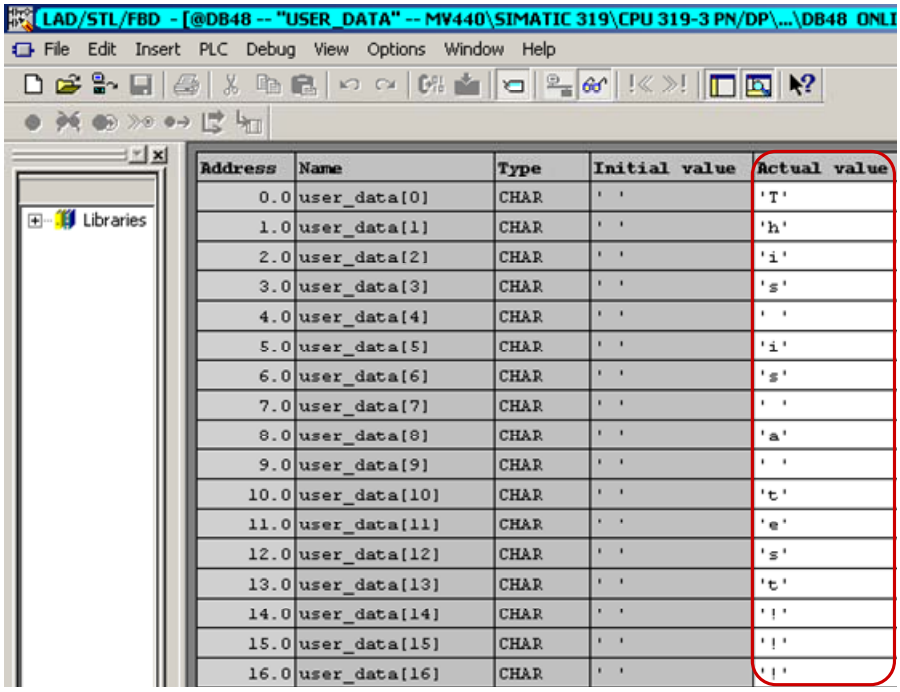
Figure 4-4



	Address	Symbol	Display format	Status value
1	A 2.6		BOOL	true
2	DB79.DBX 11.0	"VS130_FB79".RESET	BOOL	false
3	M 201.0		BOOL	false
4				
5	//Signals statusbyte			
6	E 2.0		BOOL	true
7	E 2.2		BOOL	true
8	E 2.3		BOOL	false
9	E 2.5		BOOL	false
10				
11	//FB-Parameter values			
12	DB79.DBW 32	"VS130_FB79".LENGTH	DEC	10
13	DB79.DBB 10	"VS130_FB79".PARAM1	DEC	0
14	DB79.DBB 30	"VS130_FB79".CODE_OUT	DEC	0
15	DB79.DBW 8	"VS130_FB79".COMMAND	HEX	W#16#0081
16				
17	DB79.DBX 22.0	"VS130_FB79".ACTIVE	BOOL	true
18	DB79.DBX 22.1	"VS130_FB79".DONE	BOOL	true
19	DB79.DBX 22.2	"VS130_FB79".ERROR	BOOL	false
20				
21	M 202.0		BOOL	false
22	M 202.1		BOOL	false
23	M 202.2		BOOL	false
24	M 202.4		BOOL	false

In this example, a QR code is recognized and evaluated by the MV440 code reading system. The data is saved in data block DB48 of the CPU 319-3PN/DP.

Figure 4-5



Address	Name	Type	Initial value	Actual value
0.0	user_data[0]	CHAR	' '	'T'
1.0	user_data[1]	CHAR	' '	'h'
2.0	user_data[2]	CHAR	' '	'i'
3.0	user_data[3]	CHAR	' '	's'
4.0	user_data[4]	CHAR	' '	' '
5.0	user_data[5]	CHAR	' '	'i'
6.0	user_data[6]	CHAR	' '	's'
7.0	user_data[7]	CHAR	' '	' '
8.0	user_data[8]	CHAR	' '	'a'
9.0	user_data[9]	CHAR	' '	' '
10.0	user_data[10]	CHAR	' '	't'
11.0	user_data[11]	CHAR	' '	'e'
12.0	user_data[12]	CHAR	' '	's'
13.0	user_data[13]	CHAR	' '	't'
14.0	user_data[14]	CHAR	' '	'!'
15.0	user_data[15]	CHAR	' '	'!'
16.0	user_data[16]	CHAR	' '	'!'

Note

Go to the following link to generate a random barcode for testing:

http://www.tec-it.com/online-demos/tbarcode/barcode-generator.aspx?LANG=en