

PROFIBUS compatible encoder connected to SIEMENS IM-308

Technical Information

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Changes

Due to our steady endeavor to improve our products, the information contained in this technical manual is subject to alteration at any time.

Printing

This manual was created on a personal computer using Microsoft Word for Windows 6.0. The font used is *Arial*.

Writings

Titles or emphasized text is printed *Italic* or **Bold Face**.

Courier-font shows text, that is shown on a display or monitor e.g. the menu items of a computer software.

" < > " marks keys of a computer keyboard (e.g. <RETURN>).

Document notice

none in this revision.

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Revision History

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Note:

The cover of this document shows the current revision status and the corresponding date. Since each individual page has its own revision status and date in the footer, there may be different revision statuses within the document.

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1 General

To connect TR devices compatible with PROFIBUS-DP to a SIEMENS SIMATIC S5 PLC-System, an interface card working as a master on the PROFIBUS-DP is necessary. Examples of such master devices are the interface cards IM 308-B and IM 308-C

To make a TR-encoder \Leftrightarrow interface card system working correctly, both devices need individual software to set up their parameters for the data interface. SIEMENS delivers two software packages. One is for the IM 308-B called 'COM-ET-200' and one is for the IM 308-C called 'COM-ET-200 for Windows™'.

To program the encoder parameters, the TR software 'EPROG' is shipped with this disk. EPROG can run on every PC or SIEMENS PG 7xx using the operating system MS-DOS™, MS-Windows™ 3.x or MS-Windows™ '95.

To connect the encoder to the serial interface of a computer, a PC adaptor art.No. 490-00301 is necessary. This adaptor converts EIA RS 232 to EIA RS 485.

It is assumed that the following is well-known:

usage of a PC or a SIEMENS PG 7xx

usage of the operating systems MS-DOS™, MS-Windows™ 3.x or MS-Windows™ '95

usage of the SIEMENS software 'COM-ET-200' or 'COM-ET-200 for MS-Windows™'

2 Programming PROFIBUS-DP parameters with EPROG

In this chapter you will find a description how to set up the PROFIBUS-DP specific parameters. For the usage and functionality of EPROG please refer to the documentation No. TR-E-BA-GB-0011.

The encoder will work properly on the PROFIBUS-DP only if some specific parameters are set up before starting the bus cycle. The Input/Output configuration and - if address switches are disabled - the encoders station address*, must be programmed using EPROG software.

When the encoder is properly connected to the PC adaptor and after starting up EPROG, you will find a section 'Profibus-DP' in the scoll list. Use the F2-key named 'Map' to gain quick access to this section.

Profibus-DP	:	Yes
Address switch	:	Yes
Station no.	:	3
In/Outputs	:	32 I.
Data type	:	Position
Data bits	:	24
Code	:	Binary
Signal bits	:	0

In this section all important parameters for correct opperation on the Profibus-DP are set up. The encoders station address and the Input / Output configuration must be equal to the parameters set later with COM-ET-200.

2.1 Address switch

You can either enable (Yes) or disable (no) the address switches. Enabling the address switches causes the encoder to read the switches and use the current setting as the station address.

2.1.1 Station number

If the address switches are disabled you can program the station number the encoder uses on the Profibus-DP. If the address switches are enabled you cannot program the station number. If you try you will get an error message saying that the stations number is set according to the address switches. Valid address settings are 3 up to 99.

2.2 In / Outputs

Sets the Input / Output configuration that the encoder uses. There are two possibilities:

The setting **32I.** means, the Profibus-DP master gets 32 input bits. The master must then be configured to read four bytes of inputs with consistency enabled.

The setting **8 O. + 24 I.** means, the Profibus-DP master gets 24 input bits and 8 output bits. The master must therefore be configured to read three bytes of inputs with consistency enabled and can output one byte. With this configuration it is possible to adjust the encoder using one either the 2nd or 3rd preset value stored in the encoder. Bit x.1 sets the encoder position to Preset 2 Bit x.2 sets it to preset 3.

These setting are not supported by type B interface cards for the IM 308 !

* if address switches are disabled and not yet programmed

2.3 Data type

The encoder output can either be position data or electronic cams, if available. If cams are enabled they must be programmed in the 'Cams' section.

2.4 Data bits

Sets how many of the possible 32 data bits are output. Valid values are 1 up to 32.

2.5 Code

The encoder is able to output it's position with Binary, Gray Code, Shifted Gray Code, BCD, Excess3 and Shifted Excess3. For a S5-PLC you should keep the code set to Binary.

2.6 Signal bits

If the number of data bits is programmed to less than 32, the encoder can output signal bits. Each bit can be programmed individually and contains bitwise coded error messages.

3 Configuration of IM308-B with COM ET 200 V4.x

3.1 Preparation

SIEMENS delivers a software package called COM-ET-200 for the configuration of the B-Series of the IM 308. To set up an encoder with this software you need type files that contain manufacturer specific parameters of PROFIBUS-DP slaves. On your diskette in the directory PROFIBUS.DP\COMET4X you can find the following type files for the encoder:

TR1345TD.200	german version
TR1345TE.200	english version
TR1345TF.200	french version
TR1345TI.200	italian version
TR1345TS.200	spanish version

Copy all these files into the COM-ET-200 directory on your PC or PG 7xx. If COM-ET-200 is installed on a CP/M partition, you must copy the files to this partition using the 'pcopy' command.

In the following it is assumed that the software package COM-ET-200 is well known. If not stop here and refer to the SIEMENS manual of COM-ET-200 first.

3.2 Entry of ET 200 system parameters

Start up COM ET 200 on your PC or SIEMENS PG. Select the language version you want to use and type the name of the Program file you want to create or open. Press the <F1> key, "Entry of ET 200 system parameters" to configure the master system IM 308 B.

```

Program file selected C:ENCOD@ET.200          SIMATIC S5 / COM ET 200
ET 200-SYSTEM PARAMETERS
-----
System name: ENCODERTEST
Bus parameters:
Station number IM 308-B master module:      1
PG connected to bus:          N
Second IM 308-B:             N
Additional act. station:     N
Baud rate:                    187.5 kbaud
Bus profile:                   DP - Standard
Controller parameters:
CPU-Type:                      A
Response monitoring:           Y          000.7 s
QVZ when station fails:      Y
Diagnostics:                  Y   Diagnostics address:  252
Dual-port RAM addr:          N   Basic DPR page no.:
Ready signal:
Power up delay:              20 s
    
```

Important parameters on this screen are the bus profile that should be set to DP - Standard and the CPU type that must be set according to your PLC host system. For setting the baud rate please refer to the SIEMENS manual 'Distributed I/O system ET-200'. All other parameters have to be set up manufacturer or customer specific, and don't influence the encoders functionality on the PROFIBUS.

3.3 Configuring

After setting up the system parameters the IM 308 B must be told how to address it's periphery. That is done by setting up a table where each slave uses an entry. Press the <F2> key (Configuring) to enter the stations number. This number must be set according to the address you programmed into the encoder using the EPROG software. After that you have to choose whether the encoder is addressed over the P, Q or dual-port ram area. This does not influence the functionality of the encoder. For further information about addressing modes, please refer to the documentations of the S5 PLC and the IM-308-B. After choosing the addressing area you must select the correct station type. Select 'TR-LSPM2 DP'. Do this by pressing the <F7> key when editing the field 'Station type'. This will pop up a menu where you can select this item.

The station type 'TR-LSPM2 DP' appears in this pop up menu, only when you have copied the type files from your diskette to the COM ET 200 work directory before startup of the COM ET 200 software. If you do not copy these files you will not be able to configure the encoder. Your encoder will not work with standard ET 200 type files.

```

Program file selected C:ENCOD@ET.200          SIMATIC S5 / COM ET 200
CONFIGURING
-----
Station number:   3          Area: P          Station type: TR-LSPM2   DP
Station name:                Encoder TR Electronic
Next available address:  DI:   0  DQ:   0  AI:   0  AQ:   0

Configuration:                Module address:  I:          Q:
(Shift F6: DP-Slave - Parametriertelegamm)
  0.          1.          2.          3.          4.          5.          6.          7.
  000          147

  8.          9.          10.         11.         12.         13.         14.         15.

 16.         17.         18.         19.         20.         21.         22.         23.

 24.         25.         26.         27.         28.         29.         30.         31.
    
```

The encoder has to be configured with code '000' at slot 0 (empty slot), and code '147' at slot 1. All others slots must be kept empty (without entry). 147 is the code for input 4 bytes consistent and corresponds to the setting '32 I.' programmed into the encoder using the EPROG software. You can decode the 147 setting by pressing the <F7> key when editing slot 1.

Settings other than these are **not** possible using an IM-308-B !

3.4 Known technical problems

3.4.1 Upcoming acknowledgement delay

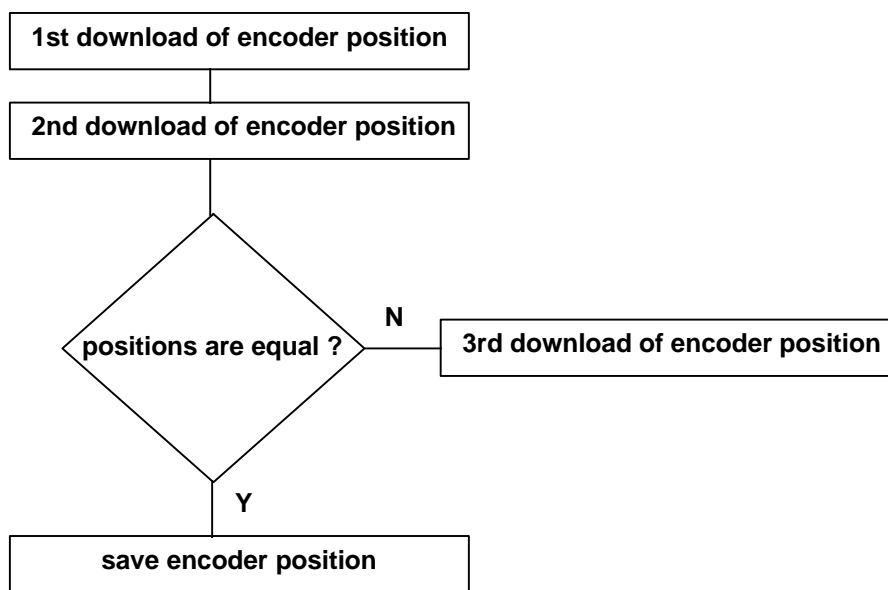
Using the encoder together with IM 308-B, acknowledgement delays can occur with the CPU-types 941-943 A and B in AG115 and 928-B in AG135.

This is not an encoder failure. Inside the encoder is an ASIC called LSPM2 that manages the PROFIBUS-DP protocol.

No problems occur when using an IM 308-C. We recommend the usage of this device.

3.4.2 Non consistent encoder positions

If you decide to read the encoder by using the commands L PY xxx or L QB xxx instead of L IB xxx, the encoder position downloaded from the PLC is not repeated. To get repeated position data, FB must be programmed. This reads the position twice, compares these positions and reads the position a third time if the comparison fails to be equal. This must be done during one PLC-Cycle.



Note

After getting a difference between the first and the second position downloaded from the IM, the third download can be used without further check, because the IM needs more time to update the input data from the PROFIBUS than the PLC needs to download the position value.

This is not an encoder failure. The data transfer from the encoder cpu to the protocol interface chip is consistent. No problems occur when using an IM 308-C. We recommend the usage of this device.

4 Configuration of the IM308-C with COM ET 200 for Windows

4.1 Preparation

To set up the interface card IM308-C, SIEMENS delivers a software package called COM-ET-200 for Windows. With this software you can find the following language independent type files on your diskette in the directory **\PROFIBUS.DP\COMWIN10\TYPDAT5X**:

TR24CETX.200	typ file for CE-65 rotary encoder with 24 input Bits and 8 output bits.
TR32CETX.200	typ file for CE-65 rotary encoder with 32 input Bits.
TR24LATX.200	typ file for LA-66 linear encoder with 24 input Bits and 8 output bits.
TR32LATX.200	typ file for LA-66 linear encoder with 32 input Bits.
TRSL2DTX.200	typ file for PROFIBUS display module.

Copy all these files into the directory COMWINxx\TYPDAT5X on your PC or PG 7xx.

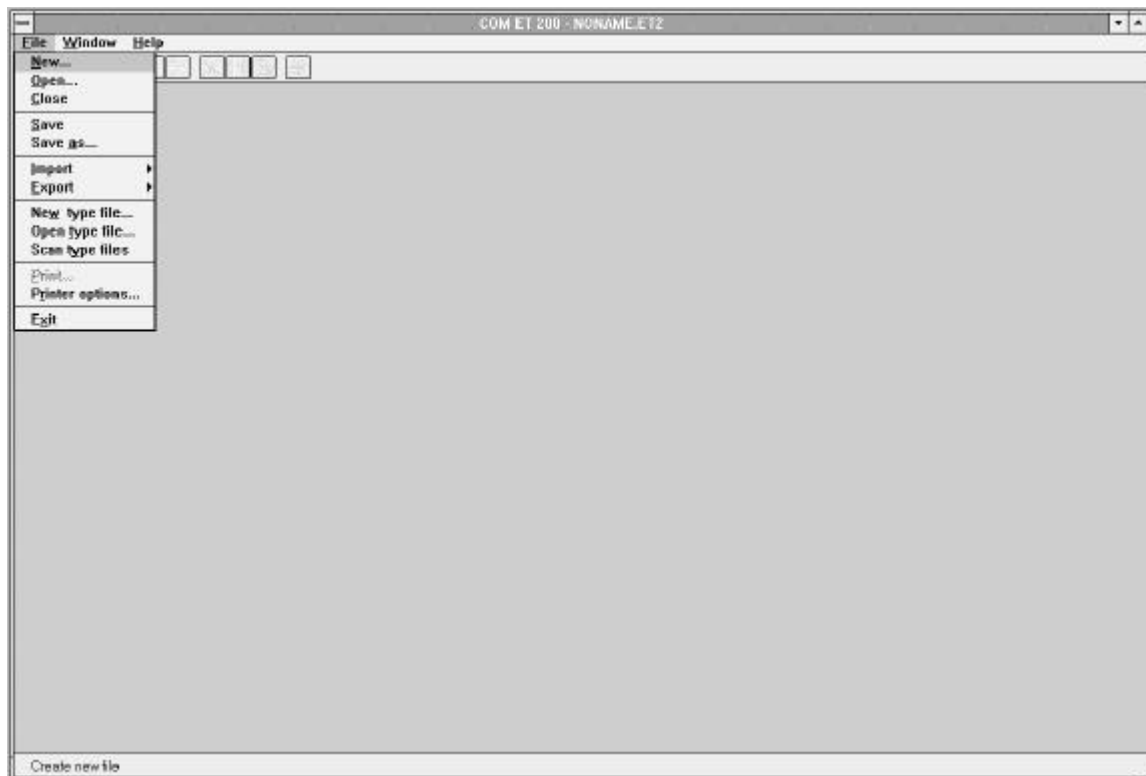
You will also find a some bitmap files that COM-ET-200 for Windows needs. You find them on your diskette in the directory **\PROFIBUS.DP\COMWIN10\BITMAPS**:

TR1345CN.BMP	Bitmap (Picture) for CE-Encoder
TR1345CS.BMP	Bitmap (Picture) for CE-Encoder
TR1345LN.BMP	Bitmap (Picture) for LA-Encoder
TR1345LS.BMP	Bitmap (Picture) for LA-Encoder
TRSL2D_N.BMP	Bitmap (Picture) for TRS display module
TRSL2D_S.BMP	Bitmap (Picture) for TRS display module

Copy all these files into the directory COMWINxx\BITMAPS on your PC or PG 7xx.

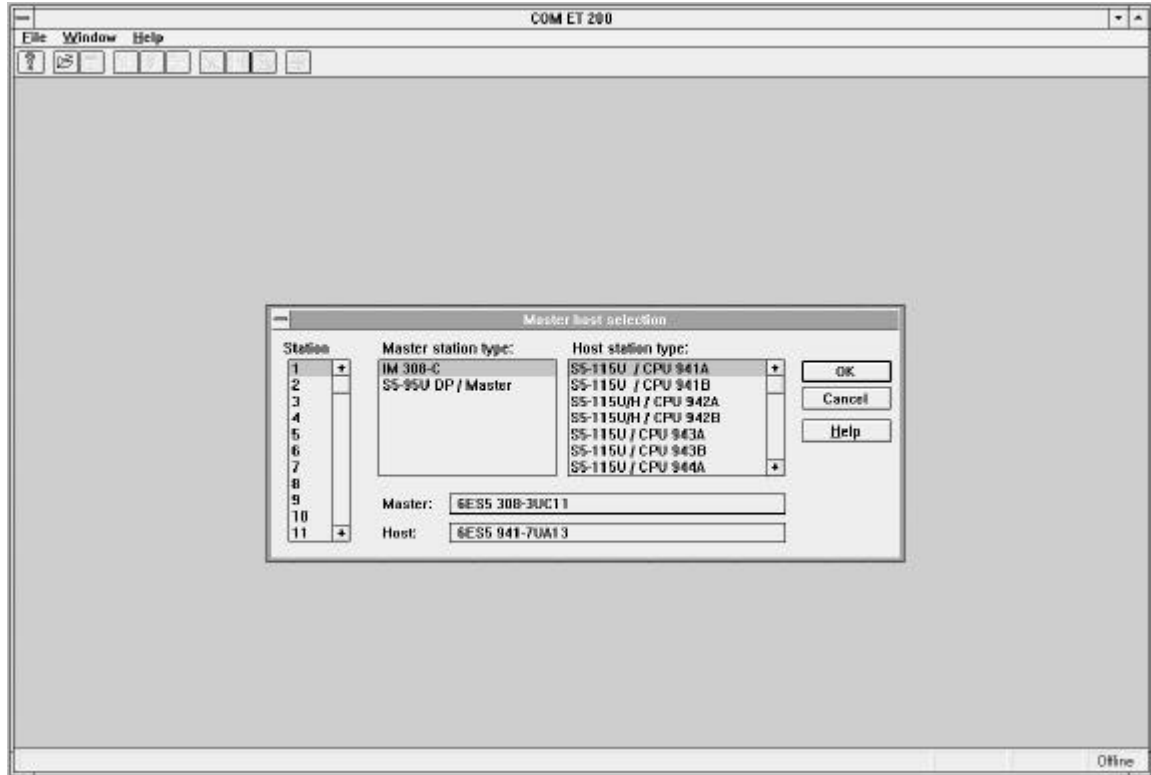
4.2 Scan type files

After copying the files from your diskette, you can start up COM-ET-200 for Windows. The first step is to scan the new type files. Do this by selecting the menu item 'File | Scan type files'. Please note that COM-ET-200 for Windows does not report if the scan was successful.



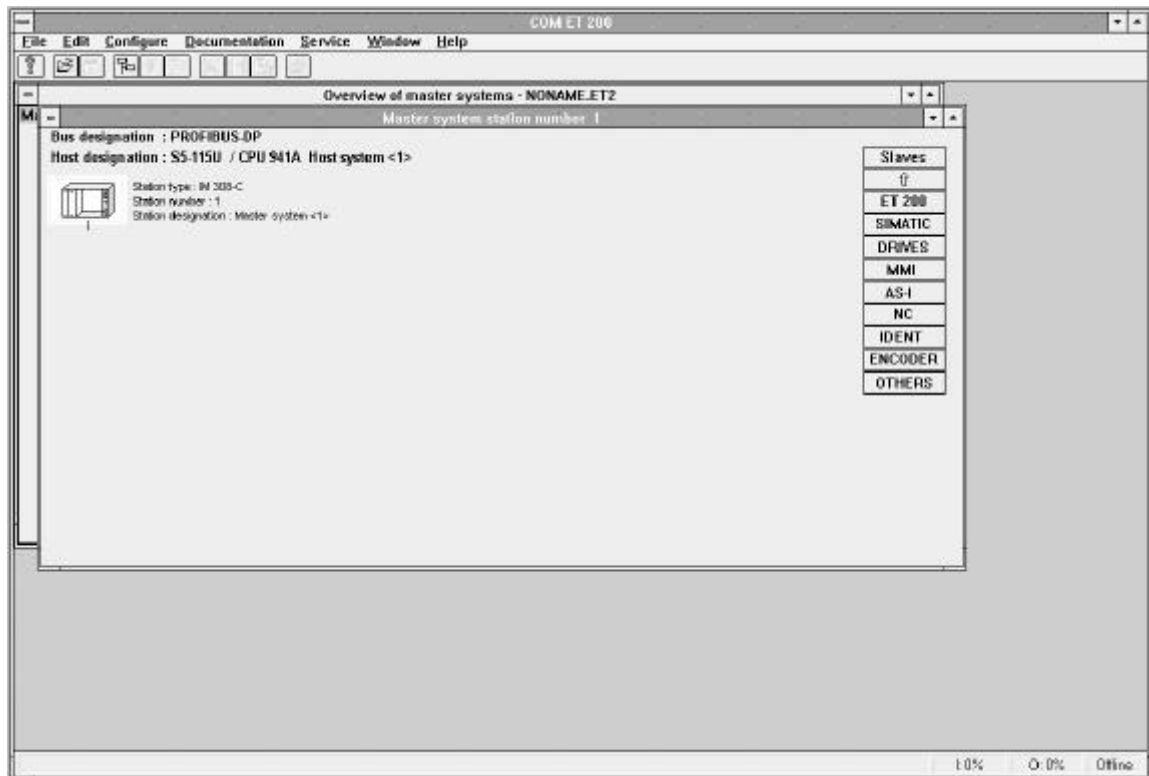
4.3 Configuring the master system

After scanning the type files you can either create a new 'File | New' or open 'File | Open' an existing configuration. If you decide to create a new one you first have to configure the master host selection



In this screen you have to choose the station number of your PROFIBUS master station, the master station type, and the host station type. Select the items according to your hardware.

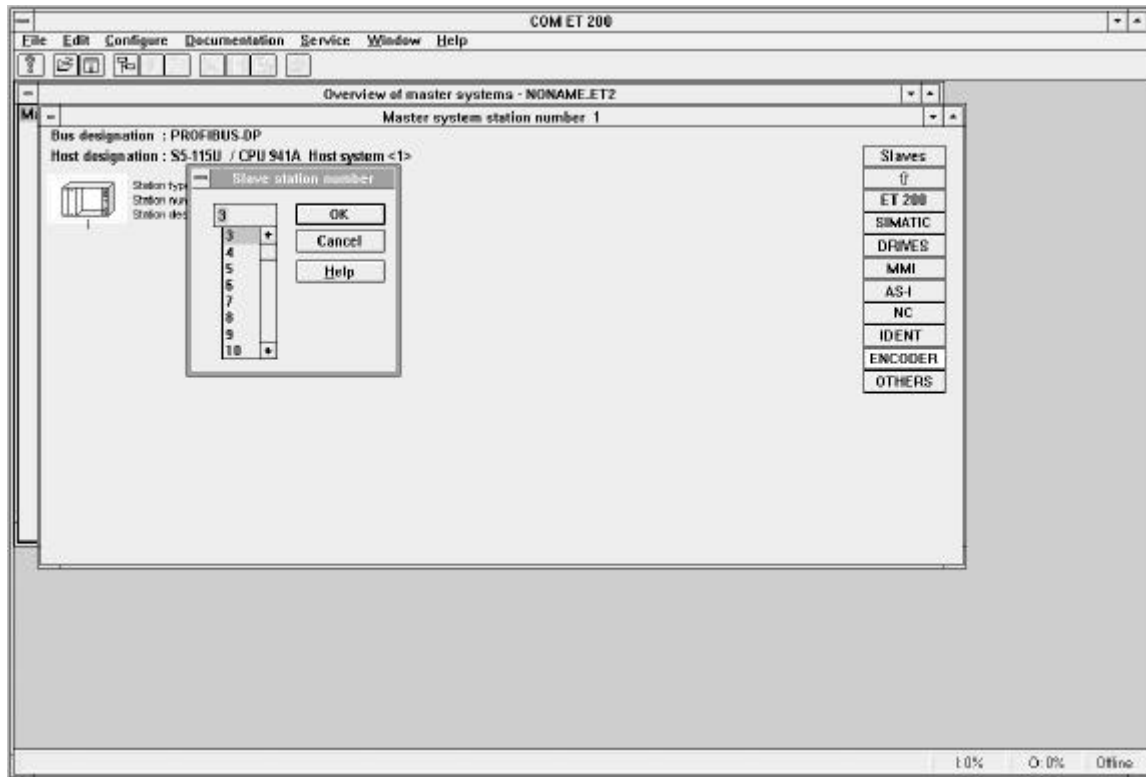
4.4 Configuring the slave stations



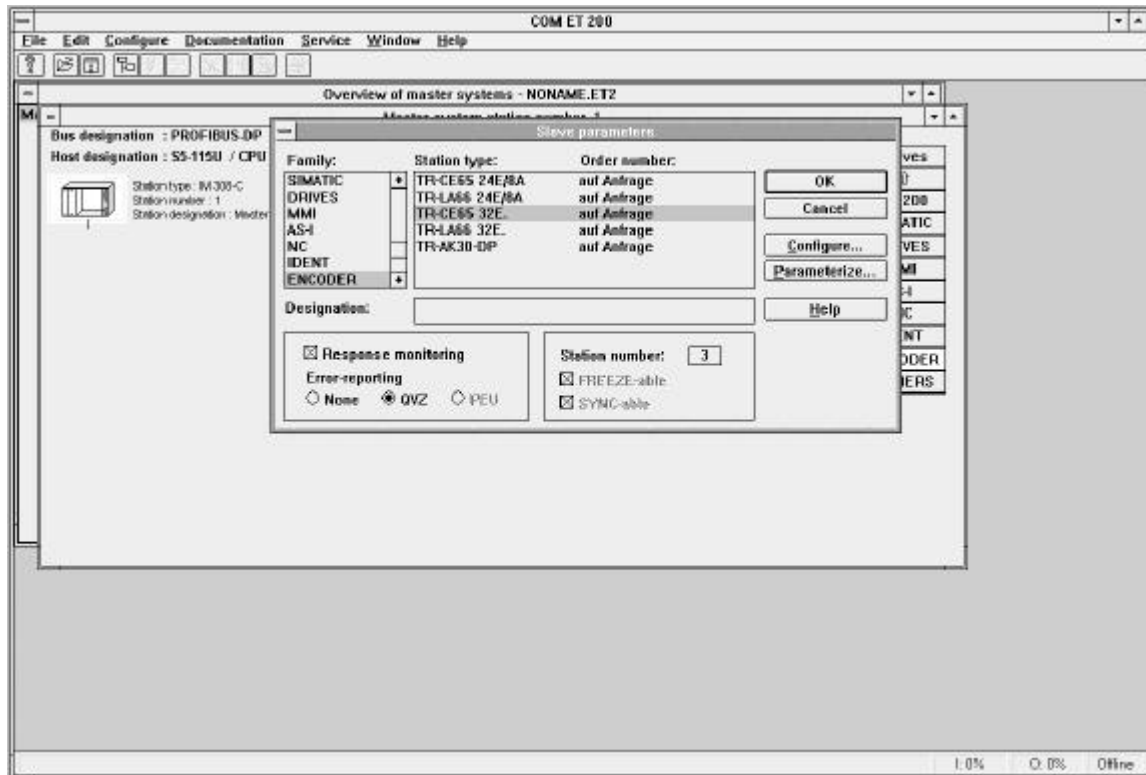
If not visible before, a new item 'ENCODER' will appear in the slaves list. To add an encoder to the bus structure click on ENCODER in the slaves list and move the mouse to the position you want to add the slave.

4.5 Configuring the encoder as Profibus-DP Slave

When you add the encoder you are first asked for the slave station number.

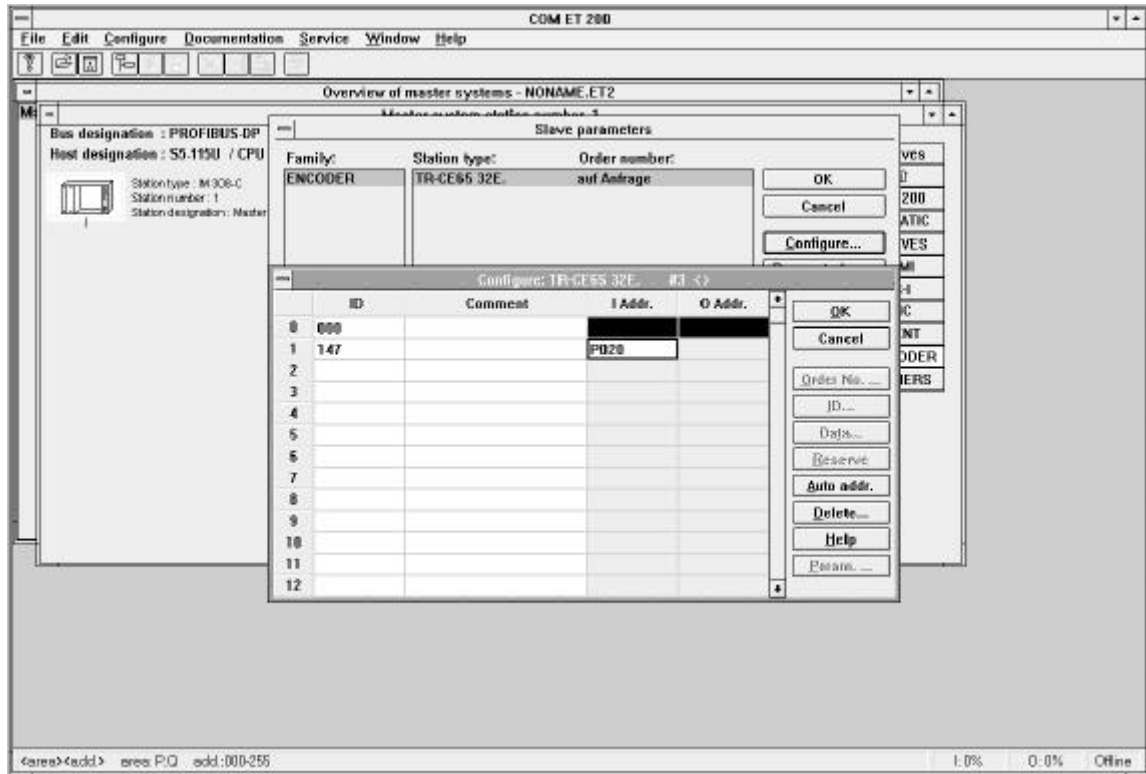


After that select the desired slave type from the list that appears on the screen.

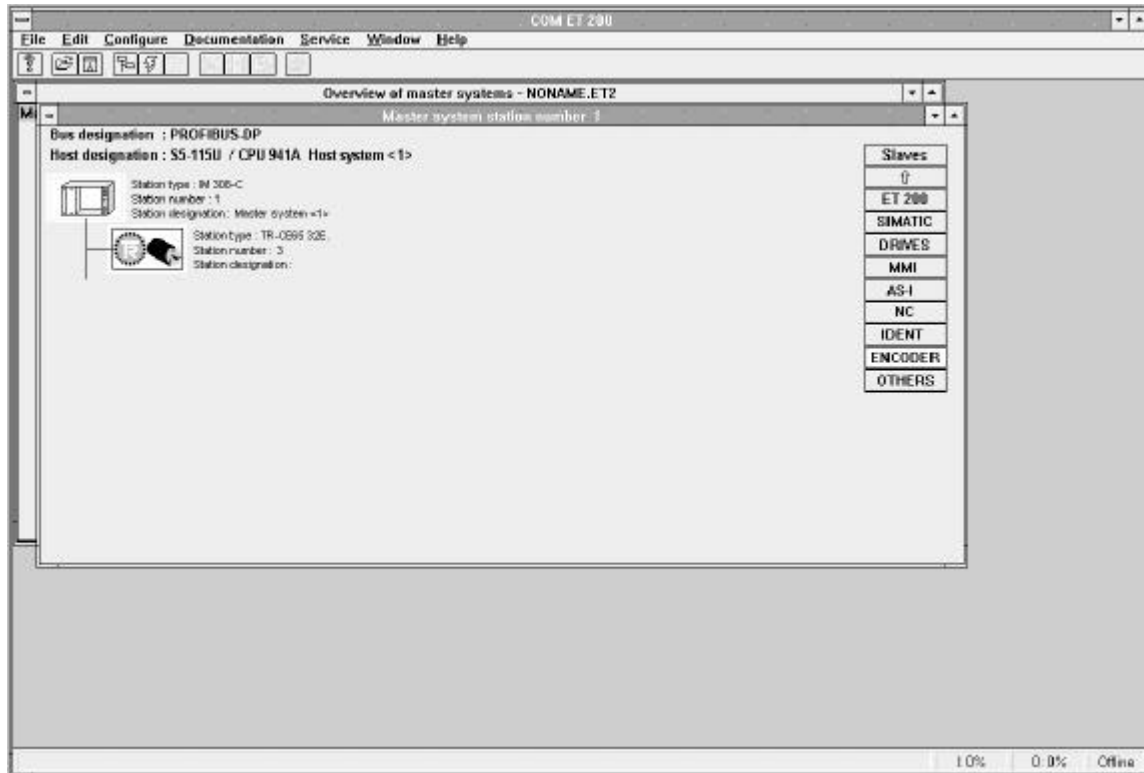


4.6 Configuring the Encoders

To configure the encoder, click on the button <Configure...>, and you will get a window with a table popping up where you have to make the Input/Output configuration. The type files for the CE-65 rotary encoder and the LA-66 linear encoder contain pre-defined codes according to the Input/Output configuration programmed into the encoder using the EPROG software. You just have to enter the Input/Output base address.



If all data is entered correctly, then the encoder will be integrated into the bus structure.



Please refer to the SIEMENS manual for all other parameters that are to be set up with COM-ET-200 for Windows.

5 Configuration of other PROFIBUS master devices

To configure PROFIBUS master devices from other manufacturers, a special file called TR1345.GSD is stored on your diskette in the directory **\PROFIBUS.DP\GSD**. This file contains all informations about the CE-65 rotary encoder and the LA-66 linear encoder for use with PROFIBUS-DP compatible fieldbus systems. Please refer to the manufacturer's manual on how to interpret this file.

For further technical information please call our local sales representative.