SIMATIC S5

COM ET 100

Communications Software

Software Manual

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A Assigning Input/Output Addresses with the COM ET 100 Communications Software

A.1 General Remarks

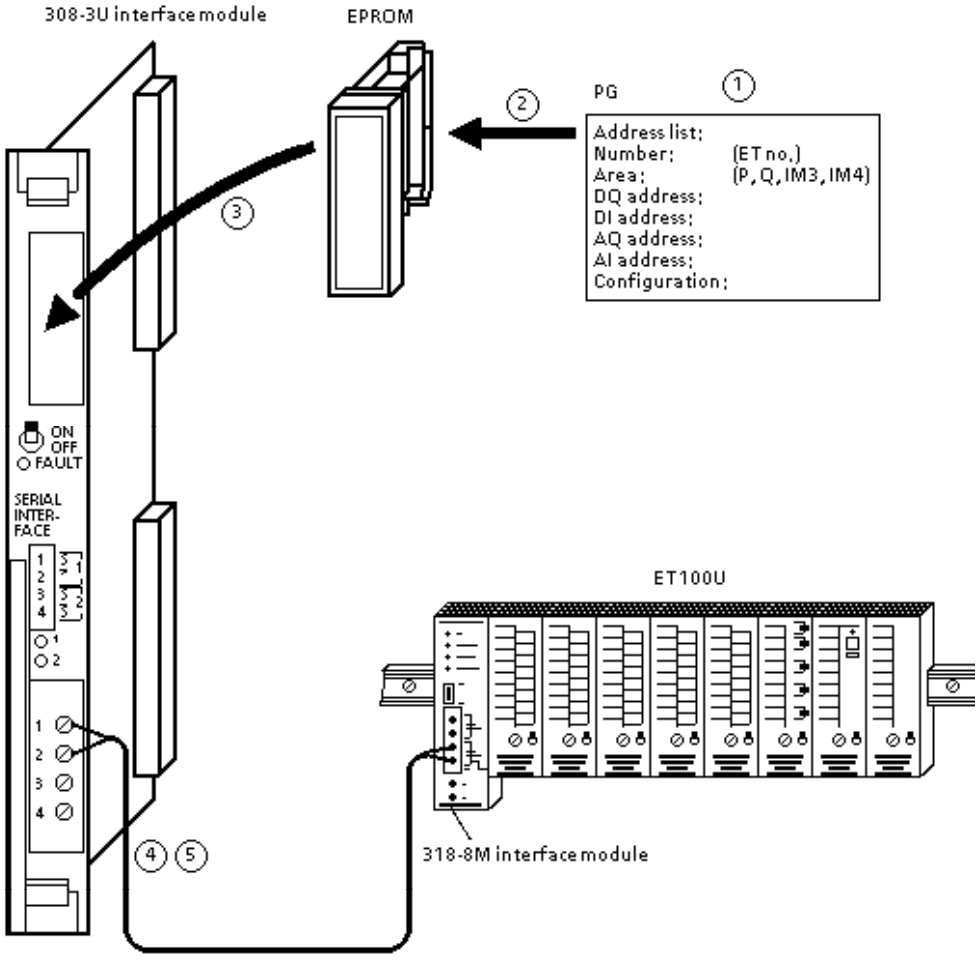
The COM ET 100 communications software is used to assign the input/output addresses for, and define the configuration of, the ET 100U. This information is stored in an EPROM, which must be plugged into the 308-3 interface module. The number of the ET 100 must be set on the 318-8 interface module. COM ET 100 must be loaded into a programmer (PG 635, PG 675 or PG 685; A.8 for information on the PG 615); the menu-driven program prompts for the following information for each ET 100U:

- The program name under which the data is to be stored
- The addressing range reserved by the input/output modules (I/O area and extension areas; max. 2K bytes of addresses)
- The type of each module, e.g. digital output module, analog input module, and so on
- The slots for the various modules
- The starting addresses of the module types used

The address list is transferred from the programmer to the EPROM submodule. The submodule must then be plugged into the central controller's 308-3 interface module (Figure A- 1)

Note:

Before you begin, please make a backup copy of COM ET 100. To do so, format a floppy with the "DSKMAINT" utility, which is on the PCP/M floppy, and copy the original COM ET 100 floppy with "PIP".



Generate address list on the PG; COM ET 100 provides operator guidance
Program the EPROM using the programmer
Plug the EPROM into the central controller's 308-3 interface module (to permanently store the addresses)
The 308-3 (central controller) and 318-8 (ET 100U) check the module locations to be sure that all modules are plugged into the correct slots
The 308-3 and 318-8 interchange data in block-serial mode

Figure A-1 Module Locations

A.2 Starting the COM ET 100 Communications Software

The COM ET 100 system software can execute only in conjunction with the S5-DOS operating system. The PG 675 programmer requires a memory expansion board for S5-DOS, but can also be used without an expansion board with the PCP/M-86 basic operating system and the ZEFU software (Table A-1)

Programming with the PG 615 programmer is described in detail in Section A.9.

All descriptions in this manual referring to the PG 685 programmer apply analogously to the PG 695 programmer.

Table A-1 Operating Systems for the Various Programmers

PG 635 PG 685	**PG 675 with memory expansion board**	**PG 675 without memory expansion board**
S5-DOS COM ET 100	S5-DOS COM ET 100	PCP/M-86 ZEFU COM ET 100

When using the ZEFU software (S5-DOS, version III), you should generate a working floppy containing the required files (Table. A-2) After the S5PX308X.CMD file has been transferred to the workdisk, its name must be changed to S5PD308X.CMD with the "REN" utility, which you will find on the PCP/M-86 floppy.

Table A-2 ZEFU Files for the Workdisk

FILE	Floppy
S5.CMD	ZEFU 1/3
S5WX000H.CMD	ZEFU 1/3
S5WX001H.CMD	ZEFU 1/3
S5WX100X.CMD	ZEFU 1/3
S5WX202X.CMD	ZEFU 2/3
S5XXMO1X.DAT	ZEFU 1/3
S5XXMO2X.DAT	ZEFU 1/3
S5XXMO3X.DAT	ZEFU 1/3
S5KDS01XDAT	ZEFU 1/3
S5KDS02XDAT	ZEFU 1/3
S5KXS02X.CMD	ZEFU 1/3
S5PX308X.CMD*	COM ET100

* File must be renamed!

A.2.1 Starting COM ET 100 with the PG 635 Programmer

Proceed as follows to start the COM ET 100 software using the PG 635:

- Switch on the programmer and load the PCP/M-86 operating system
- Insert the floppy containing ZEFU 2/2 in drive 0 (A), the one containing the COM ET 100 software in drive 1 (B)
- Start the command interpreter by pressing keys "S" and "5". Set the cursor to COM ET100 in the Package Select menu and start COM ET 100 by pressing function key F1 (Package). (PG 635 manual, Order No. 6ES5 835 0SC11).
- Replace the COM ET 100 floppy in drive 1 (B) with a formatted data floppy

A.2.2 Starting COM ET 100 with the PG 675 Programmer

Proceed as follows to start COM ET 100 over the PG 675:

- Switch on the programmer and load the PCP/M-86 operating system
- Insert the floppy containing the S5-DOS command interpreter or the ZEFU software in drive 0 (A) and the floppy containing the COM ET 100 software in drive 1 (B)
- Start the command interpreter by pressing keys "S" and "5". The "Package Select" menu is then displayed. You can start the COM ET 100 software by pressing function key F1 (Package). The Language Select menu is displayed a few seconds later.
- Replace the COM ET 100 floppy in drive 1 (B) with a formatted data floppy

A.2.3 Starting COM ET 100 with the PG 685 Programmer

If the PCP/M-86 basic operating system and S5-DOS are already on the hard disk, PCP/M-86 starts COM ET 100 as soon as you switch on the programmer (For details please refer to the PG 685 manual, Order No. 6ES5 885 -OSC 21).

- Switch on the programmer and wait until PCP/M-86 displays its version number
- Copy the COM ET 100 software from the floppy to the hard disk by inserting the floppy in the drive and entering "PIP B:=A:*.*".
- Start S5-DOS with the "S5" command, set the cursor to the COM ET100 package, and load it into the programmer's memory by pressing function key F1 (Package). COM ET 100 then displays its Language Select menu.

A.3 Address Assignments for the ET 100U Modules

The "Language" menu is displayed as soon as you have started the COM ET 100 software. If you want to use a drive other than the default drive for your formatted data floppy, make the appropriate entry in the "Datadisk in FD" field.

Then proceed as follows:

- Select one of the languages by pressing the associated function key (F1 to F5); the "ET 100" form is displayed.

- Enter a program name of no more than eight characters, then press function key F1 (ADDRESS ASSIGN.) to enter form 3, "ET 100 Address Assignment".

- In this form, the device number (ET 100 No.) whose base addresses and configuration you want to define is displayed at the upper left. Please make sure that this number is identical to the number set on the 318-8 interface module.

- Enter the I/O area (P, Q, IM3 or IM4) first, then the starting addresses for the four module types (digital input modules, digital output modules, analog input modules, analog output modules).

Note:

- Not every programmable controller permits use of all I/O areas. Please refer to the relevant information in the programmable controller manuals
- The P area is the standard I/O (peripheral) area, and can be addressed, for example, with STEP 5 statements (L PW, T QB, A I 4.5, and so on)
- In the P area, the diagnostic address that you can set on the 308-3 interface module (addresses 128-255) may not be used for the addresses of the ET 100U modules
- Analog modules can be addressed from 128 to 254 in the P area and from 0 to 254 in the Q area
- The Q area is the extended I/O area, and can be addressed with specific statements only (L QW, L QB, T QB and so on)
- If the Q area is to be copied (page mode), address 255, which is reserved for page select, may not be assigned
- The starting addresses for analog modules must always be even-numbered addresses

A.4 Configuring the ET 100U Modules

Enter the address identifiers of the modules that are plugged into the relevant ET 100U in the configuring fields. You can call a list of permissible entries to screen by pressing F7 (HELP). You will also find a list of address identifiers in the relevant manuals in the sections dealing with technical specifications for the ET 100U / AG S5-100U modules. You can reserve fields for future modules by defining identifiers or entering 000 in these fields. Each field reserves one half byte or nibble. Be sure that you do not exceed the maximum address space of 32 bytes per peripherial device.

The addresses of all similar modules in an ET 100U are contiguous. Digital modules reserve one nibble for every four and one byte for every eight inputs or outputs. Analog modules require two bytes for each channel.

When you have completed your entries for one ET 100U, you can define the end addresses automatically by pressing F4 (page up) and F5 (page down).

A.4.1 Using the ICM 560 Individual Control Module

If you are using ICM 560s, you must fill in a separate screen form for each. The specified data must include the required I/O area and the starting addresses for the analog input and output modules. Enter address identifier "2AX" in the configuring field and leave the other fields blank. The ICM 560 reserves four bytes for the input and four bytes for the output module.

A.5 Storing Plant Data and Programming EPROMs

After you have completed your entries, store all plant data on the data floppy by pressing F2 (STORE).

Now transfer the plant data to the EPROM submodule. Make sure that the EPROM has been plugged into its receptacle. If you are still in the "ET100 Address Assign." form, press F8 (EXIT) to return to the ET100 top menu and press F2 (PROGR. EPROM). Status messages "Submodule handling active" and "Submocule handling terminated" are displayed at the lower left of the screen.

N O T E C A R E F U L L Y:

Insert or remove the EPROM submodule only when the central controller is switched off.

Plug the EPROM into the central controller's 308-3 interface module (Figure A.1, Module locations). When you switch on the central controller, the 308-3 interface module forwards the address list to the ET 100U's 318-8 interface module, which checks the locations of all (configured) modules, compares them against the address list, and reports any discrepancies to the central controller. During operation, only modules entered in the address list can participate in data interchange.

The 308-3 and 318-8 interface modules detect errors in the ET 100U and on the data transmission circuit. These include:

- ET 100U no longer addressable (total failure)
- Error on the transmission link (wire break, no terminating resistor)
- Error on the output modules (on-load voltage, short-circuited output)
- Wrong module inserted or error on the ET 100U internal bus (e.g. module has eight instead of four inputs)
- No module

(S5 ET 100 U manual, Order No. 6ES5 998-1ET11)

A.6 Address Assignments on the S5-115U Programmable Controller

The S5-115U has only a P area as address space.

On the S5-115U, the process image in address locations 0 to 127 is generated on a word (= 2 bytes) basis, and must therefore conform to the following rules:

- The starting addresses for the ET 100U / ICM 560 modules must always be even numbers (0, 2, 4 and so on)
- The end addresses for the ET 100U / ICM 560 modules must always be odd numbers (1, 3, 5 and so on)
- All addresses must be contiguous, even when several modules are involved
- The "even-numbered starting address / odd-numbered end address" rule also applies when you reserve address blocks for future system components
- It is sometimes possible to observe the "even-numbered starting address / odd-numbered end address" rule only when the address space is filled by a virtual, i.e. non-physical module. In this case, you must configure a module with COM ET 100 without plugging it into the bus module. The slot for this module, however, must be "physically" available. The relevant ET 100U's diagnostic byte reports "Module removed", and a time-out (QVZ) results. The only way to prevent the programmable controller from going to STOP is by disabling QVZ mode on the 308-3 interface module, using switch S3/3 or by selecting another system configuration (Programming example, section A.9, and the manual for the 308-3 interface module, Order No. 6ES5 998-2DP11).

Note:

There are two process images, one for inputs (PII) and one for outputs (PIQ). The conditions discussed above must be observed for both inputs and outputs.

The following table (Table A-3) shows what an address assignment might look like if all the above prints are taken into account.
The number in italics under the four module areas refer to the respective starting addresses.

Table A-3 ET 100 Adress Assignments (Example)

Address identifier	4DQ	4DI	8DI	8DQ	2AQ	4AI	4AI	2AX (ICM 560)
DQ area *(000)**	0.0 to 0.3			0.4 to 1.3				
DI area *(001)**		1.0 to 1.3	1.4 to 2.3					
AQ area *(128)**					128.0 to 131.7			132.0 to 135.7
AI area *(128)**						128.0 to 135.7	136.0 to 143.7	144.0 to 147.7

***** Starting address of the respective module areas

A.7 Overview of Screen Forms and Function Key Menus

To display input and output values, COM ET 100 provides various screen forms which can be invoked by function keys.

The form fields displayed in reverse video are input fields. These fields are cross-hatched in the descriptions which follow.

The output fields automatically updated by the program are also cross-hatched.

You can return step by step to the "Language" form by pressing function key F8 (EXIT).

A.7.1 Form 1: LANGUAGE

```
COPYRIGHT (C) BY SIEMENS AG                        SIMATIC S5  /  ET 100
LANGUAGE/SPRACHE

 EEEEEEEE      TTTTTTTTT              1      00000          00000
 E                  T              1 1     0     00       0     00
 E                  T           1    1    0     0   0    0     0   0
 EEEEEE             T                1    0    0    0    0    0    0
 E                  T                1    0   0     0    0   0     0
 E                  T                1     00     0      00     0
 EEEEEEEE           T                1      00000          00000



 DATADISK/DATENDISKETTE IN FD/LW:    B:    (A,B,C)

 VERSION/AUSGABESTAND:               A02

 SERIAL No./SERIEN-Nr.:              7994-0037-XXXXXX
```

F1	F2	F3	F4	F5	F6	F7	F8
DEUTSCH	ENGLISH	FRANCAIS	ESPANOL	ITALIANO			EXIT

Figure A-2 Form 1: LANGUAGE

Function keys F1 to F5 are used to select the required language. You can return to the S5-DOS operating system by pressing function key F8 (EXIT) and acknowledging with F1 (YES).

Note:
Please change your data disk in this screen form only. The default drive for the data disk is drive B. If you want to transfer your data from drive A or C, simply modify the entry in the line "Datadisk/Datendiskette in FD/LW".

A.7.2 Form 2: ET 100

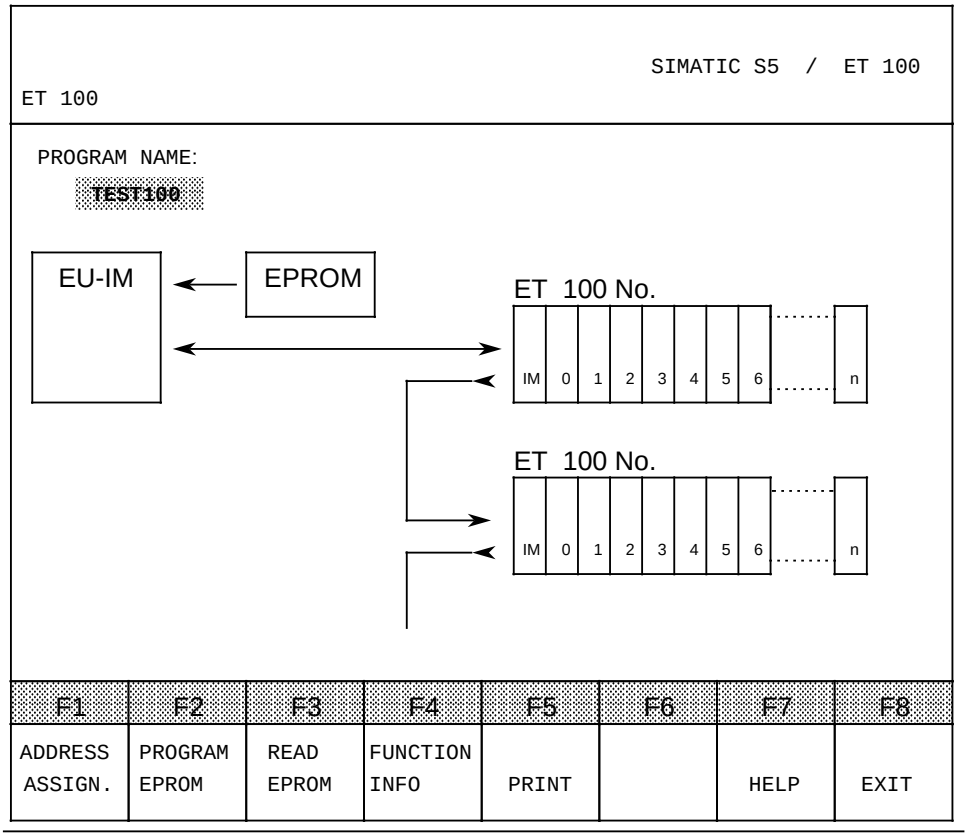


Figure A-3 Form 2: ET 100

You can enter the file name under which your system data are to be stored on the floppy disk in this form. All files generated by COM ET 100 have the suffix .308, so that a program named "TEST100", for example, will be stored under the name "TEST100.308".

FUNCTION KEY MENU:

F1: Display "Address Assignment" form

F2: Transfer all plant data to the EPROM submodule

F3: Transfer the contents of the EPROM submodule to the programmer's memory. NOTE CAREFULLY: The floppy files are overwritten by the EPROM files when their names are identical and when you acknowledge the prompt with F1 (YES).

F4: Displays plant documentation data

F5: The data selected in the "PRINT" form are output to the PT88 printer

F7: You can display all stored program names consecutively in the "Program name" field by repeatedly pressing this key.

F8: "EXIT" returns you to the "ET 100" form.

A.7.3 Form 3: ET 100 Address Assignment

```
                                                    SIMATIC S5  /  ET 100
ET 100 ADDRESS ASSIGNMENT                          PROGRAM NAME:  TEST100

ET 100 No. :  01   Number selected on IM 318-8M                      End
Area:              (P,Q,IM3,IM4)                                    address:
DQ address:        Starting address for digital output modules
DI address:        Starting address for digital input modules
AQ address:        Starting address for analog output modules
AI address:        Starting address for analog input modules
Configuration:   0.    1.    2.    3.    4.    5.    6.    7.
                 8.    9.    10.   11.   12.   13.   14.   15.
                 16.   17.   18.   19.   20.   21.   22.   23.
                 24.   25.   26.   27.   28.   29.   30.   31.
```

F1	F2	F3	F4	F5	F6	F7	F8
SELECT ET100 NO.	SAVE	PRE-ASSIGN	PAGE UP	PAGE DOWN	FURTHER FUNCTIONS	HELP	EXIT

Figure A-4 Form 3.1: ET 100 Address Assignment, Menu Line 1

F1	F2	F3	F4	F5	F6	F7	F8
ERASE FORM	ERASE FIELD	INSERT	ET 100 INFO	ADDR.SP. INFO	FURTHER FUNCTIONS		

Figure A-5 Form 3.2: ET 100 Address Assignment, Menu Line 2

This form has a two-line function key menu. The two menu lines can be screened interchangeably by pressing function key F6 (Further Functions).

The number of the ET 100U or ICM 560 is displayed at the upper left in the form.

FUNCTION KEY MENU, LINE 1:

F1: Press this key to display the "NUMBER SELECT" form, in which you can select an arbitrary ET 100 or ICM 560 number (1 - 63).

F2: Store new or modified data

F3: F3 (PREASSIGN) copies the form last completed to an arbitrary ET 100 number. This function is convenient for identical or similar system configurations. You must enter the starting addresses for the relevant ET 100 number, however, as these are not copied.

F4: PAGE UP. You can call the form for the next higher ET 100 number by pressing this function key.

F5: PAGE DOWN. You can go back to the next lower ET 100 number by pressing this function key.

F7: Function key F7 (HELP) consecutively screens I/O areas P, Q, IM3 and IM4 in the "Area" field. When the cursor is set to the configuring fields, you can call a list of permissible address identifiers by pressing F7 (HELP).

F8: EXIT returns you to the "LANGUAGE" form. The data in the form are lost unless you store them on floppy before pressing F8 (EXIT).

FUNCTION KEY MENU, LINE 2:

F1: Erases all form entries.

NOTE CAREFULLY:

All form data is erased as soon as you press F1. You are not prompted to acknowledge your decision to erase the data!

F2: Erases a configuring entry. The field to which the cursor is set is erased and the remaining fields are moved to the left.

F3: Insert in configuring field. A blank field is inserted at the current cursor position and the remaining fields are moved to the right.

F4: ET 100 INFO. All device numbers from 1 to 63 are displayed. Those already processed are marked with an asterisk (*).

F5: ADDRESS SPACE INFO. Provides an overview of the address assignments for all I/O areas. Overlapping addresses are marked with an asterisk (*).

A.7.4 Form 4: Info Functions

SIMATIC S5 / ET 100

INFO FUNCTIONS

PROGRAM NAME:

F1	F2	F3	F4	F5	F6	F7	F8
PROGRAM NAME	ADDR. ASSIGNED	ET 100 INFO	ET 100 CONFIG.	SIGNAL ASSIGN.		HELP	EXIT

Figure A-6 Form 4: INFO FUNCTIONS

FUNCTION KEY MENU:

F1: Which program names are on the floppy?

F2: What addresses are assigned under the specified program name?

F3: Which ET 100 numbers are reserved under this program name?

F4: Function not yet implemented.

F5: Function not yet implemented.

F7: You can display all stored program names consecutively in the "PROGRAM NAME" field by repeatedly pressing this key.

F8: "EXIT" returns you to the "ET 100" form.

A.7.5 Form 5: Number Select

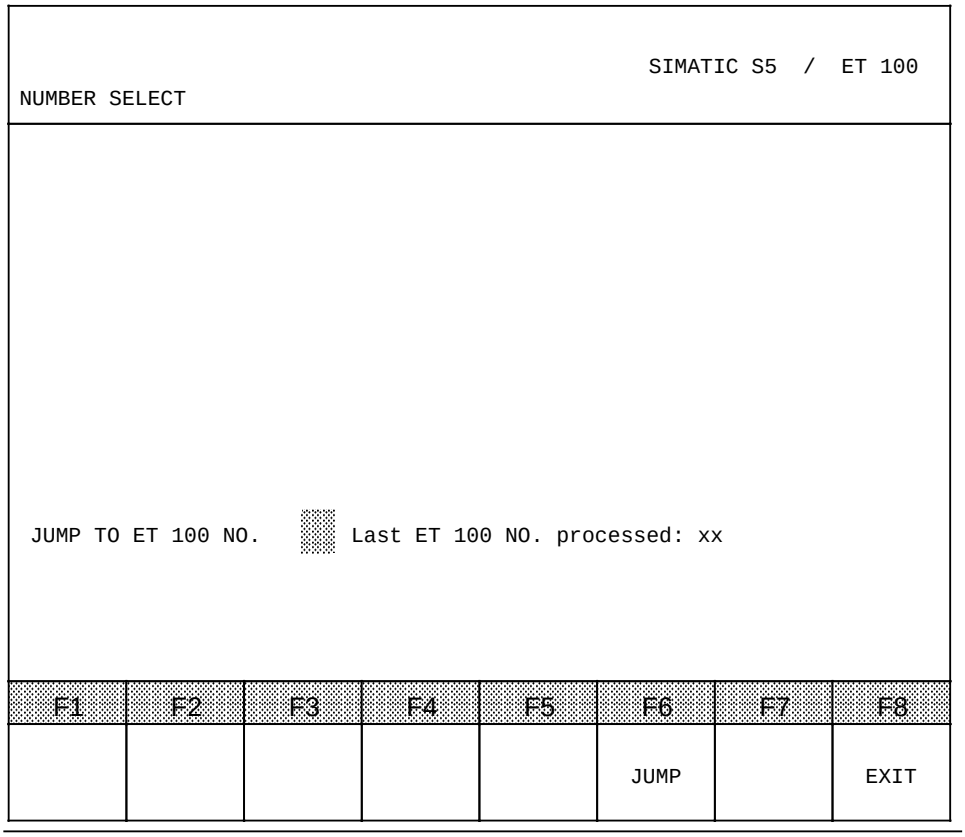


Figure A-7 Form 5: NUMBER SELECT

You can select individual ET 100 numbers directly in this form. You can call the relevant form automatically by entering a two-digit number. If you enter only a 1-digit number, you must press function key F6 (JUMP).

F8 (EXIT) returns you to the "ET 100 Address Assignment" form.

A.7.6 Form 6: HELP

SIMATIC S5 / ET 100

HELP

Permissible entries in this field:

Digital input modules:	4DI	8DI	
Digital output modules:	4DQ	8DQ	
Digital I/O modules:	4DX	8DX	
Analog input modules:	1AI	2AI	4AI
Analog output modules:	1AQ	2AQ	4AQ
Analog I/O modules:	1AX	2AX	4AX
Free space:	000		

F1	F2	F3	F4	F5	F6	F7	F8
							EXIT

Figure A-8 Form 6: HELP

You can call "HELP" by pressing function key F7 in the "ET 100 Address Assignment" form when the cursor is positioned to one of the configuring fields.

"HELP" displays a list of permissible configuring field entries.

F8 (EXIT) returns you to the "ET 100 Address Assignment" form.

A.7.7 Form 7: ET 100 Info

```
                                                SIMATIC S5  /  ET 100
ET100 INFO                                      PROGRAM NAME: TEST100

ET 100 Nos. already processed are indicated by "x"

ET100 No. ET100 No. ET100 No. ET100 No. ET100 No. ET100 No. ET100 No.

  1 *       2 *       3         4 *       5 *       6         7
  8         9        10 *      11 *      12        13        14
 15        16        17        18        19        20        21
 22        23        24        25        26        27        28
 29        30 *      31 *      32 *      33 *      34        35
 36        37        38        39        40        41        42
 43        44        45        46        47        48        49
 50        51        52        53        54        55        56
 57        58        59        60        61        62        63
```

F1	F2	F3	F4	F5	F6	F7	F8
							EXIT

Figure A-9 Form 7: ET 100 INFO

You can call this form by pressing function key F4 (second line of the function key menu) in the "ET 100 Address Assignment" form.

ET 100 INFO lists all ET 100 numbers that have been stored under a specific program name.

F8 (EXIT) returns you to the "ET 100 Address Assignment" form.

A.7.8 Form 8: Addresses Assigned

```
                                                  SIMATIC S5  /  ET 100
ADDRESSES ASSIGNED                                PROGRAM NAME: TEST100

I/O area:           P   Overlap indicated by "*"

OUTPUTS:      000-020                 INPUTS:       010-034
              128-164                               128-132
                                                    146-164
```

F1	F2	F3	F4	F5	F6	F7	F8
I/O AREA P	I/O AREA Q	I/O AREA IM3	I/O AREA IM4				EXIT

Figure A-10 Form 8: ADDRESSES ASSIGNED

You can call this form by pressing function key F5 (second line of the function key menu) in the "ET 100 Address Assignment" form.

The ADDRESSES form lists the addresses assigned in the various I/O areas. The example above shows the addresses assigned in the P area under the name "TEST100". You can select the various I/O areas with function keys F1 to F4.

F8 (EXIT) returns you to the "ET 100 Address Assignment" form.

A.7.9 Form 9: Program Names

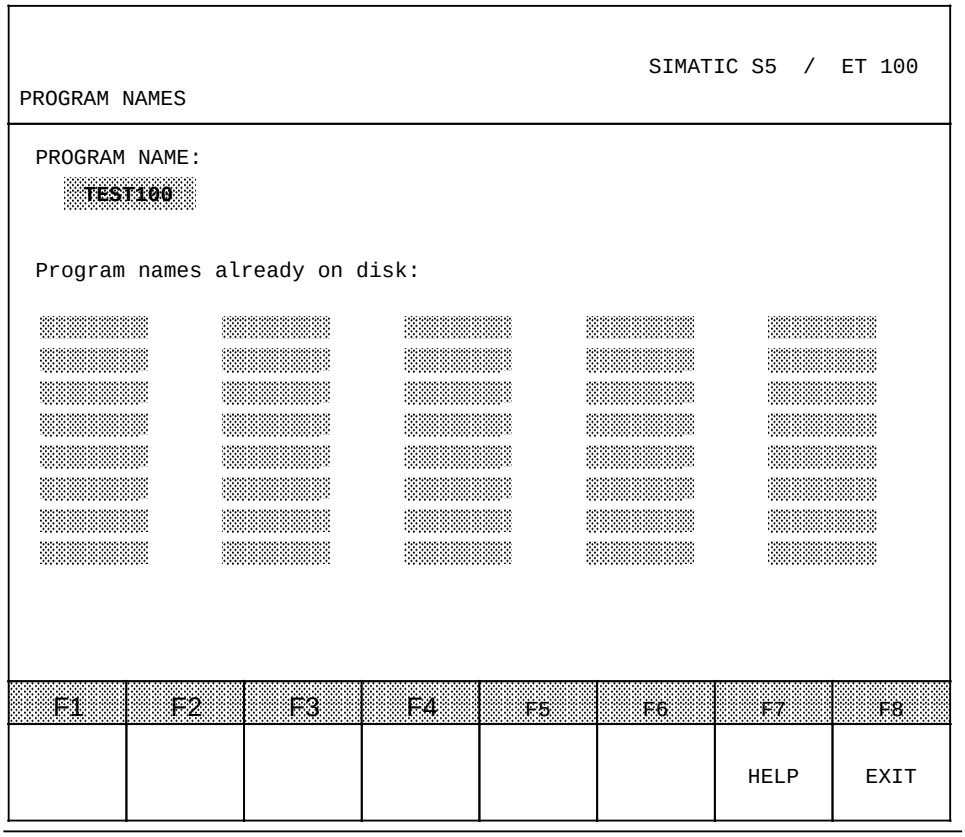


Figure A-11 Form 9: PROGRAM NAMES

Proceeding from the "ET 100" form, you can display form 9 by pressing F4 (Info) and then F1 (Program Name).

The PROGRAM NAMES form lists all program names stored on the floppy. You can transfer the program names successively from the list to the "Program name" field with F7 (HELP).

You can return to the "ET 100 Address Assignment" form via the "Info function" with F8 (EXIT).

A.7.10 Form 10: Print

SIMATIC S5 / ET 100

PRINT PROGRAM NAME: **TEST100**

F1	F2	F3	F4	F5	F6	F7	F8
ADDRESS ASSIGN.	ADDR. ASSIGNED	ET100 INFO	ET 100 CONFIG.	SIGNAL ASSIGN.	PRINT STOP		

Figure A-12 Form 10 : PRINT

FUNCTION KEY MENU:

F1: Print all "ET 100 Address Assignment" screen forms. These forms contain the ET 100 configuration data, the starting addresses of the module types and the I/O area.

F2: Print "Addresses Assigned " forms. These forms show the address space reserved by each I/O area.

F3: Print "ET 100 INFO" form. This form shows all processed ET 100U modules.

F4: Function not yet implemented.

F5: Function not yet implemented

F6: Stop printing

F8: Return to "ET 100" form.

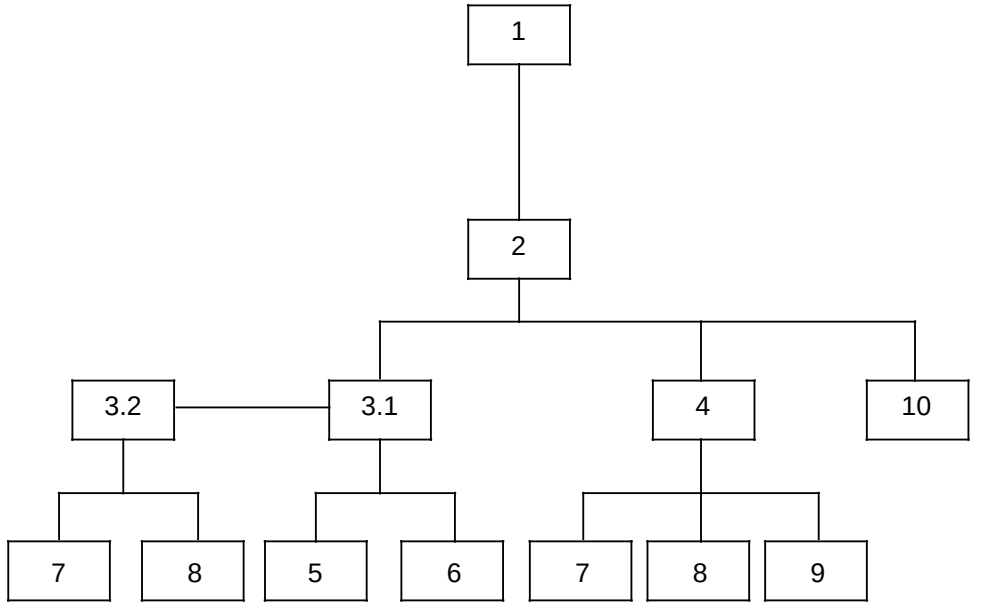


Figure A-13 Overview of PG 635/PG 675/PG 685 Forms

Form 1: LANGUAGE (language select)
Form 2: ET 100 (selection menu for Address Assignments, Programming and reading EPROM, Info functions and Print function).
Form 3: ET 100 ADDRESS ASSIGNMENT (form has a two-line function key menu).
Form 4: INFO FUNCTIONS
Form 5: NUMBER SELECT
Form 6: HELP
Form 7: ET 100 INFO (shows which ET 100 has been programmed).
Form 8: ADDRESSES ASSIGNED
Form 9: PROGRAM NAMES
Form 10: PRINT

A.8 Assigning Input/Output Addresses with the PG 615

The following EPROMs are required to enable the use of COM ET 100 on the PG 615 programmer:

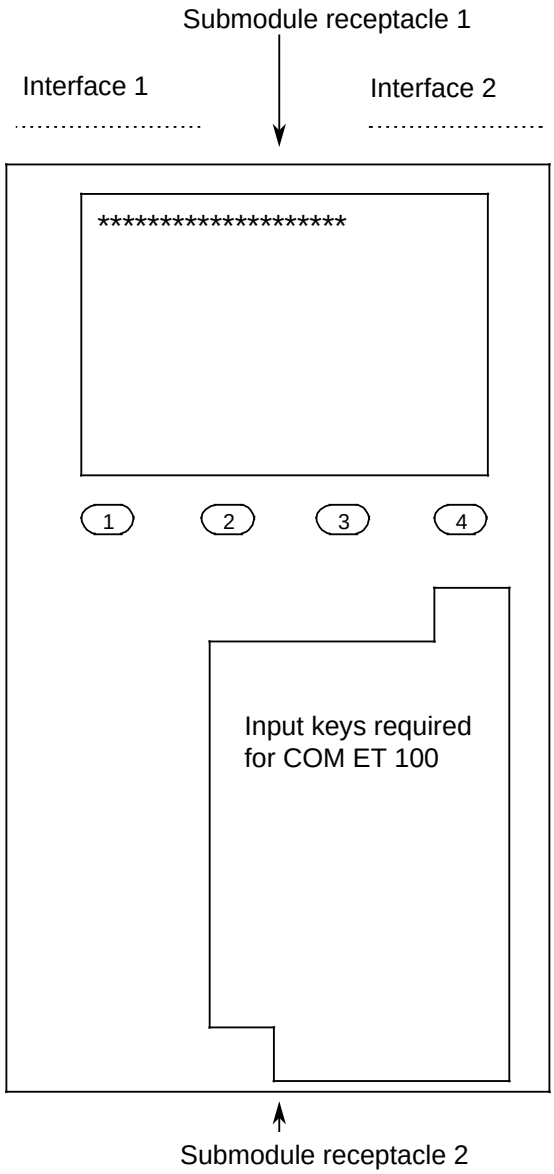
- An operating system EPROM containing COM ET 100, Order No. 6ES5 815-8MA11.
- An EPROM memory submodule, Order No. 376-0AA11 (with an adapter for mechanical extension, Order No. 6ES5 615-1UA11).

NOTE CAREFULLY:
The operating system EPROM must remain plugged in during operation.

The EPROMS must be inserted in the receptacles provided on the PG 615. The upper receptacle is for the operating system EPROM with COM ET 100, the lower for the memory submodule.

Two Subminiature D connectors are located at the top of the PG 615. Interface 1 (15-pin subminiature D plug connector) is required for the power supply from the programmable controller or adapter. A printer can be connected over interface 2 (25-pin subminiature D socket connector) (Figure A-15).

The next several pages provide an overview of the PG 615's operator interface and keypad.



SUBMODULE RECEPTACLE 1:
For the operating system submodule with COM ET 100

This submodule must not be removed during operation!

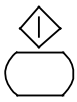
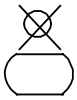
SUBMODULE RECEPTACLE 2:
EPROM memory submodule

INTERFACE 1:
Power supply from programmable controller or adapter

INTERFACE 2:
Printer port

Figure A-14 PG 615 Operator Interface

Table A-4 Overview of PG 615 Function Keys

Key	Function
0 - 9	Decimal keypad
	<ENTER> This key is used to confirm your input values and return to the preceding level.
	<ERASE SEGMENT> Erases the character to which the cursor is positioned. All characters to the right of the cursor are moved one position to the left.
	<INSERT SEGMENT> A blank is inserted at the cursor position.
	<ERASE INPUT FIELD> The field containing the cursor is erased.
	<LEFT ARROW> Moves the cursor one position/field to the left.
	<RIGHT ARROW> Moves the cursor one position/field to the right.
	<UP ARROW> Moves the cursor up one position/field.
	<DOWN ARROW> Moves the cursor down one position/field.
	<BRK> Returns to the preceding level without confirming the input values (= ABORT).

When a display contains a menu, decimal keys 1 to 4 are regarded as function keys. The softkey menu below the display shows the function assigned to each key. Only the PG 615 keys listed on the preceding page are used for COM ET 100.

A.8.1 Program Start

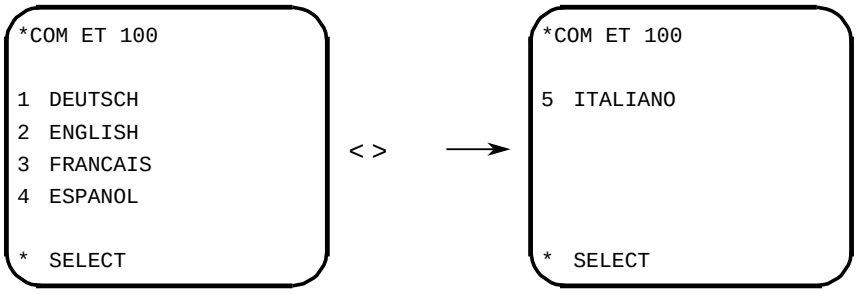


Figure A-15 "Language Select" Form

When COM ET 100 is started, the version number is displayed on the PG 615, followed by the Language Select form. You can select one of the languages shown in the form by pressing the function key shown at the left of the language you want to select. When you want to choose a different language, or if you have pressed the wrong key, you must restart the program by briefly interrupting the power supply to the PG 615.

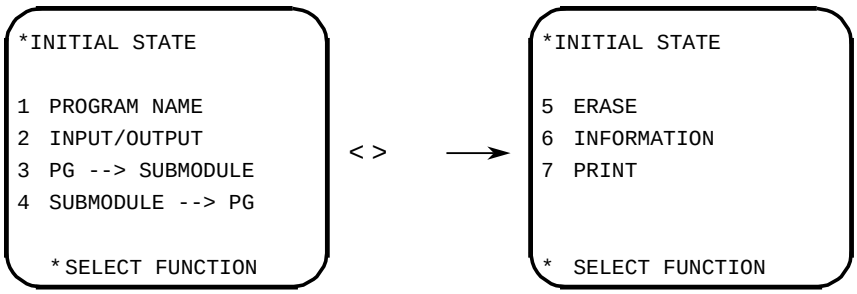


Figure A-16 "Initial State" Form

After you have selected a language, the "Initial State" form is displayed. This form is used to invoke the basic COM ET 100 functions. A function should, of course, be invoked only when it serves a practical purpose to do so. The "Print" function, for example, should be called only when data is available. You can enter this form from all levels by pressing the <BRK> key one or more times.

A.8.2 Enter Program Name

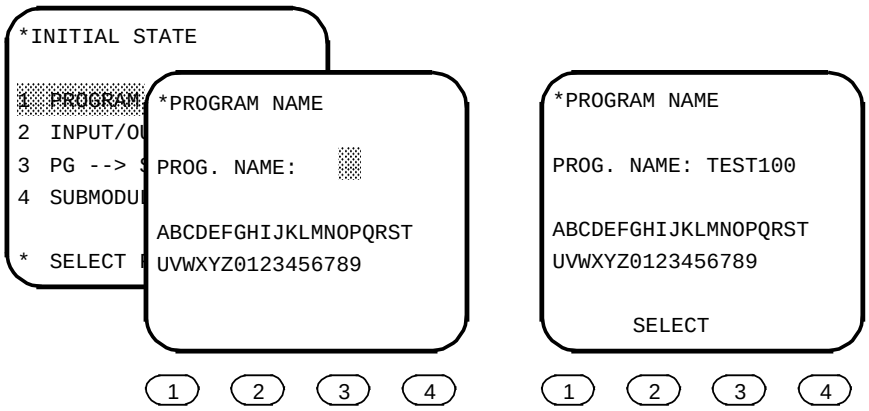


Figure A-17 "Program Name" Form

You can utilize the editing functions "Erase" and "Insert" as well as the cursor control keys in this form. To enter a character string, set the cursor to a character in one of the "alphabet" lines and press function key F2: SELECT to transfer that character to the input field. The arrow in the input field moves one position to the right to indicate the next position. Terminate and confirm your entry by pressing <ENTER>. This will return you to the "Initial State" form.

A.8.3 Input/Output

With this function, you can enter all ET Module data, query existing data, and modify or reenter this data if required.
The Input function is invoked by pressing F2 (Input/Output) in the "Initial State" form.

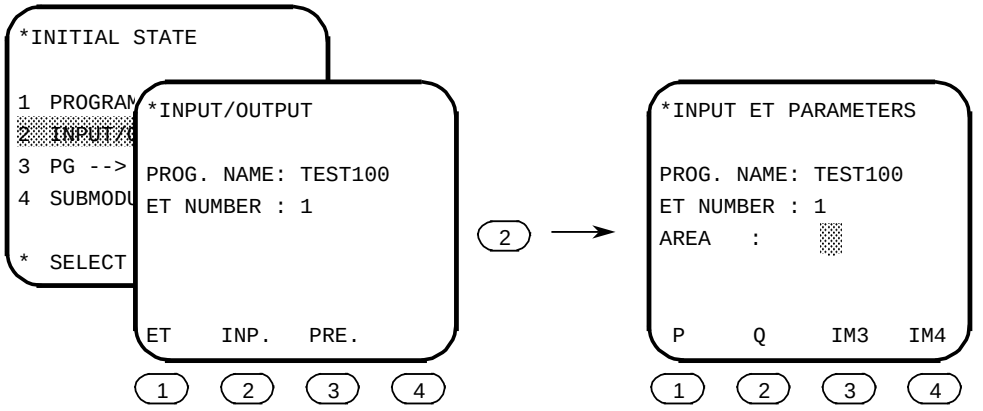


Figure A-18 "Input/Output" Form

A.8.4 Initial Entry of ET Data

The entries for new ETs must be made in a specific order, i.e. you cannot proceed to forms 2, 3 and so on until you have made a correct entry in form 1, "Program Name".

- The (I/O) area is entered via function keys F1 to F4 (P, Q, IM3, IM4). Only when you have made this entry is it possible to proceed to the address entries by pressing <DOWN ARROW>.

- Addresses must be entered for each module type (digital input and output modules, analog input and output modules). The cursor can be moved in the four address fields using the cursor control keys. You can correct your entries with the "Erase segment", "Insert" and "Clear entry field" keys. You must enter at least one addressing range in order to proceed to the area or configuration form. The input values must lie within certain boundaries; an error is reported if they do not.

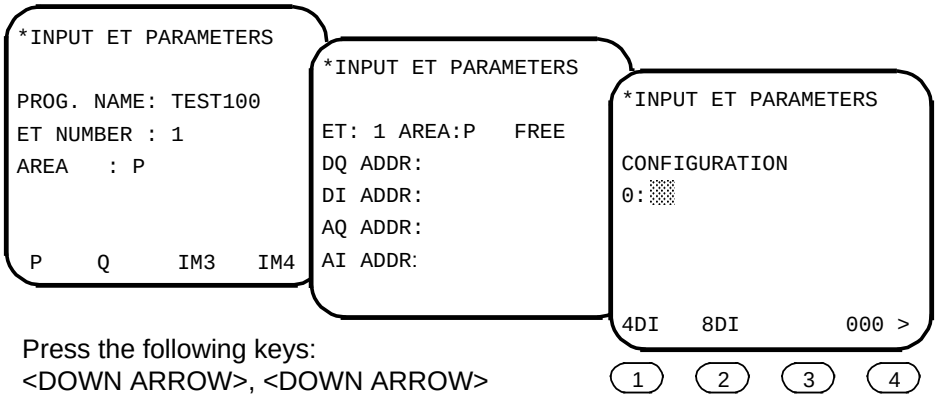


Figure A-19 "Input ET Parameters" Form

- In the configuring form, you must enter a 3-character alphanumeric identifier for each module on the ET 100U. These identifiers are in line 8 of the configuration form. You can screen six menus of identifiers by pressing the <LEFT ARROW> and <RIGHT ARROW> keys. The cursor is set to the first input field; you can select the required identifier with "F1" to "F4". Module locations are corrected with the the "Erase" and "Insert" keys. You cannot page through existing ET 100 files while in Input Mode. In this mode, the <UP ARROW> and <DOWN ARROW> keys are only for selecting input fields in the configuration form.

- Press <ENTER> when you have completed all input fields.

A.8.5 Entries in Forms Already Containing Data

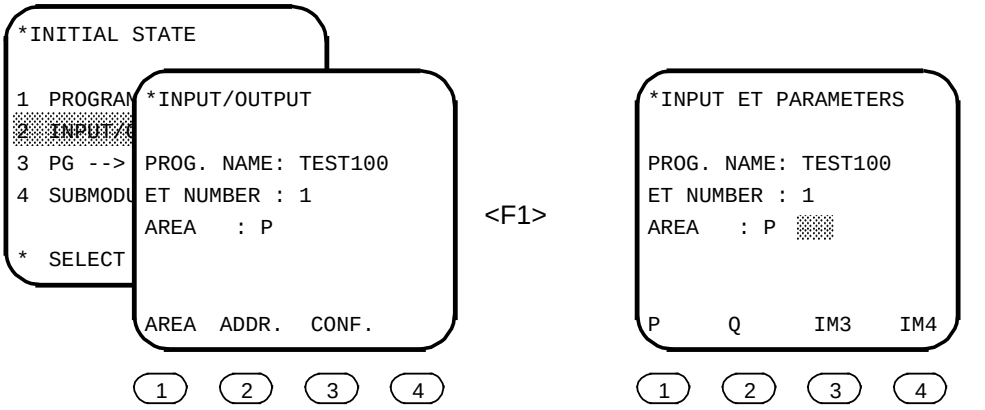


Figure A-20 "Input ET Parameters" Form Already Containing Data

When data entries have already been made under the specified program name, you can proceed direct to the three input forms (Area, Addresses, Configuration) and correct or supplement the existing data. When you press <ENTER>, your entries are checked for errors. If none are found, the "Input/Output" form for the current ET number is displayed; otherwise, an error message appears and COM ET 100 branches to the field containing the error to enable you to make the necessary corrections. If, for example, you have neglected to specify an addressing range for the relevant module type, COM ET 100 returns control to the "Address Assignment" form. The cursor is set to the field in which you must make your entry.

If the permissible message length of 32 bytes has been exceeded, COM ET 100 displays the following form:

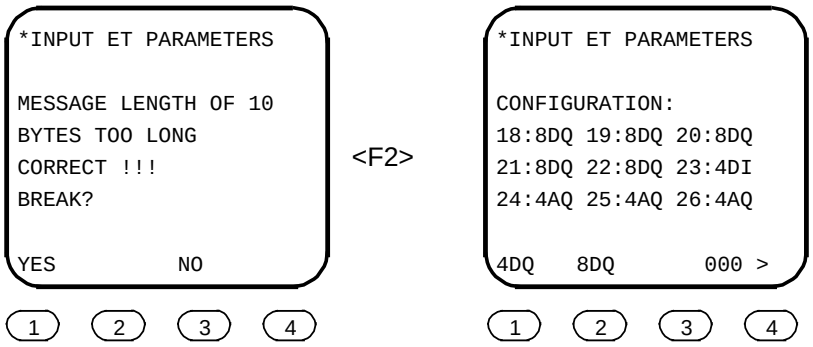


Figure A-21 "Message Length Exceeded" Form

If you respond with F3 (NO), the Configuration form is displayed. The cursor is set to the field beginning with which you must erase the module address identifiers in order to attain the permissible length.

NOTE CAREFULLY:

If you acknowledge with F1 (YES), your previous entries are lost and control is returned to the "Input/Output" form.

A.8.6 Display of Plant Data

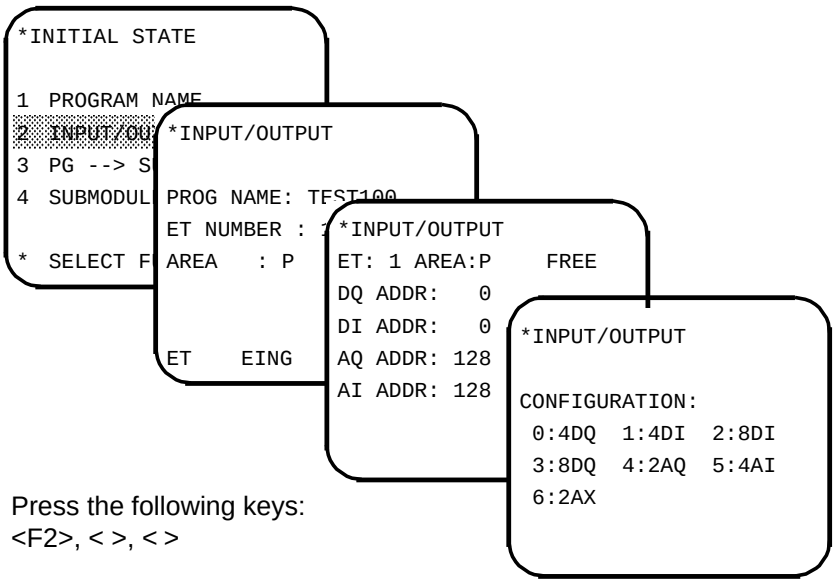
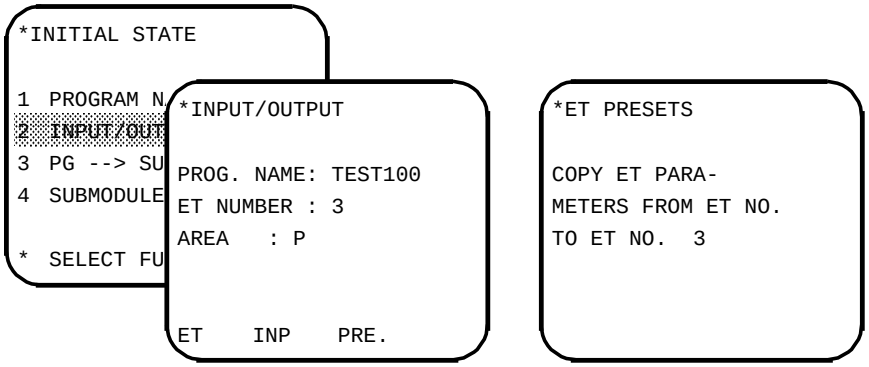


Figure A-22 "Input/Output" Form Containing Plant Data

The first form defines the program name, the current ET number and the address assignments. You can proceed to the next ET 100 by pressing the <DOWN ARROW> several times to skip the "Addresses" and "Configuration" fields. Conversely, you can go back to the preceding fields by pressing the <UP ARROW> key. You can also select the required ET direct with function key F1 (ET).

Special feature
In the address form, the starting addresses of each block are followed by the next free addresses; if there is no gap between the address space for one ET 100U and that for the next ET 100U, however, three asterisks (***) are displayed instead.

A.8.7 Defaults (Presets)



Press the following keys: <F2>, <F3>

Figure A-23 "ET PRESETS (Defaults)" Form

When using several ET 100Us with identical or similar configuration, you can transfer the configuration of the (source) ET 100 to an arbitrary number of unconfigured (destination) ET100s. To do so, press F3 (PRE.) and enter the number of the (source) ET 100, then starting the transfer by pressing <ENTER>. Do not forget to change the starting addresses afterwards to avoid multiple definitions.
"ETs not identical" is displayed if you enter the same ET number twice or specify an illegal ET number.
Address overlapping results if you copy the configuring data for an ET 100U without changing the starting addresses. In this case, COM ET 100 displays the following form to enable you to make the necessary corrections.

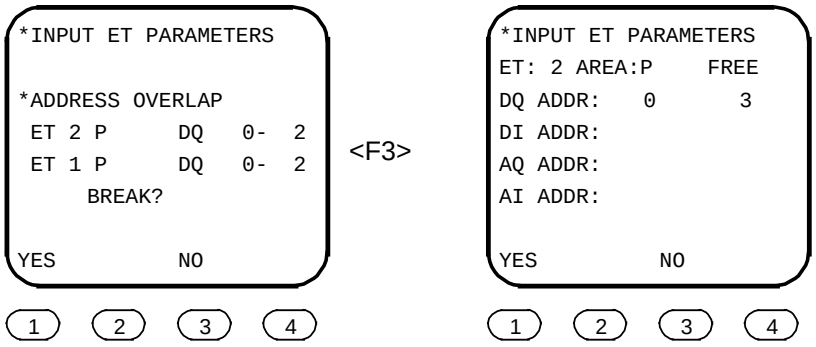


Figure A-24 "Address Overlap" Form

Lines 4 and 5 show the numbers of the ET 100s whose addressing ranges overlap. The display also includes the address types, the starting addresses and, when the address block length is greater 1, the end addresses. If you acknowledge with "F3:NO", the program returns control to the "ADDRESSES" form; the cursor shows where you are to make your correction.

A.8.8 Transfer Programmer Submodule

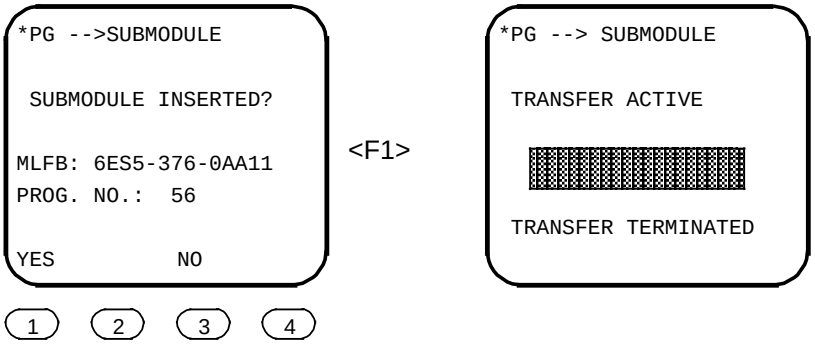


Figure A-25 "Transfer PG -> Submodule" Form

This function transfers the configuring data from the PG 615 to the EPROM memory submodule; prerequisite is that a program name was entered and that ET 100 data are available. If you respond to the "EPROM subm. inserted?" prompt with F1 (YES), the EPROM is subjected to a check. Possible error messages are "EPROM NOT EMPTY", "WRONG EPROM" or "NO EPROM INSERTED". When one of these messages appears, you should abort programming mode by pressing F3 (NO) and correct the error.
The transfer of data to the EPROM submodule begins if no errors are detected during the check. Twenty blocks are displayed on line 5 during transfer. These blocks are erased one at a time, beginning at the left, each erasure taking about 5% of the total programming time.
The EPROM is then subjected to a read-after-write check and its contents compared with the PG 615 data. Either "TRANSFER TERMINATED" or "TRANSFER ERROR" is then displayed on line 7, depending on the result of the comparison.
The transfer of data to the EPROM submodule can be aborted at any time by pressing the <BRK> key.

A.8.9 Transfer Submodule Programmer

This function is used to transfer the system data from the EPROM submodule to the programmer. The same check routines are executed as for a transfer from the programmer to the submodule. The transfer is started by pressing "F1: YES"; either "TRANSFER TERMINATED" or "TRANSFER ERROR" is displayed when the transfer is complete, depending on whether or not an error occurred.

NOTE CAREFULLY:
When new data is transferred, all existing programmer data is deleted.

A.8.10 Erasing Plant Data

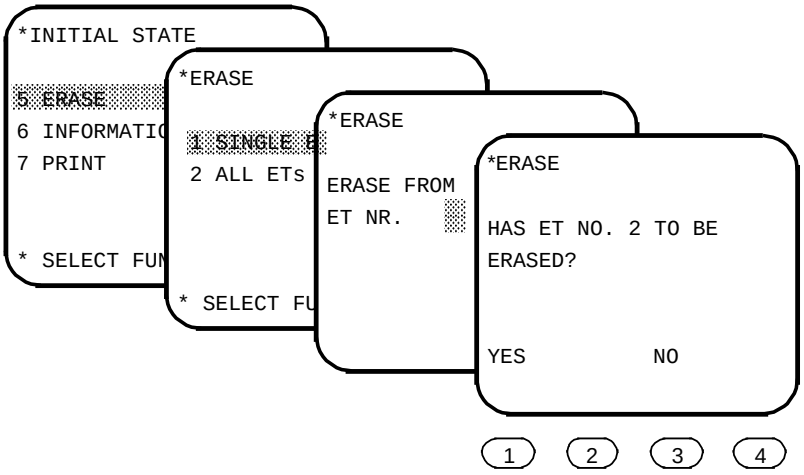


Figure A-26 "Erase Plant Data" Form

You can erase individual ET 100s or the entire PG 615 data area by selecting the appropriate function in the top menu:

- Erase single ET: Enter the ET number and acknowlege with either F1 (YES) or F2 (NO).
- Erase all ETs: All PG 615 data is erased when the prompt is acknowledged with YES.

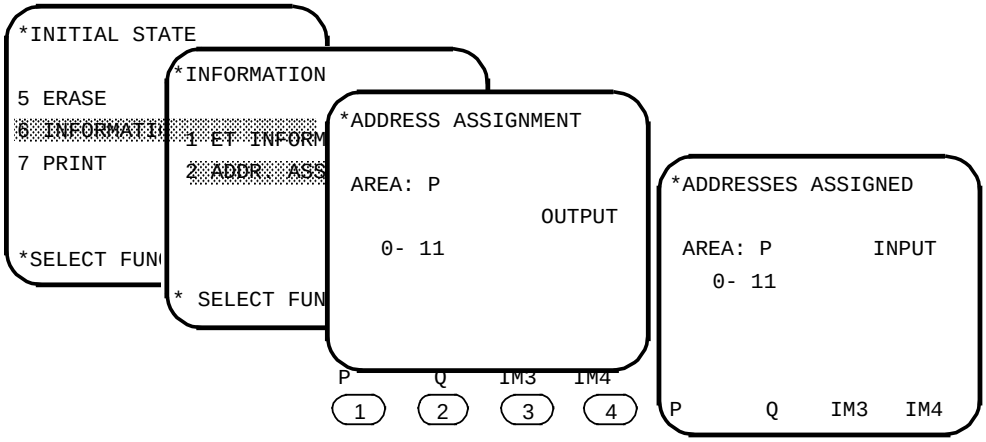
"TERMINATED" is displayed in both cases. As for transfer functions, you can press RETURN instead of F1 (YES) and <BRK> in place of F3 (NO).

A.8.11 Info

You can request two kinds of information:

- Addresses
  This form provides an overview of all address assignments. Function keys F1 to F4 are used to select the required area. The area selected and the address assignments for the input/output modules are displayed on line 3.

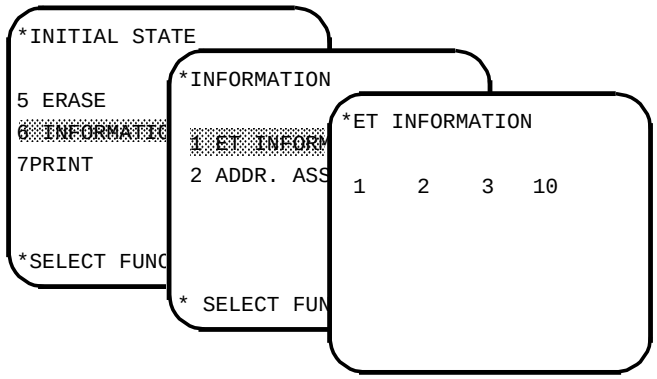
- ET info
  This form displays the numbers of all ET 100s processed. The numbers are shown in ascending order. If there are more than twenty ET 100s, arrows are faded in to indicate that page turning is permitted.



Press keys: <6>, <2>, <DOWN ARROW>

Figure A-27 "Info and Address Assignments" Form

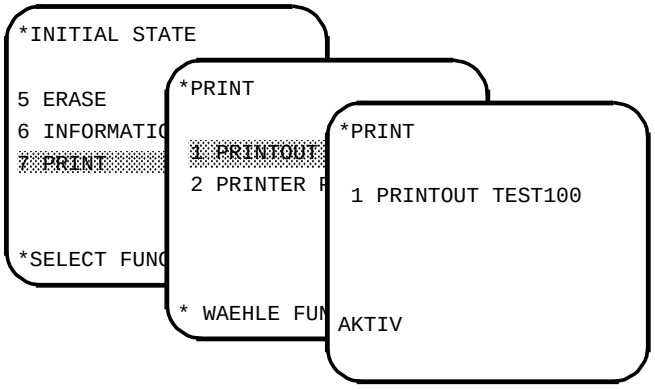
An arrow in the form indicates the permissible direction for paging.



Press keys: <6>, <1>

Figure A-28 "Info" Forms

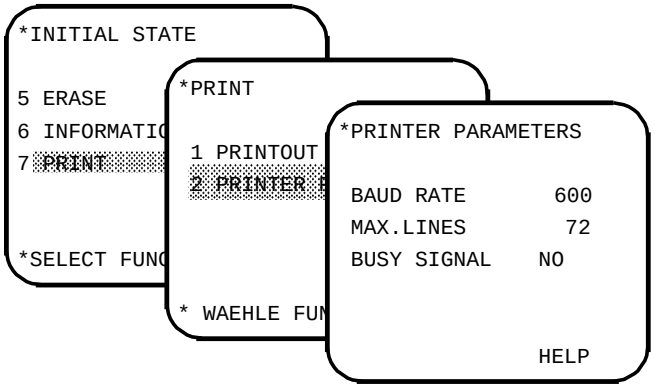
A.8.12 Printing System Data and Setting Printer Parameters



Press keys: <7>, <1>

Figure A-29 "Print" Forms

The program name is faded into line 3 of the display. You can start the print out by pressing F1, and stop it by pressing F3. Once begun, a page is always completed.



Press keys: <7>, <2>

Figure A-30 "Print" and "Printer Parameters" Forms

To change the printer parameters, the cursor must be set to the associated input fields. You may change the following parameters:

- The baud rate can be set in steps to a value between 300 and 9600 baud with F4 (HELP).
- The maximum number of lines (per page) can be set to 72 by pressing F1 or to 66 by pressing F2.
- Busy signal: You must press F3 (NO) if the printer is not equipped with a BUSY circuit.
- Wait after CR: On printers without a BUSY circuit, CR must be followed by a wait to enable positioning of the printer head to the start of the next line. The waiting time can be set to a multiple of 25 ms with digit keys 0 to 9.
- Wait after LF: (same as wait after CR).

The PG 615 transmits CR and LF control characters to the printer. It also transmits control character FF to printers equipped with a BUSY circuit.

You must position the paper to the start of a page before beginning with the printout, as the printer automatically goes to a new page when the specified number of lines (66 or 72) has been printed.

Parameter default values:

Baud rate:	600
Max. lines:	72
Busy signal:	NO
Wait for CR:	00
Wait for LF:	20

The PT 80 printer uses the above defaults.

A.8.13 Restrictions

The COM ET 100 communications software restricts certain functions to protect existing data and prevent errors.

The following functions may be invoked only when the keylock switch in set to position II:

1. Program name editing
2. Input/defaulting
3. Transfer from EPROM submodule to PG
4. Erase

The EPROM submodule can be programmed only if you have entered a program name.

The following functions can be invoked only if ET 100U system data has been loaded into the programmer:

1. Transfer from Programmer to submodule
2. Erase (delete)
3. Info
4. Print

A.8.14 Overview of PG 615 Screen Forms

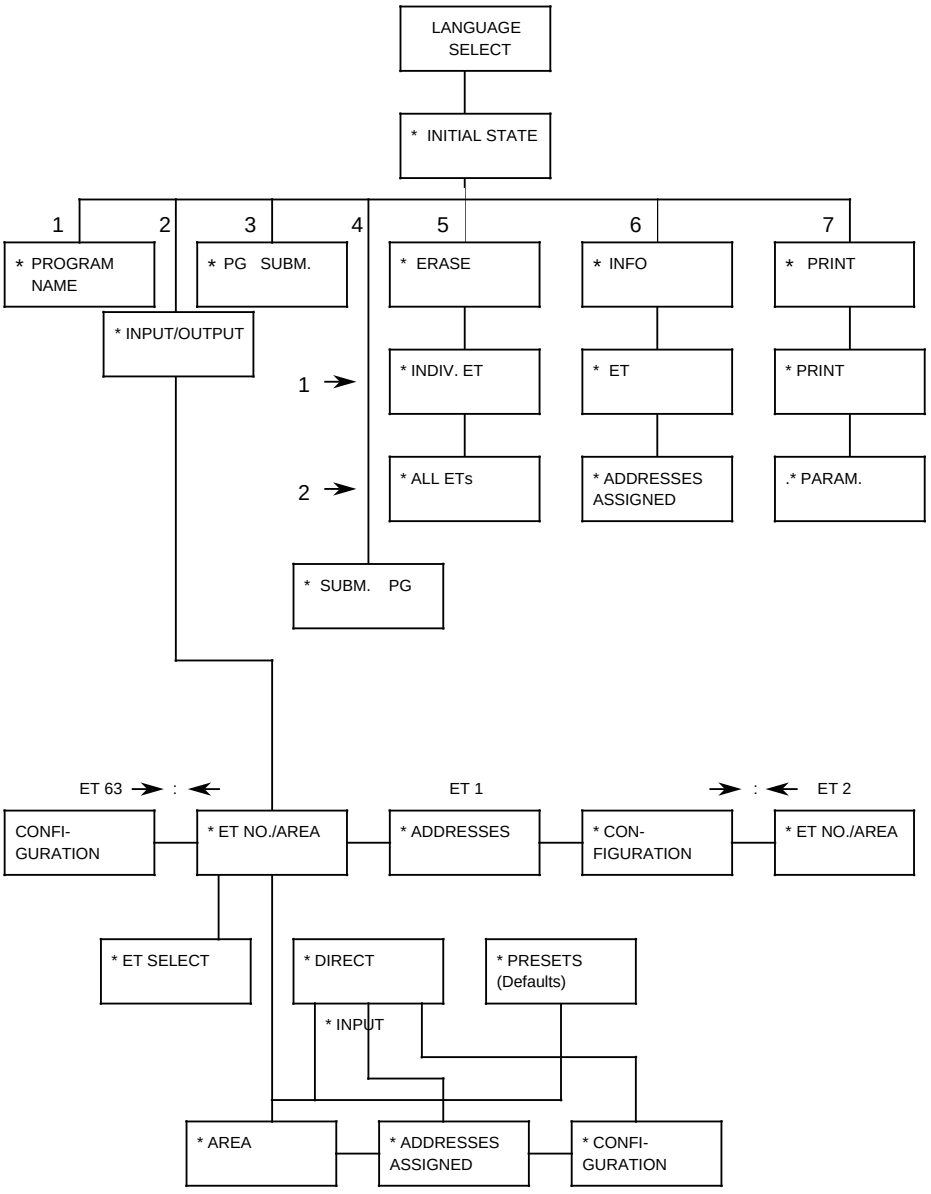


Figure A-31 Overview of PG 615 Forms

A.9 Programming Example

The system for our program example comprises an S5-115U programmable controller and an ET 100U (I/O device). The S5-115U is equipped with a 32XDC 24V digital input module (slot 0, addresses 0.0 to 3.7) and a 32XDC 24V;0,5A digital output module (slot 1, addresses 4.0 to 7.7).

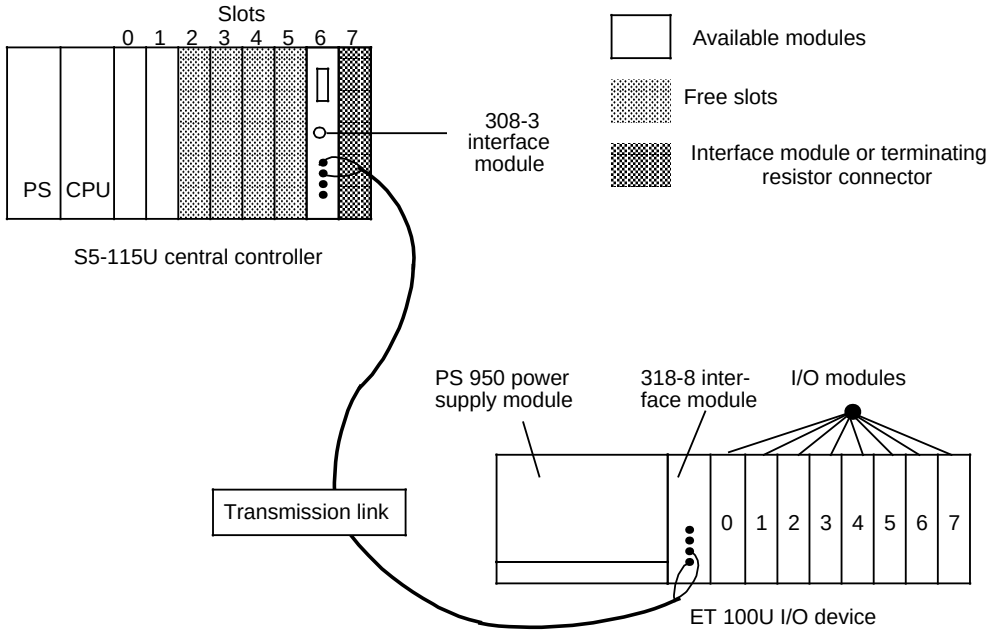


Figure A-32 Configuration for the Programming Example

Originally, the ET 100U was to be equipped with seven modules in slots 0 to 6 (Table A-5). This configuration, however, would preclude conformance to the rules which apply to an S5-115U, i.e. "even-numbered starting address, odd-numbered end address" in the addressing area reserved for digital output addresses (A.6). It was not possible to use a virtual module, as the time-out signal (QVZ) was not to be disabled (A.6). For this reason, slot 7 was equipped with an (unused) digital output module in the example.

Table. A-5 ET 100 Module Locations

Modules	Slot	Address identifier
1. Digital output module 8XDC 24..60V/0.5A	0	8DQ
2. Digital input module 8XDC 24..60V	1	8DI
3. Digital output module 4XAC 230V	2	4DQ
4. Analog output module 2X +/- 10V	3	2AQ
5. Analog input module 4X +/- 20 mA	4	4AI
6. Counter module 25/250 kHz	5	2AX
7. Digital output module 4XAC 230V	6	4DQ
8. Digital output module 4XDC 24..60V/0.5A	7	4DQ

The starting addresses were defined as follows in the "ET 100 Address Assignment" form, i.e. form 3:

DO address	(starting address for digital output modules):	008
DI address	(starting address for digital input modules):	010
AO address	(starting address for analog output modules):	128
AI address	(starting address for analog input modules):	128

The ET 100U's DO and DI addresses are higher than those of the 32XDC 24V and 32XDC 24V;0,5A modules in the S5-115U's available address space.

All data is stored under the name "TEST100". You can enter the file name in the "ET 100" form, i.e. form 2.

```
                                                  SIMATIC S5  /  ET 100
ET 100 ADDRESS ASSINGMENT                      PROGRAM NAME:  TEST100

ET 100-No. :  01  Number selected on IM 318-8M                    End
Area:          P  (P,Q,IM3,IM4)                                address:
DQ address:  008  Starting address for digital output modules      009
DI address:  010  Starting address for digital input modules       011
AQ address:  128  Starting address for analog output modules       135
AI address:  128  Starting address for input modules               139
Configuration:   0.    1.    2.    3.    4.    5.    6.    7.
                 8DQ   8DI   4DQ   2AQ   4AI   2AX   4DQ   4DQ
                 8.    9.    10.   11.   12.   13.   14.   15.
                 16.   17.   18.   19.   20.   21.   22.   23.
                 24.   25.   26.   27.   28.   29.   30.   31.

┌──────────┬──────┬──────────┬──────┬──────┬──────────┬──────┬──────┐
│    F1    │  F2  │    F3    │  F4  │  F5  │    F6    │  F7  │  F8  │
├──────────┼──────┼──────────┼──────┼──────┼──────────┼──────┼──────┤
│ SELECT   │ SAVE │ PRE-     │ PAGE │ PAGE │ FURHTER  │ HELP │ EXIT │
│ ET100-NO.│      │ ASSIGN   │ UP   │ DOWN │ FUNCTIONS│      │      │
└──────────┴──────┴──────────┴──────┴──────┴──────────┴──────┴──────┘
```

Figure A-33 "Programming Example" Form

I/O area P must be used for address assignments on the S5-115U, so enter a P in the "Area" field. The address identifiers for the various modules must be entered in the configuring fields provided in form 3 (Figure A-33).
COM ET 100 enters the end addresses automatically when you change forms or press F4 (page up) and F5 (page down).

The address assignments for the modules in the programming example (Table A-6) are listed on the next page.

Table A-6 Addresses for ET 100U Modules

Address identifier	8DQ	8DI	4DQ	2AQ	4AI	2AX	4DQ	4DQ
Slot number	0	1	2	3	4	5	6	7
DQ area			8.0 to 8.3				8.4 to 8.7	9.0 to 9.3
DI area	10.0 to 10.7	11.0 to 11.7						
AQ area				128.0 to 131.7		132.0 to 135.7		
AI area					128.0 to 135.7	136.0 to 139.7		

Note:

- The unused nibble 9.4 to 9.7, (4DQ, slot 7) cannot be used for addressing in other ET 100Us.
- You may use the same address numbers for digital input and digital output modules without worrying about illegal overlapping; the same applies to the analog modules.
- Modules that reserve both input and output addresses (the "2AX" counter module, for example) may reserve different addresses for the two areas (132.0 - 135.7 and 136.0 - 139.7).
- The starting addresses for analog modules must always be even numbers.
- The address space per ET 100U may not exceed 32 bytes.

When you have entered all data in the "ET 100 Address Assignment" form, you should press F2 (STORE) to dump this data on floppy disk. COM ET 100 then displays the "ET 100" form to enable, for example, EPROM programming.

A.10 Error and Status Messages

Active!
COM ET 100 is executing. Please wait.

Address out of range!
The starting address of a module is too high and the end address is thus out of range (higher than 255). Assign a lower starting address.

Digital and analog addresses overlap!
The starting addresses of the digital and analog modules overlap. You must change one of these starting addresses.

Drive identifier must be either A:, B: or C:!
You have specified an illegal drive identifier in the "Language/Sprache" form.

EPROM contains no data!
The EPROM submodule that has been inserted in the programmer contains no data, i.e. no data can be read from this EPROM.

EPROM handling active!
Data is being transferred from the programmer to EPROM or vice versa.

EPROM handling error - Check submodule!
EPROM read/write error. Replace the EPROM memory submodule.

EPROM handling terminated!
The data has been transferred without error from the programmer to EPROM or vice versa.

Erase configuring field 31?
You have attempted to insert a configuring field although all of these fields have already been entered (0-31). If you answer the above question by pressing function key F1 (YES), the contents of the 31st configuration field will be erased.

Erase EPROM first!
The EPROM has not been erased completely or is defective. Try to erase it again; if this error message appears a second time, replace the EPROM.

For configuring fields only!
You pressed F7 (HELP) while the cursor was in a field for start addresses. Only numerical entries from 0 - 255 are permissible in these fields.

Function not implemented!
The selected function has not yet been implemented.

Illegal address overlap!
An ET 100U or ICM 560 reserves the same address space as another ET 100U or ICM 560.

Illegal entry!
You have entered a letter where only digits are permitted.

Insert data floppy in specified drive!
No data floppy in the drive specified in the "Language/Sprache" form.

Loss of data! Exit without save?
You have attempted to exit the "Address Assignment" form without saving the last entries on the floppy disk. You can store these entries by responding to the prompt with function key F3 (NO) and then pressing F2 (STORE). You can then exit the form with F8 (EXIT). If you do not want to save the data, reply to the prompt with F1 (YES), thus exiting the Address Assignment form.

Message length exceeds 32 bytes! Continue?
The address space reserved for an ET 100U exceeds 32 bytes. If you want to work with the system as configured, first press F3 (NO), then try either to do away with some of the modules or to distribute them among other ET 100Us. If you acknowledge with F1 (YES), all form entries are deleted.

Name not on floppy disk!
You have have attempted to call a non-existent file. Correct your entry or page through the names with F7 (HELP) until you have found the required file.

No address specification!
You have forgotten to enter the module starting address in one or more fields. If, for example, you are using digital input modules, you must enter a DI starting address.

No EPROM inserted!
You have attempted to program or read an EPROM before inserting it in the programmer's EPROM receptacle.

No ET 100 programmed!
The attempt to store data with F2 was futile, as none of the input forms contained data.

No program name entered
Before entering the configuring data, you must input the program name under which you want to store and recall that data.

No program names on the floppy!
An attempt to page through the program names with F7 (HELP) has shown that there are no such files on the floppy. These files have the suffix .308 in the directory.

No such drive on this programmer!
The specified drive cannot be accessed. Enter the drive containing your data floppy in the "Language/Sprache" form.

No more than 40 program names permitted!
COM ET 100 can maintain up to 40 files on one floppy disk. If you need more than 40 files, please transfer some of them to another (formatted) floppy, using the PCP/M-86 operating system's "PIP" command.

Not an ET 100 submodule!
Your EPROM memory submodule contains data which COM ET 100 cannot process. Please check the Order No. (6ES5 376-0AA11).

Odd-numbered analog address!
The starting addresses for analog modules must always be even numbers.

Press P area key again to page!
You can call additional data in the "ADDRESS ASSIGNMENT" form by pressing function keys F1 to F4 (for the various I/O areas).

Program name already exists - Overwrite file?
The file name you loaded from an EPROM file into the programmer's memory is not the name of a floppy file. Press F1 (YES) if you wish to overwrite the floppy file and F3 (NO) if you do not.

Return to system?
This message is displayed when you press F8 (EXIT) in the "Language" form. Acknowledge with F1 (YES) if you wish to exit COM ET 100 or F3 (NO) if you do not.

Transfer error - Floppy directory is full!
There is no more space available in the floppy or hard disk directory for new entries. Insert a new (formatted) floppy and use it to store any additional data. If the error message pertains to the hard disk, return to the operating system and delete the hard disk files you no longer need.

Transfer error - User disk is full!
There is no more space available on the data floppy in the specified drive. Insert a new (formatted) floppy.

Wrong EPROM!
The memory submodule is not an 6ES5 376-0AA11. Replace the EPROM.