SIMATIC
S7-300/400 Tips

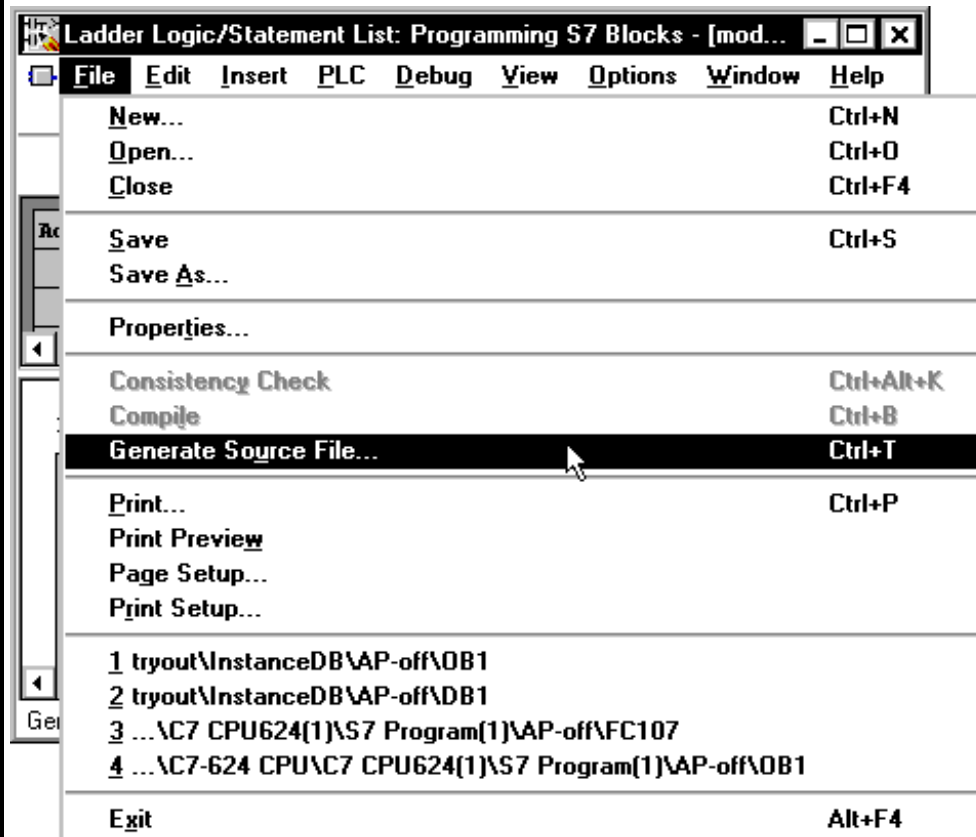| Group	Topic
3	**Copying Blocks between Computers**

Overview

The Drag-and-Drop interface of the Simatic Manager lets you easily copy blocks between programs in a project, and between projects on a computer.   However, to copy a block from one computer to another, the normal procedure is to archive the project on the source computer, retrieve the project on the destination computer, then copy the blocks.   This is a lot of work, just to copy a block.   Fortunately, STEP 7 lets you import and export blocks in the form of text files. This applications tip describes how to use the import/export mechanism to copy blocks between projects.
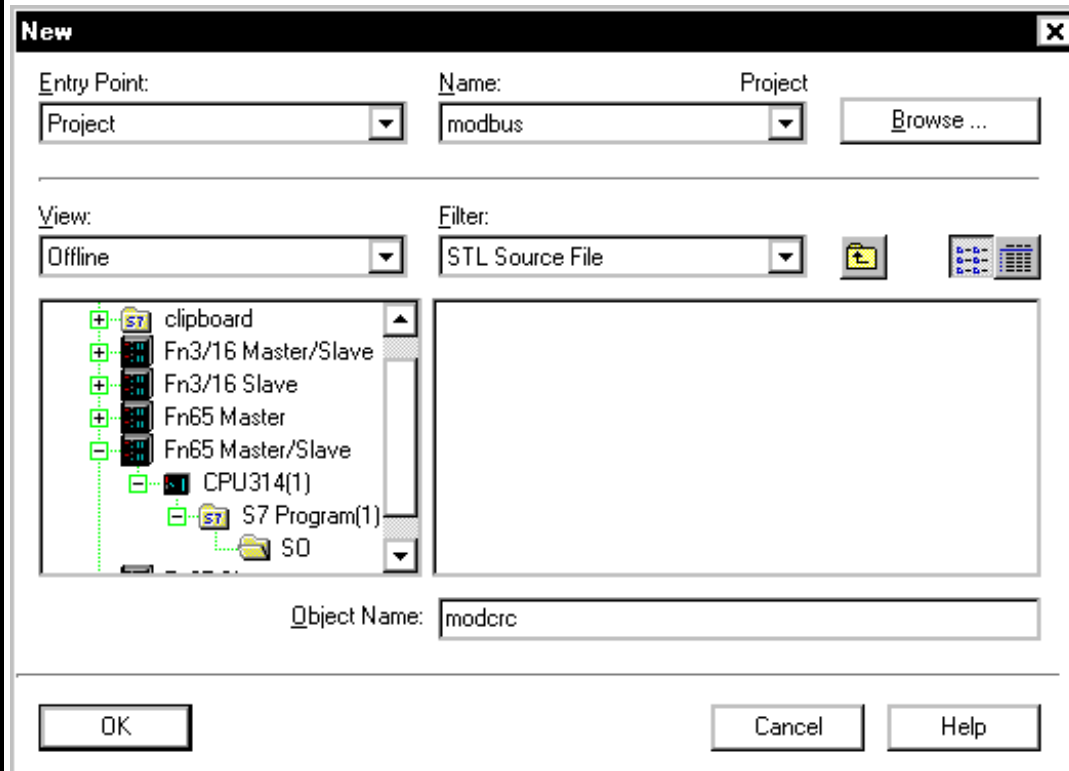
Copying a Single Block

The general procedure for copying a block from the source project to a project on the same or different computer is:

1. Generate a source file for the block
2. Export the source file from the source project
3. Import the source file into the destination project
4. Compile the source file to generate the block in the destination project
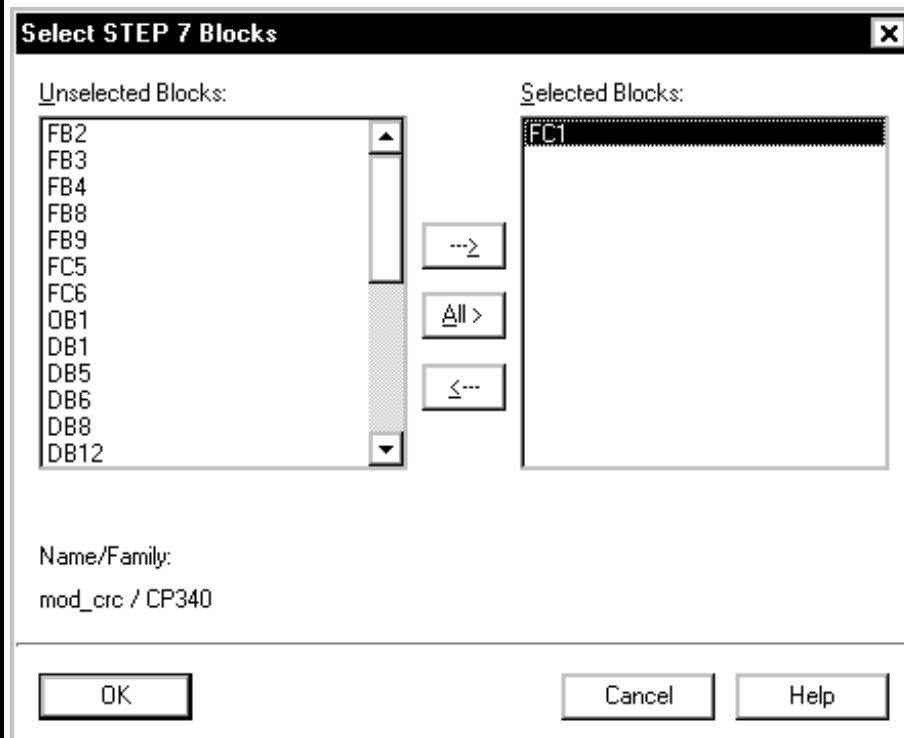
To generate a source file for the block, open the block with the Ladder Logic/Statement List editor.   In the **File** menu, select the **Generate Source File** menu item.

```
┌─────────────────────────────────────────────────────────────────────┐
│ ▓ Ladder Logic/Statement List: Programming S7 Blocks - [mod...  _ □ ✕ │
├─────────────────────────────────────────────────────────────────────┤
│ □▪ File  Edit  Insert  PLC  Debug  View  Options  Window  Help        │
│    ┌──────────────────────────────────────────────┐                   │
│    │ New...                              Ctrl+N    │                   │
│    │ Open...                             Ctrl+O    │                   │
│    │ Close                               Ctrl+F4   │                   │
│ Ac │──────────────────────────────────────────────│                   │
│    │ Save                                Ctrl+S    │                   │
│    │ Save As...                                    │                   │
│ ◄  │──────────────────────────────────────────────│                   │
│    │ Properties...                                 │                   │
│    │──────────────────────────────────────────────│                   │
│    │ Consistency Check                   Ctrl+Alt+K│                   │
│    │ Compile                             Ctrl+B    │                   │
│    │ Generate Source File...        ▶    Ctrl+T    │                   │
│    │──────────────────────────────────────────────│                   │
│    │ Print...                            Ctrl+P    │                   │
│    │ Print Preview                                 │                   │
│    │ Page Setup...                                 │                   │
│    │ Print Setup...                                │                   │
│ ◄  │──────────────────────────────────────────────│                   │
│ Ge │ 1 tryout\InstanceDB\AP-off\OB1                │                   │
│    │ 2 tryout\InstanceDB\AP-off\DB1                │                   │
│    │ 3 ...\C7 CPU624(1)\S7 Program(1)\AP-off\FC107 │                   │
│    │ 4 ...\C7-624 CPU\C7 CPU624(1)\S7 Program(1)\AP-off\OB1 │          │
│    │──────────────────────────────────────────────│                   │
│    │ Exit                                Alt+F4    │                   │
│    └──────────────────────────────────────────────┘                   │
└─────────────────────────────────────────────────────────────────────┘
```
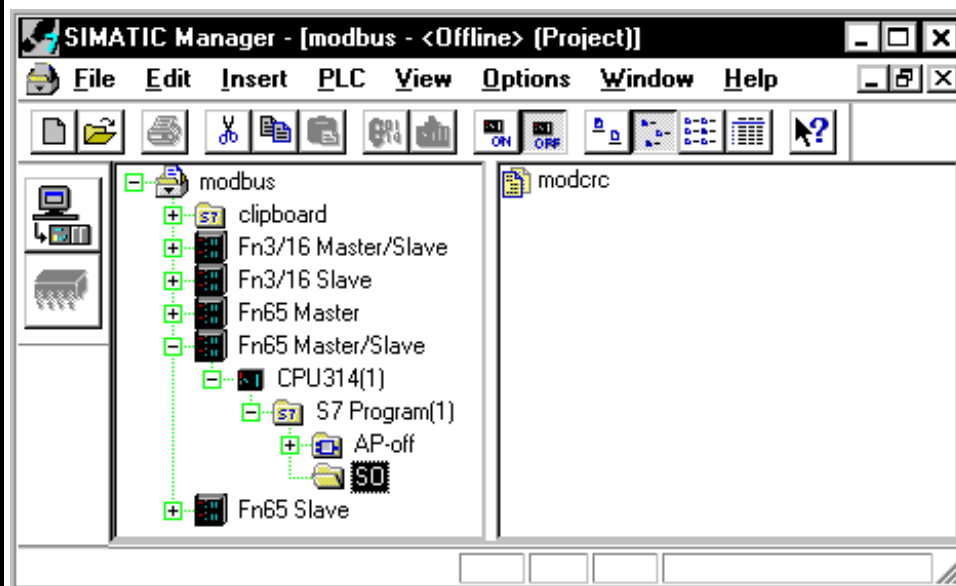
STEP 7 will open a file selection box, asking you for the name and location of the source file. Specify the source project, and program, and select the SO folder.   Give the source file a descriptive file name.   Press **OK** to accept the source file selection.

New   ✕

Entry Point: Name: Project
Project   ▼   modbus   ▼   Browse ...

View: Filter:
Offline   ▼   STL Source File   ▼   📁   ▦

⊞ 🖳 clipboard
⊞ 🖳 Fn3/16 Master/Slave
⊞ 🖳 Fn3/16 Slave
⊞ 🖳 Fn65 Master
⊟ 🖳 Fn65 Master/Slave
   ⊟ 🖳 CPU314(1)
      ⊟ 🖳 S7 Program(1)
         📁 SO

Object Name: modcrc

OK   Cancel   Help

STEP 7 will now open a dialog box asking you to select the block(s) to put into the source file. Click on the block you want to copy in the Unselected Blocks list, and press the → button to move it to the Selected Blocks list.   Press the **OK** button generate the source file.

Select STEP 7 Blocks   ☒

Unselected Blocks: Selected Blocks:

FB2   FC1
FB3
FB4
FB8
FB9   --->
FC5
FC6   All >
OB1
DB1
DB5   <---
DB6
DB8
DB12

Name/Family:

mod_crc / CP340

    OK   Cancel   Help

STEP 7 will generate a source file in the SO folder of the specified project and program.

SIMATIC Manager - [modbus - <Offline> [Project]]   _ □ ☒

File   Edit   Insert   PLC   View   Options   Window   Help   _ 🗗 ☒

modbus   modcrc
    clipboard
    Fn3/16 Master/Slave
    Fn3/16 Slave
    Fn65 Master
    Fn65 Master/Slave
        CPU314(1)
            S7 Program(1)
                AP-off
                SO
    Fn65 Slave

In the SIMATIC Manager window, right-click on the source file you just generated.   In the pop-up menu, select **Export Source File**.
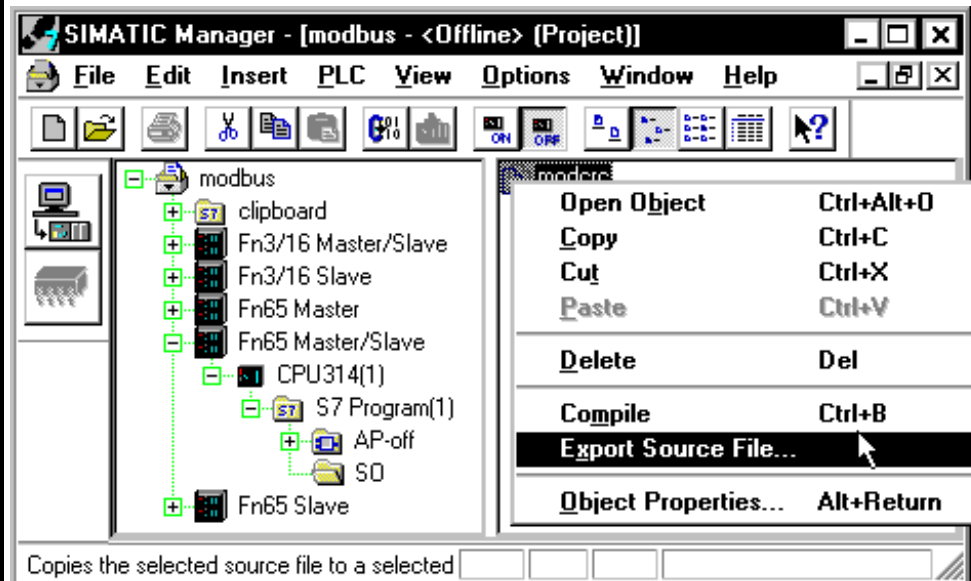
STEP 7 will ask you where you want to store the export file.   Specify an appropriate disk and directory, and press the **Save** button.   STEP 7 will generate the specified export file.   The export file will contain text information, detailing the block structure, code in Statement List, and documentation.
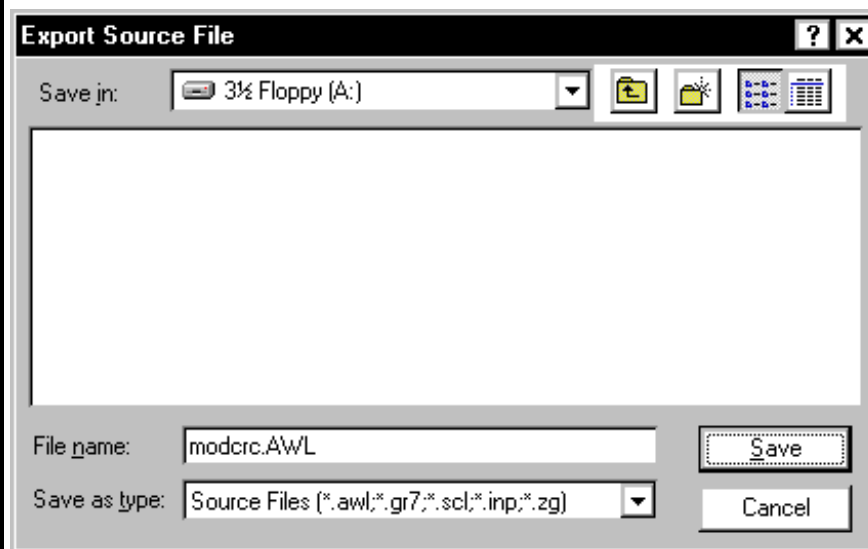
Copy the export file to the destination computer (or place the diskette with the export file in the destination computer's diskette drive.)   Open the destination project with the STEP 7 SIMATIC Manager.   Open the project hierarchy down to the SO folder of the destination program.   Right click on the SO folder, and select **External Source File** from the pop-up menu.
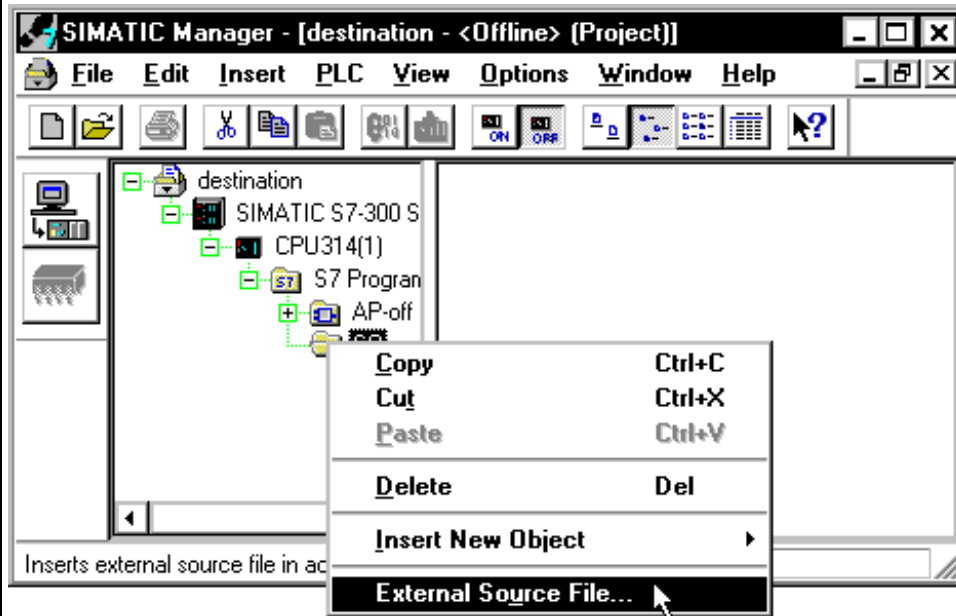
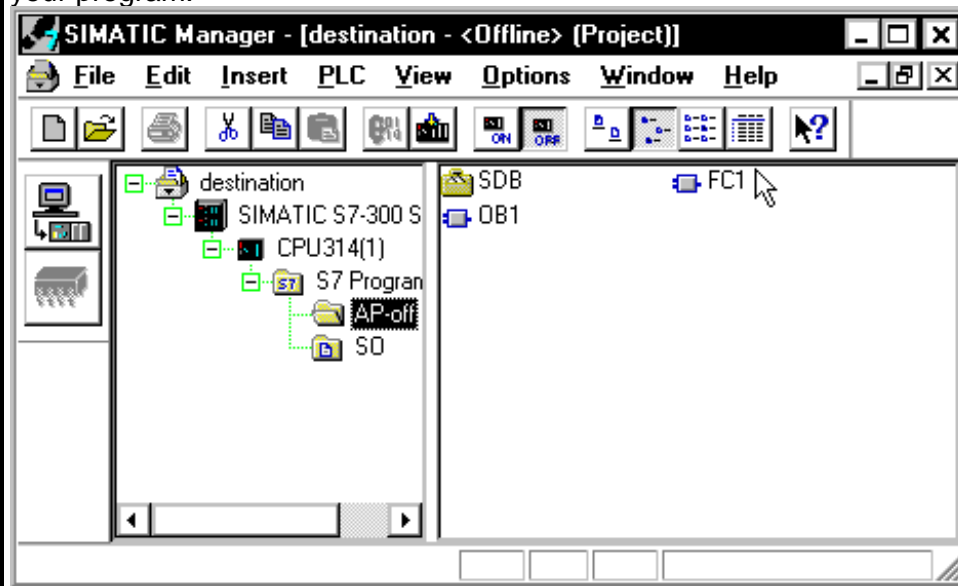STEP 7 will open a file selection dialog: select your export file and press the **Open** button.
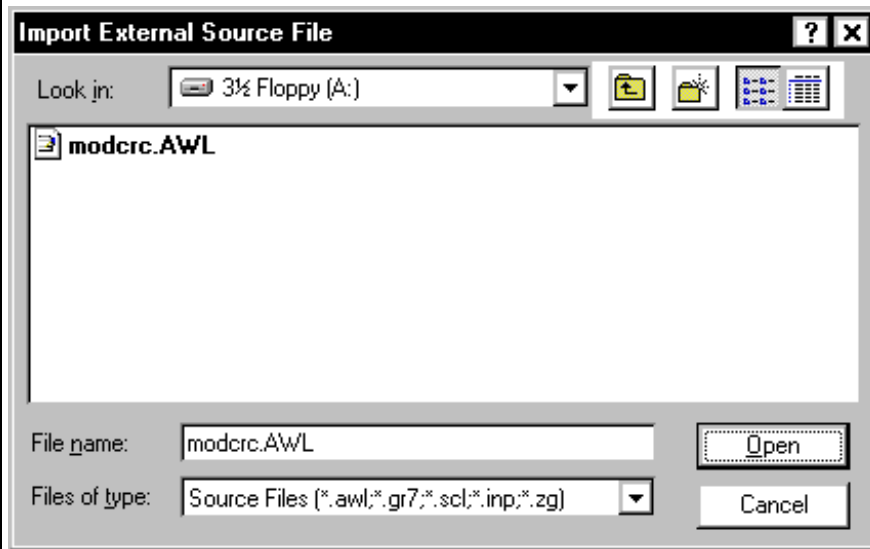
STEP 7 will copy the export file into the program's SO folder.   Right-click on the source file in the SO folder, and select the **Compile** item from the pop-up menu.
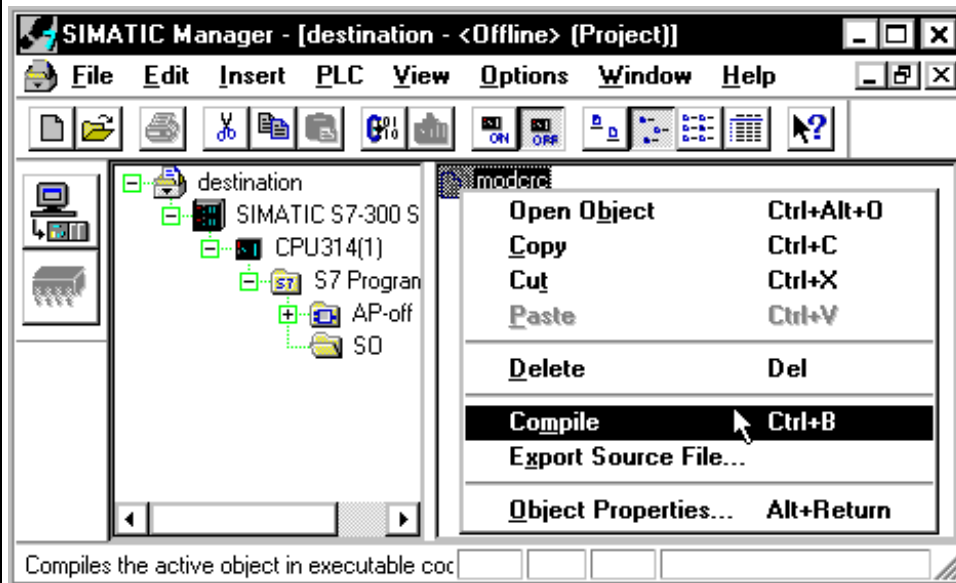
STEP 7 will invoke the Ladder Logic/Statement List editor to compile the source file to a block. STEP 7 will often generate warnings when compiling a source file.   These can generally be ignored, as they are just warning you that you need to be careful with certain instructions.   If you have errors in the compile, the probable cause is that your block is referencing blocks that are not present in the destination program.   I will talk more about this in the section on **Copying Multiple Blocks**.   When your block has compiled, you may close the LAD/STL editor.
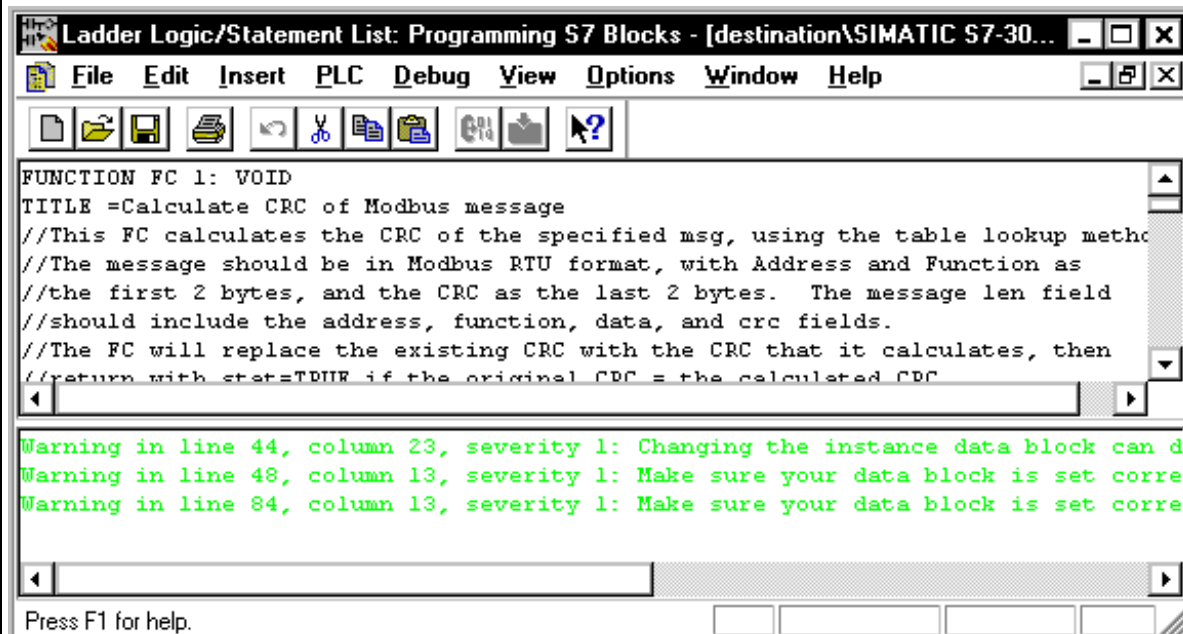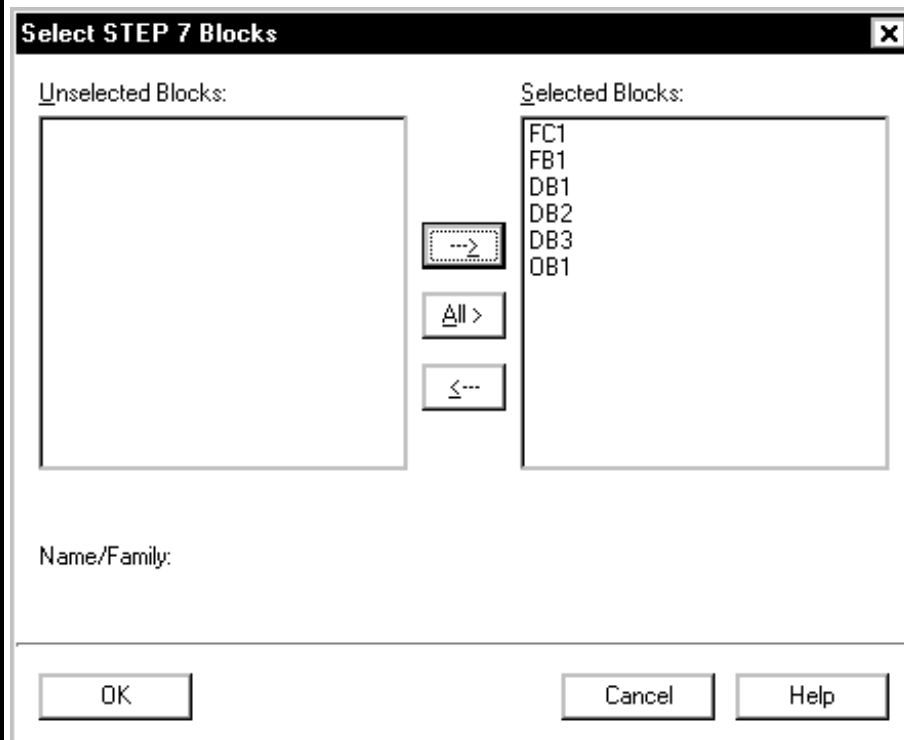
In the SIMATIC Manager, click on the AP-off folder.   You should now see the copied block in your program.

```
SIMATIC Manager - [destination - <Offline> (Project)]

File  Edit  Insert  PLC  View  Options  Window  Help

destination                        SDB          FC1
  SIMATIC S7-300 S                 OB1
    CPU314(1)
      S7 Progran
        AP-off
        S0
```

Copying Multiple Blocks

If you are copying several blocks that reference each other, you must put them all in a single source file to avoid compile errors and/or time stamp compatibility problems.   To put multiple blocks into a source file, specify all the blocks you want to copy in the block selection dialog.

```
Select STEP 7 Blocks                                    X

Unselected Blocks:               Selected Blocks:
                                 FC1
                                 FB1
                                 DB1
                     -->         DB2
                                 DB3
                     All >       OB1

                     <---

Name/Family:

  OK                       Cancel      Help
```

There is one <u>big</u> "gotcha" in putting multiple blocks in a source file: block order is very important. If you put blocks into the source file in the wrong order, you will see compile errors and/or time stamp validation errors when you compile the source file in the destination program.   To avoid these errors, follow these rules:

- Called blocks must be put into the **Selected Blocks** list before the blocks that call them. The Reference Data: Program Structure view tells you which blocks call which. Blocks at the right of a program structure branch must be put into the **Selected Blocks** list before
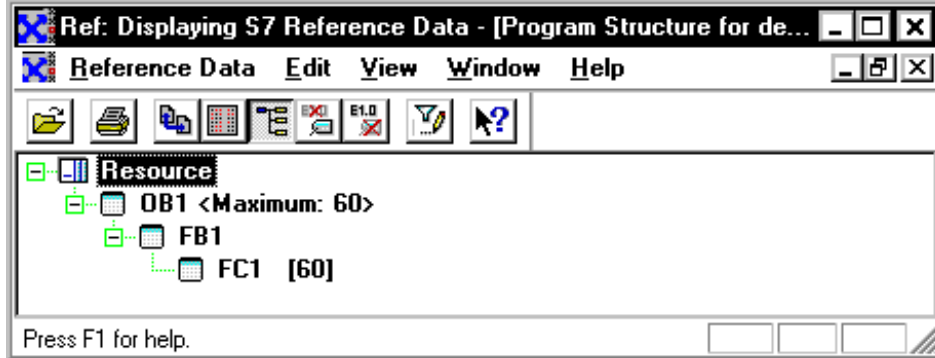
  blocks to the left.
- Instance data blocks must be put into the **Selected Blocks** list after their associated function block, but before the block(s) that call their FB.
- Shared data blocks must be put into the **Selected Blocks** list before blocks that explicitly reference them.

All the other steps in copying multiple blocks are the same as copying a single block.

General Notes

The SIMATIC S7-300/400 Application Tips are provided to give users of the S7-300 and S7-400 some indication as to how, from the view of programming technique, certain tasks can be solved with this controller. These instructions do not purport to cover all details or variations in equipment, nor do they provide for every possible contingency. Use of the S7-300/400 Application Tips is free.

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